TABLE OF CONTENTS
for
PERMIT RENEWAL APPLICATION
for
RIVER BIRCH LANDFILL
D-051-6741/P-0321
AIN 32219

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VOLUME I

SUBMITTAL LETTER

SECTION I TABLE OF CONTENTS

SECTION II EXISTING PERMIT DOCUMENTS

SECTION III RESPONSE TO LAC 33:VII-REGULATIONS

PART I - LAC 33:VII.519

PART II - LAC 33:VII.521

A. LAC 33:VII.521.A LOCATION CHARACTERISTICS

1. A.1.a Area Master Plans 1
1. A.1.b. Access Road Adequacy 2
2. A.1.c. Existing Land Use 3
3. A.1.d. Aerial Photograph 4
4. A.1.e.i. List of Sensitive Ecologic Areas 5
5. A.1.e.ii. Documentation from Agencies 6
6. A.1.e.iii. Measures Planned to Protect Areas 7
7. A.1.f. Wetlands Demonstration 8
8. A.1.g. Demographic Information 9
9. A.2.a Wells 10
10. A.2.b.i. Faults 11
11. A.2.b.ii. Fault set-back Distance 12
12. A.2.c. Utilities 13

B. LAC 33:VII.521.B. FACILITY CHARACTERISTICS

1. B.1.a. Elements of Disposal System 14
2. B.1.b. Perimeter Barrier 15
3. B.1.c. Buffer Zone 16
4. B.1.d. Fire-Protection Measures 17

	5.	B.1.e.	Landscaping 18
	6.	B.1.f.	Devices to Monitor Incoming Waste 19
	7.	B.1.g.	NPDES Discharge Points 20
	8.	B.1.h.	Other Features 21
	9.	B.2.a.	Areas for Isolating Waste 22
	10.	B.2.b.	Location of Leachate System 23
C.	LAC 33:VII.521.C		FACILTIY SURFACE HYDROLOGY
	1.	C.1.a.	Prevent Surface Drainage 24
	2.	C.1.b.	Runoff/Run-on 25
	3.	C.1.c.	Maximum Rainfall 26
	4.	C.1.d.	Aquifer Recharge Areas 27
	5.	C.1.e.	Restriction of Flood Plain 28
D.	LAC 33:VII.521.D.		FACILITY GEOLOGY
	1.	D.1.a.	Cross-section of Soils 29
	2.	D.1.b.	Soil Boring Logs 30
	3.	D.1.c.	Soil Classification Tests 31
	4.	D.1.d.	Geologic Cross-section 32
	5.	D.1.e.	Fault Verification 33
	6.	D.1.f.	Seismic Impact Zone Calculations 33
	7.	D.1.g.	Unstable Area Demonstration 33
	8.	D.2.	Type III Facility 34
E.	LAC 33:VII.521.E.		FACILITY SUBSURFACE HYDROLOGY
	1.	E.1.a.i.	Areal Extent Beneath Facility 35a-35c
	2.	E.1.a.ii.	Thickness and Depth Permeable Zones 36
	3.	E.1.a.iii.	Groundwater Flow Directions and Rate 37a-37b
	4.	E.1.a.iv.	Change in Groundwater Flow 38a-38b
	5.	E.1.b.i.	Areal Extent Recognized Aquifers 39
	6.	E.1.b.ii.	Thickness and Depth Recognized Aquifer 40
	7.	E.1.b.iii.	Interconnection of Aquifer 41
	8.	E.1.b.iv.	Groundwater low 42
	9.	E.2.	Type II Landfarms 43
F.	LAC 33.VII.521.F.		FACILITY PLANS AND SPECIFICATIONS
	1.	F.1.	Certification 44
	2.	F.2.a.	Detailed Plan View Drawings 45
	3.	F.2.b.	Pertinent Features Drawings 46
	4.	F.2.c.	Levee Material and Source 47
	5.	F.3.a.	Dimensions of Daily Fill & Cover 48
	6.	F.3.b.	Type of Cover Material and Source 49

	7.	F.4.a.	Geologic Cross-sections 50
	8.	F.4.b.	Description of Liner System 51a-51b
	9.	F.4.c.	Description of Leachate System 52a-52b
	10.	F.5.a.	Groundwater Flow Direction 53
	11.	F.5.b.	Groundwater Monitoring Wells 54
	12.	F.5.c.	Groundwater Monitoring Program 55
	13.	F.5.d.	Monitoring Well Data 56
	14.	F.5.e.	Groundwater Plan 57
	15.	F.5.f.	Monitoring Well Abandonment 58
	16.	F.6.	Gas Collection System 59
G.	LAC 33:VII.521.G.		FACILITY ADMINISTRATIVE PROCEDURES
	1.	G.1.a.	Recordkeeping System 60
	2.	G.1.b.	Minimum Personnel 61
	3.	G.1.c.	Days of Operation 62
	4.	G.2.	Certified Facility Operators 63
H.	LAC 33:VII.521.H.		FACILITY OPERATIONAL PLANS
	1.	H.1.a.	Type and Quantity of Waste 64a-64b
	2.	H.1.b.	Waste Handling Procedure 64a-64b
	3.	H.1.c.	Minimum Equipment 64a-64b
	4.	H.1.d.	Plan to Segregate Waste 65
	5.	H.1.e.	Inclement Weather Procedures 66
	6.	H.1.f.	Safety Contingency Plan 67
	7.	H.1.g.	Vector Control 68
	8.	H.2.a.	Operational Plan 69
	9.	H.2.b.	Salvaging Procedures 70
	10.	H.2.c.	Scavenging Control 71
	11.	H.3.	Type I and II Landfarms 72
	12.	H.4.	Type I-A and II-A Facilities 73
	13.	H.5.	Type I-A and II-A Facilities 74
	14.	H.6.	Type I-A and II-A Facilities 75
	15.	H.7.	Air Monitoring Plan 76
I.	LAC 33:VII.521.I.		IMPLEMENTATION SCHEDULE
	1.	I.1.a.	Construction Schedule 77
	2.	I.1.b.	Details of Phased Implementation 78
	3.	I.2.	Closing or Upgrading Areas 79
J.	LAC 33:VII.521.J.		FACILITY CLOSURE
	1.	J.1.a.	Date of Final Closure 80
	2.	J.1.b.	Method of Closing Facility 81

3.	J.1.C.	Closure Costs	82
4.	J.2.a.	Description of Final Cover	83
5.	J.2.b.	Largest Area Requiring Final Cover	84
6.	J.2.c.	Estimate of Maximum Inventory	85
7.	J.2.d.	Closure Schedule	86
8.	J.3.a.	Sequence of Final Closure	87
9.	J.3.b.	Drawing Showing Final Contours	88
10.	J.3.c.	Closure Document (filed with Clerk of Court	89

K. LAC 33:VII.521.K. FACILITY POST-CLOSURE

1.	K.1.a.	Long-term Use of Facility	90
2.	K.1.b.	Cost of Post-Closure	91
3.	K.2.a.	Post Closure-Plan	92
4.	K.2.b.	Collection System Abandonment	93
5.	K.2.c.	Public Safety Measures	94
6.	K.2.d.	Facility Post-Closure Use	95

L. LAC 33:VII.521.L. FINANCIAL RESPONSIBILITY

1.	L.1.	Current Land Owner	96
2.	L.2.	Agency Requesting Permit	97
3.	L.3.	Evidence of Liability Coverage	98
4.	L.4.	Financial Assurance Mechanism	99

M. LAC 33:VII.521.M SPECIAL REQUIREMENTS

1.	M.	Special Requirements	100

PART III-LAC 33:VII.523:ADDITIONAL SUPPLEMENTARY INFOMRATION

Memorandum outlining changes to Permit which affect LAC 33:VII.523.
Supplemental response to the "IT Decision" Questions

VOLUME II

SECTION I TABLE OF CONTENTS
SECTION IV ATTACHMENTS AND APPENDICES
ATTACHMENT 1 PURCHASE AGREEMENTS & LEGAL DESCRIPTIONS
Original Landfill Site
Western Portion of Landfill
ATTACHMENT 2 NOTIFICATION TO FAA
1993 Notification
2003 Notification
ATTACHMENT 3 LETTERS FROM TRANSPORTATION AGENCIES

ATTACHMENT 4 DEMOGRAPHIC INFORMATION
- 1993 Notification
- Updated 2003 Information

ATTACHMENT 5 LETTERS FROM ENVIRONMENTAL AGENCIES
- 2003 Letters
- 1993 Letters

ATTACHMENT 6 WETLAND DETERMINATIONS
- 2006 Determination Original Site
- 1999 Determination Original Site
- 1994 Determination Original Site

ATTACHMENT 7 WELL DOCUMENTATIONS
- 2003 Information
- 1993 Information

ATTACHMENT 8 BUFFER WAIVERS
- Updated Buffer Zone Correspondence
- Waiver for Original Site
- Waiver for Western Portion of Site

ATTACHMENT 9 ZONING CLASSIFICATIONS
- 2003 Zoning Ordinance
- 1993 and 1994 Zoning Letters

ATTACHMENT 10 LETTERS FROM EMERGENCY RESPONDERS
ATTACHMENT 11 METEOROLOGICAL DATA AND WIND ROSE
ATTACHMENT 12 PREVIOUS PERMIT APPLICATION CERTIFICATIONS
ATTACHMENT 13 CERTIFICATE OF LIABILITY INSURANCE, AND CLOSURE NOTIFICATION TO BE FILED CLERK OF COURT
ATTACHMENT 14 EXEMPTION REQUEST FOR CONE PENTROMETER/ BORINGS AND EXEMPTION APPROVAL LETTER
ATTACHMENT 15 PROOF OF PUBLIC NOTICE
ATTACHMENT 16 PROOF OF AUTHORITY TO SIGN PERMIT

APPENDIX A OPERATIONAL PLAN
APPENDIX B GROUNDWATER MONITORING PLAN
APPENDIX C ENGINEERING CALCULATIONS
APPENDIX D CONSTRUCTION QUALITY ASSURANCE
APPENDIX E CLOSURE/POST-CLOSURE PLAN AND COST
APPENDIX F LANDFILL GAS COLLECTION SYSTEM PHASE I

VOLUME III

SECTION I	TABLE OF CONTENTS
SECTION V	GEOTECHNICAL REPORTS & INVESTIGATION
PART I	Preliminary Geotechnical Investigation (Eustis Engineering), 5-5-1990
PART II	Cone Pentrometer Results-Fugro Geosciences, Inc., 1993-1995
PART III	Borings-Soil Testing Engineers, 1993 & Boring-Engineering Associates, Inc., 2006
PART IV	Soil Test Results
PART V	LDEQ-SWD Correspondence, 1993-1995
PART VI	Plots of Geotechnical Results
PART VII	Geologic Cross Sections and Figures from Woodward Clyde Consultants From Original Permit Application and Groundwater Elevation Contour Map (Nov. 29-30, 2005)
PART VIII	Geotechnical Report Landfill Expansion Soil Testing Engineers, Jan. 1999
PART IX	Monitoring Well Plans, Excavation Stability and Consolidation Figures And settlement Plan for Cells 1-30 from Soil Testing Engineering Geotechnical Report and Letter of Explanation for Well Spacing Between Wells MW-9 and MW-10
PART X	Eustis Engineering Geotechnical Investigation January 6, 2003 and Table 1-Relationship of Subsurface Stratigraphic Units
PART XI	Figures from Eustis Engineering Geotechnical Investigation January 6, 2003 and Monitoring Well Cross-Sections
PART XII	Log of Boring and Test Results Eustis Engineering Geotechnical Investigation January 6, 2003
PART XIII	Log of Cone Penetrometer Test Results Eustis Engineering Geotechnical Investigation January 6, 2003
PART XIV	Well Report for Piezometers P1 through P6 Eustis Engineering Geotechnical Investigation January 6, 2003 and Boring Logs for EA-1-P-01-06 and EAI-P-03-06
PART XV	Supplemental Geotechnical Information Eustis Engineering January 10, 2003
PART XVI	Supplemental Enclosures from Eustis Engineering Geotechnical Information January 10, 2003
PART XVII	Existing Monitoring Well Data

VOLUME IV

SECTION I TABLE OF CONTENTS
SECTION VI FIGURES
FIGURE 1 Site Location Map
FIGURE 2 Property Map Eastern Portion of Site
FIGURE 2.1 Property Map Western Portion of Site
FIGURE 3 Land Usage
FIGURE 4 Flood Plain Map
FIGURE 5R1 Location of Wells
FIGURE 6 Aerial Photograph
FIGURE 7 Fault Location Map
FIGURE 8.1 Topographic Map
FIGURES 9 - 29 Relocated to Volume III
Geologic Cross Sections and Figures from Woodward Clyde Consultants From Original Permit Application (See Volume III Section V Part VII for Figures)
FIGURE 30C Initial Site Plan
FIGURE 31 Overall Site Plan
FIGURE 32 Overall Site Excavation Plan
FIGURE 33 Overall Site Top of Clay Liner Plan
FIGURE 34 Leachate Collection System
FIGURE 35 Finished Grading Plan
FIGURE 36 Typical Landfill Section East-West Section A
FIGURE 37 Typical Landfill Section North-South Section B
FIGURE 38 Typical Landfill Section Filling Sequence
FIGURE 39 Typical Liner, Access Road & Landfill Details
FIGURE 40 Leachate Collection and Liner Details
FIGURE 40A Leachate Collection Pipe & Vertical Riser Details for Cells 13-25, 37, 29, 31
FIGURE 41 Typical Landfill Details
FIGURE 42 Finish Site Plan
FIGURE 43 Operations Site Plan
FIGURE 44 Typical Details Interior Perimeter Ditch
FIGURE 45 Project Implementation Schedule
FIGURE 46 Drainage Area Map
FIGURE 47 Site Grid System
FIGURE 48 Leachate Treatment Pond Site Plan
FIGURE 49 Leachate Treatment Pond Typical Details
FIGURE 50 Miscellaneous Details and Sections
FIGURE 51 Miscellaneous Details and Sections
FIGURE 52 Typical Details for Reconstruction of Existing Leachate Treatment Pond to Waste Disposal Cell

FIGURE 53 Reserved for Future Drawing
FIGURE 54 – 70 Relocated in Volume III
Monitoring Well Plans, Excavation Stability and Consolidation
Figures and Settlement Plan for Cells 1-30 from Soil Testing Engineers
Geotechnical Report (See Volume III Section V Part IX for Figures)
FIGURE J 1 Gas Extraction System
FIGURE J 2 Typical Landfill Section Gas Extraction System

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STATE OF LOUISIANA
DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF ENVIRONMENTAL AFFAIRS
SOLID WASTE DIVISION
PERMITS SECTION

PERMIT RENEWAL APPLICATION

FOR

RIVER BIRCH LANDFILL

D-051-6 741/P-0321
AIN 32219

PREPARED BY:

PAUL L. MIERS ENGINEERING, LLC

SUBMITTED FOR:

RIVER BIRCH, INC.

VOLUME III of IV

June 13, 2005
Revised: March 2007

PART I

Preliminary Geotechnical Investigation (Eustis Engineering) 5-5-1990

PRELIMINARY GEOTECHNICAL INVESTIGATION

PROPOSED LANDFILL SITE

WARD PROPERTY

JEFFERSON PARISH, LOUISIANA

FOR
BROWNING-FERRIS INDUSTRIES, INC.
COLONIAL LANDFILL
SORRENTO, LOUISIANA

5 SEPTEMBER 1990

EUSTIS ENGINEERING
GEOTECHNICAL ENGINEERS
3011 28th Street • Metairie, Louisiana 70002 • 504-834-0157

EUSTIS ENGINEERING
GEOTECHNICAL ENGINEERS
Construction Quality Control and Materials Testing
3311 28th Street • Metairie, Louisiana 70002 • 504-834-0157

5 September 1990

Browning-Ferris Industries, Inc.
Colonial Landfill
Post Office Box 605
Sorrento, Louisiana 70078

Attention Mr. Pat Koloski

Gentlemen:

Preliminary Geotechnical Investigation
Proposed Landfill Site
Ward Property
Jefferson Parish, Louisiana

Transmitted is our engineering report for a preliminary geotechnical investigation performed for the subject project.

Thank you for asking us to perform these services.

Yours very truly,

EUSTIS ENGINEERING

Lloyd A. Held, Jr

LLOYD A. HELD, JR.

PRELIMINARY GEOTECHNICAL INVESTIGATION

PROPOSED LANDFILL SITE

WARD PROPERTY

JEFFERSON PARISH, LOUISIANA

FOR
BROWNING-FERRIS INDUSTRIES, INC.
COLONIAL LANDFILL
SORRENTO, LOUISIANA

By
Eustis Engineering
Metairie, Louisiana

5 SEPTEMBER 1990

TABLE OF CONTENTS

	Page
INTRODUCTION	1
SCOPE	2
SOIL BORINGS	2
LABORATORY TESTS	3
DESCRIPTION OF SUBSOIL CONDITIONS	3
Geology	3
Stratigraphy	4
Ground Water	4
ENGINEERING EVALUATIONS	5
Furnished Information	5
Slope Stability	5
Settlement	6
Pressure Relief	6
Liner	6
FURTHER GEOTECHNICAL INVESTIGATION	7
FIGURE 1	
APPENDIX	

PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED LANDFILL SITE
WARD PROPERTY
JEFFERSON PARISH, LOUISIANA

INTRODUCTION

1. This report contains the results of a preliminary geotechnical investigation performed at a potential landfill site located in Jefferson Parish, Louisiana. Authorization for the investigation was received from Mr. Pat Koloski representing Browning-Ferris Industries, Inc.

2. This report has been prepared in accordance with generally accepted geotechnical engineering practice for the exclusive use of Browning-Ferris Industries for specific application to the subject site. The site is the Ward property located on the west bank of Jefferson Parish near the St. Charles Parish line. In the event that any changes in the planned use of the property as a landfill are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusion of this report are modified or verified in writing. Should these data be used by anyone other than Browning-Ferris Industries, they should contact Eustis Engineering for interpretation of data and to secure any other information pertinent to this project.

3. The evaluations contained in this report are based in part on data obtained from the soil borings. The nature and extent of variations in subsoil conditions between and away from the boring locations may not become evident until construction. If variations then appear, it will be necessary to reevaluate the recommendations contained in this report.

SCOPE

4. The scope of the investigation included the drilling of soil test borings to determine subsoil conditions and stratification and to obtain samples of the various strata encountered. Soil mechanics laboratory tests and chemical analyses were performed on samples obtained from the borings and used to evaluate physical properties of the subsoils and to determine the concentration of possible contaminants. Engineering evaluations based on the soil borings and laboratory tests were made to evaluate the potential of the site as a landfill.

SOIL BORINGS

5. Three (3) undisturbed sample type soil test borings and one (1) auger boring were drilled during the period of 7 - 8 May 1990 at the locations shown on Figure 1. The undisturbed borings were drilled to a depth of 80 feet below the existing ground surface, and the auger boring was drilled to a depth of approximately 16 feet below the existing ground surface. The undisturbed borings were drilled with our truck mounted rotary type drill rig, and the auger boring was drilled with hand held equipment. The borings were grouted in accordance with applicable Louisiana Department of Transportation and Development requirements. Detailed descriptive logs of these borings are shown in tabular and graphical form in the Appendix.

6. Undisturbed samples of the subsoils were obtained at close intervals or change in stratum using a 3-in. diameter Shelby tube sampling barrel. Samples were extruded from the sampling barrel in the field, inspected and visually classified by Eustis Engineering's soil technician. Representative portions were placed in moisture proof containers for preservation prior to laboratory testing.

7. Disturbed samples obtained from the auger borings were obtained at close intervals and classified by Eustis Engineering's soil technician. Samples were contained in glass jars for preservation of their natural moisture content.

LABORATORY TESTS

8. Soil mechanics laboratory tests consisting of natural water content, unit weight and either unconfined compression or unconsolidated undrained triaxial compression shear tests were performed on representative samples obtained from the borings. In addition, Atterberg liquid and plastic limits determinations were performed on representative samples to aid in classification of the subsoils and to give an indication of their plasticity and compressibility.

9. Chemical analyses were performed on three samples obtained from the auger boring near the existing sludge lagoons. These chemical analyses consisted of the determination of oil and grease and priority pollutant contents. The chemical analyses were performed by Analysis Laboratories, Inc. The results of chemical analyses are shown in the Appendix of this report.

DESCRIPTION OF SUBSOIL CONDITIONS

Geology

10. The site is located on the modern deltaic lobe of the Mississippi River. From the existing ground surface Recent deltaic backswamp deposits are encountered to the Pleistocene deposits. Near surface deltaic backswamp deposits have areas of organic swamp and marsh deposits. Backswamp clays that are encountered from the surface of beneath organic deposits are clays interspersed with

lenticular sand and silt deposits. Pleistocene deposits are primarily clays of deltaic origin interbedded with sand and silt strata.

Stratigraphy

11. Please refer to the logs of borings shown in the Appendix. Backswamp deposits are encountered from the existing ground surface to depths varying between approximately 67 to 68 feet at Borings 1 and 2 and to 63 feet at Boring 3. These are generally soft to medium stiff gray clay with lenses and layers of clayey silt and sandy silt with roots and shell and organic matter. At Borings 1 and 2 the near surface clay strata are oxidized and gray and tan to depths ranging between 4 and 6 feet. At Boring 3 an organic swamp deposit is encountered from the ground surface to a depth of approximately 3 feet. At Auger Boring A-2, the near surface backswamp deposits are interbedded strata of loose brown humus with organic clay layers and very soft to soft gray clay strata with roots and organic matter to the termination of the auger boring at 16 feet.

12. Pleistocene deposits are interbedded strata of stiff to very stiff tan, gray and greenish-gray clay and silty clay, medium compact clayey silt and medium dense tan silty sand with sand layers. These are encountered from the Pleistocene's contact with Recent deposits to the termination of the undisturbed borings at 80 feet.

Ground Water

13. An auger boring was made near Boring B-2 in order to determine the ground water conditions at the time of the field investigation. This auger boring was made without the addition of drilling fluid and allowed to remain open for observation.

Following a 3 hour observation period, the ground water was noted to be at a depth of 5.5 feet below the existing ground surface. The depth to ground water will vary with climatic conditions and drainage. The depth to ground water should be established by those responsible for construction immediately prior to initiation of construction activities.

ENGINEERING EVALUATIONS

Furnished Information

14. We understand the proposed track of land is being considered for use as a landfill. If developed, landfill materials will be placed in an open excavation. It is desirable that this excavation extend to depths ranging between 20 and 30 feet below the existing ground surface. After placed in the excavation, it is desirable that the landfill materials be stacked to as high an elevation as practical before being covered.

Slope Stability

15. In order to achieve depths proposed, it will be necessary to provide relatively flat excavation slopes. Based on our experience at nearby sites, slopes on the order of 1 vertical to 7 horizontal may be estimated for excavations 20 feet below the existing ground surface. An average slope of 1 vertical on 8 horizontal may be estimated for an excavation extending to 30 feet below the existing ground surface.

16. Landfill materials placed above similar materials within the excavation may be anticipated to be stacked to a height of approximately 20 feet above the existing ground surface at a 1 vertical on 6 horizontal slope. A 5 percent drainage slope may be assumed above this height toward the interior of the landfill.

Settlement

17. When stacked above the existing ground surface, landfill materials should be anticipated to settle. Exact settlement analyses are beyond the scope of this investigation. However, assuming the landfill is in place for approximately 50 years, foundation settlement should be on the order of 2 to 4 feet for landfill heights ranging between 20 and 50 feet above the existing ground surface.

18. Additional areal subsidence of the area will also be experienced due to drainage and biodegradation. Biodegradation of organic matter within the near surface foundation soil and above the low water table will continue until these materials are disintegrated. Biodegradation of landfill materials will also occur. The magnitude of additional areal subsidence due to biodegradation of organic soils within the foundation may be estimated to be 1 to 2 feet. Subsidence due to biodegradation of landfill materials cannot be estimated at this time.

Pressure Relief

19. Extensive pressure relief will not be required for excavations extending to approximately 30 feet below the existing ground surface. Lenses of semi-pervious materials are encountered at various levels at or below this depth. However, these materials appear to be deposited as individual lenses and not hydraulically connected to any water bearing aquifer. Dewatering of the excavation may be accomplished by sumps and pumps.

Liner

20. It is anticipated that the Louisiana Department of Environmental Quality will require the site to be lined with a

compacted clay liner or a geosynthetic membrane. Current requirements are that a compacted clay liner provide an equivalent 3 feet of material having a permeability of 10^{-7} cm/sec or less. Compaction of clay fill materials on the soft backswamp clays at the site will be difficult. The use of on-site materials as clay fill will require that these materials be processed and dried considerably before placement. Considering the climate of southeast Louisiana, construction of such a clay liner may not be economical. Therefore, an artificial liner may be required for the site. Depending upon LA DEQ requirements at the time of permit application, consideration may be given to a bentonite/geosynthetic composite that has been used as a liner in other areas.

FURTHER GEOTECHNICAL INVESTIGATIONS

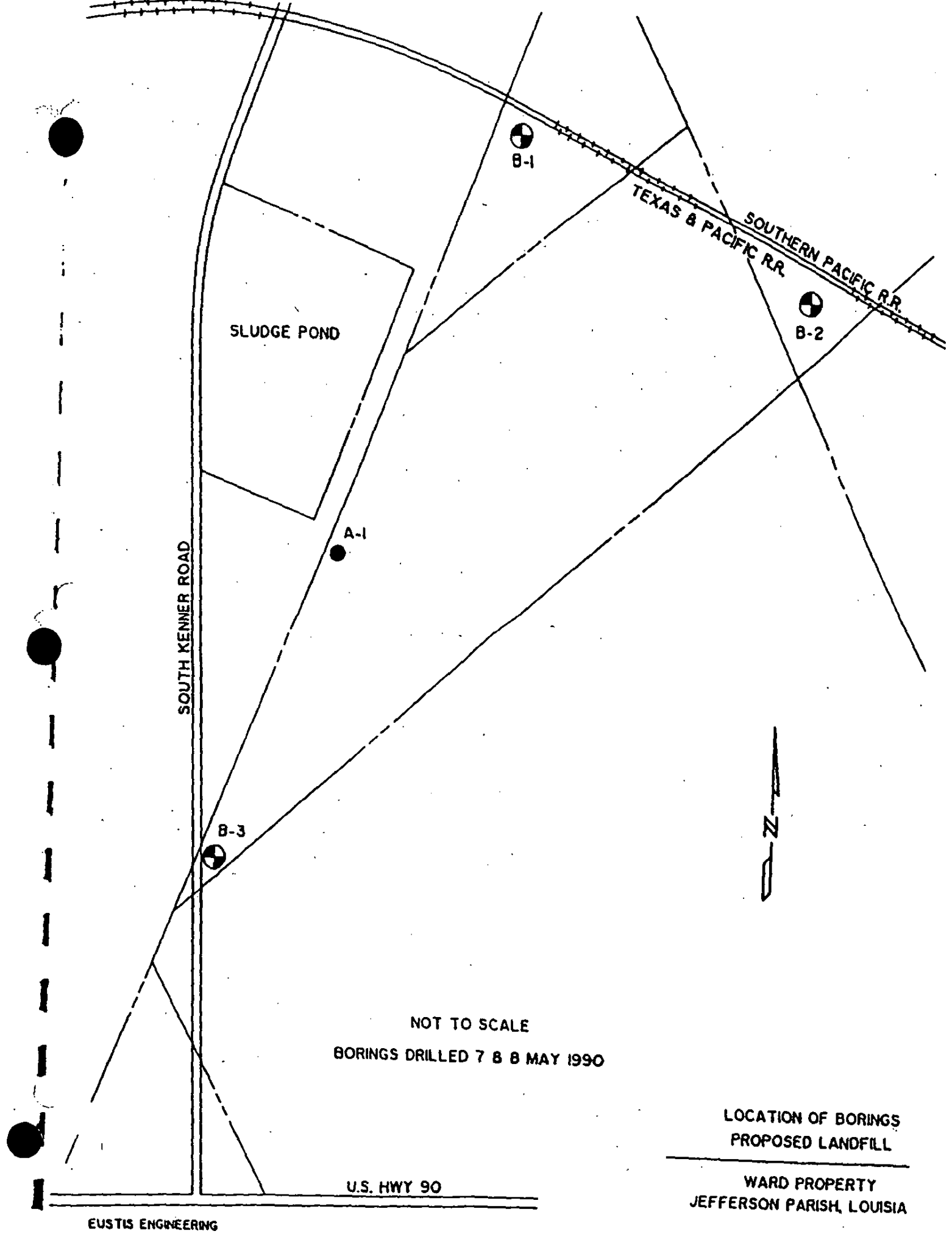
21. Should this site be developed as a landfill, further geotechnical investigations and detailed engineering analyses should be performed. We will be available for you to formulate final geotechnical engineering requirements for the development of the site as a landfill.

EUSTIS ENGINEERING

Lloyd A. Held, Jr.

Lloyd A. Held, Jr.

W. W. Gwyn:ln
EE 11068



LOCATION OF BORINGS
PROPOSED LANDFILL

WARD PROPERTY
JEFFERSON PARISH, LOUISIA

FIG1

APPENDIX

BEST COPY

ATTACHMENT A

EUTIS ENGINEERING BORINGS

LEGEND AND NOTES FOR LOG OF BORING AND TEST RESULTS

PP — Pocket penetrometer resistance in tons per square foot

TV — Torvane shear strength in tons per square foot

SPT — Standard Penetration Test. Number of blows of a 140-lb. hammer dropped 30 inches required to drive 2-in O.D., 1.4-in. I.D. sampler a distance of one foot into the soil, after first seating it 6 inches

SPLR — Type of Sampling: Shelby, SPT, Auger, No Sample

SYMBOL — Clay, Silt, Sand, Humus. Predominant type shown heavy; Modifying type shown light

DENSITY — Unit weight in pounds per cubic foot

USC — Unified Soil Classification

TYPE

UC	Unconfined compression shear
OB	Unconsolidated undrained triaxial compression shear on one specimen confined at the approximate overburden pressure
UU	Unconsolidated undrained triaxial compression shear
CU	Consolidated undrained triaxial compression shear
DS	Direct shear
CON	Consolidation
PD	Particle size distribution
k	Coefficient of permeability in centimeters per second
SP	Swelling pressure in pounds per square foot

ϕ — Angle of internal friction in degrees

c — Cohesion in pounds per square foot

Other laboratory test results reported on separate figure

Ground Water Measurements — Initial, Final

GENERAL NOTES

(1) At the time the borings were made, ground water levels were measured below existing ground surface. These observations are shown on the boring logs. However, ground water levels may vary due to seasonal and other factors. If important to construction, the depth to ground water should be determined by those persons responsible for construction, immediately prior to beginning work.

(2) While the individual logs of borings are considered to be representative of subsurface conditions at their respective locations on the dates shown, it is not warranted that they are representative of subsurface conditions at other locations and times.

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Proposed Landfill, Ward Property, Highway 90, Jefferson Parish, Louisiana

Ground Elev: | Datum: | Gr. Water Depth: | Job No. 11068 | Date Drilled 5/07/90 | Boring: 1 | Refer To "Legends & Notes"

Scale in Feet	PP	SPT	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
	0.75			Medium stiff tan & gray clay w/roots & organic matter	CH	1	1-2											
	0.25			Soft tan & gray clay w/organic matter	CH	2	3-4											
5	0.30			Soft gray clay w/roots & organic matter	CH	3	5-6	112	41	86	UC	—	435					
	0.25					4	7-8											
10	0.25					5	9-10	72						100	28	72		
	0.25					6	11-12	68	61	103	UC	—	300					
	0.25					7	13-14											
15	0.25			w/silt lenses		8	15-16											
	0.25			Very soft gray clay w/silt pockets		9	17-18	71	59	102	UC	—	245					
20	0.25			Soft gray silty clay w/clayey silt & clay lenses	CL	10	19-20	38						37	22	15		
	0.25			Soft gray clay w/silt lenses	CH	11	21-22											
	0.25					12	23-24											
25				Loose gray clayey silt w/clay lenses & silty sand layers	ML	13	25-26											
	0.25			Soft gray clay w/silt & silty sand lenses & layers & pockets	CH	14	27-28											
30	0.25					15	29-30	51	73	110	UC	—	425					
	0.25					16	31-32											
	0.25					17	33-34	38						46	19	27		
35	0.25					18	35-36											
	0.25					19	37-38											
40	0.25					20	39-40	37	85	116	UC	—	495					
45	0.25					21	43-44											
50	0.25			Medium stiff gray clay w/silt pockets		22	48-49	39	83	116	UC	—	575					

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Proposed Landfill, Ward Property, Highway 90, Jefferson Parish, Louisiana

Ground Elev | Datum | Gr. Water Depth | Job No 11068 | Date Drilled 5/07/90 | Boring 1 | Refer to "Legends & Notes"

Scale in Feet	PP	SPT	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
				Soft gray clay	CH													
55	0.30					23	53-54											
60	0.45					24	58-59											
65	1.10			Stiff light gray & tan silty clay w/sand pockets	CL	25	63-64	24	101	125	UC	—	1220					
70	2.25			Stiff gray & tan sandy clay	CL	26	68-69	21						36	19	17		
75	2.75			Very stiff tan & gray clay	CH	27	73-74											
80				Medium compact tan clayey silt	ML	28	78-79											

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Proposed Landfill, Ward Property, Highway 90, Jefferson Parish, Louisiana

Ground Elev. | Datum | Gr. Water Depth | Job No. 11068 | Date Drilled 5/07/90 | Boring 2 | Refer To "Legends & Notes"

Scale in Feet	PP	SPI	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
				Soft to medium stiff gray & tan clay w/organic matter & silt pockets	CH													
	0.50					1	2-3											
				Soft tan & gray clay	CH													
5	0.25					2	5-6	43	77	110	UC	—	435					
	0.40			Soft gray clay w/roots & silt pockets	CH	3	8-9											
10	0.25					4	11-12	55						77	23	54		
15	0.25					5	14-15											
	0.30			Medium compact gray clayey silt w/silty clay lenses & layers	ML	6	18-19	30	95	124	CB	—	785					
	0.25			Soft gray clay w/silt lenses & pockets	CH	7	23-24											
25																		
30	0.25					8	28-29	42						47	18	29		
	0.25					9	31-32											
	0.25					10	33-34	46	76	111	UC	—	420					
35	0.25					11	35-36											
				Loose gray sandy silt w/clay layers	ML	12	37-38											
				Soft gray silty clay w/clay layers	CL													
40	0.25					13	39-40											
				Soft to medium stiff gray clay w/silt lenses	CH													
45	0.25					14	43-44	42	80	114	UC	—	505					
50	0.25					15	48-49											

EUSTIS ENGINEERING

LOG OF BORING AND TEST RESULTS

Proposed Landfill, Ward Property, Highway 90, Jefferson Parish, Louisiana

Ground Elev: | Datum: | Gr. Water Depth: | Job No: 11068 | Date Drilled: 5/07/90 | Boring: 2 | Refer To "Legends & Notes"

Scale in Feet	PP	SPT	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
55	0.30			Soft gray clay w/silt lenses	CH	16	53-54	60						87	21	66		
60	0.30			w/silt lenses & shells		17	58-59											
65	0.45			Medium stiff gray clay w/few shells & sand pockets	CH	18	63-64	58	66	104	UC	—	765					
70	2.25			Very stiff greenish-gray & tan sandy clay	CL	19	68-69	20						56	21	35		
75	2.40			Very stiff tan & gray clay w/sand layers	CH	20	73-74	24	99	123	UC	—	1355					
80				Medium dense tan silty sand w/clay & clayey silt layers	SM	21	78-79											

EUSTIS ENGINEERING

LOG OF BORING & TEST RESULTS

Proposed Landfill, Ward Property, Highway 90, Jefferson Parish, Louisiana

(Sheet 1 of 2)

Ground Elev: | Datum: | Gr. Water Depth: | Job No: 11068 | Date Drilled 5/08/90 | Boring: 3 | Refer To "Legends & Notes"

Scale in Feet	PP	SPT	Symbol	Visual Class/Description	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
	0.60			Medium stiff dark gray organic clay w/humus layers	CH	1	2-3	105						170	39	131		
5	0.40			Soft tan & gray clay w/silt pockets & roots	CH	2	5-6	56	67	104	UC	—	480					
	0.25			Very soft to soft gray clay w/roots	CH	3	8-9											
10	0.25			w/roots & organic clay layers		4	11-12											
15	0.25			w/organic matter & silt lenses		5	14-15	87	52	97	UC	—	220					
	0.25			Soft gray clay w/silt & silty sand lenses	CH	6	18-19	80						96	26	70		
20	0.25					7	23-24	80	55	100	UC	—	265					
25	0.25					8	28-29											
30	0.25					9	33-34	60	66	106	UC	—	330					
35	0.25					10	38-39	62						81	22	59		
40	0.25					11	43-44	68	61	103	UC	—	395					
45	0.25					12	48-49											
50																		

EUS ENGINEERING

LOG OF BOR AND TEST RESULTS

Proposed Landfill, Ward Property, Highway 90, Jefferson Parish, Louisiana

Ground Elev | Datum | Gr Water Depth | Job No 11068 | Date Drilled 5/08/90 | Boring 3 | Refer to "Legends & Notes"

Depth in Feet	PP	SPT	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Dia Tes
				Soft to medium stiff gray clay w/silty sand lenses & shell fragments	CH													
55	0.30					13	53-54	70	59	99	UC	—	505					
60	0.35					14	58-59											
65	2.50			Very stiff greenish-gray & tan silty clay w/clayey silt pockets	CL	15	63-64	20	107	128	UC	—	2110					
70				Stiff to very stiff tan & gray clay w/silt lenses & sand layers	CH	16	68-69	46						92	26	66		
75	1.75			Stiff tan & gray silty clay w/clay layers	CL	17	73-74											
80				Medium compact gray clayey silt	ML	18	78-79											
				Methane gas noted after pushing to 70 feet.														

EUSTIS EN[illegible]EERING

LOG OF BORING A[illegible]ST RESULTS

Proposed Landfill, Ward Property, Highway 90, Jefferson Parish, Louisiana

Ground Elev.: | Datum: | Gr. Water Depth: | Job No: 11068 | Date Drilled: 5/08/90 | Boring: A-2 | Refer To "Legends & Notes"

Scale in Feet	PP	SPT	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests Ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
				Loose brown humus w/organic clay layers	Pt	1	2											
5				Very soft gray clay w/roots & organic matter	CH	2	4											
				Soft gray clay w/roots & organic matter	CH	3	6											
10						4	9											
				Loose brown humus w/organic clay layers	Pt	5	12											
15				Soft gray clay w/roots	CH	6	16											
20																		

APPENDIX B

SUBSURFACE CHARACTERIZATION

Woodward-Clyde Consultants

Project Notes

Subject: SUBSURFACE INVESTIGATION

Project Name: RIVERBIRCH

Project No.: 95B054

Task No.: 7 File No.:

Sheet 1 of 8

I. [illegible] Date: 04/10/95

Checked By: MB Date: 4/13/95

SCOPE: PREPARE A ORGANIZED SUBSURFACE CHARACTER PACKAGE FOR THE SITE.

FIELD INVESTIGATION PERFORMED BY:

1. FUGRO ENGINEERING, "PRELIMINARY GEOTECHNICAL INVESTIGATION PROPOSED LANDFILL SITE, WARD PROPERTY, JEFFERSON PARISH, LOUISIANA", SEPTEMBER 5, 1990.
   BORINGS: E-1, E-2, E-3

2. FUGRO GEOSCIENCES, INC., "LONG PENETROMETER TESTING" August 93, January 95
   SOUNDINGS: C-1 thru C-42

3. SOIL TESTING ENGINEERS, INC., AUGUST & SEPT. 19
   Borings: B1 - thru B-44

Drilling was subcontracted to STE & WCC perform laboratory tests and prepared boring logs.

Summary of Field Investigation is presented in the following appendicies:

Attachment A. Fugro's borings

Attachment B. Fugro Soundings, Details in App I.

Attachment C STE Borings

Correlation / Comparison of borings and soundings

Attachment E presents a letter to LEDEQ dated November 4, 1993 comparing the soundings and borings. At selected locations, prior the field investigation, both cone penetrometer soundings and conventional soil borings were identified.

The CPT and soil borings comparison showed the CPT provides comparable and reliable subgrade soil information.

FIGURES

Figure. 10 presents a site plan with boring and sounding locations.

Figure. 8 presents a topographic map with survey information provided by Dufrene Surveying & Engineers, Inc.
The map provides surface elevations referenced to the mean sea level with bearings based on Louisiana

State Plan Coordinate System. All bearing were converted to X, Y, Z coordinates to locate the borings and soundings.

The site is generally flat with generally less than 2ft. of variation in local area across the site.

Figure 11. Presents a plan view of cross-section

Figure 12-17. presents the geological cross sections thru all the X-sects.

Figure 18. presents Isometric Profile.

Attachment D. presents a summary of all the laboratory information on boring logs in Appendix SC-C.

Attachment F:

A series of plots were generated on the laboratory information with depth to include:

- Moisture Content with depth.
- Plasticity Index with depth.
- Liquid Limit with depth.
- Plasticity index versus Liquid limit
- Grain Size distribution
- Wet unit weight with depth.
- Shear Strength with depth.
- Permeability with depth.
- Consolidation tests.

SUBSOIL CHARACTERIZATION

The subsurface soils are generally uniform across the site with soft to very soft clays to a depth of approximately 63 feet over stiff greenish clays to the termination depth of the deepest borings. The upper layer is identified as Holocene with the lower layer identified as Pleistocene.

All the test results for the Atterber

Limits plot above and along the "A-line" in the Unified Soil Classification System. The material is typically identified as CL or CH.

The organic content for representative samples ranged between less than 1% to 45%. The highest values were generally on the 0' to 2' sample interval. The organic content below the upper sample interval was generally below 4%. The presence of organic matter appears to be discontinuous across the site.

In general the site is characterized as:

	Depth (ft)	γ_w (pcf)	C^* (psf)	ϕ
STRATUM I. Very soft to soft gray clays	0'-63'	100	300	0
STRATUM II Stiff greenish gray clays	63'-100'	110	750	0

Considering the borings beneath or close vicinity of cell 1, the Holocene layer is further divided into two sub layers with thicknesses 30 ft & 31 ft, and c = 300 psf and c = 340 psf respectively. (Figure SS-1). An increase in strength with time is also expected. This strength incr which is not taken into consideration in the design stage will increase the factor of safety (F.S) against slope failure with time.

- Figure SS_1 (attached) presents the shear strength versus depth for Cell 1 locatio

Woodward-Clyde Consultants

Project Notes

Subject: Subsurface Characterization

R. McGall Date: Jan 30, 1994

Checked By: _____ Date: _____

Project Name: River Birch

Project No.: _____

Task No.: _____ File No.: _____

Sheet 7 of 8

Consolidation Tests

Consolidation Tests were performed at the following locations at sample intervals. Illustrate over consolidation ratio (OCR), P_o (effective overburden), P_c (preconsolidation pressure).

$C_c = \frac{\Delta e}{\log(P_2/P_1)}$

Boring No.	Depth	e_o	P_o (1) tsf	P_c tsf	OCR (2)	C_c (3)	C_c'	C_{cs} (4)
1	14'-16'	1.497	0.66	1.5	2.2	0.78	0.31	0.66
3	30-32'	1.795	0.71	1.4	1.9	0.87	0.31	0.56
6	88-90	0.7651	2.08	2.2	1.1	0.16	0.01	0.30
14	28-30	2.256	0.61	0.95	1.6	1.20	0.37	0.66
17	16-18	1.216	0.63	1.6	2.5	0.50	0.23	0.35
17	32-34	1.795	0.73	1.1	1.2	0.80	0.29	0.60
18	2-4	1.526	0.15	2.2	14	0.58	0.23	0.86
19	12-14	1.447	0.49	0.88	1.8	0.54	0.22	0.67
21	78-80	0.733	1.66	2.1	1.3	0.15	0.09	0.19
25	14-16	2.444	0.50	0.66	1.3	1.36	0.40	0.85
30	78-80	1.562	1.72	2.2	1.3	0.76	0.30	0.7
32	24-26	1.643	0.72	0.95	1.3	0.72	0.27	0.5
36	22-24	1.309	0.71	0.95	1.3	0.43	0.19	0.3
37	88-90	0.624	1.99	1.6	0.8	0.10	0.06	0.1
5	14-16	1.295	0.41	0.51	1.2	0.38	0.17	
22	14-16	1.290	0.41	0.53	1.41	0.32	0.14	

$C_c' = \frac{C_c}{1+e_o}$

(1) Based on water table at time of boring

(2) OCR suggest normally consolidated soils. There are values which are near South Kenner Road B-1 & B-17 greater than 2. B-18 with OCR=14 may be a feature of the surface crust. The consolidation curves indicate the materials are sensitive therefore affected by sampling.

(3) Use of reconstructed field curves is not appropriate for all tests.

(4) $C_{cs} = 0.009(w_L - 10)$ Skempton (1944) quick check of C_c

Woodward-Clyde Consultants

Project Notes

Subject: Subsurface Characterization

R. Le Goll Date: Jan 31, 1994

Checked By: _____ Date: _____

Project Name: River Birch

Project No.: _____

Task No.: _____ File No.: _____

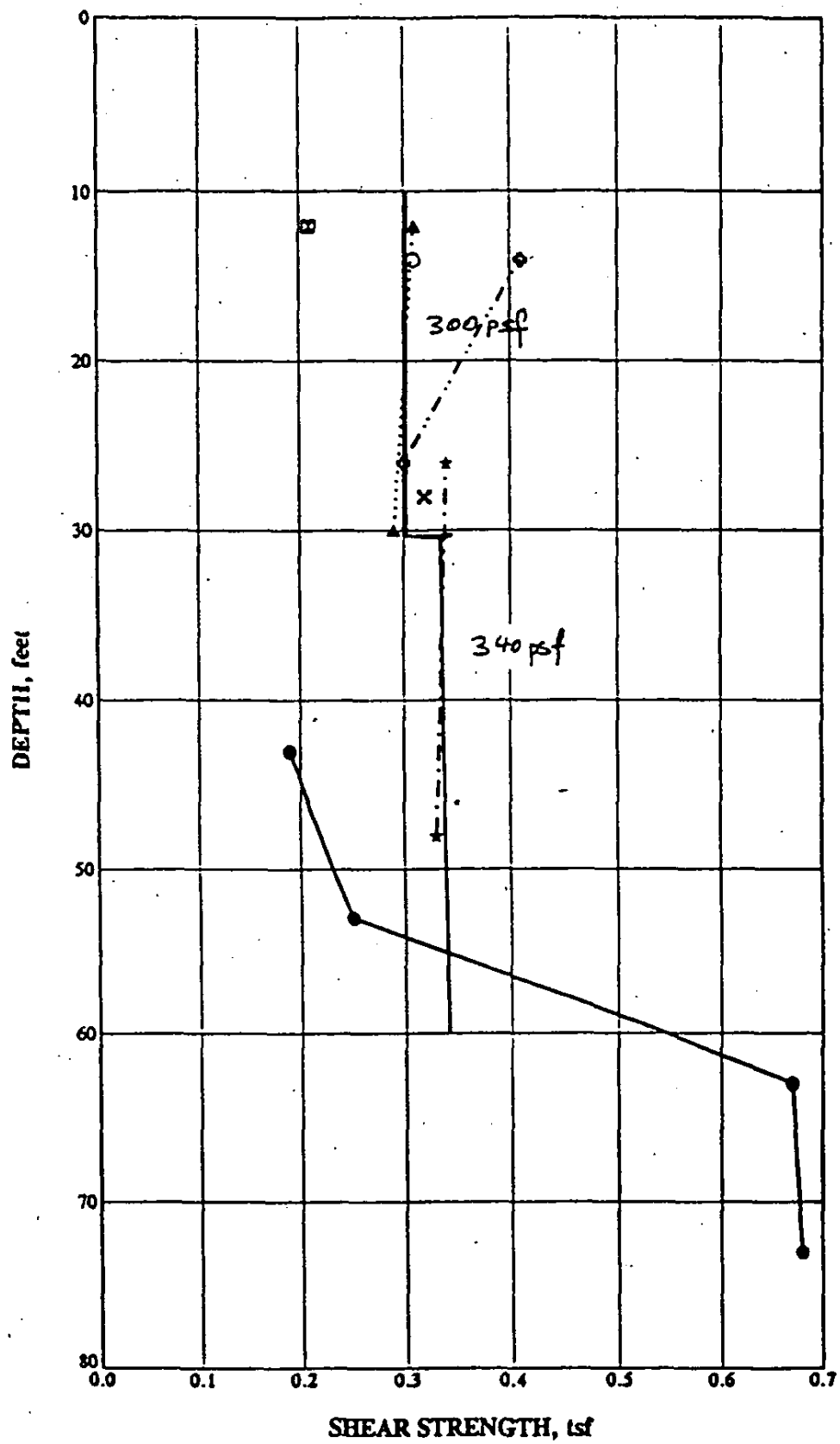
Sheet 8 of _____

Summation of C_c, C_r vs depth - will use γ' for gamma in computer input

Depth ft	C_c'	C_r	C_r'
0 - 2	0.23	0.09	0.036
12-14	0.22	0.06	0.025
14-16	0.31, 0.17, 0.14	0.07, —, —	0.028
16-18	0.23	0.04	0.018
22-24	0.19	0.04	0.017
24-26	0.27	0.10	0.038
28-30	0.37	0.11	0.034
30-32	0.31	0.10	0.036
32-34	0.29	0.10	0.036
78-80	0.09, 0.30	0.02, 0.15	0.007, 0.059
88-90	0.06, 0.09	—, 0.02	—, 0.012

Use: $C_c' = 0.27$ 0'-63' Holocene ~ $C_r' = 0.030$

$C_c' = 0.09$ 63'-100' Pleistocene ~ $C_r' = 0.006$



LEGEND

Boring Number	Te Sym
B-6	●
B-7	■
B-8	▲
B-11	★
B-13	×
B-22	◇
B-23	○

Project: River Birch Landfill
Project Number: 93B248C

SHEAR STRENGTH vs DEPTH

2/15/95 SHVDPT 38248

Woodward-Clyde Consulta

ANALYSIS LABORATORIES, INC.
P. O. BOX 8666 • 2932 LIME ST. • METAIRIE, LA. 70011 • 889-0710

May 25, 1990 A-5076

Mr. Bill Gwyn
EUSTIS ENGINEERING COMPANY
P.O. Box 8708
Metairie, LA 70011-8708

EXAMINATION OF SOIL SAMPLES

Six (6) samples of soil received on May 17, 1990 @ 3:15PM and identified as "Job No. 11068, Taken 5-17-90," were examined to determine the oil and grease content of three designated samples and to determine the concentration of metals in the EP Extract of the other three samples.

The results were as follows:

	Concentration, milligrams/kilogram, dry basis		
	Sample A-2/1	A-2/2	A-2/4
Total Oil & Grease, mg/kg dry basis	1526	<49ND	<50ND
Water Content, weight percent as received	77.3	47.9	54.9

N.D. None Detected.

Metals - Concentration in E.P. Extract milligrams/Liter

EPA Hazardous Waste Number	Contaminant	A-2/3	A-2/5	A-2/6	Maximum Concentration (milligrams per Liter)
D004	Arsenic	<0.05	<0.05	<0.05	5.0
D005	Barium	0.21	0.30	0.43	100.0
D006	Cadmium	<0.01	<0.01	<0.01	1.0
D007	Chromium	<0.05	<0.05	<0.05	5.0
D008	Lead	<0.05	<0.05	<0.05	5.0
D009	Mercury	<0.002	<0.002	<0.002	0.2
D010	Selenium	<0.01	<0.01	<0.01	1.0
D011	Silver	<0.05	<0.05	<0.05	5.0

ANALYSIS LABORATORIES, INC.

CHEMIST

PART II

Cone Penetrometer Results – Fugro Geosciences, Inc. 1993-1995

BEST COPY

ATTACHMENT B

FUGRO CONE PENETROMETER RESULTS

FUGRO

FUGRO GEOSCIENCES, INC.

6105 Rookı
Houston, Texas 7707·
Tel: (713) 778-558
Fax: (713) 778-550

January 31, 1995
Report Number 0301-5013

Woodward Clyde Consultants
2822 O'Neal Lane
Baton Rouge, LA 70816

Attention: Mr. Bob Sanders

CONE PENETROMETER TESTING
AND RELATED SERVICES
JEFFERSON PARISH LANDFILL
LOUISIANA

Dear Mr. Sanders:

Please find enclosed herewith the final results of the cone penetrometer tests conducted at the above referenced location.

For your information, the soil stratigraphy was identified using Campanella and Robertson's Simplified Soil Behavior Chart. Please note that because of the empirical nature of the soil behavior chart, the soil identification should be verified locally.

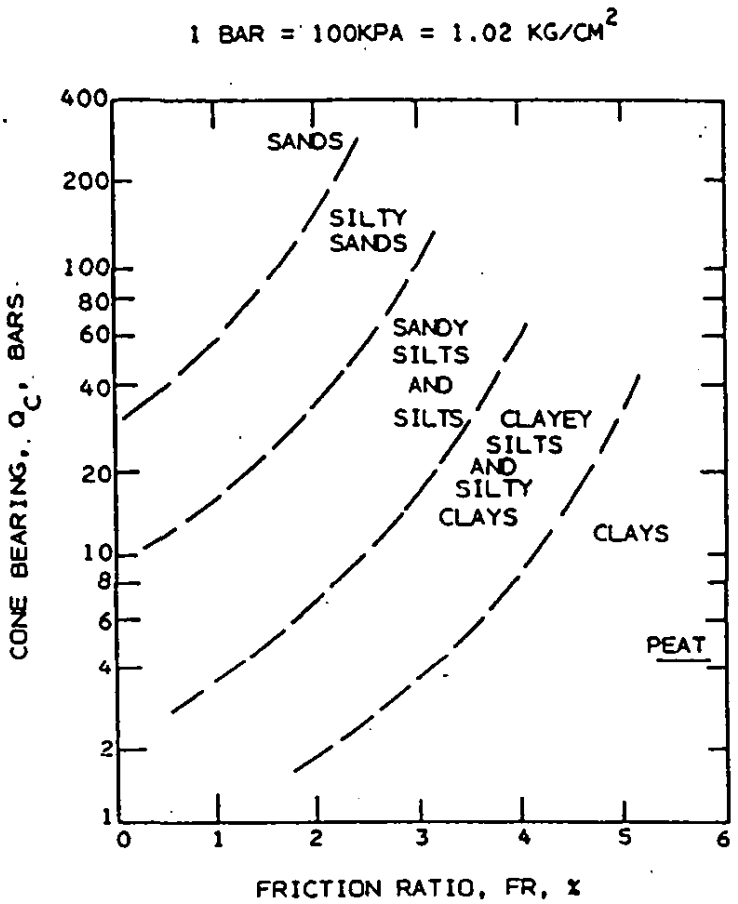
Fugro Geosciences appreciates the opportunity to be of service to your organization. If you should have any questions, or if we can be of further assistance, please do not hesitate to contact us. We look forward to working with you in the future.

Very truly yours,
FUGRO GEOSCIENCES, INC.

Recep Yilmaz
President

RY/cam

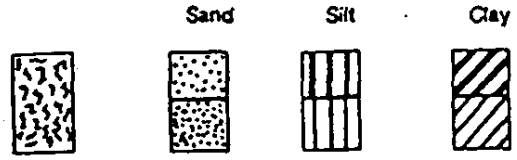
Enclosure (diskette)



CAMPANELLA AND ROBERTSON CLASSIFICATION CHART

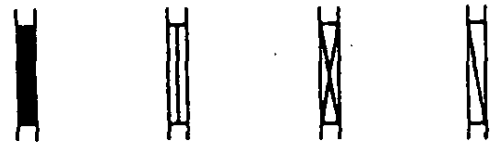
Key To Soil Classification and Symbols

SOIL TYPE
(Shown in Symbol Column)



Predominant Type Shown Heavy

SAMPLE TYPE
(Shown in Samples Column)



TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE GRAINED SOILS (Major portion Retained on No. 200 Sieve)
Includes (1) clean gravels and sand described as fine, medium or course, depending on distribution of grain sizes (2) silty or clayey gravels and sands and (3) fine grained low plasticity soils (PI < 10) such as sandy silts. Condition is rated according to relative density, as determined by lab tests or estimated from resistance to sampler penetration.

Descriptive Term	Penetration Resistance*	Relative Density
Loose	0 - 10	0 to 40%
Medium Dense	10 - 30	40 to 70%
Dense	30 - 50	70 to 90%
Very Dense	Over 50	90 to 100%

* Blows/Foot, 140# Hammer, 30" Drop

FINE GRAINED SOILS (Major Portion Passing No. 200 Sieve)
Includes (1) inorganic and organic silts and clays, (2) sandy, gravelly or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as indicated by penetrometer readings or by unconfined compression tests for soils with PI $\geq$ 10.

Descriptive Term	Cohesive Shear Strength Tons/Square Foot
Very Soft	Less Than 0.125
Soft	0.125 to 0.25
Firm	0.25 to 0.50
Stiff	0.50 to 1.00
Very Stiff	1.00 to 2.00
Hard	2.00 and Higher

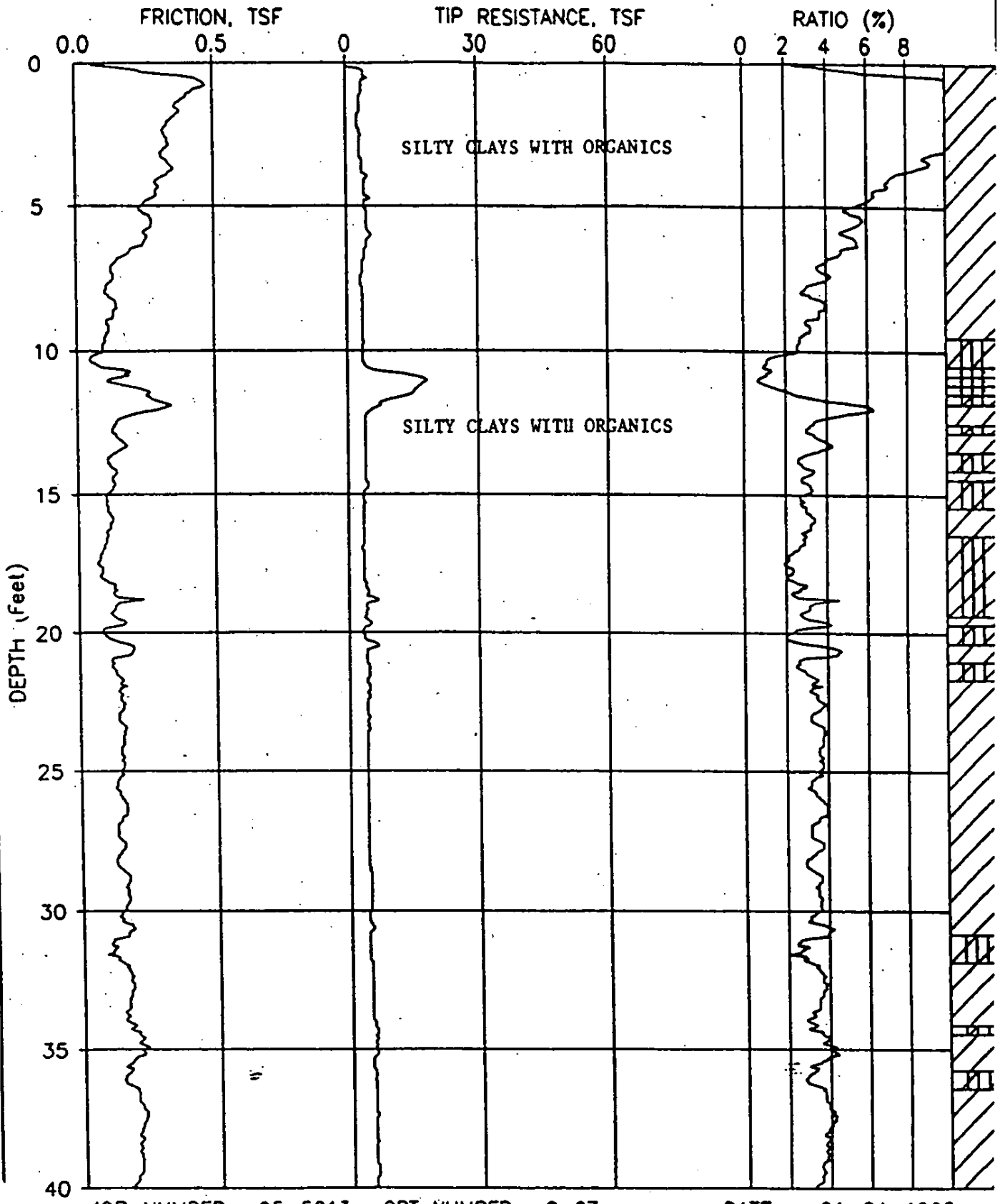
Note: Slickensided and fissured clay may have lower unconfined compressive strengths than shown above because of planes of weakness c shrinkage cracks; consistency ratings of such soils are based on hand penetrometer readings.

TERMS CHARACTERIZING SOIL STRUCTURE

Parting:	paper thin in size
Seam:	1/8" to 3" thick
Layer:	greater than 3"
Fissured:	containing shrinkage cracks, frequently filled with *fine sand or silt, usually more or less vertical*
Sensitive:	pertaining to cohesive soils that are subject to appreciable loss of strength when remolded
Interbedded:	composed of alternate layers of different soil types
Laminated:	*composed of thin layers of varying color and* texture
Calcareous:	containing appreciable quantities of calcium carbonate
Well Graded:	having wide range in grain sizes and substantial *amounts of all intermediate particle sizes*
Poorly Graded:	predominantly of one grain size, or having a range of sizes with some intermediate size miss-ing
Flocculated:	pertaining to cohesive soils that exhibit a lo knit or flakey structure
Slickensided:	*having inclined planes of weakness that* slick and glossy in appearance.

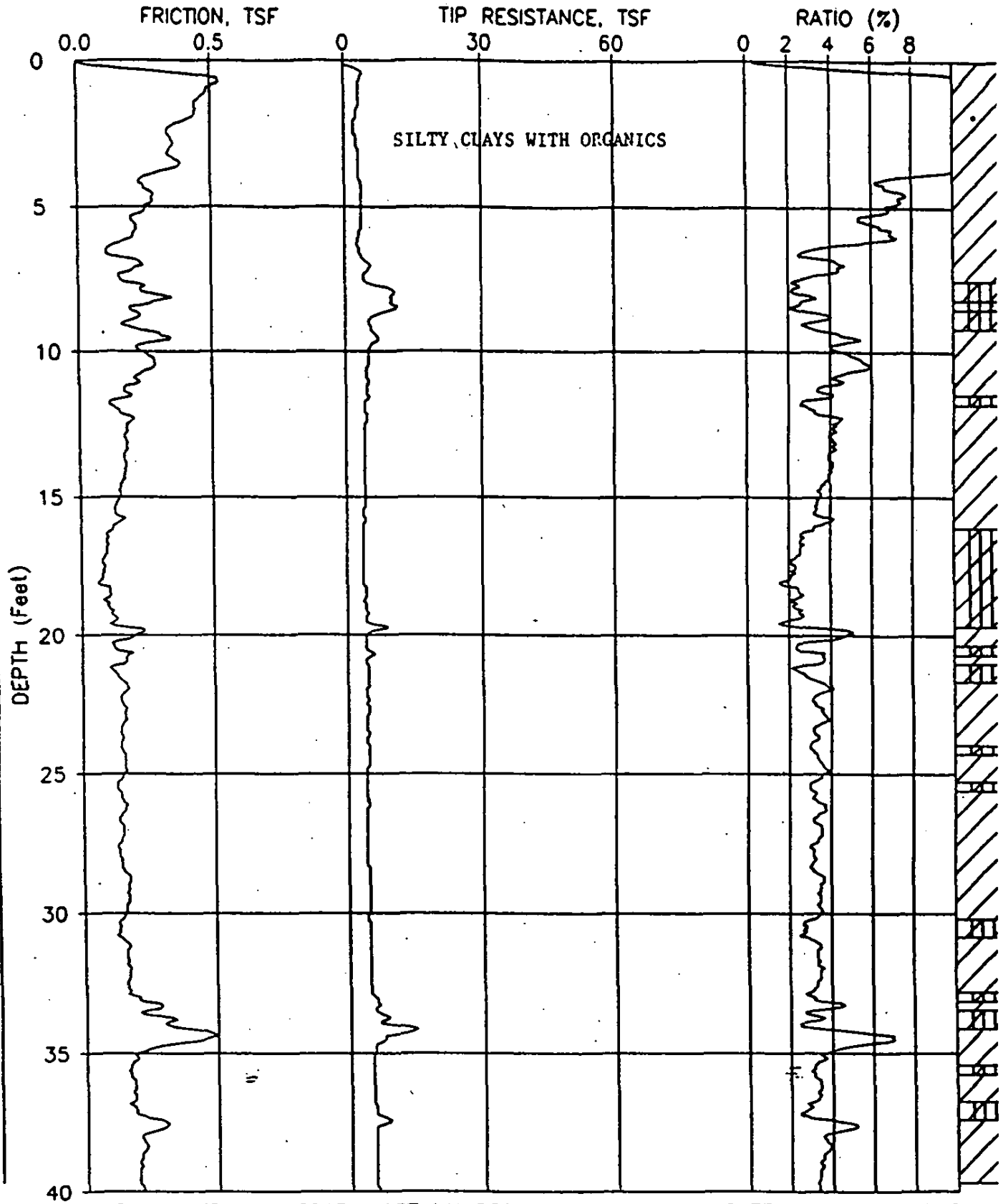
Degree of Slickensided Development

Slightly Slickensided:	slickensides present at intervals of 1 2", soil does not easily break al these plates
Moderately Slickensided:	slickensides spaced at intervals of 1 2", soil breaks easily along these pla
Extremely Slickensided:	continuous and interconnected slic sides spaced at intervals of 4" to soil breaks along the slickensides pieces 3" to 6" in size
Intensely Slickensided:	slickensides spaced at intervals of than 4", continuous in all directions; breaks down along planes into nod 1/4" to 2" in size.



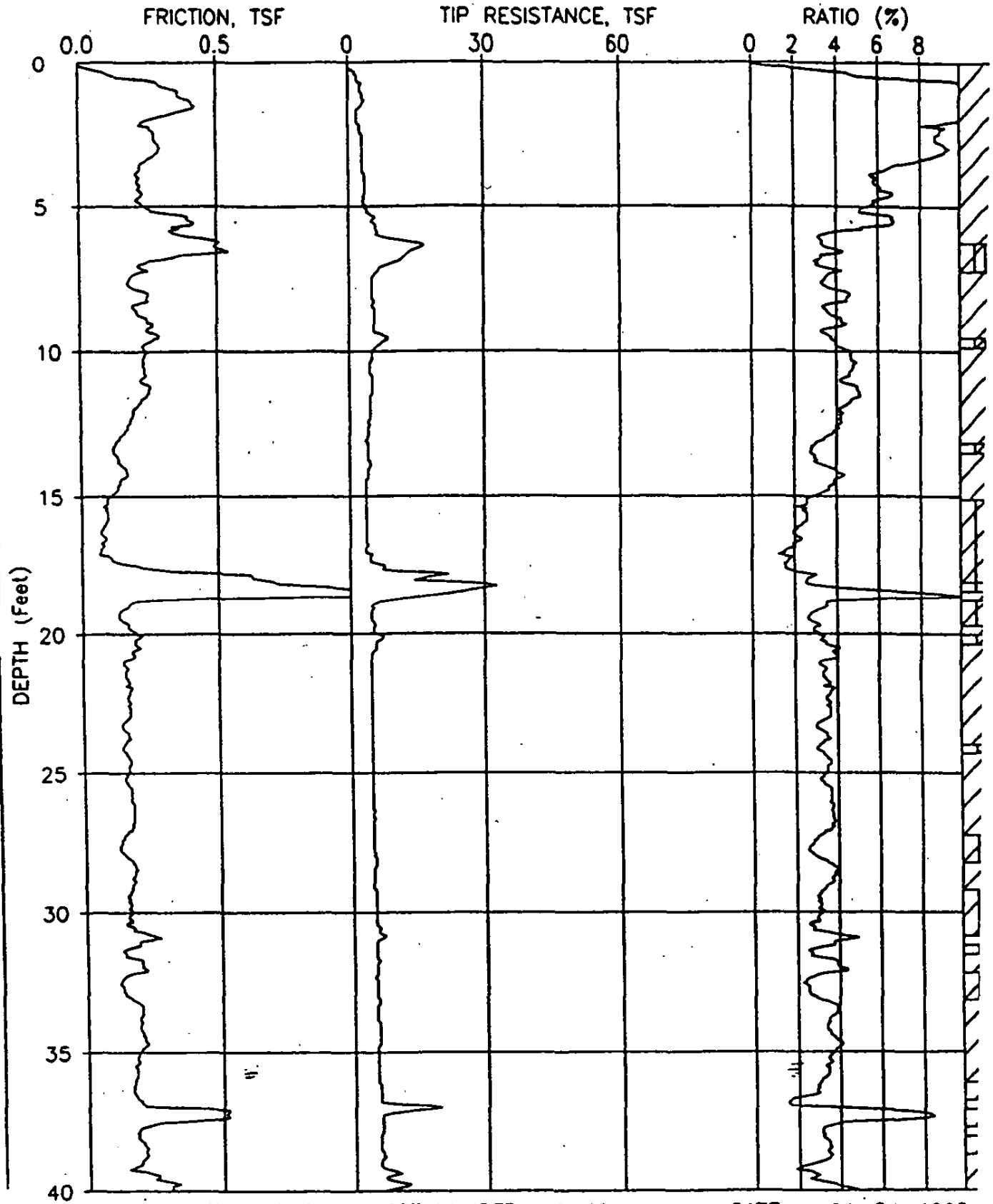
JOB NUMBER : 95-5013 CPT NUMBER : C-27 DATE : 01-24-1995
ELEVATION : 0.00 CONE NUMBER: F7.5CKEV080

FUGRO GEOSCIENCES,INC



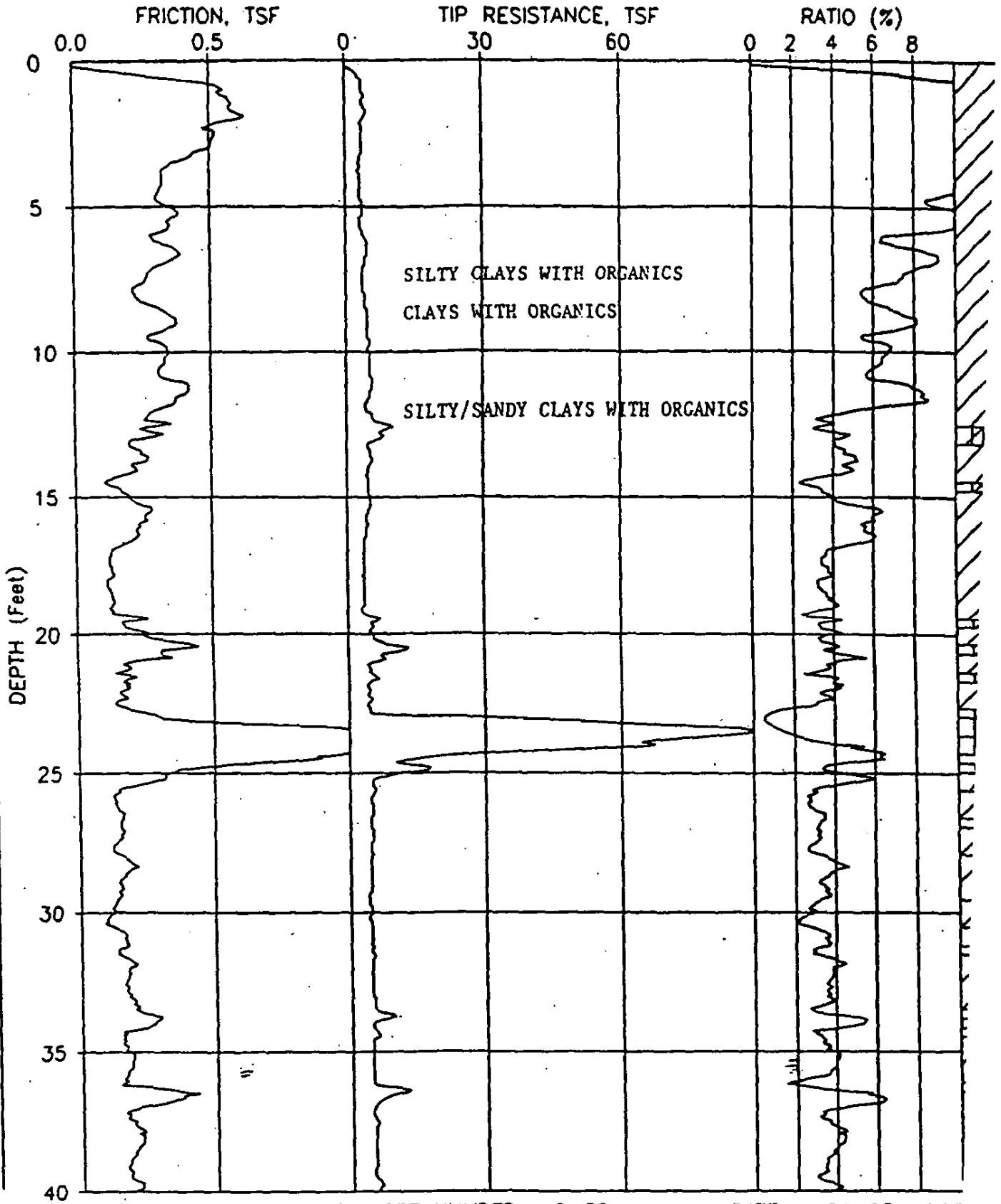
JOB NUMBER : 95-5013 CPT NUMBER : C-28 DATE : 01-24-1995
ELEVATION : 0.00 CONE NUMBER: F7.5CKEV080

FUGRO GEOSCIENCES,INC



JOB NUMBER : 95-5013 CPT NUMBER : C-29 DATE : 01-24-1995
ELEVATION : 0.00 CONE NUMBER: F7.5CKEV080

FUGRO GEOSCIENCES,INC



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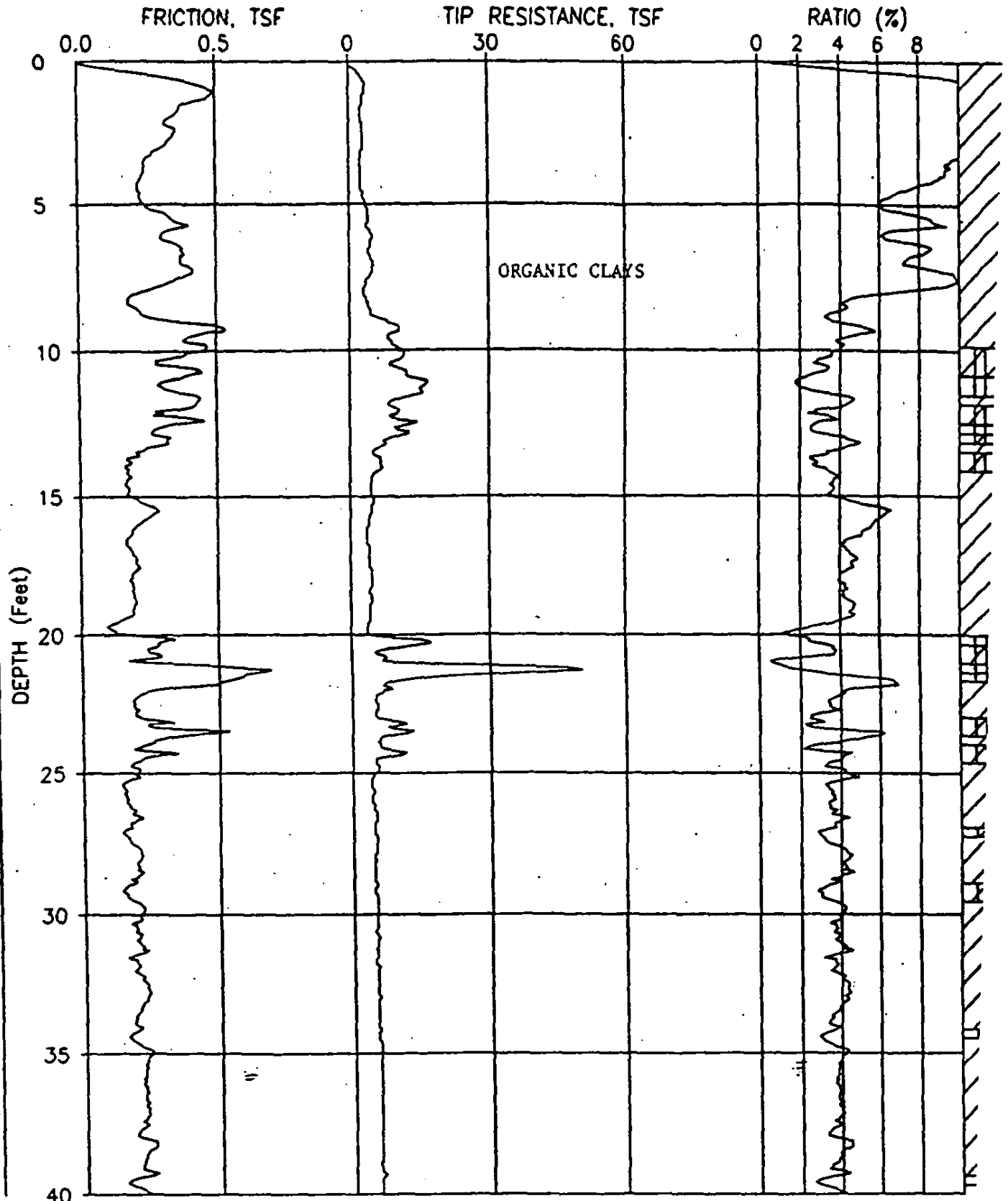
ELEVATION : 0.00 CONE NUMBER: F7.5CKEV080

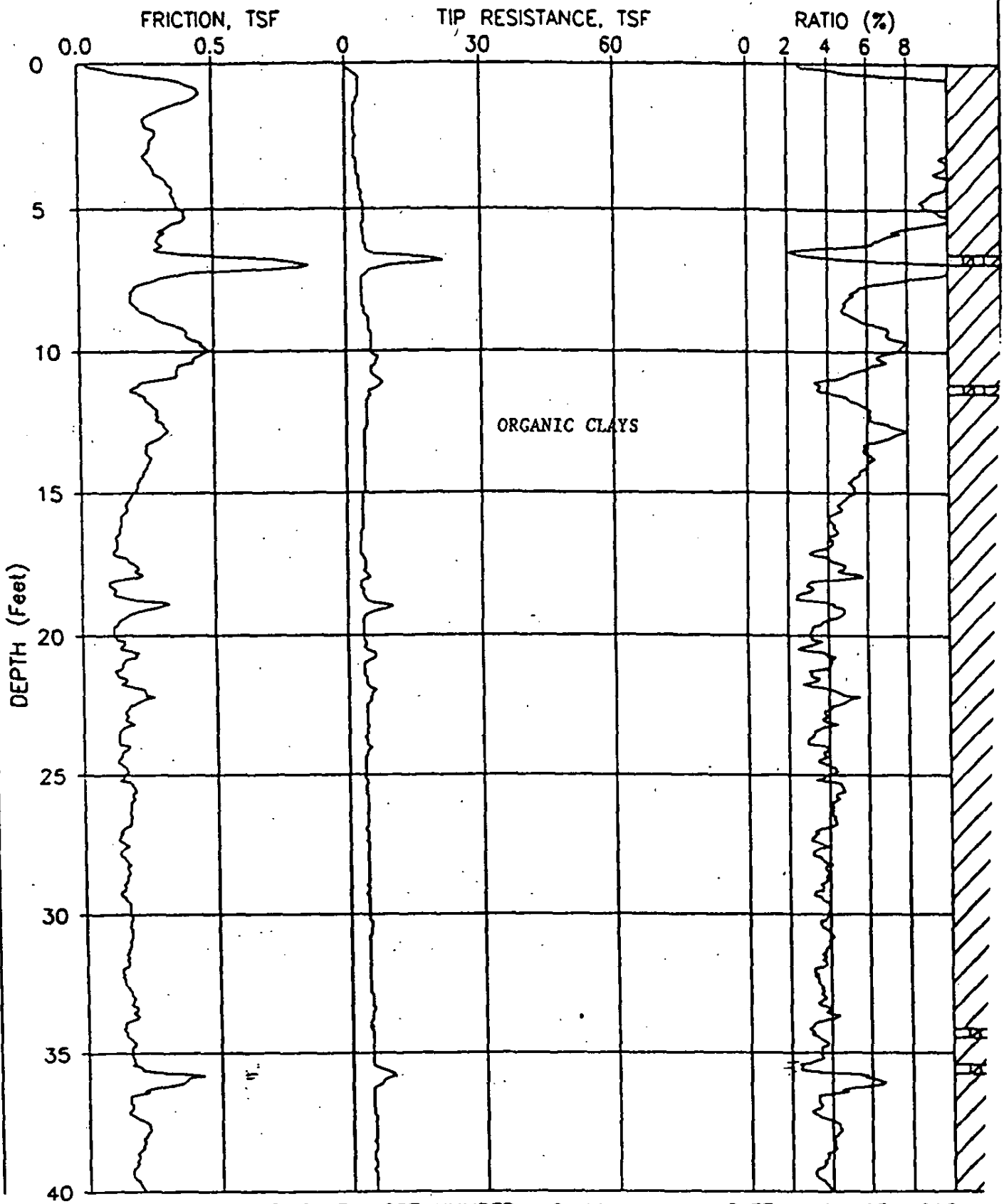
FUGRO GEOSCIENCES,INC



JOB NUMBER : 95-5013 CPT NUMBER : C-43 DATE : 01-25-1995

ELEVATION : 0.00 CONE NUMBER: F7.5CKEV080

FUGRO GEOSCIENCES,INC



JOB NUMBER : 95-5013 CPT NUMBER : C-44 DATE : 01-25-1995

ELEVATION : 0.00 CONE NUMBER: F7.5CKEV080

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FUGRO GEOSCIENCES, INC.

Bal.

FUGRO

6105 Rookin
Houston, Texas 77074
Tel: (713) 778-5580
Fax: (713) 778-5501

August 23, 1993
Report Number 0301-3108

Mr. Charles Hedges
Woodward-Clyde Consultants
2822 O'Neal Lane
Baton Rouge, Louisiana 70816

CONE PENETROMETER TESTING
AND RELATED SERVICES
JEFFERSON PARISH LANDFILL
LOUISIANA

Dear Mr. Hedges:

Please find enclosed herewith the final results of the cone penetrometer tests conducted at the above referenced location.

For your information, the soil stratigraphy was identified using Campanella and Robertson's Simplified Soil Behavior Chart. Please note that because of the empirical nature of the soil behavior chart, the soil identification should be verified locally.

Fugro Geosciences appreciates the opportunity to be of service to your organization. If you should have any questions, or if we can be of further assistance, please do not hesitate to contact us. We look forward to working with you in the future.

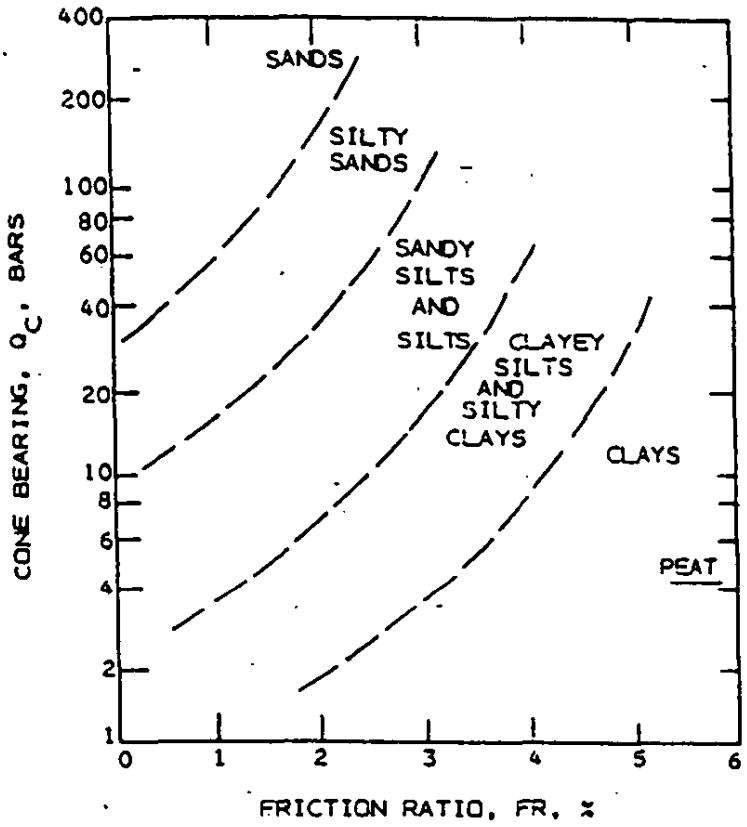
Very truly yours,
FUGRO GEOSCIENCES, INC.

Jeffery L. Ness

Jeffery L. Ness
CPT Manager

JLN/kjs

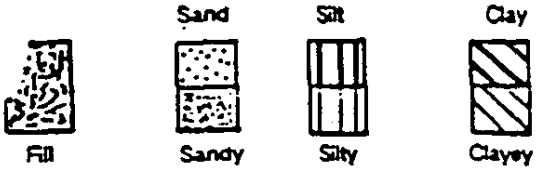
1 BAR = 100KPA = 1.02 KG/CM^2



CAMPANELLA AND ROBERTSON CLASSIFICATION CHART

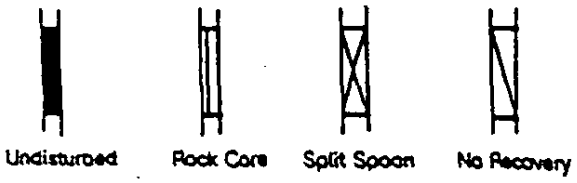
Key To Soil Classification and Symbols

SOIL TYPE
(Shown in Symbol Column)



Predominant Type Shown Heavy

SAMPLE TYPE
(Shown in Samples Column)



TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE GRAINED SOILS (Major portion Retained on No. 200 Sieve)
Includes (1) clean gravels and sand described as fine, medium or course, depending on distribution of grain sizes (2) silty or clayey gravels and sands and (3) fine grained low plasticity soils (PI < 10) such as sandy silts. Condition is rated according to relative density, as determined by lab tests or estimated from resistance to sampler penetration.

Descriptive Term	Penetration Resistance*	Relative Density
Loose	0 - 10	0 to 40%
Medium Dense	10 - 30	40 to 70%
Dense	30 - 50	70 to 90%
Very Dense	Over 50	90 to 100%

* Blows/Foot, 140# Hammer, 30" Drop

FINE GRAINED SOILS (Major Portion Passing No. 200 Sieve)
Includes (1) inorganic and organic silts and clays, (2) sandy, gravelly or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as indicated by penetrometer readings or by unconfined compression tests for soils with PI $\geq$ 10.

Descriptive Term	Cohesive Shear Strength Tons/Square Foot
Very Soft	Less Than 0.125
Soft	0.125 to 0.25
Firm	0.25 to 0.50
Stiff	0.50 to 1.00
Very Stiff	1.00 to 2.00
Hard	2.00 and Higher

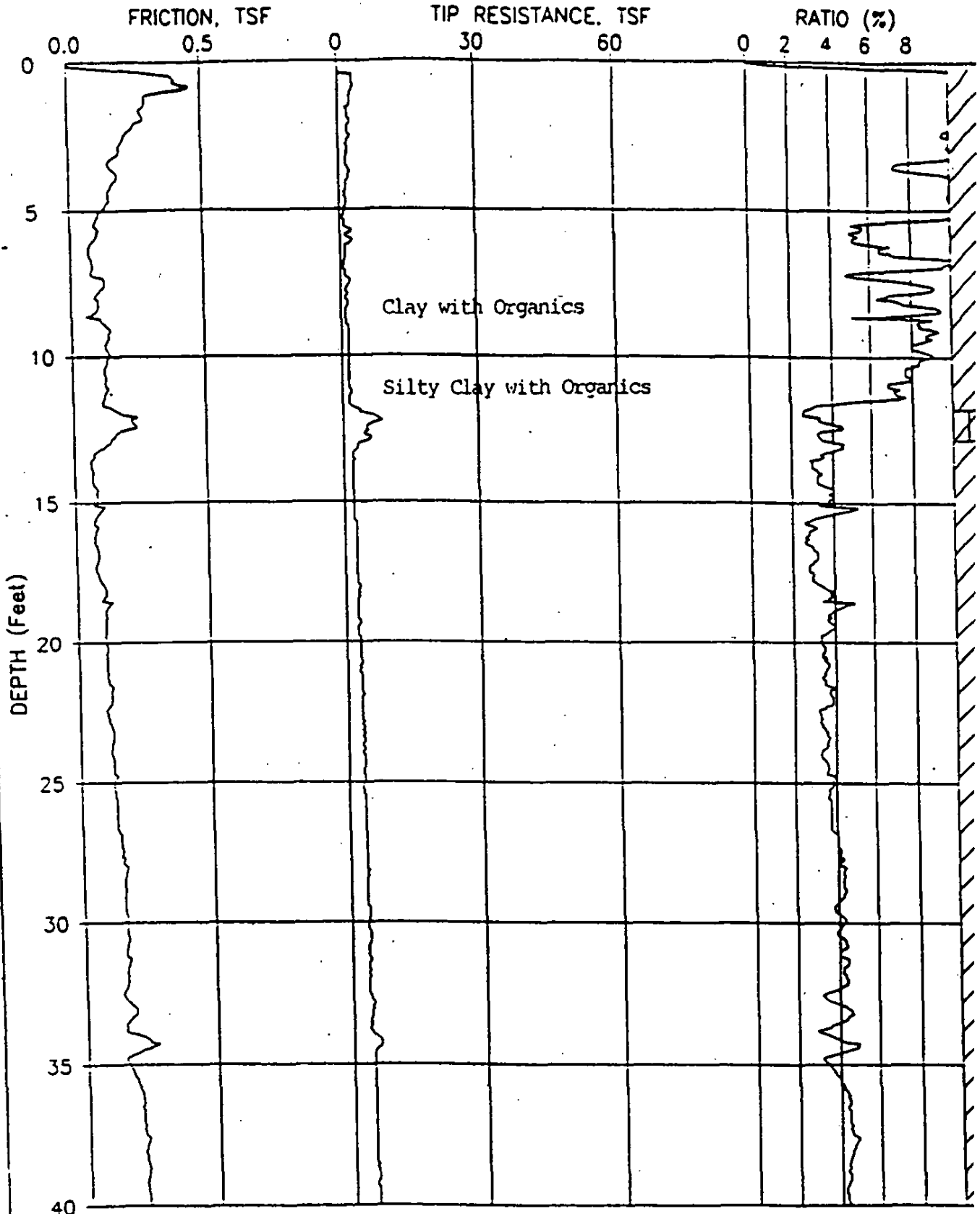
Note: Slickensided and fissured clay may have lower unconfined compressive strengths than shown above because of planes of weakness or shrinkage cracks; consistency ratings of such soils are based on hand penetrometer readings.

TERMS CHARACTERIZING SOIL STRUCTURE

Parting:	paper thin in size
Seam:	1/8" to 3" thick
Layer:	greater than 3"
Fissured:	containing shrinkage cracks, frequently filled with fine sand or silt, usually more or less vertical
Sensitive:	pertaining to cohesive soils that are subject to appreciable loss of strength when remolded
Interbedded:	composed of alternate layers of different soil types
Laminated:	composed of thin layers of varying color and texture
Calcareous:	containing appreciable quantities of calcium carbonate
Well Graded:	having wide range in grain sizes and substantial amounts of all intermediate particle sizes
Poorly Graded:	predominantly of one grain size, or having a range of sizes with some intermediate size missing
Flocculated:	pertaining to cohesive soils that exhibit a loose knit or flakey structure
Slickensided:	having inclined planes of weakness that are slick and glossy in appearance.

Degree of Slickensided Development

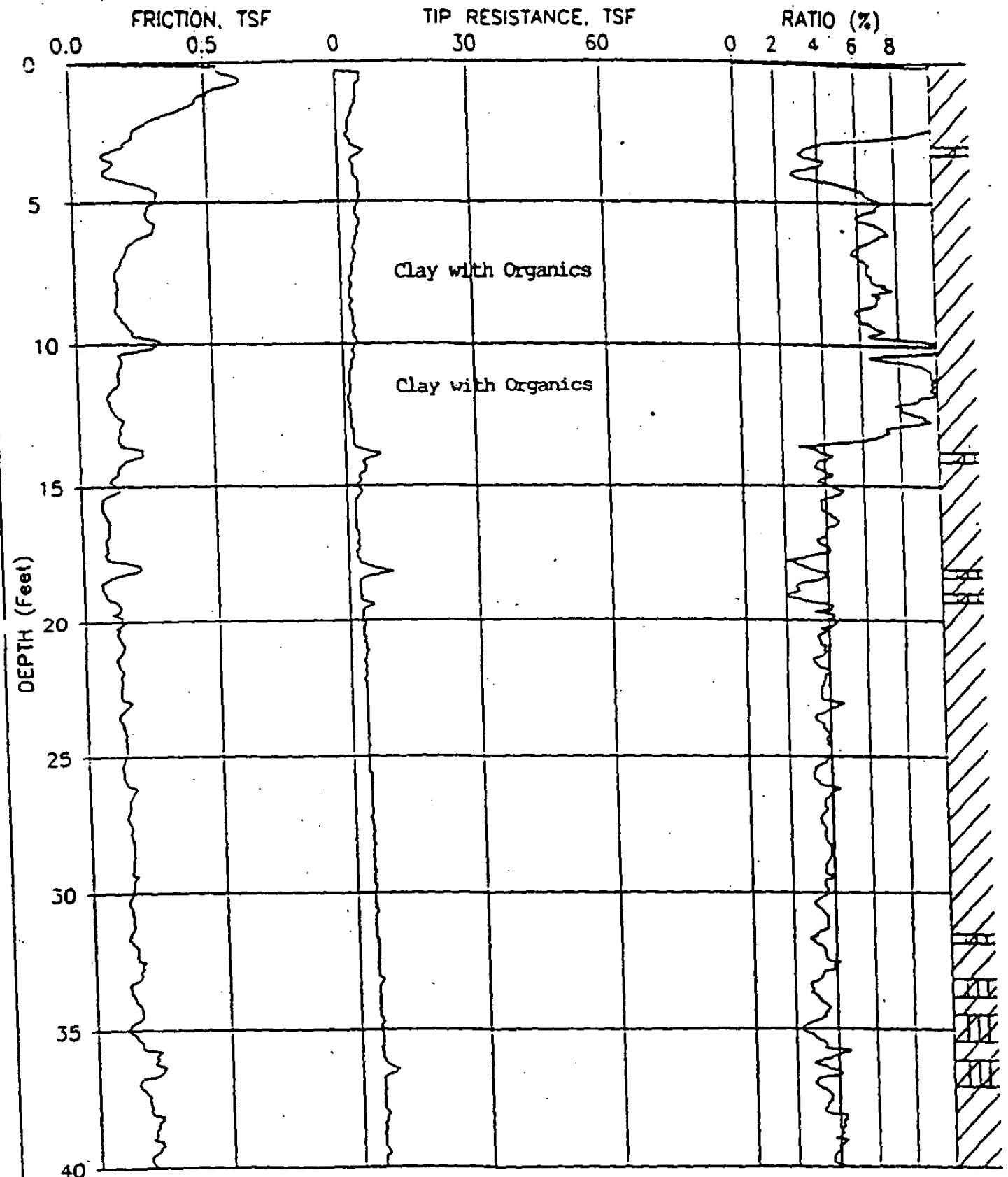
Slightly Slickensided:	slickensides present at intervals of 1' to 2', soil does not easily break along these plates
Moderately Slickensided:	slickensides spaced at intervals of 1' to 2', soil breaks easily along these planes
Extremely Slickensided:	continuous and interconnected slickensides spaced at intervals of 4" to 12", soil breaks along the slickensides into pieces 3" to 6" in size
Intensely Slickensided:	slickensides spaced at intervals of less than 4", continuous in all directions; soil breaks down along planes into nodules 1/4" to 2" in size.



JOB NUMBER : 93-3108 CPT NUMBER : C1 DATE : 08-24-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE709

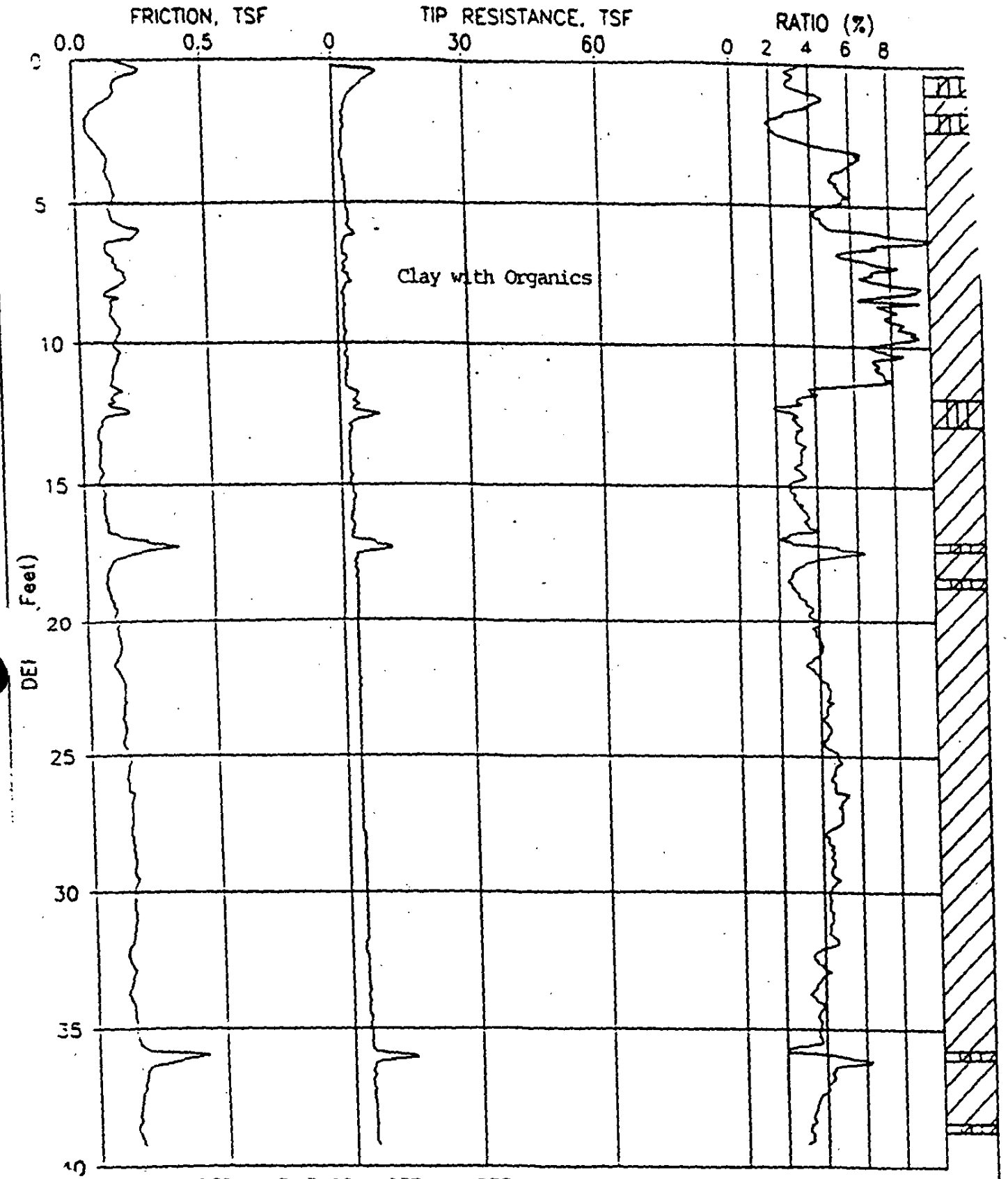
FUGRO GEOSCIENCES,INC



JOB NUMBER : 93-3108 CPT NUMBER : C2 DATE : 08-24-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE709

FUGRO GEOSCIENCES,INC



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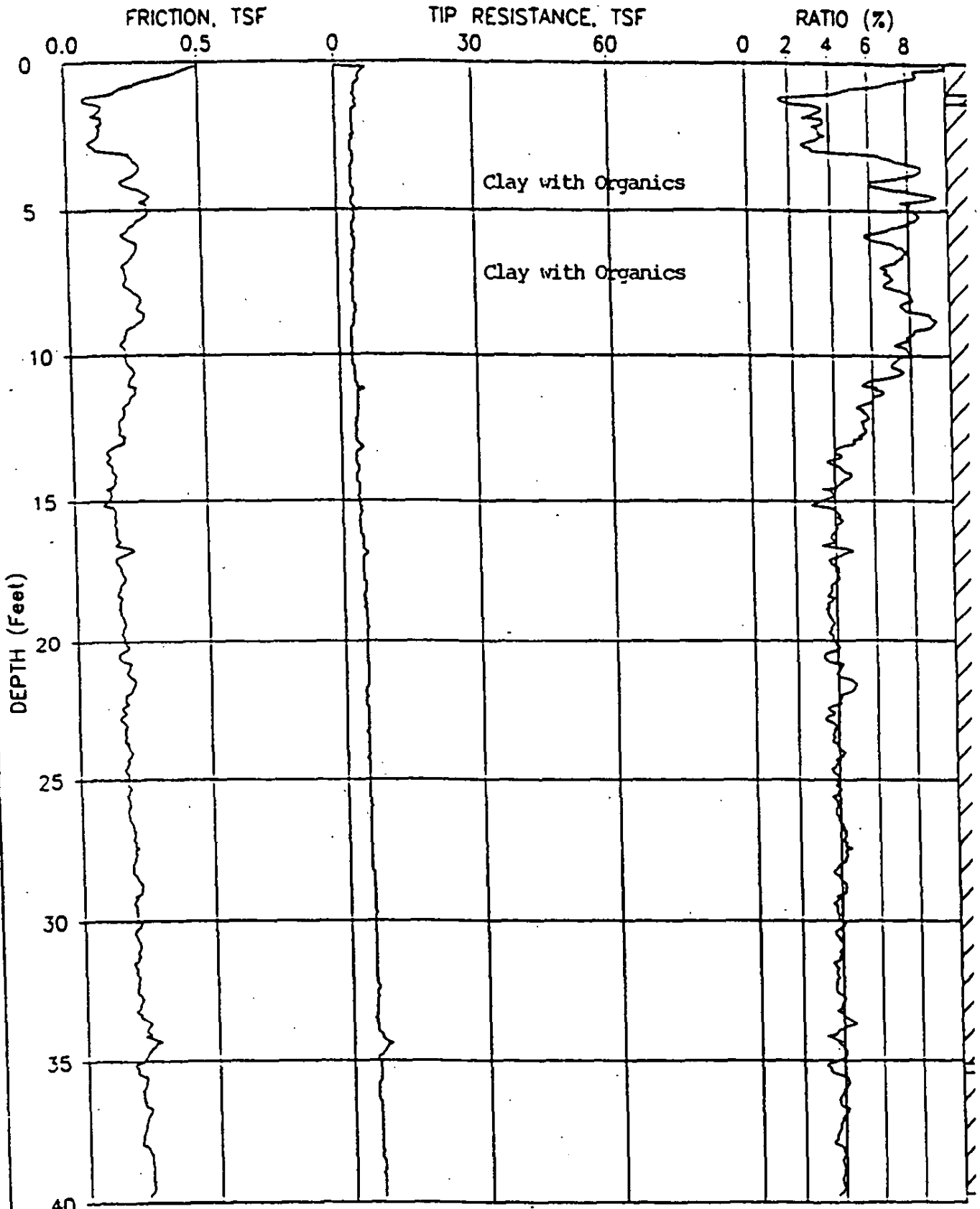
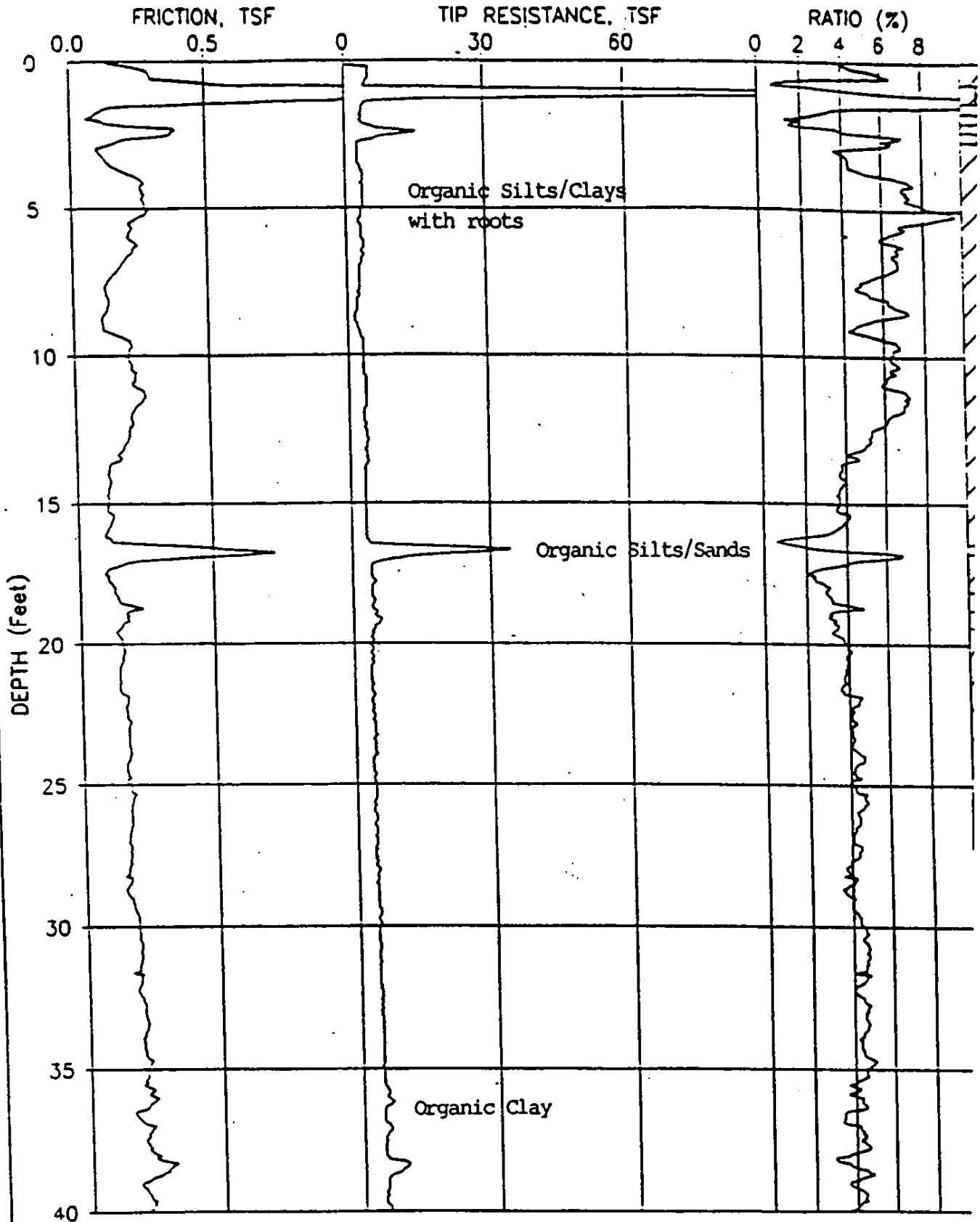
ELEVATION : 0.00 CONE NUMBER: F5CKE709



JOB NUMBER : 93-3108 CPT NUMBER : C4 DATE : 09-01-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE611

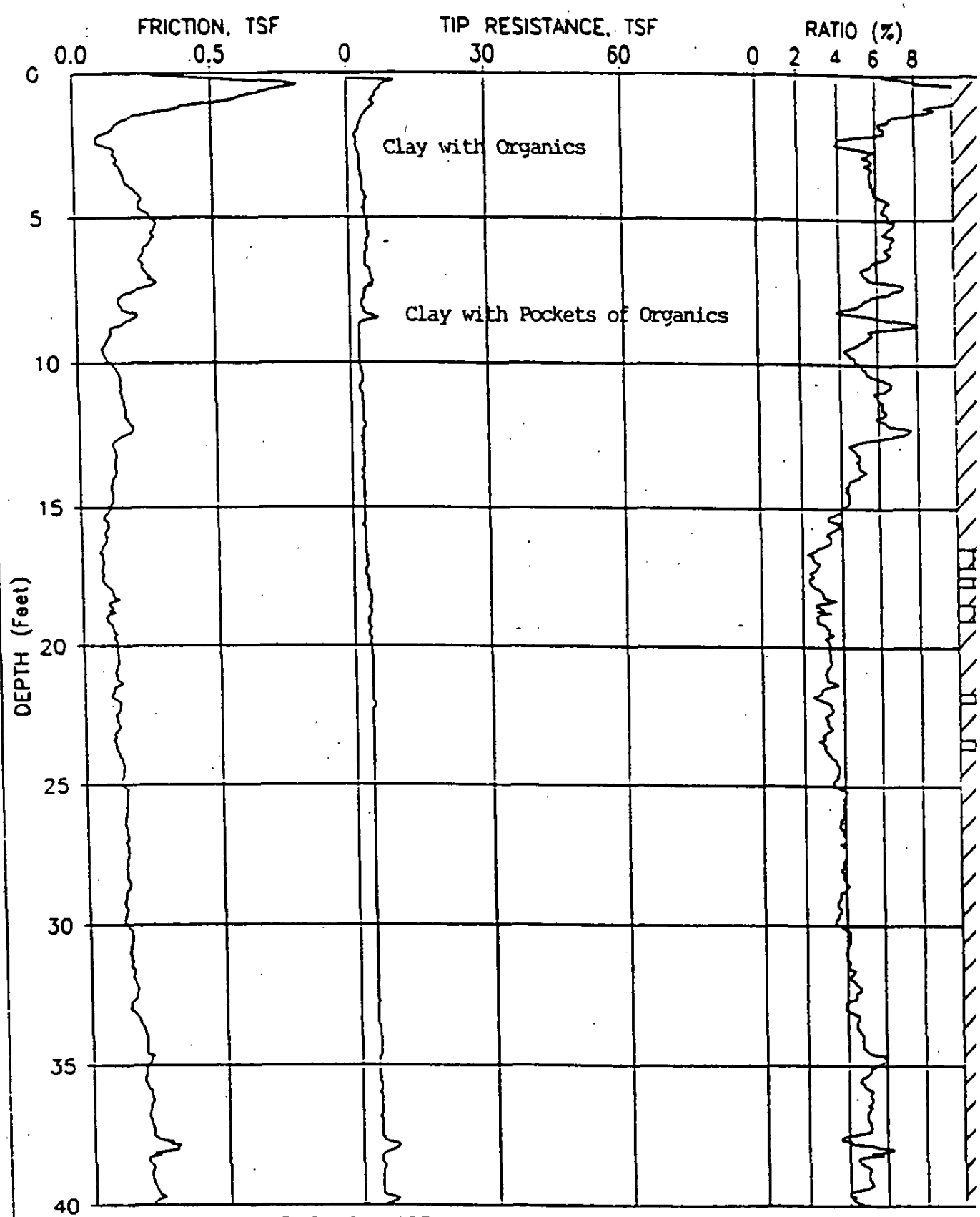
FUGRO GEOSCIENCES,INC



JOB NUMBER : 93-3108 CPT NUMBER : C5 DATE : 08-26-199

ELEVATION : 0.00 CONE NUMBER: F5CKE709

FUGRO GEOSCIENCES,INC



JOB NUMBER : 93-3108 CPT NUMBER : C6 DATE : 08-30-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE709

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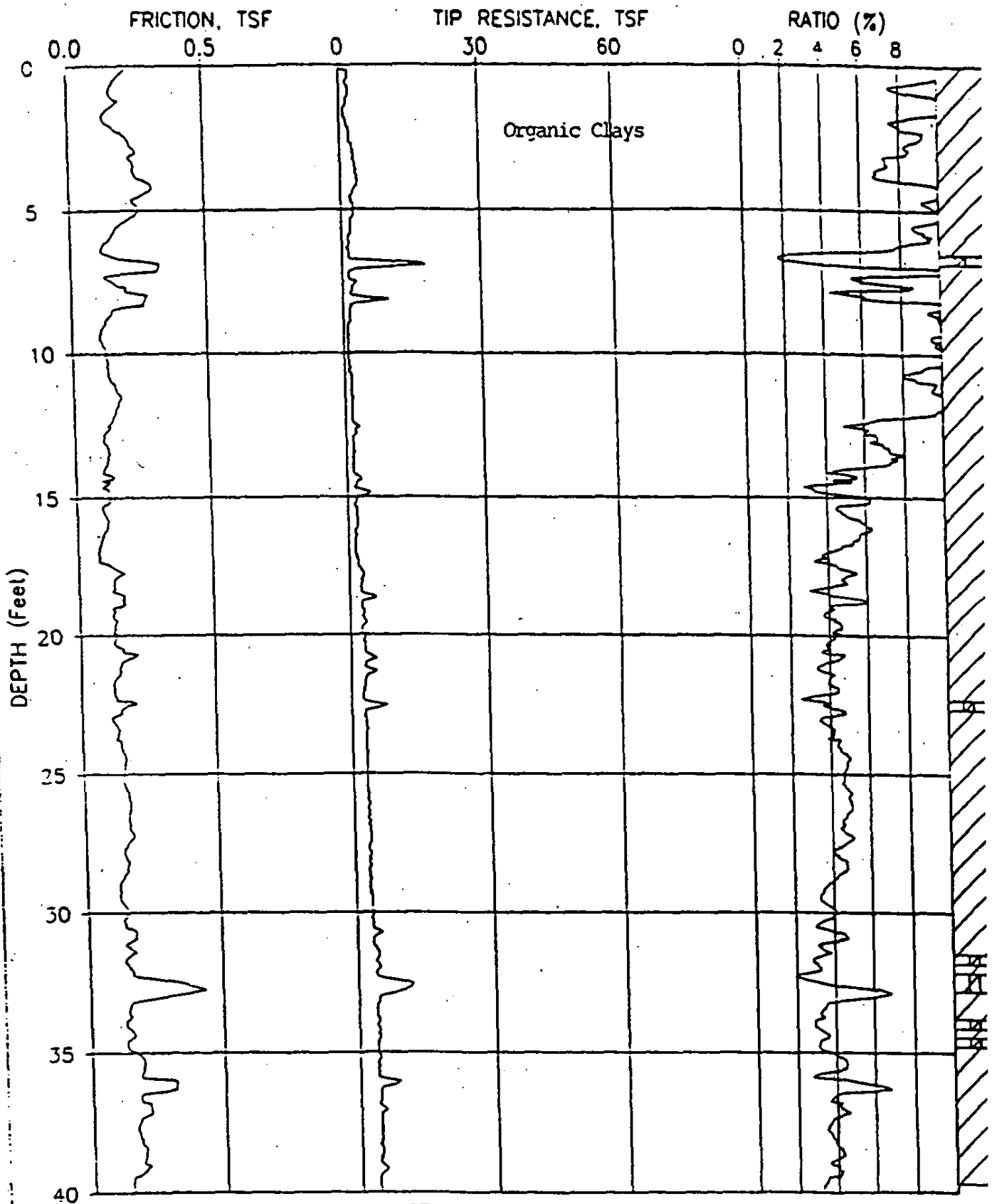

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ELEVATION : 0.00 CONE NUMBER: F5CKE709

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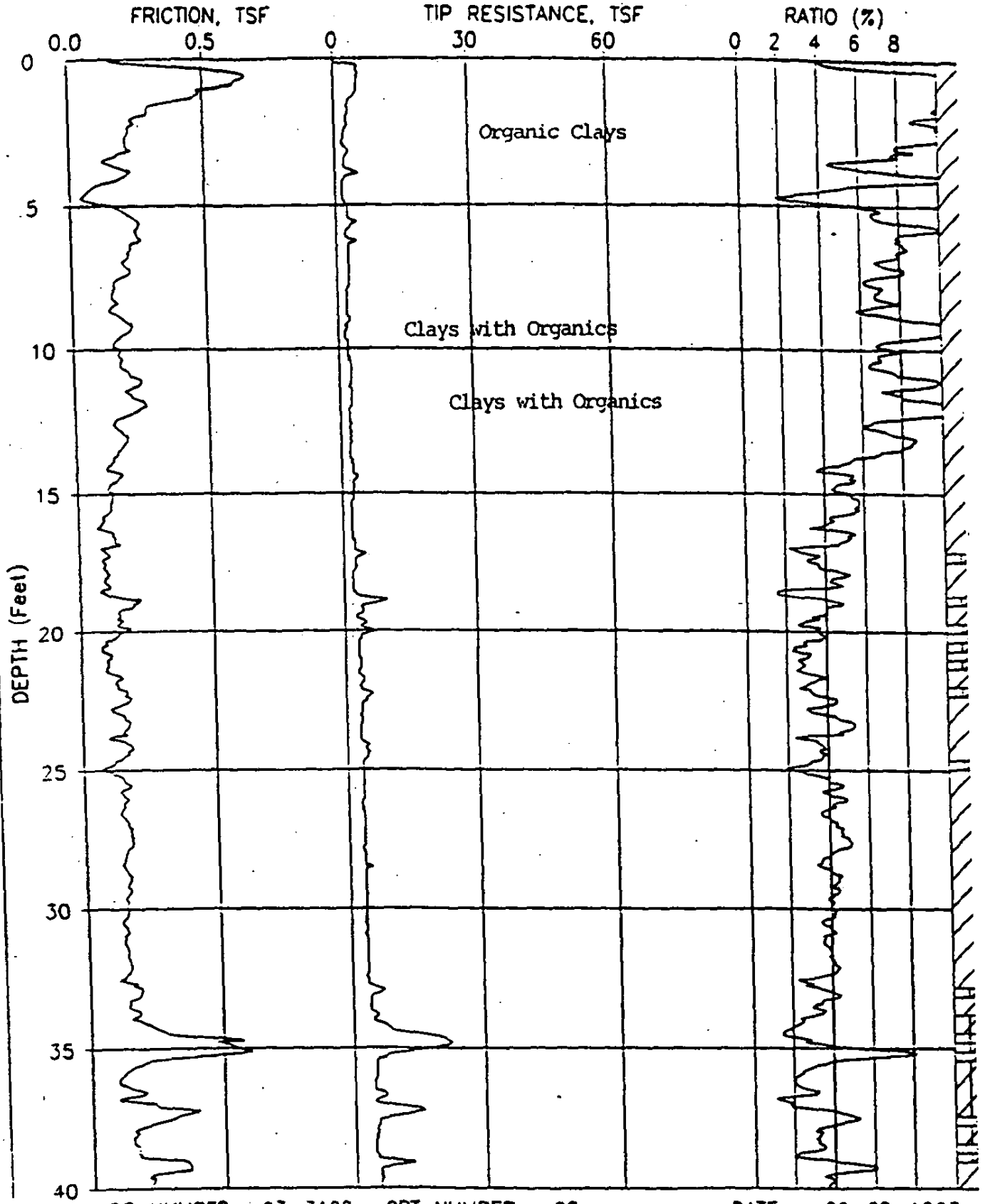

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ELEVATION : 0.00 CONE NUMBER: F5CKE611

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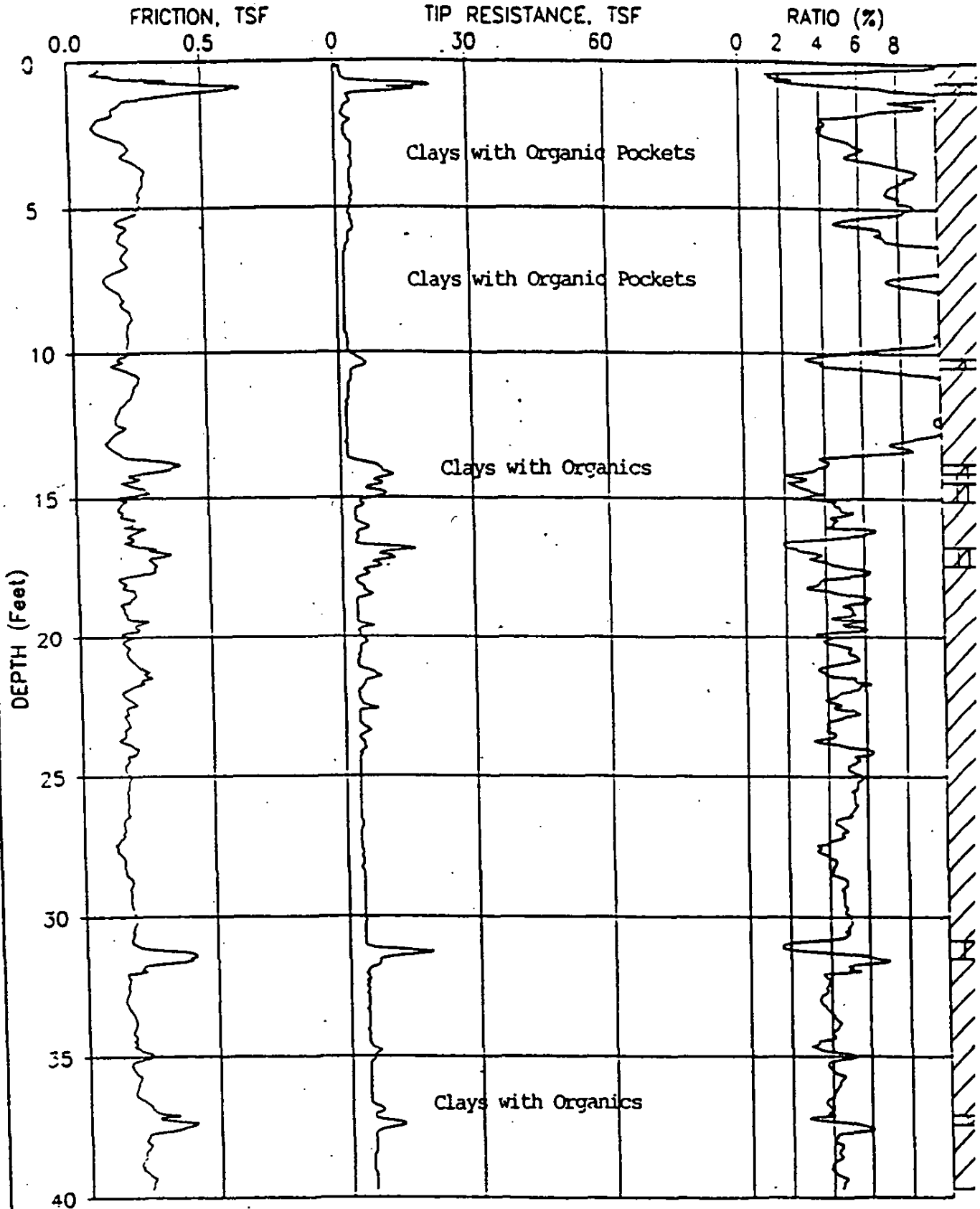

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ELEVATION : 0.00 CONE NUMBER: F5CKE611

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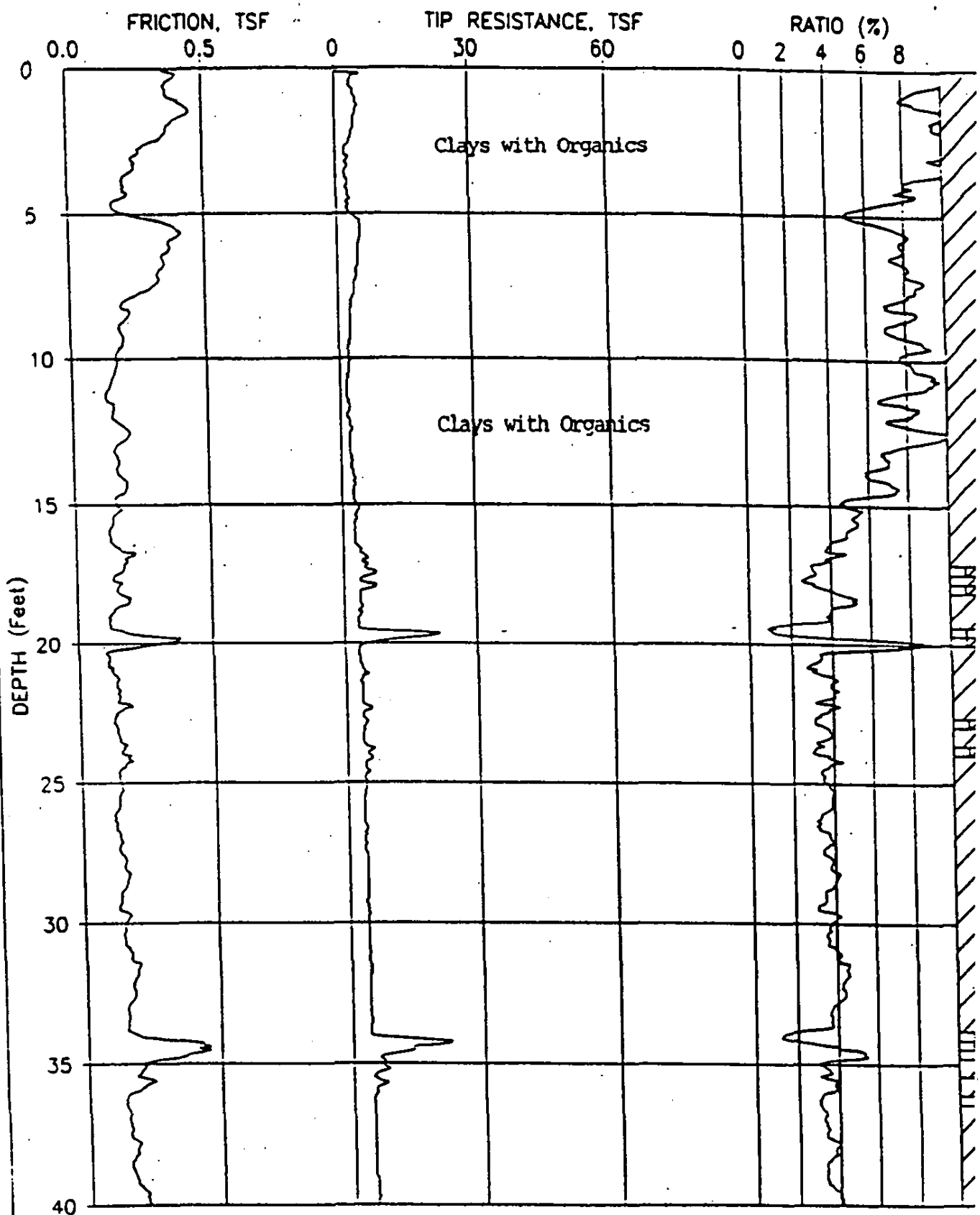

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ELEVATION : 0.00 CONE NUMBER: F5CKE709

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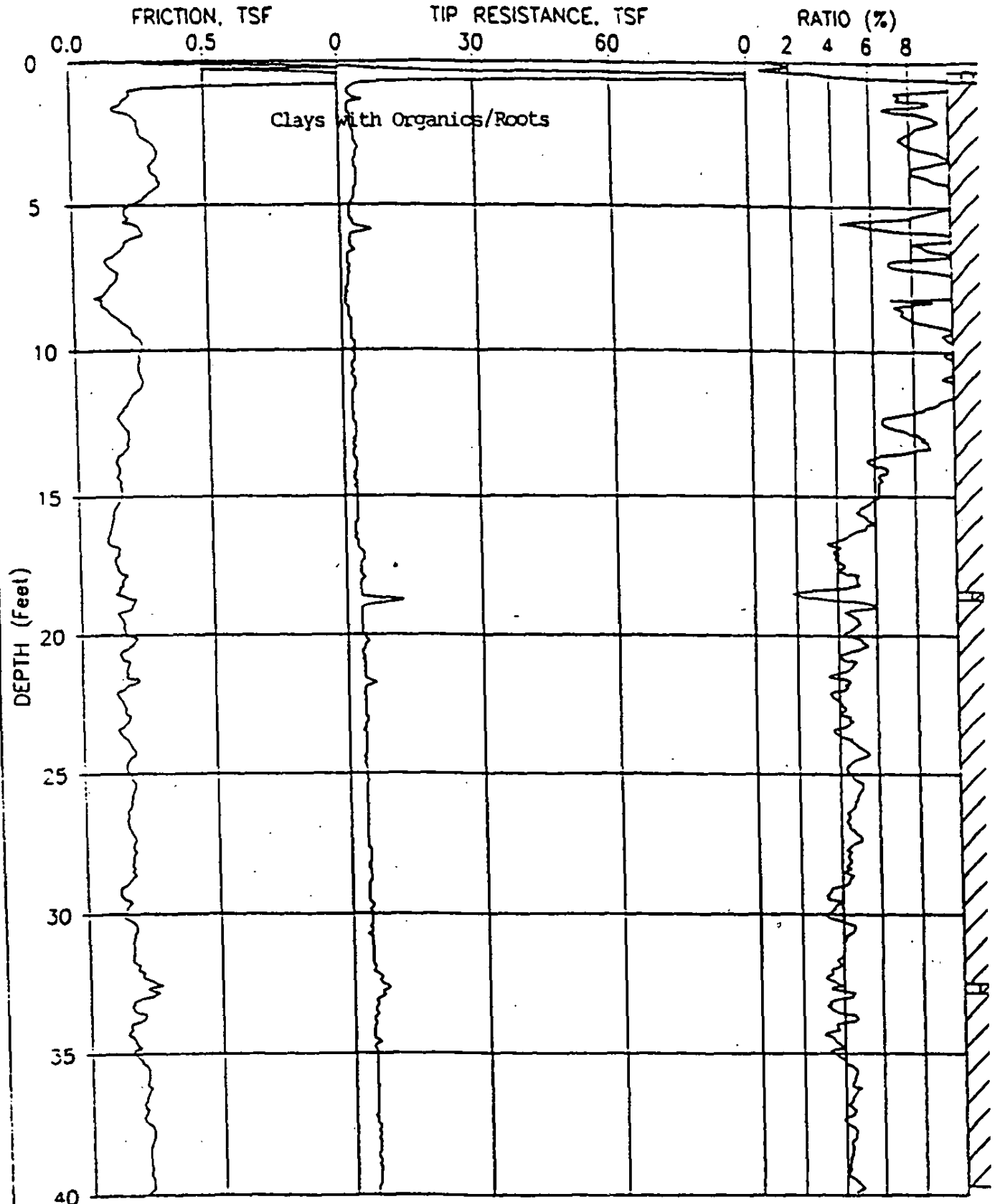

JOB NUMBER : 93-3108 CPT NUMBER : 11 DATE : 08-30-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE709

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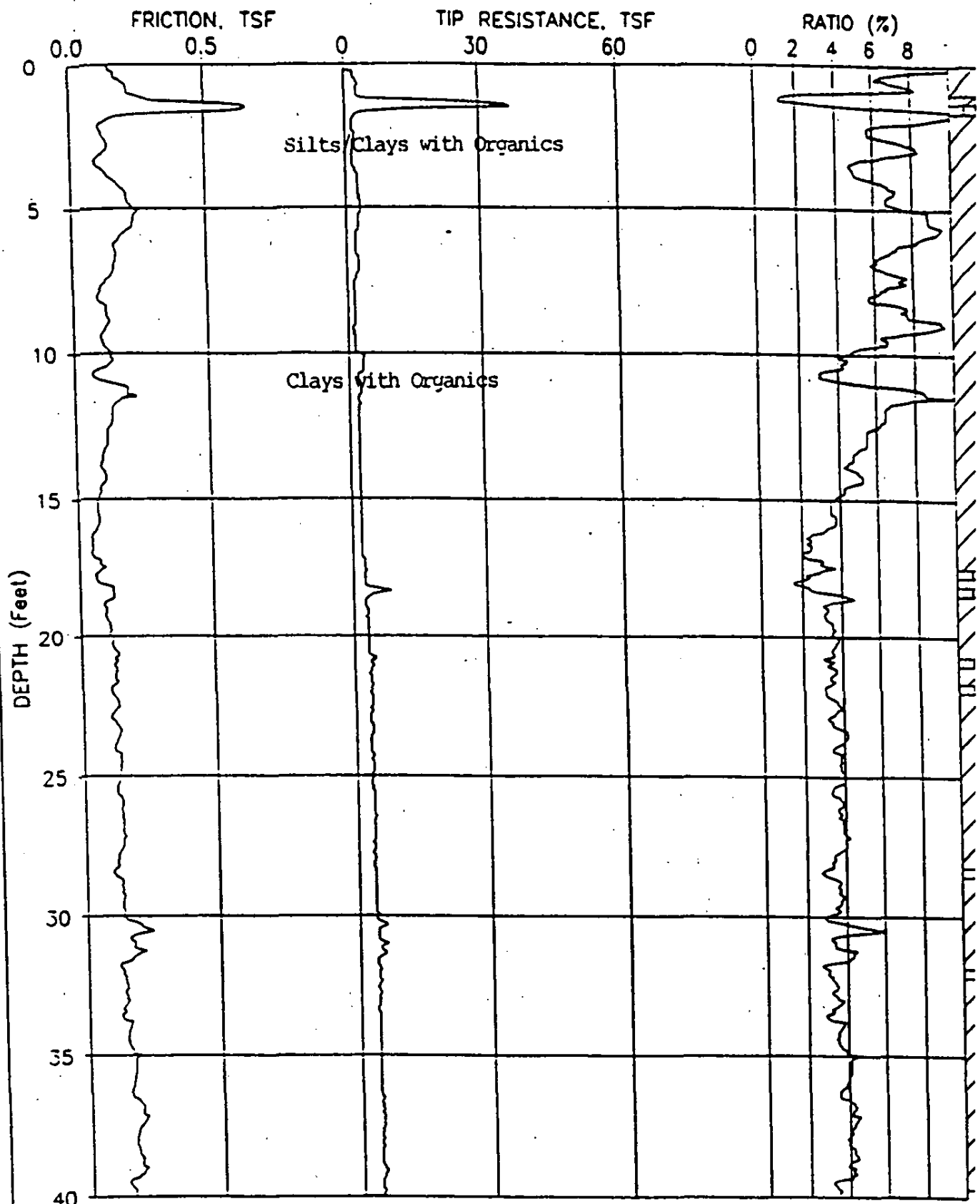

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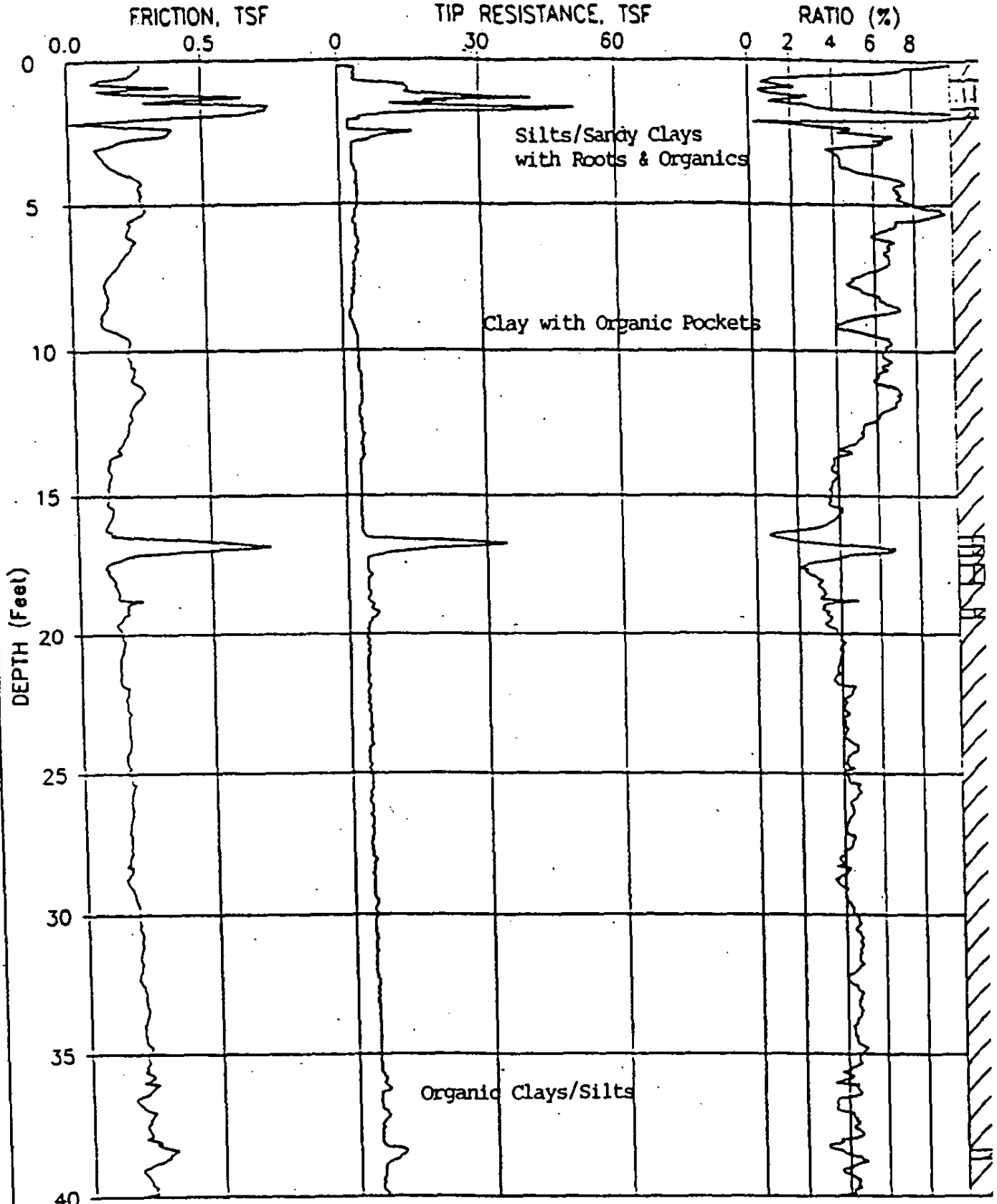

JOB NUMBER : 93-3108 CPT NUMBER : C13 DATE : 08-26-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE709

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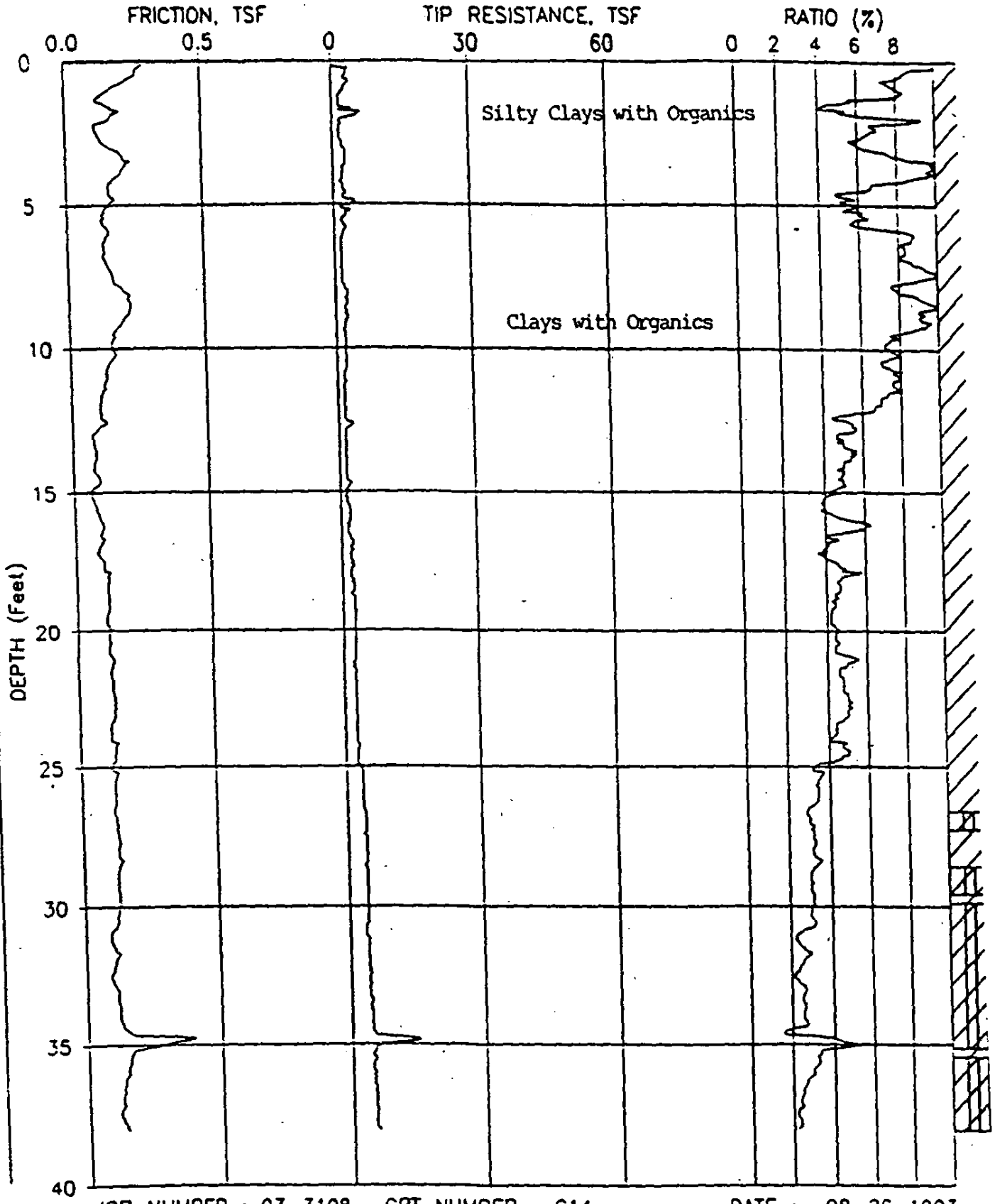

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ELEVATION : 0.00 CONE NUMBER: F5CKE709

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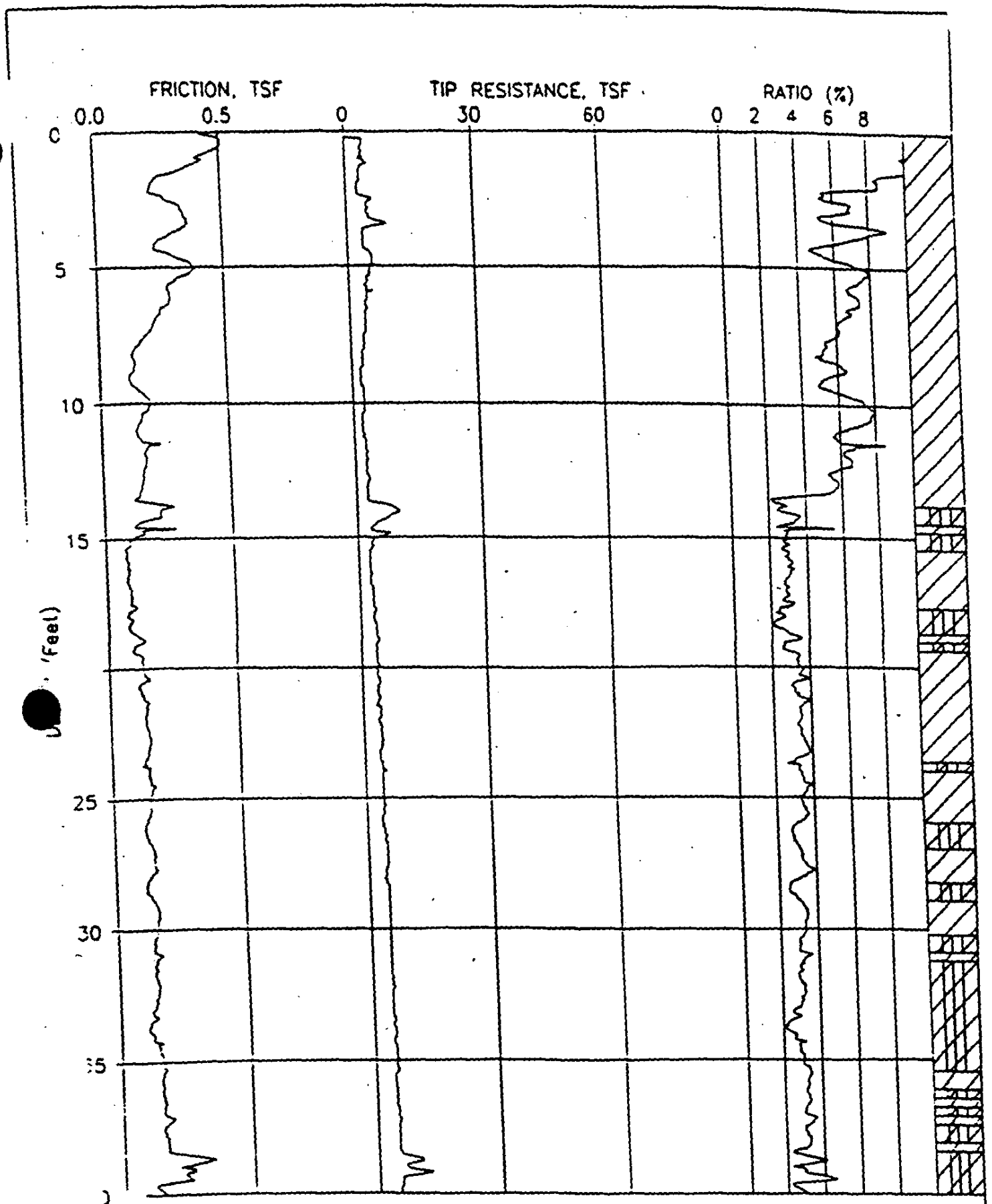
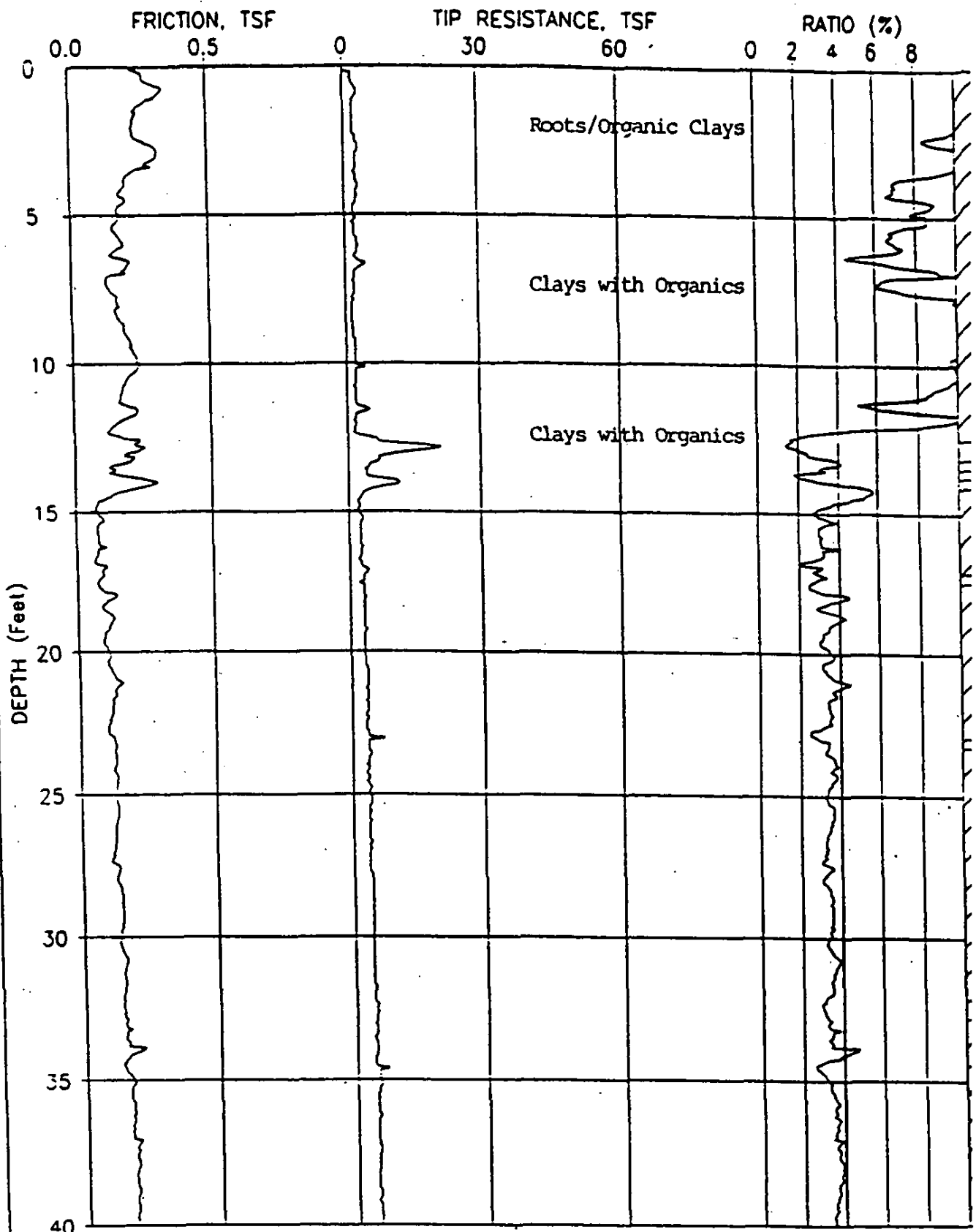


3 NUMBER : 93-3108 CPT NUMBER : C16 DATE : 08-25-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE709

GEOSCIENCES,INC



JOB NUMBER : 93-3108 CPT NUMBER : C17 DATE : 08-25-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE709

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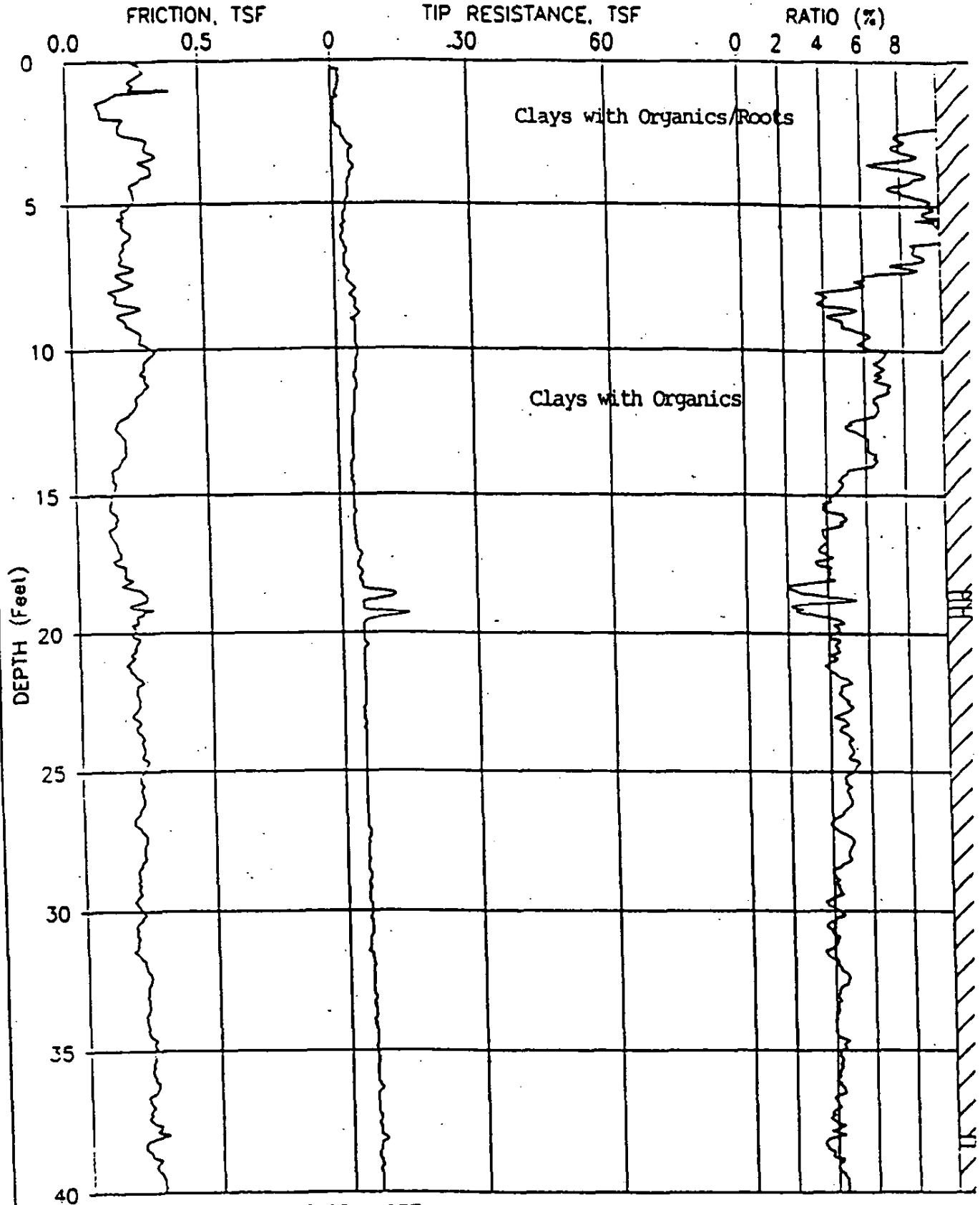

JOB NUMBER : 93-3108 CPT NUMBER : C18 DATE : 08-31-1993
ELEVATION : 0.00 CONE NUMBER: F5CKE611

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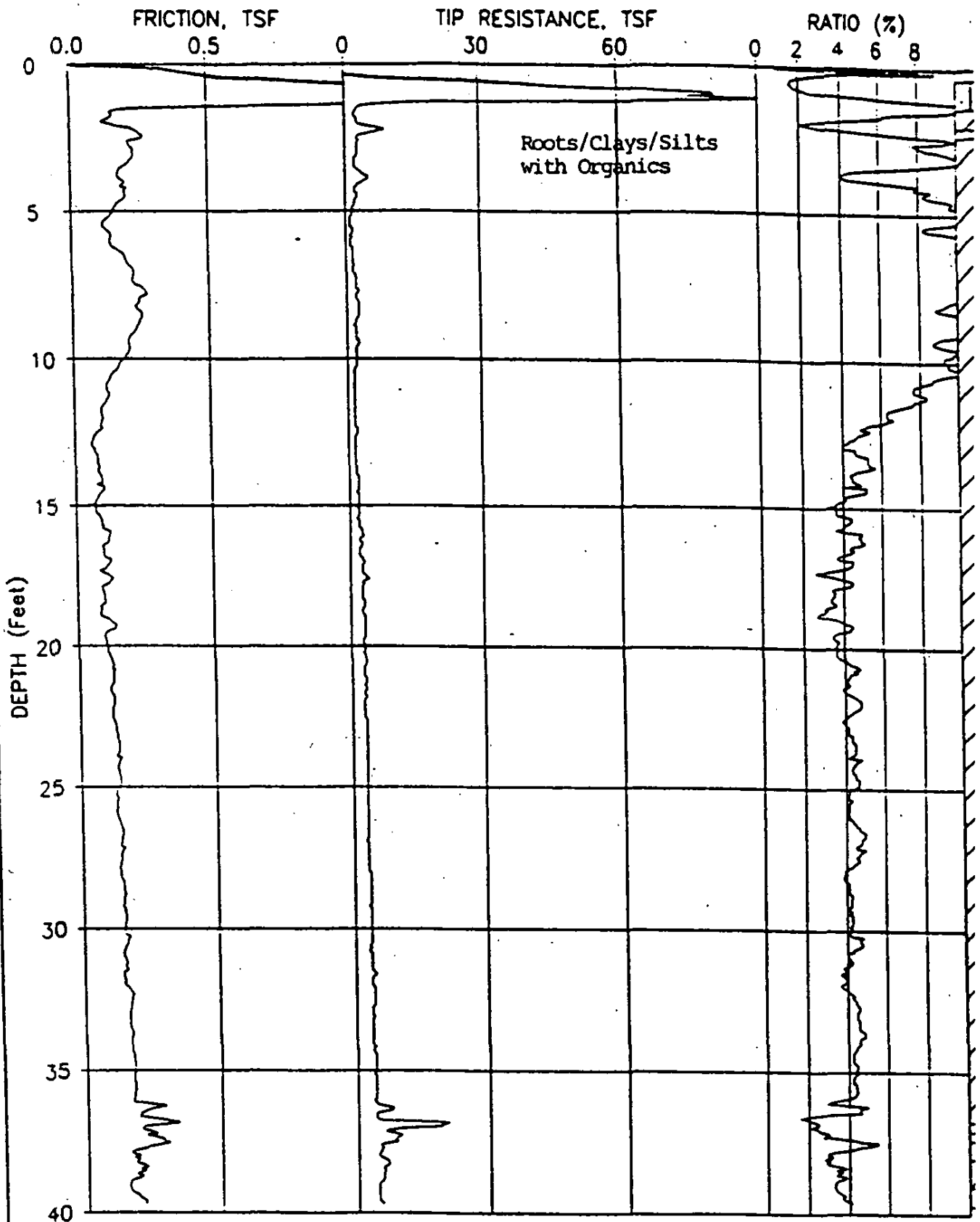

JOB NUMBER : 93-3108 CPT NUMBER : C19 DATE : 08-26-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE709

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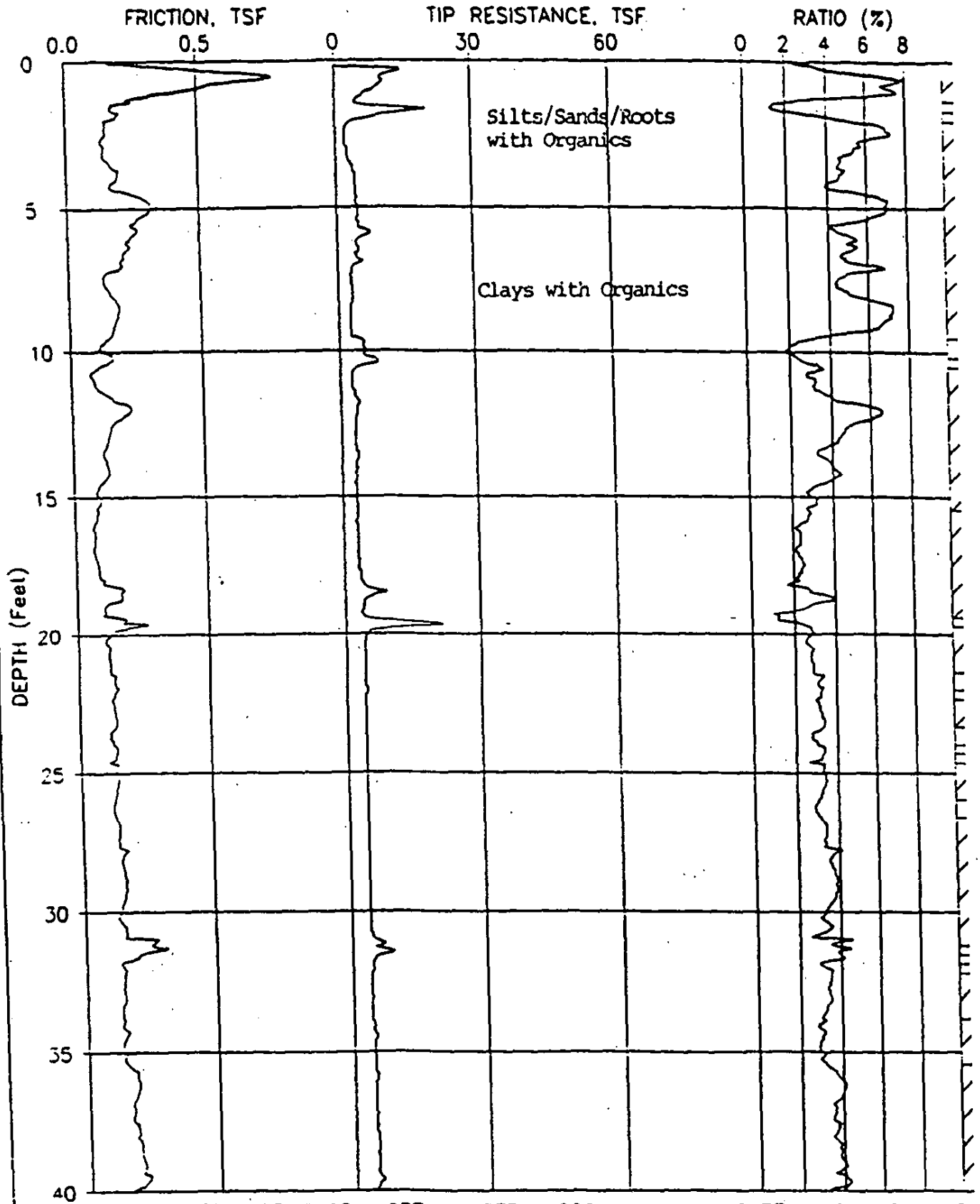

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ELEVATION : 0.00 CONE NUMBER: F5CKE709

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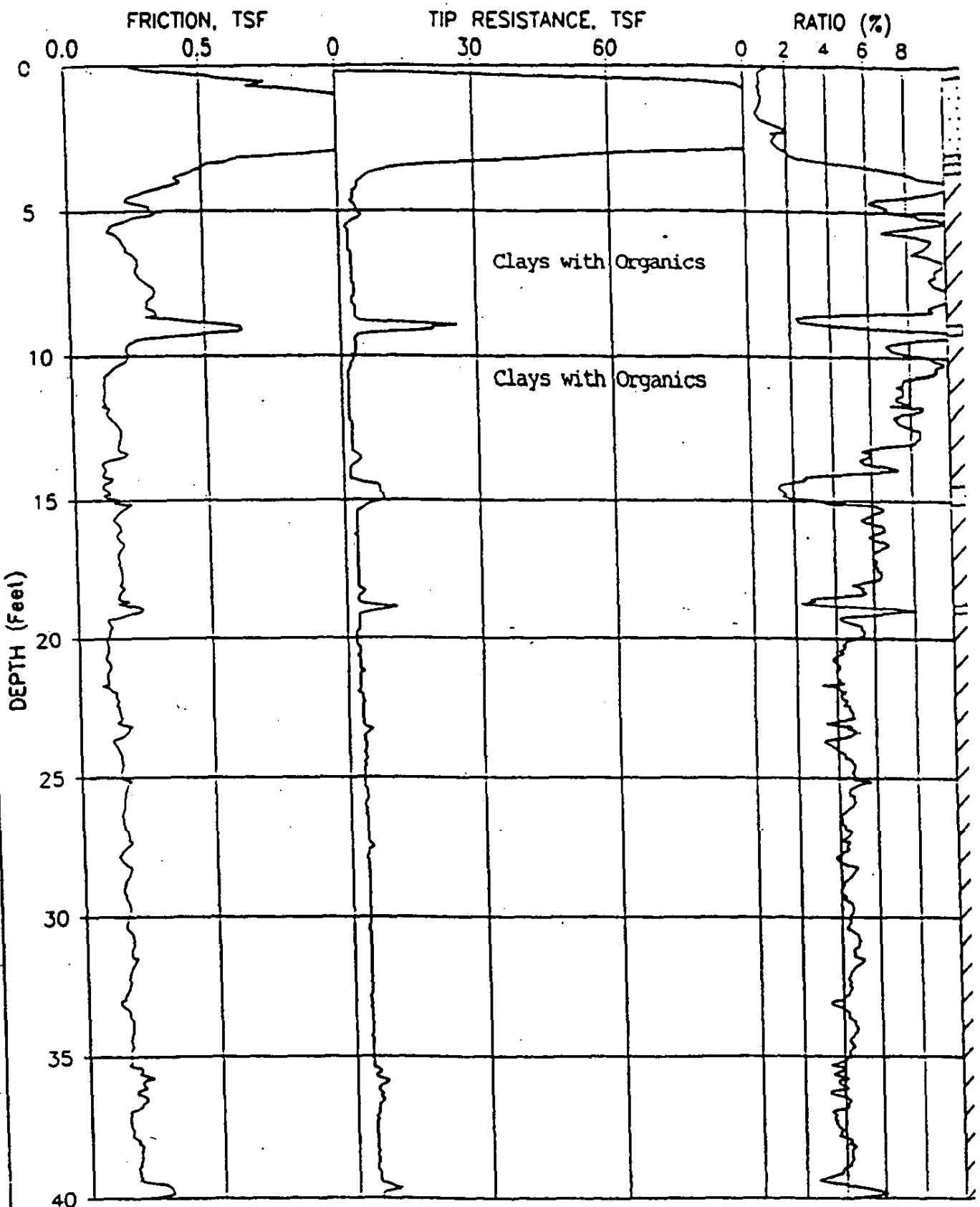

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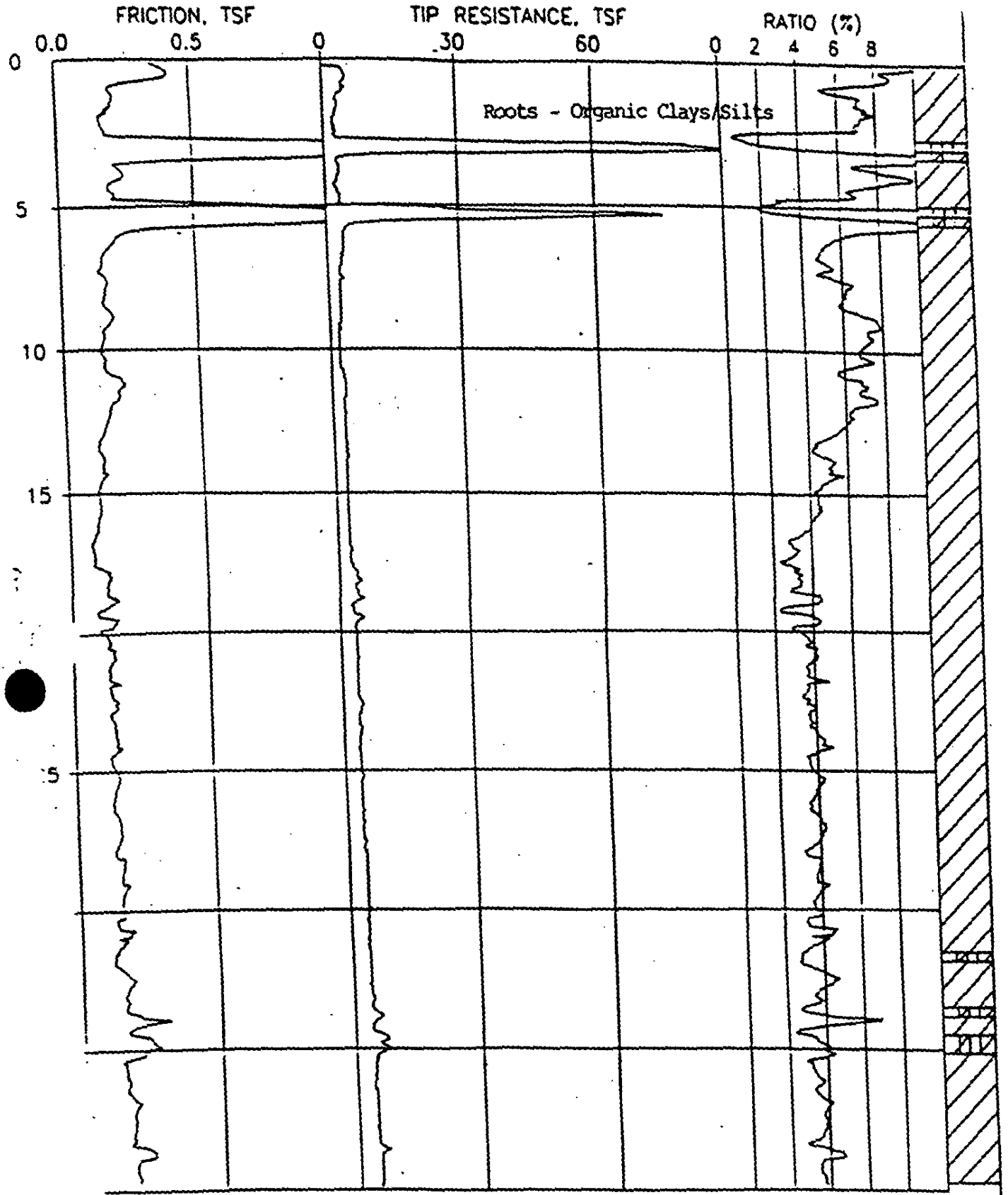

JMBER : 93-3108 CPT NUMBER : C22 DATE : 08-30-1993

ION : 0.00 CONE NUMBER: F5CKE709

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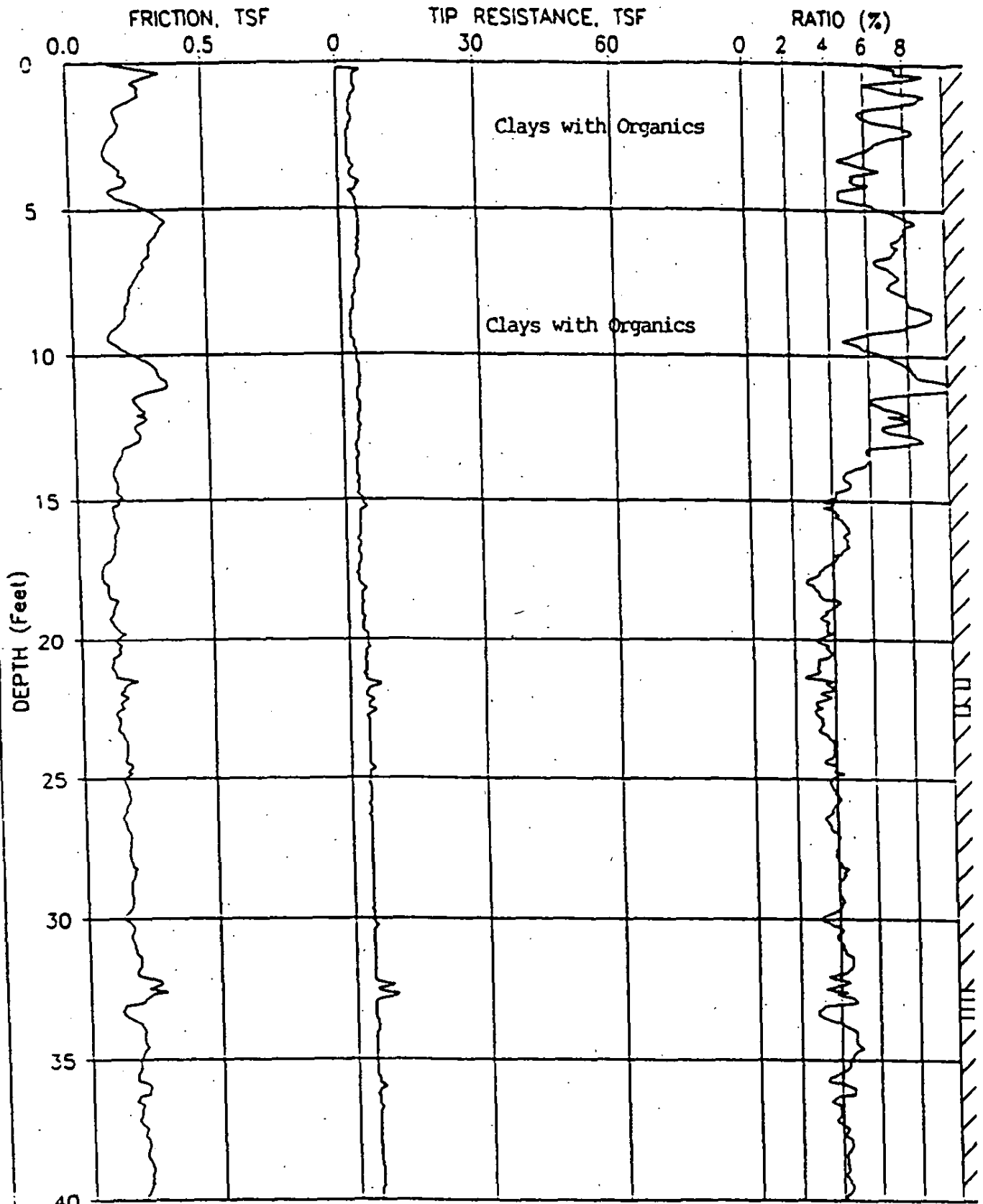

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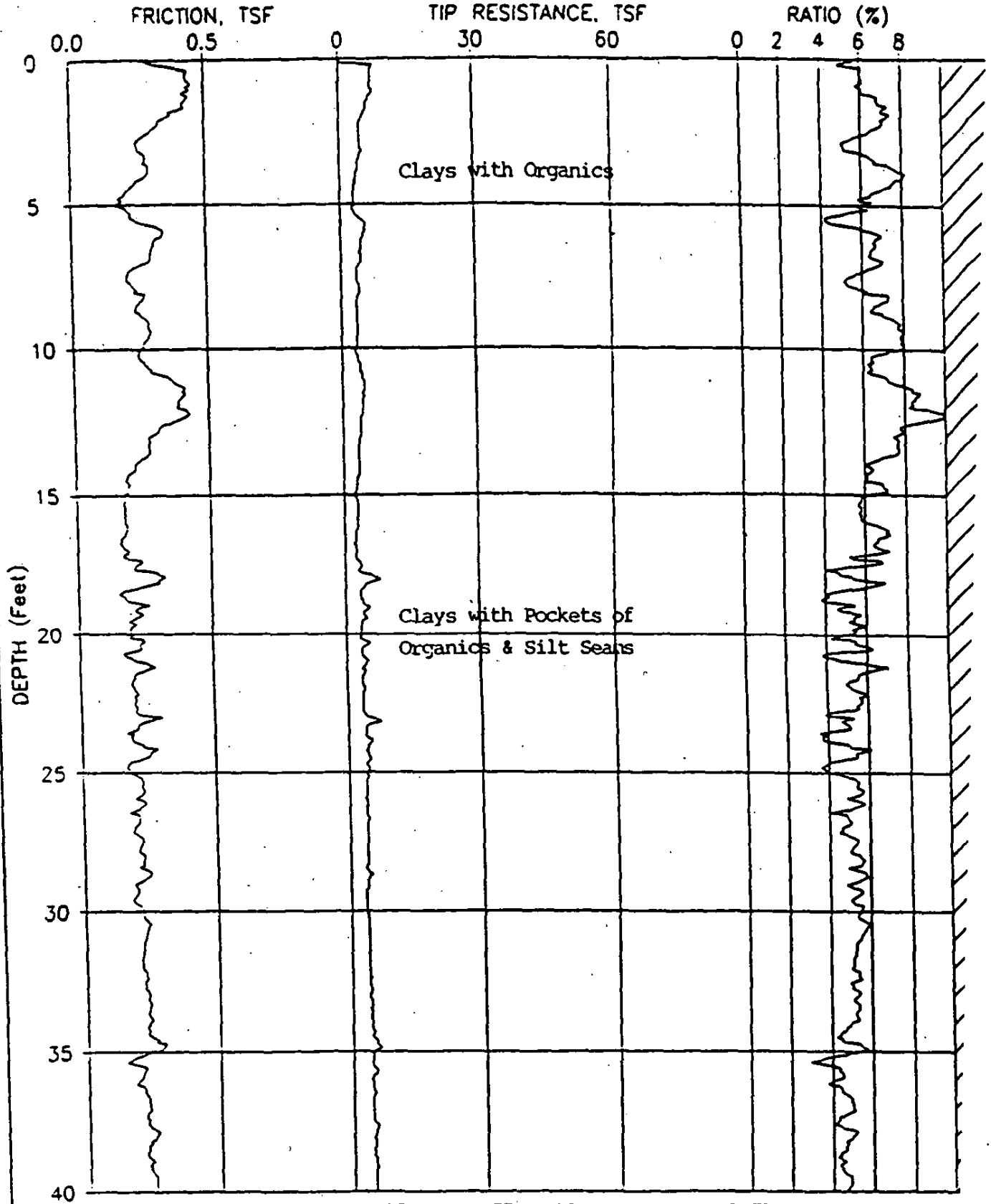

JOB NUMBER : 93-3108 CPT NUMBER : C24 DATE : 08-31-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE611

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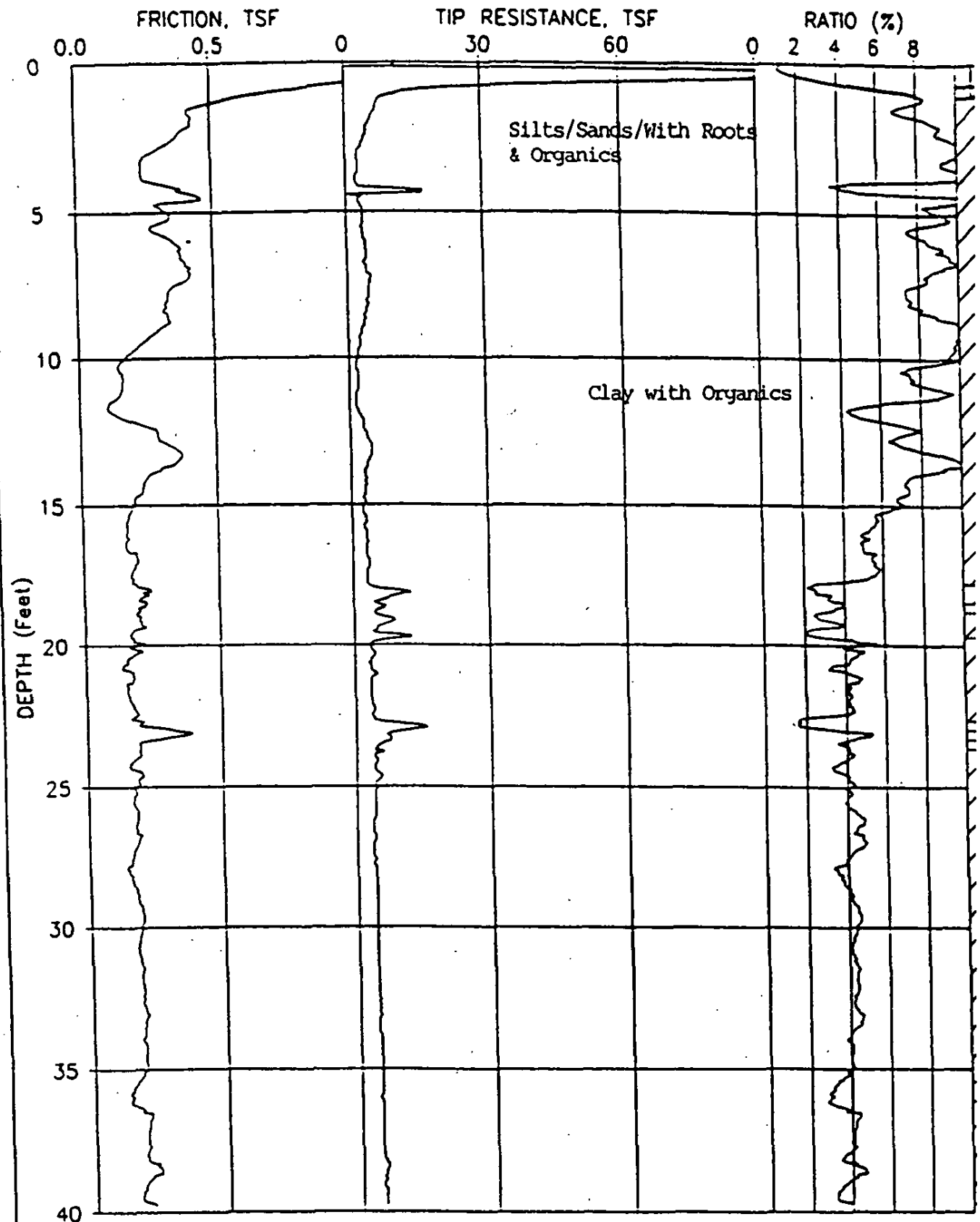

JOB NUMBER : 93-3108 CPT NUMBER : C25 DATE : 08-30-1993
ELEVATION : 0.00 CONE NUMBER: F5CKE709

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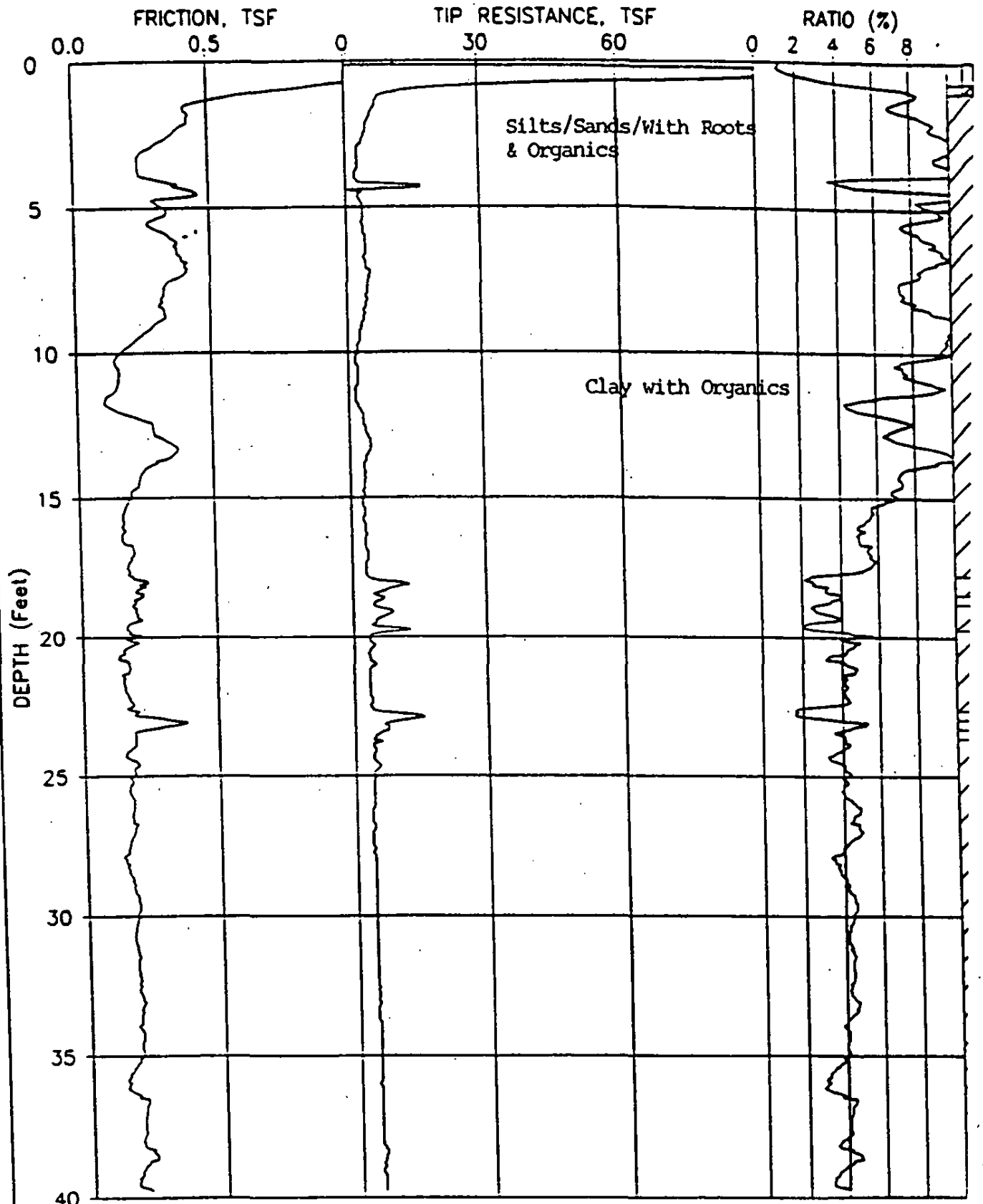
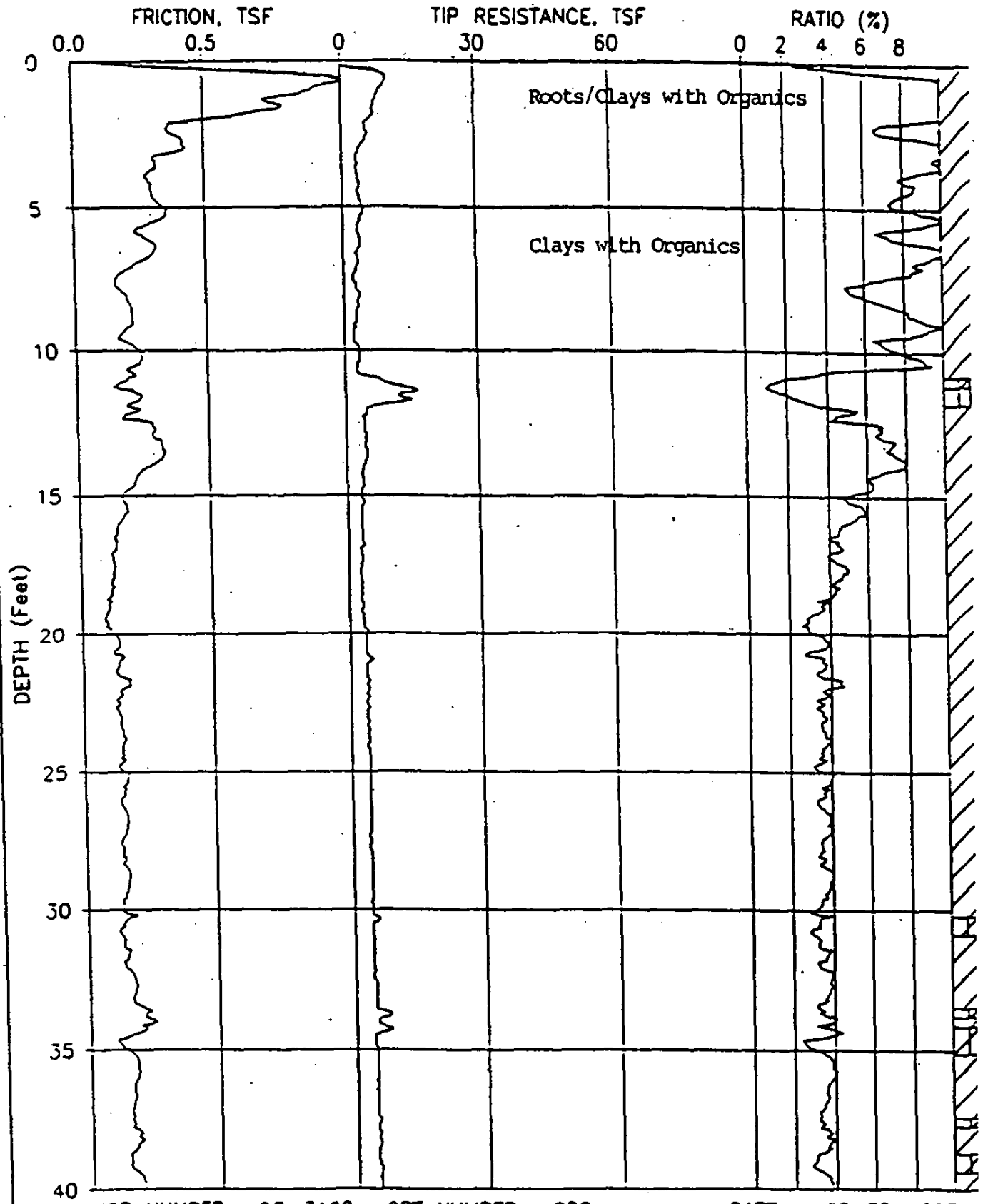


JOB NUMBER : 93-3108 CPT NUMBER : C25 DATE : 08-30-1993
ELEVATION : 0.00 CONE NUMBER: F5CKE709

FUGRO GEOSCIENCES,INC



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ELEVATION : 0.00 CONE NUMBER: F5CKE709

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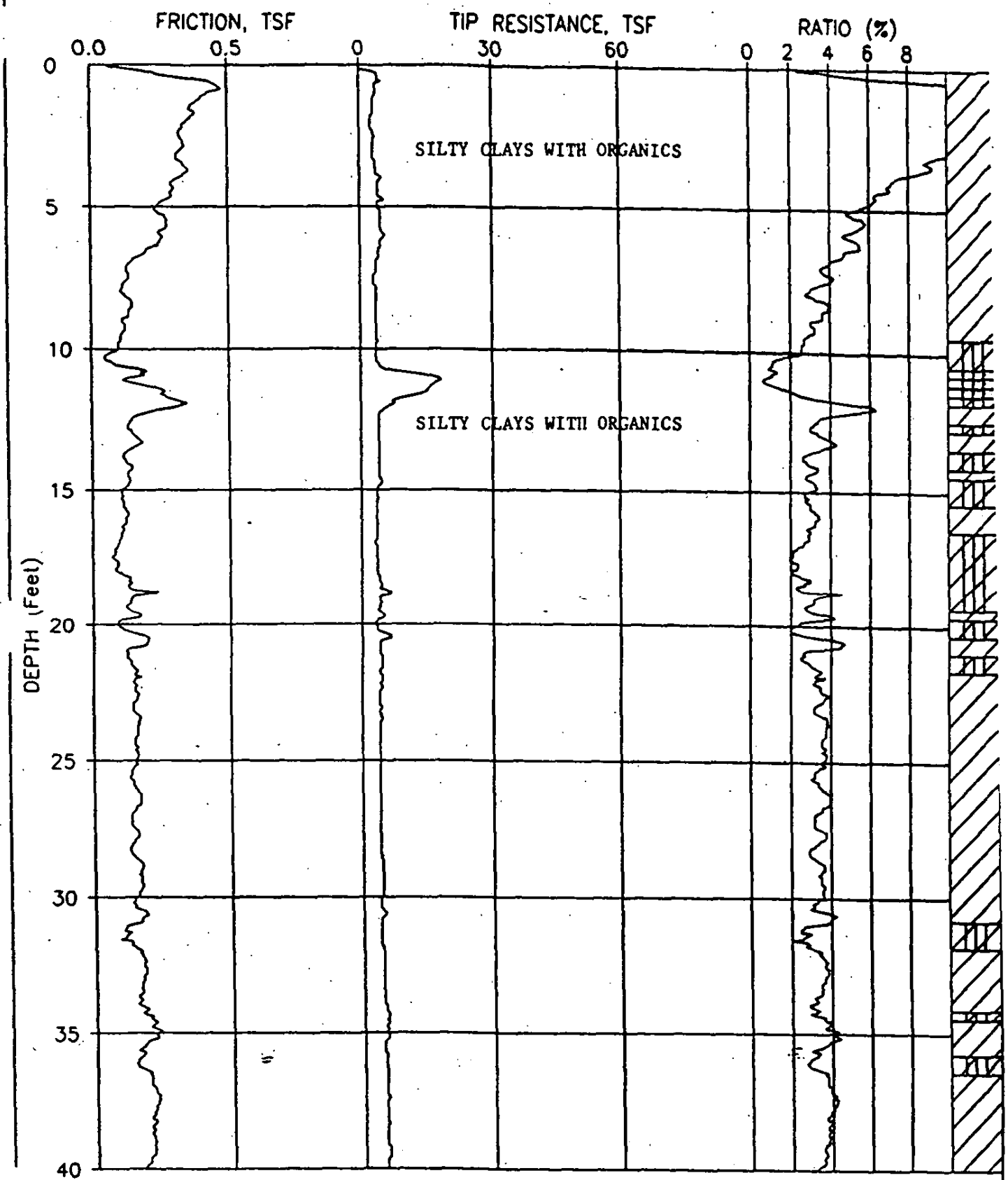
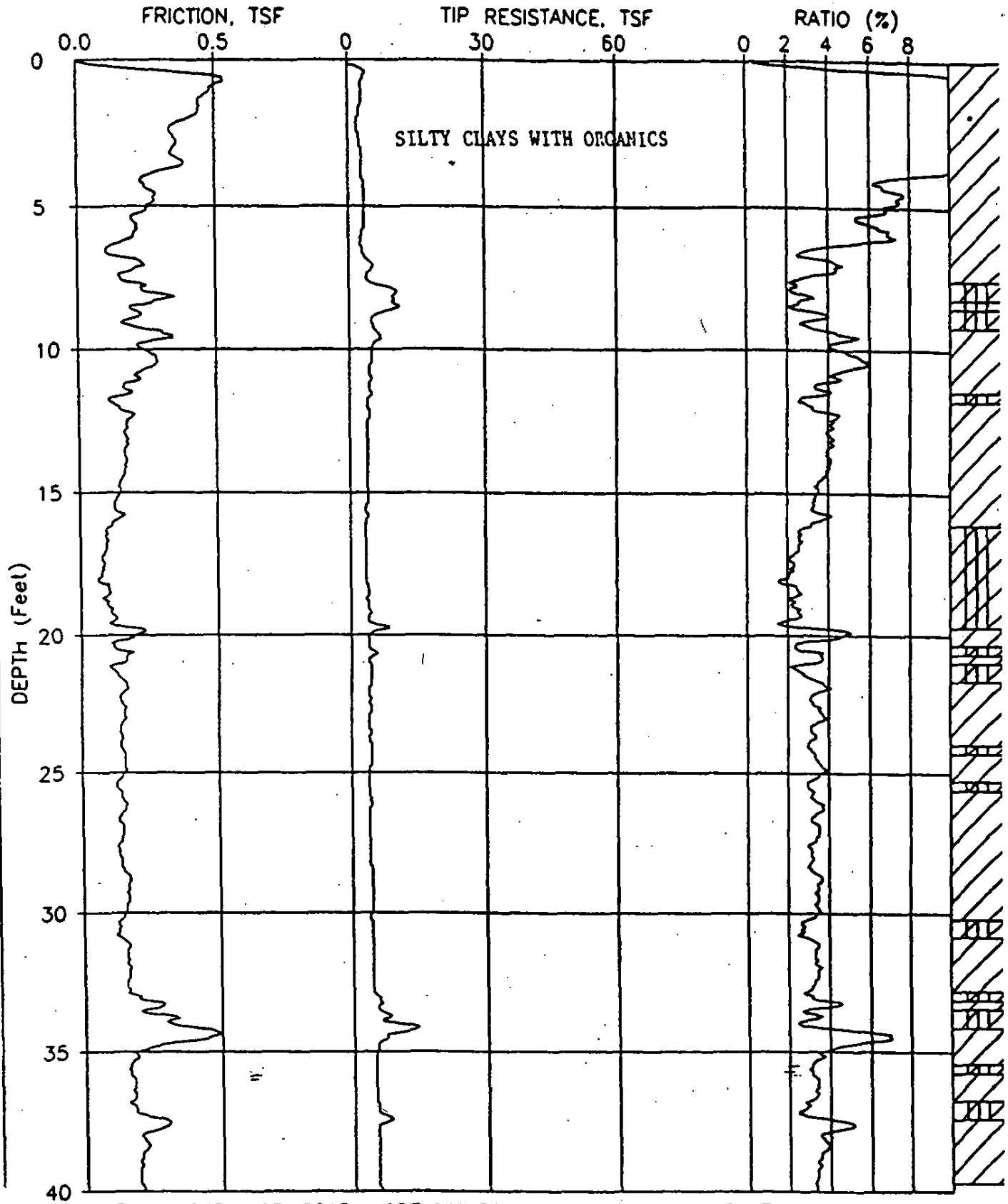


JOB NUMBER : 95-5013 CPT NUMBER : C-27 DATE : 01-24-1995

ELEVATION : 0.00 CONE NUMBER: F7.5CKEV080

FUGRO GEOSCIENCES,INC



JOB NUMBER : 95-5013 CPT NUMBER : C-28 DATE : 01-24-1995

ELEVATION : 0.00 CONE NUMBER: F7.5CKEV080

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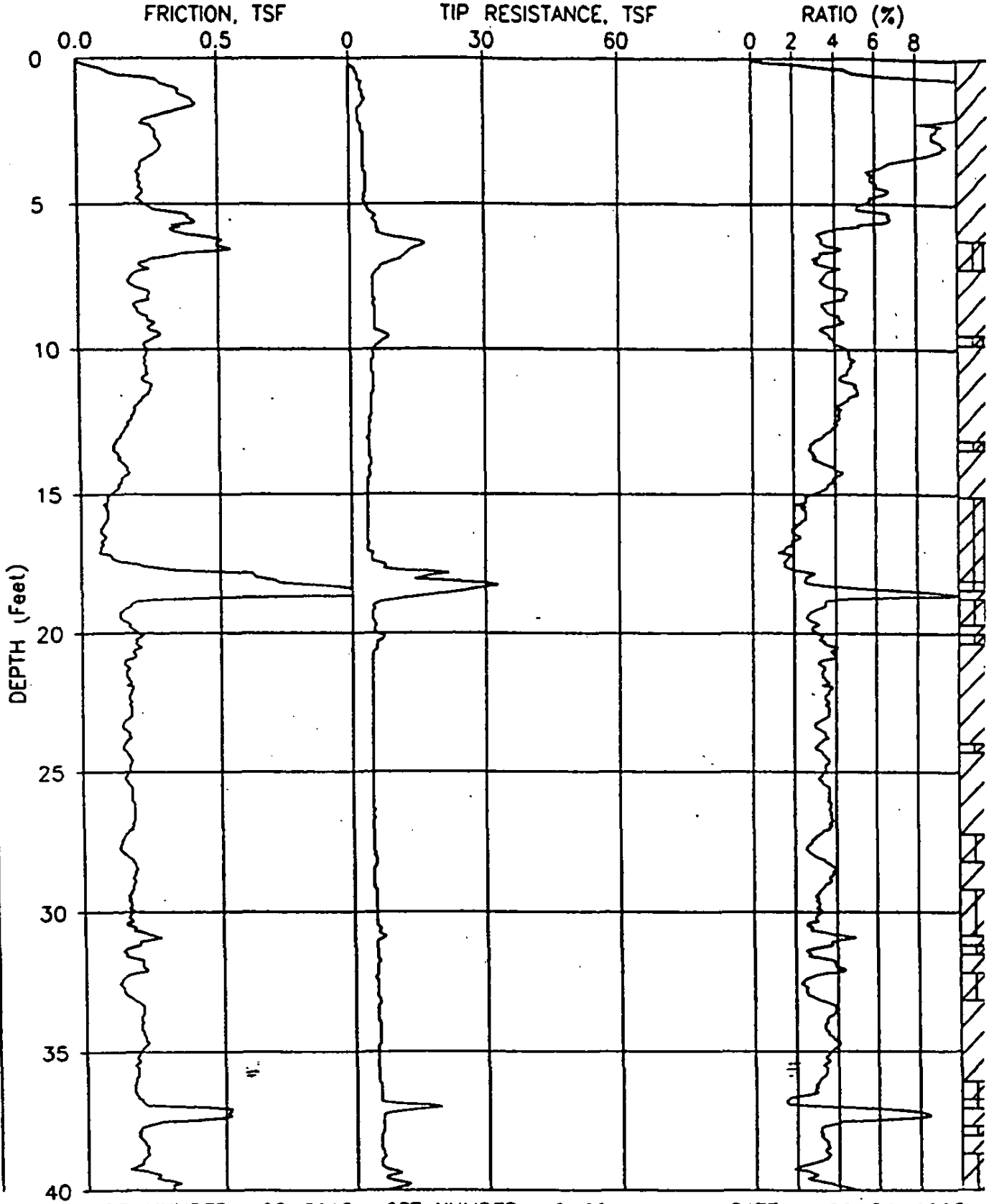
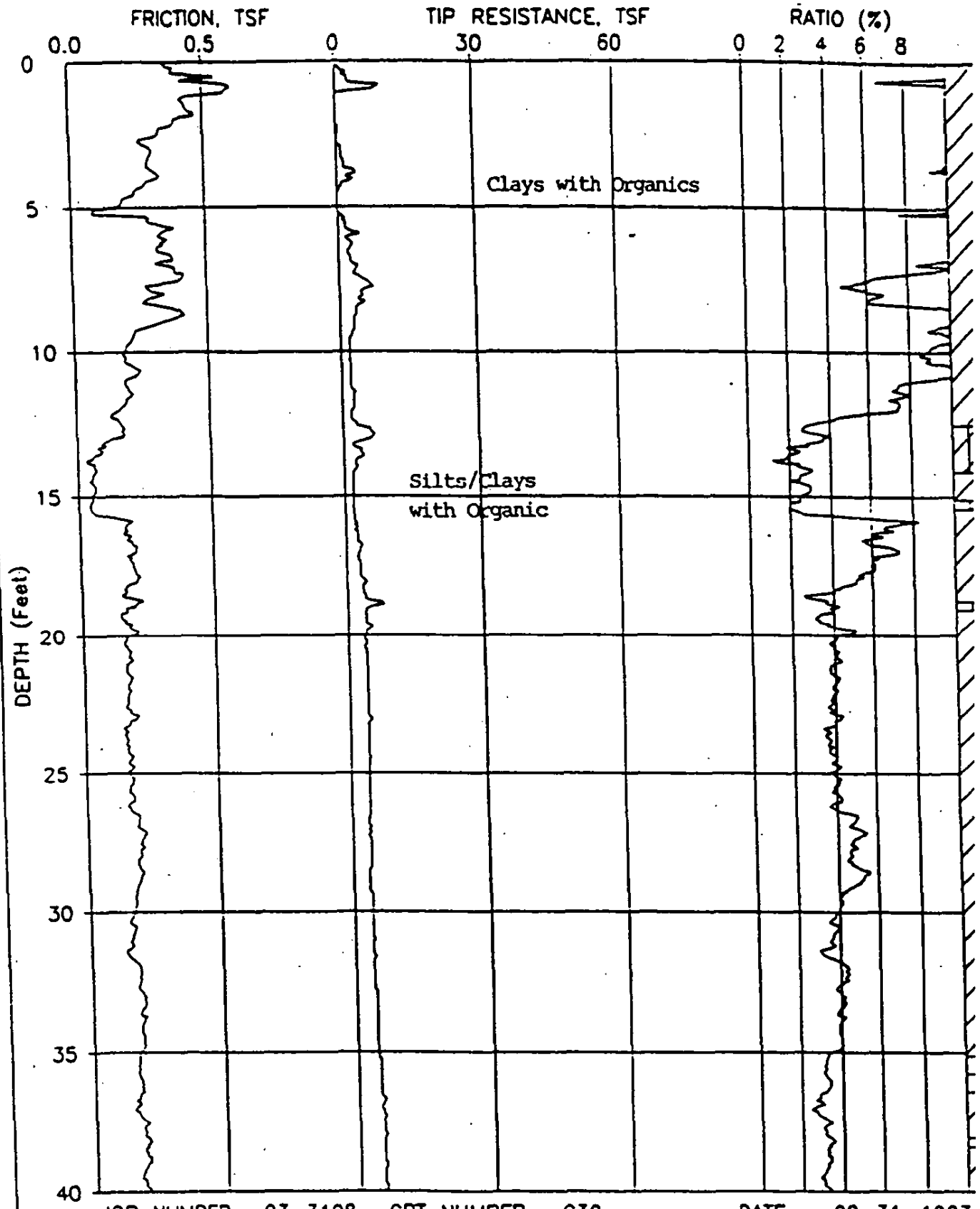


JOB NUMBER : 95-5013 CPT NUMBER : C-29 DATE : 01-24-1995
ELEVATION : 0.00 CONE NUMBER: F7.5CKEV080

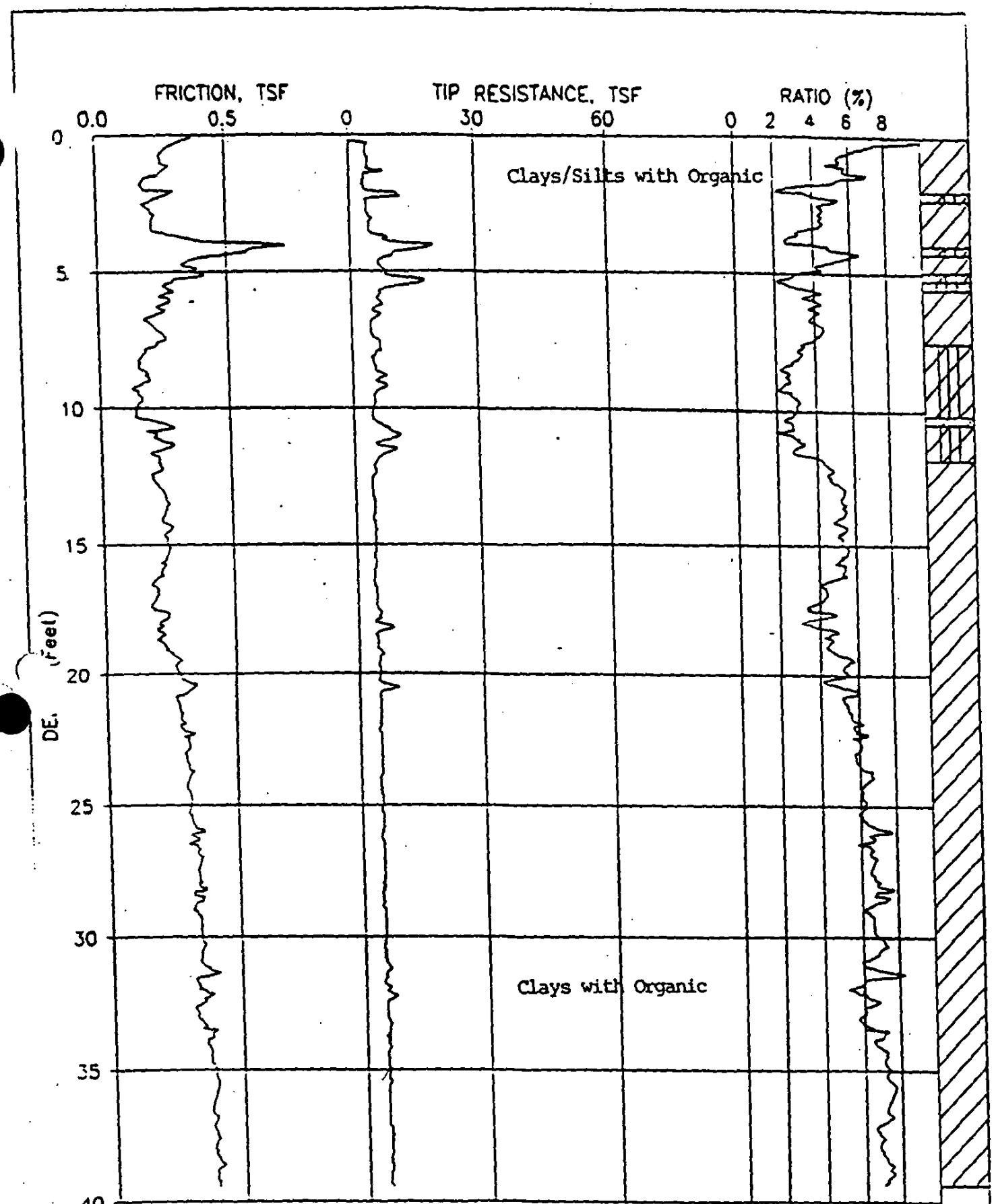
FUGRO GEOSCIENCES,INC



JOB NUMBER : 93-3108 CPT NUMBER : C30 DATE : 08-31-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE611

FUGRO GEOSCIENCES,INC



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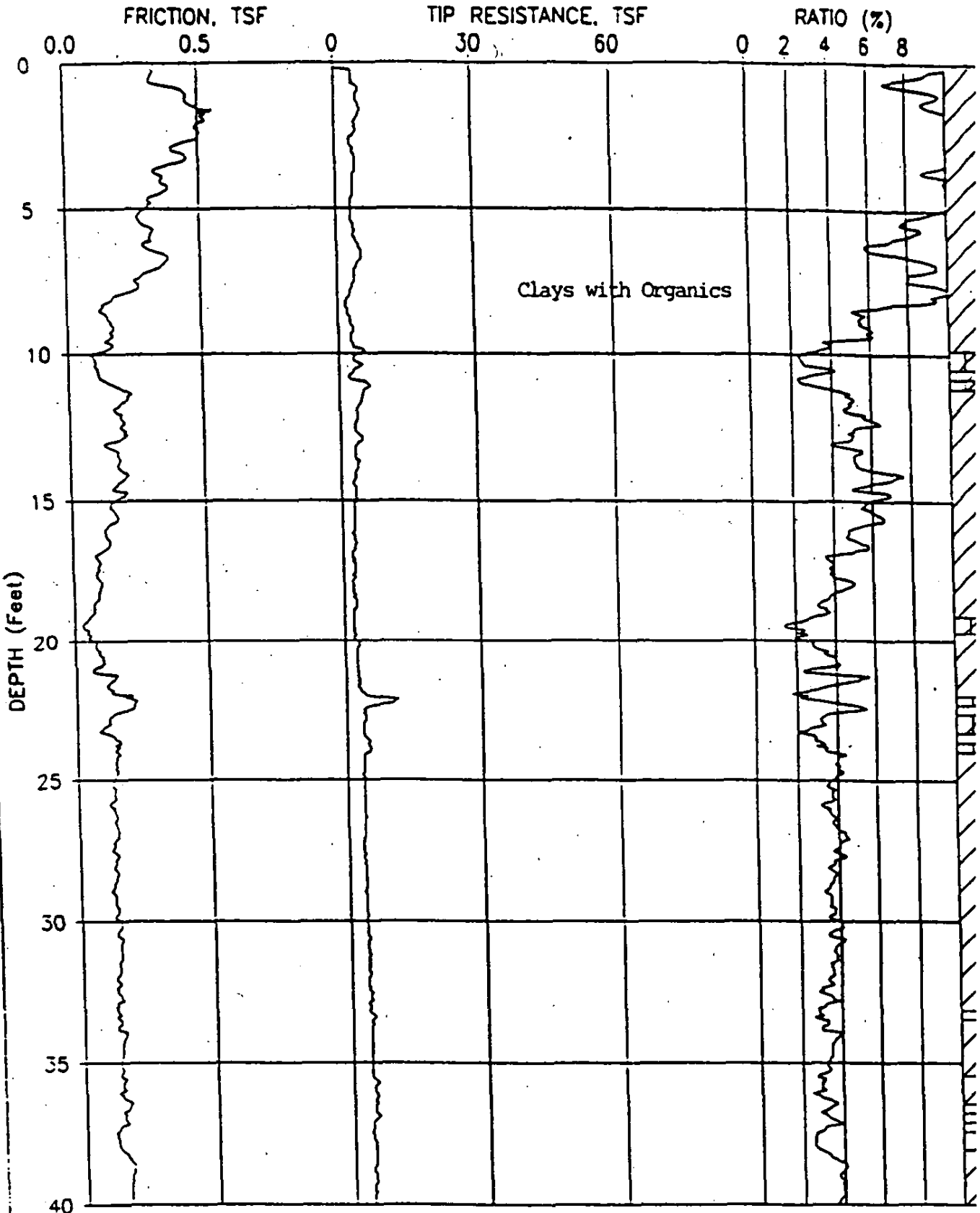
ELEVATION : 0.00 CONE NUMBER: F5CKE709

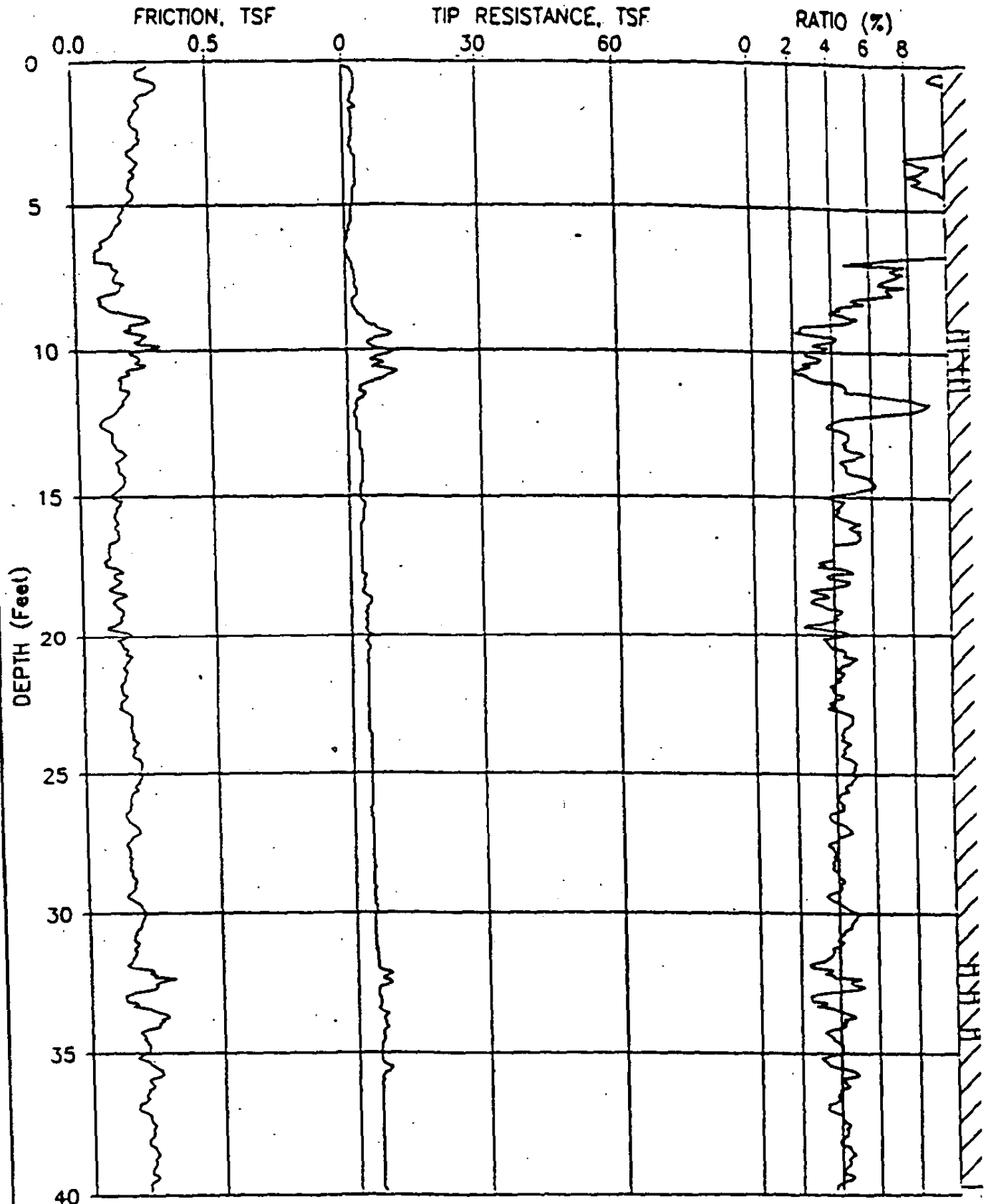
FUGRO GEOSCIENCES,INC



JOB NUMBER : 93-3108 CPT NUMBER : C32 DATE : 09-02-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE611

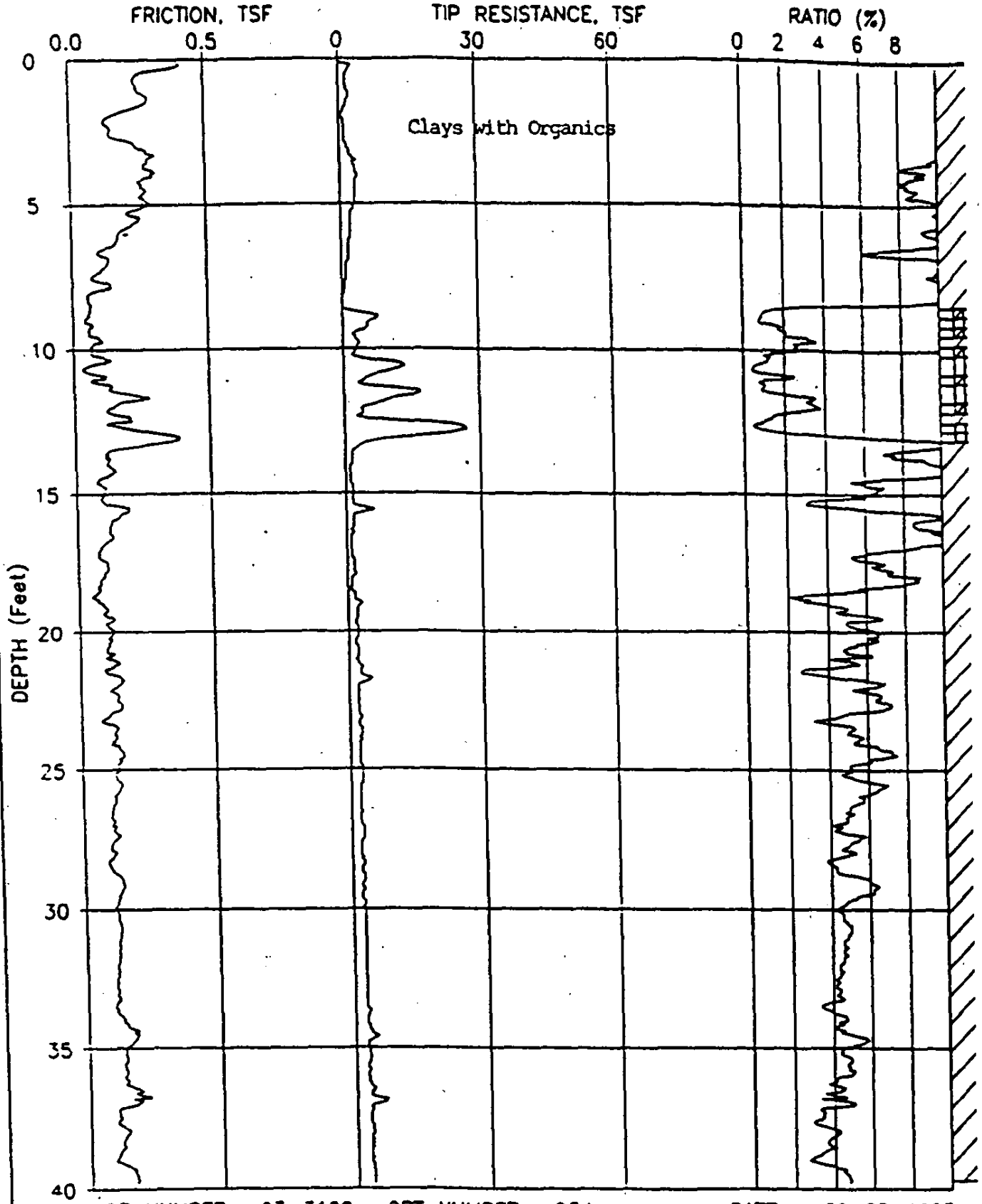
FUGRO GEOSCIENCES,INC



JOB NUMBER : 93-3108 CPT NUMBER : C33 DATE : 09-02-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE611

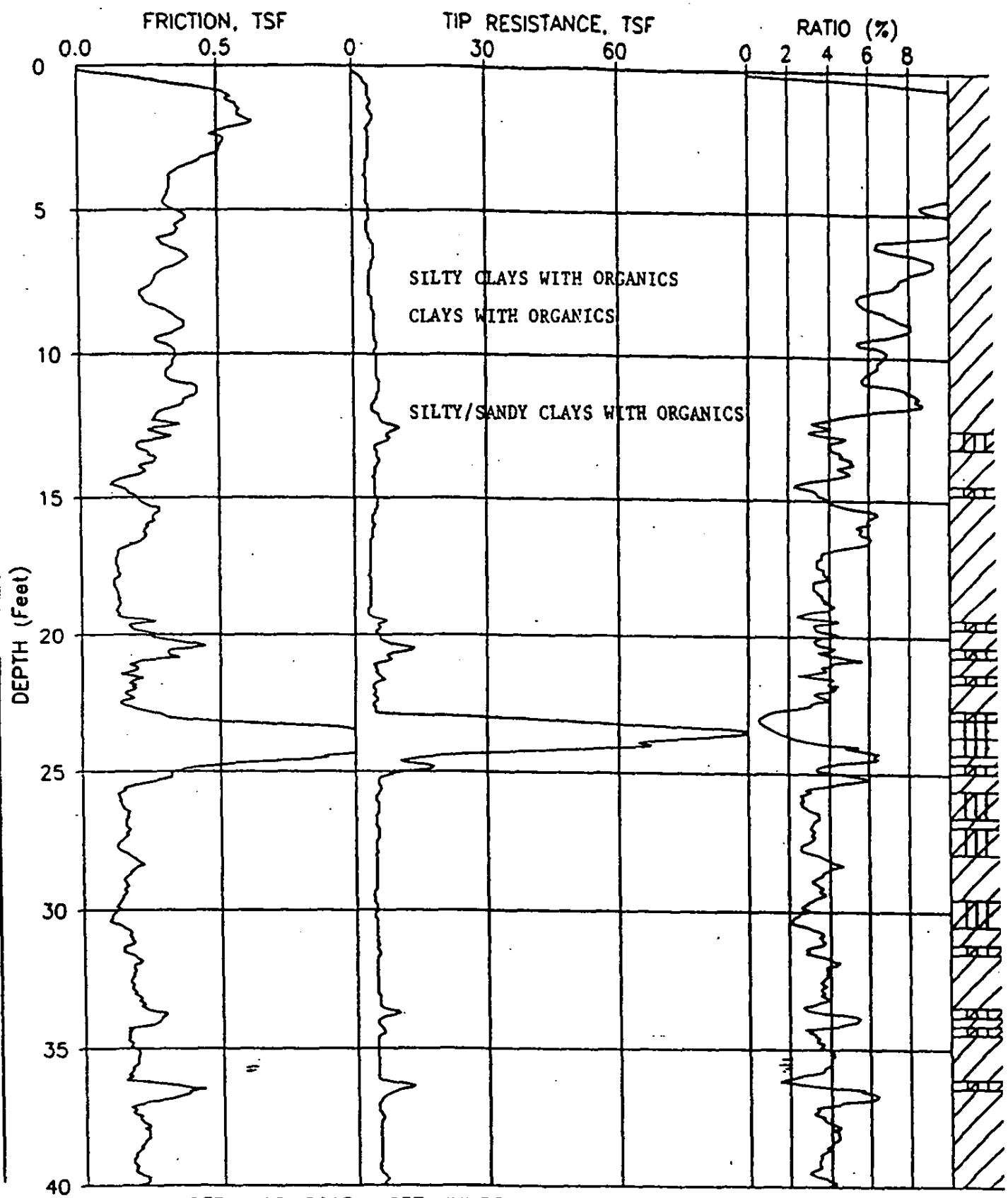
FUGRO GEOSCIENCES,INC



JOB NUMBER : 93-3108 CPT NUMBER : C34 DATE : 09-02-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE611

FUGRO GEOSCIENCES,INC



JOB NUMBER : 95-5013 CPT NUMBER : C-35 DATE : 01-25-1995

ELEVATION : 0.00 CONE NUMBER: F7.5CKEV080

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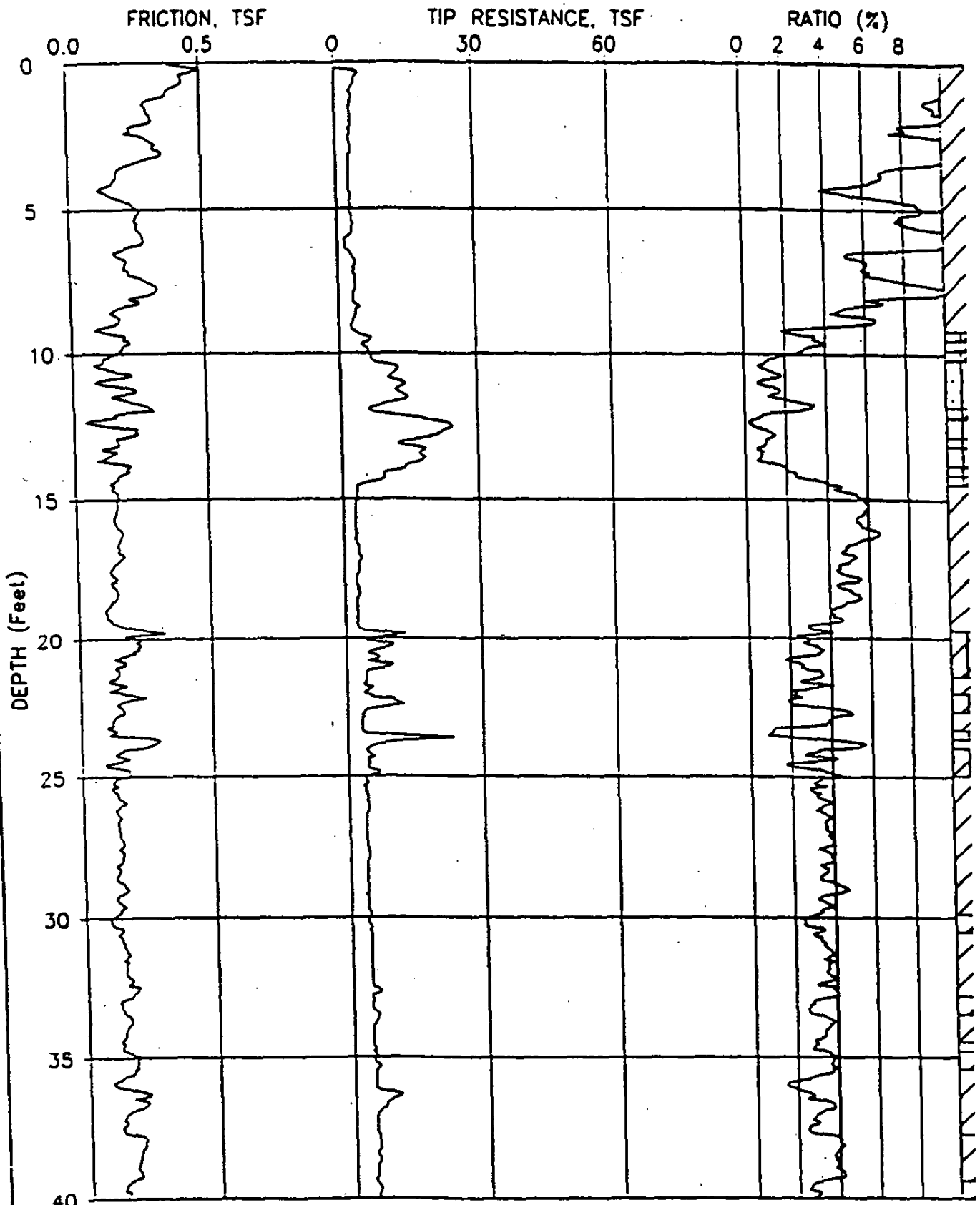
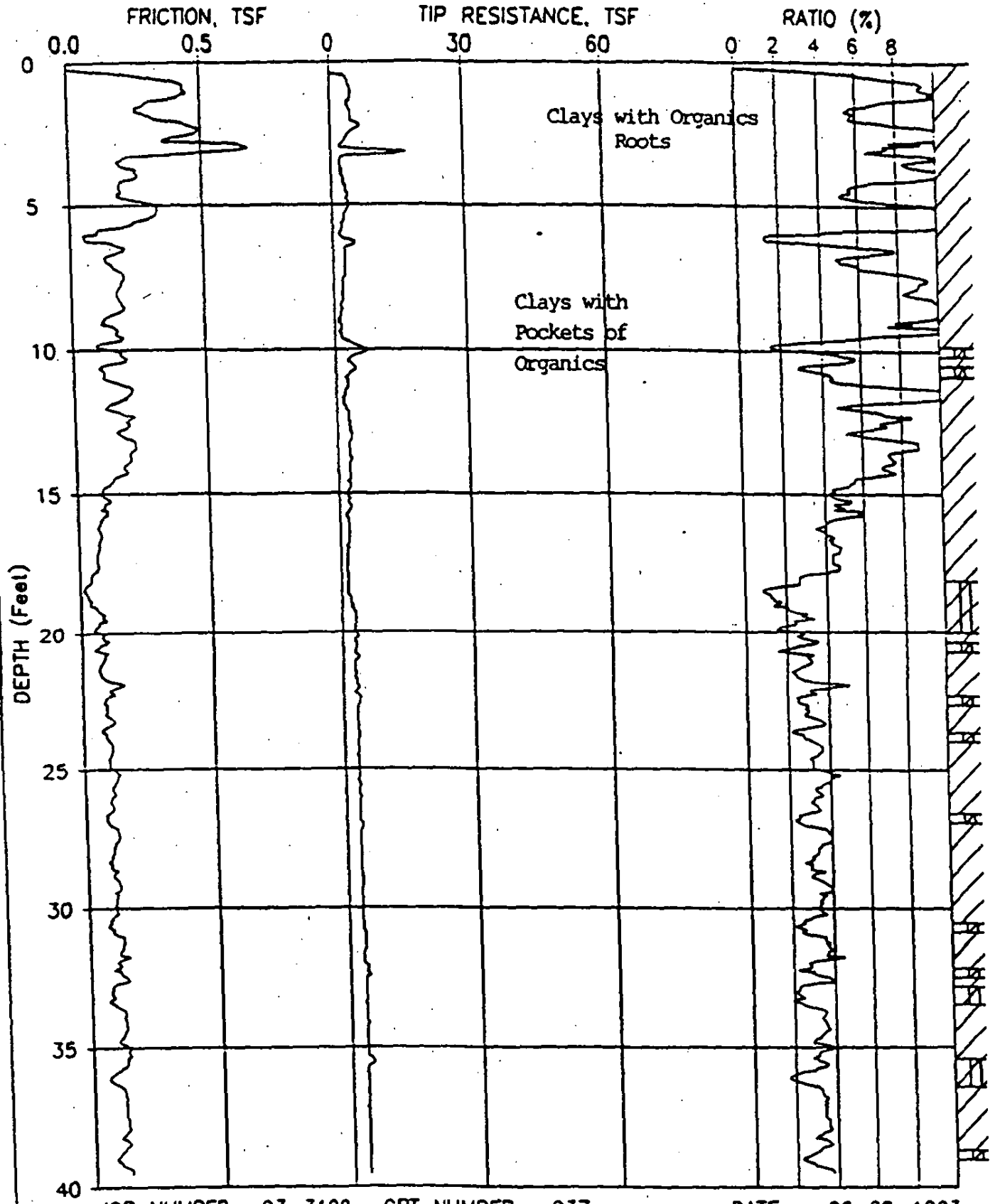


JOB NUMBER : 93-3108 CPT NUMBER : C36 DATE : 09-02-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE611

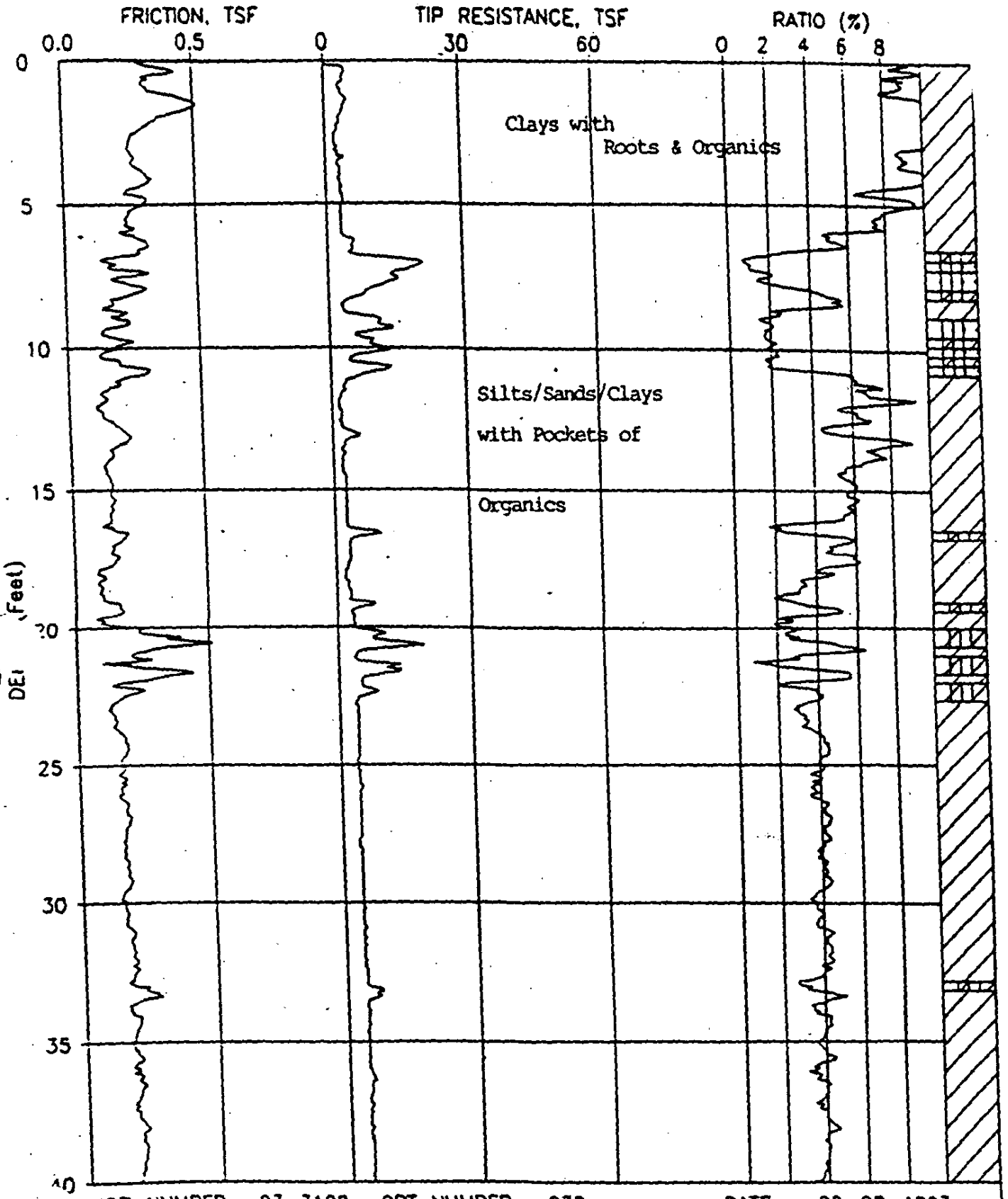
FUGRO GEOSCIENCES,INC



JOB NUMBER : 93-3108 CPT NUMBER : C37 DATE : 09-02-1993

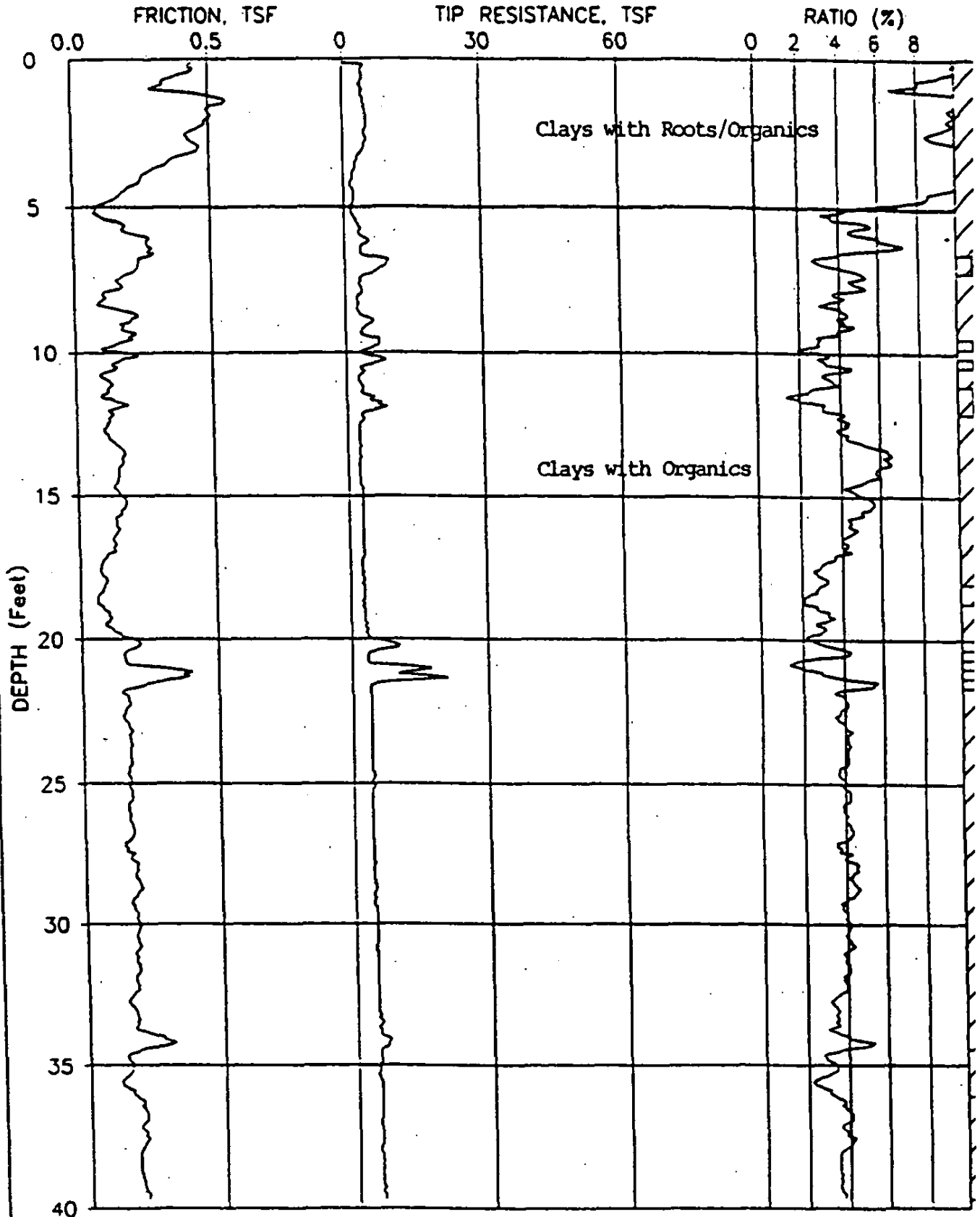
ELEVATION : 0.00 CONE NUMBER: F5CKE611

FUGRO GEOSCIENCES,INC



JOB NUMBER : 93-3108 CPT NUMBER : C38 DATE : 09-02-1993
ELEVATION : 0.00 CONE NUMBER: F5CKE611

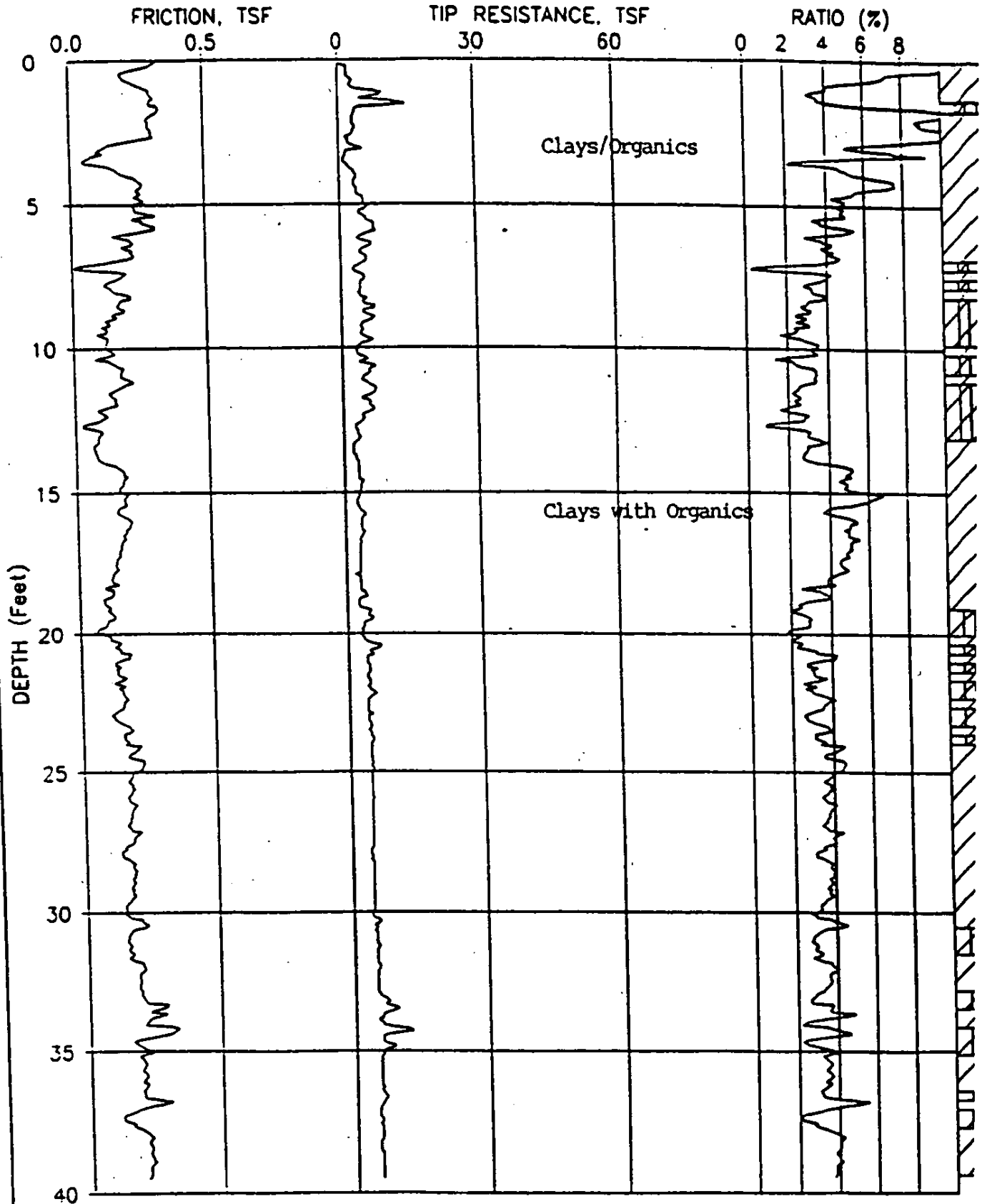
GRO GEOSCIENCES,INC



JOB NUMBER : 93-3108 CPT NUMBER : C39 DATE : 09-02-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE611

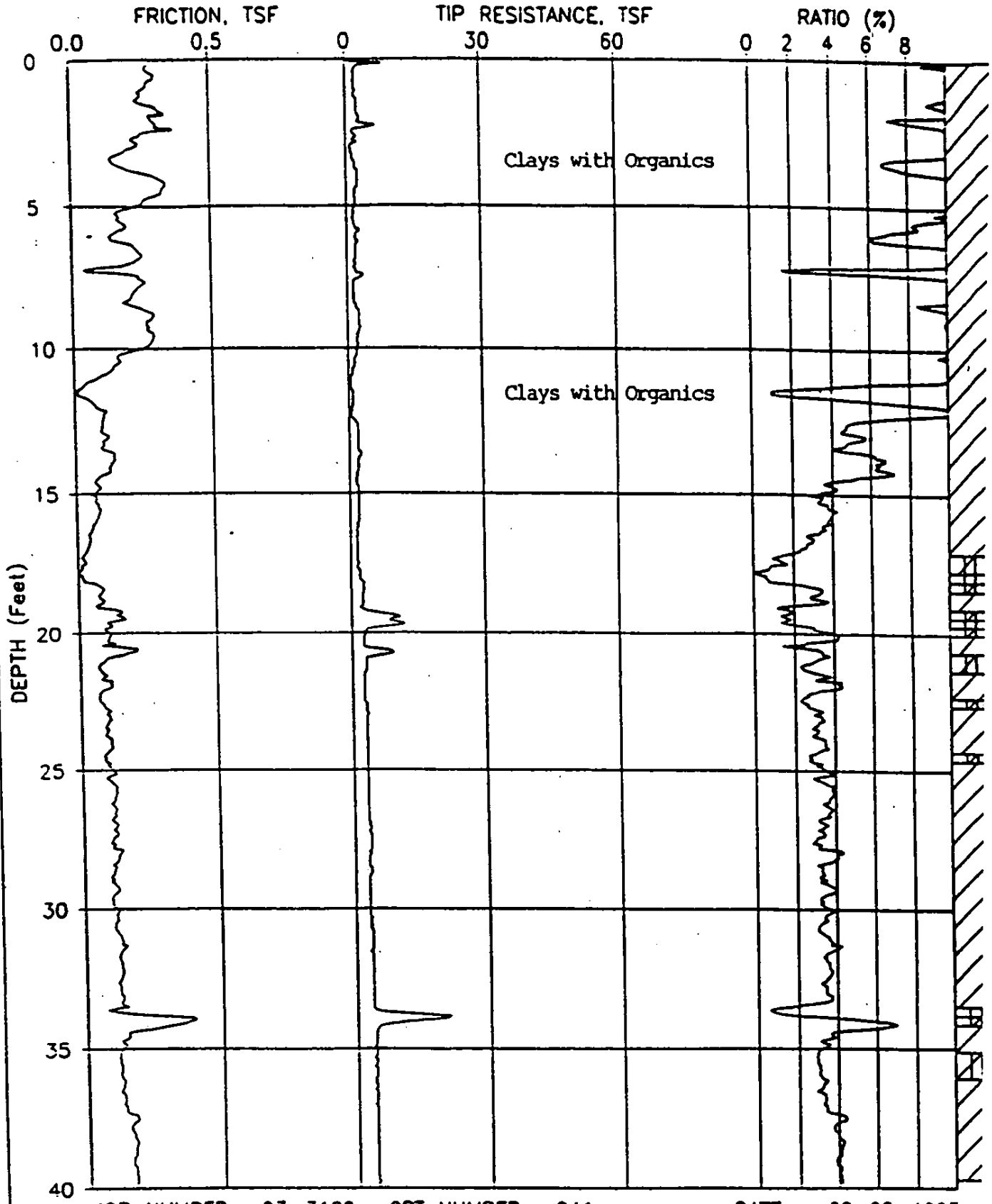
FUGRO GEOSCIENCES,INC



JOB NUMBER : 93-3108 CPT NUMBER : C40 DATE : 09-02-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE611

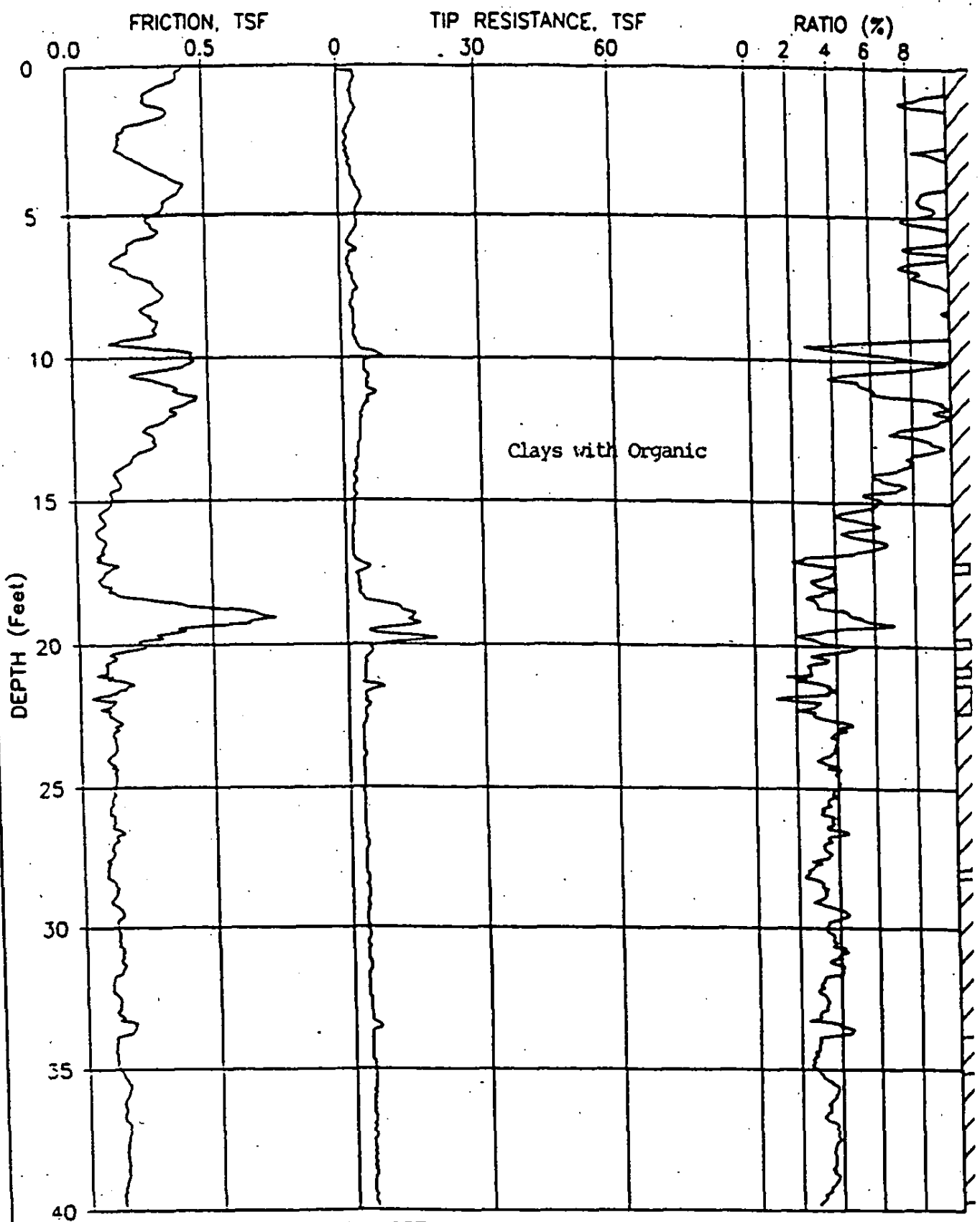
FUGRO GEOSCIENCES,INC



JOB NUMBER : 93-3108 CPT NUMBER : C41 DATE : 09-02-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE611

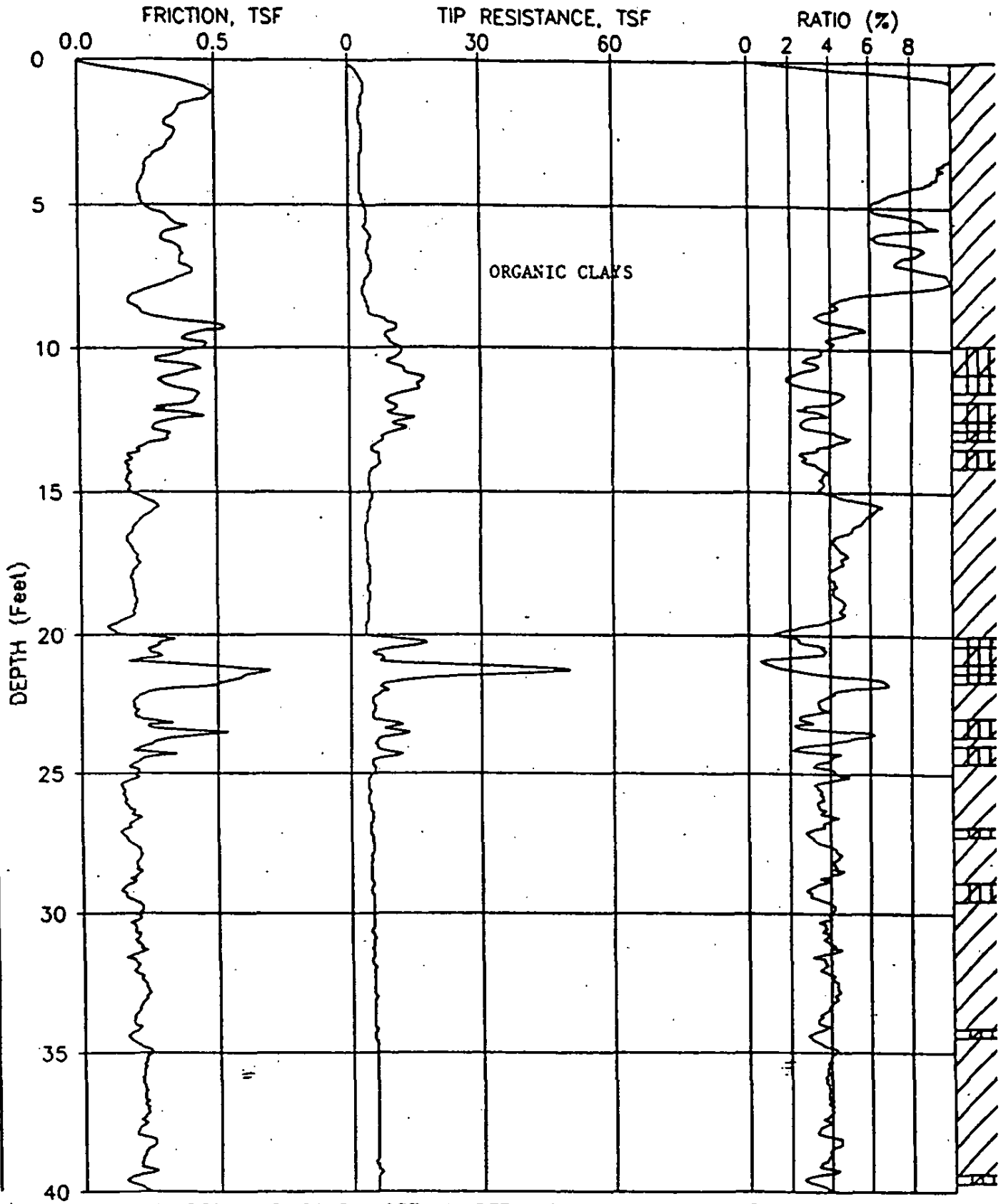
FUGRO GEOSCIENCES,INC



JOB NUMBER : 93-3108 CPT NUMBER : C42 DATE : 09-02-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE611

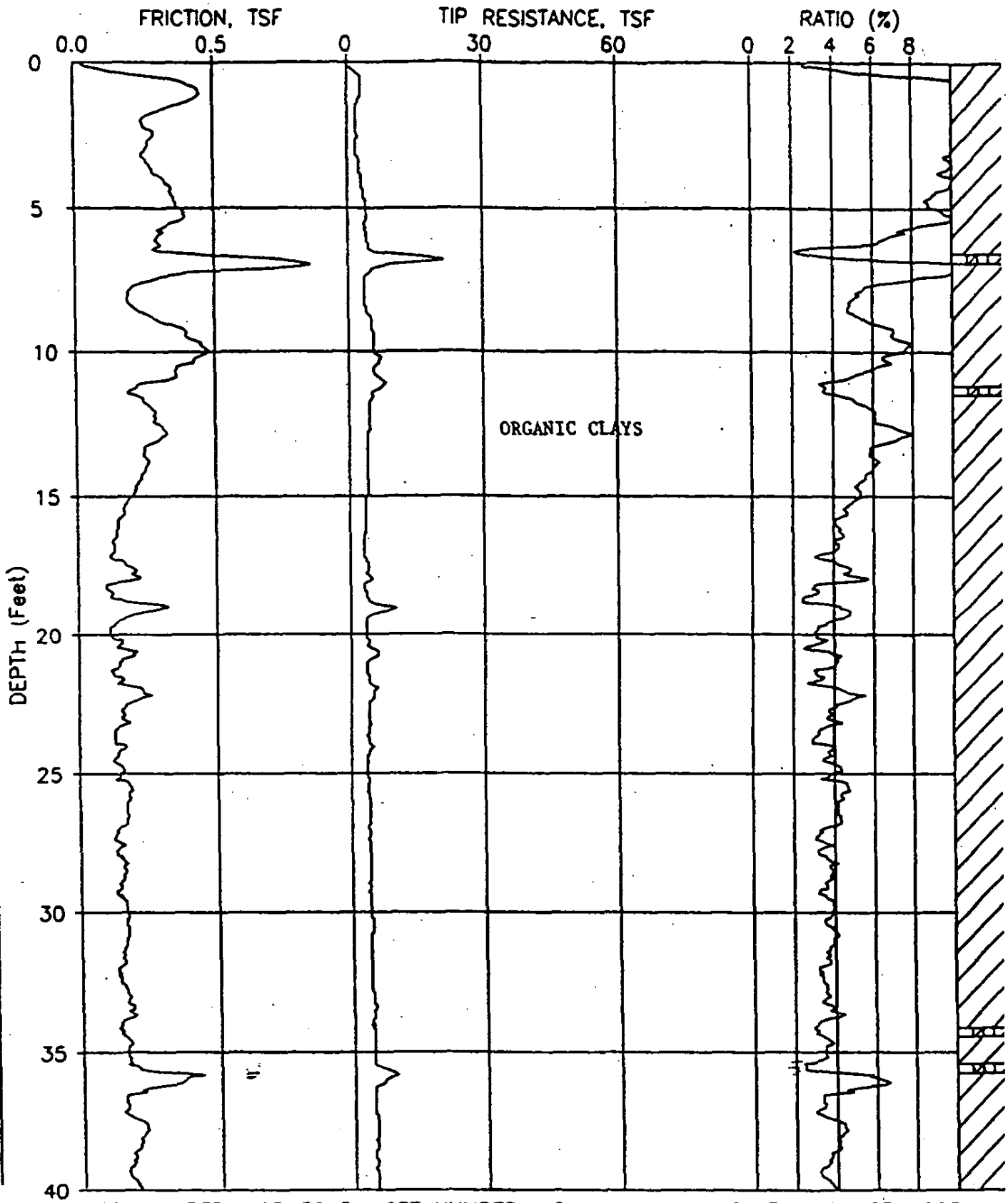
FUGRO GEOSCIENCES,INC



JOB NUMBER : 95-5013 CPT NUMBER : C-43 DATE : 01-25-1995

ELEVATION : 0.00 CONE NUMBER: F7.5CKEV080

FUGRO GEOSCIENCES,INC



JOB NUMBER : 95-5013 CPT NUMBER : C-44 DATE : 01-25-1995

ELEVATION : 0.00 CONE NUMBER: F7.5CKEV080

FUGRO GEOSCIENCES,INC

PART III

Borings-Soil Testing Engineers, 1993

And

Boring-Engineering Associates, Inc., 2006

BEST COPY

ATTACHMENT C

SOIL TESTING ENGINEERS BORINGS

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: [illegible]
FILE: 93B248C
DATE: 8/20/93
TECHNICIAN: Bailey
APPROVED: [illegible]
PAGE: 1 of 1

Hollow-stem Augered: **Full Depth**

Free water was encountered at a depth of 15' during hollow stem augering. The water level rose to a depth of 12.16' after an observation period of 15 minutes.

Coordinates: N 458,022 E 2,337,781 Ground Surface Elevation: -0.2

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum	
0				2.25	41	100	108	62	Very stiff, black Organic CLAY	(OH
				0.44	26	108	36	15	Soft, tan and light gray Silty CLAY with traces of clay	(CL
5					30		34	10	Brown and gray Sandy SILT with clay and roots	(ML
									Soft to medium, gray CLAY with roots	(CH
					51				—with ferrous stains, 6'- 8'	
10				0.58	195		270	213	Medium, gray and dark gray CLAY with organic pockets and roots	(CH-OH
			(1)		78	97	83	60	Soft, gray CLAY	(CH
			(2)		51		83	60	—with occasional peat, 12'- 14' —with organics, silt pockets, 14'- 16'	
15									—with very fine sandy silt lenses, 16'- 20'	
					45					
20									—with occasional silt lenses and sandy silt pockets, 20'- 22'	
									—with silt seams 1/16" - 3" apart, 22'- 24'	
									—soft to medium below 24' —with occasional silt seams, 24'- 28'	
25				0.48	56	98	94	63		
30										
					57					
35				0.41	40	111	48	25	—with occasional silt pockets, 36'- 38'	
40									Bottom of boring at 40'. Borehole grouted full depth.	

(1) K = 5.1E-06 cm/sec
(2) See consolidation curve.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT:	River Birch Landfill	BORING:	B-2
LOCATION:	Jefferson Parish, Louisiana	FILE:	93B248C
		DATE:	8/22/93
		TECHNICIAN:	Bailey
CLIENT:	Gulf Engineers and Consultants, Inc.	APPROVED:	V.P.E.
		PAGE:	1 of 1

Dry Augered: Wash Bored:

Free water was encountered at a depth of 14' during dry augering. The water level rose to a depth of 10.4' after an observation period of 15 minutes.

Coordinates: N 458,670 E 2,337,916 Ground Surface Elevation: -2.0

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0					50		113	65	Stif,f gray and dark gray Organic CLAY with roots (OH
									Medium, gray CLAY (CH
					54		75	48	—with roots, 2'- 6'
5									—with a trace of peat, 6'- 12'
				0.13	134	80	158	105	—very soft, gray and dark gray below 8' with organic pocket (8'- 10'
10									—with very fine sandy silt lenses and layers, 12'- 16'
				0.21	48	108	47	25	
15									—with silt lenses and seams, 16'- 32'
20					79		94	62	—with silt streaks, 20'- 22'
25									
30			(1)		73	98	77	48	
35				0.28	63	99	78	49	—with silt pockets, 36'- 38'
40									Bottom of boring at 40'. Borehole grouted full depth.

(1) K = 9.3E-08 cm/sec

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-3
FILE: 93B248C
DATE: 8/23/93
TECHNICIAN: Bailey
APPROVED: V. Poice
PAGE: 1 of 1

Dry Augered: Full Depth

Free water was encountered at a depth of 6' during dry augering. The water level rose to a depth of 4.3' after an observation period of 15 minutes.

Coordinates: N 459,483 E 2,338,313 Ground Surface Elevation: -2.5

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0			4 b/f (1)		19				Very loose, brown Silty SAND with clay pockets and a trace of organics (SM)
			3 b/f						
5					57		78	54	Very soft, gray CLAY (CH)
									—with roots and peat, 4'- 12'
					63		79	52	
10				0.13	55	100	62	39	—with very fine sandy silt lenses, 12'- 20'
15				0.12	60	96	85	59	
20									—with occasional silt pockets, 20'- 22'
					53		65	37	
25				0.20	63	95	76	49	
					64		77	51	
30			(2)	0.20	64	100	73	46	—with occasional silt pockets, 30'- 32'
35									
									—soft below 38'
40				0.28	53	102	66	42	Bottom of boring at 40'. Borehole grouted full depth.

(1) See grain size distribution curve.
(2) See consolidation curve.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-4
FILE: 93B248C
DATE: 9/1/93
TECHNICIAN: M. Fontenot
APPROVED: V. Pence
PAGE: 1 of 3

Dry Augered: 0'- 10' Wash Bored: 10'- 100'

Free water was encountered at a depth of 7' during dry augering. The water level rose to a depth of 5.5' after an observation period of 15 minutes.

Coordinates: N 460,292 E 2,338,707 Ground Surface Elevation: -1.4

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0				3.05	39	92	100	64	Very stiff, brown, gray and black CLAY with wood, organic material and peat (CH-OH)
5				0.12	92	88	104	71	Very soft, gray CLAY with organic material and wood (CH)
10			(1)		219	75	275	218	
15					108	87	93	64	Very soft, gray CLAY with peat and wood (CH-OH)
20				0.21	49	97	99	67	Very soft, gray CLAY with organic material (CH) —with clay pockets, 20'- 32'
25									
30					51	102	52	28	—with silt seams and lenses, 30'- 32'
35					54	102	83	54	Alternating layers and lenses of soft, gray CLAY and Sandy SILT to Silty SAND (CH/ML/SM) —with organic material, 32'- 36' —with silt seams and pockets, 32'- 38' —with sandy silt pockets and seams, 38'- 40'
40									

Continued Next Page

(1) K = 6.8E-08 cm/sec

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-4
FILE: 93B248C
DATE: 9/1/93
TECHNICIAN: M. Fontenot
APPROVED: V. Pelic
PAGE: 2 of 3

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.L. (%)	Description of Stratum
40									Alternating layers and lenses of soft, gray CLAY and Sandy SILT to Silty SAND (CH/ML/SM)
45									
			0.25	0.42	52	101	91	62	Soft, gray CLAY with shell fragments (CH) —with silt seams, 48'- 55'
50									
			0.75	0.51	67	99	103	67	—medium below 53'
55									
			1.00						
60									
			2.5		21				Stiff, bluish gray and greenish gray Silty CLAY (CL) —with traces of sand, 63'- 65'
65									
			3.75						—with sand pockets and silt seams, ferrous stains, 68'- 70'
70									
			1.75		28				Firm, tan and light gray Clayey SILT (ML-CL)
75									
									—with clay pockets and ferrous stains, 78'- 80'
80									

Continued Next Page

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-4
FILE: 93B248C
DATE: 9/1/93
TECHNICIAN: M. Fontenot
APPROVED: V. Peic
PAGE: 3 of 3

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
80									Firm, tan and light gray Clayey SILT (ML-CL)
									Medium, greenish gray and gray CLAY with traces of silt, sand and shell fragments (CH)
			1.5		36				—with sand pockets below 81'
85									
			1.0						
90									
			1.0		41				
95									
			1.25	0.78	38	108	59	38	
100									Bottom of boring at 100'. Borehole grouted full depth.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-5
FILE: 93B248C
DATE: 9/21/93
TECHNICIAN: Bailey
APPROVED: V. Pecee
PAGE: 1 of 1

Dry Augered: 0'- 6' Full Depth 6'- 40'

Free water was encountered during dry augering. The water level was at a depth of 4' after an observation period of 15 minutes.

Coordinates: N 461,134 E 2,339,008 Ground Surface Elevation: -1.0

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0					45				Very stiff, tan and gray CLAY with roots and organics (CI
									Soft, gray CLAY and PEAT (CI
									—with wood and organic material to 12'
5									
					128		157	117	
10									
			(1)	0.15	53	111	55	32	—very soft below 14'
15									—with silt seams, 16'- 22'
20									
				0.27	72	95	104	69	
25									
									—with silt seams, 28'- 34'
30									
				0.20	55	94	66	42	—with silt layers below 34'
35									
					33		52	30	Alternating layers and lenses of very soft, gray CLAY and loose gray Sandy SILT (CH/ML)
40									

(1) See consolidation curve.

Bottom of boring at 40'.

Borehole grouted full depth.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill

LOCATION: Jefferson Parish, Louisiana

CLIENT: Gulf Engineers and Consultants, Inc.

BORING: D-0
FILE: 93B248C
DATE: 9/28/93
TECHNICIAN: M. Fontenot
APPROVED: V. Pecee
PAGE: 1 of 3

Dry Augered: 0'- 10' Wash Bored: 10'- 100'

Free water was encountered at a depth of 9' during dry augering. The water level rose to a depth of 7.5' after an observation period of 15 minutes.

Coordinates: N 461,943 E 2,339,402 Ground Surface Elevation: -1.0

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Stiff, brown and gray Silty CLAY with organic material (CL)
5					60		98	71	Very soft, brown and gray CLAY with wood and organic material (CH) —with wood, 4'- 6'
10									
15									
			(1)		52	113	46	28	Very soft, gray Silty CLAY with some fine silty sand, silt seams, pockets, and lenses and clay pockets (CL)
20									Very soft, gray CLAY (CH) —with silt seams, pockets and lenses, 18'- 20' —with sandy silt seams, pockets and lenses below 20' —with organic material, 20'- 28'
25									
30					45		52	33	Alternating layers of soft, gray CLAY, Sandy SILT and SILT (CH/ML)
35									
40									Very soft, gray CLAY with silt seams (CH)

Continued Next Page

(1) K = 6.5E-07 cm/sec

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-6
FILE: 93B248C
DATE: 9/28/93
TECHNICIAN: M. Fontenot
APPROVED: V. Pecez
PAGE: 2 of 3

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
40									Very soft, gray CLAY with silt seams and pockets (CH)
				0.19	60	98	80	58	—with sandy silt seams, 43'- 50'
45									
									—with shell fragments, 48'- 70'
50									
				0.25	66	97	95	68	—with silt pockets, 53'- 60'
55									
60									
				0.67	54	103	81	58	—medium, with shells below 63'
65									
			0.25						—with sandy silt seams, 68'- 70'
70									
			1.00	0.68	26	116	34	12	Medium, greenish gray Silty CLAY with shells, silt seams and pockets (CL)
75									
			1.0						
80									

Continued Next Page

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-6
FILE: 93B248C
DATE: 9/28/93
TECHNICIAN: M. Fontenot
APPROVED: V. Pete
PAGE: 3 of 3

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
80									Medium, greenish gray Silty CLAY with shells, silt seams and pockets (CL)
									—with clay pockets, 80'- 90'
			1.5						
85									
									Stiff, greenish gray to bluish gray CLAY with silt pockets (CH-CL)
			1.0		27		43	25	
90									
									—with fine sand pockets below 93'
95									
					45		76	53	
100									Bottom of boring at 100'. Borehole grouted full depth.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-7
FILE: 93B248C
DATE: 9/30/93
TECHNICIAN: Fontenot
APPROVED: V. Frei
PAGE: 1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 8.5' during dry augering. The water level rose to a depth of 7' after an observation period of 15 minutes.

Coordinates: N 462,752 E 2,339,796 Ground Surface Elevation: -0.7

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Soft, brown and gray CLAY (CH
									—with organic fragments to 20'
5					82		109	77	—gray below 6'
10									—with silt pockets, 10'- 20'
				0.21	84	94	122	88	
									—with clay nodules, 14'- 16'
15									
20									—with silt and sand pockets, 20'- 22'
					73		80	52	—with sandy silt seams, lenses and pockets, 22'- 32'
25									Soft, gray CLAY with sandy silt seams (CL)
30									
									—with silty sand seams and lenses below 32'
35					42		49	28	
									Bottom of boring at 40'. Borehole grouted full depth.
40									

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT:	River Birch Landfill	BORING:	B-8
LOCATION:	Jefferson Parish, Louisiana	FILE:	93B248C
		DATE:	10/7/93
		TECHNICIAN:	R. Rizzo
CLIENT:	Gulf Engineers and Consultants, Inc.	APPROVED:	V. Peele
		PAGE:	1 of 1

Dry Augered: 0'- 4' Wash Bored: 4'- 40'

Free water was encountered at a depth of 4' during dry augering. The water level remained at a depth of 4' after an observation period of 15 minutes.

Coordinates: N 463,521 E 2,340,279 Ground Surface Elevation: -0.3

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Soft, gray and brown CLAY (CH)
									—with organic material to 4'
									—with roots to 6'
5									—with ferrous nodules, 4'- 6'
									—with wood, 6'- 8'
					80		141	101	—with organic pockets, 8'- 10'
10									
				0.31	60	96	86	56	—with 4" sand layers at 12' and organic pockets, 12'- 14'
15									
									Alternating layers of very soft, gray CLAY, Clayey SILT and Silty SAND (CL-ML)
									—with silt, 17'- 22'
20					69		46	21	
									Gray SAND (SP)
25									
									Very soft, gray CLAY (CL)
30				0.29	66	104	48	24	
									Gray SAND (SP)
35									Very soft, gray CLAY (CH)
									Bottom of boring at 40'. Borehole grouted full depth.
40									

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-9
FILE: 93B248C
DATE: 9/8/93
TECHNICIAN: M. Fontenot
APPROVED: V. Pelce
PAGE: 1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 8' during dry augering. The water level rose to a depth of 5.5' after an observation period of 15 minutes.

Coordinates: N 463,925 E 2,340,476 Ground Surface Elevation: -0.2

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum	
0									Stiff, brown and dark gray CLAY	(CH)
			NR						—with organic fragments to 16'	
									—brown, with organic matter below 3'	
5				0.30	39	107	37	14	Soft, tan, brown and light gray Silty CLAY	(CL)
				0.50	57	100			Soft to medium, light gray CLAY	(CH)
10					73		101	72	—very soft, 10'- 14'	
15				0.35	73	93	137	102	—soft below 20'	
									—with silt seams below 16'	
									—with traces of fine sand, 18'- 22'	
20					57		87	60	Very soft, gray CLAY	(CH)
			(1)		46	110	54	37	—with sandy silt and silt layers, 20'- 22'	
25				0.13	39	100	35	11	Very soft, gray Silty CLAY with sandy silt layers	(CL)
				0.28	51	103	60	38	Soft, gray CLAY with silt and fine sand seams	(CH)
									—with traces of organics, 26'- 28'	
30										
35					38		44	24	—very soft below 34'	
40									Bottom of boring at 40'. Borehole grouted full depth.	

NR = No Recovery
(1) K = 6.7E-08 cm/sec

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-10
FILE: 93B248C
DATE: 9/9/93
TECHNICIAN: M. Fontenot
APPROVED: V. Fede
PAGE: 1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 9' during dry augering. The water level rose to a depth of 7' after an observation period of 15 minutes.

Coordinates: N 463,764 E 2,340,790 Ground Surface Elevation: 0.1

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Brown Clayey SILT becoming brown Silty CLAY (ML-CL
									—with organic fragments to 14'
									Soft, gray CLAY (CH
5					58		94	65	—with roots, 4'- 8'
				0.42	54	98	97	70	—with silt pockets, 6'- 8'
10									
					76		121	87	—with wood fragments at 12'
15									—with silt pockets and a trace of fine sand, 14'- 16'
				0.20	49	101	56	35	Alternating layers of soft, gray CLAY and gray Sandy SILT (CH/CL/ML
					46		48	25	—with silt seams and lenses, 16'- 38'
20									—with fine sand seams and lenses, 18'- 20'
				0.28	48	100	80	54	Soft, gray CLAY with silt and fine sand seams, lenses and laminations (CH
25									
30				0.31	52	105	62	38	
35									—with organic material below 36'
					45		50	29	Bottom of boring at 40'. Borehole grouted full depth.
40									

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT:	River Birch Landfill	BORING:	B-11
LOCATION:	Jefferson Parish, Louisiana	FILE:	93B248C
		DATE:	10/1/93
		TECHNICIAN:	Fontenot
CLIENT:	Gulf Engineers and Consultants, Inc.	APPROVED:	V. Pelee
		PAGE:	1 of 3

Dry Augered: 0'- 10' Wash Bored: 10'- 100'

Free water was encountered at a depth of 9' during dry augering. The water level rose to a depth of 8' after an observation period of 15 minutes.

Coordinates: N 462,954 E 2,340,396 Ground Surface Elevation: -0.5

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Soft, brown and gray CLAY (CH)
									—with organic fragments to 18'
5					73		118	85	—very soft, gray below 6'
									—with roots, 6'- 8'
10									—with silt pockets, 10'- 18'
15									
									—with silt seams, 18'- 30'
20					43		53	26	—with sandy silt pockets, 20'- 22'
									—with organic fragments, 22'- 24'
25				0.34	66	100	81	54	—with traces of silt and organics, 26'- 28'
30									—with sandy silt seams, 30'- 34'
35					62		80	51	—with silty sand seams and lenses, 34'- 40'
40									

Continued Next Page

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-11
FILE: 93B248C
DATE: 10/1/93
TECHNICIAN: Fontenot
APPROVED: V. Feece
PAGE: 2 of 3

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
40									Soft, gray CLAY (CH
									—with silt seams, 43'- 50'
45				0.33	61	98	83	54	
50									—with shell fragments, 53'- 60'
55					64		96	66	
60									
					23		58	39	Stiff, light gray, tan and bluish gray CLAY with silt and sand and traces of organic material (CH
65									
									Very stiff, green CLAY with silt seams and fine sand pockets (CH
70									
									Firm, tan Clayey SILT with clay pockets and traces of organic materi (ML
75									
					28		31	9	Stiff, light gray and brown Silty CLAY (CI —with silt seams and pockets, 76'- 90'
80									

Continued Next Pa

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-11
FILE: 93B248C
DATE: 10/1/93
TECHNICIAN: Fontenot
APPROVED: V. Perez
PAGE: 3 of 3

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
80									Stiff, light gray and brown Silty CLAY (CL)
									—with fine sand pockets, 83'- 95'
85									
									—with ferrous stains below 88'
90									
					27		50	31	Very stiff, tan and light gray CLAY with fine sand pockets, ferrous stains and silt seams (CH)
95									
100									Bottom of boring at 100'. Borehole grouted full depth.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT:	River Birch Landfill	BORING:	B-12
LOCATION:	Jefferson Parish, Louisiana	FILE:	93B248C
		DATE:	9/29/93
		TECHNICIAN:	Fontenot
CLIENT:	Gulf Engineers and Consultants, Inc.	APPROVED:	V. Tesee
		PAGE:	1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 9.5' during dry augering. The water level rose to a depth of 7.5' after an observation period of 15 minutes.

Coordinates: N 462,145 E 2,340,001 Ground Surface Elevation: -1.1

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Soft, gray and brown CLAY (CH)
									—with organic fragments to 18'
									—very soft, gray below 4'
5									
10									
									—with silt pockets, 12'- 18'
					84		107	75	—with wood fragments, 14'- 16'
15									
									—with silt seams, lenses and layers, 18'- 24'
20									
					53		55	31	—with sandy silt - silty sand lenses, 22'- 24'
									—with silt seams and pockets, 24'- 34'
25									
									—with organic fragments, 28'- 32'
30									
									—with sandy silt seams and organic fragments, 34'- 36'
35									
					49		84	54	—with silty sand seams, lenses and layers below 36'
									Bottom of boring at 40'. Borehole grouted full depth.
40									

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT:	River Birch Landfill	BORING:	B-13
LOCATION:	Jefferson Parish, Louisiana	FILE:	93B248C
		DATE:	9/28/93
		TECHNICIAN:	M. Fontenot
CLIENT:	Gulf Engineers and Consultants, Inc.	APPROVED:	V. Fere:
		PAGE:	1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 7' during dry augering. The water level rose to a depth of 4' after an observation period of 15 minutes.

Coordinates: N 461,336 E 2,339,607 Ground Surface Elevation: -1.2

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Stiff, brown and gray CLAY (CH)
									—with organic fragments to 16'
5									—soft, gray below 4'
10									
15					55		50	31	—with silt pockets, 14'- 16'
									—with sandy silt seams, pockets, lenses and layers, 16'- 20'
20									—with silt seams, 20'- 28'
					62		94	66	
25									
				0.32	54	100	53	32	—with silt seams, lenses and layers, 28'- 30'
30									
									—with silt pockets, 32'- 34'
35									
									—with sand seams below 36'
					54		82	59	Bottom of boring at 40'. Borehole grouted full depth.
40									

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-14
FILE: 93B248C
DATE: 9/14/93
TECHNICIAN: Bailey
APPROVED: V. VEL
PAGE: 1 of 1

Dry Augered: 0'- 6' Wash Bored: 6'- 40'

Free water was encountered at a depth of 5' during dry augering. The water level rose to a depth of 2.5' after an observation period of 45 minutes.

Coordinates: N 460,537 E 2,339,202 Ground Surface Elevation: -1.4

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Soft, brown and gray CLAY (CH)
									—with roots to 6'
				0.28	72	92	92	66	—with ferrous stains, 4'- 6'
5									—with peat lenses and layers, 6'- 8'
									—with traces of peat, 8'- 10'
10									—with occasional hard, white nodules, 10'- 12'
				0.16	53	103	54	32	—with occasional silt pockets and lenses and traces of organic material, 12'- 14'
									—with occasional silt lenses, 14'- 16'
15									—very soft below 16'
									—with silt seams, 16'- 20'
				0.19	74	99	64	39	
20									—with silt seams and lenses, 20'- 22'
									—with silt seams, 22'- 24'
									—with occasional silt pockets, 24'- 26'
25									
			(1)	0.18	78	97	83	53	—with traces of organics and silt pockets at 28'
30									
35									
				0.33	51	103	67	43	Bottom of boring at 40'. Borehole grouted full depth.
40									

(1) See consolidation curve.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

AUG 18 95 WCSGBR 3B248 B-14

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-15
FILE: 93B248C
DATE: 9/14/93
TECHNICIAN: Bailey
APPROVED: V. Ice
PAGE: 1 of 1

Dry Augered: 0'- 6' Wash Bored: 6'- 40'

Free water was encountered at a depth of 6' during dry augering. The water level rose to a depth of 2' after an observation period of 45 minutes.

Coordinates: N 459,718 E 2,338,819 Ground Surface Elevation: -2.9

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Soft, brown CLAY becoming peat (CH-OH)
					249		224	167	PEAT (PT)
5									Soft, dark gray CLAY (CH)
									—with peat layers, 4'- 6'
									—with traces of peat and roots, 6'- 8'
									—with occasional roots, 8'- 12'
10					77		113	86	
				0.24	72	94	105	74	—with organic pockets
15									—with occasional roots and silt lenses, 16'- 18'
									—with silt lenses and seams, 18'- 20'
20									—with occasional silt lenses, 20'- 28'
				0.16	57	99	50	29	—very soft, gray below 22'
25									
30				0.09	85	93	89	61	
35									
									—with occasional silt seams below 36'
40				0.16	85	97	76	51	Bottom of boring at 40'. Borehole grouted full depth.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-10
FILE: 93B248C
DATE: 9/15/93
TECHNICIAN: Bailey
APPROVED: √ FECE?
PAGE: 1 of 1

Dry Augered: 0'- 6' Wash Bored: 6'- 40'

Free water was encountered at a depth of 6' during dry augering. The water level rose to a depth of 2.3' after an observation period of 30 minutes.

Coordinates: N 458,909 E 2,338,425 Ground Surface Elevation: -1.7

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0					118		181	111	Brown PEAT and soft gray Organic CLAY (PT-OH)
5				0.09	120	74	183	147	—with roots, 6'- 8'
									Very soft, gray CLAY (CH)
									—with occasional roots, 8'- 14'
10			(1)	0.17	78	98	90	63	—with silt seams, 12'- 16'
15									—with silt lenses and layers, 16'- 18'
									—with silt seams, 18'- 20'
20				0.21	85	97	76	49	—with occasional silt seams, 20'- 26'
25									
									—with occasional silt seams, 28'- 30'
30				0.17	69	96	90	65	
									—with silt seams and lenses, 32'- 34'
									—with silt seams, 34'- 38'
35									
									—with silt lenses and seams below 38'
									Bottom of boring at 40'.
40									Borehole grouted full depth.

(1) K = 8.9E-08 cm/sec

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT:	River Birch Landfill	BORING:	B-17
LOCATION:	Jefferson Parish, Louisiana	FILE:	93B248C
		DATE:	8/21/93
		TECHNICIAN:	Bailey
CLIENT:	Gulf Engineers and Consultants, Inc.	APPROVED:	V. Perez
		PAGE:	1 of 1

Dry Augered: Wash Bored:

Free water was encountered at a depth of 15' during dry augering. The water level rose to a depth of 10.7' after an observation period of 15 minutes.

Coordinates: N 458,273 E 2,338,115 Ground Surface Elevation: -1.0

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Medium, tan and gray Silty CLAY to Clayey SILT (ML-CL)
			(1)		30	120	42	18	—with roots to 2' —with traces of clay, 2'- 4'
				0.50	38	109	58	33	Medium, tan and gray CLAY (CH)
5									—with ferrous stains, 4'- 8' and silt pockets, 4'- 6'
									Soft, gray CLAY (CH)
10									Brown PEAT (PT)
									Soft, gray CLAY (CH)
									—with occasional roots and peat and silt pockets, 12'- 14' —with very fine sandy silt layers, 14'- 16'
15			(2)	0.28	38	108	49	28	—with occasional roots and sandy silt pockets, 16'- 18'
									—with silt lenses, 18'- 22'
20									
									—with occasional silt seams, 22'- 28'
25									
30				0.47	65	100	85	57	
			(3)		62	102	77	50	
35									
									—with occasional silt seams, 36'- 38'
				0.42	63	100	80	53	Bottom of boring at 40'. Borehole grouted full depth.
40									

(1) K = 4.5E-07 cm/sec
(2) See consolidation curve.
(3) See consolidation curve.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-18
FILE: 93B248C
DATE: 8/20/93
TECHNICIAN: Bailey
APPROVED: V. Pelle
PAGE: 1 of 1

Dry Augered: Full Depth Wash Bored:

Free water was encountered at a depth of 8' during dry augering. The water level rose to a depth of 14.7' after an observation period of 15 minutes.

Coordinates: N 458,835 E 2,338,859 Ground Surface Elevation: -1.5

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0					46	90	115	52	Very stiff, brown and dark gray Organic CLAY (OH-CH)
			(1)		52		105	73	—with roots to 8' —with ferrous stains, 2'- 6'
5									
									Soft, gray Silty CLAY (CL) —with clay pockets, 8'- 10'
10									Soft, gray CLAY (CH) —with occasional fine sandy silt pockets, 10'- 12' —with roots and sandy silt layers, 12'- 16'
				0.30	67	110	45	24	
15				0.26	43	108	51	27	—with silt seams, 16'- 22'
20									—with occasional silt seams, 22'- 26'
25				0.18	86	98	97	64	—very soft below 26'
30					57		73	45	—with occasional silt seams, 30'- 34'
35					48		48	24	Soft, gray CLAY with sandy silt seams and partings (CL)
					52		74	48	Soft, gray CLAY (CH) Bottom of boring at 40'. Borehole grouted full depth.
40									

(1) See consolidation curve.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

AUG 18 95 WCSGBR 38248 B-18

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-19
FILE: 93B248C
DATE: 9/16/93
TECHNICIAN: Bailey
APPROVED: V. Eele
PAGE: 1 of 1

Dry Augered: 0'- 8' Wash Bored: 8'- 40'

Free water was encountered during dry augering. Depth not reported.

Coordinates: N 459,111 E 2,339,024 Ground Surface Elevation: -2.0

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Soft, brown and gray CLAY (CH)
									—with roots to 4'
									—with ferrous stains, 2'- 6'
5									
									Soft, gray Silty CLAY with organics and roots (CL)
				0.23	48	105	55	32	Soft, gray CLAY (CH)
10									—with 4" layer of very fine sandy silt at 8'
									—with silt lenses and pockets, 8'- 12'
			(1)		51	134	84	60	—with silt pockets, 12'- 14'
									—with roots, 12'- 16'
									—with silt lenses, 14'- 20'
15									
20									—with occasional silt seams and lenses, 20'- 24'
				0.22	78	95	98	68	—with traces of organics, 22'- 24'
25									
									—with occasional silt seams, 26'- 28'
30									
				0.23	71	96	73	50	
35									
									Bottom of boring at 40'.
									Borehole grouted full depth.
40									

(1) See consolidation curve.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-20
FILE: 93B248C
DATE: 9/16/93
TECHNICIAN: Bailey
APPROVED: V. FECE
PAGE: 1 of 1

Dry Augered: 0'- 8' Wash Bored: 8'- 40'

Free water was encountered at a depth of 7' during dry augering. The water level rose to a depth of 5.75' after an observation period of 15 minutes.

Coordinates: N 459,920 E 2,339,418 Ground Surface Elevation: -1.6

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Soft, gray CLAY (CH
									—with roots to 6'
									—with ferrous nodules, 2'- 4'
5					35		50	29	—with silt, 4'- 10'
10									
15			(1)		63	100	75	48	—with traces of organic materials, 14'- 16'
									—with occasional silt lenses, 14'- 18'
									—with occasional silt pockets, 18'- 20'
20									—with silt, 20'- 22'
				0.25	82	99	63	39	—with silt seams and lenses, 22'- 24'
									—with occasional silt seams, 24'- 28'
25									
									—with occasional silt pockets, 28'- 30'
30									—with silt lenses, 30'- 32'
				0.28	68	100	69	45	
35									
									—with occasional silt pockets, 36'- 38'
									—with very fine sandy silt lenses below 38'
									Bottom of boring at 40'.
									Borehole grouted full depth.
40									

(1) K = 1.4E-07 cm/sec

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-21
FILE: 93B248C
DATE: 8/31/93
TECHNICIAN: Fontenot / Bailey
APPROVED: V. Freeze
PAGE: 1 of 3

Dry Augered: Wash Bored:

Free water was encountered at a depth of 5.5' during dry augering. The water level rose to a depth of 3.0' after an observation period of 15 minutes.

Coordinates: N 460,729 E 2,339,812 Ground Surface Elevation: -1.5

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compres. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0				1.64	50	100			Stiff, brown, gray and black CLAY with roots, organic material and peat (CH-OH)
5					92		122	86	
10									—with occasional roots, 10'- 12'
									—with occasional organic traces, 12'- 16'
15									
				0.16	56	106			Very soft, gray CLAY (CH)
									—with traces of organic material
									—with silt seams and lenses, 16'- 38'
20									
25					77		100	67	
30									
35									—with silt layers, 36'- 38'
40									

Continued Next Page

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-21
FILE: 93B248C
DATE: 8/31/93
TECHNICIAN: Fontenot / Bailey
APPROVED: V. Pece

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
40									Very soft, gray CLAY (CH)
				0.41	64	98	94	64	
45									
50									
			(1)	0.18	63	94	86	56	
55									
60									
									Stiff, greenish gray Silty CLAY (CL)
			(2)	1.19	23	122	40	23	
65									
				1.71	22	124	39	22	
70									
									Firm, tan and light gray Clayey SILT (ML-CL)
				0.66	28	114	33	9	—with silt pockets, seams, lenses and layers, 73'- 75'
75									
			(3)	0.52	29	115	31	7	—with clay pockets and silt lenses and layers, 78'- 80'
80									

Continued Next Page

(1) (2) See grain size distribution curve.
(3) See consolidation curve.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-21
FILE: 93B248C
DATE: 8/31/93
TECHNICIAN: Fontenot / Bailey
APPROVED: V Perez
PAGE: 3 of 3

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
80									Firm, tan and light gray Clayey SILT (ML-CL)
									—with ferrous nodules, 83'- 95'
85									Stiff, light gray, gray and tan CLAY with some silt and shell fragments (CH)
					41	108	93	63	—with calcareous nodules and shell fragments below 88'
90									
									—with sand pockets and seams, ferrous nodules and stains, 93'- 95'
95									
					32	108	50	31	—with sand pockets, seams and lenses below 98'
100									Bottom of boring at 100'. Borehole grouted full depth.

(1) (2) See grain size distribution curve.
(3) See consolidation curve.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-22
FILE: 93B248C
DATE: 8/22/93
TECHNICIAN: M. Fontenot
APPROVED: V. Fecc
PAGE: 1 of 1

Dry Augered: Not reported
Wash Bored: Not reported
Coordinates: N 461,539 E 2,340,207
Ground Surface Elevation: -1.3

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum	
0									Very soft, gray CLAY	(CH)
									—with organic fragments to 12'	
5					74	89	100	71	—with wood remains, 6'- 8'	
									—with silt and fine sand traces, 8'- 10'	
10									—with silt traces, 10'- 12'	
									—with silt seams, lenses and laminations, 12'- 32'	
15			(1)	0.41	46	105	45	22	Very soft, gray Silty CLAY with silt and clay pockets	(CL)
									Very soft, gray CLAY with silt layers	(CH)
20					45	104	54	30	—with traces of fine sand	
25				0.30	57	99	67	42	Soft, gray CLAY	(CH)
30			NR							
35					46	102	38	10	Soft, gray CLAY with silt seams	(CL)
									—with sandy silt seams and laminations, 34'- 36'	
									—with silty sand seams and pockets, 36'- 38'	
									—with sand seams and pockets below 38'	
40									Bottom of boring at 40'. Borehole grouted full depth.	

NR = No Recovery
(1) See consolidation curve.

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-23
FILE: 93B248C
DATE: 9/30/93
TECHNICIAN: M. Fontenot
APPROVED: [illegible]
PAGE: 1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 8' during dry augering. The water level rose to a depth of 6.5' after an observation period of 15 minutes.

Coordinates: N 462,348 E 2,340,601 Ground Surface Elevation: -1.2

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Stiff, brown and black CLAY with organic material (CH-OH)
									—very soft below 2'
									—gray below 4'
5					79		100	73	—with wood remains, 6'- 8'
10									—with silt pockets below 10'
15				0.31	63	100	85	61	
20									Stiff, brown and black CLAY with silt seams, pockets and layers (CH)
25					80		98	75	—with traces of organics, 24'- 26'
30									—with organic material, 32'- 36'
35					64		79	52	—with sandy silt seams and pockets, 34'- 36'
									—with silty sand seams and pockets below 36'
40									Bottom of boring at 40'. Borehole grouted full depth.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-24
FILE: 93B248C
DATE: 10/7/93
TECHNICIAN: R. Rizzo
APPROVED: Y. Fciez
PAGE: 1 of 1

Dry Augered: 0'- 4' Wash Bored: 4'- 40'

Free water was encountered at a depth of 4' during dry augering. The water level remained at a depth of 4' after an observation period of 15 minutes.

Coordinates: N 463,157 E 2,340,995 Ground Surface Elevation: -0.1

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Stiff, brown CLAY with black organic material and roots (CH-OH)
									—medium, brown, gray and tan below 2'
									—with wood, 2'- 8'
5									—with ferrous nodules, 4'- 6'
									Soft, gray CLAY (CH)
10					67		101	74	—with roots, 10'- 12'
15									
20									—with wood, 20'- 22'
									—with roots, 22'- 24'
									Alternating layers and lenses of gray Silty SAND, Sandy SILT and CLAY (ML-CL)
25			(1) (2)		40	113	34	8	
									—with sand layers, 28'- 30'
30									Very soft, gray CLAY (CH)
35					57		51	31	
									Bottom of boring at 40'. Borehole grouted full depth.
40									

(1) See grain size distribution curve.
(2) K = 8.4E-07 cm/sec

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-25
FILE: 93B248C
DATE: 9/9/93
TECHNICIAN: M. Fontenot
APPROVED: V. Rees
PAGE: 1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 9' during dry augering. The water level rose to a depth of 7' after an observation period of 15 minutes.

Coordinates: N 463,360 E 2,341,594 Ground Surface Elevation: 0.3

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Stiff, brown and tan Silty CLAY with organic material (CL)
					58		120	88	Very soft, gray CLAY (CH)
5									—with organic material, 4'- 6'
									—with silt pockets, 4'- 10'
				0.16	71	97	78	51	—with organic fragments, 8'- 20'
10					60		97	68	
			(1)	0.32	65	93	104	79	—with silt pockets, 14'- 16'
15									—with fine sand traces, 14'- 20'
					80		100	73	
20									—with silt and fine sand seams, 20'- 22'
									—with silt and fine sand seams and lenses, 22'- 26'
									—with calcareous nodules, 22'- 24'
					72		92	62	
25									—with silt and fine sand seams, lenses and laminations, 26'- 40'
30				0.27	52	101	53	31	
35				0.26	47	108	35	11	
									—with silt and fine sand seams and lenses below 38'
									Bottom of boring at 40'.
									Borehole grouted full depth.
40									

(1) See consolidation curve.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

AUG 18 95 WCSGBR 3B248 B-25

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-26
FILE: 93B248C
DATE: 9/10/93
TECHNICIAN: M. Fontenot
APPROVED: V. Fecie
PAGE: 1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 9' during dry augering. The water level rose to a depth of 7.5' after an observation period of 15 minutes.

Coordinates: N 462,550 E 2,341,200 Ground Surface Elevation: -0.8

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0					57		94	63	Stiff, brown, tan and light gray CLAY with roots and organic material (CH)
5				0.33	55	99	106	74	Very soft, gray CLAY with organic material (CH)
									—with small roots, 4'- 6'
10									—with silt pockets, 10'- 14'
15				0.32	74	100	94	67	Very soft, gray CLAY with silt seams and partings and occasionally organic material (CH)
									—with silt and fine sand pockets, 14'- 20'
20									—with silt and fine sand seams, 20'- 22'
									—with silt and fine sand seams and lenses, 22'- 38'
25				0.24	54	96	88	58	
30									—with calcareous nodules, 30'- 32'
35			(1)	0.22	48	103	56	33	
									—with fine sand seams and lenses below 38'
40									Bottom of boring at 40'. Borehole grouted full depth.

(1) K = 4.5E-08 cm/sec

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-27
FILE: 93B248C
DATE: 9/30/93
TECHNICIAN: Fontenot
APPROVED: V. Perez
PAGE: 1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 8' during dry augering. The water level rose to a depth of 6.5' after an observation period of 15 minutes.

Coordinates: N 461,741 E 2,340,806 Ground Surface Elevation: -1.5

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Stiff, brown and black CLAY with organic materials (CH
									—soft, 2'- 4'
					61		127	95	—stiff, 4'- 6'
5									—very soft below 6'
10									Very soft, gray CLAY with sandy silt pockets, seams and layers (CH
									—with silt pockets, 10'- 16'
				0.28	80	88	134	100	
15									—with sandy silt seams, lenses and layers, 16'- 18'
									—with silt pockets and seams, 18'- 20'
20									—with silt pockets, seams and lenses, 20'- 24'
									—with sandy silt pockets, seams and lenses, 24'- 28'
25									
									—with sandy silt seams and pockets, 28'- 38'
30									
					56		52	33	
35									
									—with silt seams and organic fragments below 38'
									Bottom of boring at 40'.
									Borehole grouted full depth.
40									

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

AUG 18 95 WCSGBR 3B248 B-27

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-28
FILE: 93B248C
DATE: 10/6/93
TECHNICIAN: R. Rizzo
APPROVED: V. PEREZ
PAGE: 1 of 1

Dry Augered: 0'- 8' Wash Bored: 8'- 40'

Free water was encountered at a depth of 8' during dry augering. The water level rose to a depth of 7' after an observation period of 15 minutes.

Coordinates: N 460,932 E 2,340,412 Ground Surface Elevation: -1.4

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum	
0									Very stiff, brown and gray CLAY with roots, wood and organic material	
				0.79	56	97	98	73	—medium, with ferrous nodules, 2'- 6'	(CH
5									—very soft, dark gray below 6'	
					48		73	50	Very soft, gray SILT	(OH
10									Very soft, gray Silty CLAY	(CL
									Soft, gray CLAY	(CH
15					52		73	46	—very soft below 16' —with traces of organic materials and silt pockets, 16'- 18'	
20									Very soft, gray Silty Sandy CLAY	(CH
					78		84	57		
									Very soft, gray CLAY	(CH
25										
30										
35					70		90	62	—with traces of organics and silt pockets	
									Bottom of boring at 40'. Borehole grouted full depth.	
40										

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-29
FILE: 93B248C
DATE: 9/15/93
TECHNICIAN: Bailey
APPROVED: J.Fiore
PAGE: 1 of 1

Dry Augered: 0'- 8' Wash Bored: 8'- 40'

Free water was encountered at a depth of 8' during dry augering. The water level rose to a depth of 5.5' after an observation period of 30 minutes.

Coordinates: N 460,123 E 2,340,017 Ground Surface Elevation: -1.4

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Stiff, brown, tan and gray CLAY with roots and organic material (CH)
5					66	91	102	72	—with ferrous stains, 4'- 6'
10									Soft, green Silty CLAY with fine sand pockets (CL)
15			(1)	0.36	62	102	91	63	Soft, gray CLAY with silt seams and partings and occasional organic material (CH) —with occasional silt pockets, 12'- 18' —with traces of peat, 12'- 14'
20			(2)		59				—with silt lenses, 18'- 24'
25									—with fine sandy silt lenses, 24'- 26'
30				0.27	71	102	88	57	—with occasional silt seams, 28'- 34'
35									—with occasional silt pockets, 34'- 38'
40				0.13	82	96	95	67	—with occasional silt seams below 38' Bottom of boring at 40'. Borehole grouted full depth.

(1) K = 2.3E-07 cm/sec
(2) See grain size distribution curve.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-30
FILE: 93B248C
DATE: 9/2/93
TECHNICIAN: M. Fontenot
APPROVED: [illegible]
PAGE: 1 of 3

Dry Augered: 0'- 10' Wash Bored: 10'- 100'

Free water was encountered at a depth of 7' during dry augering. The water level rose to a depth of 5' after an observation period of 15 minutes.

Coordinates: N 459,377 E 2,339,577 Ground Surface Elevation: -1.8

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Soft, gray CLAY with organic material (CL
5					40	109	61	34	—with silt pockets, 6'- 8'
									—with traces of silt, 8'- 10'
10					56	102	70	44	—with silt pockets and seams, 10'- 12'
									—with silt pockets, 12'- 14'
									—with shell fragments, 14'- 18'
15									—with traces of silt, 14'- 16'
									—with silt pockets and seams, 16'- 20'
									Very soft, gray CLAY with silt and sandy silt lenses and seams (CL
20				0.18	32	105	47	24	—with sand pockets and seams and organic material, 18'- 20'
									—with organic material, 24'- 26'
25									—with silt and fine sand seams, 26'- 30'
									—with organic material, 28'- 30'
30					50	103			—with silt and fine sand seams and lenses, 30'- 40'
									—with laminations, 32'- 40'
35				0.32	55	108	41	20	
40									

Continued Next Page

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-30
FILE: 93B248C
DATE: 9/2/93
TECHNICIAN: M. Fontenot
APPROVED: V. Fesse
PAGE: 2 of 3

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
40									Very soft, gray CLAY (CH)
									—with traces of silt and fine sand, 43'- 45'
45									
				0.27	66	97	96	69	
50									
					63	100			
55									
									—with shell fragments, 58'- 60'
60									
					20	124			Firm, greenish gray fine SAND (SM)
65									
				0.60	32	118	34	10	Medium, light gray and gray Silty CLAY (CL)
70									
75									
			(1)	1.04	51	108	88	60	Stiff, greenish gray and light gray CLAY (CH) —with fine sand pockets and slickensides, 78'- 80'
80									

Continued Next Page

(1) See consolidation curve.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-30
FILE: 93B248C
DATE: 9/2/93
TECHNICIAN: M. Fontenot
APPROVED: V. [illegible]
PAGE: 3 of 3

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
80									Stiff, greenish gray and light gray CLAY (CI
									—with slickensides below 80'
									—with shell fragments below 83'
									—with wood fragments, 83'- 85'
85									—with fine sand pockets below 83'
90									
95									
				1.13	40	110	68	46	
100									Bottom of boring at 100'. Borehole grouted full depth.

(1) See consolidation curve.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-31
FILE: 93B248C
DATE: 9/15/93
TECHNICIAN: Bailey
APPROVED: V. Foret
PAGE: 1 of 1

Dry Augered: 0'- 8' Wash Bored: 8'- 40'

Free water was encountered at a depth of 8' during dry augering. The water level rose to a depth of 5.5' after an observation period of 15 minutes.

Coordinates: N 459,920 E 2,340,296 Ground Surface Elevation: -1.9

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum	
0					41		93	56	Stiff, brown, gray and tan CLAY —with roots to 6'	(CH)
5				0.58	31	114	46	23	Medium, tan and light gray Silty CLAY —with ferrous stains, 4'- 8'	(CL)
10			5 b/f (1)		29				Loose, gray SILT with some sand, clay and traces of organics —with occasional clay seams, 8'- 10' —with roots, 8'- 14'	(ML)
			5 b/f							
			6 b/f (1)							
15			6 b/f		24				—with occasional clay lenses, 16'- 18'	
			4 b/f							
			4 b/f							
20			3 b/f (1)		34				—with root traces, 20'- 22' —with clay lenses, 22'- 24'	
			3 b/f							
25			4 b/f (1)		30				—with occasional clay pockets, 24'- 26'	
					53		95	66	Soft, gray CLAY —with occasional silt pockets, 26'- 32'	(CH)
30				0.38	69	98	87	57		
35									—with silt lenses, 36'- 40'	
40				0.37	54	101	72	49	Bottom of boring at 40'. Borehole grouted full depth.	

(1) See grain size distribution curves.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-32
FILE: 93B248C
DATE: 9/24/93
TECHNICIAN: W. Brady
APPROVED: V. Pezez
PAGE: 1 of 1

Dry Augered: 0'- 8' Wash Bored: 8'- 40'

Free water was encountered at a depth of 10' during dry augering. The water level rose to a depth of 8' after an observation period of 15 minutes.

Coordinates: N 460,325 E 2,340,617 Ground Surface Elevation: -1.4

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0					51		96	64	Medium, brown CLAY with wood (CH)
5					30		36	13	Gray Silty CLAY with organic material (CL)
10									Soft, gray Silty CLAY (CL)
15				0.20	46	107	51	32	Alternating layers of soft, gray CLAY, Clayey SILT and some fine SAND (CH-CL-SM)
20			(1) (2) NR		29	127			Gray Sandy SILT to SILT with traces of clay and organics (ML)
25					58	102	75	52	Soft, gray CLAY with traces of silt (CH)
30			11 b/ft (2) 14 b/ft		40				Firm, gray Clayey SILT with fine sand (ML)
35					43		57	37	Medium, gray CLAY (CH) —with traces of organics, 32'- 34' —with silt seams, 32'- 36'
40				0.54	51	111	54	36	Bottom of boring at 40'. Borehole grouted full depth.

NR = No Recovery
(1) K = 1.6E-04 cm/sec
(2) See grain size distribution curves.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

AUG 18 95 WCSGBR 3B248 B-32

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-33
FILE: 93B248C
DATE: 9/28/93
TECHNICIAN: W. Brady
APPROVED: V. EEE
PAGE: 1 of 3

Dry Augered: Wash Bored:

Free water was encountered at a depth of 6' during dry augering. The water level rose to a depth of 4.5' after an observation period of 15 minutes.

Coordinates: N 461,135 E 2,341,011 Ground Surface Elevation: -1.7

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Very soft, gray CLAY (CH)
									—with wood, roots and organic material to 14'
5					66		110	74	
10									—with silt streaks, 10'- 12'
15					59		71	45	—with silt pockets and trace of organics
									—with silt seams and partings, 18'- 26'
20									
25					53		71	45	
30									
35									—with silt seams, 34'- 36'
									—with silt layers and seams, 36'- 38'
									—with silt seams, 38'- 45'
40									

Continued Next Page

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-33
FILE: 93B248C
DATE: 9/28/93
TECHNICIAN: W. Brady
APPROVED: V. REE
PAGE: 2 of 3

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
40									Very soft, gray CLAY (CH)
				0.52	51	104	76	47	
45									
50									
			0.3		57		104	70	
55									—with 4" sand layer with shells at 55'
			0.4						—with silt seams, 58'- 60'
60									
									Medium, gray CLAY with shells (CH)
			1.0		46		81	55	
65									
70									
					61		94	63	—with wood at 73'
75									
				0.75	64	101	96	66	
80									

Continued Next Page

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-33
FILE: 93B248C
DATE: 9/28/93
TECHNICIAN: W. Brady
APPROVED: V. Fiel
PAGE: 3 of 3

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
80									Medium, gray CLAY with shells (CH
									—with wood, 83'- 85'
85									
					44		92	63	—stiff, greenish gray below 88' —with silt streaks at 88'
90									
95									
					38		107	72	—with silt pockets below 98'
100									Bottom of boring at 100'. Borehole grouted full depth.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT:	River Birch Landfill	BORING:	B-34
LOCATION:	Jefferson Parish, Louisiana	FILE:	93B248C
		DATE:	9/24/93
		TECHNICIAN:	W. Brady
CLIENT:	Gulf Engineers and Consultants, Inc.	APPROVED:	V. Feles
		PAGE:	1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 10' during dry augering. The water level rose to a depth of 8' after an observation period of 15 minutes.

Coordinates: N 461,944 E 2,341,405 Ground Surface Elevation: -1.5

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Medium, gray and brown CLAY with roots and organic material (CH)
					58		116	89	—with wood to 8'
5									
									—with silt pockets, 8'- 10'
10									Soft, gray Silty CLAY (CL)
			(1)		83	96	104	78	Soft, gray CLAY with silt seams and partings (CH)
				0.26	88	101	118	91	—with wood, 12'- 16'
15									
									—with silt seams at 18'
20									
									—with silt seams, 22'- 34'
				0.23	76	94	101	75	
25									
30									
					51		61	42	
35									
									—with silt streaks below 38'
									Bottom of boring at 40'.
									Borehole grouted full depth.
40									

(1) K = 2.9E-07 cm/sec

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-35
FILE: 93B248C
DATE: 9/24/93
TECHNICIAN: W. Brady
APPROVED: V. Perez
PAGE: 1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 10' during dry augering. The water level rose to a depth of 8' after an observation period of 15 minutes.

Coordinates: N 462,753 E 2,341,799 Ground Surface Elevation: -0.7

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.L. (%)	Description of Stratum
0									Medium, gray and brown CLAY with wood (CH)
5									Soft, gray CLAY with silt seams and partings and occasional organic material (CH)
									—with wood, 4'- 10'
					59		92	68	
10									—with silty sand at 10'
									—with silt layer at 12'
				0.30	98	94	87	61	
15									
									—with silt seams, 18'- 20'
20									
									—with silty clay layer at 22'
					83		84	60	—with silt seams, 24'- 32'
25									
30									
					58		73	52	
									—with silt streaks, 34'- 36'
35									
					51		64	46	—with silt seams below 38' Bottom of boring at 40'. Borehole grouted full depth.
40									

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-36
FILE: 93B248C
DATE: 10/5/93
TECHNICIAN: R. Rizzo
APPROVED: V. Pece
PAGE: 1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 10' during dry augering. The water level rose to a depth of 9' after an observation period of 15 minutes.

Coordinates: N 462,956 E 2,342,398 Ground Surface Elevation: 0.1

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum	
0					55		109	67	Medium, brown and gray CLAY with roots	(CH)
									—with ferrous nodules, 2'- 8'	
5									—with wood, 4'- 8'	
					51		87	62	—soft, gray, with wood and silt, 8'- 10'	
10									Very soft, gray SILT with roots	(ML)
15				0.25	82	94	110	83	Very soft, gray CLAY —with trace of organics	(CH)
20									Soft, gray SILT becoming CLAY	(ML)
					49	109	44	20	Soft, gray CLAY with alternating layers of sandy silt or silty sand	(CL)
25									Very soft, gray slightly Silty CLAY	(CL)
									Very soft, gray CLAY —with sand lenses, 26'- 28'	(CH)
30									—with sand layer at 32'	
35					44		56	36		
40									Bottom of boring at 40'. Borehole grouted full depth.	

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-37
FILE: 93B248C
DATE: 9/29/93
TECHNICIAN: W. Brady
APPROVED: V. FECEZ
PAGE: 1 of 3

Dry Augered: 0'- 6' Wash Bored: 6'- 100'

Free water was encountered during dry augering.

Coordinates: N 462,146 E 2,342,004 Ground Surface Elevation: -0.7

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Soft, gray and brown CLAY with wood, roots and organic material (CH)
5					70		115	87	
									—with silt pockets, 8'- 10'
10					41		35	10	Alternating layers of Silty CLAY and fine SAND with organic material (CL/ML)
15				0.27	32	114	36	10	
									Very soft, gray CLAY (CH)
20									Soft, gray CLAY (CH)
					56		64	44	—with silt and sand seams and partings, 20'- 30'
25				0.36	49	103	51	31	
30									—with silt seams, 30'- 32'
									—with 1" layer of silt at 34'
35				0.47	49	103	71	49	—with silt seams, 36'- 40'
40									

Continued Next Page

Unified Soil Classifications based on limited laboratory test data and visual observations.

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-37
FILE: 93B248C
DATE: 9/29/93
TECHNICIAN: W. Brady
APPROVED: J Hsieh
PAGE: 2 of 3

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
40									Soft, gray CLAY (CH)
45									—with silt seams at 48'
50									
55									
					62		84	58	—with silt seams, 58'- 70'
60									
65									
			(1)		62	100	93	69	
70									
									—with shells, 73'- 75'
75									—stiff, brown, gray and dark gray below 75'
			2.0		52		153	103	—with wood and organic material, 78'- 80'
80									

Continued Next Page

(1) K = 5.2E-08 cm/sec
(2) See grain size distribution curve.
(3) See consolidation curve.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-37
FILE: 93B248C
DATE: 9/29/93
TECHNICIAN: W. Brady
APPROVED: V Perez
PAGE: 3 of 3

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum	
80									Stiff, brown, gray and dark gray CLAY	(CH)
85			(2)		23		25	6	Light gray Silty SAND with some clay —with sand pockets, 83'- 90'	(CL-ML)
90			(3)		23	125	27	9	Greenish gray and light gray Clayey SAND	(CL)
95									Stiff, gray, light gray and bluish gray CLAY —with silt layer at 93'	(CH)
					36		66	46		
100									Bottom of boring at 100'. Borehole grouted full depth.	

(1) K = 5.2E-08 cm/sec
(2) See grain size distribution curve.
(3) See consolidation curve.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-38
FILE: 93B248C
DATE: 9/30/93
TECHNICIAN: W. Brady
APPROVED: V. FSEE
PAGE: 1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered during dry augering. The water level was observed at a depth of 8.5' after a period of 15 minutes.

Coordinates: N 461,337 E 2,341,610 Ground Surface Elevation: -0.9

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Medium, brown CLAY with wood (CH)
			NR						
									—tan and brown below 4'
5									
									—soft, light gray below 6'
				0.23	81	95	73	48	—with organic pockets, 8'- 10'
10									
									—with silt pockets, 12'- 16'
					69		99	66	—with organic pockets, 14'- 16'
15									
									—with silt seams at 16'
									—with organic material and wood, 16'- 18'
									—very soft below 18'
									—with silt seams, 18'- 20'
20					45		40	15	—with silt pockets, 20'- 22'
									—with silt seams, 24'- 34'
25									
30									
					46		57	34	—with alternating layers of sandy silt and silt, 32'- 34'
35									
									—with silt seams below 36'
				0.45	62	104	69	43	Bottom of boring at 40'. Borehole grouted full depth.
40									

NR = No Recovery

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-39
FILE: 93B248C
DATE: 9/28/93
TECHNICIAN: W. Brady
APPROVED: V. Peters
PAGE: 1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 10' during dry augering. The water level rose to a depth of 7' after an observation period of 15 minutes.

Coordinates: N 460,462 E 2,341,014 Ground Surface Elevation: -0.8

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum	
0									Hard, brown CLAY with wood	(CH)
									—medium, light gray and brown below 2'	
5									Medium, brown and light gray Silty CLAY	(CL)
									—soft below 6'	
									—light gray below 8'	
10			(1)		36	114	NP	NP	Gray SILT	(ML)
15				0.20	44	108	55	33	Soft, gray CLAY	(CH)
									—with silt and traces of organic materials	
20										
			13 b/ft (2)		33				Firm, light gray Clayey SILT	(ML)
25			15 b/ft							
			16 b/ft							
			16 b/ft						—with some sand below 28'	
30					61		61	37	Very soft, light gray CLAY with silt seams	(CH)
35									—with silt layers below 36'	
					44		48	27	Bottom of boring at 40'. Borehole grouted full depth.	
40										

NP = Non-plastic
(1) K = 2.1E-06 cm/sec
(2) See grain size distribution curve.

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

AUG 18 95 WCSGBR 3B248 B-39

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-40
FILE: 93B248C
DATE: 9/30/93
TECHNICIAN: W. Brady
APPROVED: V. Reese
PAGE: 1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 10' during dry augering. The water level rose to a depth of 9' after an observation period of 15 minutes.

Coordinates: N 461,004 E 2,341,732 Ground Surface Elevation: -1.2

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Medium, brown CLAY (CH)
									—with wood to 10'
									—light gray and brown, 2'- 8'
					64		119	83	
5									
									—soft, 6'- 18'
									—light gray below 8'
10									—with silt seams and pockets, 10'- 16'
					75		117	84	—with wood, 14'- 18'
15									
									—very soft below 18'
20				0.20	58	107	46	18	—with silt layers, 20'- 22'
25									
									—with silt layer at 26'
					64		93	63	
30									—with silt seams, 30'- 32'
									—with silt pockets, 32'- 34'
									—with silt seams, 34'- 36'
35									
					66		70	44	—with silt seams below 38' Bottom of boring at 40'. Borehole grouted full depth.
40									

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-41
FILE: 93B248C
DATE: 10/1/93
TECHNICIAN: W. Brady
APPROVED: V. Fece
PAGE: 1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 10' during dry augering. The water level rose to a depth of 9' after an observation period of 15 minutes.

Coordinates: N 461,540 E 2,342,209 Ground Surface Elevation: -0.6

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Medium, brown CLAY (CH)
									—with wood and organic material to 18'
									—light gray and brown, 2'- 6'
					70		102	69	
5									
									—soft, 6'- 8'
									—light gray below 6'
									—very soft below 8'
10									
					47		96	68	—with silt seams, 12'- 24'
				0.31	82	94	116	81	—with organic material, 14'- 16'
15									
20					50		43	19	
									—with calcareous nodules, 22'- 24'
25									
					72		58	34	—with silt seams, 26'- 28'
30									
									—with silt layer at 32'
									—with wood, 34'- 36'
35					47		52	29	—with silt seams below 36'
									Bottom of boring at 40'. Borehole grouted full depth.
40									

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-42
FILE: 93B248C
DATE: 9/23/93
TECHNICIAN: W. Brady
APPROVED:
PAGE: 1 of 1

Dry Augered: 0'- 6' Wash Bored: 6'- 40'

Free water was encountered at a depth of 5' during dry augering. The water level rose to a depth of 4' after an observation period of 15 minutes.

Coordinates: N 462,349 E 2,342,603 Ground Surface Elevation: -0.3

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Medium, light gray and brown CLAY with wood and organic material (CH)
5				0.40	49	109	62	41	—light gray below 4'
									Soft, light gray Silty CLAY with wood (CL)
10									Very soft, light gray CLAY (CH)
									—with wood to 16'
									—with silt layer at 10'
15			(1)	0.27	68	101	72	52	
					37		35	13	—with silt seams, 16'- 24'
20					65		72	49	—with traces of organic materials, 20'- 22'
25									—with silt seams, 26'- 34'
30				0.30	53	109	55	36	
35									
40				0.37	47	109	63	43	Bottom of boring at 40'. Borehole grouted full depth.

(1) K = 4.2E-05 cm/sec

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

AUG 18 95 WCSGBR 3B248 B-42

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-43
FILE: 93B248C
DATE: 10/5/93
TECHNICIAN: R. Rizzo
APPROVED: [illegible]
PAGE: 1 of 1

Dry Augered: 0'- 12' Wash Bored: 12'- 40'

Free water was encountered at a depth of 10' during dry augering. The water level rose to a depth of 9' after an observation period of 15 minutes.

Coordinates: N 461,547 E 2,342,450 Ground Surface Elevation: -0.6

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Stiff, black slightly Silty CLAY with organic matter becoming medium brown CLAY (CL
									Medium, brown CLAY (CH
									—with black organic matter, 2'- 4'
5									—soft below 4'
					73		124	93	—gray and brown, with ferrous nodules and wood, 4'- 6'
									—gray, with roots below 6'
10									Soft, gray Clayey SILT (ML
									Soft, gray CLAY (CH
15									
									—very soft below 18'
20			(1)		59	104	75	51	—with traces of silt and shell fragments
									—with organic matter, 20'- 22'
									—with silt, 22'- 26'
25									
30									
35									
					56		72	50	—with silt at 36'
									—soft below 38'
									Bottom of boring at 40'.
									Borehole grouted full depth.
40									

(1) K = 4.4E-07 cm/sec

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PROJECT: River Birch Landfill
LOCATION: Jefferson Parish, Louisiana
CLIENT: Gulf Engineers and Consultants, Inc.

BORING: B-44
FILE: 93B248C
DATE: 10/5/93
TECHNICIAN: R. Rizzo
APPROVED: V. [illegible]
PAGE: 1 of 1

Dry Augered: Wash Bored:

Free water was encountered at a depth of 9' during dry augering. The water level rose to a depth of 8' after an observation period of 15 minutes.

Coordinates: N 462,117 E 2,342,911 Ground Surface Elevation: -0.3

DEPTH (FEET)	SYMBOL	SAMPLE	S.P.T.	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum	
0									Medium, brown CLAY	(CI
									—with roots and organic matter to 4'	
									—with wood, 2'- 8'	
									—soft, 4'- 6'	
5									—gray and brown, 4'- 8'	
									—very soft, with ferrous nodules and silty clay layers, 6'- 8'	
					51		50	24	—soft, with some silt, 8'- 12'	
									—gray below 8'	
10									—with traces of organic matter, 8'- 10'	
									—very soft below 12'	
									—with wood, 14'- 16'	
15				0.13	86	87	124	92	—with pockets of organic materials and traces of silt, 16'- 18'	
20									Very soft, gray SILT with clay	(ML
					35		41	13	—with alternating layers of silt, clay and clayey silt	
25									Very soft, gray Silty CLAY	(CI
									—with traces of silt below 26'	
									Very soft, gray CLAY	(CI
30					72		97	66	—with traces of organic matter	
35										
40									Bottom of boring at 40'. Borehole grouted full depth.	

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

ENGINEERING ASSOCIATES BORING
EAI-B-1-06

SOIL BORING LOG

PROJECT NUMBER: *21140*		PROJECT NAME: *River Birch Landfill*			
BORING NUMBER: *EAI-B-1-06*		COORDINATES: *NA*		DATE:	*10/28/06*
ELEVATION : *NA*		GWL: DEPTH: *8 ft bgs*	TIME:	DATE STARTED:	*10/28/06*
ENGINEERING ASSOCIATES PERSONNEL:	*S. Funderburk*			DATE COMPLETED:	*10/28/06*
DRILLING METHOD: *Direct Push*				PAGE 1 OF 2	

DEPTH FEET	SAMPLE METHOD & NO	SAMPLE TIME & % RECOVERY	DESCRIPTION	USCS SYMBOL	PID (ppm)
	0'-2'		*(0'-2') Stiff, brown CLAY, root fragments*	*CL*	
	2'-4'		*(2'-4') Soft, brown peat with root fragments*	*PT*	
5	*4'-6'*			*CH*	
			(5'-9') Soft, gray CLAY, wet at 8 ft		
	6'-8'				
	8'-10'				
			(9'-10') Soft, black Clay	*CL*	*NA*
10	*10'-12'*		*(10'-12') Soft, gray organic CLAY with root fragments*		
	12'-14'		*(12'-13') Soft gray SILTY CLAY*	*CL*	
			(13'-16') Soft, gray SILTY CLAY	*CH*	
15	*14'-16'*				
	16'-18'		*(16'-20') Soft, gray SILTY CLAY*	*CL*	
	18'-20'				
	20'-22'		*(20'-38') Soft, gray SILTY CLAY*	*CH*	
	22'-24'				

Notes:

NA = Not Available
NR = No Recovery
ft bgs = feet below ground surface
** Sample selected for lab analysis*
PID = Photoionization Detector

Drilling Subcontractor:
Driller:

*QA Approved by:*_____

SOIL BORING LOG

PROJECT NUMBER: *21140*	**PROJECT NAME:** *River Birch Landfill*		
BORING NUMBER: *EAI-B-1-06*	**COORDINATES:** *NA*	**DATE:**	*10/28/06*
ELEVATION : *NA*	**GWL: DEPTH:** *8 ft bgs*	**TIME:** **DATE STARTED:**	*10/28/06*
ENGINEERING ASSOCIATES PERSONNEL:	*S. Funderburk*	**DATE COMPLETED:**	*10/28/06*
DRILLING METHOD: *Direct Push*		**PAGE 2 OF 2**	

DEPTH FEET	SAMPLE METHOD & NO	SAMPLE TIME & % RECOVERY	DESCRIPTION	USCS SYMBOL	PID (ppm)
25	*24'-26'*		*(20'-38') Soft, gray SILTY CLAY*		
	26'-28'				
	28'-30'			*CH*	
30	*30'-32'*				
	32'-34'				
35	*34'-36'*				
	36'-38'				
	38'-40'		*(38'-40') Soft, gray CLAYEY SILT*		
40					

Notes:

NA = Not Available
NR = No Recovery
ft bgs = feet below ground surface
** Sample selected for lab analysis*
PAD = Photoionization Detector

Drilling Subcontractor:
Driller:

*QA Approved by:*_____

PART IV

Soil Test Results

BEST COPY

ATTACHMENT D

SOIL TEST RESULTS

TABLE 1

LABORATORY DATA SUMMARY
RIVER BIRCH LANDFILL

Point ID	Depth (ft)	Compress. (tsf)	Moisture Content (%)	Wet Density lb/ft³	Liquid Limit (%)	Plastic Limit	Plasticity Index	Sieve	Organic Matter Content	Perm cm/sec	Cv mm²/sec				
											1 tsf	2 tsf	4 tsf	8 tsf	16 tsf
B-1	0.0	2.25	41	100.0	108	46	62								
B-1	2.0	0.44	26	108.0	36	21	15								
B-1	4.0		30		34	24	10								
B-1	8.0		51												
B-1	10.0	0.58	195		270	57	213								
B-1	12.0		78	97.4	83	23	60			0.0000051100					
B-1	14.0		51		83	23	60		1.6		x	0.0560	0.0460	0.0430	x
B-1	18.0		45												
B-1	26.0	0.48	56	98.0	94	31	63								
B-1	32.0		57												
B-1	36.0	0.41	40	111.0	48	23	25								
B-2	0.0		50		113	48	65								
B-2	4.0		54		75	27	48								
B-2	8.0	0.13	134	80.0	158	53	105								
B-2	14.0	0.21	48	108.0	47	22	25								
B-2	20.0		79		94	32	62								
B-2	30.0		73	98.0	77	29	48			0.0000000928					
B-2	36.0	0.28	63	99.0	78	29	49								
B-3	0.0		19					21.4*							
B-3	0.0							22.1							
B-3	4.0		57		78	24	54								
B-3	8.0		63		79	27	52								
B-3	12.0	0.13	55	100.0	62	23	39								

Woodward-Clyd

TABLE 1 (Continued)

LABORATORY DATA SUMMARY
RIVER BIRCH LANDFILL 93B248C

Point ID	Depth (ft)	Compress. (tsf)	Moisture Content (%)	Wet Density lb/ft³	Liquid Limit (%)	Plastic Limit	Plasticity Index	Sieve	Organic Matter Content	Perm cm/sec	Cv mm²/sec 1 tsf	2 tsf	4 tsf	8 tsf	16 tsf
B-3	18.0	0.12	60	96.0	85	26	59								
B-3	22.0		53		65	28	37								
B-3	24.0	0.20	63	95.0	76	27	49								
B-3	26.0		64		77	26	51								
B-3	30.0	0.20	64		77	27	46		3.2		0.0410	0.0260	0.0170	0.0130	x
B-3	38.0	0.28	53	102.0	66	24	42								
B-4	0.0	3.05	39	92.0	100	36	64								
B-4	6.0	0.12	92	88.0	104	33	71								
B-4	8.0		219	74.8	275	57	218			0.0000000616					
B-4	14.0		108	87.0	93	29	64								
B-4	20.0	0.21	49	97.0	99	32	67								
B-4	30.0		51	102.0	52	24	28								
B-4	36.0		54	102.0	83	29	54								
B-4	48.0	0.42	52	101.0	91	29	62								
B-4	53.0	0.51	67	99.0	103	36	67								
B-4	63.0		21												
B-4	73.0		28												
B-4	83.0		36												
B-4	93.0		41												
B-4	98.0	0.78	38	108.0	59	21	38								
B-5	0.0		45						8.6						
B-5	8.0		128		157	40	117		11.3						
B-5	14.0	0.15	53	111.0	55	23	32		4.4		0.3650	0.3290	x	x	x

Woodward-Clyd

TABLE 1 (Continued)

LABORATORY DATA SUMMARY
RIVER BIRCH LANDFILL 93B248C

Point ID	Depth (ft)	Compress. (tsf)	Moisture Content (%)	Wet Density lb/ft³	Liquid Limit (%)	Plastic Limit	Plasticity Index	Sieve	Organic Matter Content	Perm cm/sec	Cv mm²/sec				
											1 tsf	2 tsf	4 tsf	8 tsf	16 tsf
B-5	24.0	0.27	72	95.0	104	35	69								
B-5	34.0	0.20	55	94.0	66	24	42								
B-5	38.0		33		52	22	30								
B-6	4.0		60		98	27	71								
B-6	16.0		52	113.2	46	18	28			0.0000006510					
B-6	30.0		45		52	19	33								
B-6	43.0	0.19	60	98.0	80	22	58								
B-6	53.0	0.25	66	97.0	95	27	68								
B-6	63.0	0.67	54	103.0	81	23	58								
B-6	73.0	0.68	26	116.0	34	22	12								
B-6	88.0		27		43	18	25		1.3		0.0390	0.0700	0.0720	0.0790	0.0760
B-6	98.0		45		76	23	53								
B-7	6.0		82		109	32	77								
B-7	12.0	0.21	84	94.0	122	34	88		2.1						
B-7	22.0		73		80	28	52								
B-7	36.0		42		49	21	28								
B-8	8.0		80		141	40	101								
B-8	12.0	0.31	60	94.0	86	30	56		6.0						
B-8	20.0		69		46	25	21								
B-8	30.0	0.29	66	104.0	48	24	24		4.0						
B-9	4.0	0.30	39	107.0	37	23	14								
B-9	6.0	0.50	57	100.0											
B-9	10.0		73		101	29	72								

Woodward-Clyd

TABLE 1 (Continued)

LABORATORY DATA SUMMARY
RIVER BIRCH LANDFILL 93B248C

Point ID	Depth (ft)	Compress. (tsf)	Moisture Content (%)	Wet Density lb/ft³	Liquid Limit (%)	Plastic Limit	Plasticity Index	Sieve	Organic Matter Content	Perm cm/sec	Cv mm²/sec 1 tsf	2 tsf	4 tsf	8 tsf	16 tsf
B-9	14.0	0.35	73	93.0	137	35	102								
B-9	20.0		57		87	27	60								
B-9	22.0		46	109.6	54	17	37			0.0000000668					
B-9	24.0	0.13	39	100.0	35	24	11								
B-9	26.0	0.28	51	103.0	60	22	38								
B-9	34.0		38		44	20	24								
B-10	4.0		58		94	29	65								
B-10	6.0	0.42	54	98.0	97	27	70								
B-10	12.0		76		121	34	87								
B-10	16.0	0.20	49	101.0	56	21	35								
B-10	18.0		46		48	23	25								
B-10	24.0	0.28	48	100.0	80	26	54								
B-10	30.0	0.31	52	105.0	62	24	38								
B-10	38.0		45		50	21	29								
B-11	6.0		73		118	33	85								
B-11	20.0		43		53	27	26								
B-11	26.0	0.34	66	100.0	81	27	54								
B-11	34.0		62		80	29	51								
B-11	48.0	0.33	61	98.0	83	29	54								
B-11	58.0		64		96	30	66								
B-11	63.0		23		58	19	39								
B-11	78.0		28		31	22	9								
B-11	93.0		27		50	19	31								
B-12	14.0		84		107	32	75								

Woodward-Clyd

TABLE 1 (Continued)

LABORATORY DATA SUMMARY
RIVER BIRCH LANDFILL 93B248C

Point ID	Depth (ft)	Compress. (tsf)	Moisture Content (%)	Wet Density lb/ft³	Liquid Limit (%)	Plastic Limit	Plasticity Index	Sieve	Organic Matter Content	Perm cm/sec	Cv mm²/sec 1 tsf	2 tsf	4 tsf	8 tsf	16 tsf
B-12	22.0		53		55	24	31								
B-12	36.0		49		84	30	54								
B-13	14.0		55		50	19	31		1.8						
B-13	22.0		62		94	28	66								
B-13	28.0	0.32	54	100.0	53	21	32								
B-13	38.0		54		82	23	59								
B-14	4.0	0.28	72	92.0	92	26	66								
B-14	12.0	0.16	53	103.0	54	22	32								
B-14	18.0	0.19	74	99.0	64	25	39								
B-14	28.0	0.18	78	97.0	83	30	53				0.0260	0.0120	0.0120	0.0074	0.0051
B-14	38.0	0.33	51	103.0	67	24	43								
B-15	2.0		249		224	57	167		44.3						
B-15	10.0		77		113	27	86		2.5						
B-15	14.0	0.24	72	94.0	105	31	74								
B-15	22.0	0.16	57	99.0	50	21	29								
B-15	30.0	0.09	85	93.0	89	28	61								
B-15	38.0	0.16	85	97.0	76	25	51								
B-16	0.0		118		181	70	111								
B-16	6.0	0.09	120	74.0	183	36	147								
B-16	12.0	0.17	78	98.0	90	27	63		3.0	0.0000000890					
B-16	20.0	0.21	85	97.0	76	27	49								
B-16	30.0	0.17	69	96.0	90	25	65								
B-17	2.0		30	119.6	42	24	18			0.0000004530					

Woodward-Clyde

TABLE 1 (Continued)

LABORATORY DATA SUMMARY
RIVER BIRCH LANDFILL 93B248C

Point ID	Depth (ft)	Compress. (tsf)	Moisture Content (%)	Wet Density lb/ft³	Liquid Limit (%)	Plastic Limit	Plasticity Index	Sieve	Organic Matter Content	Perm cm/sec	Cv mm²/sec 1 tsf	2 tsf	4 tsf	8 tsf	16 tsf
B-17	4.0	0.50	38	109.0	58	25	33								
B-17	16.0	0.28	38	108.0	49	21	28		1.0		x	0.1200	0.1300	x	x
B-17	30.0	0.47	65	100.0	85	28	57								
B-17	32.0		62	102.3	77	27	50		2.5		x	0.0240	0.0260	x	x
B-17	38.0	0.42	63	100.0	80	27	53								
B-18	0.0		46	90.0	115	63	52								
B-18	2.0		52		105	32	73		1.9		x	x	0.0740	0.0390	x
B-18	14.0	0.30	67	110.0	45	21	24								
B-18	16.0	0.26	43	108.0	51	24	27								
B-18	26.0	0.18	86	98.0	97	33	64								
B-18	30.0		57		73	28	45								
B-18	34.0		48		48	24	24								
B-18	38.0		52		74	26	48								
B-19	8.0	0.23	48	105.0	55	23	32								
B-19	12.0		51	134.0	84	24	60				x	0.0550	0.0730	0.0730	0.0370
B-19	22.0	0.22	78	95.0	98	30	68								
B-19	32.0	0.23	71	96.0	73	23	50								
B-20	4.0		35		50	21	29								
B-20	14.0		63	100.0	75	27	48			0.0000001400					
B-20	22.0	0.25	82	99.0	63	24	39								
B-20	34.0	0.28	68	100.0	69	24	45								

Woodward-Clyc

TABLE 1 (Continued)

LABORATORY DATA SUMMARY
RIVER BIRCH LANDFILL 93B248C

Point ID	Depth (ft)	Compress. (tsf)	Moisture Content (%)	Wet Density lb/ft³	Liquid Limit (%)	Plastic Limit	Plasticity Index	Sieve	Organic Matter Content	Perm cm/sec	Cv mm²/sec 1 tsf	2 tsf	4 tsf	8 tsf	16 tsf
B-21	0.0	1.64	50	100.0											
B-21	8.0		92		122	36	86		4.1						
B-21	16.0	0.16	56	106.0											
B-21	24.0		77		100	33	67								
B-21	43.0	0.41	64	98.0	94	30	64								
B-21	53.0	0.18	63	94.0	86	30	56	99.8*							
B-21	63.0	1.19	23	122.0	40	17	23	90.9*							
B-21	68.0	1.71	22	124.0	39	17	22								
B-21	73.0	0.66	28	114.0	33	24	9								
B-21	78.0	0.52	29	115.0	31	24	7		0.7		x	x	1.4000	1.9000	1.3000
B-21	88.0		41	108.0	93	30	63								
B-21	98.0		32	108.0	50	29	71								
B-22	6.0		74	89.0	100	29	71								
B-22	14.0	0.41	46	105.0	45	23	22		2.0		x	0.0980	0.0720	0.1000	x
B-22	20.0		45	104.0	54	24	30								
B-22	26.0	0.30	57	99.0	67	25	42								
B-22	34.0		46	102.0	38	28	10								
B-23	6.0		79		100	27	73								
B-23	14.0	0.31	63	100.0	85	24	61								
B-23	24.0		80		98	23	75								
B-23	34.0		64		79	27	52								
B-24	10.0		67		101	27	74								
B-24	26.0		40	113.0	34	26	8	97.1		0.0000008390					

Woodward-Clyd

TABLE 1 (Continued)

LABORATORY DATA SUMMARY
RIVER BIRCH LANDFILL 93B248C

Point ID	Depth (ft)	Compress. (tsf)	Moisture Content (%)	Wet Density lb/ft³	Liquid Limit (%)	Plastic Limit	Plasticity Index	Sieve	Organic Matter Content	Perm cm/sec	Cv mm²/sec 1 tsf	2 tsf	4 tsf	8 tsf	16 tsf
B-24	36.0		57		51	20	31								
B-25	4.0		58		120	32	88								
B-25	8.0	0.16	71	97.0	78	27	51								
B-25	10.0		60		97	29	68								
B-25	14.0	0.32	65	93.0	014	25	79		13.3		0.0210	0.0097	0.006 5	0.0043	x
B-25	18.0		80		100	27	73								
B-25	24.0		72		92	30	62								
B-25	30.0	0.27	52	101.0	53	22	31								
B-25	36.0	0.26	47	108.0	35	24	11								
B-26	0.0		57		94	31	63		12.4						
B-26	4.0	0.33	55	99.0	106	32	74								
B-26	14.0	0.32	74	100.0	94	27	67								
B-26	24.0	0.24	54	96.0	88	30	58								
B-26	36.0	0.22	48	103.0	56	23	33		4.5	0.0000000446					
B-27	4.0		61		127	32	95								
B-27	14.0	0.28	80	88.0	134	34	100								
B-27	34.0		56		52	19	33								
B-28	2.0	0.79	56	97.0	98	25	73								
B-28	8.0		48		73	23	50								
B-28	16.0		52		73	27	46								
B-28	22.0		78		84	27	57								
B-28	36.0		70		90	28	62								
B-29	4.0		66	91.0	102	30	72								

Woodward-Clyde

TABLE 1 (Continued)

LABORATORY DATA SUMMARY
RIVER BIRCH LANDFILL 93B248C

Point ID	Depth (ft)	Compress. (tsf)	Moisture Content (%)	Wet Density lb/ft³	Liquid Limit (%)	Plastic Limit	Plasticity Index	Sieve	Organic Matter Content	Perm cm/sec	Cv mm²/sec 1 tsf	2 tsf	4 tsf	8 tsf	16 tsf
B-29	14.0	0.36	62	102.0	91	28	63		2.8	0.0000002265					
B-29	20.0		59					98.7							
B-29	30.0	0.27	71	102.0	88	31	57								
B-29	38.0	0.13	82	96.0	95	28	67								
B-30	6.0		40	109.0	61	27	34								
B-30	10.0		56	102.0	70	26	44								
B-30	20.0	0.18	32	105.0	47	23	24								
B-30	30.0		50	103.0											
B-30	38.0	0.32	55	108.0	41	21	20								
B-30	48.0	0.27	66	97.0	96	27	69								
B-30	53.0		63	100.0											
B-30	63.0		20	124.0											
B-30	68.0	0.60	32	118.0	34	24	10								
B-30	78.0	1.04	51	108.0	88	28	60		2.7		x	0.0300	0.0230	0.0100	0.0077
B-30	98.0	1.13	40	110.0	68	22	46								
B-31	0.5		41		93	37	56		8.0						
B-31	4.0	0.58	31	114.0	46	23	23								
B-31	8.5		29					86.1							
B-31	14.5		24					82.1							
B-31	20.5		34					96.5							
B-31	24.5		30					91.9							
B-31	26.0		53		95	29	66								
B-31	30.0	0.38	69	98.0	87	30	57								

Woodward-Cly

TABLE 1 (Continued)

LABORATORY DATA SUMMARY
RIVER BIRCH LANDFILL 93B248C

Point ID	Depth (ft)	Compress. (tsf)	Moisture Content (%)	Wet Density lb/ft³	Liquid Limit (%)	Plastic Limit	Plasticity Index	Sieve	Organic Matter Content	Perm cm/sec	Cv mm²/sec 1 tsf	2 tsf	4 tsf	8 tsf	16 tsf
B-31	38.0	0.37	54	101.0	72	23	49								
B-32	0.0		51		96	32	64		7.6						
B-32	4.0		30		36	23	13								
B-32	14.0	0.20	46	107.4	51	19	32								
B-32	20.0		29	127.0				91.9*	0.3	0.0001570000					
B-32	24.0		58	102.0	75	23	52				x	0.0240	0.0230	0.0120	0.0095
B-32	28.0		40					88.4							
B-32	32.0		43		57	20	37								
B-32	38.0	0.54	51	111.0	54	18	36								
B-33	6.0		66		110	36	74		4.1						
B-33	16.0		59		71	26	45								
B-33	24.0		53		71	26	45								
B-33	43.0	0.52	51	104.0	76	29	47								
B-33	53.0		57		104	34	70								
B-33	63.0		46		81	26	55								
B-33	73.0		61		94	31	63								
B-33	78.0	0.75	64	101.0	96	30	66								
B-33	88.0		44		92	29	63								
B-33	98.0		38		107	35	72								
B-34	2.0		58		116	27	89								
B-34	12.0		83	96.0	104	26	78		3.4	0.0000002930					
B-34	14.0	0.26	88	101.1	118	27	91								
B-34	24.0	0.23	76	93.9	101	26	75								

Woodward-Clyd

TABLE 1 (Continued)

LABORATORY DATA SUMMARY
RIVER BIRCH LANDFILL 93B248C

Point ID	Depth (ft)	Compress. (tsf)	Moisture Content (%)	Wet Density lb/ft³	Liquid Limit (%)	Plastic Limit	Plasticity Index	Sieve	Organic Matter Content	Perm cm/sec	Cv mm²/sec				
											1 tsf	2 tsf	4 tsf	8 tsf	16 tsf
B-34	34.0		51		61	19	42								
B-35	8.0		59		92	24	68		2.6						
B-35	14.0	0.30	98	94.4	87	26	61								
B-35	24.0		83		84	24	60								
B-35	32.0		58		73	21	52								
B-35	38.0		51		64	18	46								
B-36	0.5		55		109	42	67		6.7						
B-36	8.0		51		87	25	62								
B-36	16.0	0.25	82	94.0	110	27	83								
B-36	22.0		49	109.0	44	24	20				x	1.7900	1.6700	1.4900	x
B-36	36.0		44		56	20	36								
B-37	4.0		70		115	28	87								
B-37	10.0		41		35	25	10		1.7						
B-37	14.0	0.27	32	114.0	36	26	10								
B-37	22.0		56		64	20	44								
B-37	28.0	0.36	49	103.0	51	20	31								
B-37	36.0	0.47	49	103.0	71	22	49								
B-37	58.0		62		84	26	58								
B-37	68.0		62	100.0	93	24	69			0.0000000523					
B-37	78.0		52		153	50	103								
B-37	83.0		23		25	19	6	38.9*							
B-37	88.0		23	125.0	27	18	9				x	0.8000	0.9000	1.2000	1.2000
B-37	98.0		36		66	20	46								

Woodward-Clyd

TABLE 1 (Continued)

LABORATORY DATA SUMMARY
RIVER BIRCH LANDFILL 93B248C

Point ID	Depth (ft)	Compress. (tsf)	Moisture Content (%)	Wet Density lb/ft³	Liquid Limit (%)	Plastic Limit	Plasticity Index	Sieve	Organic Matter Content	Perm cm/sec	Cv mm²/sec 1 tsf	2 tsf	4 tsf	8 tsf	16 tsf
B-38	8.0	0.23	81	95.0	73	25	48								
B-38	14.0		69		99	33	66								
B-38	20.0		45		40	25	15								
B-38	32.0		46		57	23	34								
B-38	38.0	0.45	62	104.0	69	26	43								
B-39	10.0		36	114.0	NP	NP	NP			0.0000021400					
B-39	14.0	0.20	44	108.0	55	22	33								
B-39	22.0		33					53.4*							
B-39	30.0		61		61	24	37								
B-39	38.0		44		48	21	27								
B-40	4.0		64		119	36	83								
B-40	14.0		75		117	33	84								
B-40	20.0	0.20	58	107.0	46	28	18								
B-40	28.0		64		93	30	63								
B-40	38.0		66		70	26	44								
B-41	4.0		70		102	33	69								
B-41	12.0		47		96	28	68		4.0						
B-41	14.0	0.31	82	94.0	116	35	81								
B-41	20.0		50		43	24	19								
B-41	26.0		72		58	24	34								
B-41	36.0		47		52	23	29								
B-42	4.0	0.40	49	109.5	62	21	41		2.2						
B-42	14.0	0.27	68	100.9	72	20	52								
B-42	16.0		37		35	22	13			0.0000418000					

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TABLE 1 (Continued)

LABORATORY DATA SUMMARY
RIVER BIRCH LANDFILL 93B248C

Point ID	Depth (ft)	Compress. (tsf)	Moisture Content (%)	Wet Density lb/ft³	Liquid Limit (%)	Plastic Limit	Plasticity Index	Sieve	Organic Matter Content	Perm cm/sec	Cv mm²/sec 1 tsf	2 tsf	4 tsf	8 tsf	16 tsf
B-42	20.0		65		72	23	49								
B-42	30.0	0.30	53	109.1	55	19	36								
B-42	38.0	0.37	47	108.6	63	20	43								
B-43	6.0		73		124	31	93								
B-43	20.0		59	104.0	75	24	51			0.0000004390					
B-43	36.0		56		72	22	50								
B-44	8.0		51		50	26	24								
B-44	16.0	0.13	86	87.0	124	32	92		2.2						
B-44	22.0		35		41	28	13								
B-44	32.0		72		97	31	66								
C-4	0.5		55		147	69	78		20.1						
C-20	0.5		31		105	38	67		5.7						
C-25	0.5		36		95	39	56		7.7						
C-33	0.5		46		117	36	81		4.3						

Woodward-Clyc

TABLE 2

LABORATORY DATA SUMMARY
RIVER BIRCH LANDFILL

Point ID	Depth (ft)	Compress. (tsf)	Moisture Content (%)	Wet Density lb/ft³	Liquid Limit (%)	Plastic Limit	Plasticity Index	Sieve	Organic Matter Content	Perm cm/sec	Cv mm²/sec 1 tsf	2 tsf	4 tsf	8 tsf	16 tsf
B-1	14.0		51		83	23	60		1.6		x	0.0560	0.0460	0.0430	x
B-3	30.0	0.20	64	100.0	73	27	46		3.2		0.410	0.260	0.0170	0.0130	x
B-5	14.0	0.15	53	111.0	55	23	32		4.4		0.3650	0.3290	x	x	x
B-6	88.0		27		43	18	25		1.3		0.0390	0.0700	0.0720	0.0790	0.0760
B-14	28.0	0.18	78	97.0	83	30	53				0.0260	0.0120	0.0120	0.0074	0.0051
B-17	16.0	0.28	38	108.0	49	21	28		1.0		x	0.1200	0.1300	x	x
B-17	32.0		62	102.3	77	27	50		2.5		x	0.0240	0.0260	x	x
B-18	2.0		52		105	32	73		1.9		x	x	0.0740	0.0390	x
B-19	12.0		51	134.0	84	24	60				x	0.0550	0.0730	0.0730	0.0370
B-21	78.0	0.52	29	115.0	31	24	7		0.7		x	x	1.4000	1.9000	1.3000
B-22	14.0	0.41	46	105.0	45	23	22		2.0		x	0.0980	0.0720	0.1000	x
B-25	14.0	0.32	65	93.0	104	25	79		13.3		0.0210	0.0097	0.0065	0.0043	x
B-30	78.0	1.04	51	108.0	88	28	60		2.7		x	0.0300	0.0230	0.0100	0.0077
B-32	24.0		58	102.0	75	23	52				x	0.0240	0.0230	0.0120	0.0095
B-36	22.0		49	109.0	44	24	20				x	1.7900	1.6700	1.4900	x
B-37	88.0		23	125.0	27	18	9				x	0.8000	0.9000	1.2000	1.2000

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PART V

LDEQ-SWD Correspondence, 1993-1995

BEST COPY

ATTACHMENT E

LDEQ-SWD CORRESPONDENCE

State of Louisiana

Department of Environmental Quality

Edwin W. Edwards
Governor

September 19, 1995

William A. Kuchar
Secretary

CERTIFIED MAIL Z 442 016 357
RETURN RECEIPT REQUESTED

Mr. A.J. Ward, Jr.
River Birch, Incorporated
Post Office Box 1938
Gretna, Louisiana 70054

RE: Alternate Technology Exemption Request
Proposed River Birch Landfill
D-051-6741/PA #439
Jefferson Parish

Dear Mr. Ward:

We are in receipt of your submittal dated July 14, 1995, regarding a request for an exemption from the Solid Waste Rules and Regulations to utilize electronic cone penetrometer testing (CPT) instead of thin-wall and or split-spoon devices to sample all borings.

Your exemption request has been reviewed by the Solid Waste Division, and it has been determined that all the requirements of LAC 33.VII.307 have been met.

By way of this letter, an exemption is hereby granted to utilize CPT at the above-referenced facility.

Should you have any questions concerning this matter, please contact Ms. Valerie Lege or Mr. Robert Frischhertz of the Solid Waste Division at (504) 765-0249.

Sincerely,

GLENN A. MILLER
Assistant Secretary

GAM:VEL:jd

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Engineering & science applied to the earth & its environment

November 4, 1993

Mr. Bijan Sharafkhani-A
La. Department of Environmental Quality
P. O. Box 82178
Baton Rouge, LA 70884-2178

RE: Proposed Riverbirch Landfill
Geotechnical Borings
WCC File No. 93B248C

Dear Mr. Sharafkhani-A:

We have completed the conventional and electronic cone penetrometer (ECPT) geotechnical field investigation of the above referenced project. As discussed with you and your staff at an earlier meeting, we are submitting for your information the results of comparisons of the two methods based on the records obtained from two immediately adjacent boreholes.

On the attached ECPT plots (C-1, C-9; C-21), we have typed our translation of the ECPT output. Also, we have attached the results of the corresponding (B-1, B-9, B-22) conventional boring investigations.

As you know, the ECPT in the exploration mode that it was used measures soil/probe friction and tip resistance. In wooded areas where organic soils and root structures exist, the cone does not distinguish these organic structures from silt or sand lenses because both have similar electronic signatures. Signatures such as this have to be recognized for sites where non-conventional soil profiles exist. Thus, we have identified them in our translation of the ECPT plots as roots and organics while the ECPT software might have identified them as silt lenses.

The comparison of the attached ECPT sounding results and the borings show that ECPT soundings provide comparable and reliable subgrade soil information. A cursory comparison of most of the ECPT results with conventional field exploration results of this project made by us indicated a trend similar to those presented by the three pairs of results attached.

B:\SHARAFKH.LTR\RIVBRCH

Woodward-Clyde Consultants – A Subsidiary of Woodward-Clyde Group, Inc.
2822 O'Neal Lane (70816) • P.O. Box 66317 (70896) • Baton Rouge, Louisiana
(504) 751-1873 • Fax (504) 753-3616

If you have any questions concerning the above, please call us.

Sincerely,

Ara Arman, P.E.

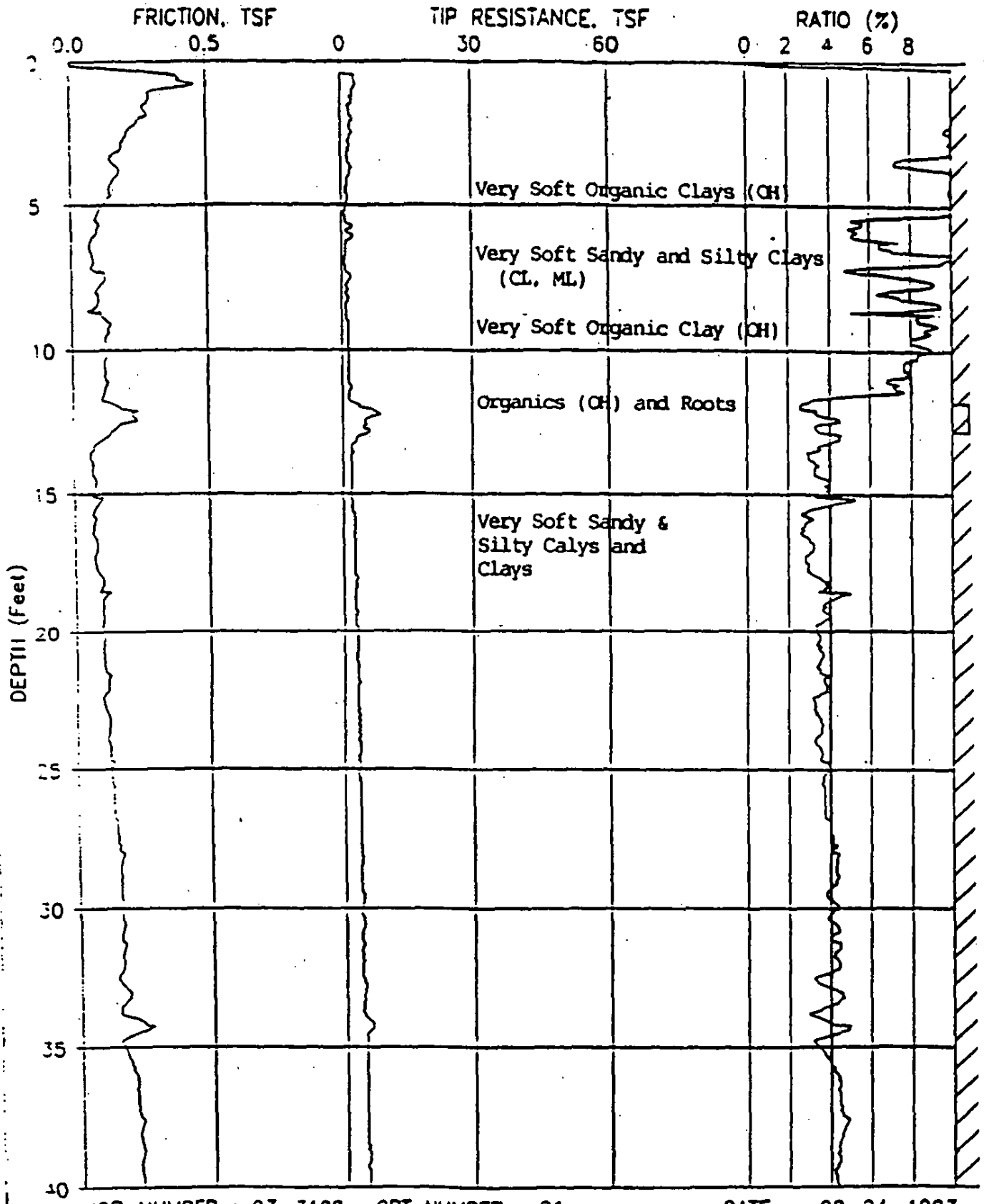
Charles S. Hedges, P.E.

AA:jr

Attachments

cc: Dr. Mike Loden
Gulf Engineers & Consultants, Inc.

B:\SHARAFKH.LTR\RIVBRCH



JOB NUMBER : 93-3108 CPT NUMBER : C1 DATE : 08-24-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE709

FUGRO GEOSCIENCES,INC

PROJECT: River Birch Landfill

LOCATION:

CLIENT:

BORING: B-1
FILE: 93B248C
DATE: 8/20/93
TECHNICIAN: Bailey
APPROVED:
PAGE: 1 of 1

10/1/93

Dry Augers: Full depth

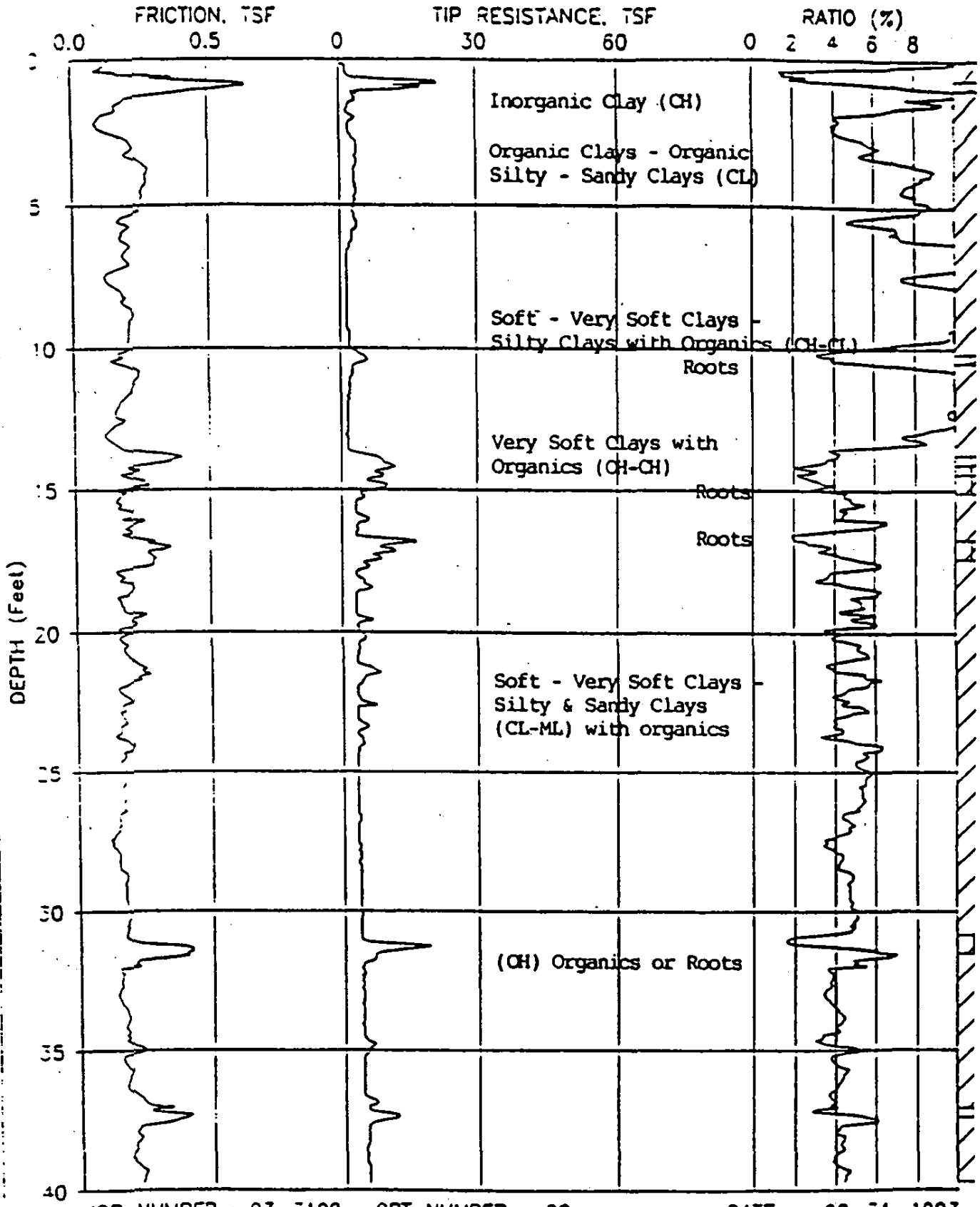
Wash Bored:

Free water was encountered at a depth of 15' during augering. The wate level then rose to 12.1' after an observation period of 15 minutes.

DEPTH (FEET)	SYMBOL	SAMPLE	P.Pen. (tsf)	Compress. Strength (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Strata
0				2.25	41	100	108	62	Very stiff black organics CLAYS wit pockets (CH)
				0.44	26	108	36	15	Soft tan, brown and light gray silt CLAYS with sand and sandy SILTS wit clay (CL/ML)
5					30		34	10	
					51				Soft to med gray CLAYS with sandy silt and organic pockets (CH) ---highly organic with roots, 10' -
10				0.58	195		270	213	
					51		83	60	
15									
					45				
20									
25				0.48	56	98	94	63	
30									
					57	111			
35				0.41	40		48	25	---becoming silty below 36'
40									Bottom of boring at 40'

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants



JOB NUMBER : 93-3108 CPT NUMBER : C9 DATE : 08-31-1993

ELEVATION : 0.00 CONE NUMBER: F5CKE611

FUGRO GEOSCIENCES,INC

PROJECT: River Birch Landfill

LOCATION:

CLIENT:

FILE: 93B248C
DATE: 9/8/93
TECHNICIAN: M. Fontenot
APPROVED:
PAGE: 1 of 1

Dry Augered: 0'- 10' Wash Bored: 10'- 40'

Free water was encountered at a depth of 8' during dry augering. The water level rose to a depth of 5.5 after an observation period of 15 minutes.

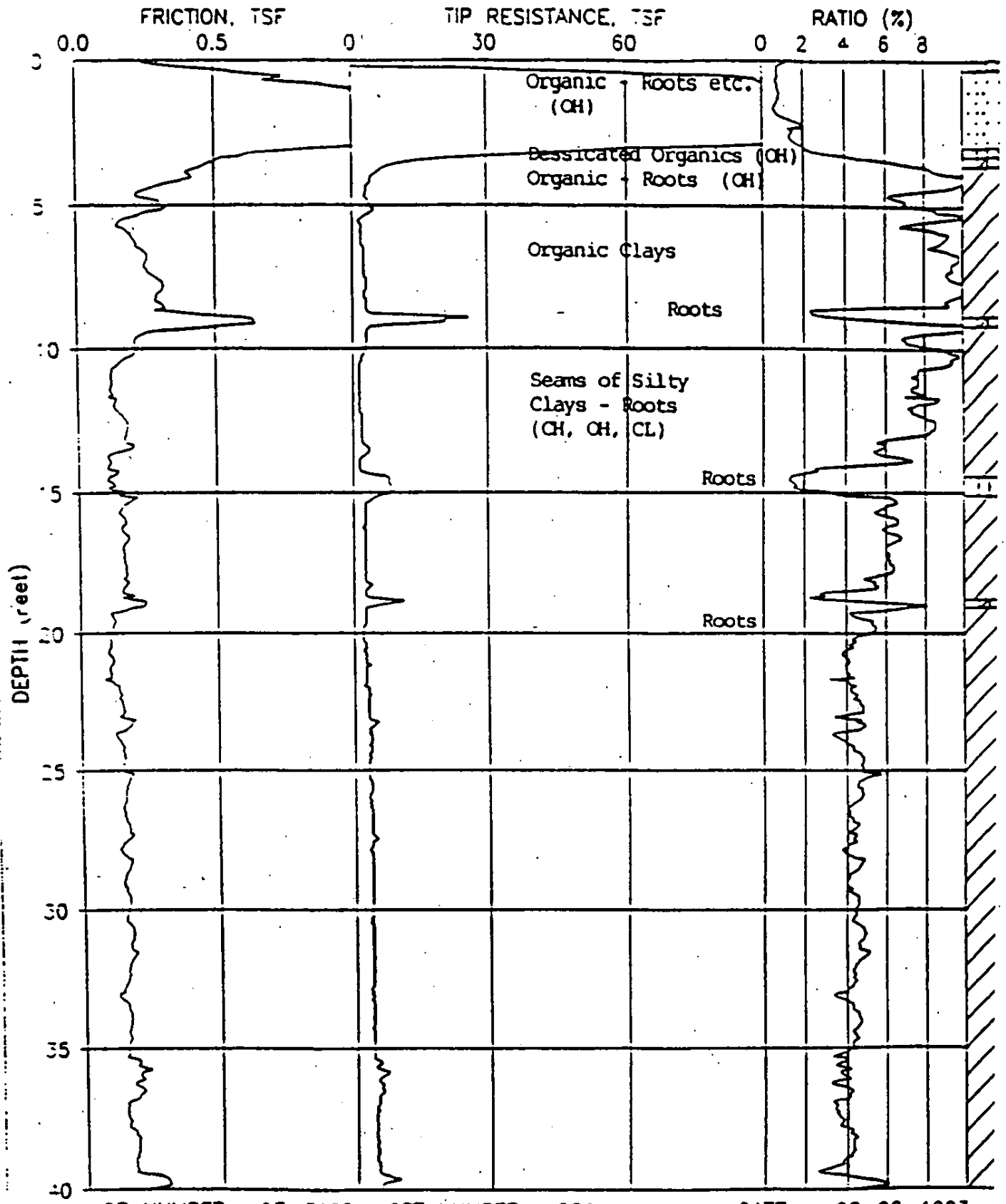
DEPTH (FEET)	SYMBOL	SOURCE	P.Pen. (tsf)	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Stiff brown CLAYS with organics (CH)
			NR						Soft to medium tan, brown and light gray silty CLAYS with silt pockets a traces of organics and roots (CL)
				0.30	39	107	37	- 14	
5				0.50	57	100			
10					73		101	72	Very soft to soft gray CLAYS with s: pockets and traces of organics (CH)
				0.35	73	93	137	102	---jointed, 14' - 16'
15									
20					57		87	60	
				0.13	39	100	35	11	---with silty clay and sandy silt layers and pockets below 22'
25				0.28	51	103	60	38	
30									
					38		44	24	
35									
40									Bottom of boring at 40'

NR - No Recovery

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

GEP 30 10 WCSOIL 3B2M



JOB NUMBER : 93-3108 CPT NUMBER : C21 DATE : 08-26-1993
ELEVATION : 0.00 CONE NUMBER: F5CKE709

FUGRO GEOSCIENCES,INC

PROJECT: River Birch Landfill

LOCATION:

CLIENT:

BORING: B-44
FILE: 93B048C
DATE: 8/22/93
TECHNICIAN: M. Footenot
APPROVED:
PAGE: 1 of 1

Dry Augered: Wash Bored:

DEPTH (FEET)	SYMBOL	SAMPLE	P.Pen. (tsf)	Compress. Stress (tsf)	Moist. Content (%)	Wet Unit Weight (pcf)	L.L. (%)	P.I. (%)	Description of Stratum
0									Soft brown CLAYS with organics ---stiff 0' - 1'
5				0.14	74	89	100	71	Very soft to soft gray CLAYS and silty CLAYS with silt seams and pockets and traces of organics (CH/C ---highly organic with wood 6' - 8'
10									
15					46	105	45	22	
20					45	104	54	30	
25				0.30	57	99	67	42	
30									
35			NR		46	102	38	10	
40									Bottom of boring at 40'

NR - No Recovery

Unified Soil Classifications based on limited laboratory test data and visual observations.

Woodward-Clyde Consultants

PART VI

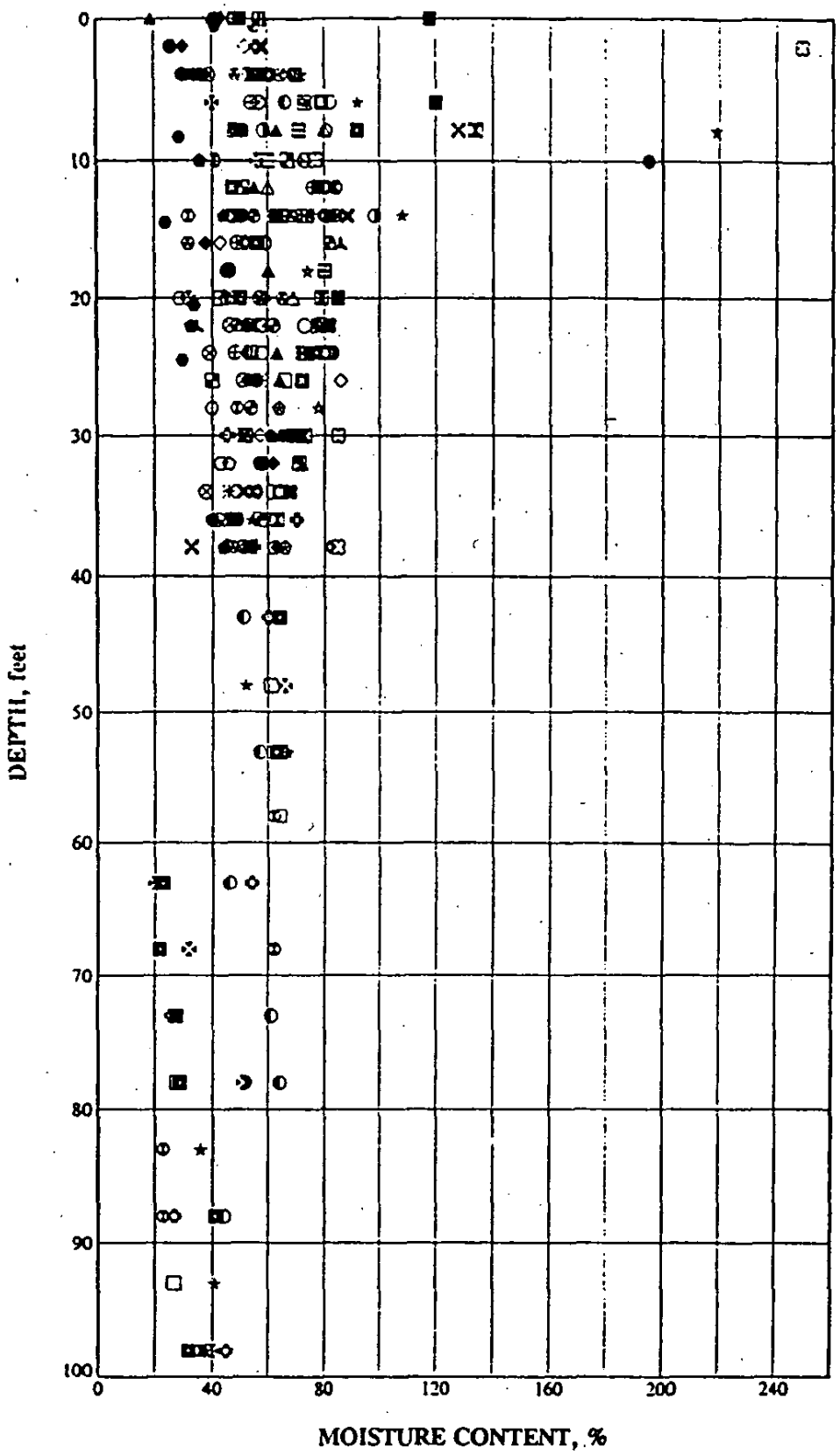
Plots of Geotechnical Results

BEST COPY

ATTACHMENT F

PLOTS OF GEOTECHNICAL RESULTS

MOISTURE CONTENT vs DEPTH



LEGEND

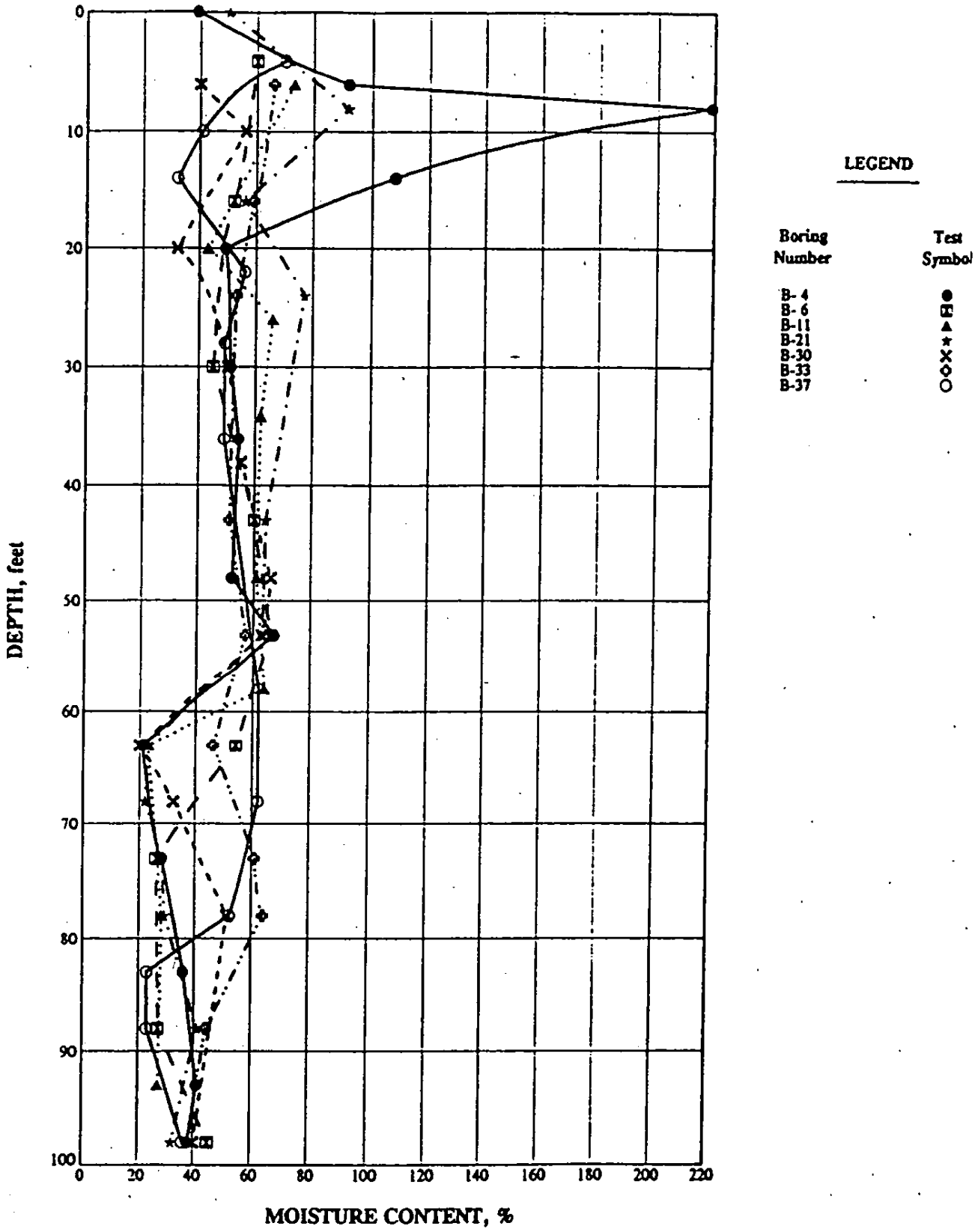
Boring Number	Test Symbol
B- 1	●
B- 2	✖
B- 3	▲
B- 4	★
B- 5	✕
B- 6	◇
B- 7	◐
B- 8	◑
B- 9	◒
B-10	◓
B-11	◔
B-12	◕
B-13	◖
B-14	◗
B-15	⊕
B-16	■
B-17	◆
B-18	○
B-19	⊡
B-20	⊠
B-21	⊞
B-22	⊗
B-23	□
B-24	⊘
B-25	⊟
B-26	⊜
B-27	⊝
B-28	⊛
B-29	⊚
B-30	⊙
B-31	⊖
B-32	⊕
B-33	⊗
B-34	⊘
B-35	⊙
B-36	⊚
B-37	⊛
B-38	⊜
B-39	⊝
B-40	⊞
B-41	⊟
B-42	⊠
B-43	⊡
B-44	⊥

Project: River Birch Landfill
Project Number: 93B248C

MOISTURE CONTENT vs DEPTH

1/26/94 MCVSDPT 38248

Woodward-Clyde Consultants

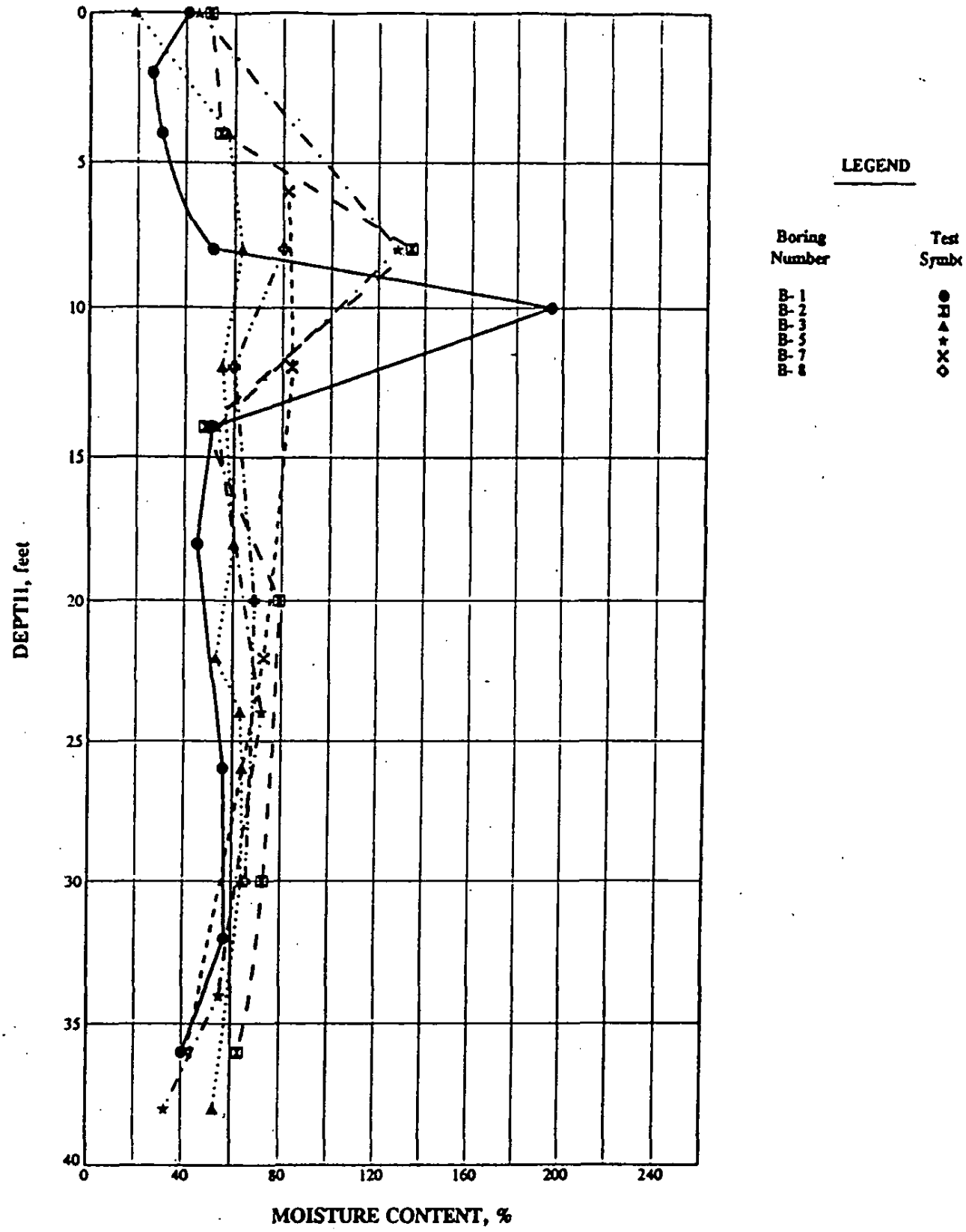


Project: River Birch Landfill
Project Number: 93B248C

MOISTURE CONTENT vs DEPTH

12/3/93 MCVSDPT 3B248

Woodward-Clyde Consultants

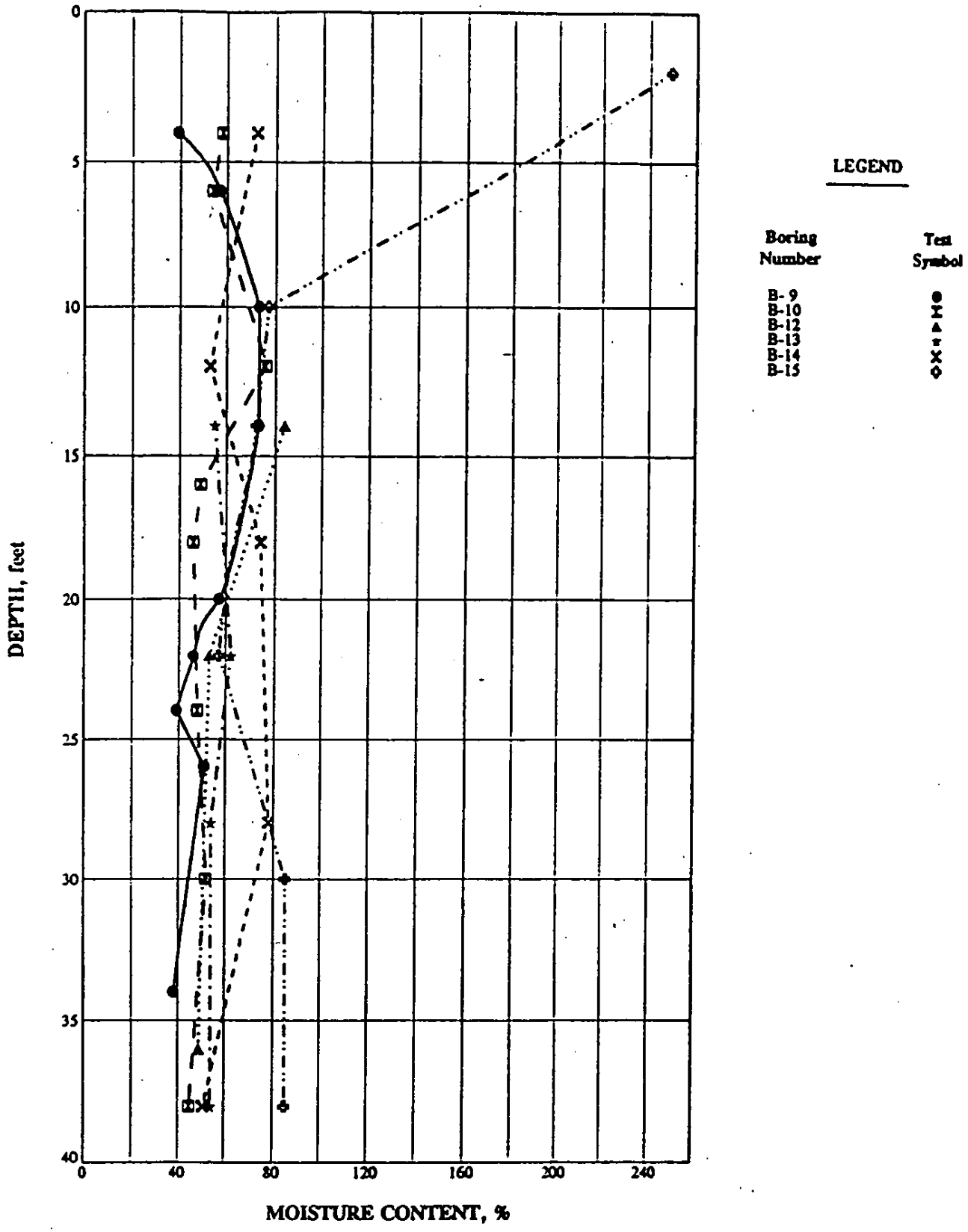


Project: River Birch Landfill
Project Number: 93B248C

MOISTURE CONTENT vs DEPTH

12/3/93 MCVSDPT 38248

Woodward-Clyde Consultants

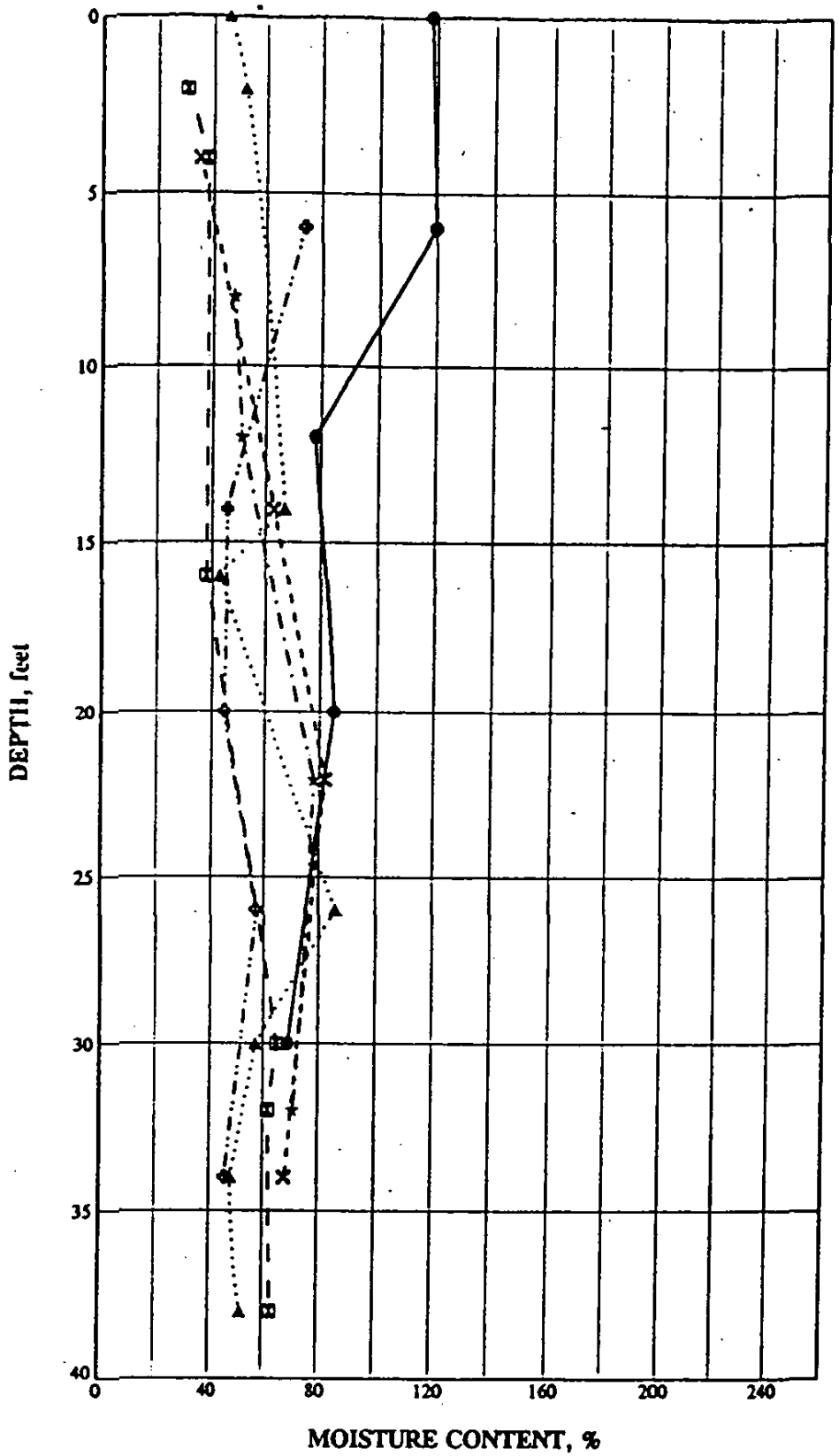


Project: River Birch Landfill
Project Number: 93B248C

MOISTURE CONTENT vs DEPTH

12/3/93 MCVSDPT 3B248

Woodward-Clyde Consultants



LEGEND

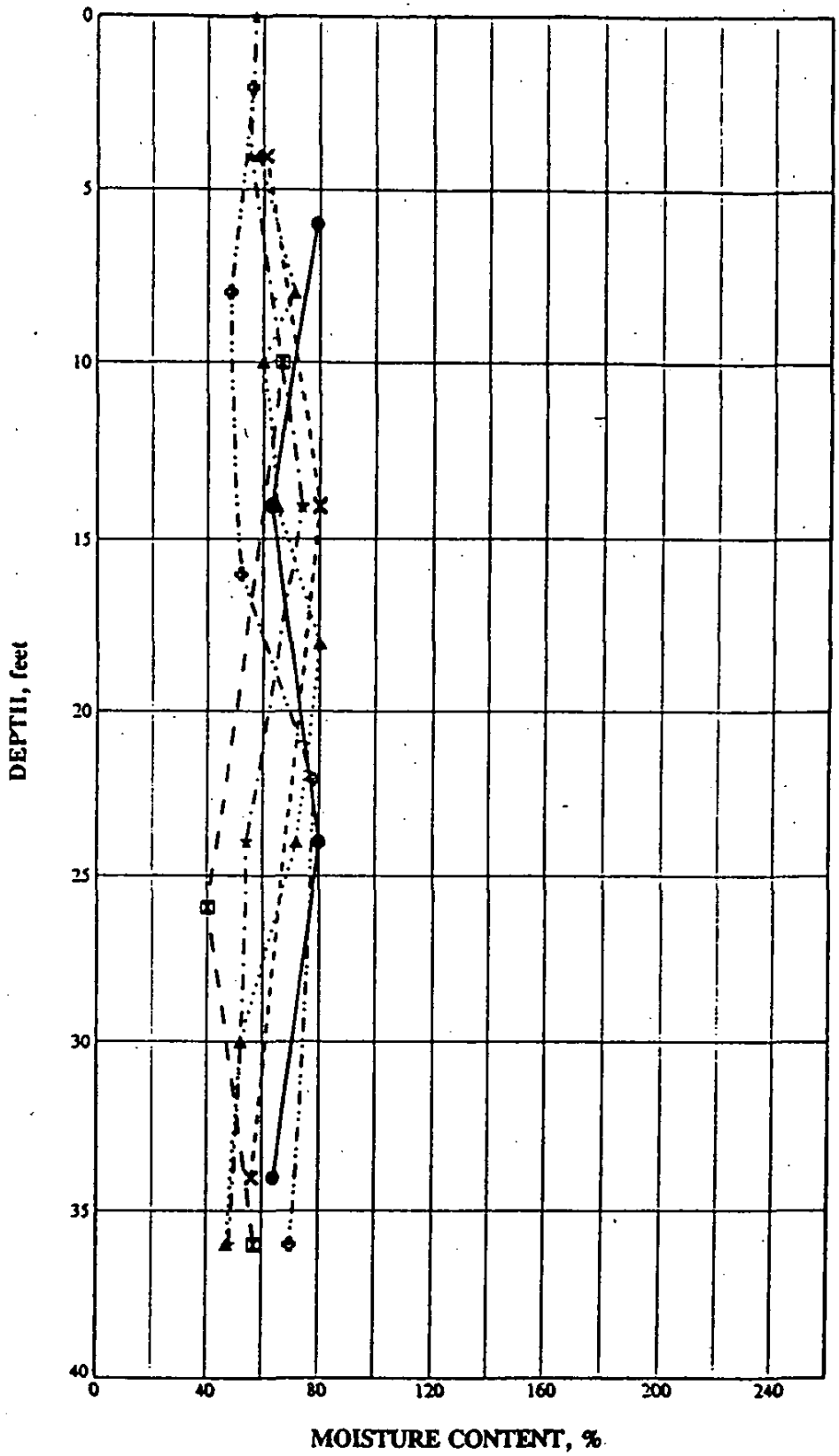
Boring Number	Test Symbol
B-16	●
B-17	⊠
B-18	▲
B-19	★
B-20	✕
B-22	◇

Project: River Birch Landfill
Project Number: 93B248C

MOISTURE CONTENT vs DEPTH

12/3/93 MCVSDPT 38248

Woodward-Clyde Consultants



LEGEND

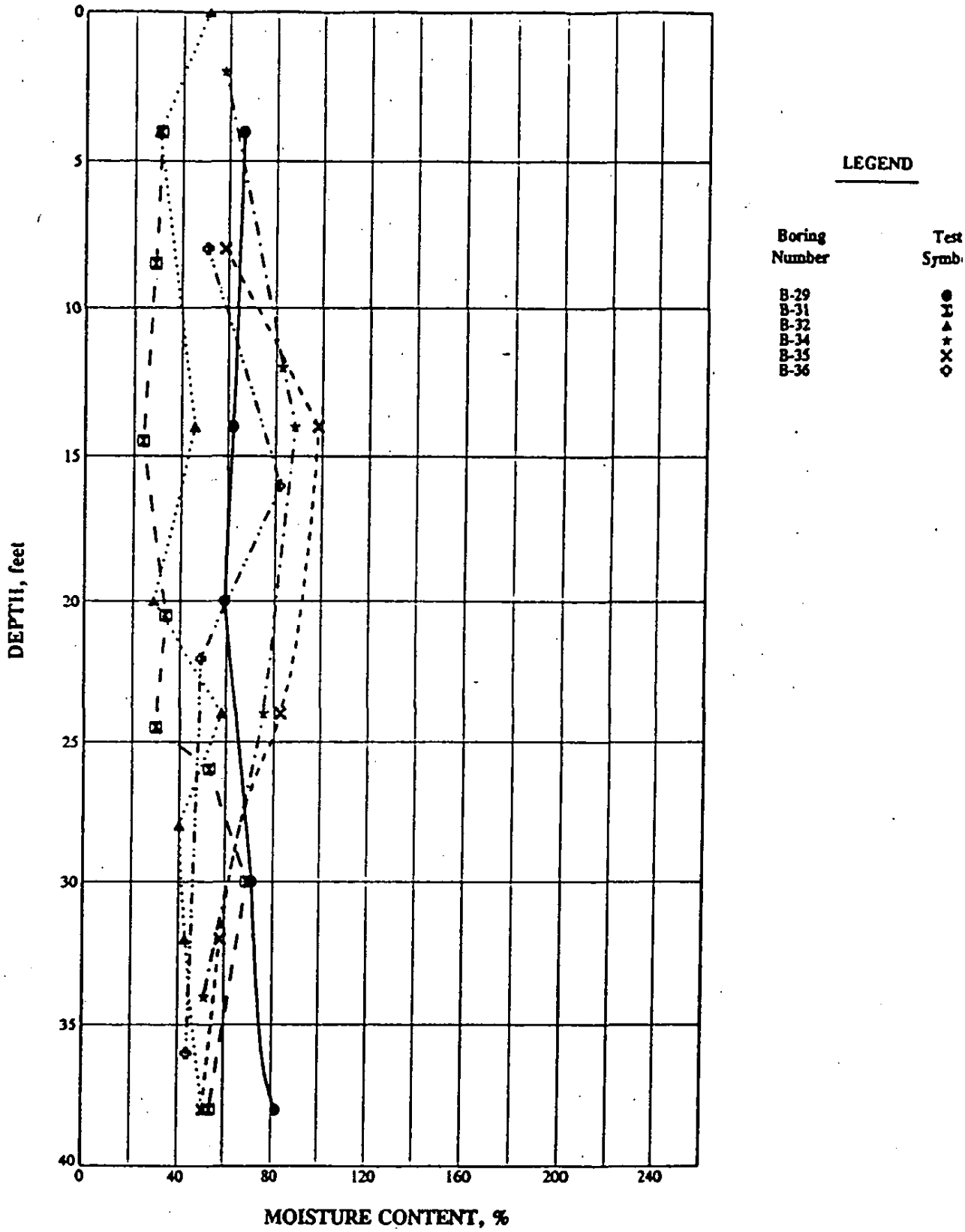
Boring Number	Test Symbol
B-23	●
B-24	⊠
B-25	▲
B-26	★
B-27	✕
B-28	◇

Project: River Birch Landfill
Project Number: 93B248C

MOISTURE CONTENT vs DEPTH

12/3/93 MCVSDPT 3B248

Woodward-Clyde Consultants

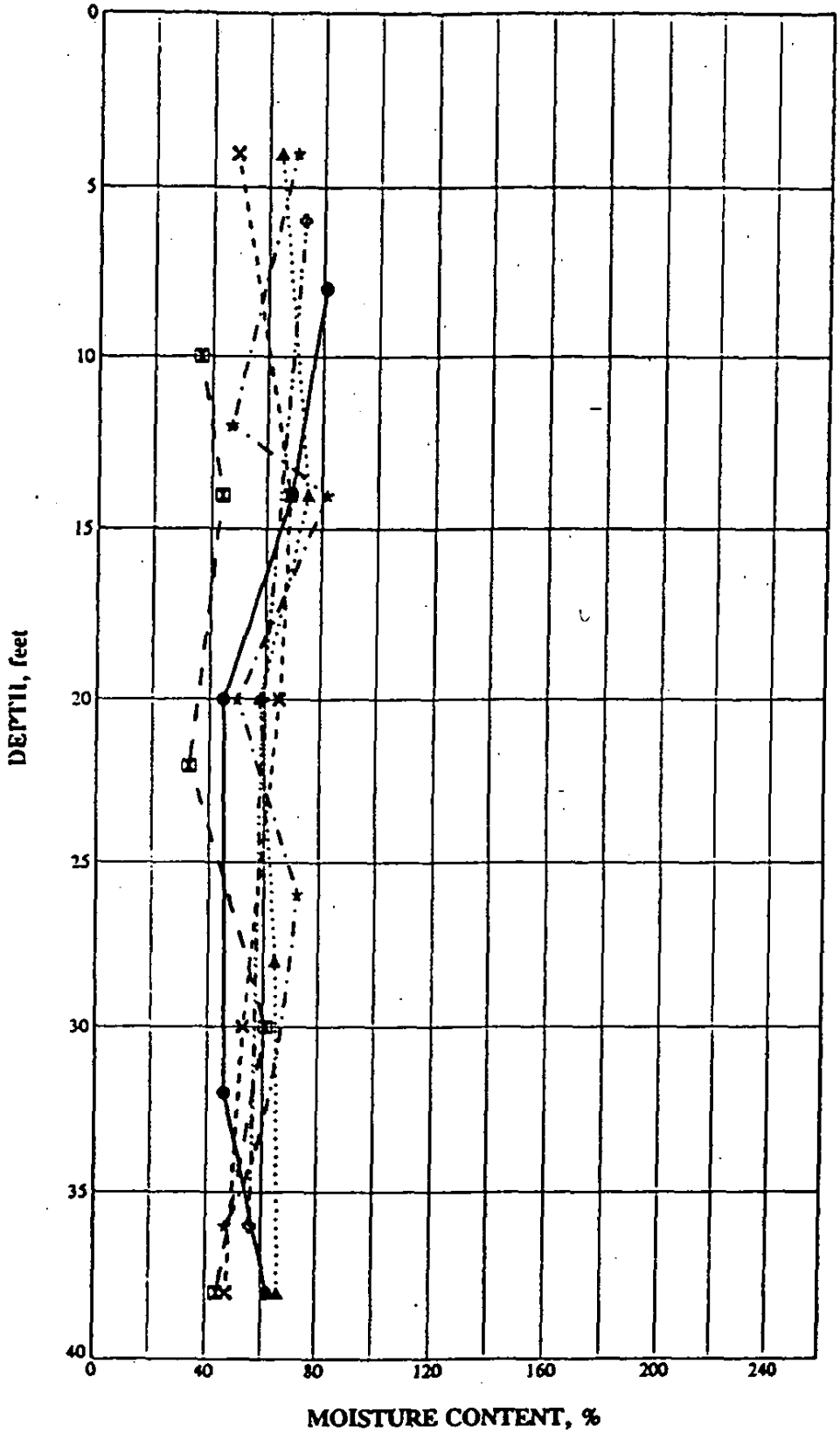


Project: River Birch Landfill
Project Number: 93B248C

MOISTURE CONTENT vs DEPTH

12/3/93 MCVSDPT 3B248

Woodward-Clyde Consultants



LEGEND

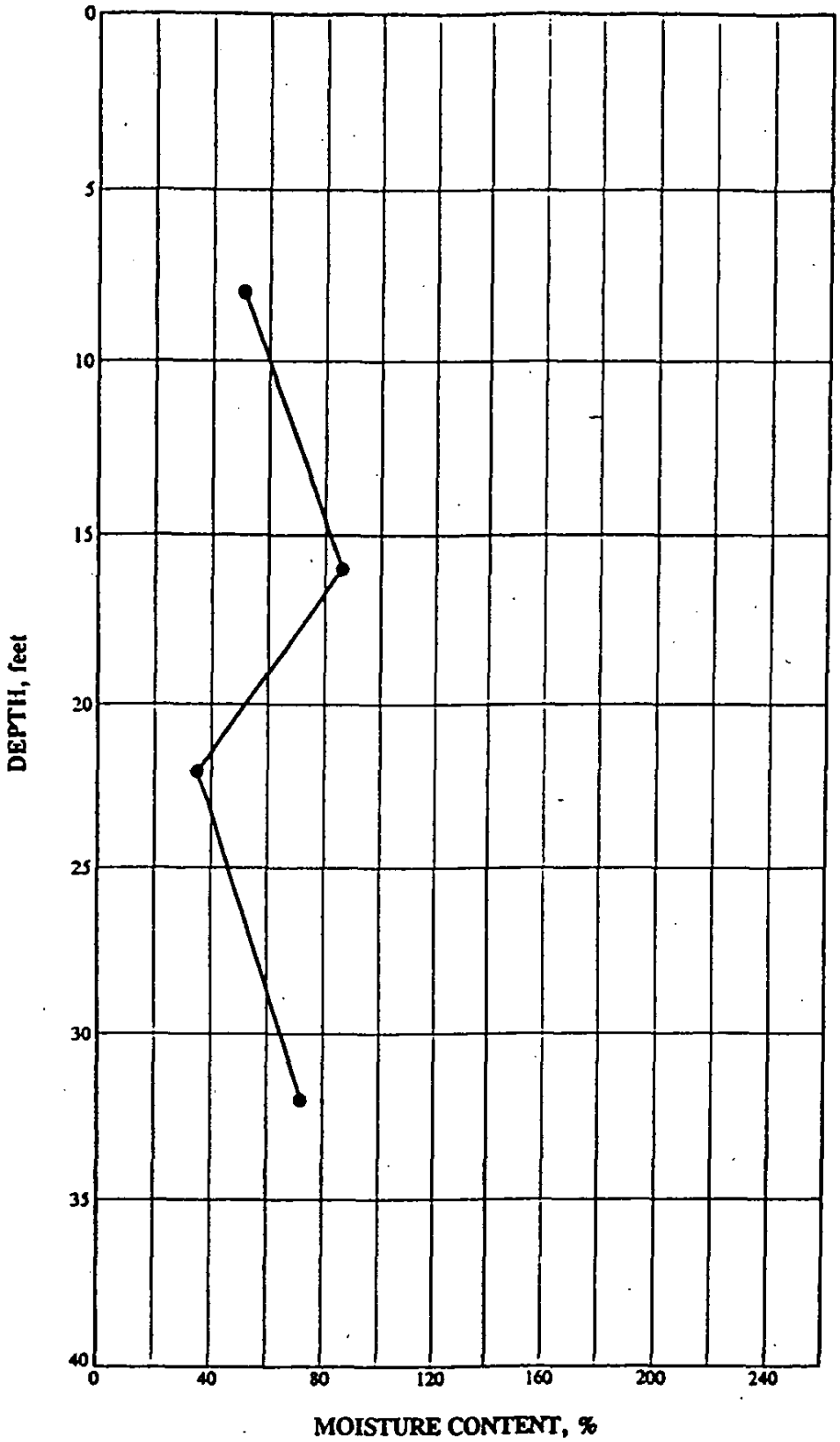
Boring Number	Test Symbo
B-38	●
B-39	⊞
B-40	▲
B-41	★
B-42	✕
B-43	◇

Project: River Birch Landfill
Project Number: 93B248C

MOISTURE CONTENT vs DEPTH

12/3/93 MCVSDPT 38248

Woodward-Clyde Consultants



LEGEND

Boring Number	Test Symbo.
B-44	●

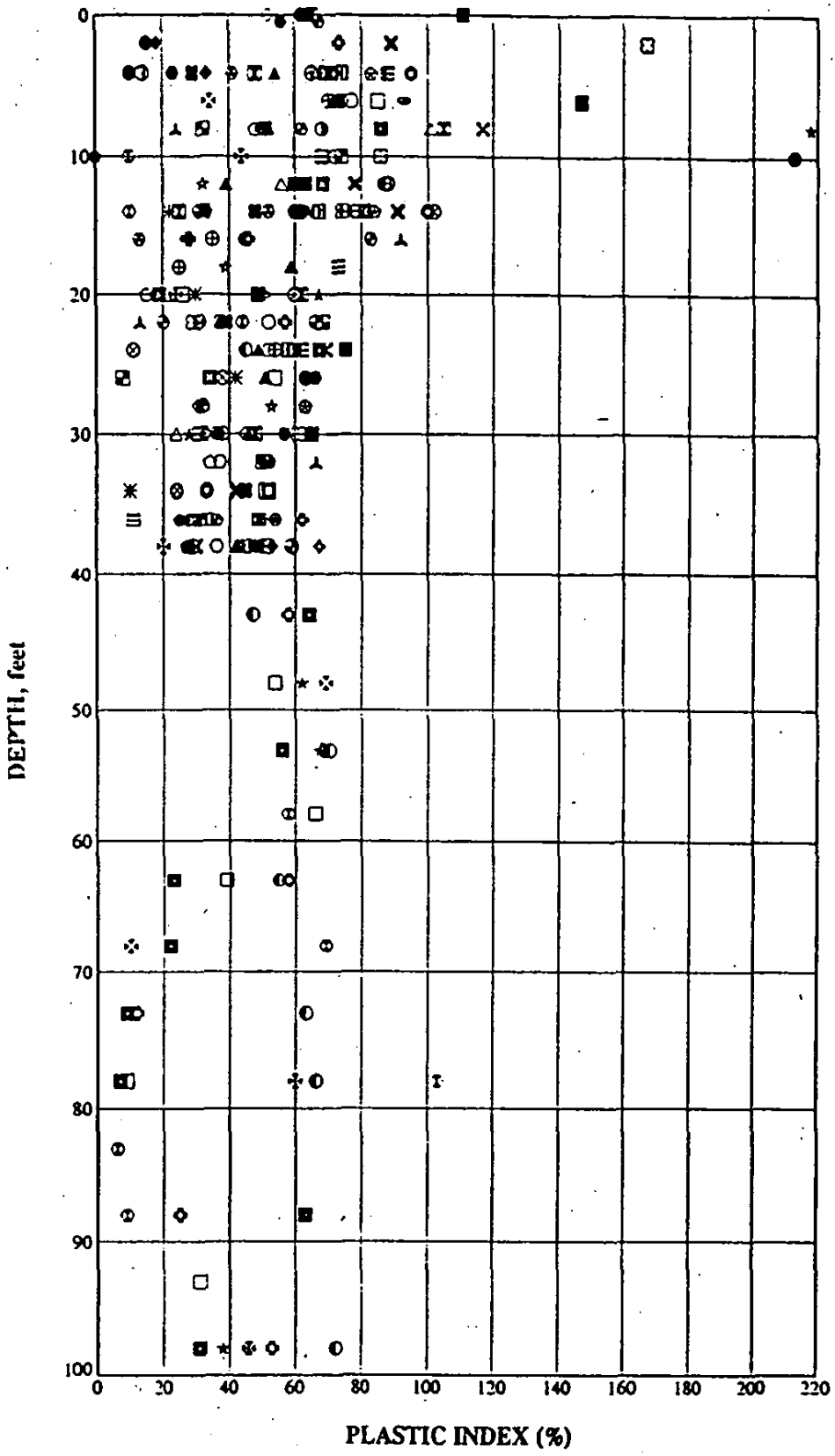
Project: River Birch Landfill
Project Number: 93B248C

MOISTURE CONTENT vs DEPTH

12/3/93 MCVSDPT 38248

Woodward-Clyde Consultants

PLASTIC INDEX vs DEPTH



LEGEND

Boring Number	Test Symbol
B- 1	●
B- 2	✱
B- 3	▲
B- 4	★
B- 5	✕
B- 6	◇
B- 7	○
B- 8	△
B- 9	⊗
B-10	⊕
B-11	⊡
B-12	⊠
B-13	⊕
B-14	⊕
B-15	⊡
B-16	■
B-17	◆
B-18	◇
B-19	⊡
B-20	■
B-21	■
B-22	✱
B-23	□
B-24	⊡
B-25	⊡
B-26	⊡
B-27	⊙
B-28	⊕
B-29	◇
B-30	✣
B-31	●
B-32	○
B-33	⊙
B-34	✕
B-35	⊗
B-36	⊕
B-37	⊕
B-38	○
B-39	●
B-40	⊗
B-41	⊡
B-42	⊕
B-43	●
B-44	⊥

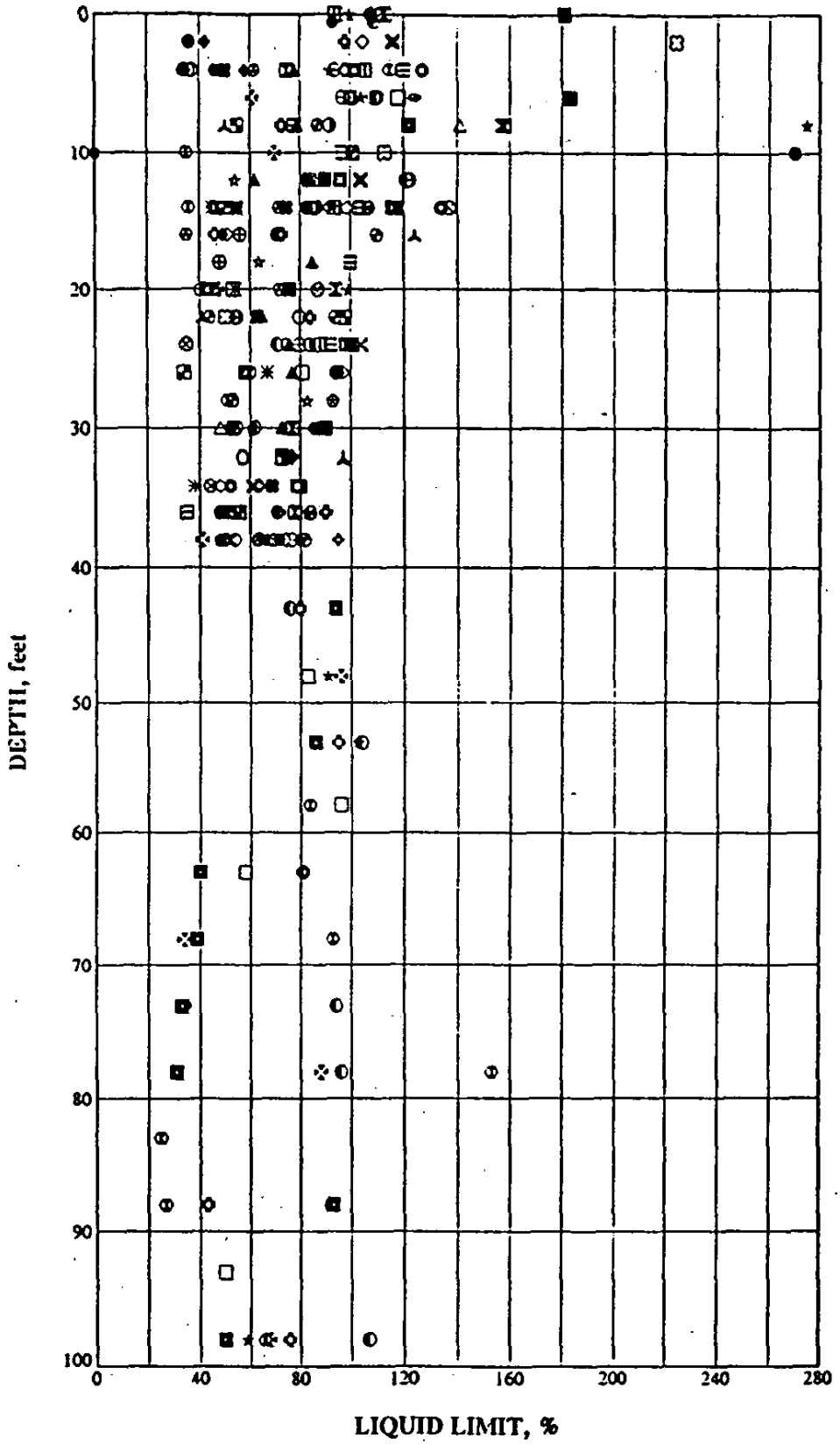
Project: River Birch Landfill
Project Number: 93B248C

PLASTIC INDEX vs DEPTH

1/26/94 PIVSDPT 38248

Woodward-Clyde Consultants

LIQUID LIMIT vs DEPTH



LEGEND

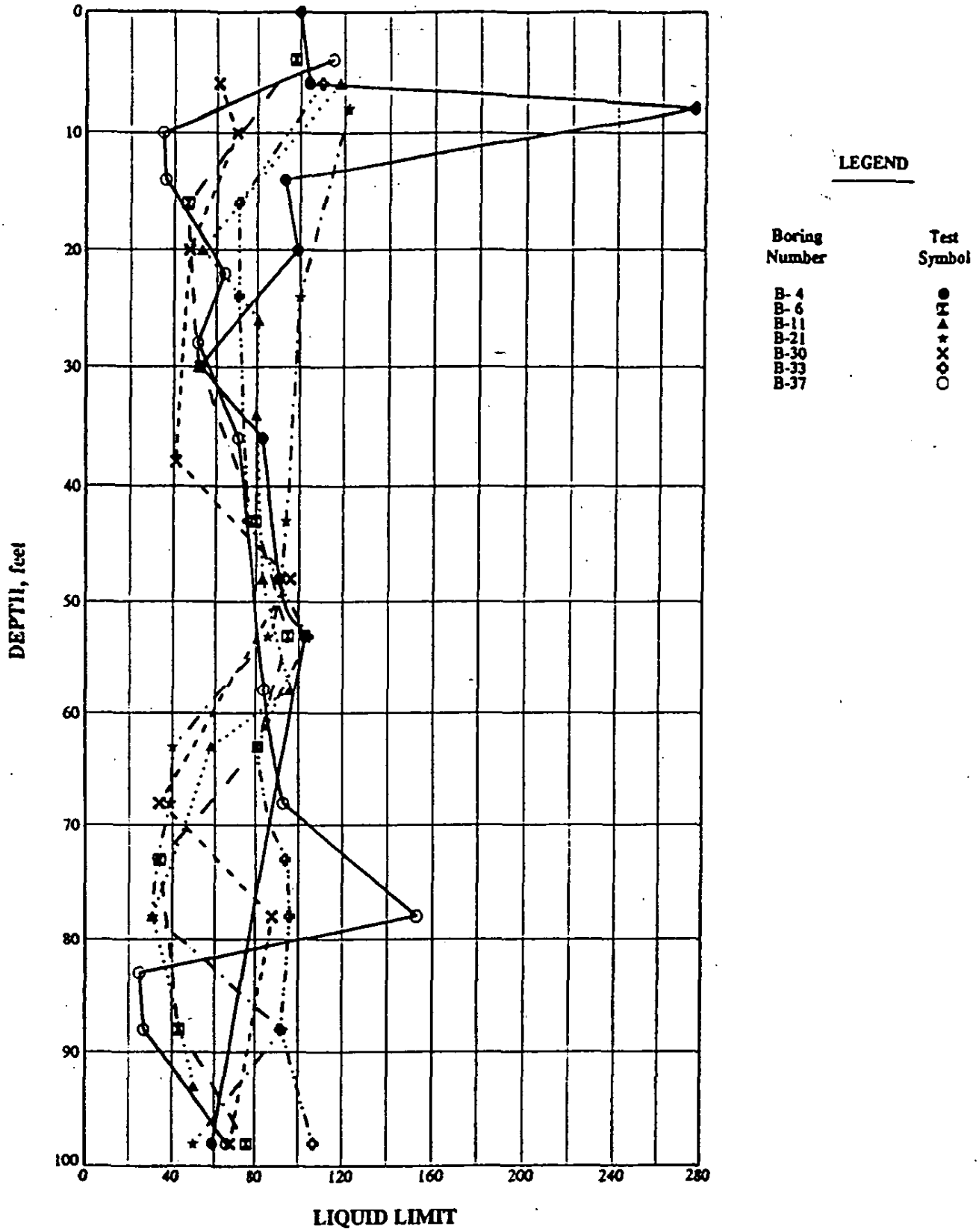
Boring Number	Test Symbol
B-1	●
B-2	⧗
B-3	▲
B-4	★
B-5	✕
B-6	◇
B-7	◯
B-8	△
B-9	⊗
B-10	⊕
B-11	□
B-12	⊕
B-13	⊕
B-14	★
B-15	⊡
B-16	■
B-17	◆
B-18	◇
B-19	⊡
B-20	■
B-21	■
B-22	✳
B-23	⊡
B-24	⊡
B-25	▥
B-26	⊡
B-27	●
B-28	◆
B-29	◇
B-30	⁘
B-31	●
B-32	○
B-33	◐
B-34	✕
B-35	⊗
B-36	⊕
B-37	⊕
B-38	○
B-39	●
B-40	⊕
B-41	⊡
B-42	⊕
B-43	●
B-44	⊥

Project: River Birch Landfill
Project Number: 93B248C

LIQUID LIMIT vs DEPTH

1/26/94 LLVSDPT 3B248

Woodward-Clyde Consultants

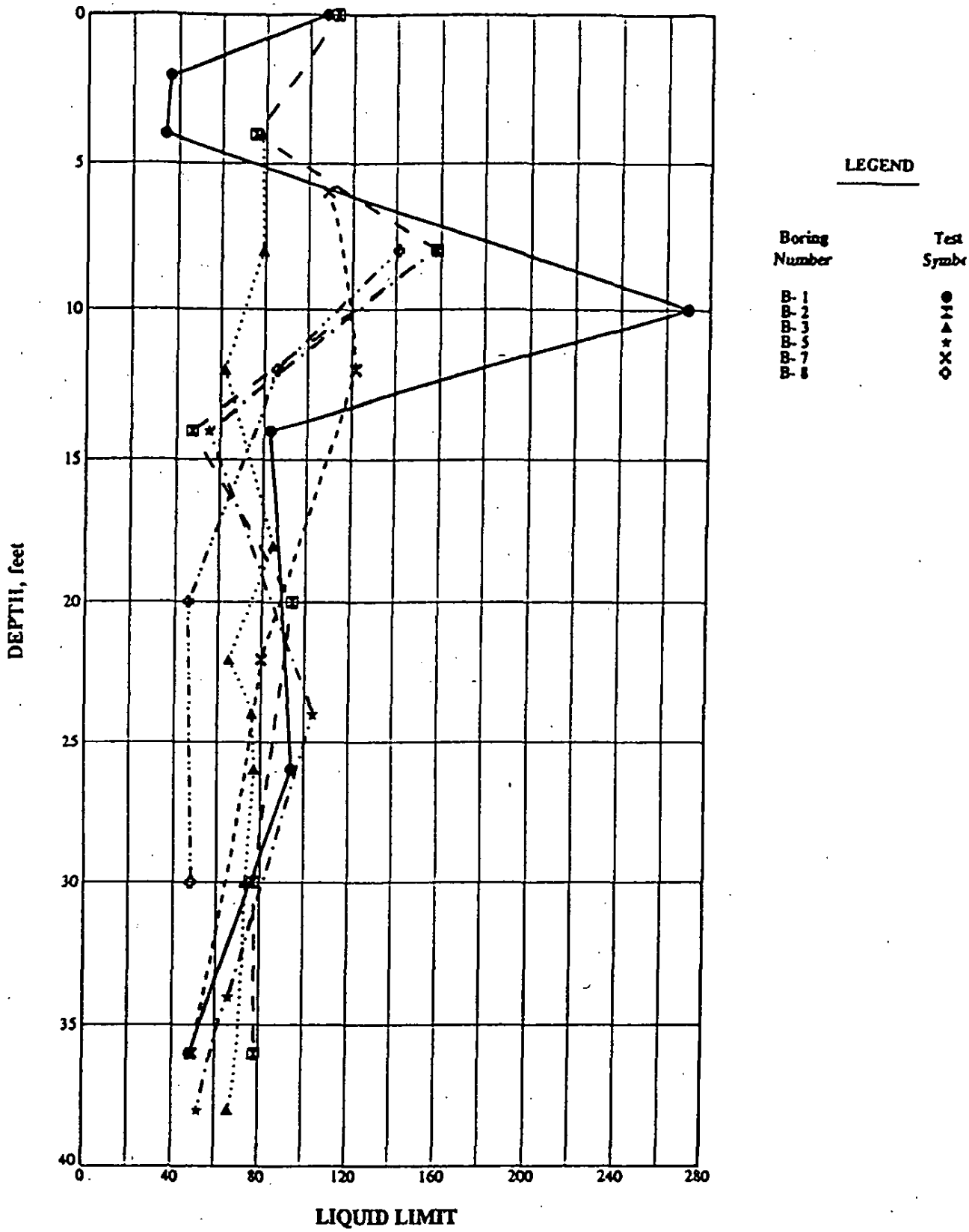


Project: River Birch Landfill
Project Number: 93B248C

LIQUID LIMIT vs DEPTH

12/3/93 LLVSDPT 3B248

Woodward-Clyde Consultants

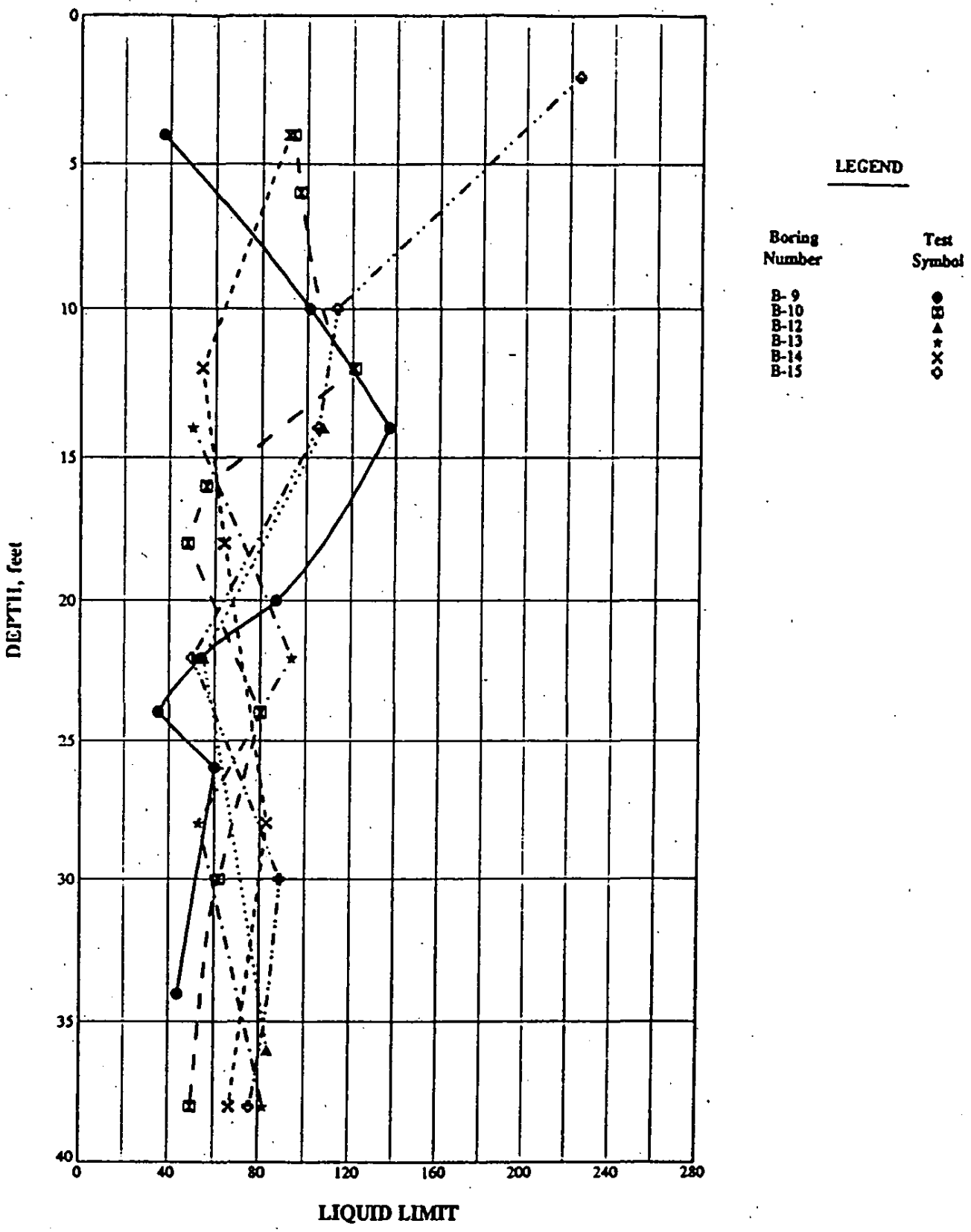


Project: River Birch Landfill
Project Number: 93B248C

LIQUID LIMIT vs DEPTH

12/3/93 LLVSDPT 38248

Woodward-Clyde Consultants

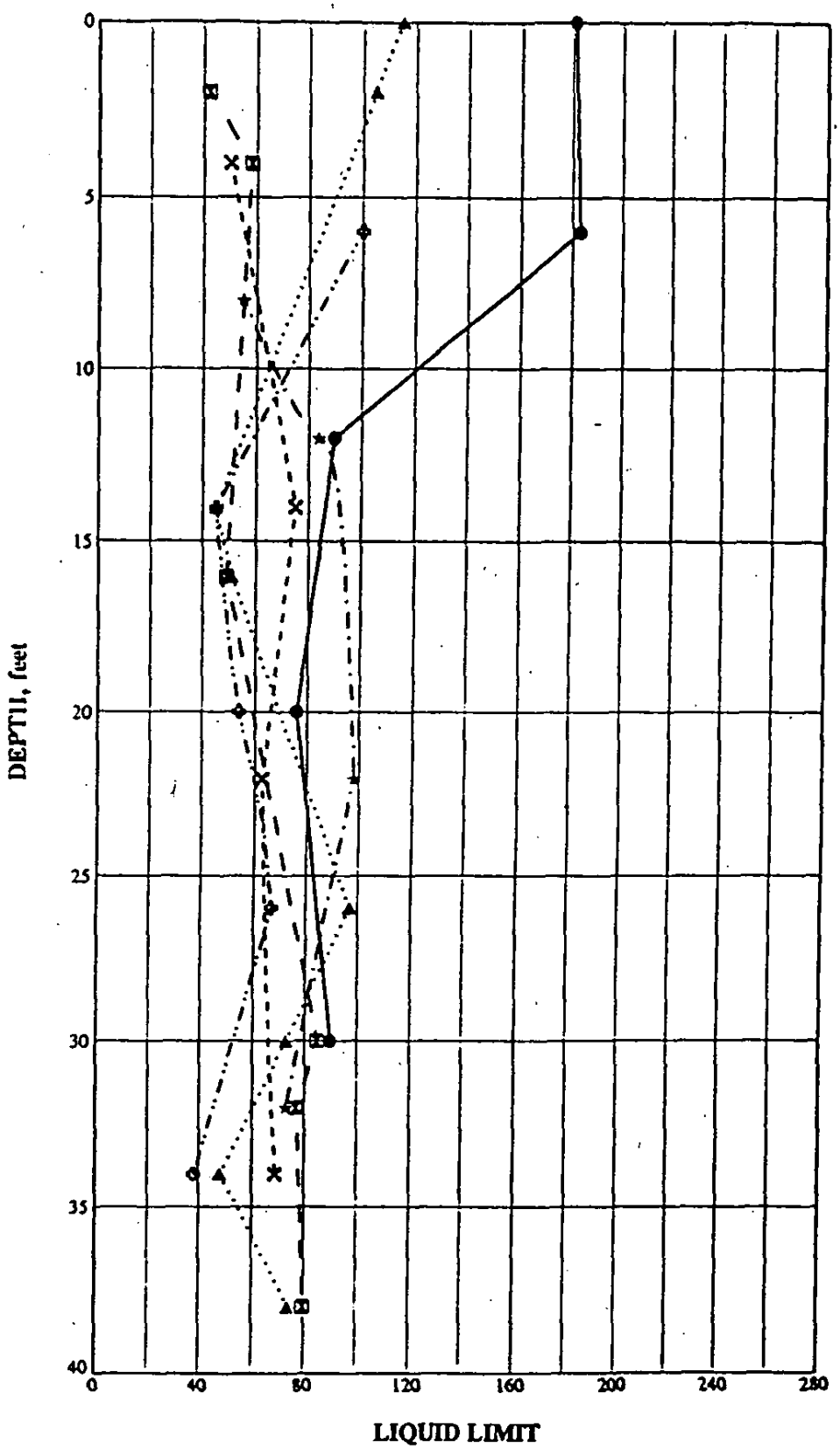


Project: River Birch Landfill
Project Number: 93B248C

LIQUID LIMIT vs DEPTH

12/3/93 LLVSDPT 38248

Woodward-Clyde Consultants



LEGEND

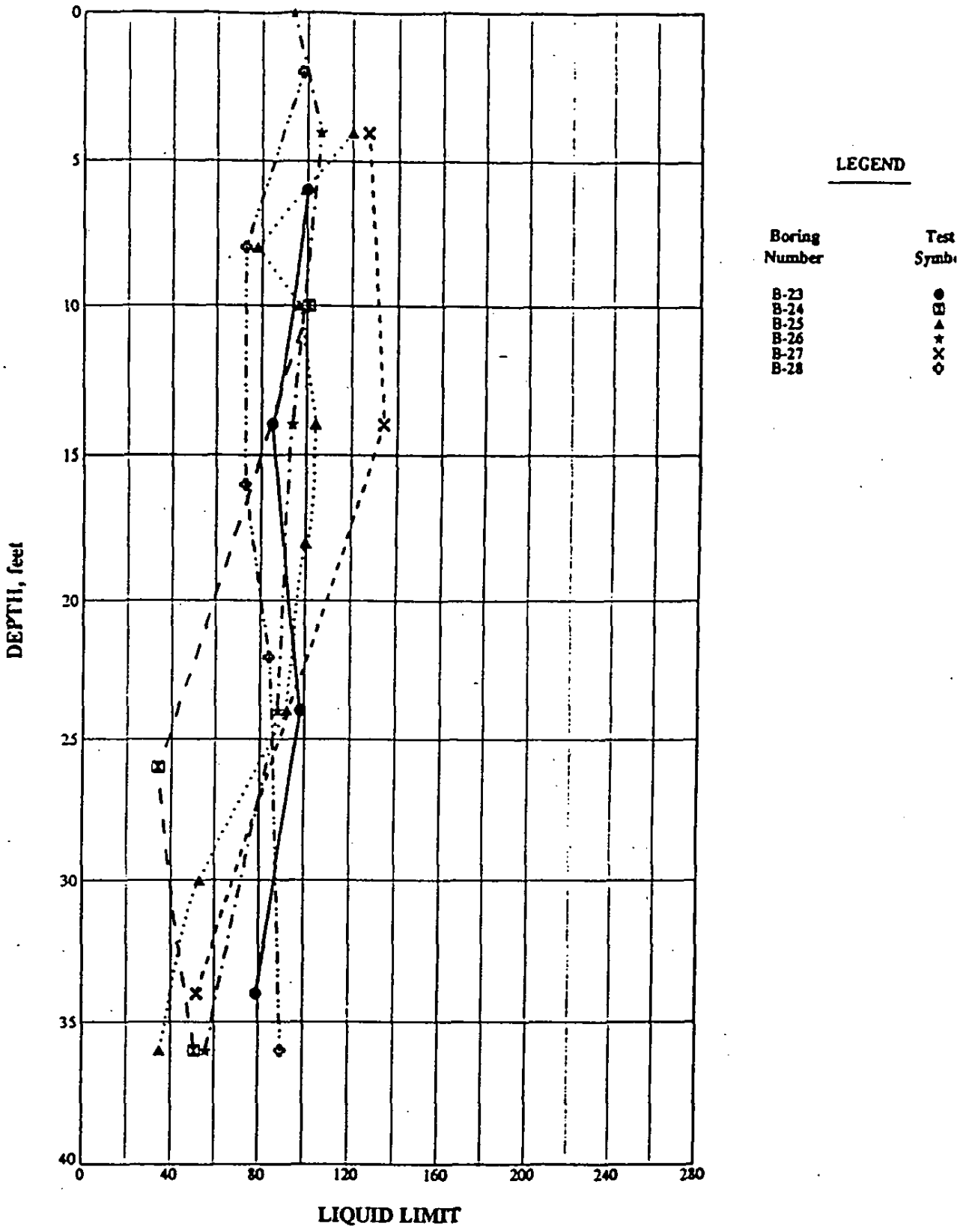
Boring Number	Te Sym
B-16	●
B-17	⊠
B-18	▲
B-19	★
B-20	×
B-22	◇

Project: River Birch Landfill
Project Number: 93B248C

LIQUID LIMIT vs DEPTH

12/3/93 LLVSDPT 3B248

Woodward-Clyde Consultants

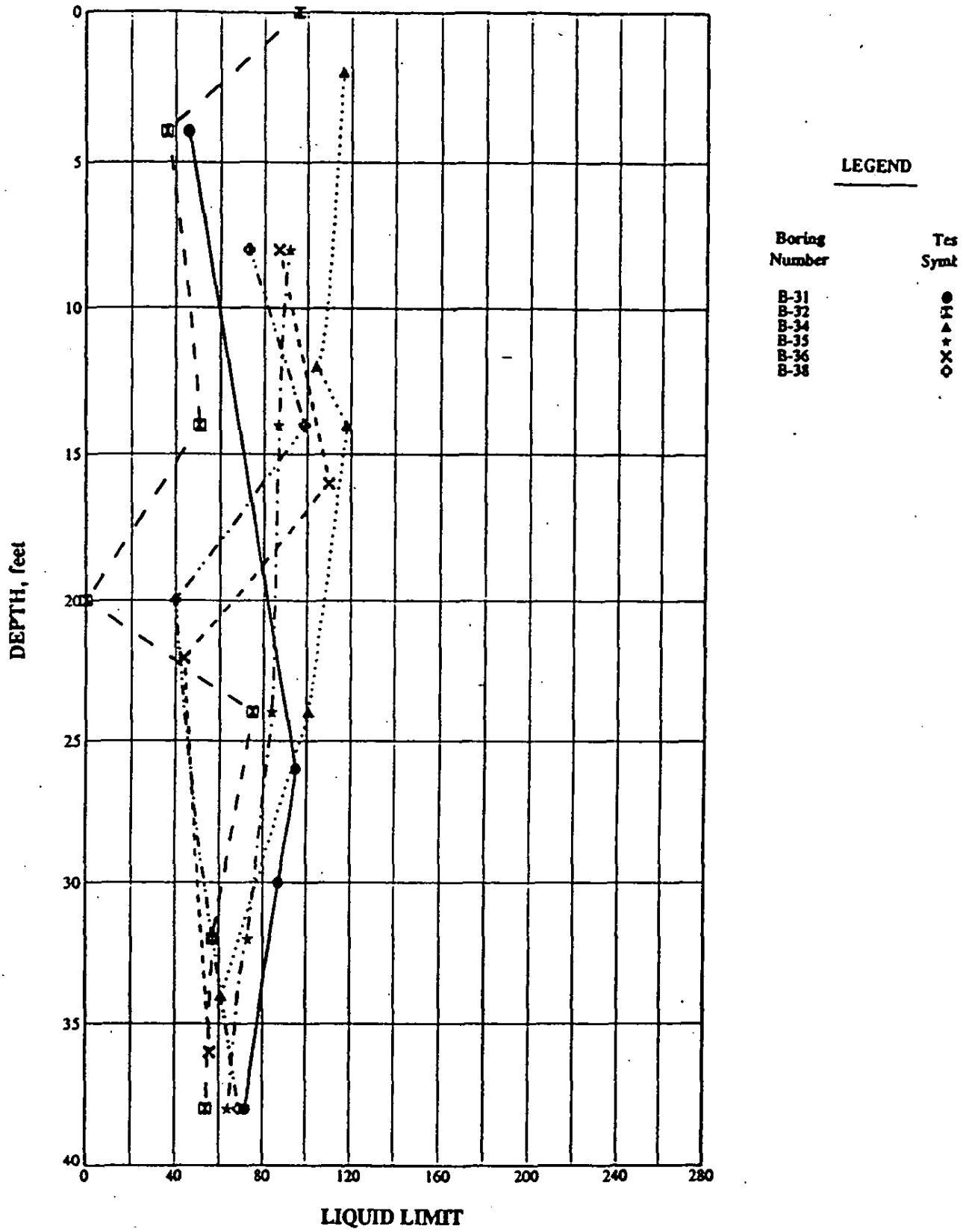


Project: River Birch Landfill
Project Number: 93B248C

LIQUID LIMIT vs DEPTH

12/3/93 LLVSDPT 3B248

Woodward-Clyde Consultants

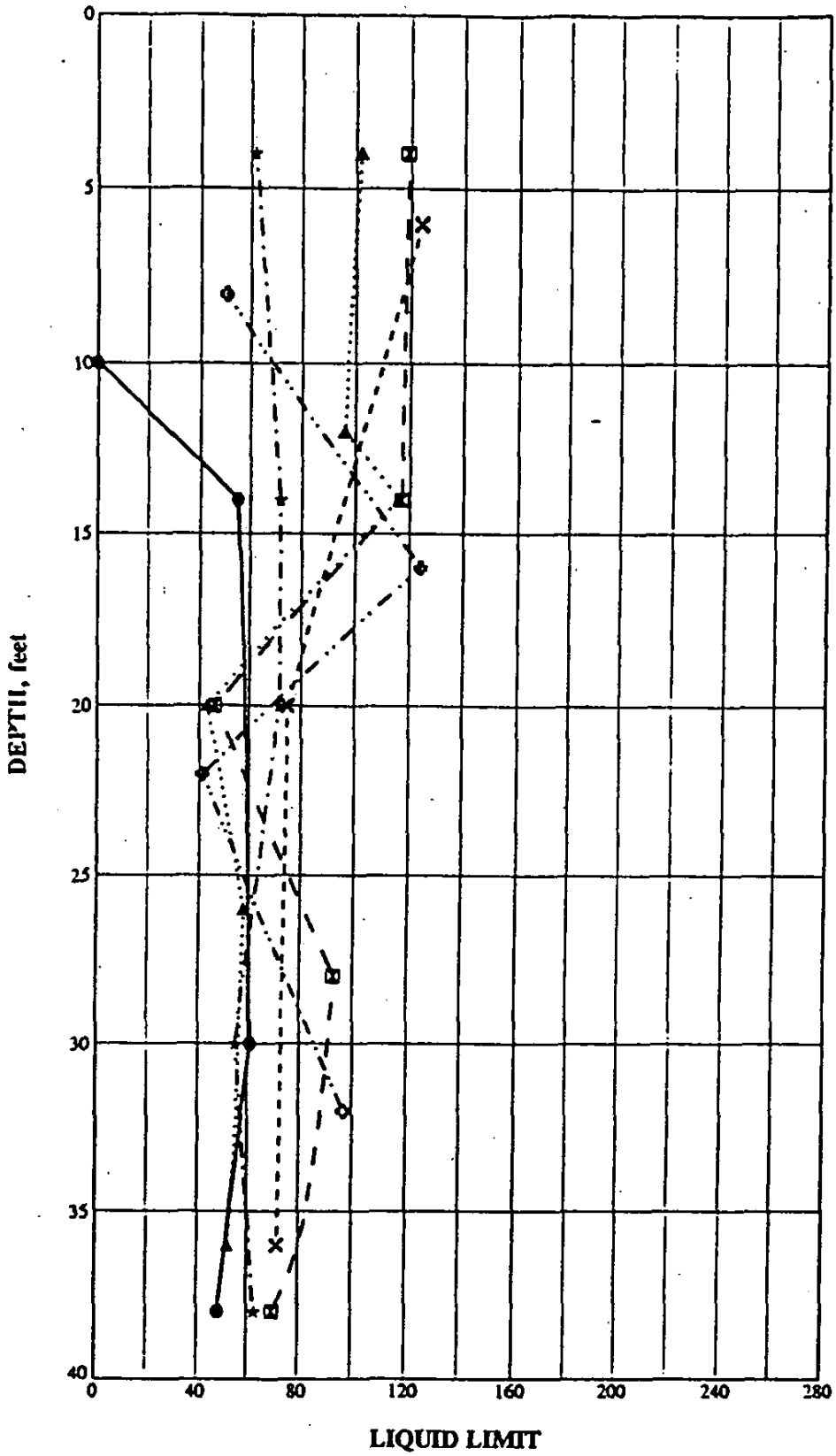


Project: River Birch Landfill
Project Number: 93B248C

LIQUID LIMIT vs DEPTH

12/3/93 LLVSDPT 38248

Woodward-Clyde Consultants



LEGEND

Boring Number	Test Symbol
B-39	●
B-40	⊠
B-41	▲
B-42	★
B-43	✕
B-44	◇

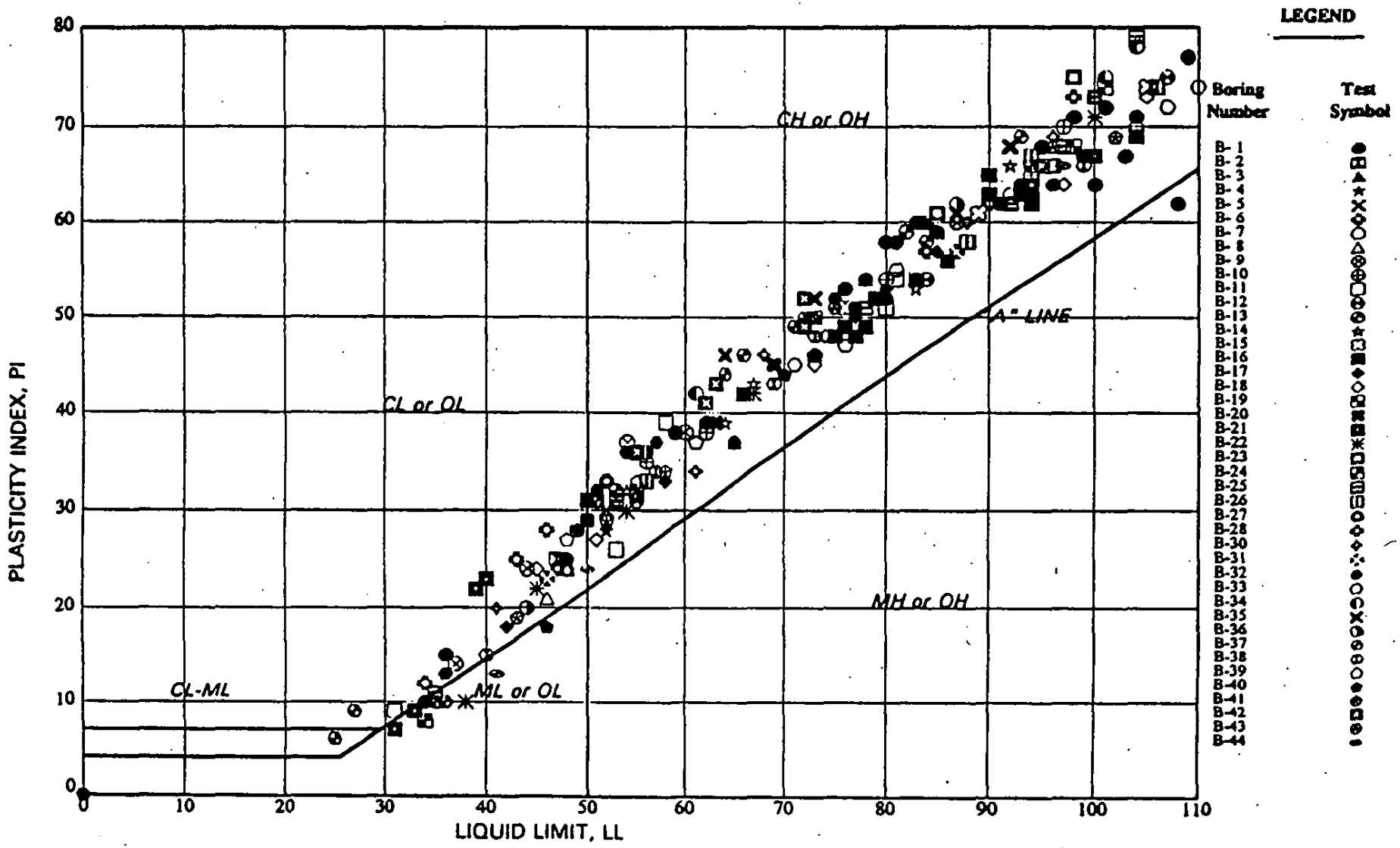
Project: River Birch Landfill
Project Number: 93B248C

LIQUID LIMIT vs DEPTH

12/3/93 LL VSDPT 3B248

Woodward-Clyde Consultants

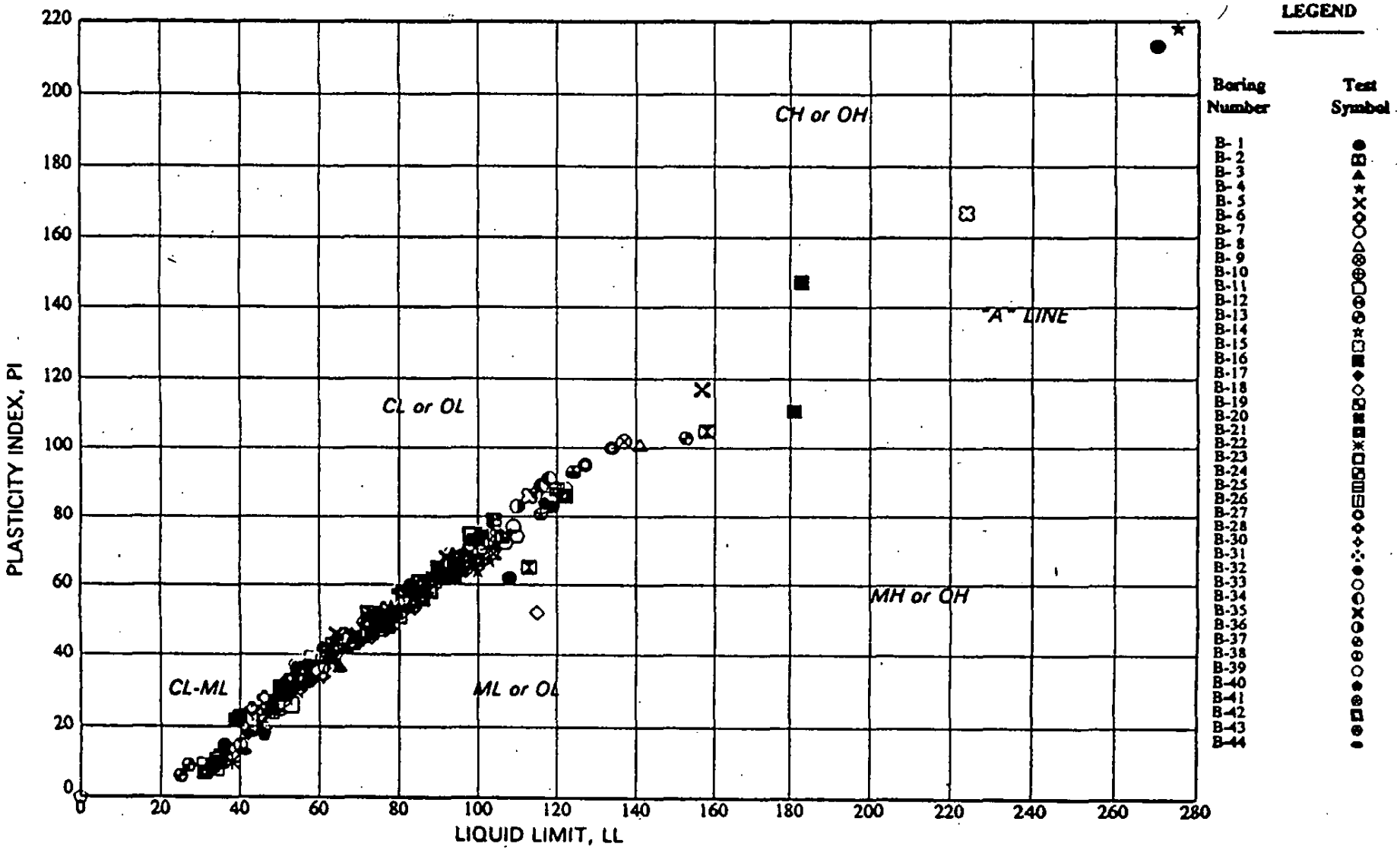
PLASTIC INDEX vs LIQUID LIMIT



Project: *River Birch Landfill* **Project Number:** *93B248C*	PLASTICITY CHART	*Figure fd1*

12/6/93 sensent3 38248

Woodward-Clyde Consultants



Project: *River Birch Landfill*
Project Number: *93B248C*

PLASTICITY CHART

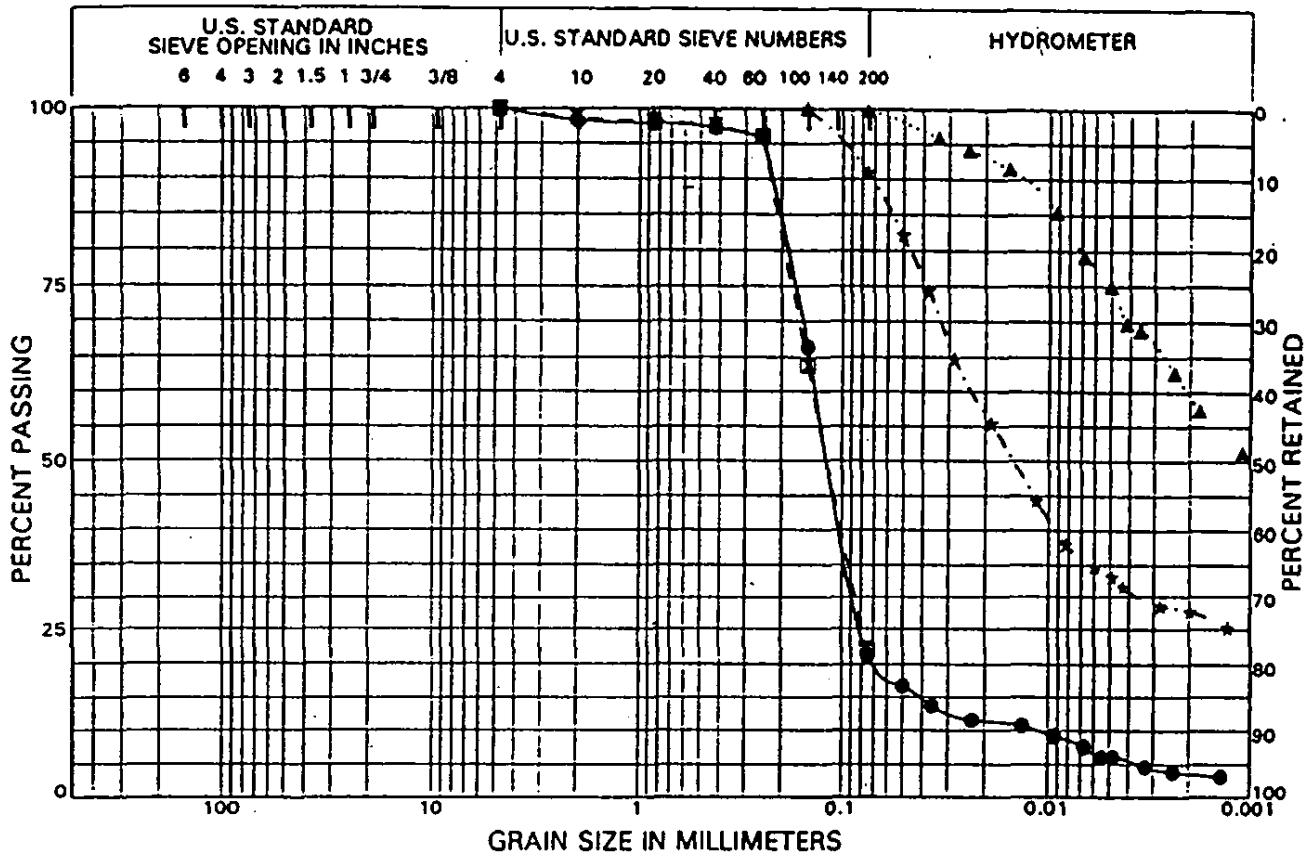
Figure fd1

12/6/93 sanset3 3B248

Woodward-Clyde Consultants

GRAIN SIZE DISTRIBUTION CURVES

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	



Boring Number	Depth (feet)	Symbol	Classification
B- 3	0.0	●	(SM)
B- 3	0.0	⊠	(SM)
B-21	53.0	▲	(CH)
B-21	63.0	★	(CL)

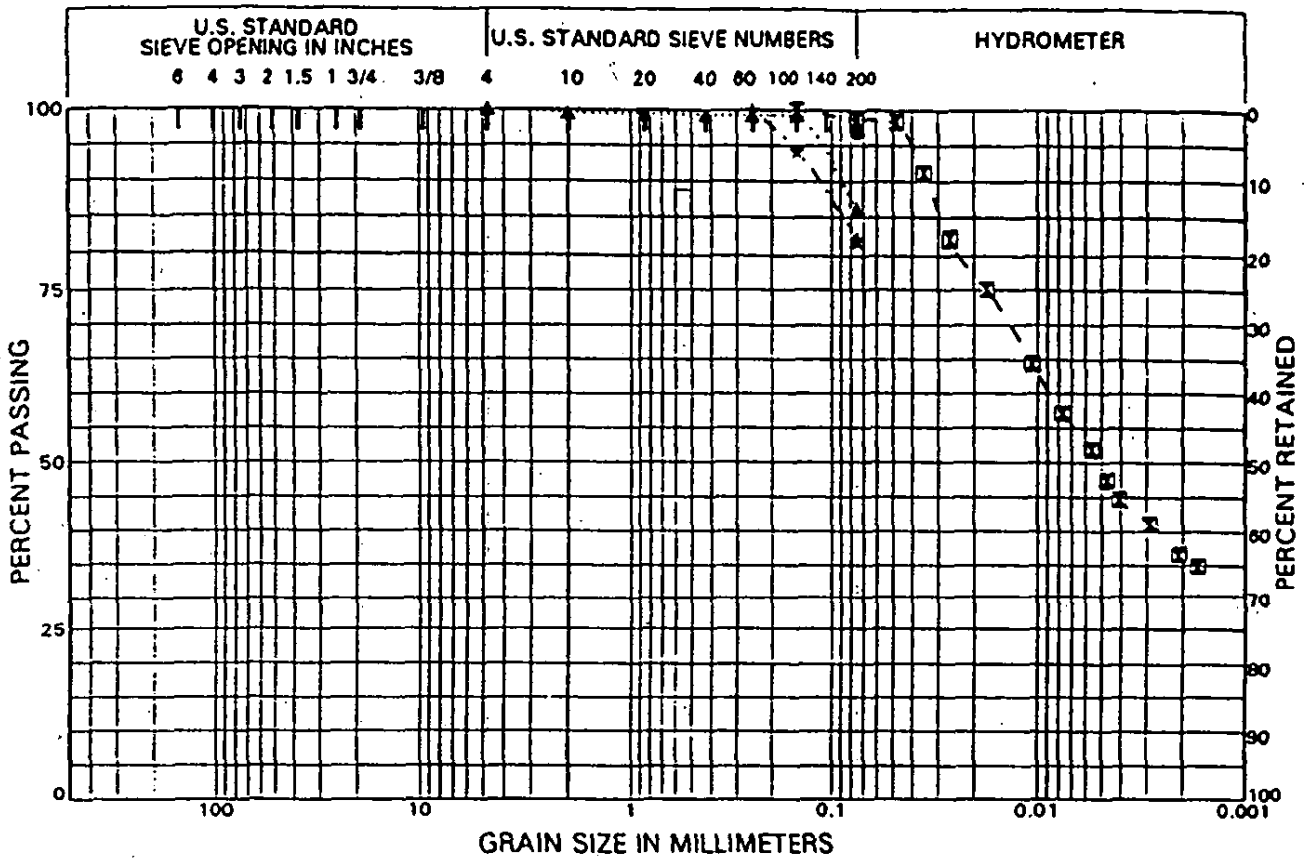
Project: River Birch Landfill
Project Number: 93B248C

GRAIN SIZE DISTRIBUTION CURVES

1/25/94 SYAML S6 38248

Woodward-Clyde Consultants

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	



Boring Number	Depth (feet)	Symbol	Classification
B-24	26.0	●	(CL-ML)
B-29	20.0	⊠	(CH)
B-31	8.5	▲	(ML/CL)
B-31	14.5	★	(ML/CL)

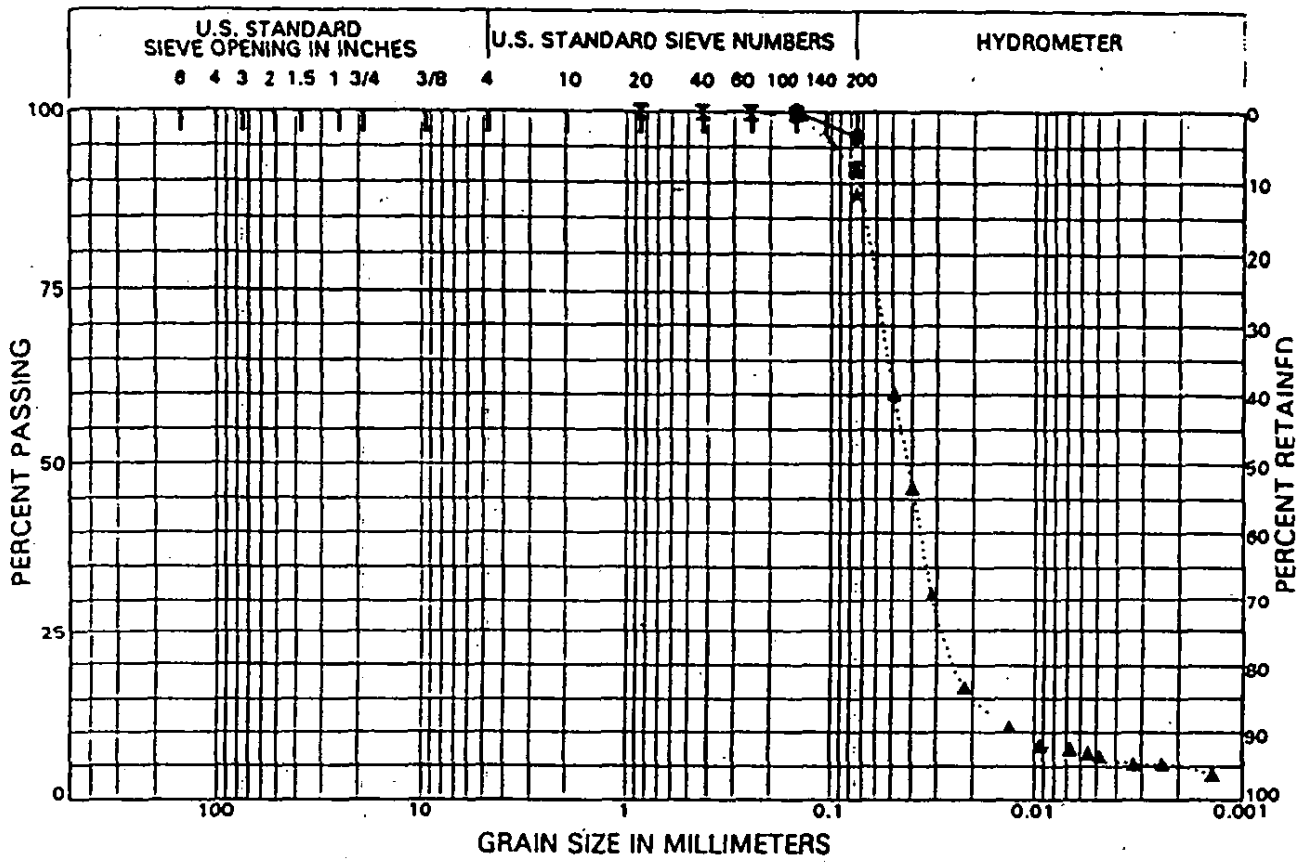
Project: River Birch Landfill
Project Number: 93B248C

GRAIN SIZE DISTRIBUTION CURVES

1-25-94 SVANLS8 38248

Woodward-Clyde Consultants

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	



Boring Number	Depth (feet)	Symbol	Classification
B-31	20.5	●	(ML/CL)
B-31	24.5	⊠	(ML/CL)
B-32	20.0	▲	(ML)
B-32	28.0	★	(CL/ML)

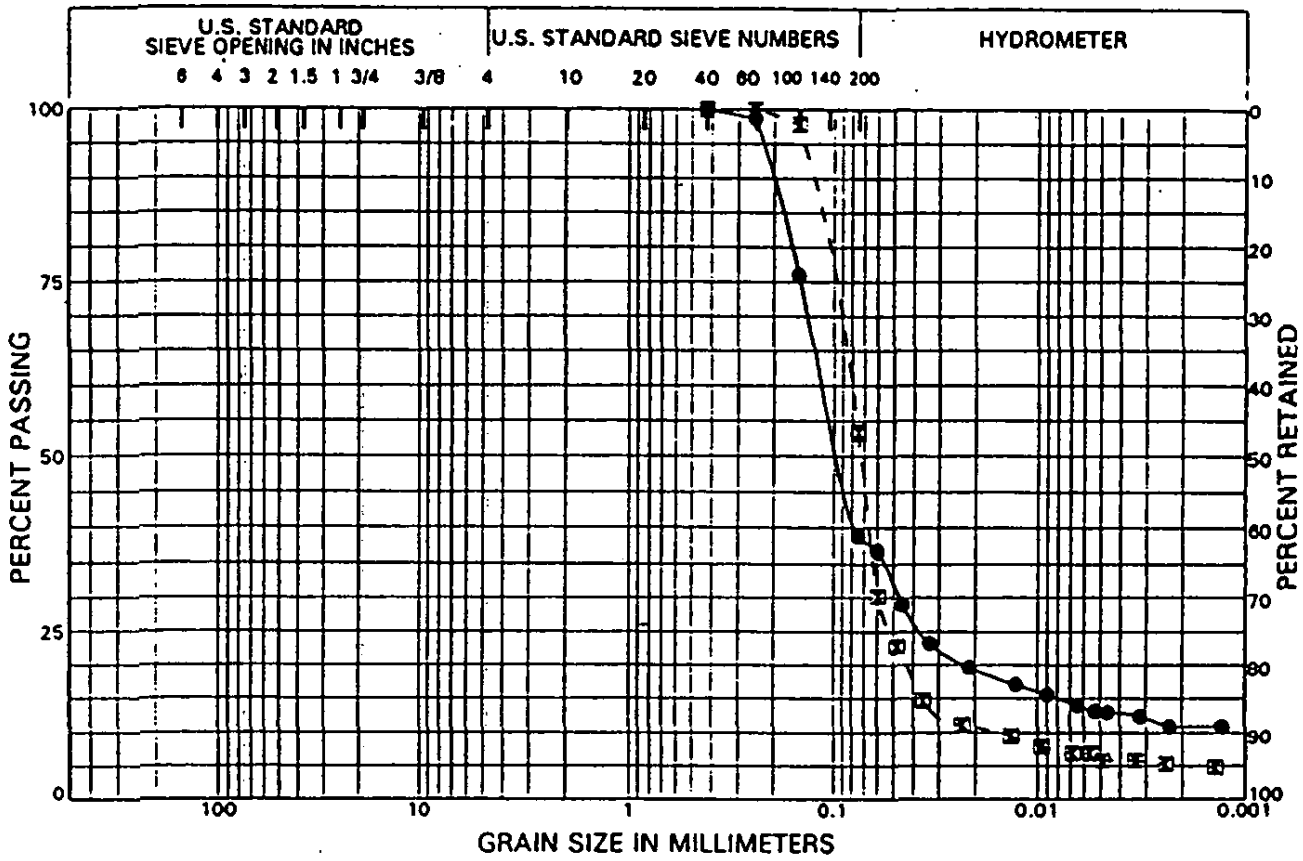
Project: River Birch Landfill
Project Number: 93B248C

GRAIN SIZE DISTRIBUTION CURVES

1/25/94 SVAM SB 38248

Woodward-Clyde Consultants

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	



Boring Number	Depth (feet)	Symbol	Classification
B-37	83.0	●	(SM/ML-CL)
B-39	22.0	⊠	(SM)

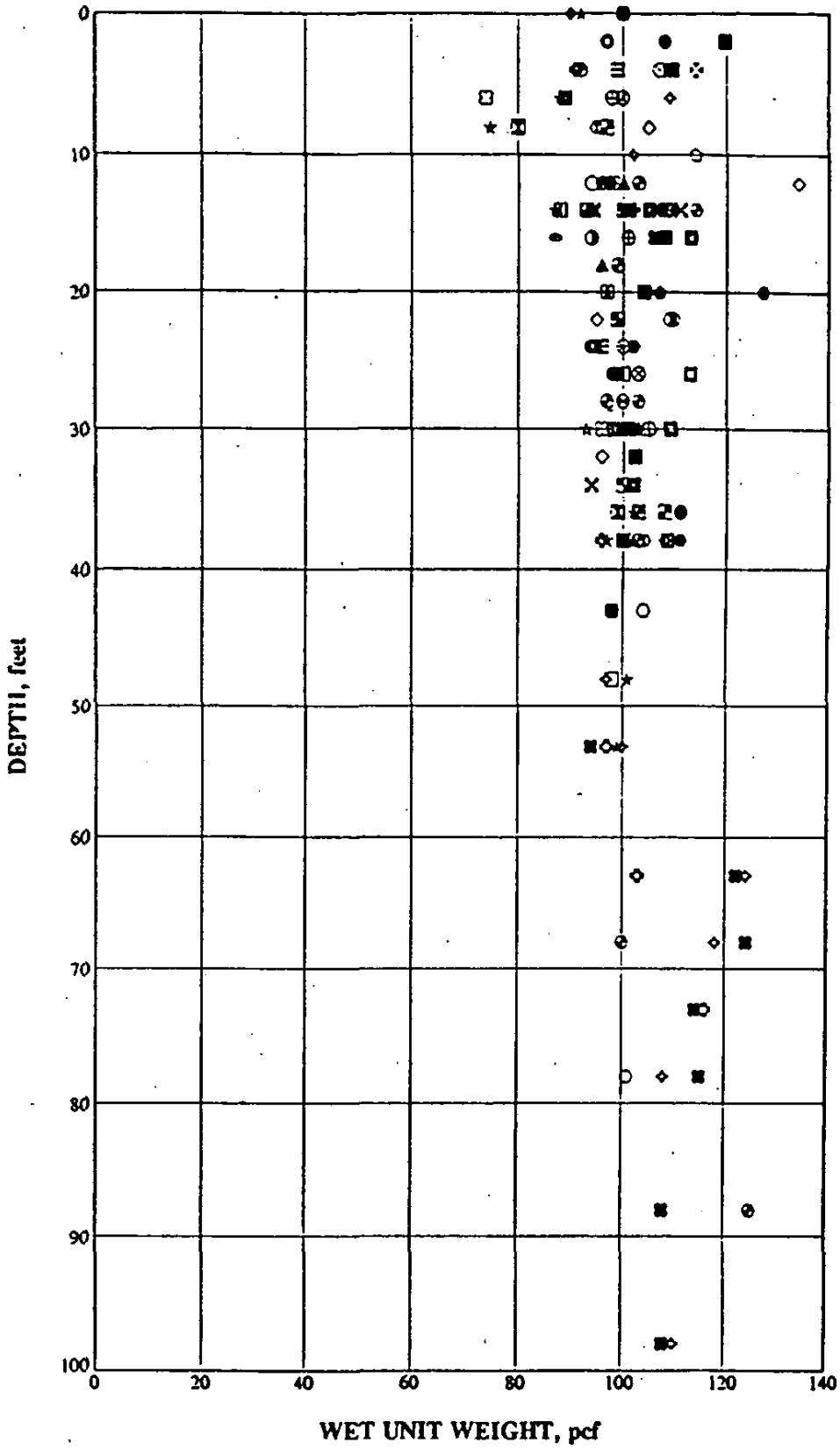
Project: River Birch Landfill
Project Number: 93B248C

GRAIN SIZE DISTRIBUTION CURVES

1/25/94 SVANLSB 3B24B

Woodward-Clyde Consultants

WET UNIT WEIGHT vs DEPTH

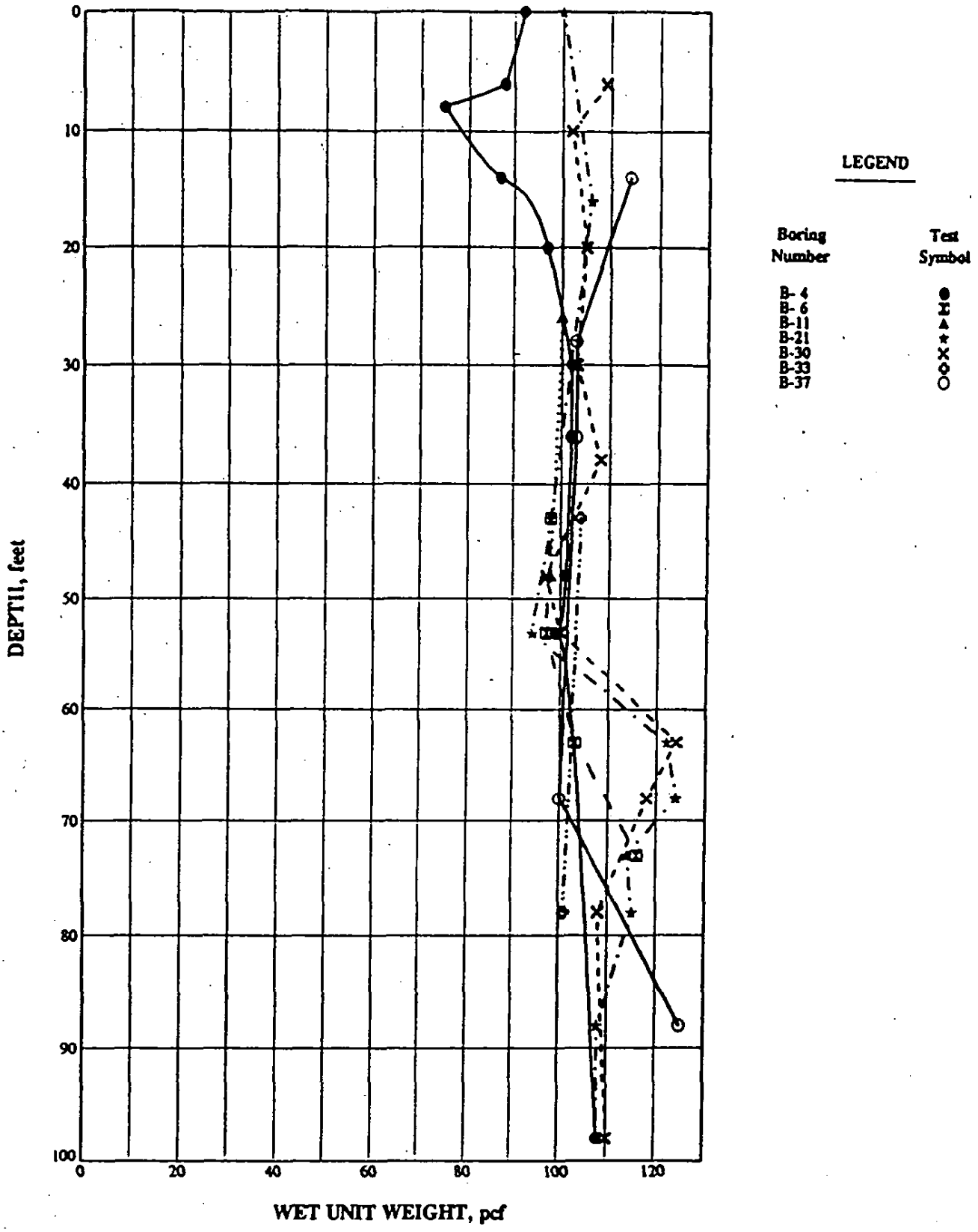


LEGEND

Boring Number	Test Symbol
B- 1	●
B- 2	⊠
B- 3	▲
B- 4	★
B- 5	×
B- 6	◇
B- 7	○
B- 8	▷
B- 9	⊗
B-10	⊕
B-11	▢
B-13	⊕
B-14	⊗
B-15	☆
B-16	⊡
B-17	■
B-18	◆
B-19	◇
B-20	⊠
B-21	■
B-22	■
B-23	✱
B-24	⊡
B-25	▨
B-26	▥
B-27	⊟
B-28	⊙
B-29	◆
B-30	◇
B-31	⁘
B-32	●
B-33	○
B-34	◐
B-35	✕
B-36	⊙
B-37	⊗
B-38	⊕
B-39	○
B-40	●
B-41	⊗
B-42	⊠
B-43	⊕
B-44	●

Project: River Birch Landfill
Project Number: 93B248C

WET UNIT WEIGHT vs DEPTH

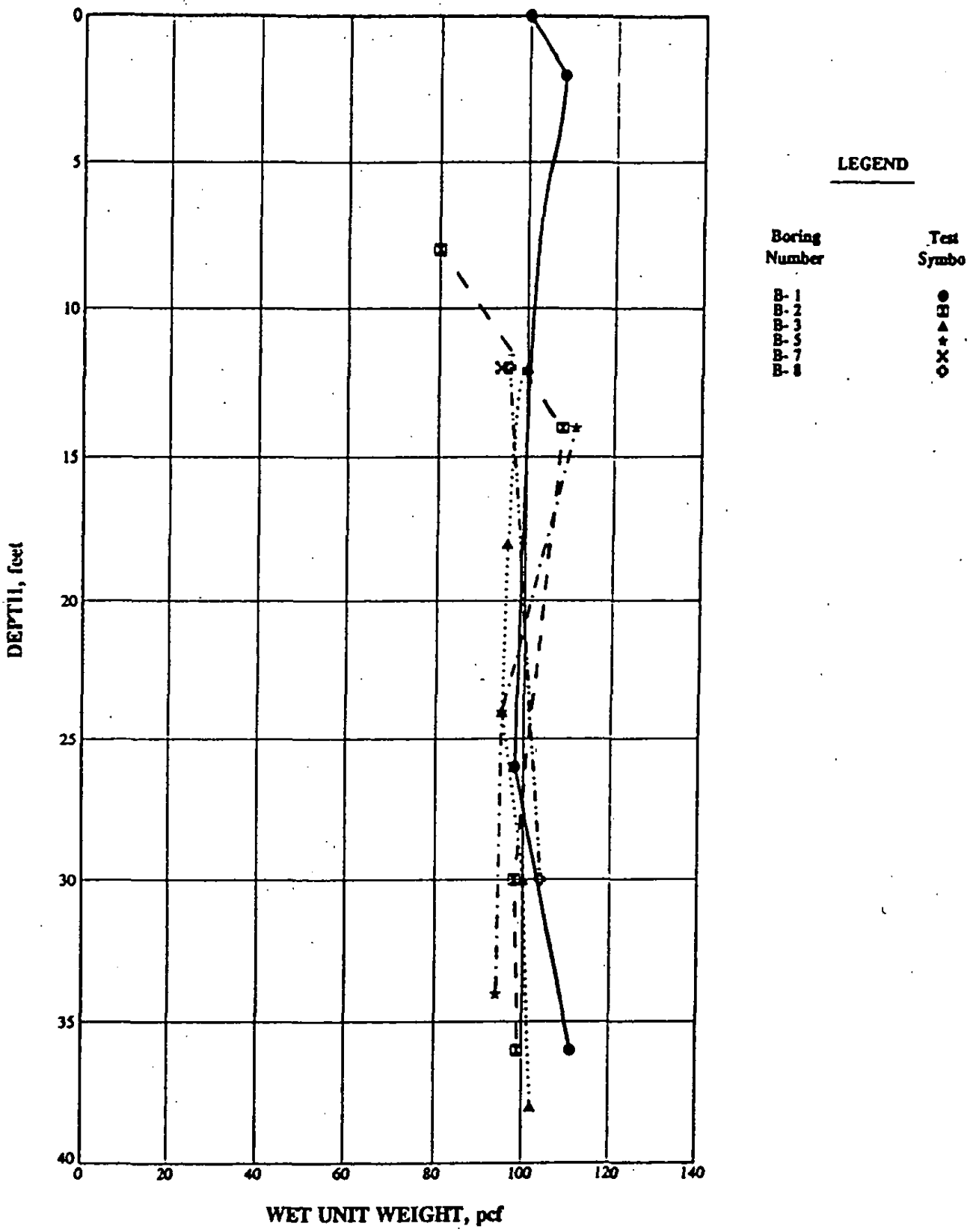


Project: River Birch Landfill
Project Number: 93B248C

WET UNIT WEIGHT vs DEPTH

12/3/93 WTVDPT 3B248

Woodward-Clyde Consultants

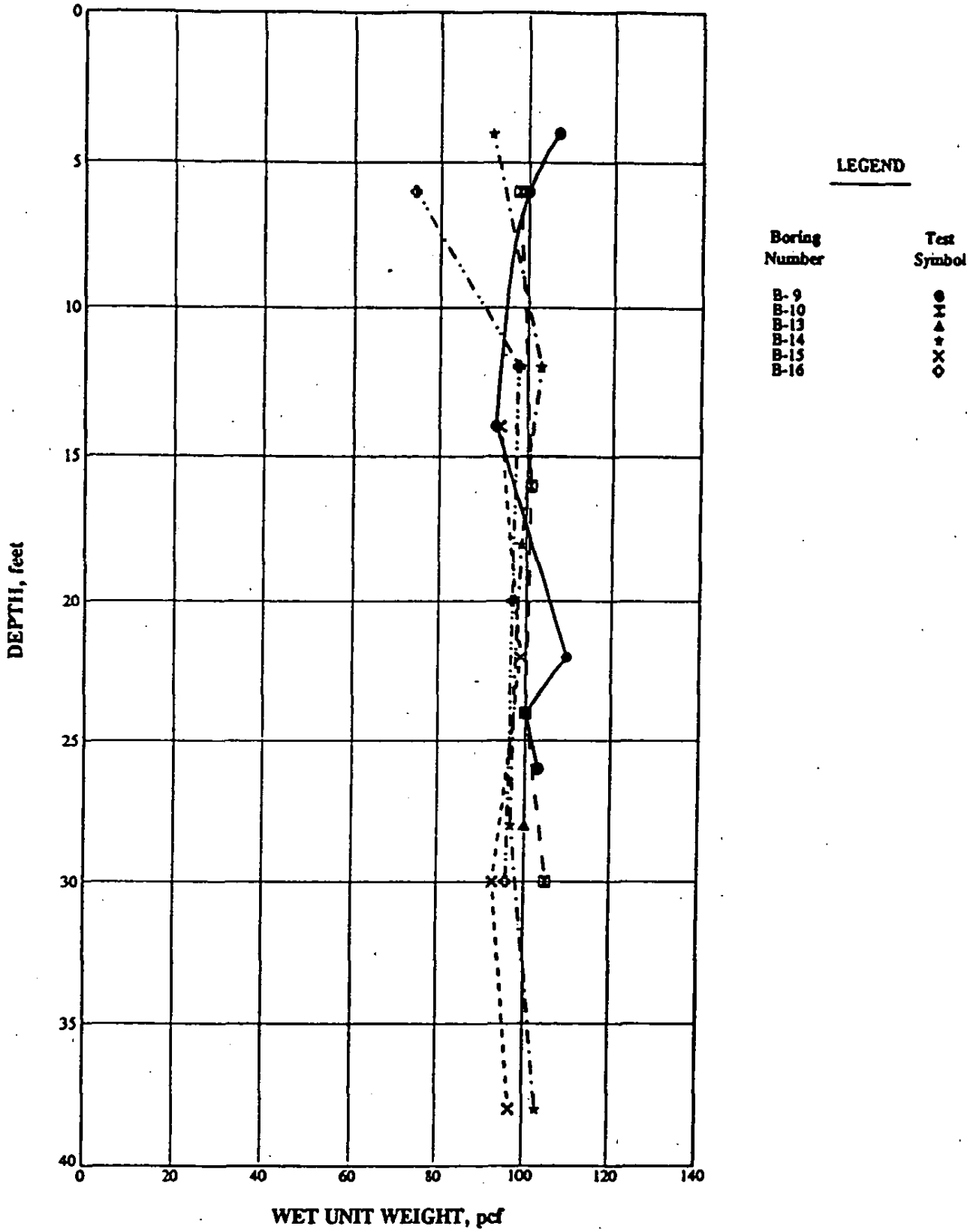


Project: River Birch Landfill
Project Number: 93B248C

WET UNIT WEIGHT vs DEPTH

12/3/93 WTVDPT 3B248

Woodward-Clyde Consultants

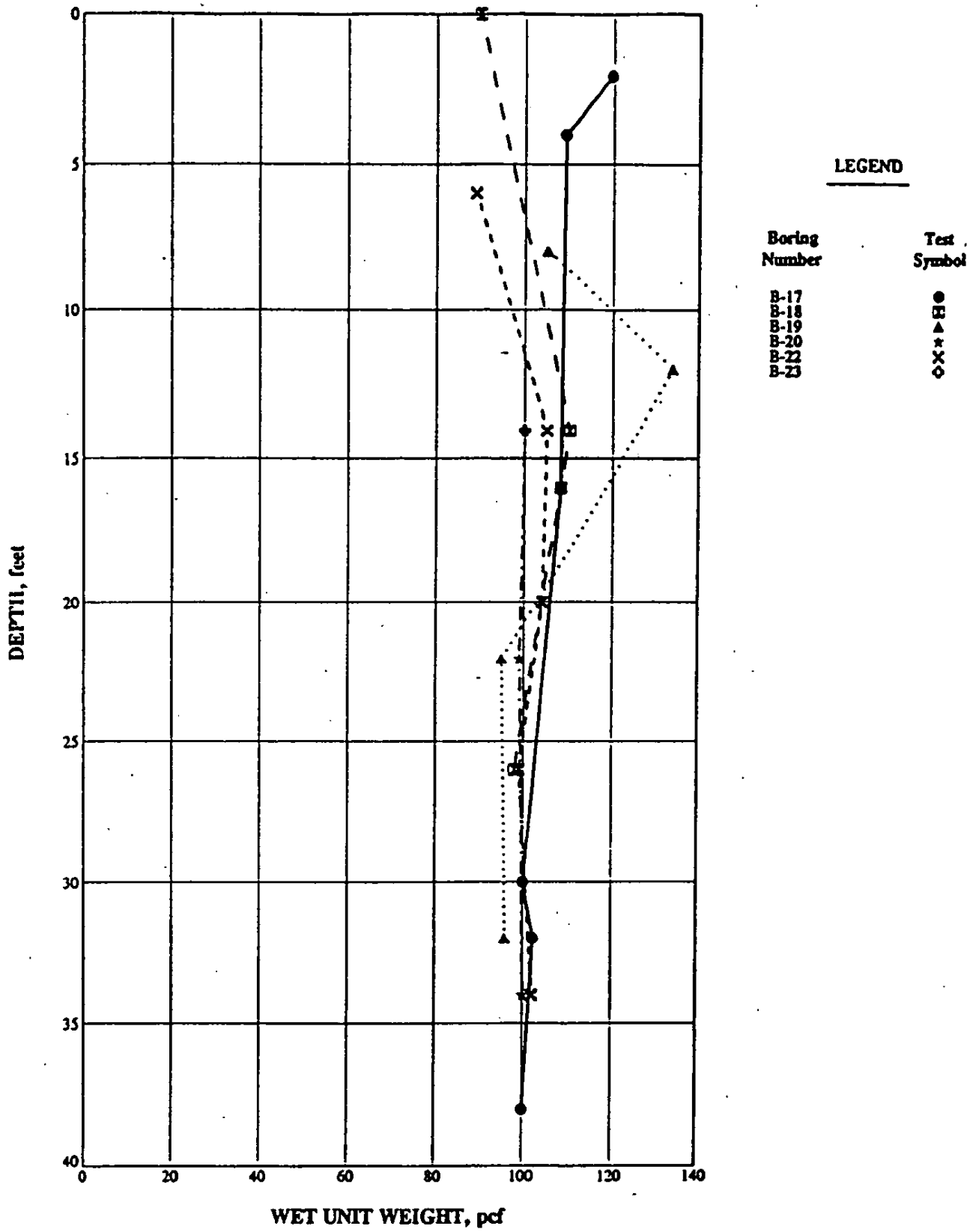


Project: River Birch Landfill
Project Number: 93B248C

WET UNIT WEIGHT vs DEPTH

12/3/93 WTVDPT 3B248

Woodward-Clyde Consultants

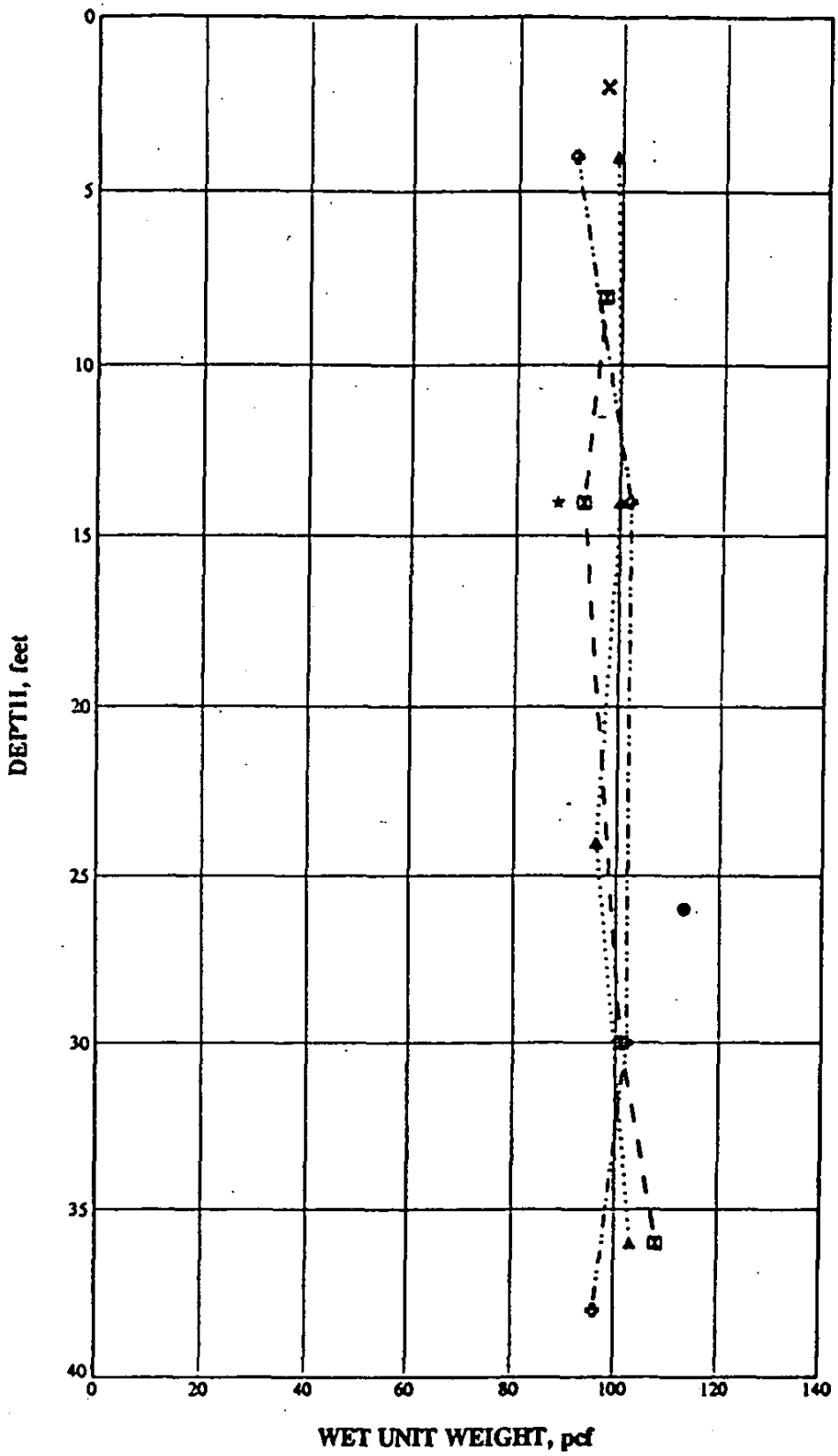


Project: River Birch Landfill
Project Number: 93B248C

WET UNIT WEIGHT vs DEPTH

12/3/93 WTVDPT 3B248

Woodward-Clyde Consultants



LEGEND

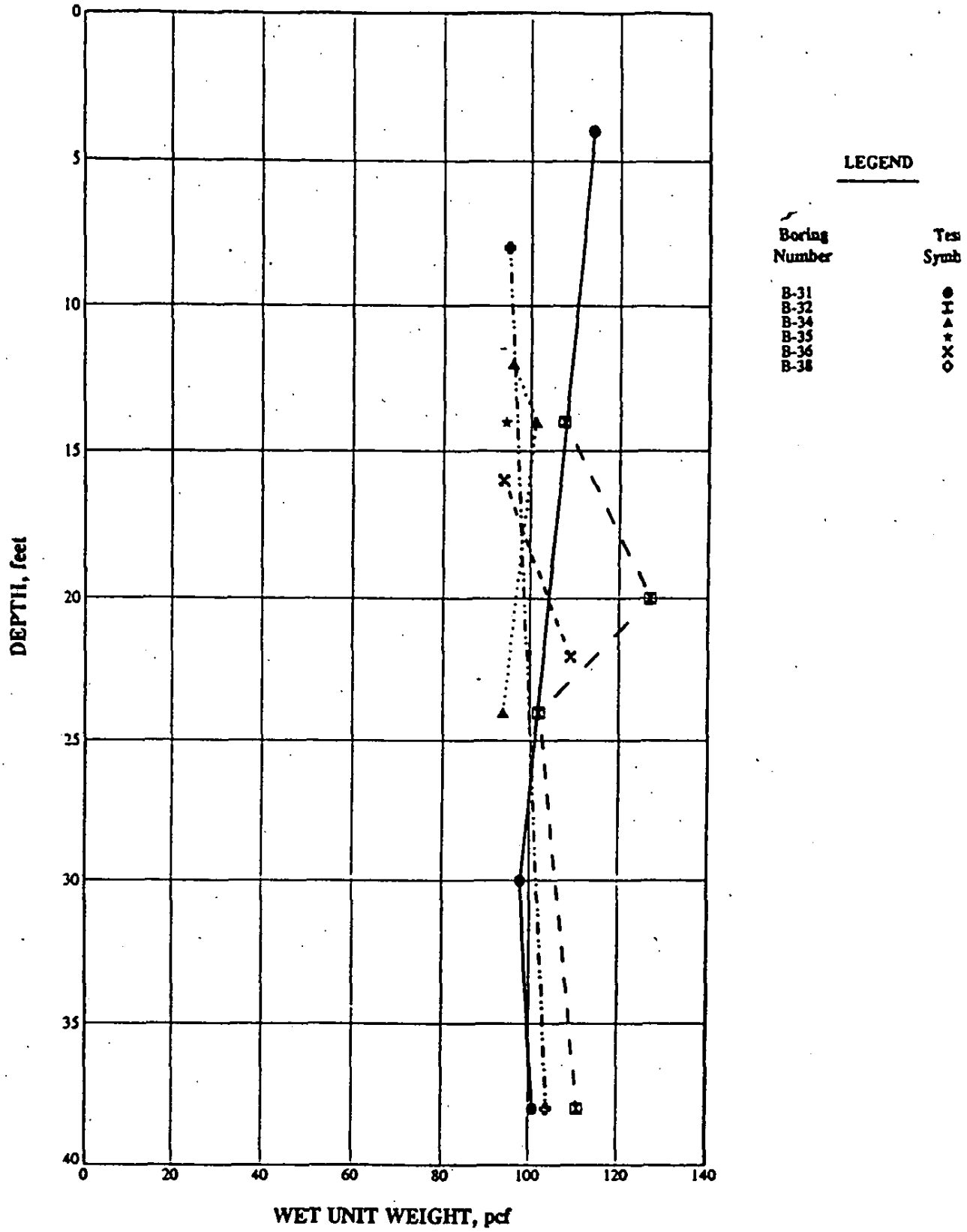
Boring Number	Test Symbol
B-24	●
B-25	⊠
B-26	▲
B-27	★
B-28	×
B-29	◇

Project: River Birch Landfill
Project Number: 93B248C

WET UNIT WEIGHT vs DEPTH

12/3/93 WTVDPT 38248

Woodward-Clyde Consultants

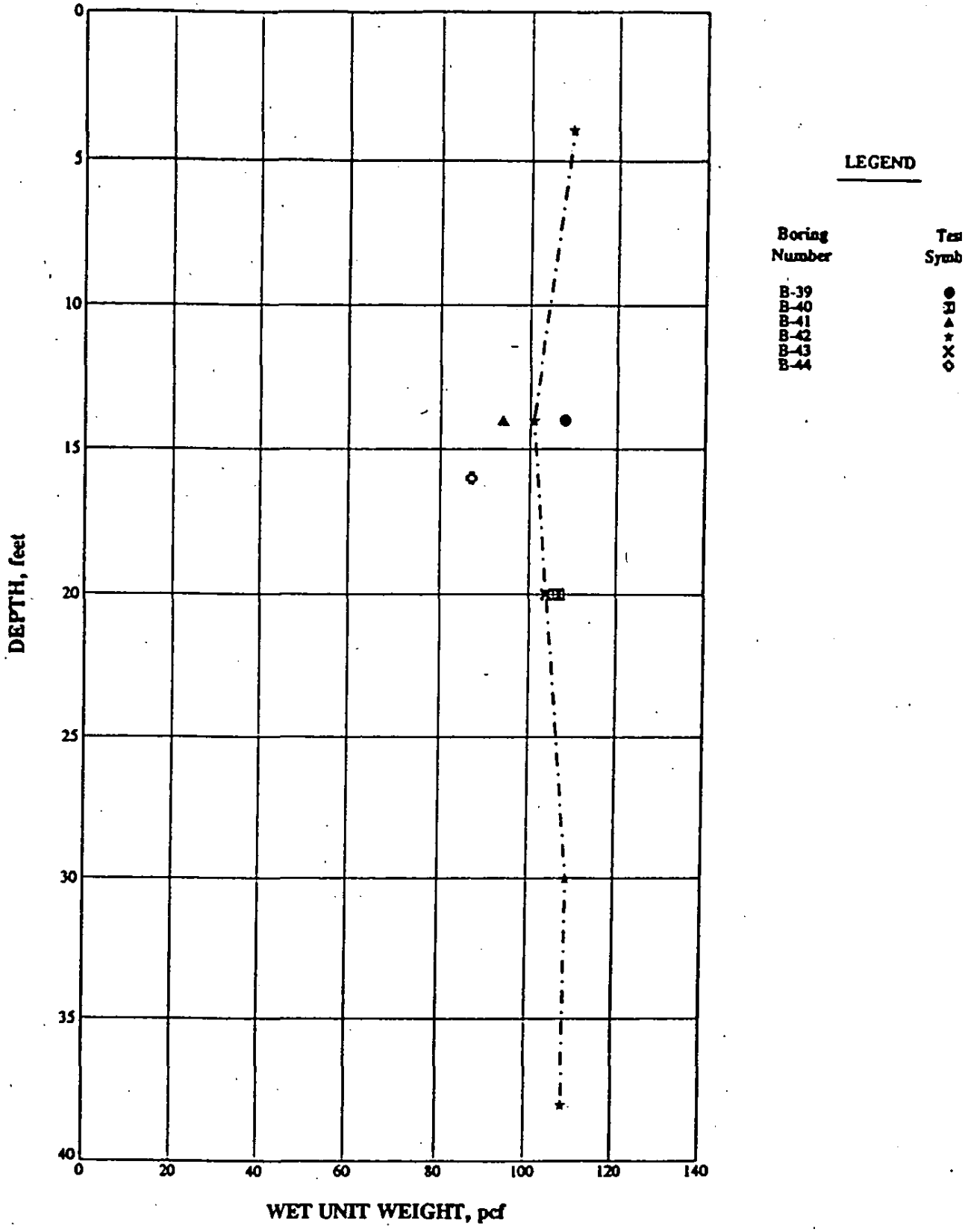


Project: River Birch Landfill
Project Number: 93B248C

WET UNIT WEIGHT vs DEPTH

12/3/93 WTVDPT 3B248

Woodward-Clyde Consultants



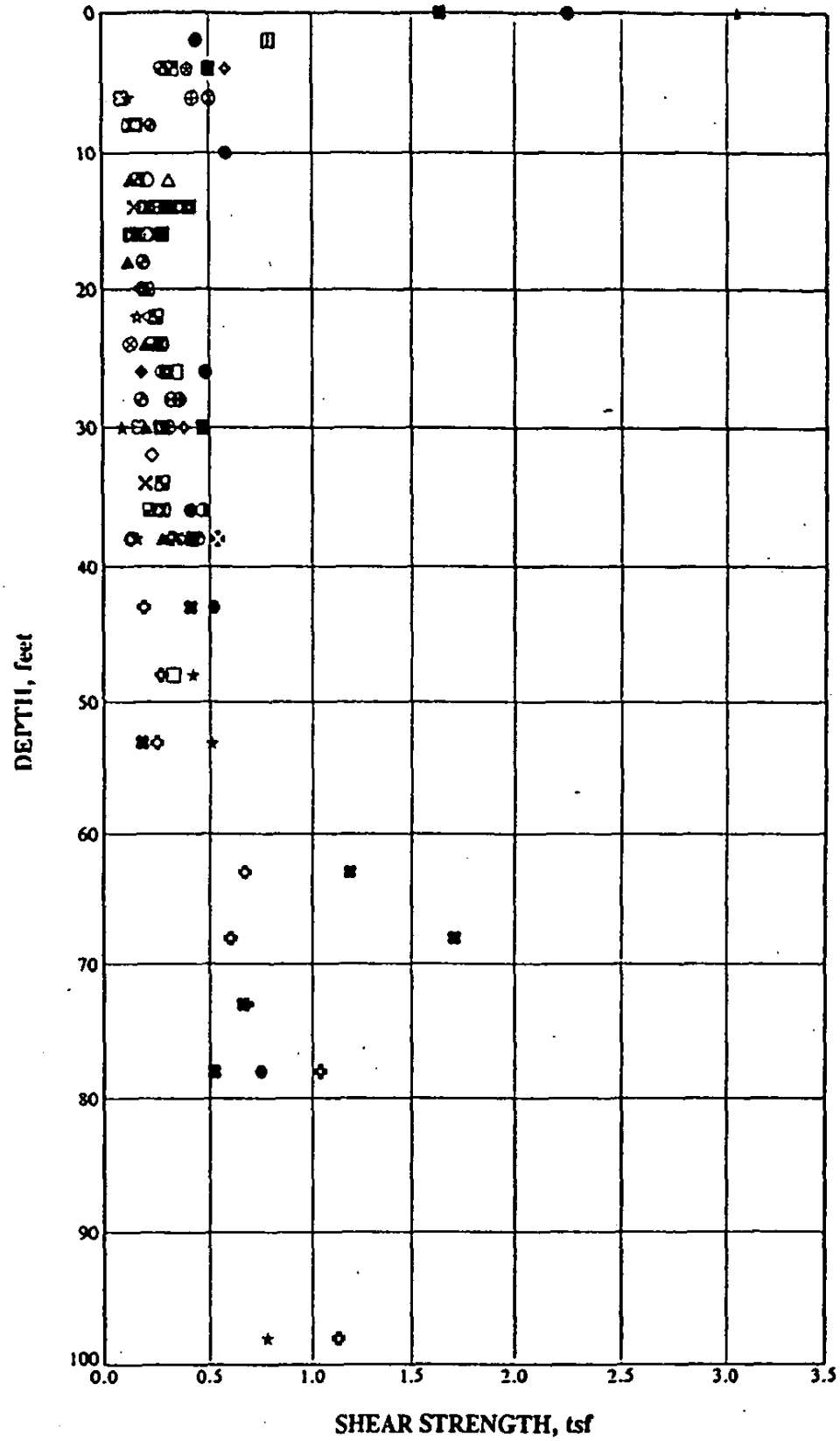
Project: River Birch Landfill
Project Number: 93B248C

WET UNIT WEIGHT vs DEPTH

12/3/93 WTVDPT 3B248

Woodward-Clyde Consultants

SHEAR STRENGTH vs DEPTH



LEGEND

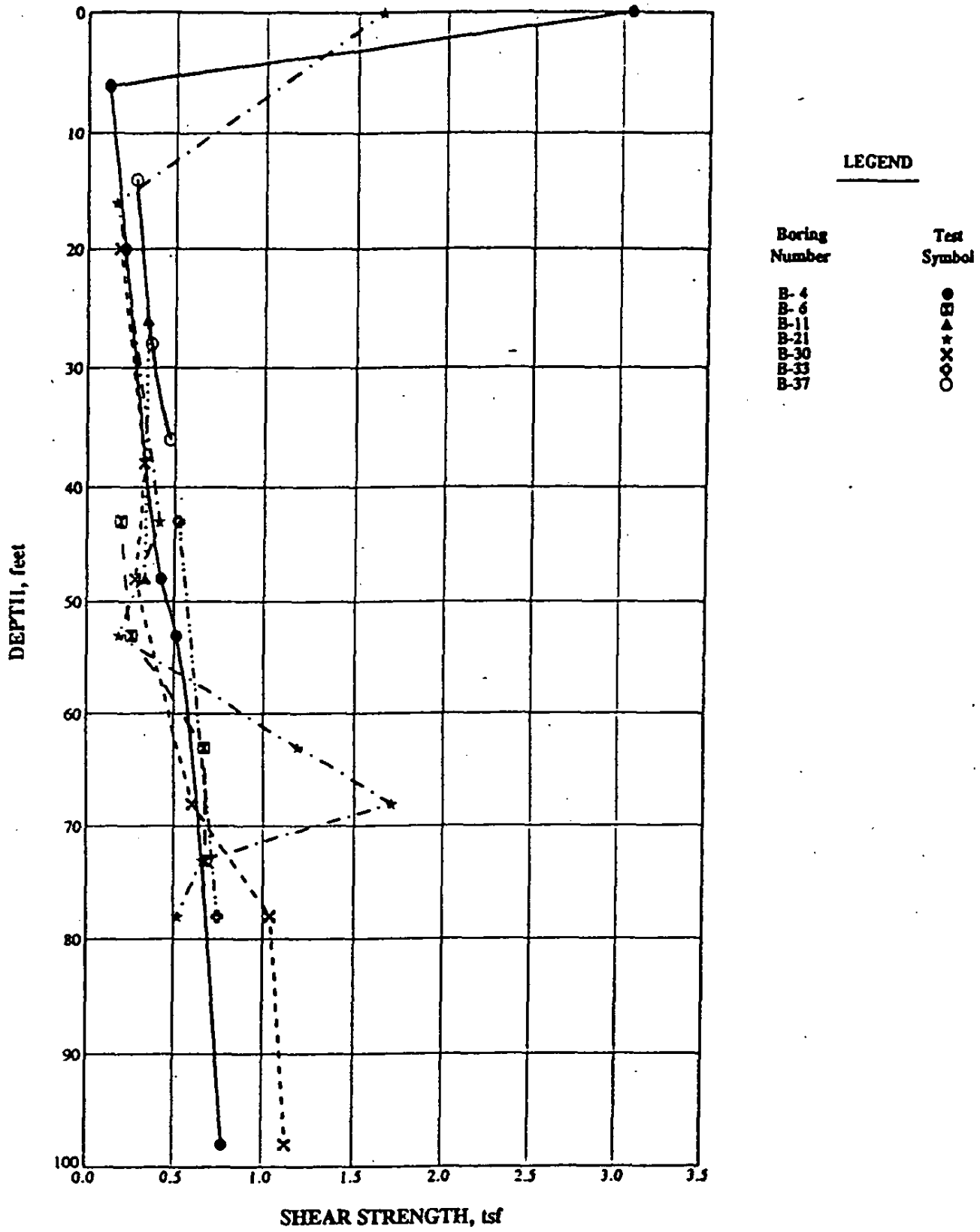
Boring Number	Test Symbol
B- 1	●
B- 2	✱
B- 3	▲
B- 4	★
B- 5	✕
B- 6	◇
B- 7	○
B- 8	△
B- 9	⊗
B-10	⊕
B-11	□
B-13	⊕
B-14	⊕
B-15	☆
B-16	⊡
B-17	▣
B-18	◆
B-19	◇
B-20	⊡
B-21	▣
B-22	▣
B-23	✱
B-25	⊡
B-26	▣
B-27	▣
B-28	⊡
B-29	○
B-30	◇
B-31	◇
B-32	⊹
B-33	●
B-34	○
B-35	○
B-36	✕
B-37	⊕
B-38	⊕
B-39	⊕
B-40	○
B-41	●
B-42	●
B-44	⊡

Project: River Birch Landfill
Project Number: 93B248C

SHEAR STRENGTH vs DEPTH

1/25/94 SHVDPT 3B248

Woodward-Clyde Consultants

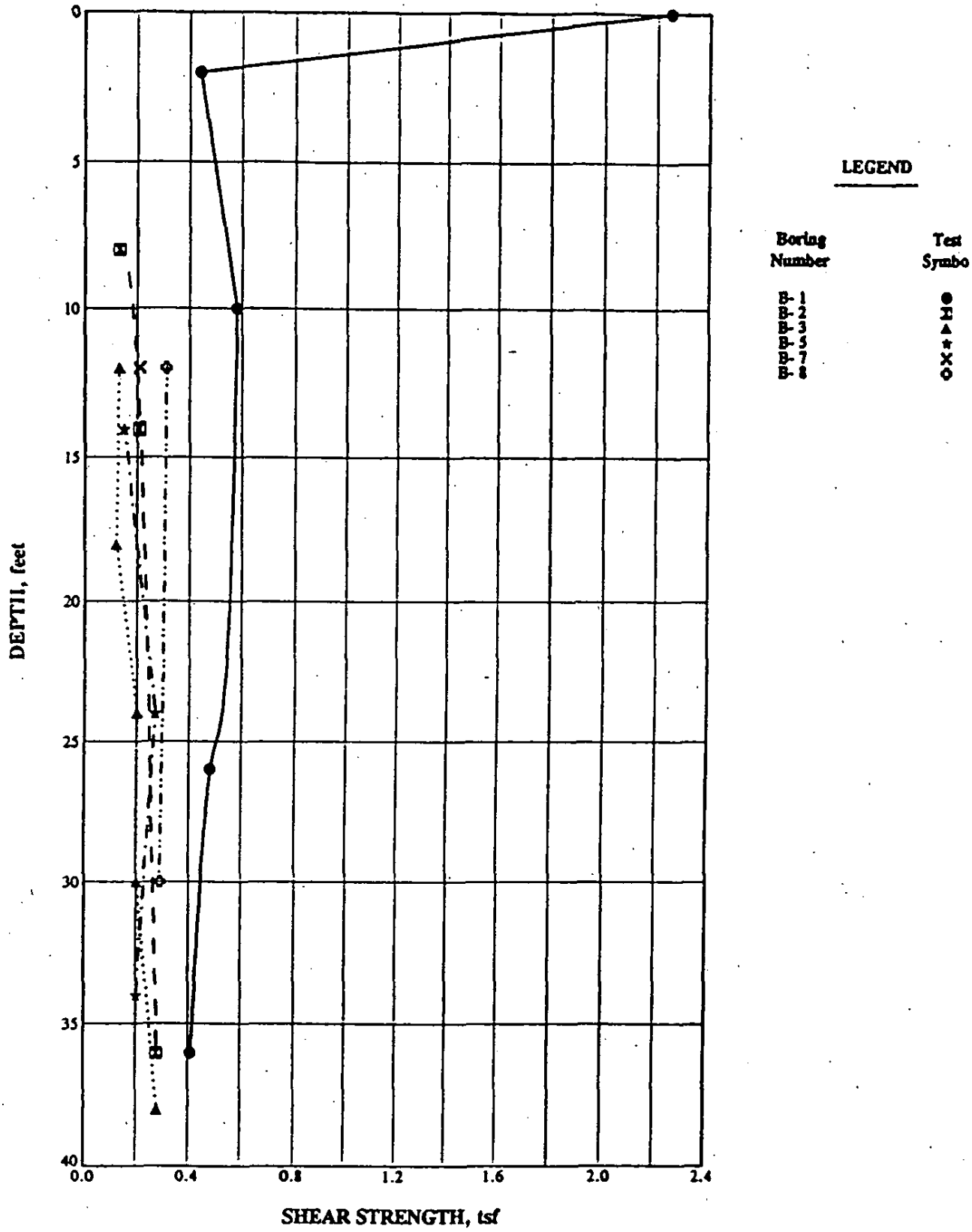


Project: River Birch Landfill
Project Number: 93B248C

SHEAR STRENGTH vs DEPTH

12/3/93 SHVDPT 3B248

Woodward-Clyde Consultants

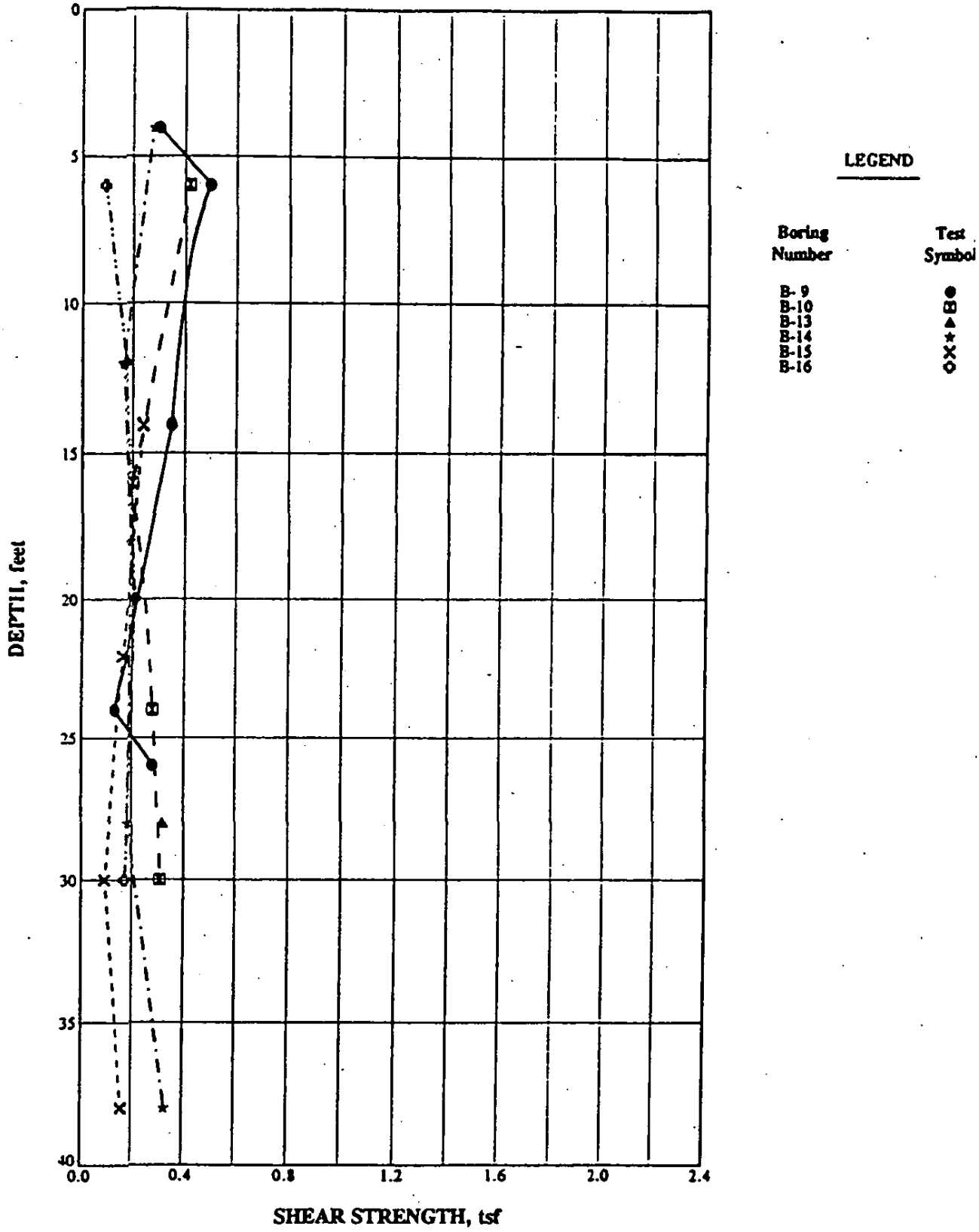


Project: River Birch Landfill
Project Number: 93B248C

SHEAR STRENGTH vs DEPTH

12/3/93 SHVDPT 3B248

Woodward-Clyde Consultants

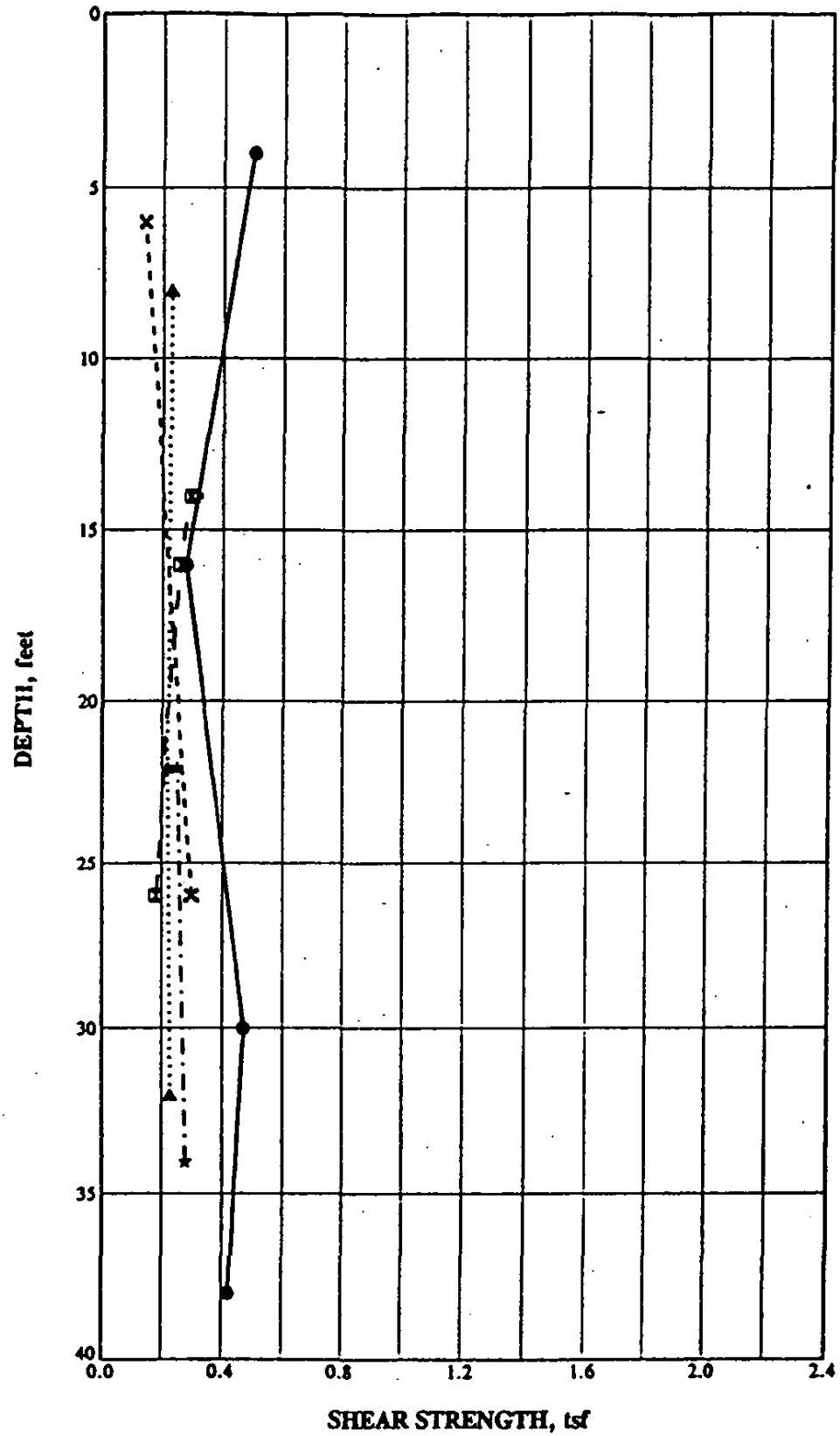


Project: River Birch Landfill
Project Number: 93B248C

SHEAR STRENGTH vs DEPTH

12/3/93 SHVDPT 3B248

Woodward-Clyde Consultants



LEGEND

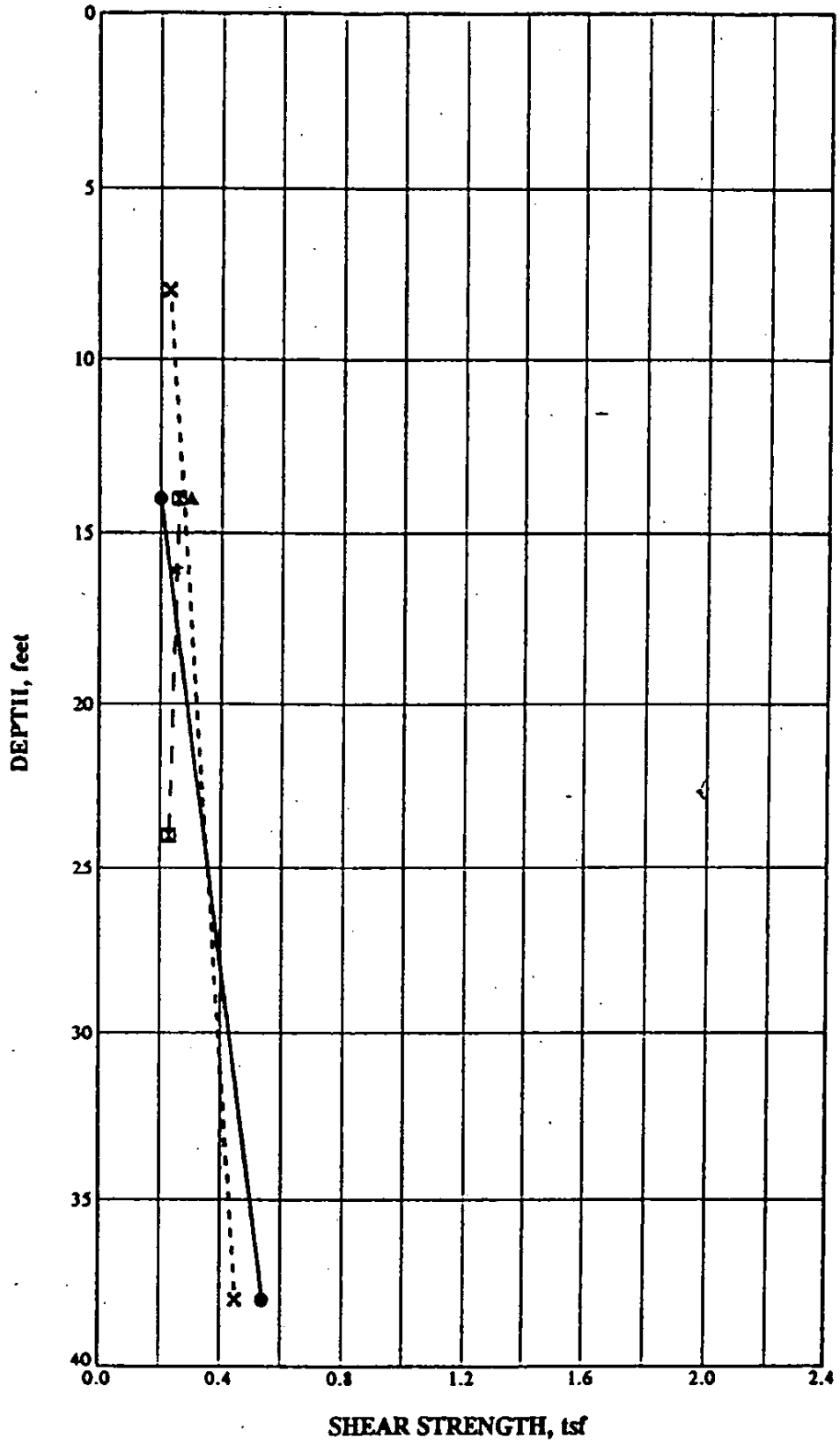
Boring Number	Test Symbol
B-17	●
B-18	⊠
B-19	▲
B-20	★
B-22	X
B-23	◇

Project: River Birch Landfill
Project Number: 93B248C

SHEAR STRENGTH vs DEPTH

12/3/93 SHVDPT 3B248

Woodward-Clyde Consultants



LEGEND

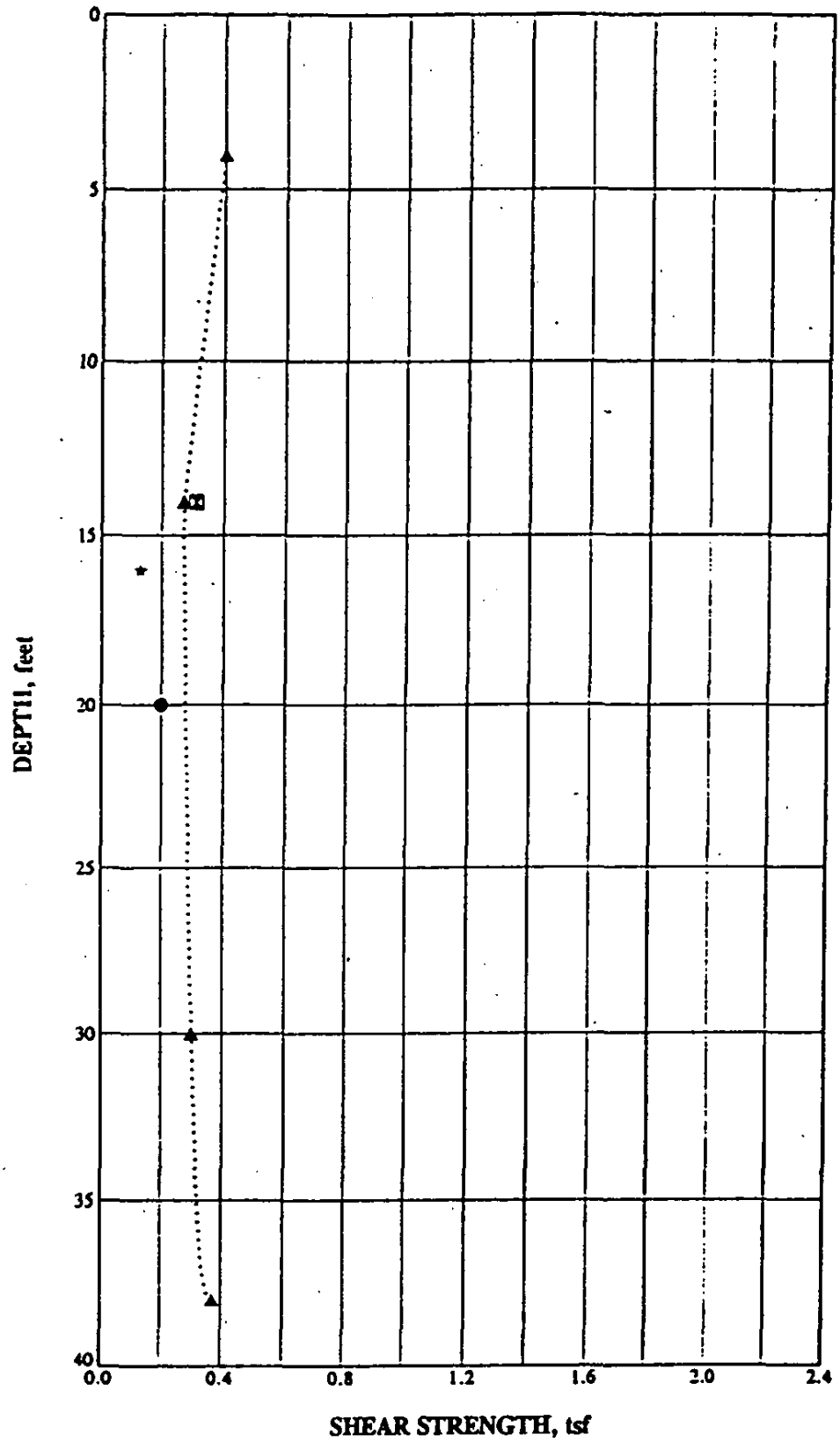
Boring Number	Test Symbol
B-32	●
B-34	⧗
B-35	▲
B-36	★
B-38	✕
B-39	◇

Project: River Birch Landfill
Project Number: 93B248C

SHEAR STRENGTH vs DEPTH

12/3/93 SHVDPT 3B248

Woodward-Clyde Consultants



LEGEND

Boring Number	Test Symbol
B-40	●
B-41	⊠
B-42	▲
B-44	★

Project: River Birch Landfill
Project Number: 93B248C

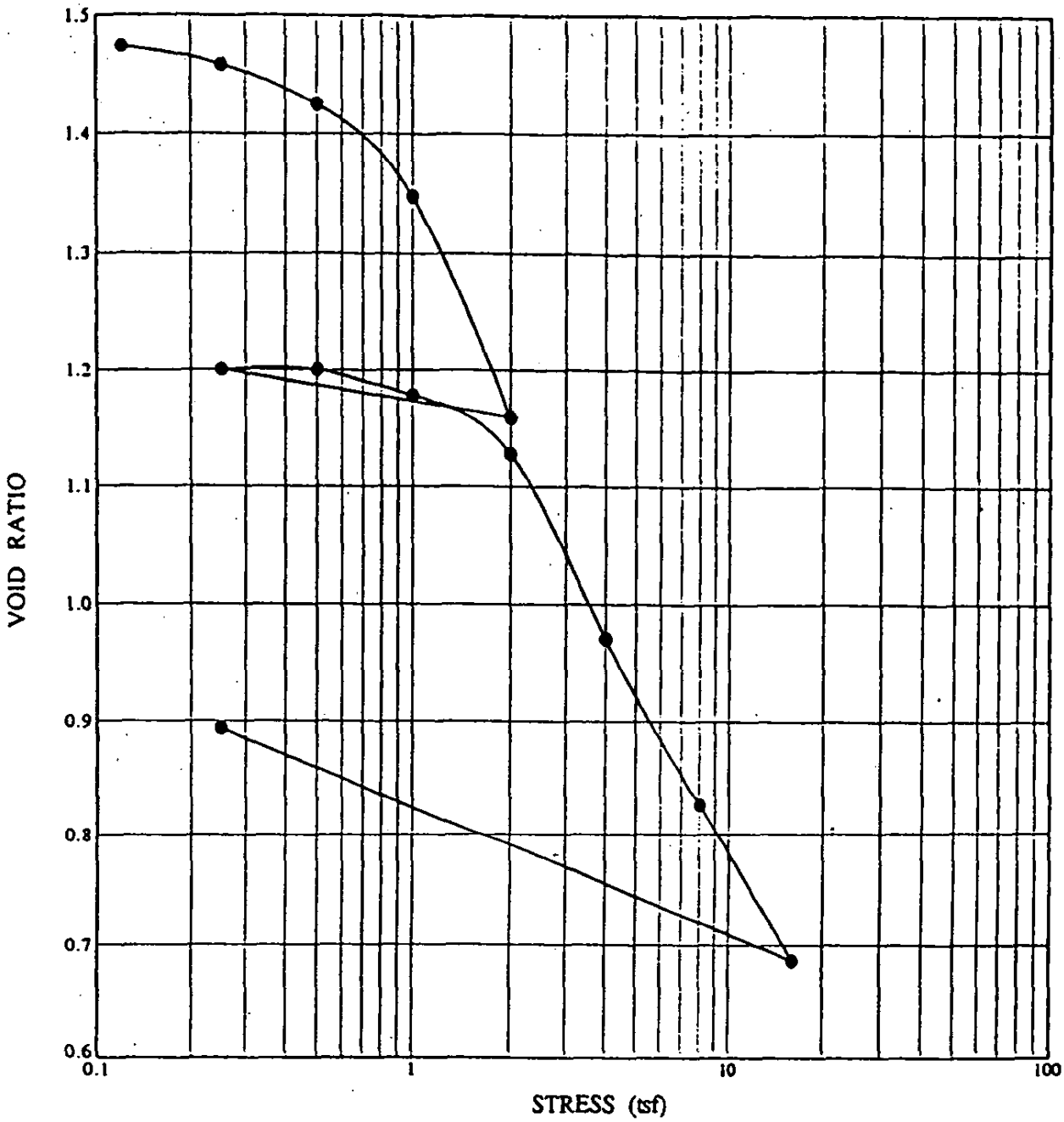
SHEAR STRENGTH vs DEPTH

12/3/93 SHVDPT 3B248

Woodward-Clyde Consultants

PERMEABILITY vs DEPTH

CONSOLIDATION TESTS



● STRAIN READINGS

Sample Data:

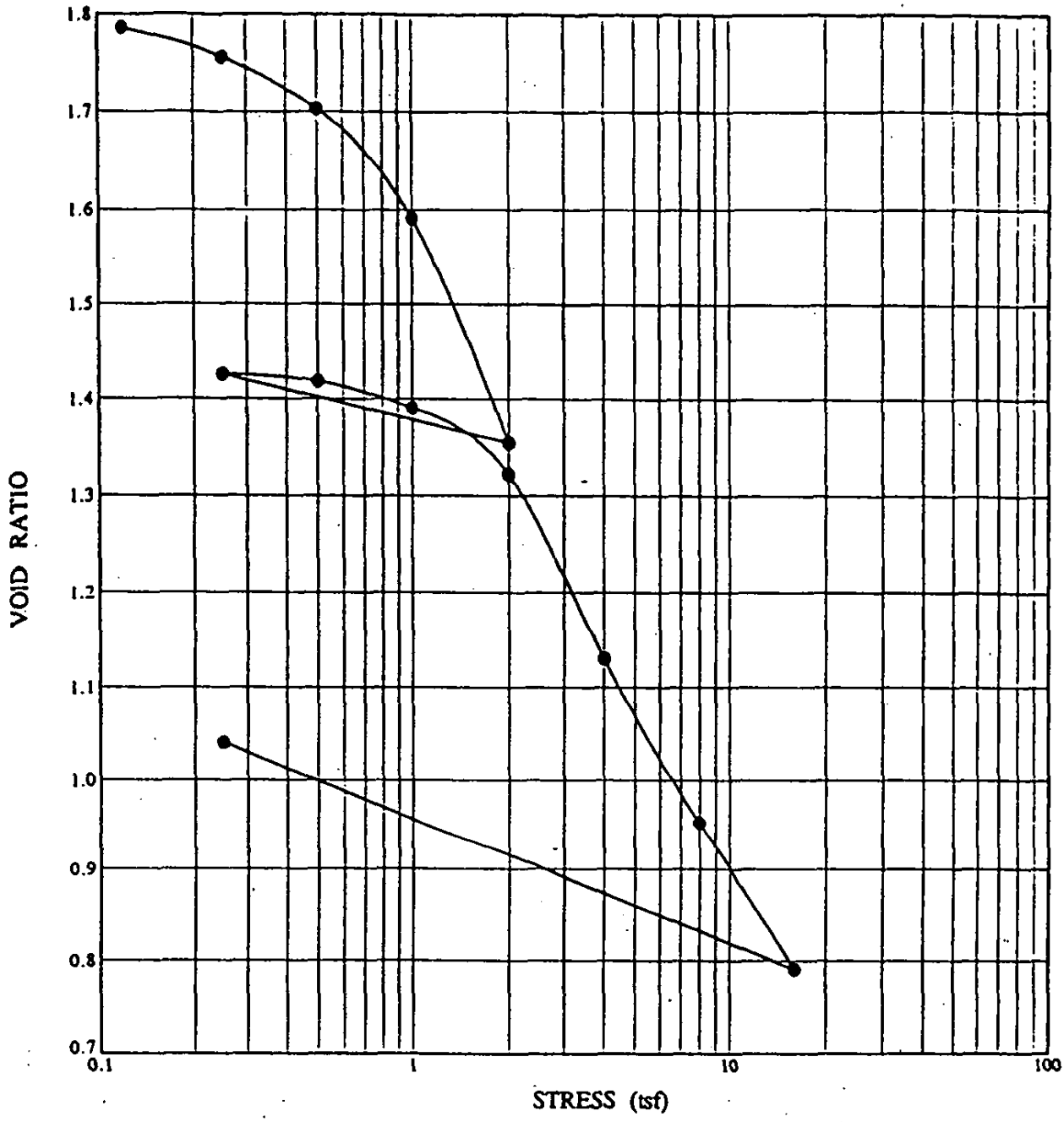
FILE: 93B248C
BORING: B- 1
DEPTH: 14' - 16'
DESCRIPTION:
SPECIFIC GRAVITY: 2.75
INITIAL MOISTURE CONTENT (%): 51
INITIAL DRY UNIT WEIGHT (pcf): 69
FINAL MOISTURE CONTENT (%): 36
FINAL DRY UNIT WEIGHT (pcf): 87
LL = 83 PL = 23 PI = 60
INUNDATION AT START

River Birch Landfill

CONSOLIDATION TEST
ASTM D 2435-80

Woodward-Clyde Consultants

JAN 25 94 CONSLV1 3B248



● STRAIN READINGS

Sample Data:

FILE: 93B248C
BORING: B-3
DEPTH: 30' - 32'
DESCRIPTION:
SPECIFIC GRAVITY: 2.77 (assumed)
INITIAL MOISTURE CONTENT (%): 63
INITIAL DRY UNIT WEIGHT (pcf): 62
LL = 73 PL = 27 PI = 46
INUNDATION AT START

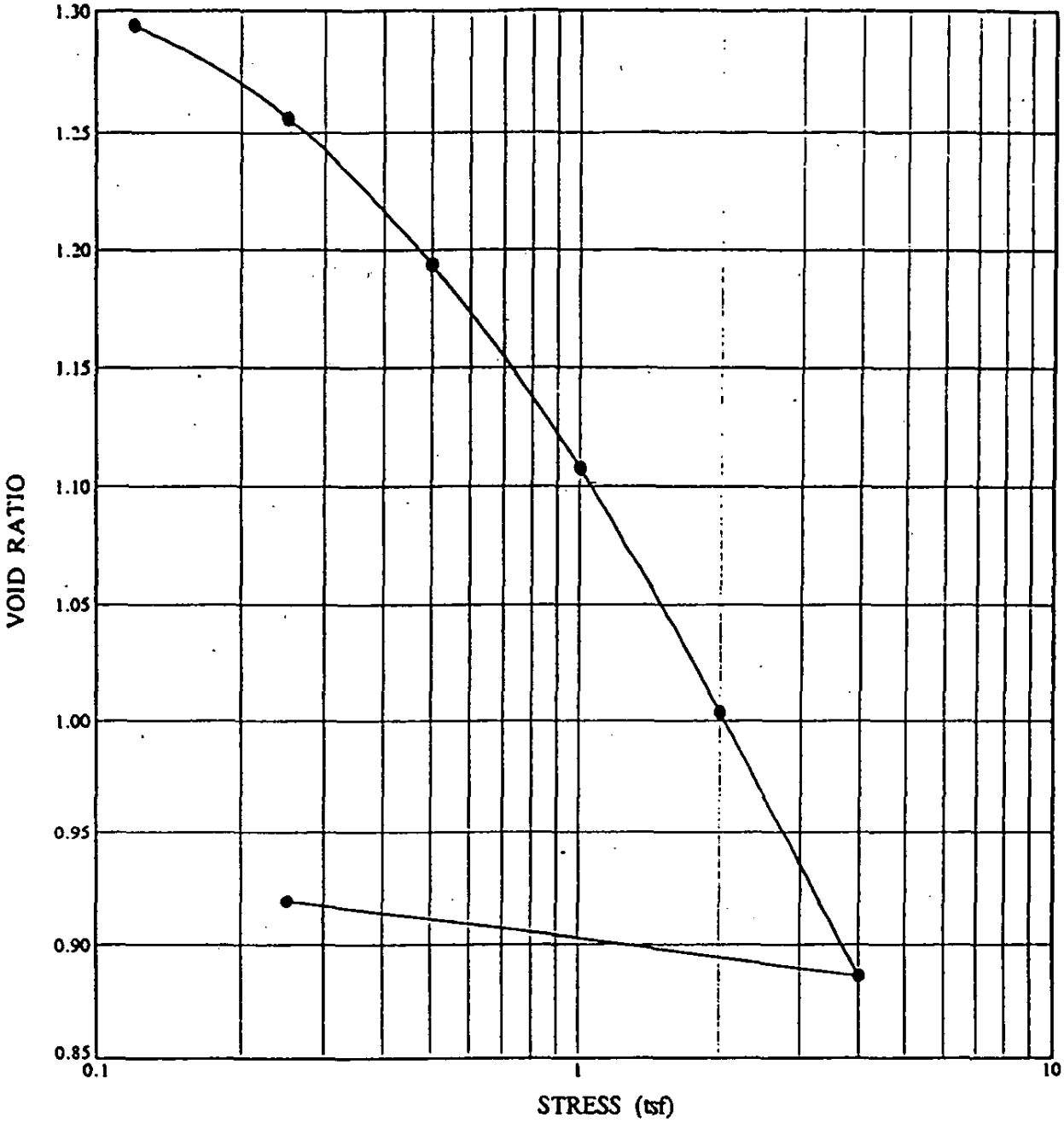
FINAL MOISTURE CONTENT (%): 31
FINAL DRY UNIT WEIGHT (pcf): 90

River Birch Landfill

CONSOLIDATION TEST
ASTM D 2435-80

Woodward-Clyde Consultants

JAN 25 94 CONSLV1 3B248



● STRAIN READINGS

Sample Data:

FILE: 93B248C
BORING: B- 5
DEPTH: 14' - 16'
DESCRIPTION:
SPECIFIC GRAVITY: 2.72 (assumed)
INITIAL MOISTURE CONTENT (%): 49
INITIAL DRY UNIT WEIGHT (pcf): 73
LL = 55 PL = 23 PI = 32
INUNDATION AT START

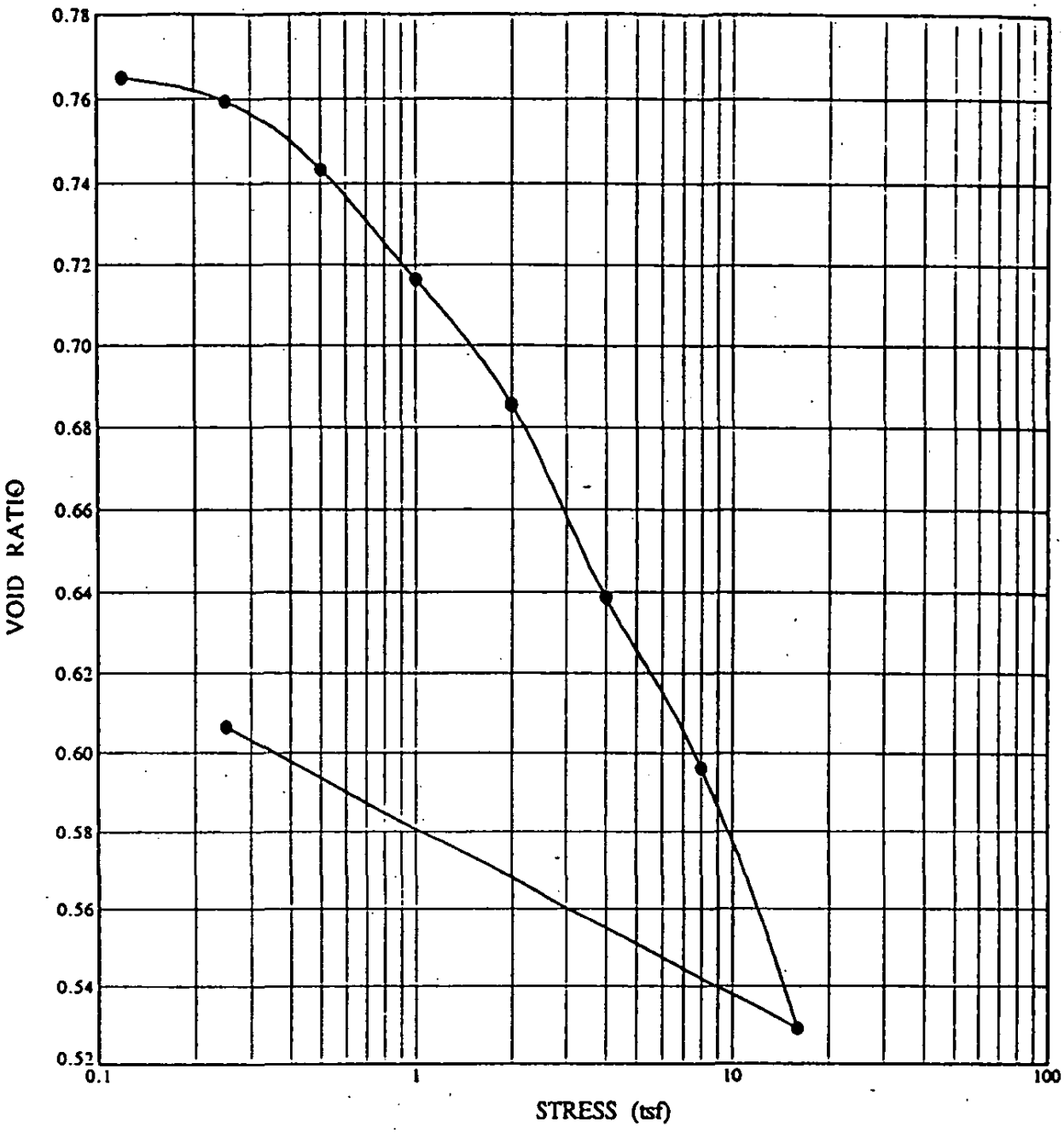
FINAL MOISTURE CONTENT (%): 34
FINAL DRY UNIT WEIGHT (pcf): 90

River Birch Landfill

CONSOLIDATION TEST
ASTM D 2435-80

Woodward-Clyde Consultants

JAN 31 94 CONSLV1 3B248



● STRAIN READINGS

Sample Data:

FILE: 93B248C
BORING: B- 6
DEPTH: 88' - 90'
DESCRIPTION:
SPECIFIC GRAVITY: 2.74 (assumed)
INITIAL MOISTURE CONTENT (%): 28
INITIAL DRY UNIT WEIGHT (pcf): 97
LL = 43 PL = 18 PI = 25
INUNDATION AT START

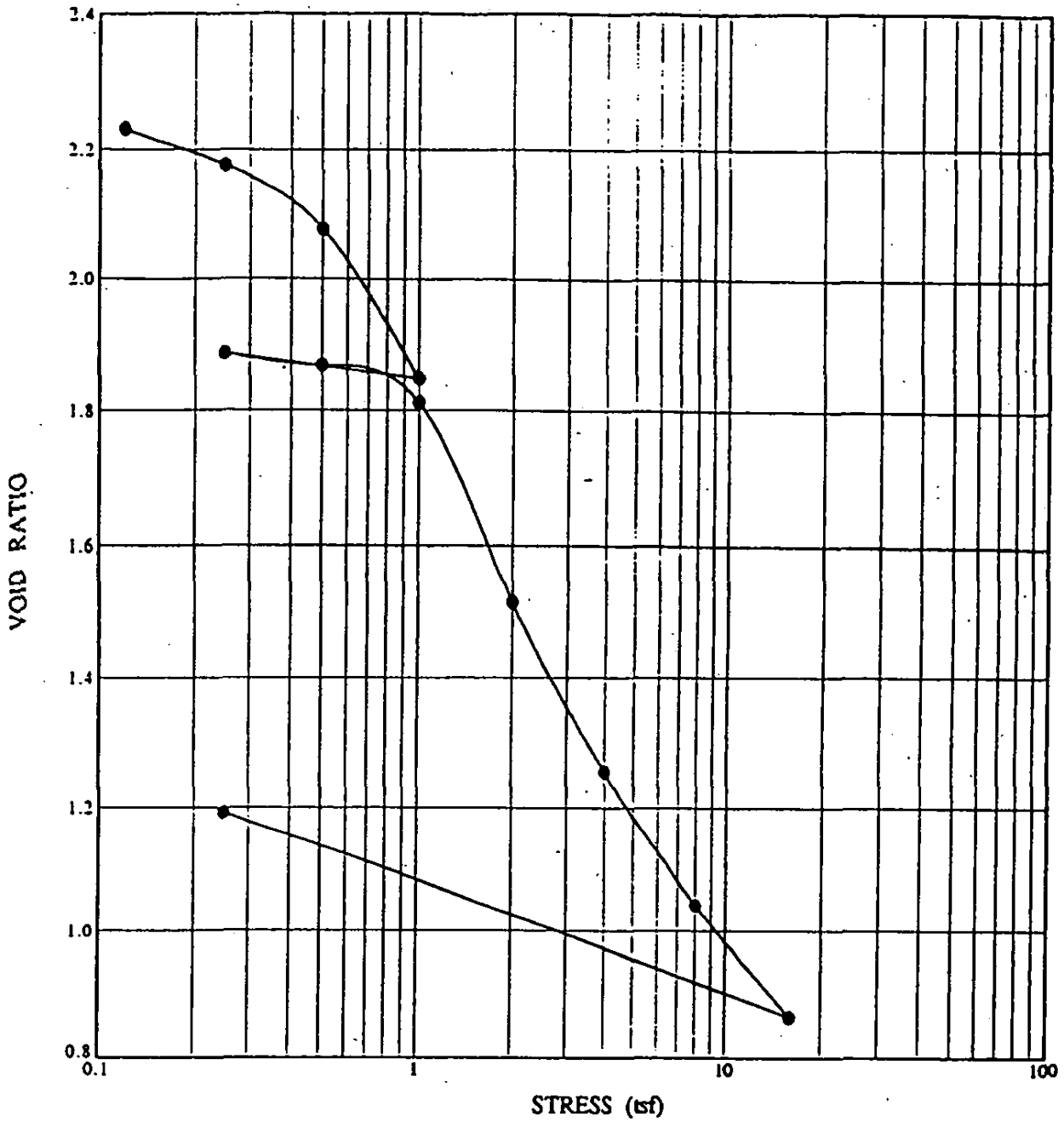
FINAL MOISTURE CONTENT (%): 22
FINAL DRY UNIT WEIGHT (pcf): 107

River Birch Landfill

CONSOLIDATION TEST
ASTM D 2435-80

Woodward-Clyde Consultants

JAN 25 94 CONSLV1 38248



● STRAIN READINGS

Sample Data:

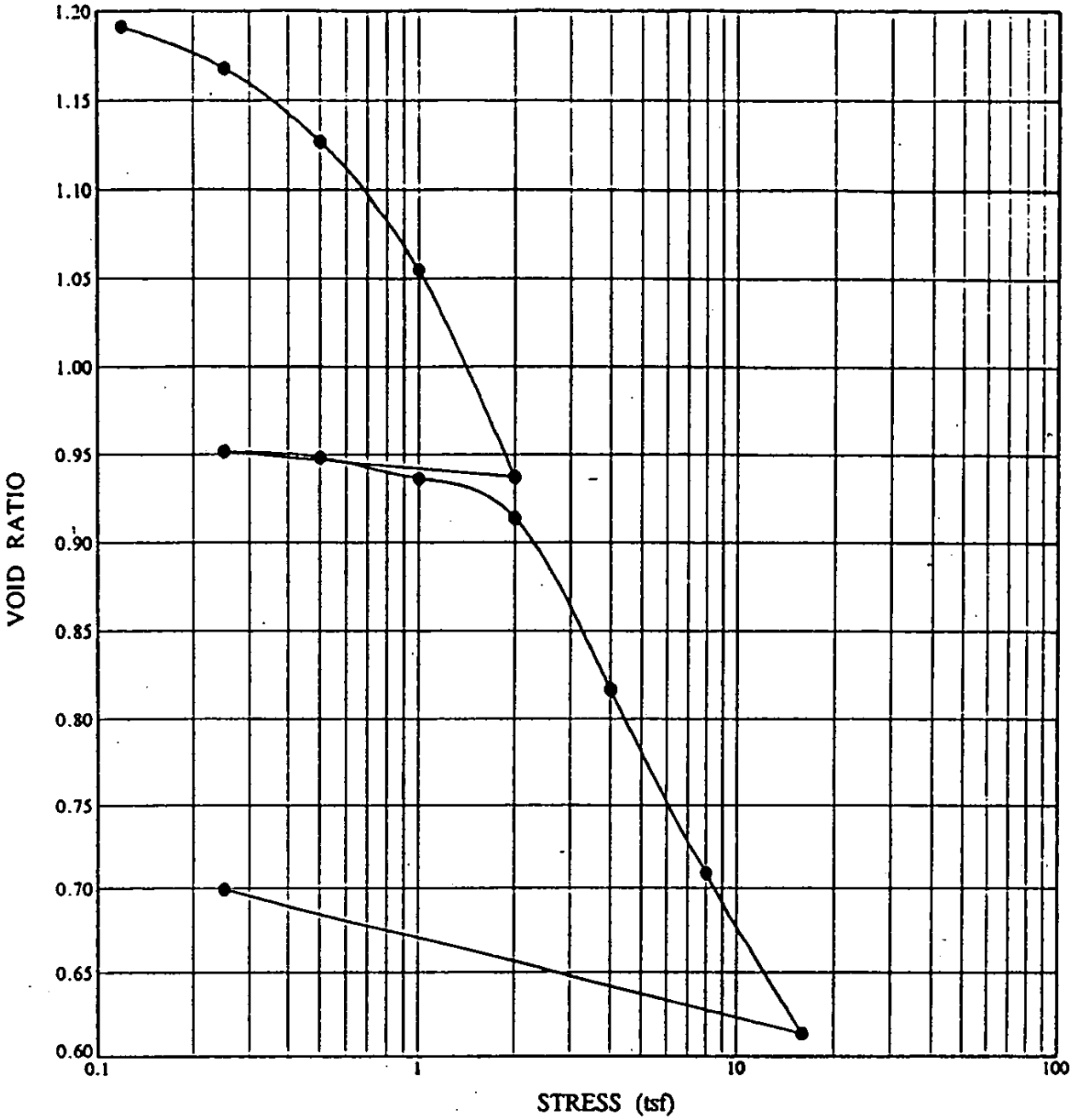
FILE: 93B248C
BORING: B-14
DEPTH: 28' - 30'
DESCRIPTION:
SPECIFIC GRAVITY: 2.77 (assumed)
INITIAL MOISTURE CONTENT (%): 78
INITIAL DRY UNIT WEIGHT (pcf): 53
LL = 83 PL = 30 PI = 53
INUNDATION AT START

FINAL MOISTURE CONTENT (%): 46
FINAL DRY UNIT WEIGHT (pcf): 77

River Birch Landfill

CONSOLIDATION TEST
ASTM D 2435-80

Woodward-Clyde Consultants



● STRAIN READINGS

Sample Data:

FILE: 93B248C
BORING: B-17
DEPTH: 16' - 18'
DESCRIPTION:
SPECIFIC GRAVITY: 2.75 (assumed)
INITIAL MOISTURE CONTENT (%): 42
INITIAL DRY UNIT WEIGHT (pcf): 77
LL = 49 PL = 21 PI = 28
INUNDATION AT START

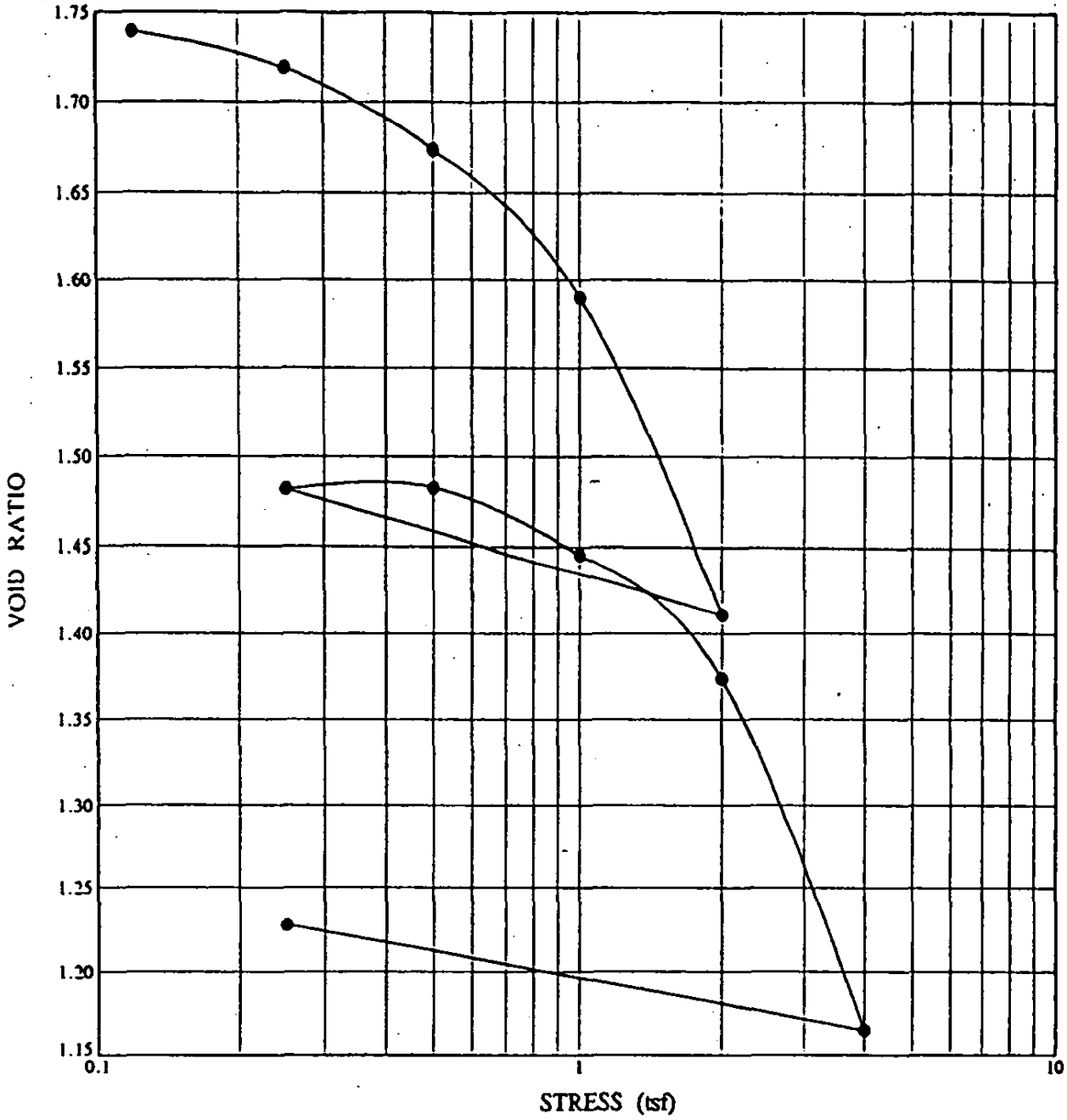
FINAL MOISTURE CONTENT (%): 26
FINAL DRY UNIT WEIGHT (pcf): 101

River Birch Landfill

CONSOLIDATION TEST
ASTM D 2435-80

Woodward-Clyde Consultants

JAN 25 94 CONSLV1 38248



● STRAIN READINGS

Sample Data:

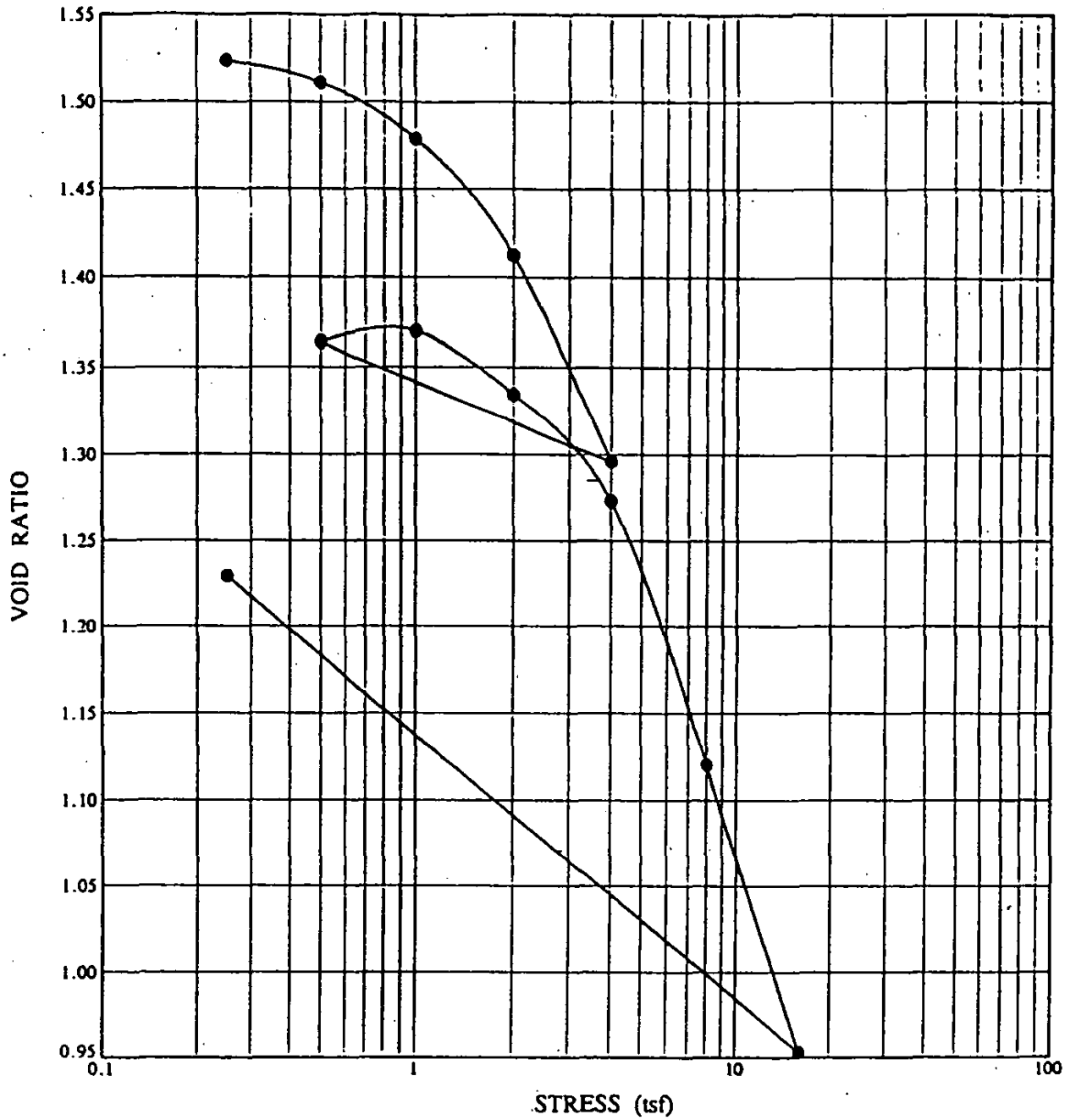
FILE: 93B248C
BORING: B-17
DEPTH: 32' - 34'
DESCRIPTION:
SPECIFIC GRAVITY: 2.78 (assumed)
INITIAL MOISTURE CONTENT (%): 62
INITIAL DRY UNIT WEIGHT (pcf): 63
LL = 77 PL = 27 PI = 50
INUNDATION AT START

FINAL MOISTURE CONTENT (%): 47
FINAL DRY UNIT WEIGHT (pcf): 80

River Birch Landfill

CONSOLIDATION TEST
ASTM D 2435-80

Woodward-Clyde Consultants



● STRAIN READINGS

Sample Data:

FILE: 93B248C
BORING: B-18
DEPTH: 2' - 4'
DESCRIPTION:
SPECIFIC GRAVITY: 2.76
INITIAL MOISTURE CONTENT (%): 52
INITIAL DRY UNIT WEIGHT (pcf): 68
LL = 105 PL = 32 PI = 73
INUNDATION AT START

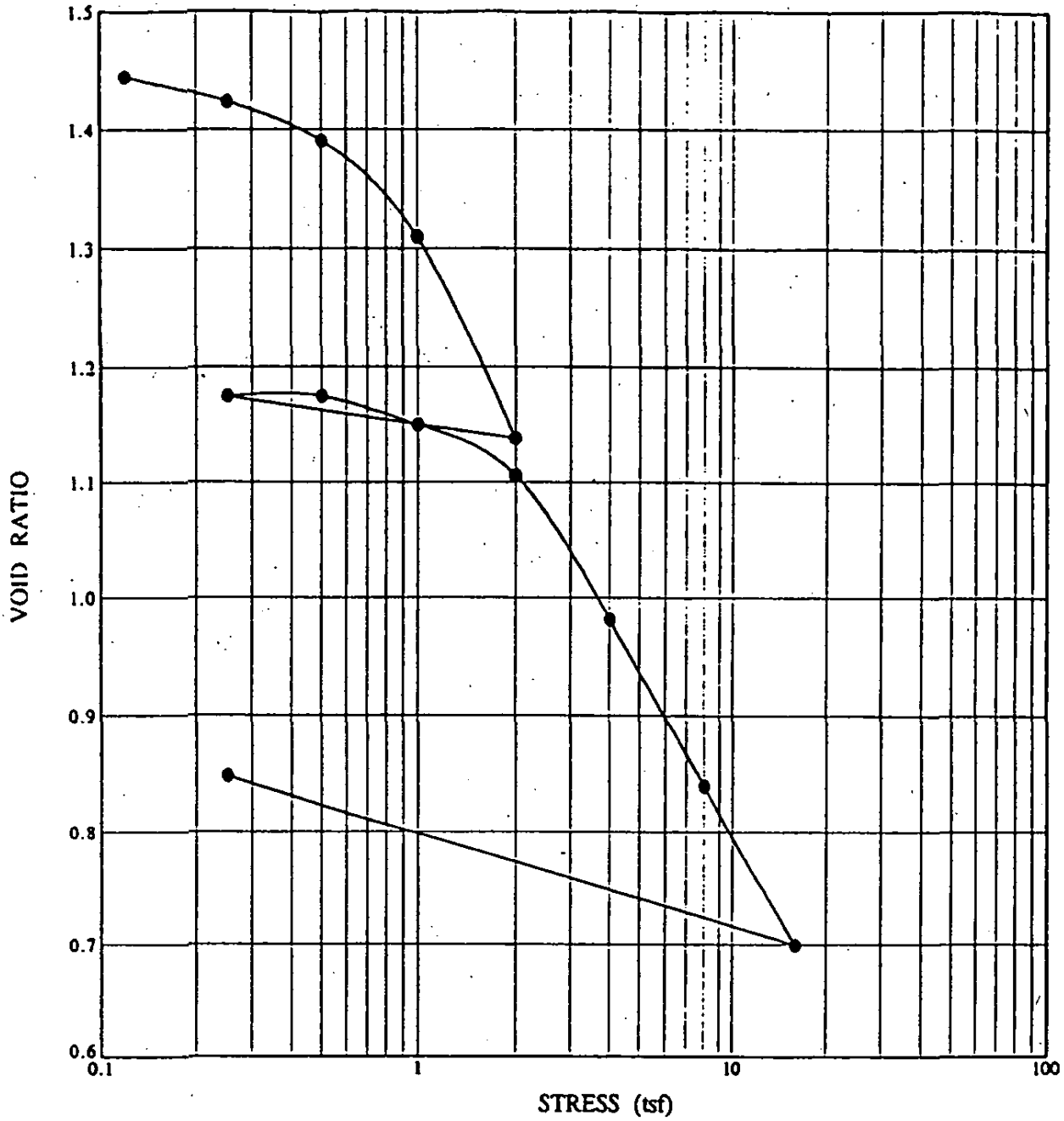
FINAL MOISTURE CONTENT (%): 43
FINAL DRY UNIT WEIGHT (pcf): 79

River Birch Landfill

CONSOLIDATION TEST
ASTM D 2435-80

Woodward-Clyde Consultants

JAN 25 94 CONSLV1 3B248



● STRAIN READINGS

Sample Data:

FILE: 93B248C
BORING: B-19
DEPTH: 12' - 14'
DESCRIPTION:
SPECIFIC GRAVITY: 2.72 (assumed)
INITIAL MOISTURE CONTENT (%): 51
INITIAL DRY UNIT WEIGHT (pcf): 69
LL = 84 PL = 24 PI = 60
INUNDATION AT START

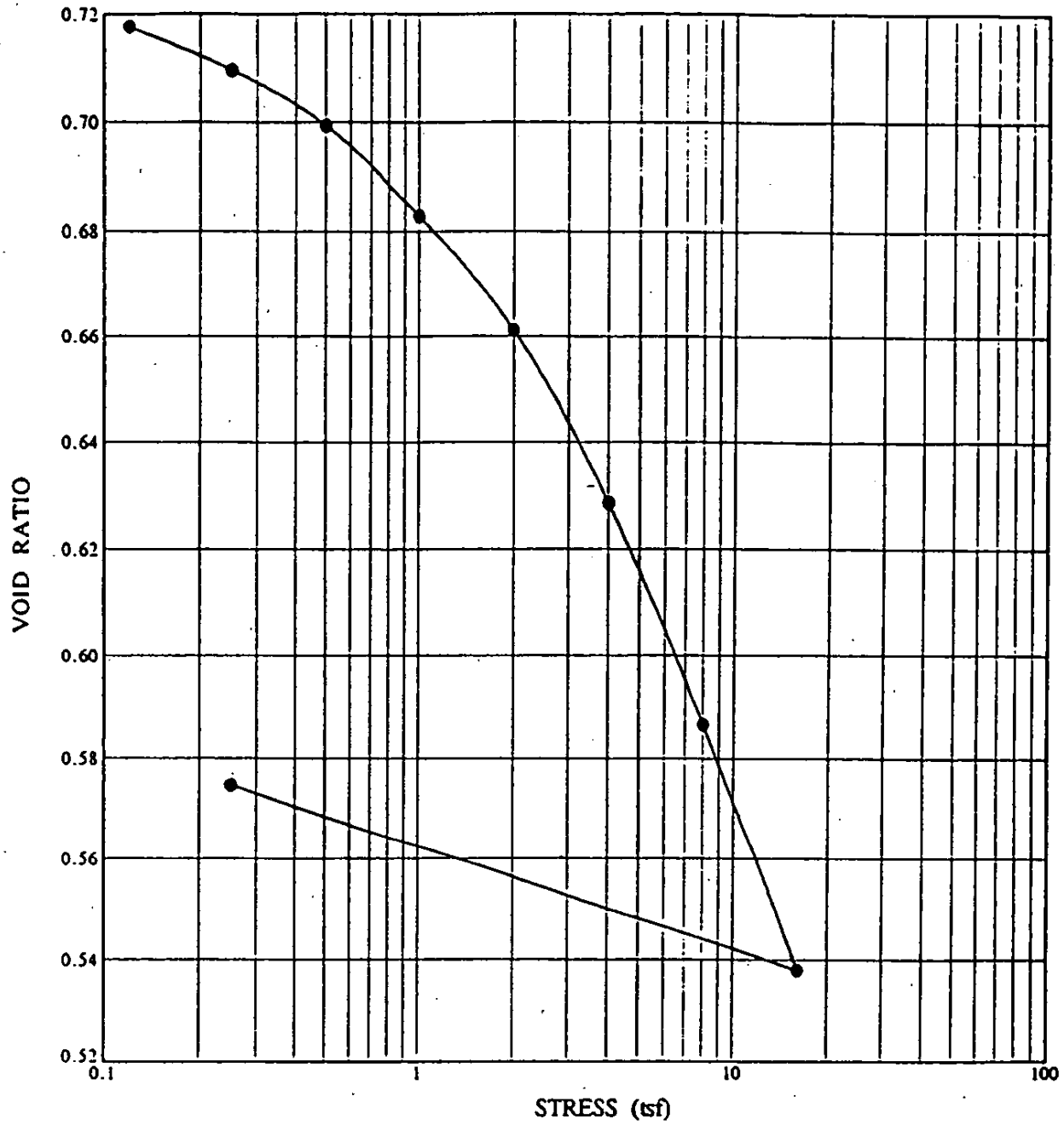
FINAL MOISTURE CONTENT (%): 35
FINAL DRY UNIT WEIGHT (pcf): 89

River Birch Landfill

CONSOLIDATION TEST
ASTM D 2435-80

Woodward-Clyde Consultants

JAN 25 94 CONSLV1 3B248



● STRAIN READINGS

Sample Data:

FILE: 93B248C
BORING: B-21
DEPTH: 78' - 80'
DESCRIPTION:
SPECIFIC GRAVITY: 2.65 (assumed)
INITIAL MOISTURE CONTENT (%): 28
INITIAL DRY UNIT WEIGHT (pcf): 95
LL = 31 PL = 24 PI = 7
INUNDATION AT START

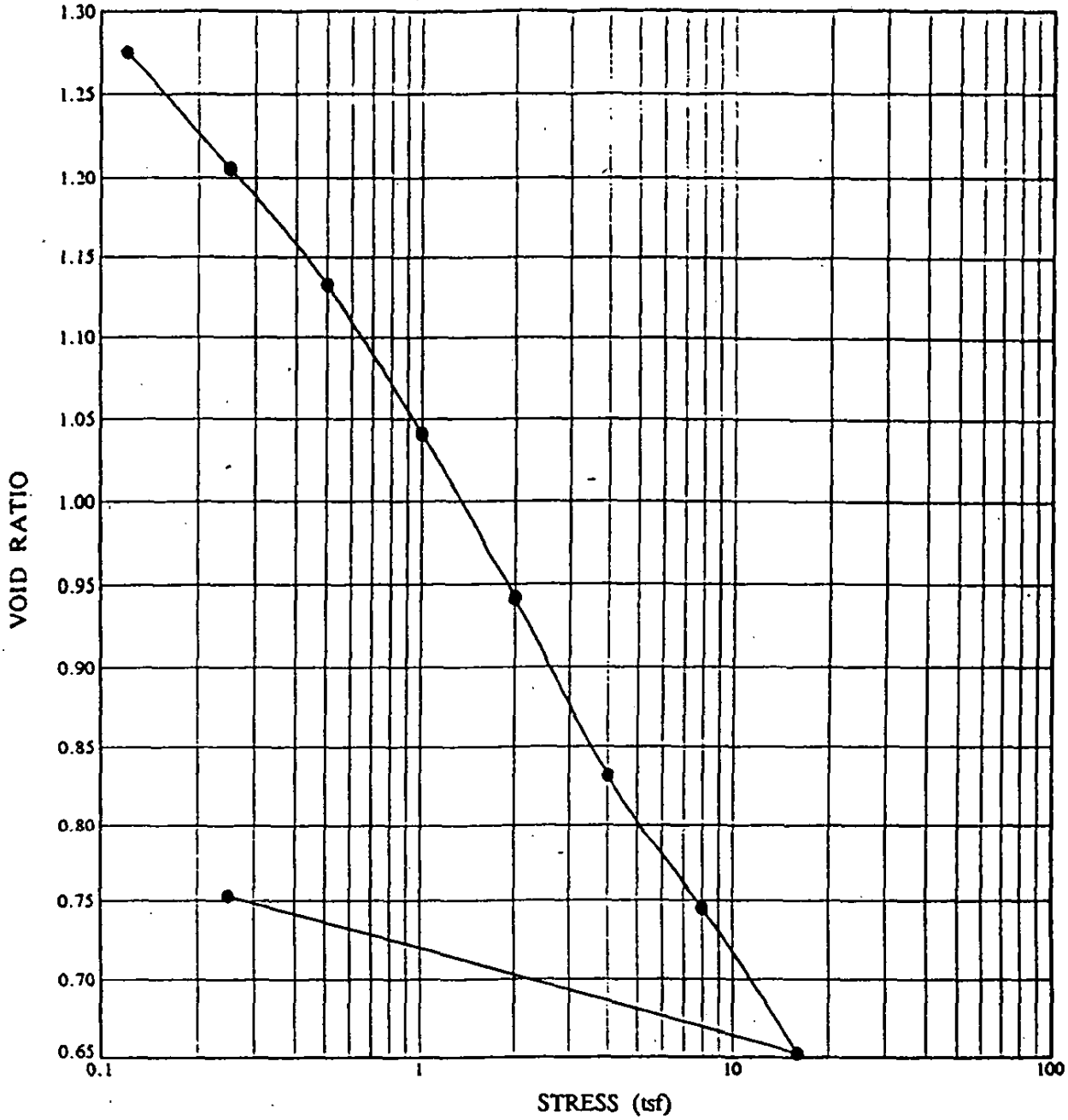
FINAL MOISTURE CONTENT (%): 24
FINAL DRY UNIT WEIGHT (pcf): 105

River Birch Landfill

CONSOLIDATION TEST
ASTM D 2435-80

Woodward-Clyde Consultants

JAN 25 94 CONSLV1 38248



● STRAIN READINGS

Sample Data:

FILE: 93B248C
BORING: B-22
DEPTH: 14' - 16'
DESCRIPTION:
SPECIFIC GRAVITY: 2.70 (assumed)
INITIAL MOISTURE CONTENT (%): 51
INITIAL DRY UNIT WEIGHT (pcf): 71
LL = 45 PL = 23 PI = 22
INUNDATION AT START

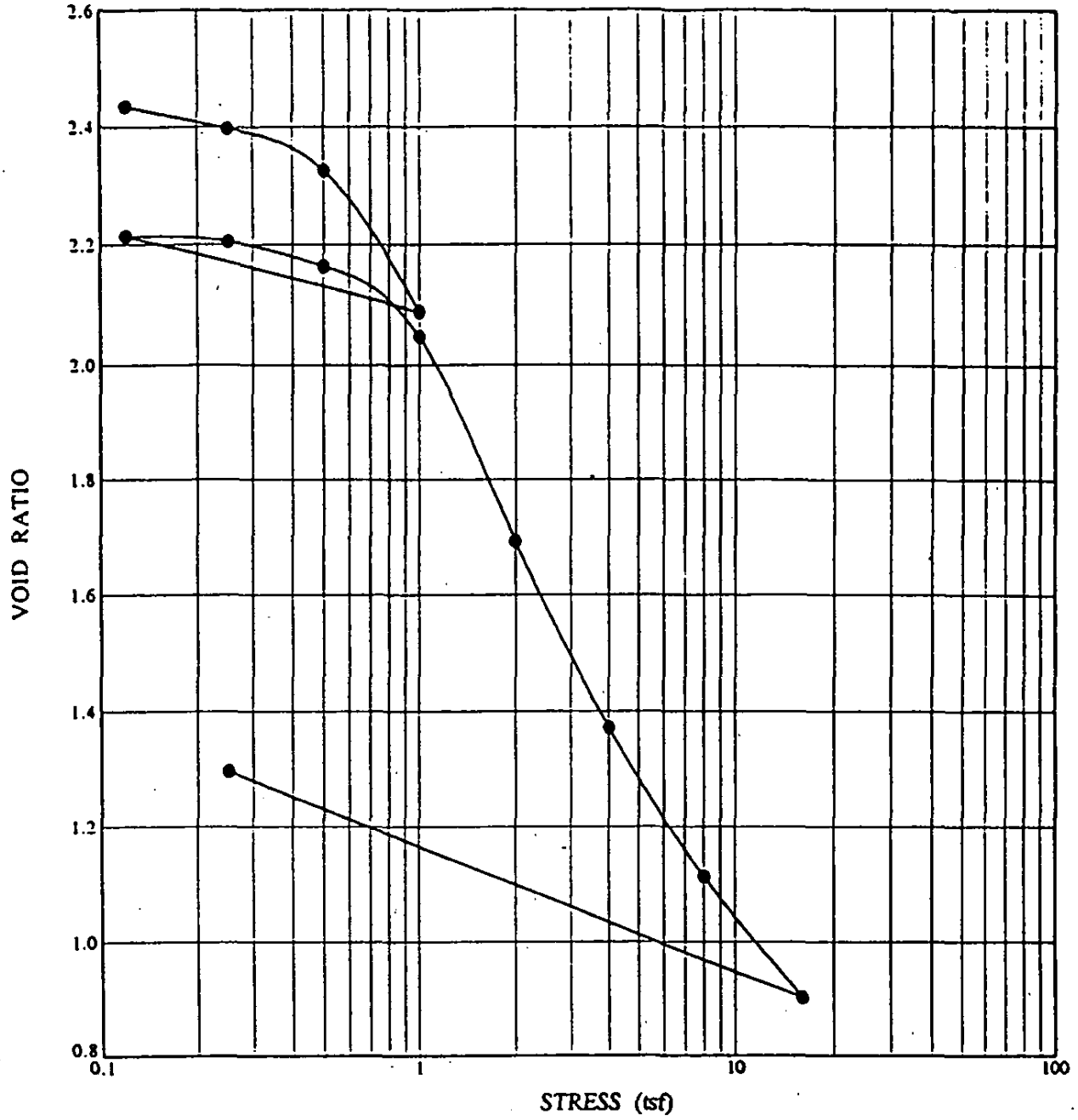
FINAL MOISTURE CONTENT (%): 28
FINAL DRY UNIT WEIGHT (pcf): 96

River Birch Landfill

CONSOLIDATION TEST
ASTM D 2435-80

Woodward-Clyde Consultants

JAN 31 94 CONSLV1 3B248



● STRAIN READINGS

Sample Data:

FILE: 93B248C
BORING: B-25
DEPTH: 14' - 16'
DESCRIPTION:
SPECIFIC GRAVITY: 2.77 (assumed)
INITIAL MOISTURE CONTENT (%): 88
INITIAL DRY UNIT WEIGHT (pcf): 50
LL = 104 PL = 25 PI = 79
INUNDATION AT START

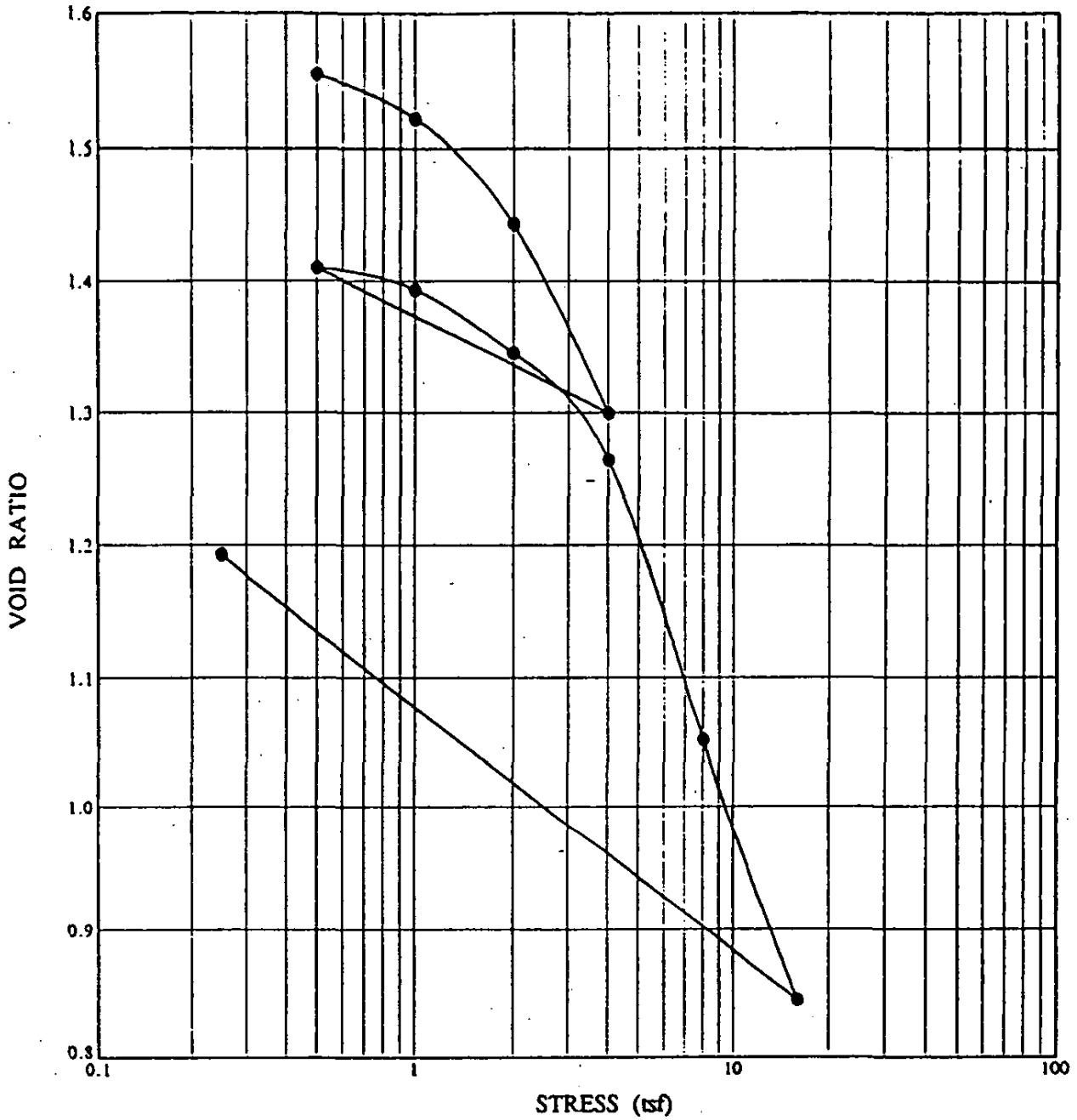
FINAL MOISTURE CONTENT (%): 50
FINAL DRY UNIT WEIGHT (pcf): 107

River Birch Landfill

CONSOLIDATION TEST
ASTM D 2435-80

Woodward-Clyde Consultants

JAN 25 94 CONSLV1 38248



● STRAIN READINGS

Sample Data:

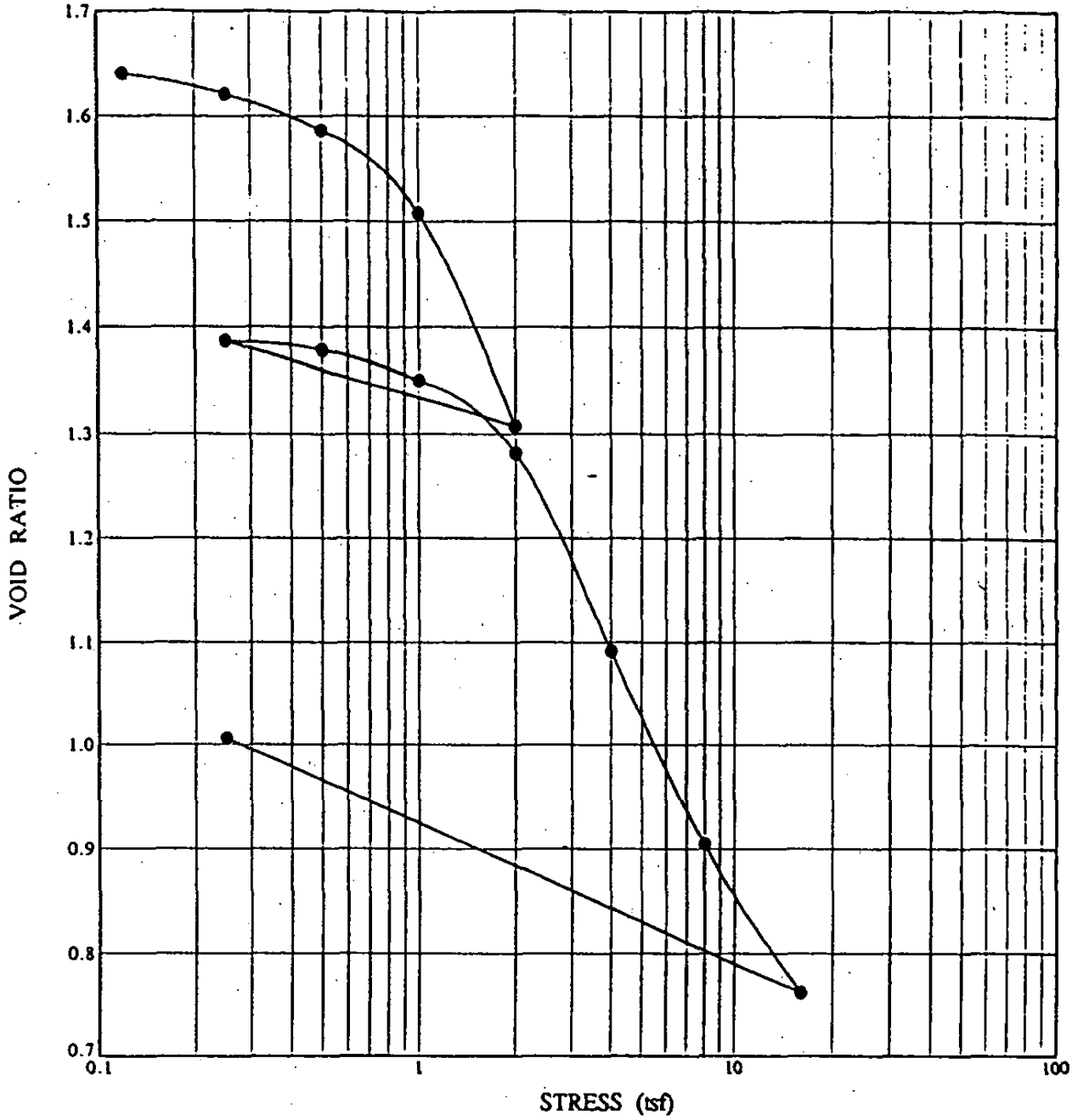
FILE: 93B248C
BORING: B-30
DEPTH: 78' - 80'
DESCRIPTION:
SPECIFIC GRAVITY: 2.74 (assumed)
INITIAL MOISTURE CONTENT (%): 54
INITIAL DRY UNIT WEIGHT (pcf): 67
LL = 88 PL = 28 PI = 60
INUNDATION AT START

FINAL MOISTURE CONTENT (%): 47
FINAL DRY UNIT WEIGHT (pcf): 76

River Birch Landfill

CONSOLIDATION TEST
ASTM D 2435-80

Woodward-Clyde Consultants



● STRAIN READINGS

Sample Data:

FILE: 93B248C
BORING: B-32
DEPTH: 24' - 26'
DESCRIPTION:
SPECIFIC GRAVITY: 2.75 (assumed)
INITIAL MOISTURE CONTENT (%): 58
INITIAL DRY UNIT WEIGHT (pcf): 65
LL = 75 PL = 23 PI = 52
INUNDATION AT START

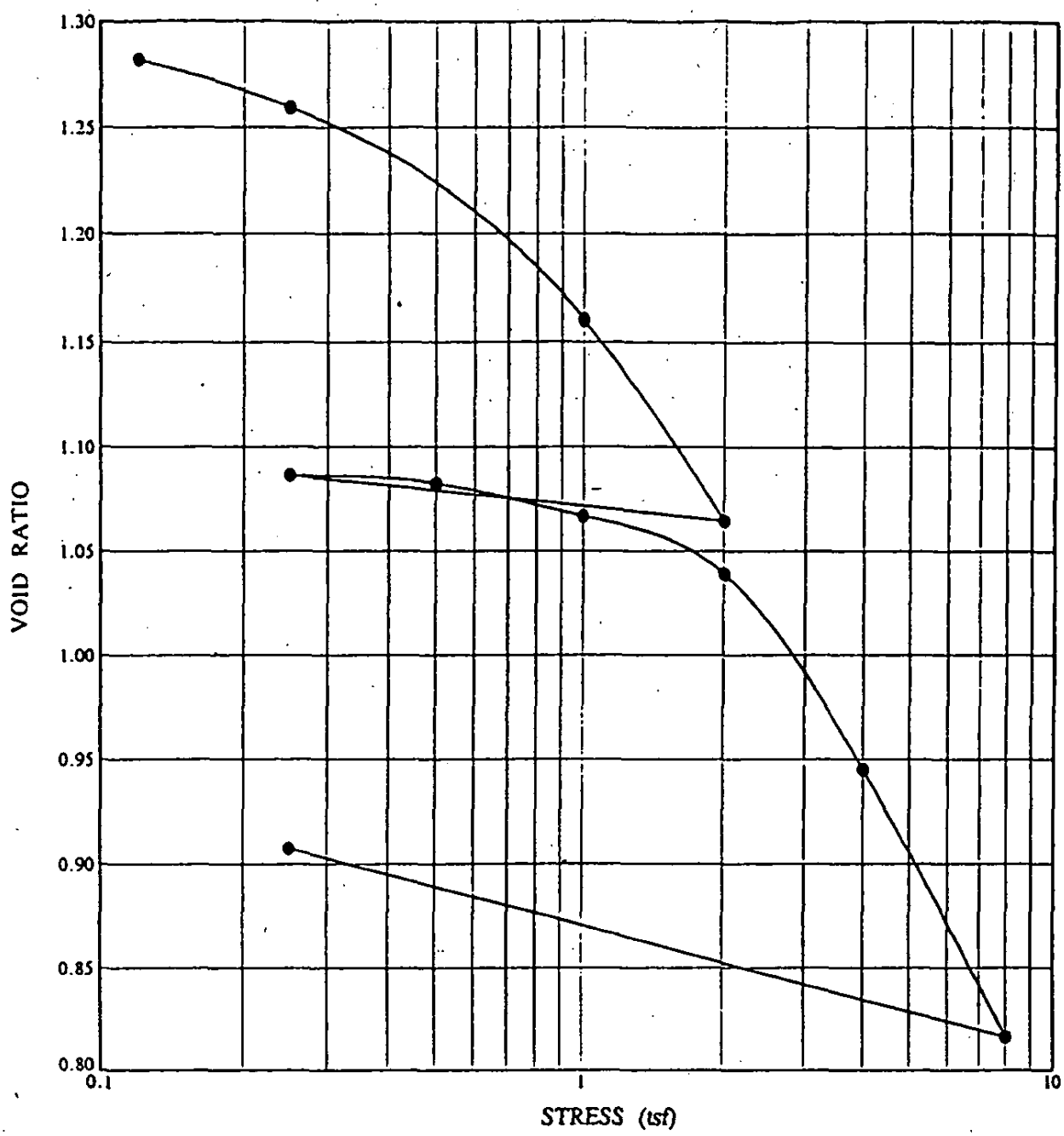
FINAL MOISTURE CONTENT (%): 38
FINAL DRY UNIT WEIGHT (pcf): 85

River Birch Landfill

CONSOLIDATION TEST
ASTM D 2435-80

Woodward-Clyde Consultants

JAN 25 94 CONSLVI 3B248



● STRAIN READINGS

Sample Data:

FILE: 93B248C
BORING: B-36
DEPTH: 22' - 24'
DESCRIPTION:
SPECIFIC GRAVITY: 2.72 (assumed)
INITIAL MOISTURE CONTENT (%): 49
INITIAL DRY UNIT WEIGHT (pcf): 74
LL = 44 PL = 24 PI = 20
INUNDATION AT START

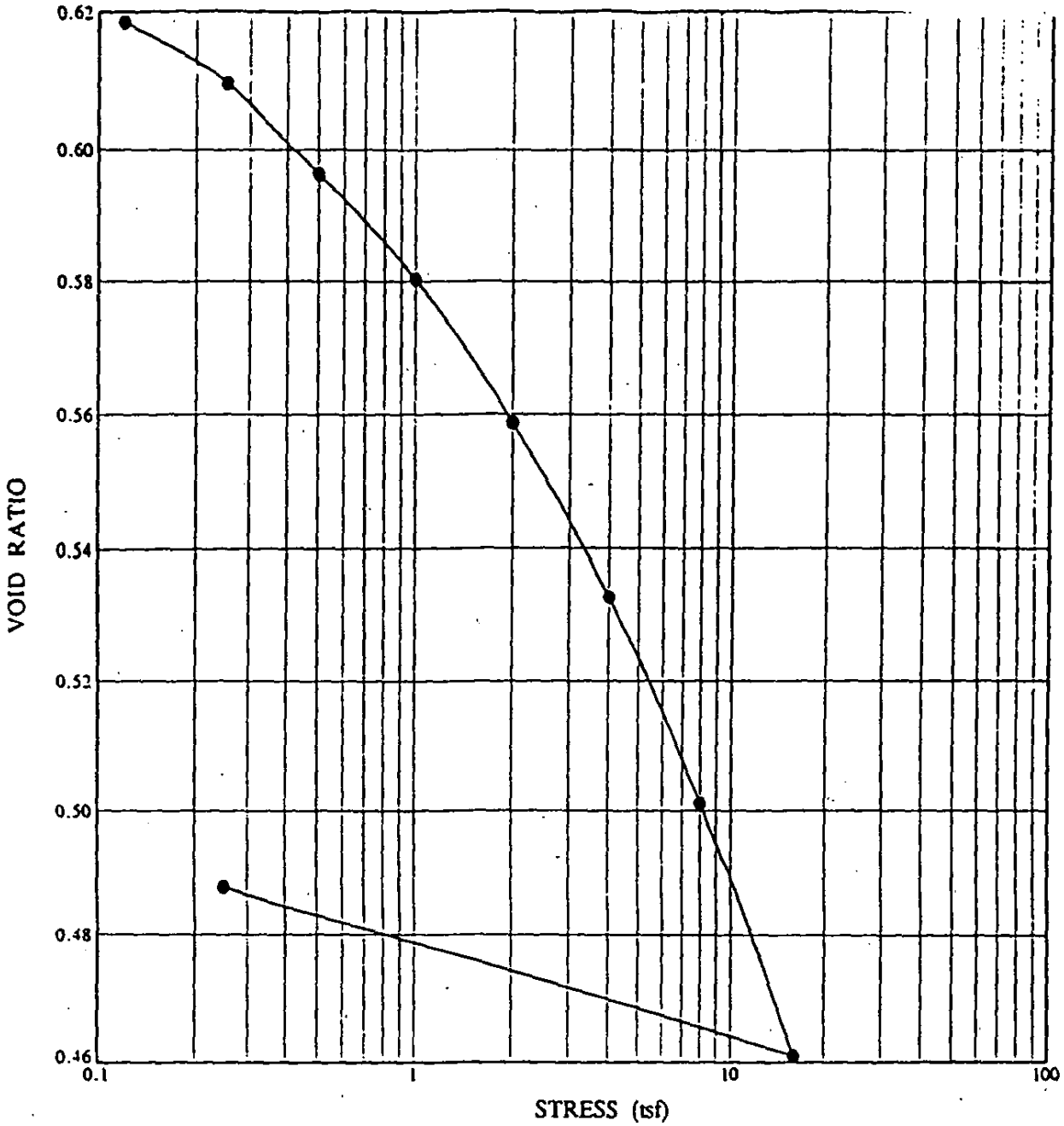
FINAL MOISTURE CONTENT (%): 37
FINAL DRY UNIT WEIGHT (pcf):

River Birch Landfill

CONSOLIDATION TEST
ASTM D 2435-80

Woodward-Clyde Consultants

JAN 25 94 CONSLV1 3B248



● STRAIN READINGS

Sample Data:

FILE: 93B248C
BORING: B-37
DEPTH: 88' - 90'
DESCRIPTION:
SPECIFIC GRAVITY: 2.65 (assumed)
INITIAL MOISTURE CONTENT (%): 23
INITIAL DRY UNIT WEIGHT (pcf): 102
LL = 27 PL = 18 PI = 9
INUNDATION AT START

FINAL MOISTURE CONTENT (%): 20
FINAL DRY UNIT WEIGHT (pcf): 111

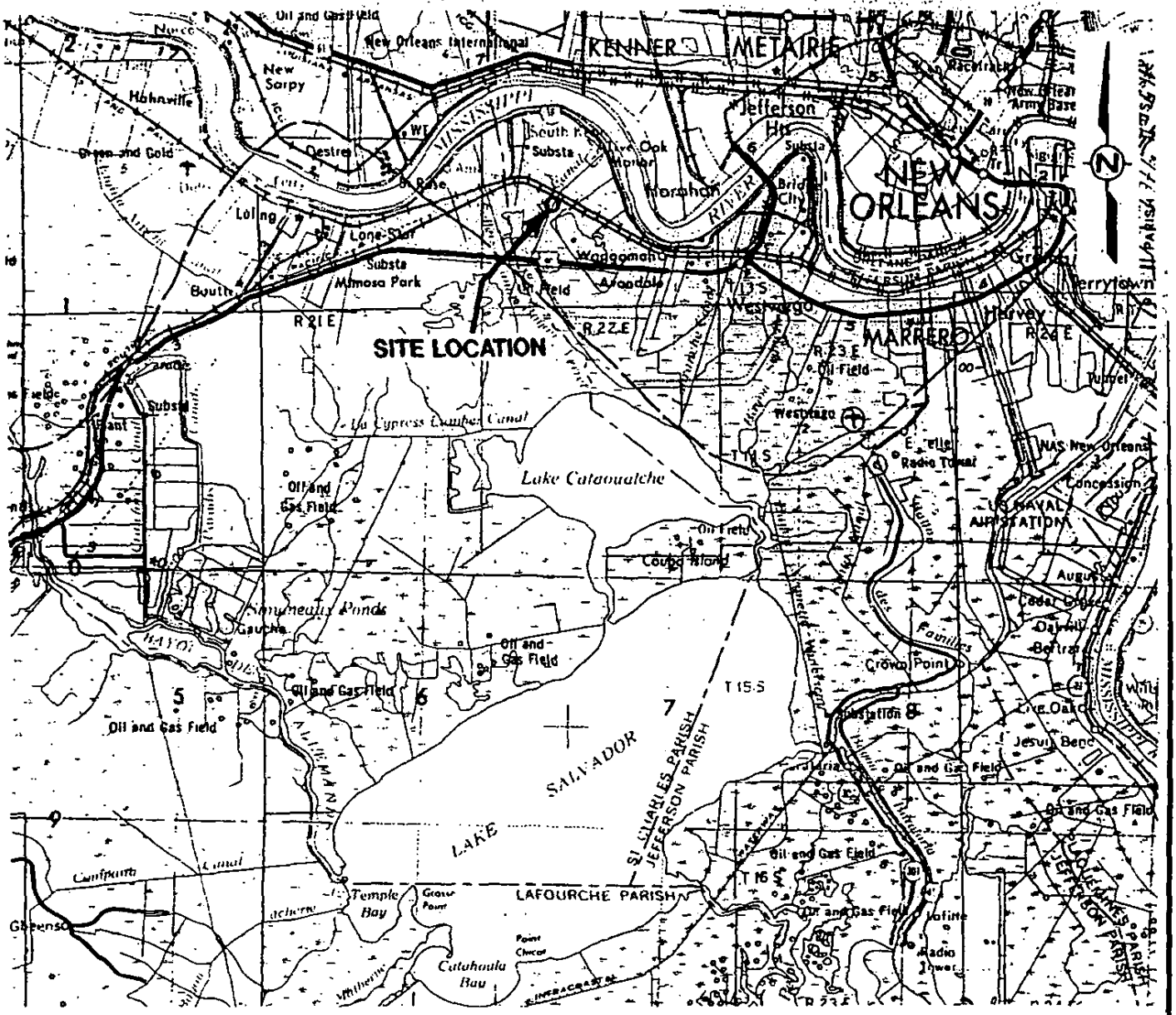
River Birch Landfill

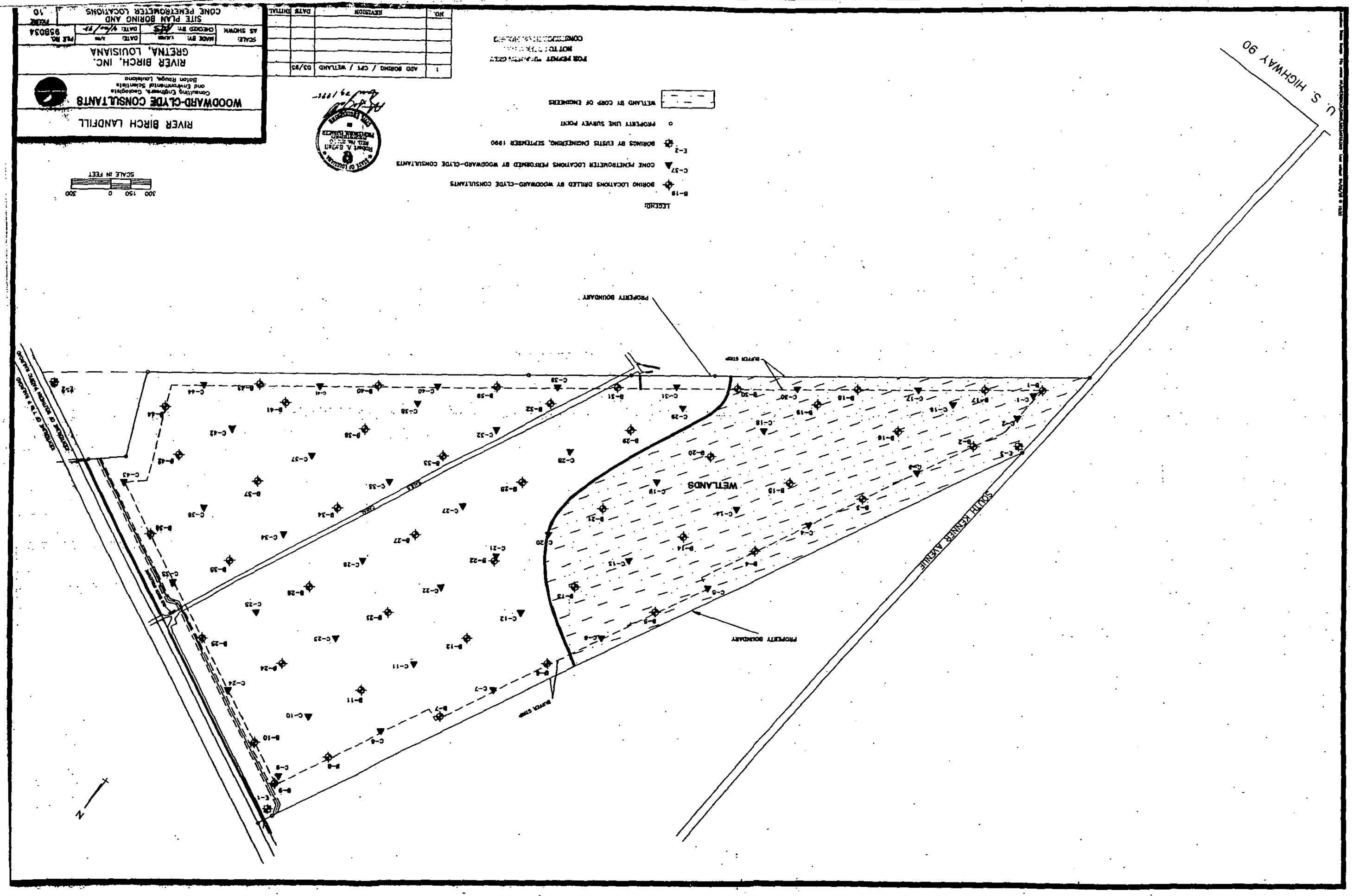
CONSOLIDATION TEST
ASTM D 2435-80

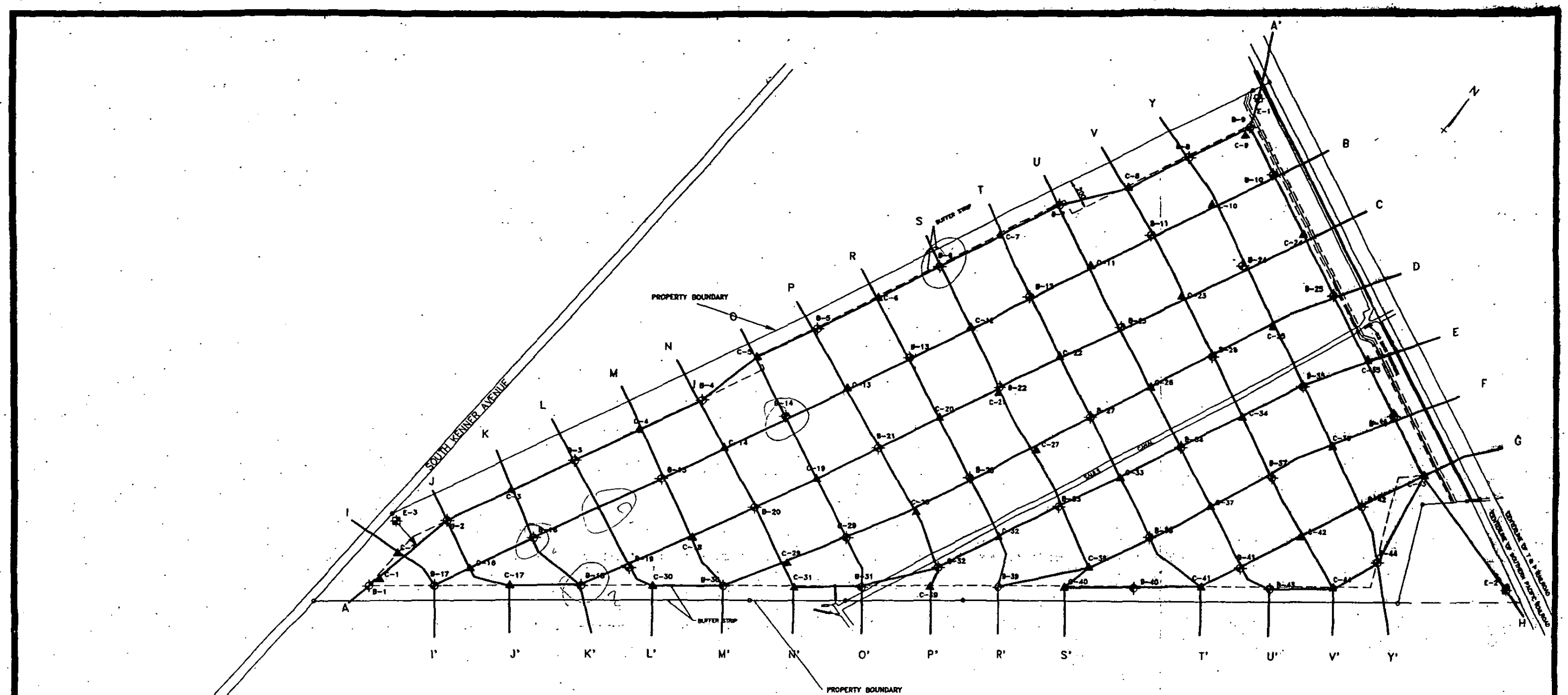
Woodward-Clyde Consultants

PART VII

Geologic Cross Sections and Figures
From
Woodward Clyde Consultants
From
Original Permit Application
And
Groundwater Elevation Contour Map
(November 29-30, 2005)


SITE LOCATION
NEW ORLEANS
KENNER
METAIRIE
MARRERO
Jefferson Hts
Westwego
Harvey
Terrytown
Lake Cataouatche
Lake Salvador
Barataria Bay
Temple Bay
Catahoula Bay
LAFOURCHE PARISH
ST. CHARLES PARISH
JEFFERSON PARISH
Crown Point
Jesuit Bend
Oil and Gas Field
Mimosa Park
Lone Star
Lafitte
Radio Tower
Radio Tower
NAS New Orleans
U.S. NAVAL AIR STATION
Concession
Cedar Grove
Oakville
Bertrand
Live Oak
Harvey
Terrytown
Tunnel
Westwego
Oil Field
Oil and Gas Field
Oil and Gas Field
Oil and Gas


U. S. HIGHWAY 90
SOUTH KENNER AVENUE
WETLANDS
PROPERTY BOUNDARY
BUFFER STRIP
LEGEND:
B-19 BORING LOCATIONS DRILLED BY WOODWARD-CLYDE CONSULTANTS
C-37 CONE PENETROMETER LOCATIONS PERFORMED BY WOODWARD-CLYDE CONSULTANTS
E-2 BORINGS BY EUSTIS ENGINEERING, SEPTEMBER 1990
PROPERTY LINE SURVEY POINT
WETLAND BY CORP OF ENGINEERS
SCALE IN FEET
200 150 0 200
N
RIVER BIRCH LANDFILL
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana
RIVER BIRCH, INC.
GRETNA, LOUISIANA
SCALE: AS SHOWN
MADE BY: LAURIE
DATE: 1/90
CHECKED BY: [illegible]
DATE: 1/90
PRJ NO. 95B034
SITE PLAN BORING AND CONE PENETROMETER LOCATIONS
FIGURE 10
NO. | REVISION | DATE | INITIAL
1 | ADD BORING / CPT / WETLAND | 03/95
FOR REPORT PURPOSES ONLY
NOT TO BE USED FOR CONSTRUCTION PURPOSES
STATE OF LOUISIANA
ROBERT A. BAYER
REG. NO. 22-0
PROFESSIONAL ENGINEER



LEGEND:

B-19 BORING LOCATIONS DRILLED BY WOODWARD-CLYDE CONSULTANTS

C-37 CONE PENETROMETER LOCATIONS PERFORMED BY WOODWARD-CLYDE CONSULTANTS

E-2 BORINGS BY EUSTIS ENGINEERING, SEPTEMBER 1990

o PROPERTY LINE SURVEY POINT

NOTE: BORING E-3 IS PROJECTED TO THE A – A' CROSS SECTION.

STATE OF LOUISIANA
Robert A. SeGall
REG. No. 23095
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

April 20, 1995

300 150 0 300
SCALE IN FEET

FOR PERMIT PURPOSES ONLY
NOT TO BE USED FOR
CONSTRUCTION OR BIDDING

NO.	REVISION	DATE	INITIAL

RIVER BIRCH LANDFILL

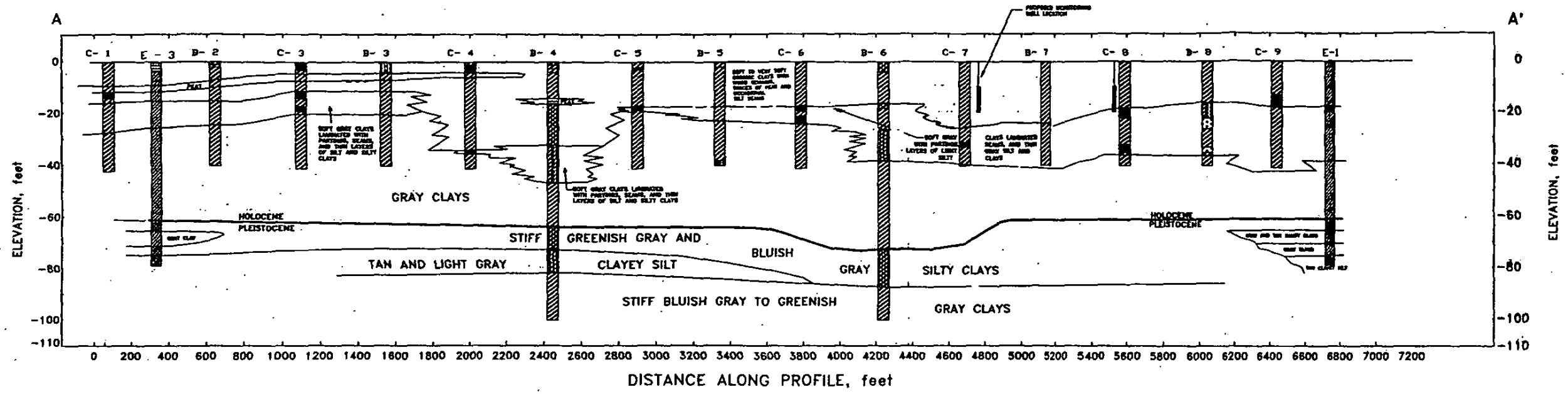
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists
and Environmental Scientists
Baton Rouge, Louisiana

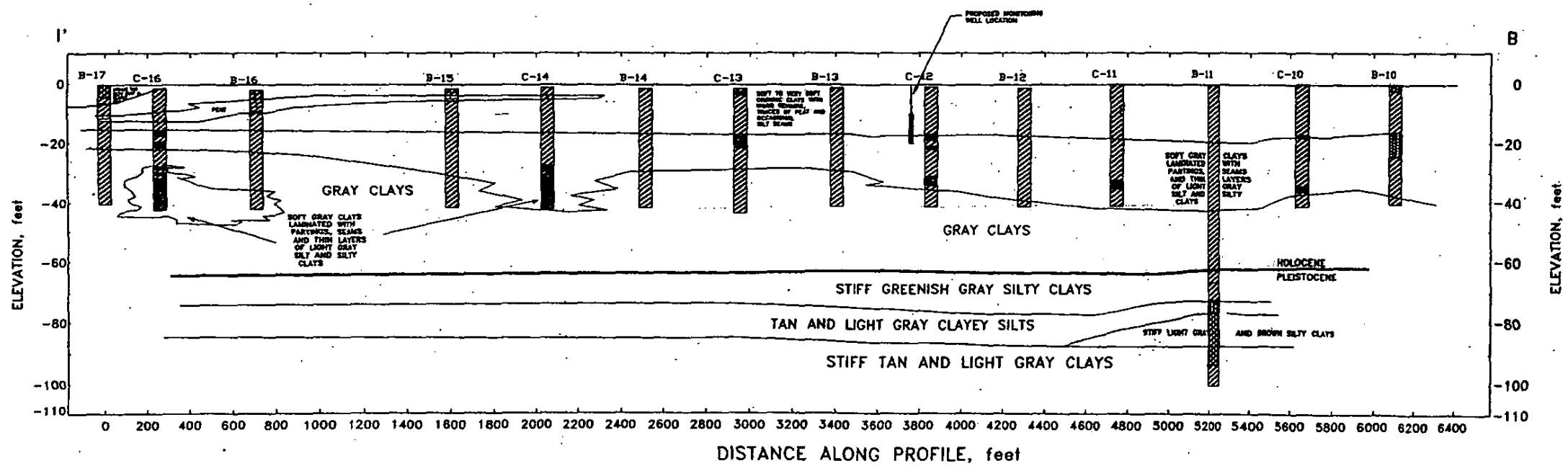
RIVER BIRCH, INC.
GRETNA, LOUISIANA

SCALE:	MADE BY:	DATE:	FILE NO.
AS SHOWN	CHECKED BY:	DATE:	958034

PLAN VIEW OF GEOLOGIC CROSS SECTIONS

FIGURE 11





NOTES: 1. STRATIFICATION BETWEEN BORINGS IS LINEARLY INFERRED BY CORRELATION OF SIMILAR SOIL CLASSIFICATIONS IN ADJACENT BORINGS. SUCH CORRELATIONS ONLY REPRESENT OUR OPINION REGARDING THE CONTINUITY OF STRATIFICATION WITH RESPECT TO THE ENGINEERING AND GEOLOGIC CHARACTERISTICS OF SOIL MATERIALS SAMPLED. ACTUAL SUBSURFACE STRATIFICATIONS MAY DIFFER FROM THE CONDITIONS REPRESENTED ON THE PROFILE AND BETWEEN SAMPLES ON THE BORING LOGS.

2. ALL DEPTHS ARE REFERENCED TO GROUND ELEVATION AT THE TIME BORINGS WERE MADE.

3. SCALES ARE AS SHOWN FOR EACH SECTION.

4. HOLOCENE AND PLEISTOCENE CORRELATION IS INFERRED FROM DEEP BORINGS IN THE SITE WIDE BORING PROGRAM.

NO.	REVISION	DATE	INITIAL

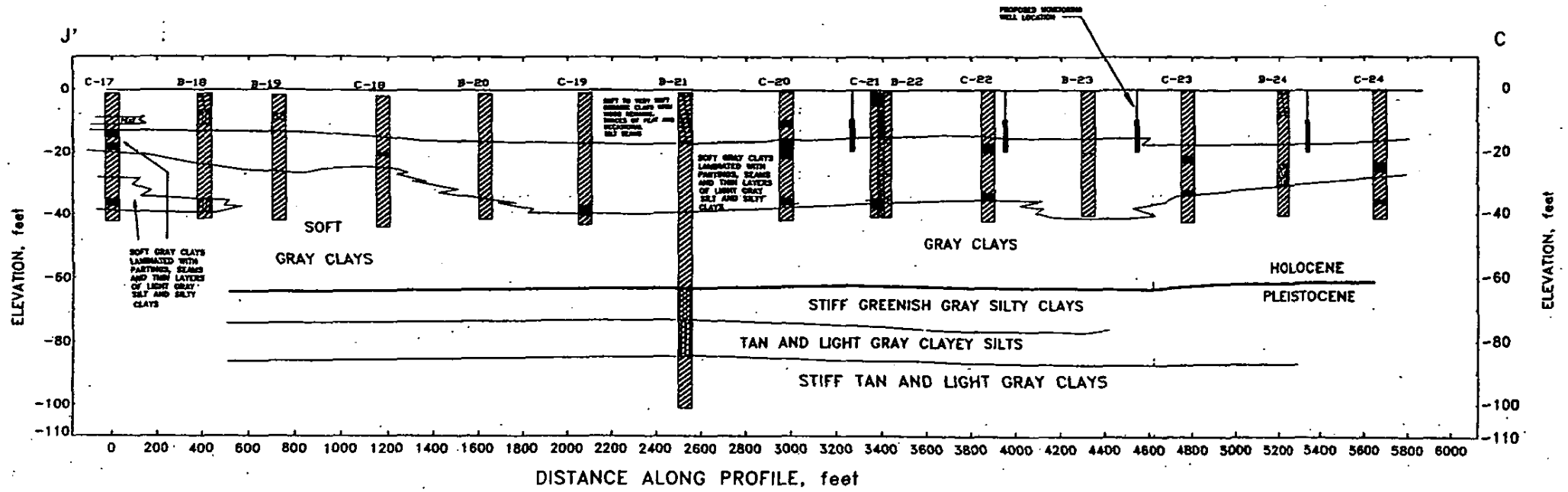
RIVER BIRCH LANDFILL

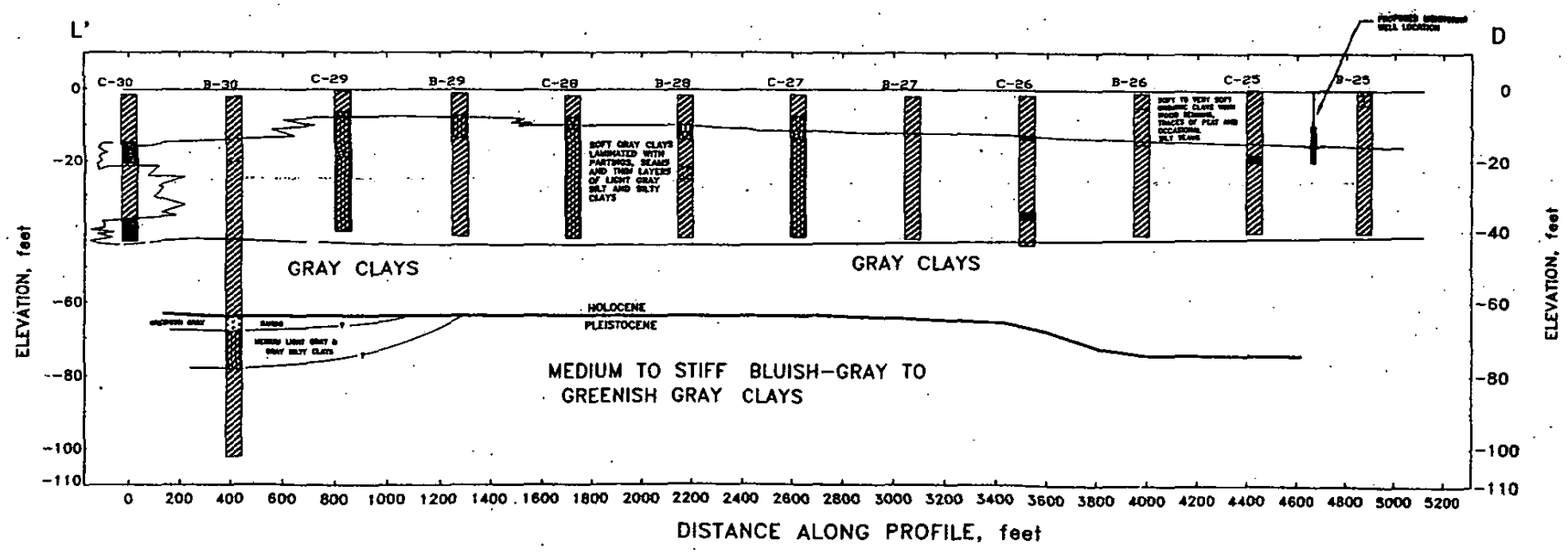
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana

RIVER BIRCH, INC.
GRETNA, LOUISIANA

SCALE: AS SHOWN	MADE BY: T. ALPER	DATE: 08/95	FILE NO. 950034
	CHECKED BY: [illegible]	DATE: 8-95	FIGURE 12

GEOLOGIC CROSS SECTIONS
A-A', I'-B





NOTES: 1. STRATIFICATION BETWEEN BORINGS IS LINEARLY INFERRED BY CORRELATION OF SIMILAR SOIL CLASSIFICATIONS IN ADJACENT BORINGS. SUCH CORRELATIONS ONLY REPRESENT OUR OPINION REGARDING THE CONTINUITY OF STRATIFICATION WITH RESPECT TO THE ENGINEERING AND GEOLOGIC CHARACTERISTICS OF SOIL MATERIALS SAMPLED. ACTUAL SUBSURFACE STRATIFICATIONS MAY DIFFER FROM THE CONDITIONS REPRESENTED ON THE PROFILE AND BETWEEN SAMPLES ON THE BORING LOGS.

2. ALL DEPTHS ARE REFERENCED TO GROUND ELEVATION AT THE TIME BORINGS WERE MADE.

3. SCALES ARE AS SHOWN FOR EACH SECTION.

4. HOLOCENE AND PLEISTOCENE CORRELATION AS INFERRED FROM DEEP BORINGS IN THE SITE WIDE BORING PROGRAM.

NO.	REVISION	DATE	INITIAL

RIVER BIRCH LANDFILL

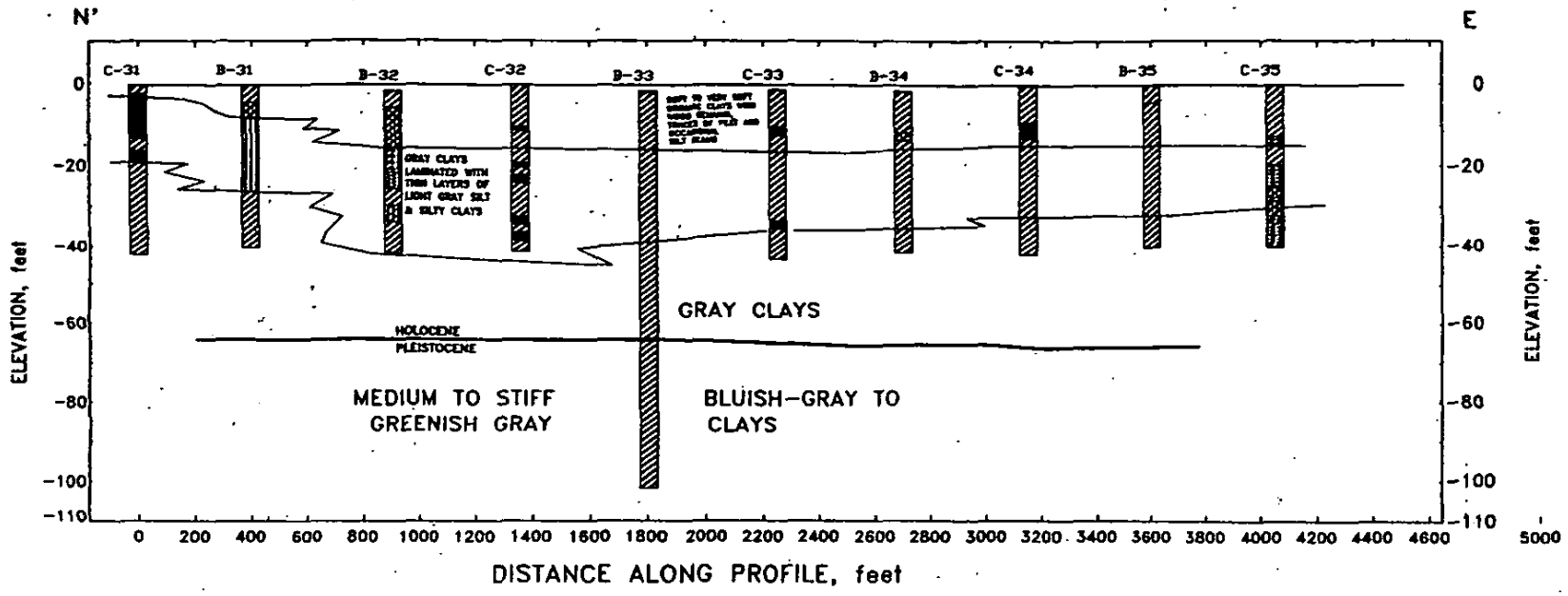
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana

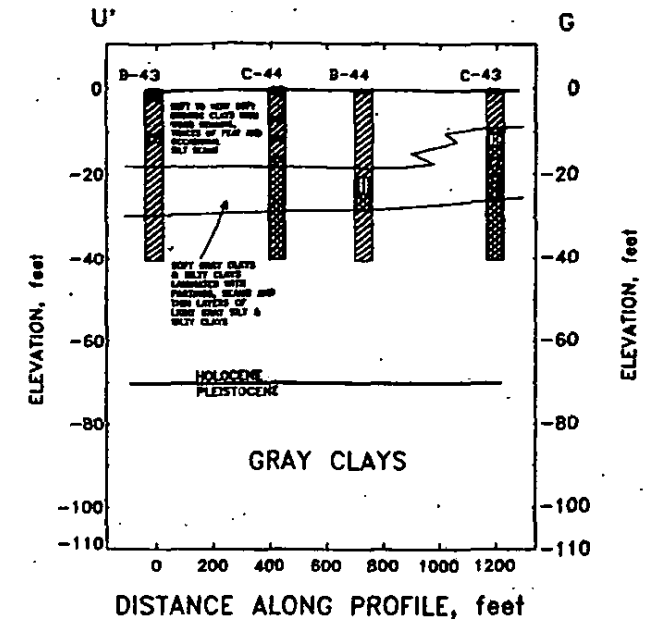
RIVER BIRCH, INC.
GRETNA, LOUISIANA

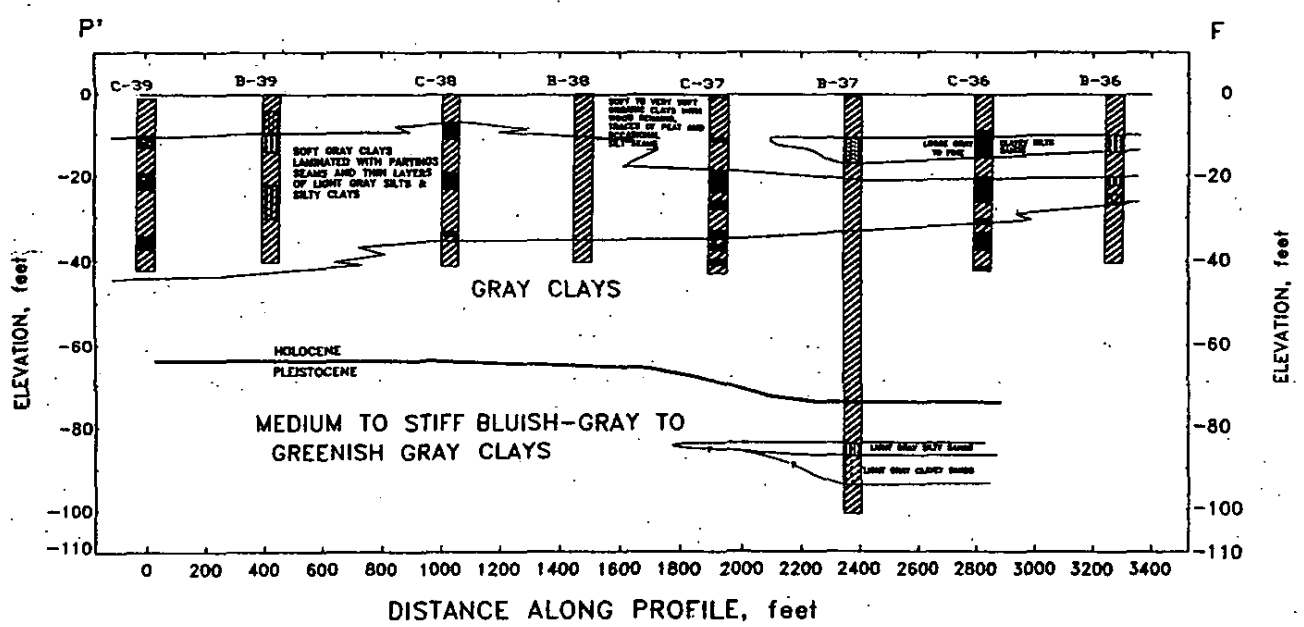
SCALE: AS SHOWN	MADE BY: T. ALBER	DATE: 03/95	FILE NO. 95B035
	CHECKED BY: V. [illegible]	DATE: 3-95	

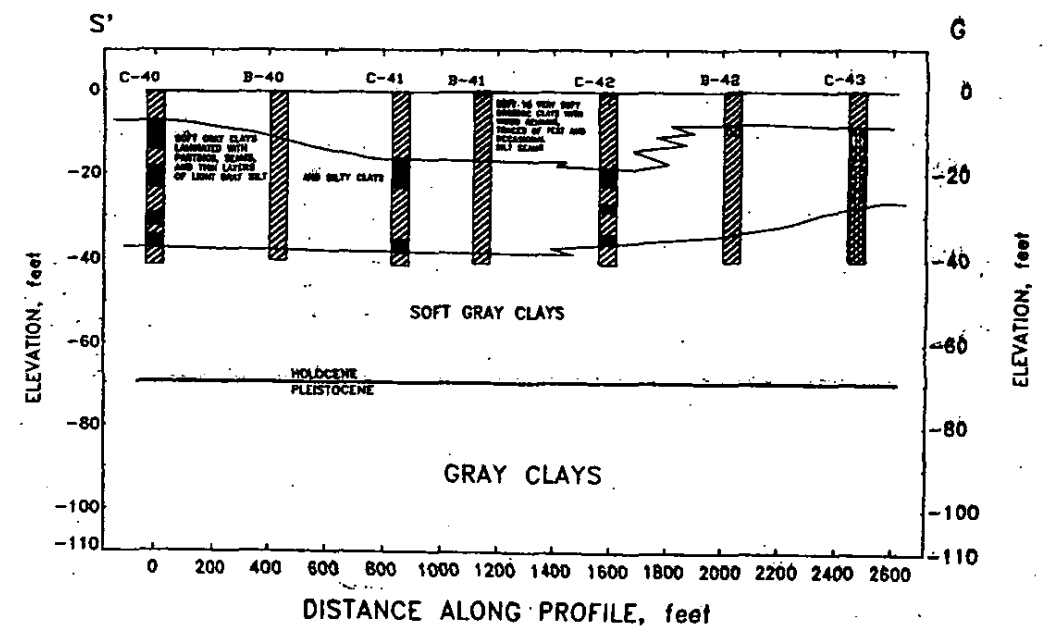
GEOLOGIC CROSS SECTIONS
J'-C, L'-D

FIGURE 13









NOTES:
1. STRATIFICATION BETWEEN BORINGS IS LINEARLY INFERRED BY CORRELATION OF SIMILAR SOIL CLASSIFICATIONS IN ADJACENT BORINGS. SUCH CORRELATIONS ONLY REPRESENT OUR OPINION REGARDING THE CONTINUITY OF STRATIFICATION WITH RESPECT TO THE ENGINEERING AND GEOLOGIC CHARACTERISTICS OF SOIL MATERIALS SAMPLED. ACTUAL SUBSURFACE STRATIFICATIONS MAY DIFFER FROM THE CONDITIONS REPRESENTED ON THE PROFILE AND BETWEEN SAMPLES ON THE BORING LOGS.
2. ALL DEPTHS ARE REFERENCED TO GROUND ELEVATION AT THE TIME BORINGS WERE MADE.
3. SCALES ARE AS SHOWN FOR EACH SECTION.
4. HOLOCENE AND PLEISTOCENE CORRELATION IS INFERRED FROM DEEP BORINGS IN THE SITE WIDE BORING PROGRAM.

NO.	REVISION	DATE	INITIAL

RIVER BIRCH LANDFILL

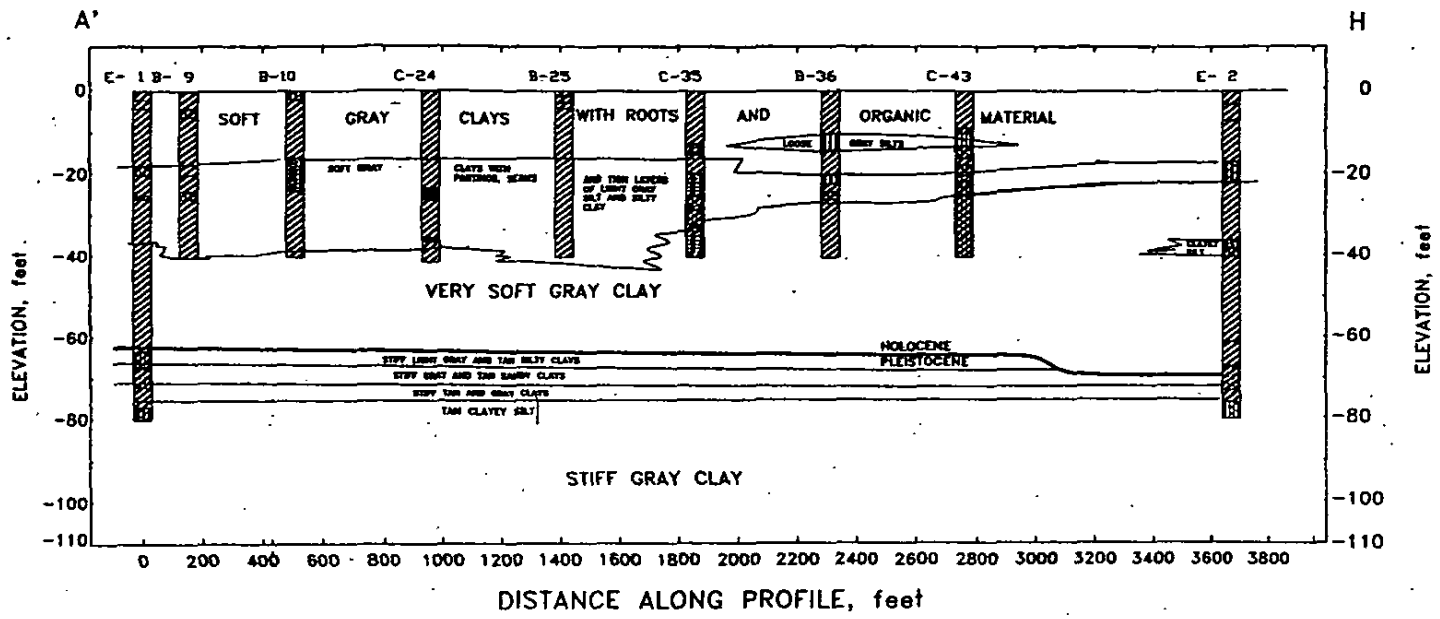
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana

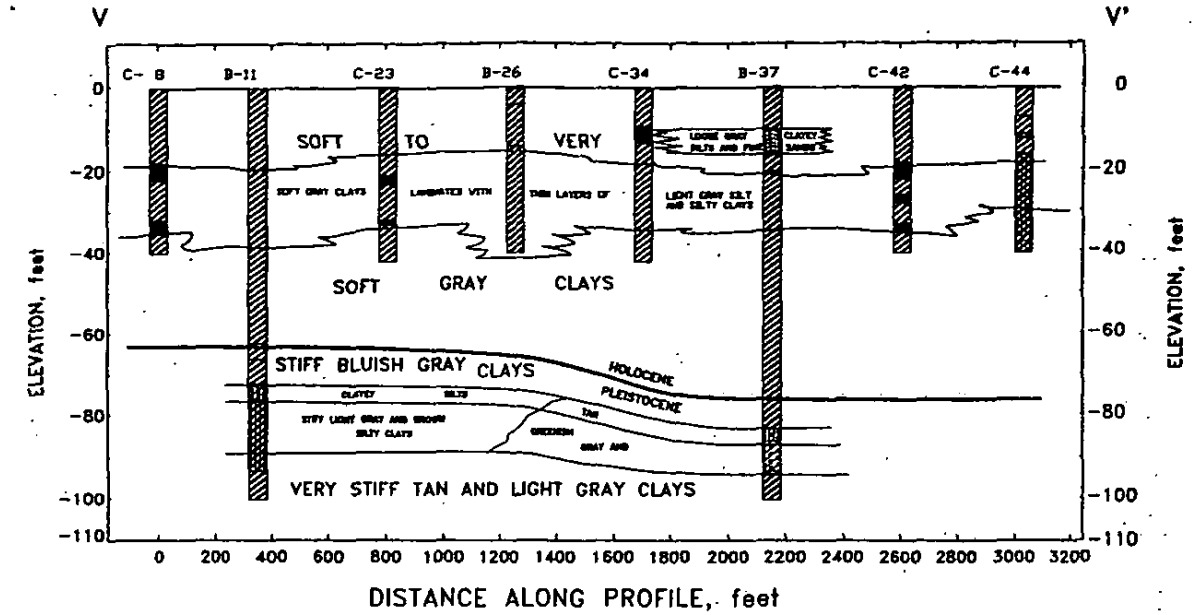
RIVER BIRCH, INC.
GRETNA, LOUISIANA

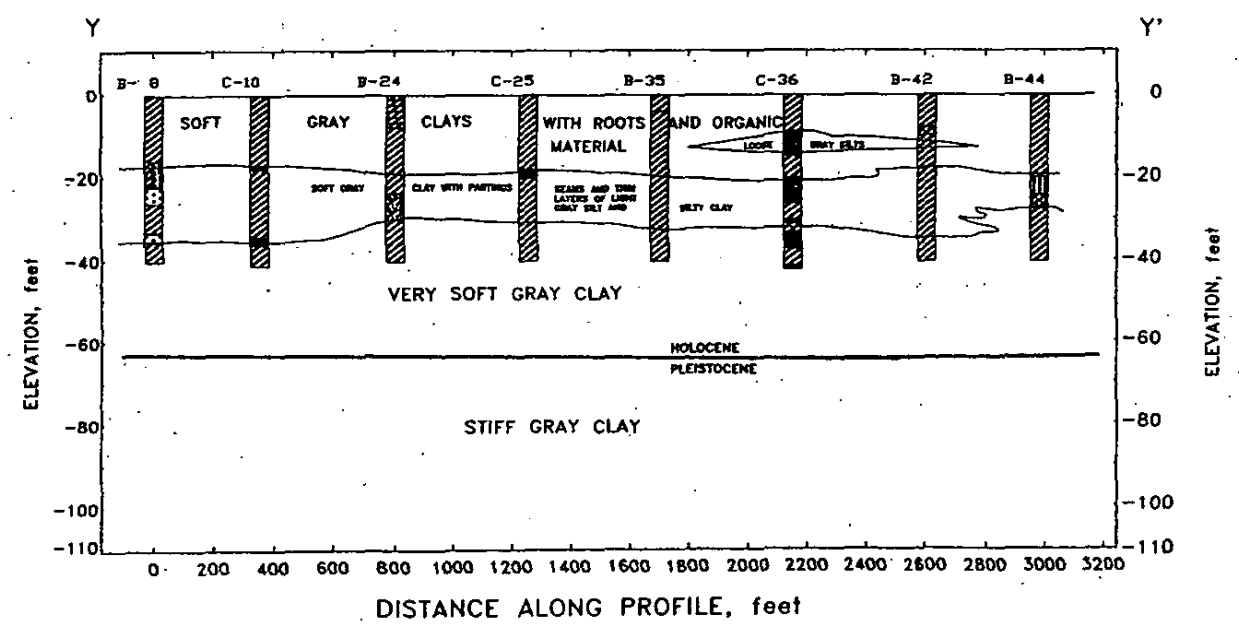
SCALE:	MADE BY: T. ALPER	DATE: 03/95	FILE NO.
AS SHOWN	CHECKED BY: V. Vesco	DATE: 8-95	95B034

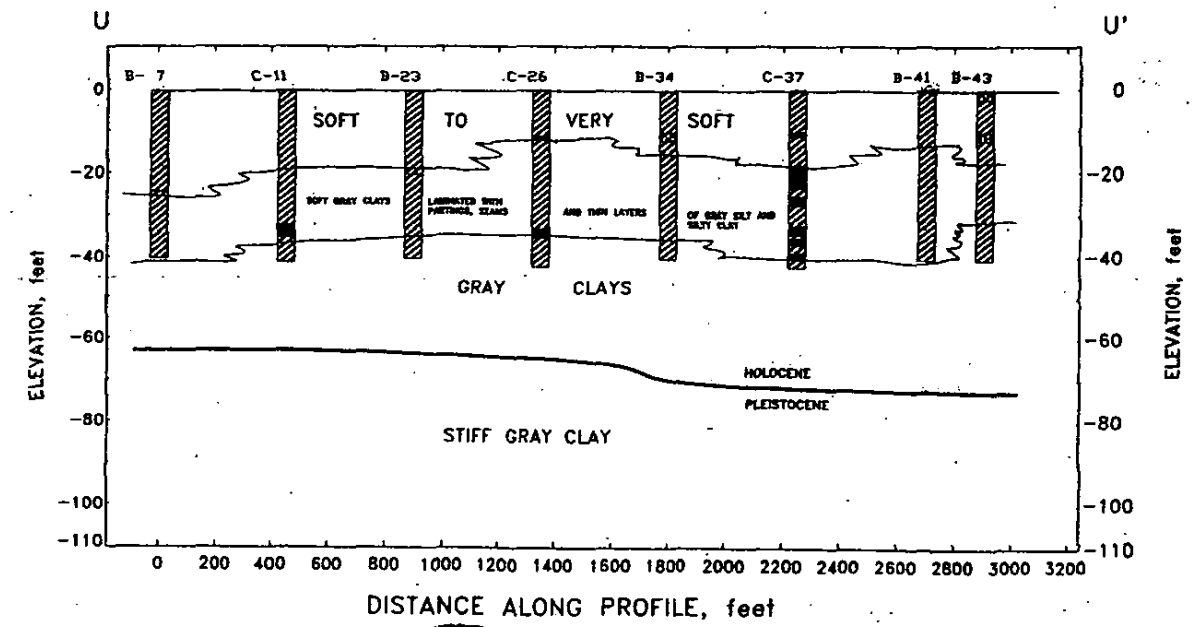
GEOLOGIC CROSS SECTIONS
N'-N, P'-P, U'-U, S'-S

FIGURE 14









NOTES: 1. STRATIFICATION BETWEEN BORINGS IS LINEARLY INFERRED BY CORRELATION OF SIMILAR SOIL CLASSIFICATIONS IN ADJACENT BORINGS. SUCH CORRELATIONS ONLY REPRESENT OUR OPINION REGARDING THE CONTINUITY OF STRATIFICATION WITH RESPECT TO THE ENGINEERING AND GEOLOGIC CHARACTERISTICS OF SOIL MATERIALS SAMPLED. ACTUAL SUBSURFACE STRATIFICATIONS MAY DIFFER FROM THE CONDITIONS REPRESENTED ON THE PROFILE AND BETWEEN SAMPLES ON THE BORING LOGS.

2. ALL DEPTHS ARE REFERENCED TO GROUND ELEVATION AT THE TIME BORINGS WERE MADE.

3. SCALES ARE AS SHOWN FOR EACH SECTION.

4. HOLOCENE AND PLEISTOCENE CORRELATION IS INFERRED FROM DEEP BORINGS IN THE SITE WIDE BORING PROGRAM.

FOR PERMIT PURPOSES ONLY
NOT TO BE USED FOR
CONSTRUCTION OR BIDDING

NO.	REVISION	DATE	INITIAL

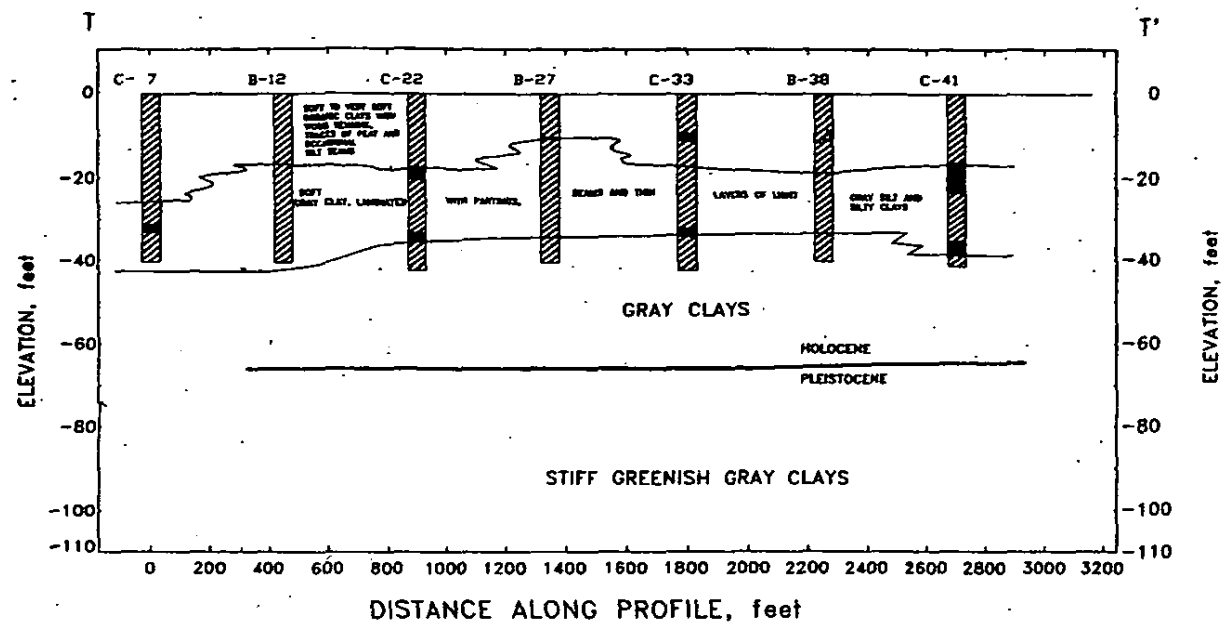
RIVER BIRCH LANDFILL

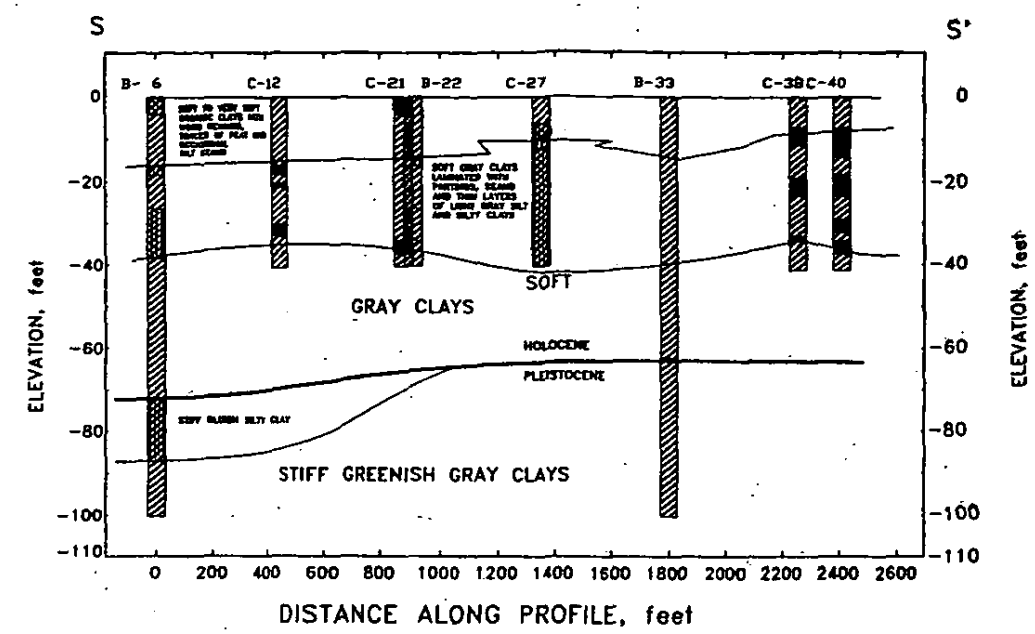
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana

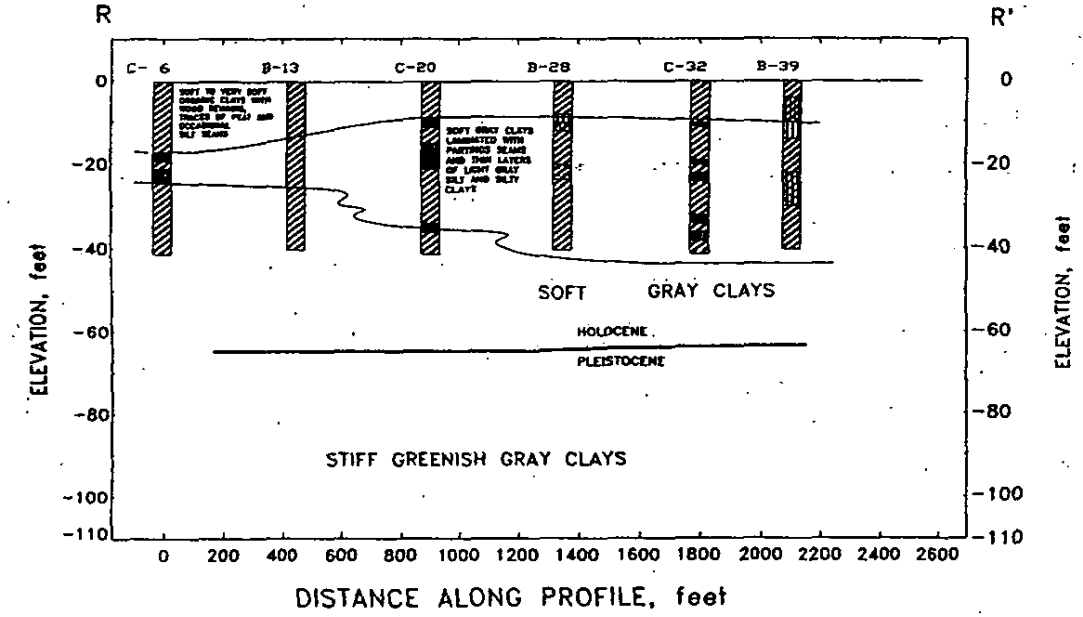
RIVER BIRCH, INC.
GRETNA, LOUISIANA

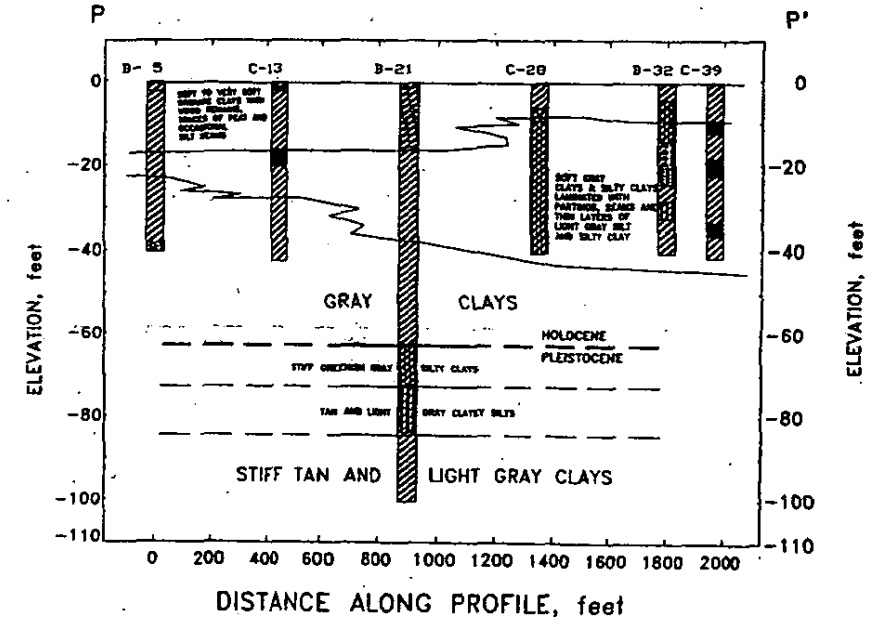
SCALE: AS SHOWN	MADE BY T. ALPER	DATE 03/95	FILE NO. 95B034
	CHECKED BY	DATE	FIGURE 15

GEOLOGIC CROSS SECTIONS
A'-H, Y-Y', V-V', U-U'









NOTES: 1. STRATIFICATION BETWEEN BORINGS IS LINEARLY INFERRED BY CORRELATION OF SIMILAR SOIL CLASSIFICATIONS IN ADJACENT BORINGS. SUCH CORRELATIONS ONLY REPRESENT OUR OPINION REGARDING THE CONTINUITY OF STRATIFICATION WITH RESPECT TO THE ENGINEERING AND GEOLOGIC CHARACTERISTICS OF SOIL MATERIALS SAMPLED. ACTUAL SUBSURFACE STRATIFICATIONS MAY DIFFER FROM THE CONDITIONS REPRESENTED ON THE PROFILE AND BETWEEN SAMPLES ON THE BORING LOGS.

2. ALL DEPTHS ARE REFERENCED TO GROUND ELEVATION AT THE TIME BORINGS WERE MADE.

3. SCALES ARE AS SHOWN FOR EACH SECTION.

4. HOLOCENE AND PLEISTOCENE CORRELATION IS INFERRED FROM DEEP BORINGS IN THE SITE WIDE BORING PROGRAM.

NO.	REVISION	DATE	BY

RIVER BIRCH LANDFILL

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana

RIVER BIRCH, INC.
GRETNA, LOUISIANA

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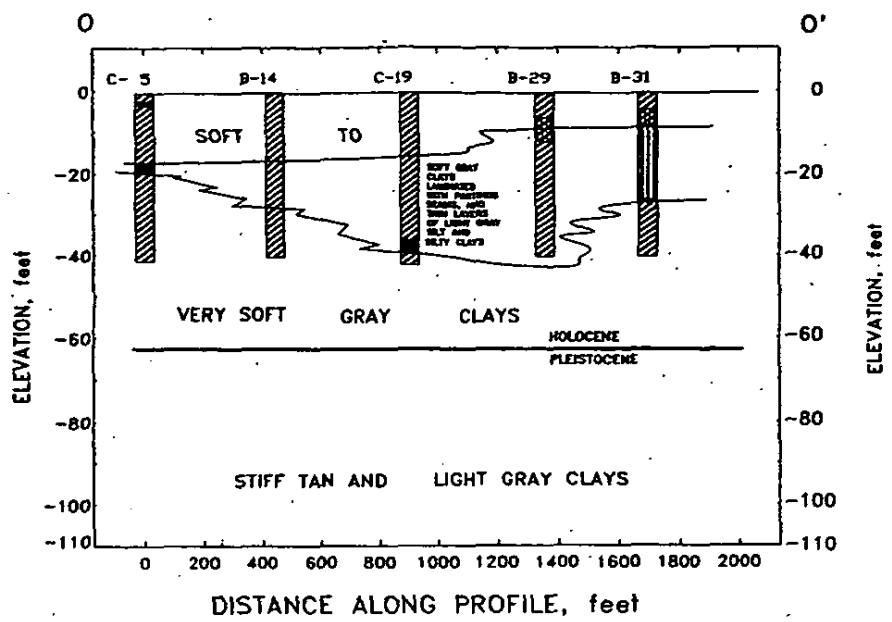
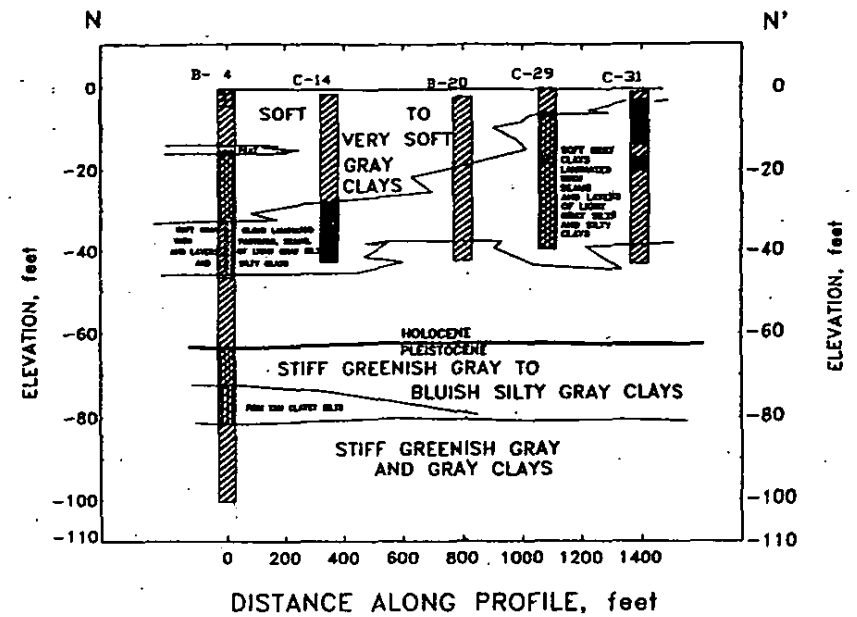
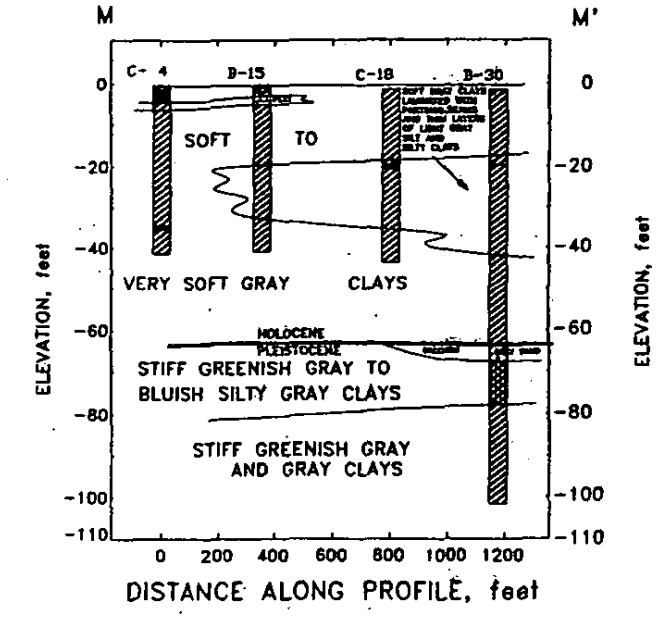
	CHECKED BY:	DATE: 8/95	

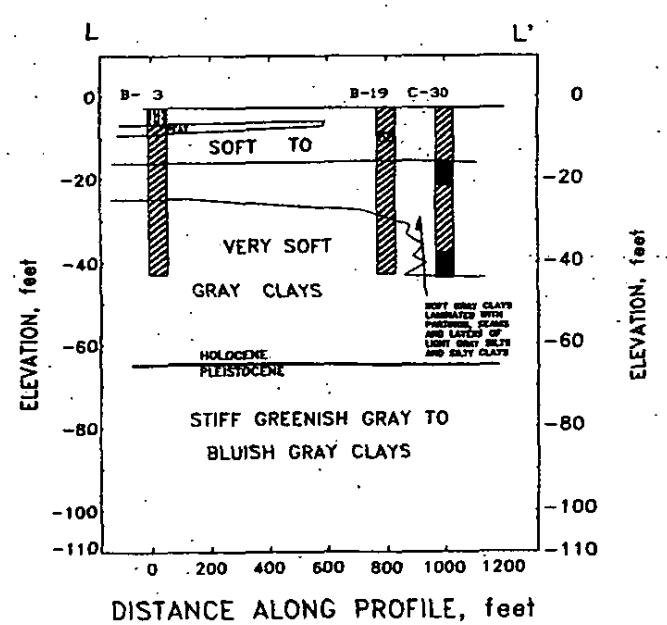
GEOLOGIC CROSS SECTIONS
T-T', S-S', R-R', P-P'

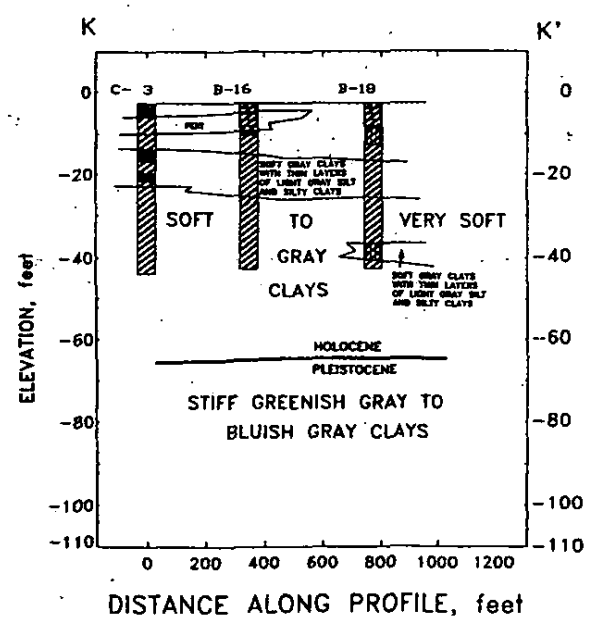
FIGURE 10

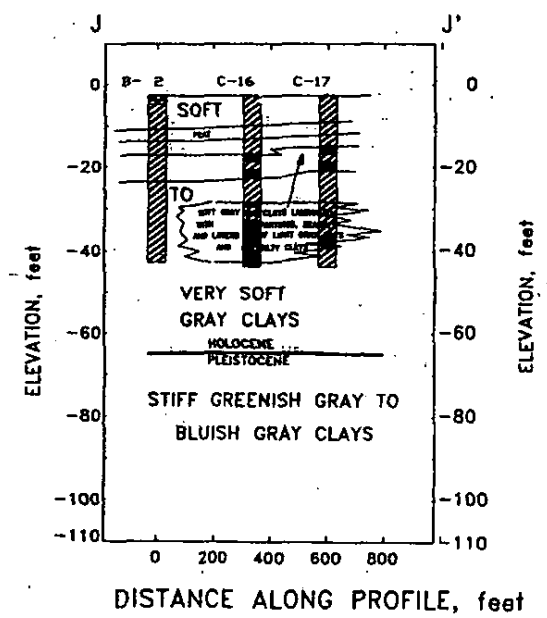


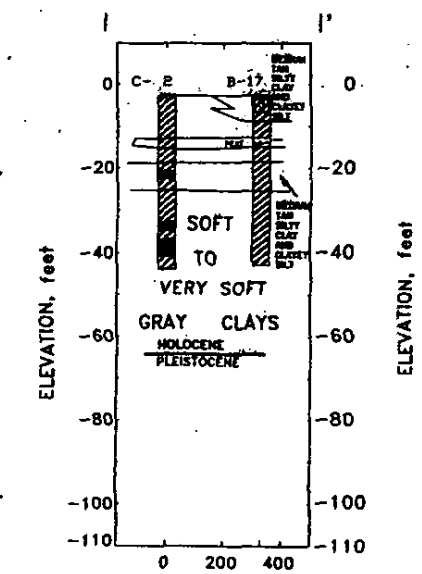












NOTES: 1. STRATIFICATION BETWEEN BORINGS IS LINEARLY INFERRED BY CORRELATION OF SIMILAR SOIL CLASSIFICATIONS IN ADJACENT BORINGS. SUCH CORRELATIONS ONLY REPRESENT OUR OPINION REGARDING THE CONTINUITY OF STRATIFICATION WITH RESPECT TO THE CONSISTENCY AND GEOLOGIC CHARACTERISTICS OF SOIL MATERIALS SAMPLED. ACTUAL SUBSURFACE STRATIFICATIONS MAY DIFFER FROM THE CONDITIONS REPRESENTED ON THE PROFILE AND BETWEEN SAMPLES ON THE BORING LOGS.

2. ALL DEPTHS ARE REFERENCED TO GROUND ELEVATION AT THE TIME BORINGS WERE MADE.

3. SCALES ARE AS SHOWN FOR EACH SECTION.

4. HOLOCENE AND PLEISTOCENE CORRELATION IS INFERRED FROM DEEP BORINGS IN THE SITE WIDE BORING PROGRAM.

STATE OF LOUISIANA
Robert A. S[illegible]
REG. No. [illegible]
REGISTERED PROFESSIONAL ENGINEER

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NOT TO BE USED FOR
CONSTRUCTION PURPOSES

NO.	REVISION	DATE	INITIAL

RIVER BIRCH LANDFILL

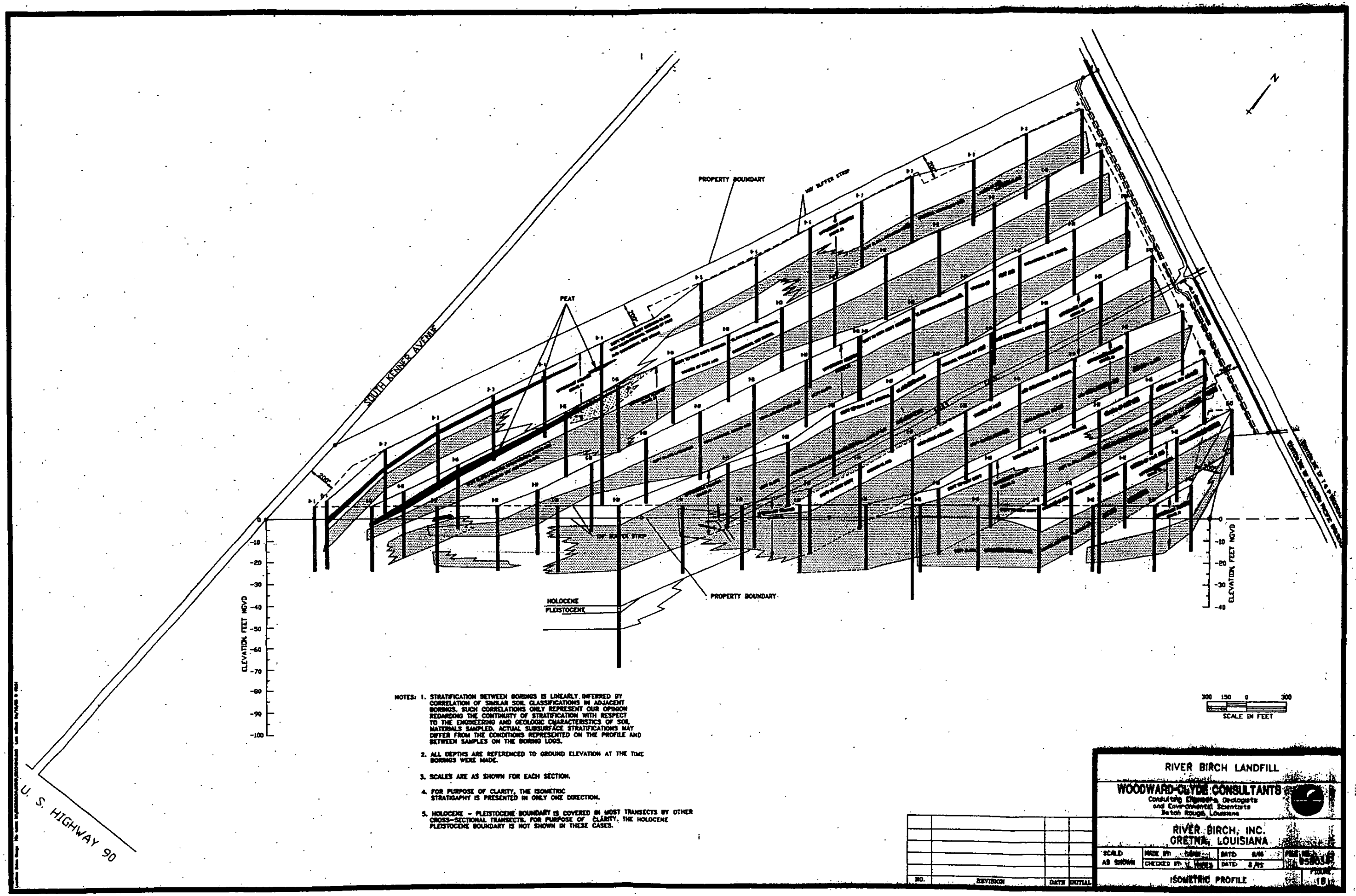
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana

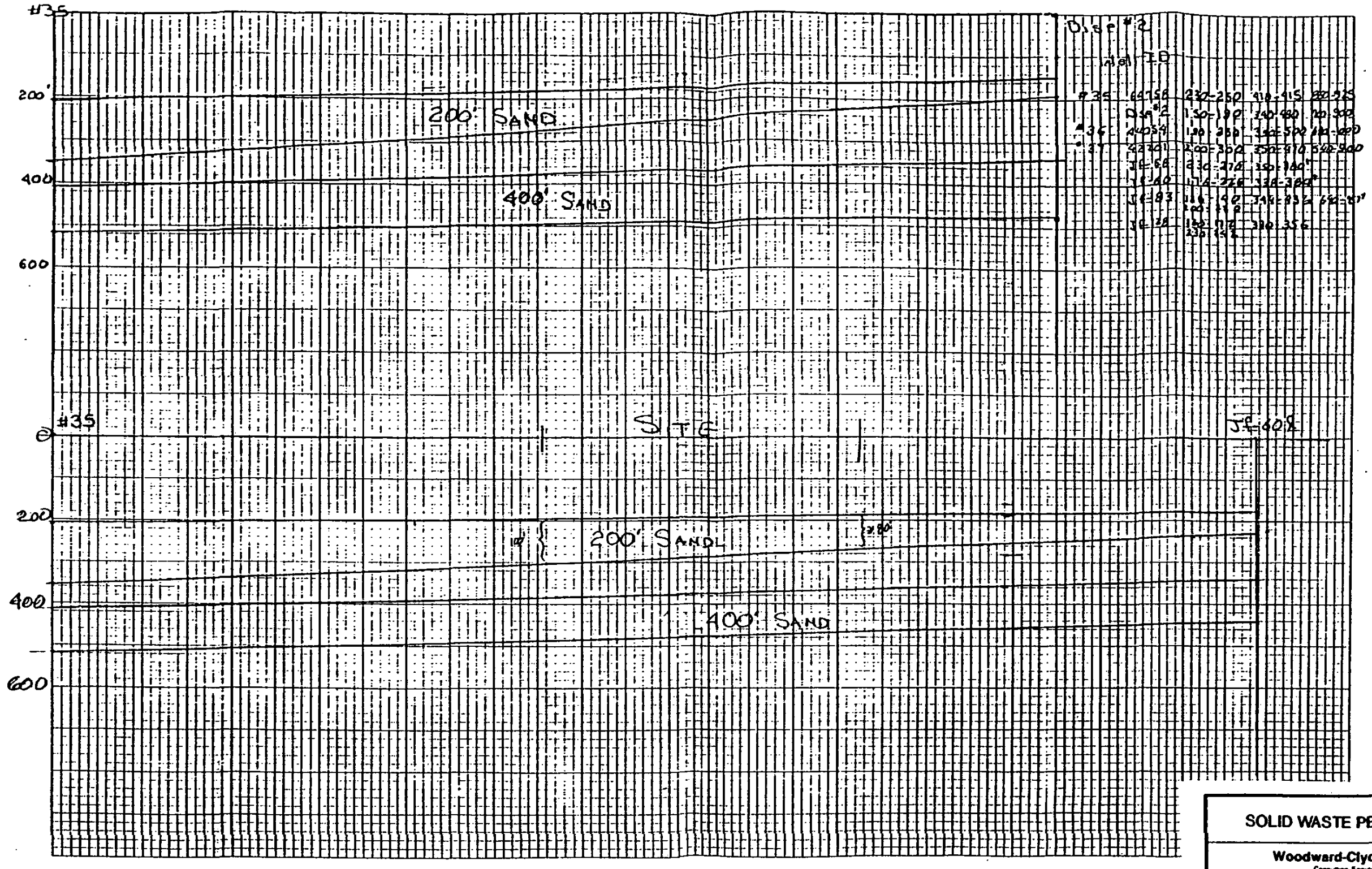
RIVER BIRCH, INC.
GRETNA, LOUISIANA

SCALE	MADE BY: T. [illegible]	DATE 03/95	FILE NO.
AS SHOWN	CHECKED BY: [illegible]	DATE 4/6/95	95B034

GEOLOGIC CROSS SECTIONS
O-O', M-M', M'-M', L-L', K-K', I-I'

PLATE 17


PROPERTY BOUNDARY
PEAT
SOUTH KENNER AVENUE
HOLOCENE
PLEISTOCENE
PROPERTY BOUNDARY
ELEVATION, FEET NGVD
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
U. S. HIGHWAY 90
N
300 150 0 300
SCALE IN FEET
NOTES: 1. STRATIFICATION BETWEEN BORINGS IS LINEARLY INFERRED BY CORRELATION OF SIMILAR SOIL CLASSIFICATIONS IN ADJACENT BORINGS. SUCH CORRELATIONS ONLY REPRESENT OUR OPINION REGARDING THE CONTINUITY OF STRATIFICATION WITH RESPECT TO THE ENGINEERING AND GEOLOGIC CHARACTERISTICS OF SOIL MATERIALS SAMPLED. ACTUAL SUBSURFACE STRATIFICATIONS MAY DIFFER FROM THE CONDITIONS REPRESENTED ON THE PROFILE AND BETWEEN SAMPLES ON THE BORING LOGS.
2. ALL DEPTHS ARE REFERENCED TO GROUND ELEVATION AT THE TIME BORINGS WERE MADE.
3. SCALES ARE AS SHOWN FOR EACH SECTION.
4. FOR PURPOSE OF CLARITY, THE ISOMETRIC STRATIGRAPHY IS PRESENTED IN ONLY ONE DIRECTION.
5. HOLOCENE - PLEISTOCENE BOUNDARY IS COVERED IN MOST TRANSECTS BY OTHER CROSS-SECTIONAL TRANSECTS. FOR PURPOSE OF CLARITY, THE HOLOCENE PLEISTOCENE BOUNDARY IS NOT SHOWN IN THESE CASES.
NO.
REVISION
DATE
INITIAL
RIVER BIRCH LANDFILL
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana
RIVER BIRCH, INC.
GRETNA, LOUISIANA
SCALE AS SHOWN
DATE
ISOMETRIC PROFILE
FIGURE 18



SOLID WASTE PERMIT APPLICATION

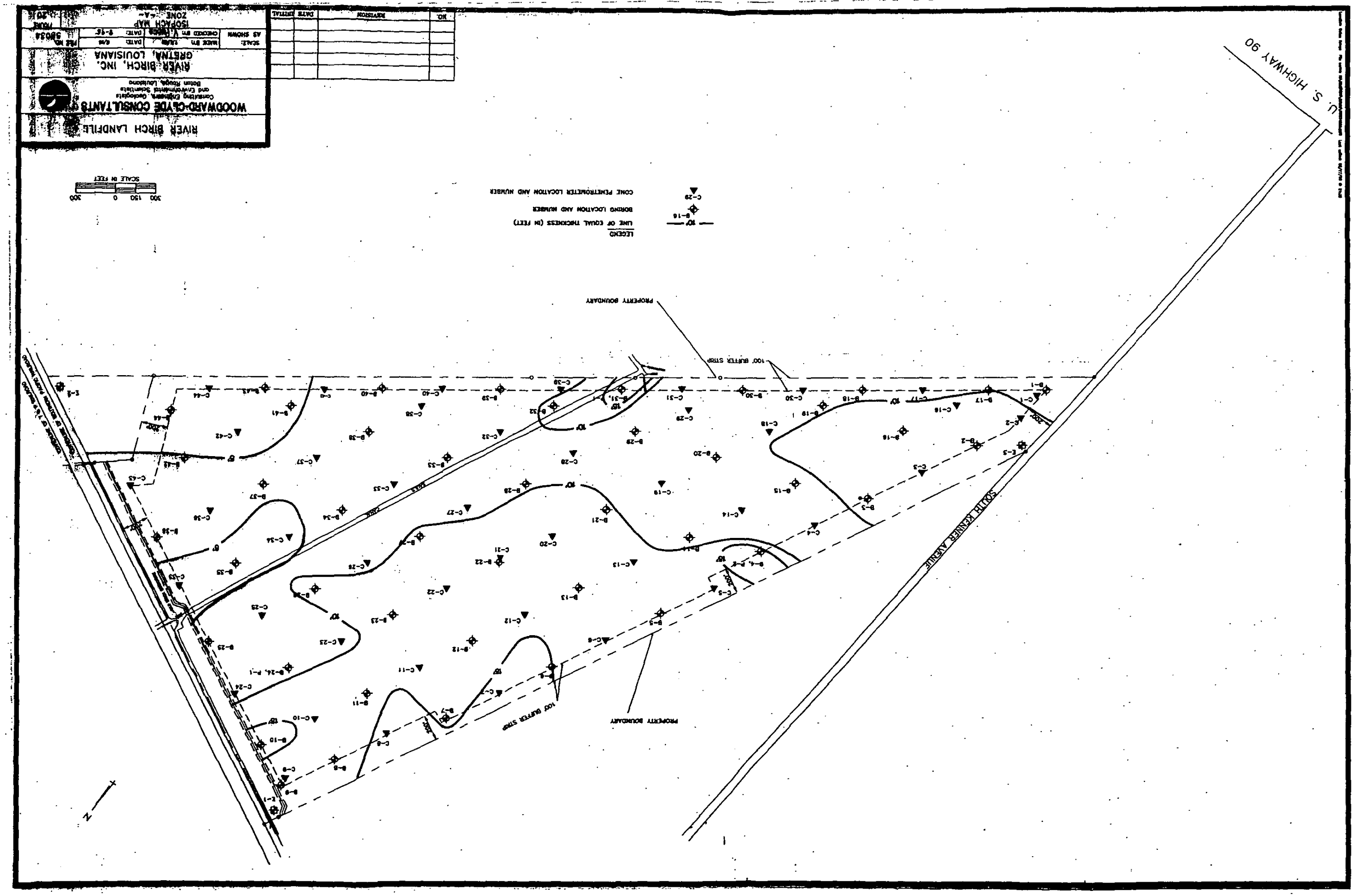
Woodward-Clyde Consultants
Consulting Engineers Geologists and Environmental Scientists
Baton Rouge Louisiana

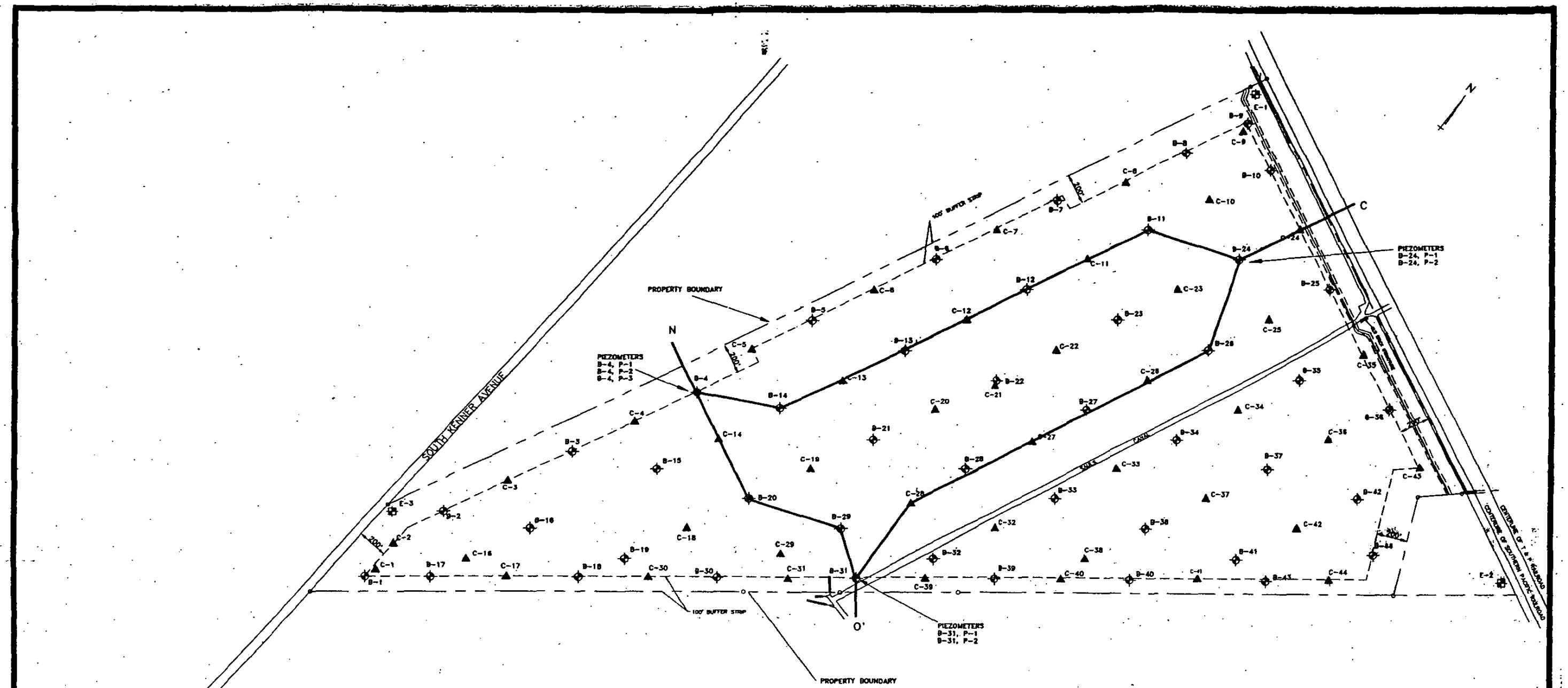
RIVER BIRCH LANDFILL
JEFFERSON PARISH, LOUISIANA

SCALE:	MADE BY RS	DATE 2/94	FILE NO
AS SHOWN	CHECKED BY KPB	DATE 4/94	93B248C

CROSS SECTION TO DEPTH OF 200 FEET

FIGURE 19


U. S. HIGHWAY 90
SOUTH KANNER AVENUE
PROPERTY BOUNDARY
100' BUFFER STRIP
LEGEND
LINE OF EQUAL THICKNESS (IN FEET)
BORING LOCATION AND NUMBER
CONE PENETROMETER LOCATION AND NUMBER
SCALE IN FEET
300 150 0 300
N
RIVER BIRCH LANDFILL
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana
RIVER BIRCH, INC.
GRETNA, LOUISIANA
SCALE: AS SHOWN
MADE BY: DATE: 8/86
CHECKED BY: DATE: 8-86
FILE NO. 5B034
ISOPACH MAP
ZONE -A-
FIGURE 20
NO. REVISION DATE INITIAL



BORING NUMER	B-4			B-24		B-31	
PIEZOMETER	P-1	P-2	P-3	P-1	P-2	P-1	P-2
TOP OF CASING ELEVATION (FEET, NGVD)	2.10	1.07	1.27	2.12	1.16	-0.27	-0.09
TOTAL DEPTH (FEET)	75.95	44.92	23.9	35.5	20.5	40.34	19.05
SCREEN LENGTH (FEET)	5	5	5	5	5	5	5
TOP OF SCREEN ELEVATION(FEET, NGVD)	-65.85	-35.85	-14.63	-25.18	-11.14	-32.61	-11.14
BOTTOM OF SCREEN ELEVATION (FEET, NGVD)	-70.85	-40.85	-19.63	-30.18	-16.14	-37.61	-16.14
MONITORED ZONE	B-ZONE	LOWER A-ZONE	UPPER A-ZONE	LOWER A-ZONE	UPPER A-ZONE	LOWER A-ZONE	UPPER A-ZONE

NOTE: PIEZOMETERS ARE LOCATED WITHIN A 10 FEET RADIUS OF THE DESIGNATED BORING.

LEGEND:

B-19 BORING LOCATIONS DRILLED BY WOODWARD-CLYDE CONSULTANTS

C-37 CONE PENETROMETER LOCATIONS PERFORMED BY WOODWARD-CLYDE CONSULTANTS

E-2 BORINGS BY EUSTIS ENGINEERING, SEPTEMBER 1990

o PROPERTY LINE SURVEY POINT

300 150 0 300
SCALE IN FEET

NO.	REVISION	DATE	INITIAL

RIVER BIRCH LANDFILL

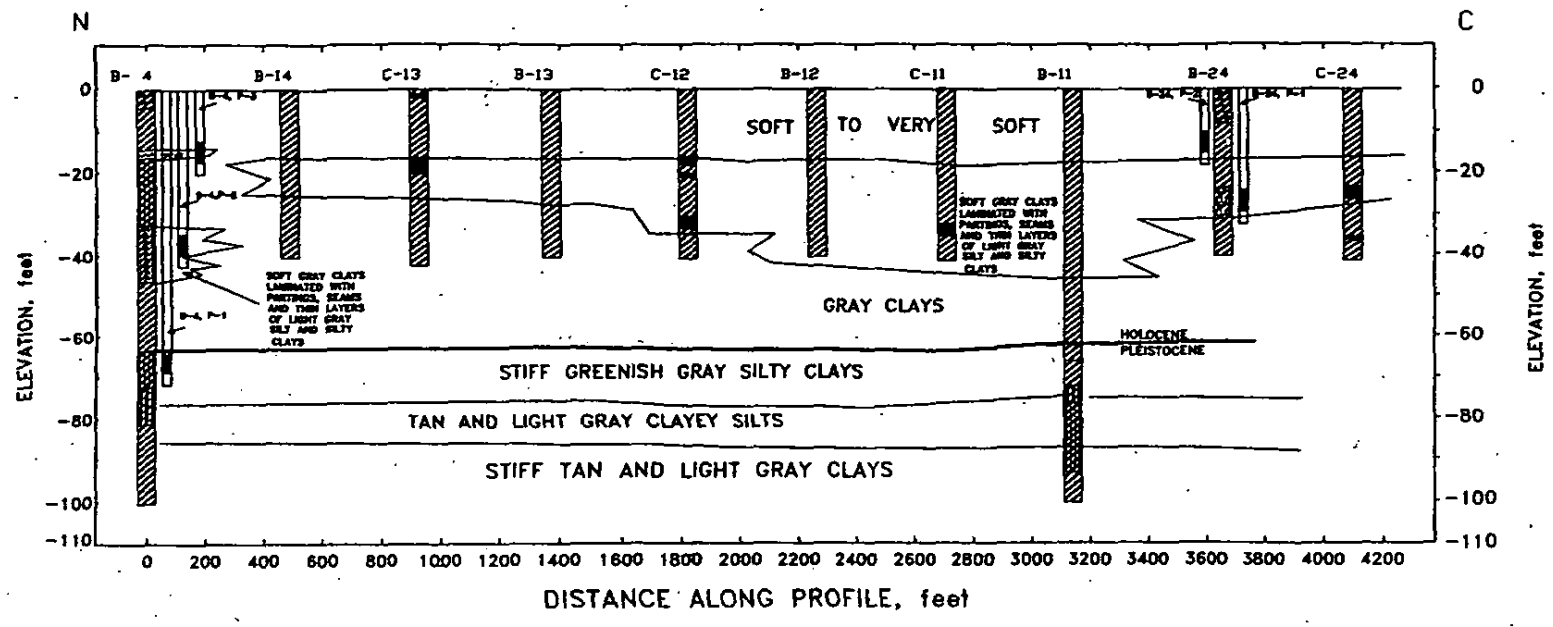
WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana

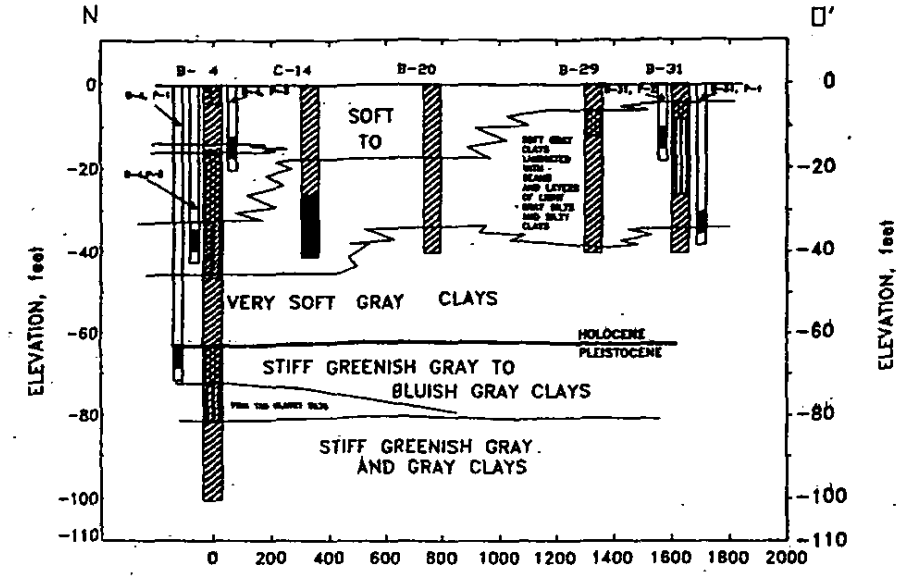
RIVER BIRCH, INC.
GRETNA, LOUISIANA

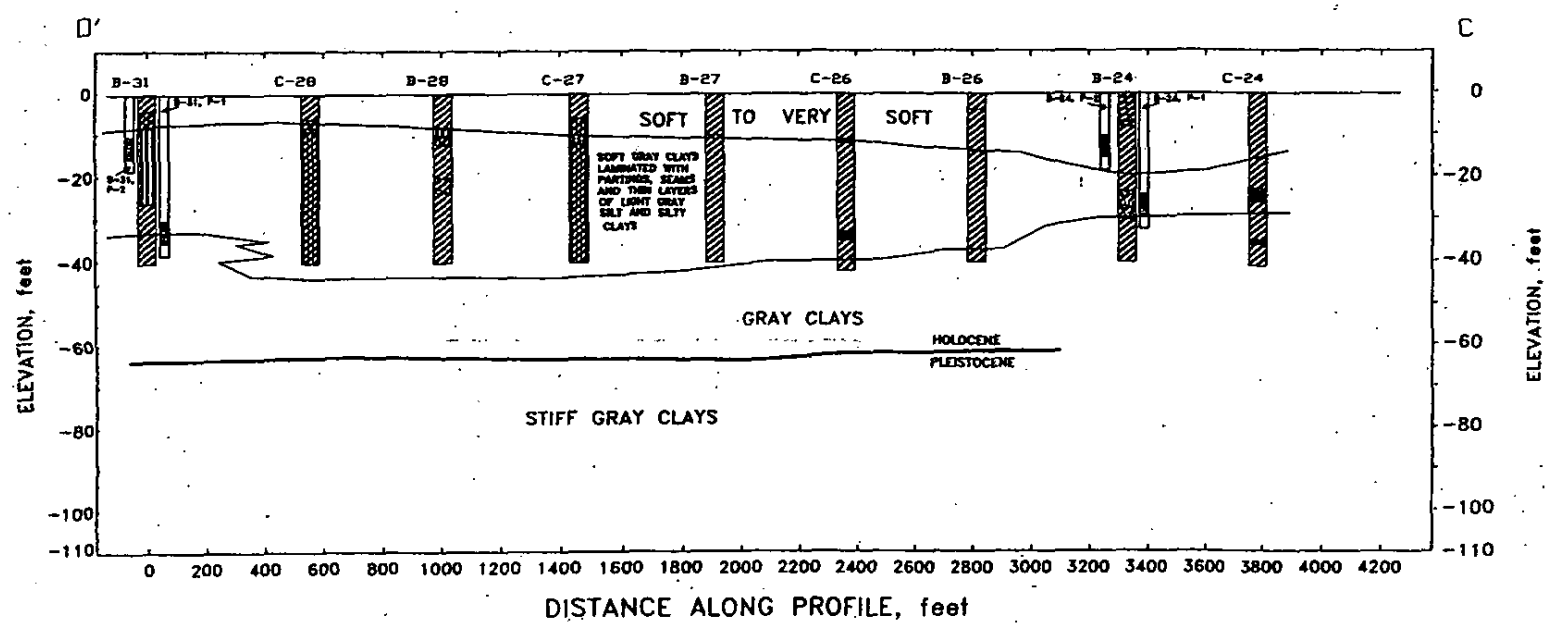
SCALE: AS SHOWN | MADE BY: | DATE: | FILE NO. 958034
CHECKED BY: | DATE: 4/1/95

CROSS SECTION TRANSECTS BETWEEN PIEZOMETER CLUSTERS

PAGE 121







BORING NUMER	B-4			B-24		B-31	
PIEZOMETER	P-1	P-2	P-3	P-1	P-2	P-1	P-2
TOP OF CASING ELEVATION (FEET, NGVD)	2.10	1.07	1.27	2.12	1.16	-0.27	-0.09
TOTAL DEPTH (FEET)	75.95	44.92	23.9	35.3	20.3	40.34	19.05
SCREEN LENGTH (FEET)	5	5	5	5	5	5	5
TOP OF SCREEN ELEVATION(FEET, NGVD)	-65.85	-35.85	-14.63	-25.18	-11.14	-32.81	-11.14
BOTTOM OF SCREEN ELEVATION (FEET, NGVD)	-70.85	-40.85	-19.63	-30.18	-16.14	-37.81	-18.14
MONITORED ZONE	B-ZONE	LOWER A-ZONE	UPPER A-ZONE	LOWER A-ZONE	UPPER A-ZONE	LOWER A-ZONE	UPPER A-ZONE

NOTE: PIEZOMETERS ARE LOCATED WITHIN A 10 FEET RADIUS OF THE DESIGNATED BORING.

NOTES: 1. STRATIFICATION BETWEEN BORINGS IS LINEARLY INFERRED BY CORRELATION OF SIMILAR SOIL CLASSIFICATIONS IN ADJACENT BORINGS. SUCH CORRELATIONS ONLY REPRESENT OUR OPINION REGARDING THE CONTINUITY OF STRATIFICATION WITH RESPECT TO THE ENGINEERING AND GEOLOGIC CHARACTERISTICS OF SOIL MATERIALS SAMPLED. ACTUAL SUBSURFACE STRATIFICATIONS MAY DIFFER FROM THE CONDITIONS REPRESENTED ON THE PROFILE AND BETWEEN SAMPLES ON THE BORING LOGS.

2. ALL DEPTHS ARE REFERENCED TO GROUND ELEVATION AT THE TIME BORINGS WERE MADE.

3. SCALES ARE AS SHOWN FOR EACH SECTION.

4. HOLOCENE AND PLEISTOCENE CORRELATION IS INFERRED FROM DEEP BORINGS IN THE SITE WIDE BORING PROGRAM.

STATE OF LOUISIANA
Robert A. SeGall
REG. No. 22306
REGISTERED PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING
April 04, 1995

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CONSTRUCTION OR BIDDING

NO.	REVISION	DATE	INITIAL

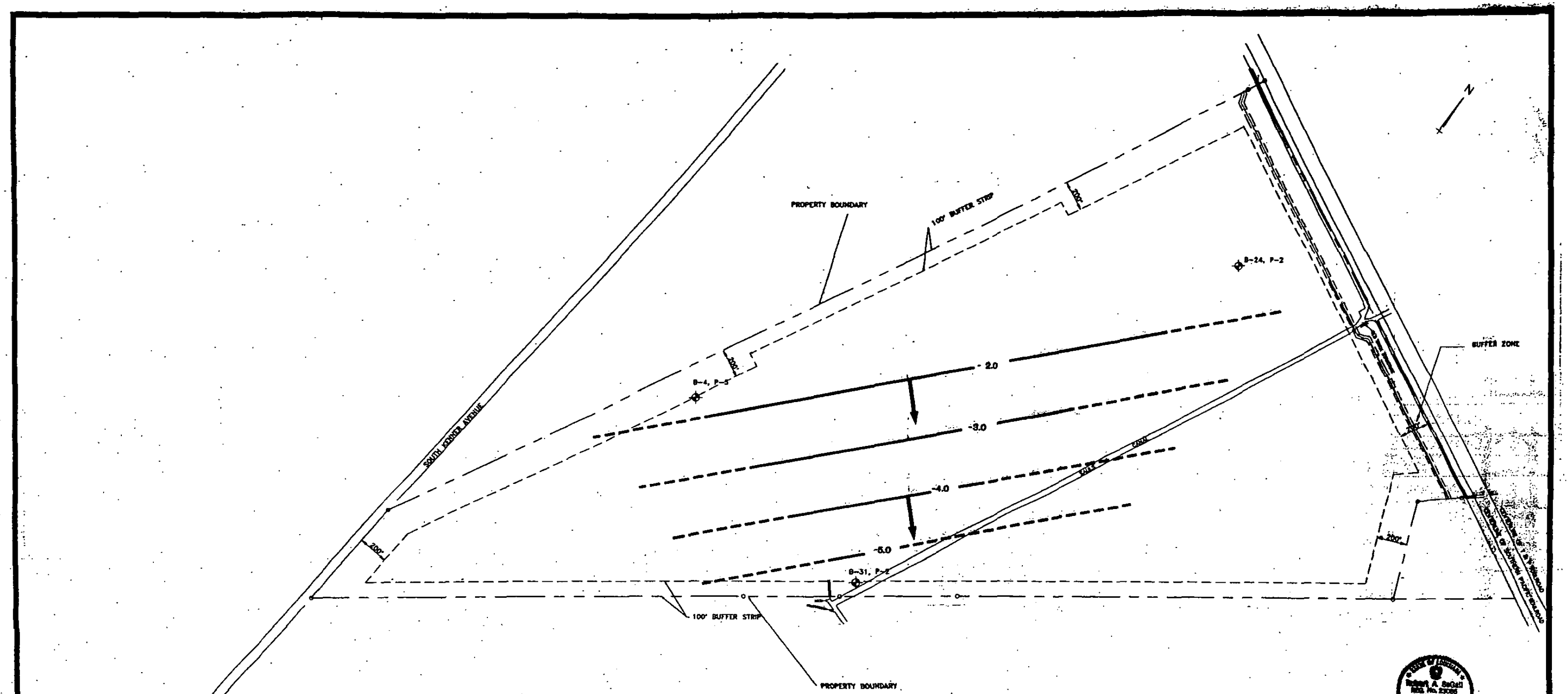
RIVER BIRCH LANDFILL

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana

RIVER BIRCH, INC.
GRETNA, LOUISIANA

SCALE	MADE BY: T.JASPER	DATE: 2/95	FILE NO.
AS SHOWN	CHECKED BY: [illegible]	DATE: [illegible]	95B034

GEOLOGICAL CROSS SECTIONS BETWEEN PIEZOMETER CLUSTERS TRANSECTS N-O', D'-D, N-D' FIGURE 1



BORING NUMER	B-4			B-24		B-31	
PIEZOMETER	P-1	P-2	P-3*	P-1	P-2*	P-1	P-2*
TOP OF CASING ELEVATION (FEET, NGVD)	2.10	1.07	1.27	2.12	1.16	-0.27	-0.09
TOTAL DEPTH (FEET)	75.95	44.92	23.9	35.3	20.3	40.34	19.05
SCREEN LENGTH (FEET)	5	5	5	5	5	5	5
TOP OF SCREEN ELEVATION(FEET, NGVD)	-65.85	-35.85	-14.63	-25.18	-11.14	-32.61	-11.14
BOTTOM OF SCREEN ELEVATION (FEET, NGVD)	-70.85	-40.85	-19.63	-30.18	-16.14	-37.81	-16.14
MONITORED ZONE	B-ZONE	LOWER A-ZONE	UPPER A-ZONE	LOWER A-ZONE	UPPER A-ZONE	LOWER A-ZONE	UPPER A-ZONE

* PIEZOMETER SHOWN ON DRAWING

LEGEND:

B-31, P-2 — UPPER ZONE A PIEZOMETER AND BORHOLE LOCATION

o — PROPERTY LINE SURVEY POINT

-3.0 — EQUIPOTENTIAL LINES WITH GROUNDWATER ELEVATIONS (FEET NGVD)

GROUNDWATER FLOW DIRECTION

NOTE:

1. PIEZOMETERS ARE LOCATED WITHIN A 10 FEET RADIUS OF THE DESIGNATED BORING.
2. UPPER A-ZONE IS APPROXIMATELY 10 FT. TO 20 FT. BELOW GROUND SURFACE

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300 150 0 300
SCALE IN FEET

NO.	REVISION	DATE	INITIAL

RIVER BIRCH LANDFILL

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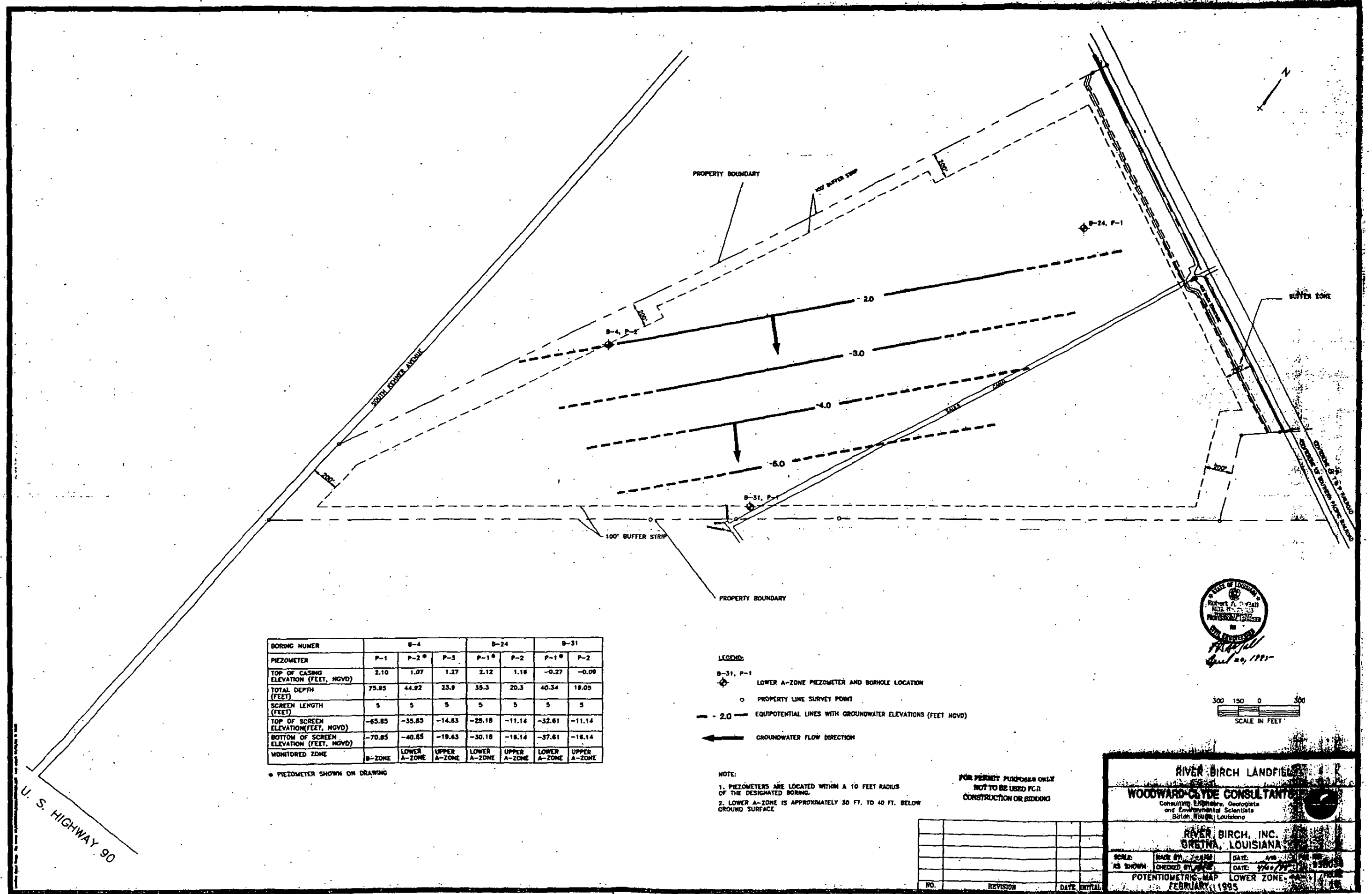
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana

RIVER BIRCH, INC.
GRETNA, LOUISIANA

SCALE: AS SHOWN | DRAWN BY: | DATE: | CHECKED BY: | DATE: 1/24/95

POTENTIOMETRIC MAP UPPER ZONE
FEBRUARY 1995



BORING NUMER	B-4			B-24		B-31	
PIEZOMETER	P-1	P-2 *	P-3	P-1 *	P-2	P-1 *	P-2
TOP OF CASING ELEVATION (FEET, NGVD)	2.10	1.07	1.27	2.12	1.16	-0.27	-0.09
TOTAL DEPTH (FEET)	75.95	44.92	23.9	35.3	20.3	40.34	19.05
SCREEN LENGTH (FEET)	5	5	5	5	5	5	5
TOP OF SCREEN ELEVATION(FEET, NGVD)	-65.85	-35.85	-14.63	-25.18	-11.14	-32.61	-11.14
BOTTOM OF SCREEN ELEVATION (FEET, NGVD)	-70.85	-40.85	-19.63	-30.18	-16.14	-37.61	-16.14
MONITORED ZONE	B-ZONE	LOWER A-ZONE	UPPER A-ZONE	LOWER A-ZONE	UPPER A-ZONE	LOWER A-ZONE	UPPER A-ZONE

* PIEZOMETER SHOWN ON DRAWING

LEGEND:

B-31, P-1 — LOWER A-ZONE PIEZOMETER AND BORHOLE LOCATION

PROPERTY LINE SURVEY POINT

- 2.0 — EQUIPOTENTIAL LINES WITH GROUNDWATER ELEVATIONS (FEET NGVD)

GROUNDWATER FLOW DIRECTION

NOTE:

1. PIEZOMETERS ARE LOCATED WITHIN A 10 FEET RADIUS OF THE DESIGNATED BORING.
2. LOWER A-ZONE IS APPROXIMATELY 30 FT. TO 40 FT. BELOW GROUND SURFACE

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CONSTRUCTION OR BIDDING

NO.	REVISION	DATE	INITIAL

RIVER BIRCH LANDFILL

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana

RIVER BIRCH, INC.
GRETNA, LOUISIANA

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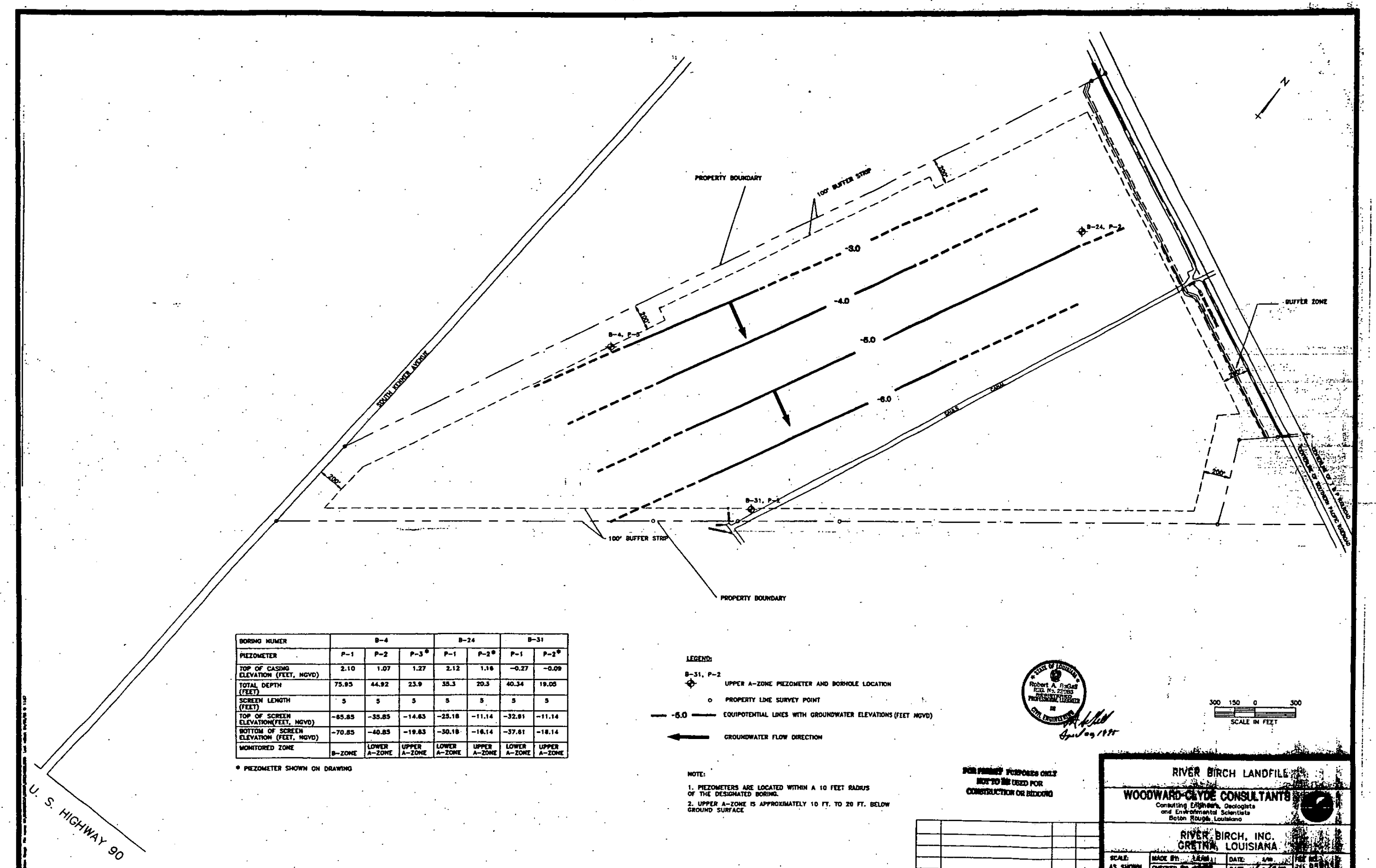
POTENTIOMETRIC MAP LOWER ZONE
FEBRUARY 1995



BORING NUMER	B-4			B-24		B-31	
PIEZOMETER	P-1	P-2	P-3*	P-1	P-2*	P-1	P-2*
TOP OF CASING ELEVATION (FEET, NGVD)	2.10	1.07	1.27	2.12	1.16	-0.27	-0.09
TOTAL DEPTH (FEET)	75.95	44.92	23.9	35.3	20.3	40.34	19.05
SCREEN LENGTH (FEET)	5	5	5	5	5	5	5
TOP OF SCREEN ELEVATION(FEET, NGVD)	-65.85	-35.85	-14.63	-25.18	-11.14	-32.81	-11.14
BOTTOM OF SCREEN ELEVATION (FEET, NGVD)	-70.85	-40.85	-19.63	-30.18	-16.14	-37.81	-16.14
MONITORED ZONE	B-ZONE	LOWER A-ZONE	UPPER A-ZONE	LOWER A-ZONE	UPPER A-ZONE	LOWER A-ZONE	UPPER A-ZONE

* PIEZOMETER SHOWN ON DRAWING

LEGEND:

B-31, P-2 — UPPER A-ZONE PIEZOMETER AND BORHOLE LOCATION

o — PROPERTY LINE SURVEY POINT

-5.0 — EQUIPOTENTIAL LINES WITH GROUNDWATER ELEVATIONS (FEET NGVD)

GROUNDWATER FLOW DIRECTION

NOTE:

1. PIEZOMETERS ARE LOCATED WITHIN A 10 FEET RADIUS OF THE DESIGNATED BORING.

2. UPPER A-ZONE IS APPROXIMATELY 10 FT. TO 20 FT. BELOW GROUND SURFACE

STATE OF LOUISIANA
Robert A. Fickel
REG. No. 22083
REGISTERED PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING
April 29, 1995

300 150 0 300
SCALE IN FEET

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NO.	REVISION	DATE	INITIAL

RIVER BIRCH LANDFILL

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana

RIVER BIRCH, INC.
GRETNA, LOUISIANA

SCALE: AS SHOWN
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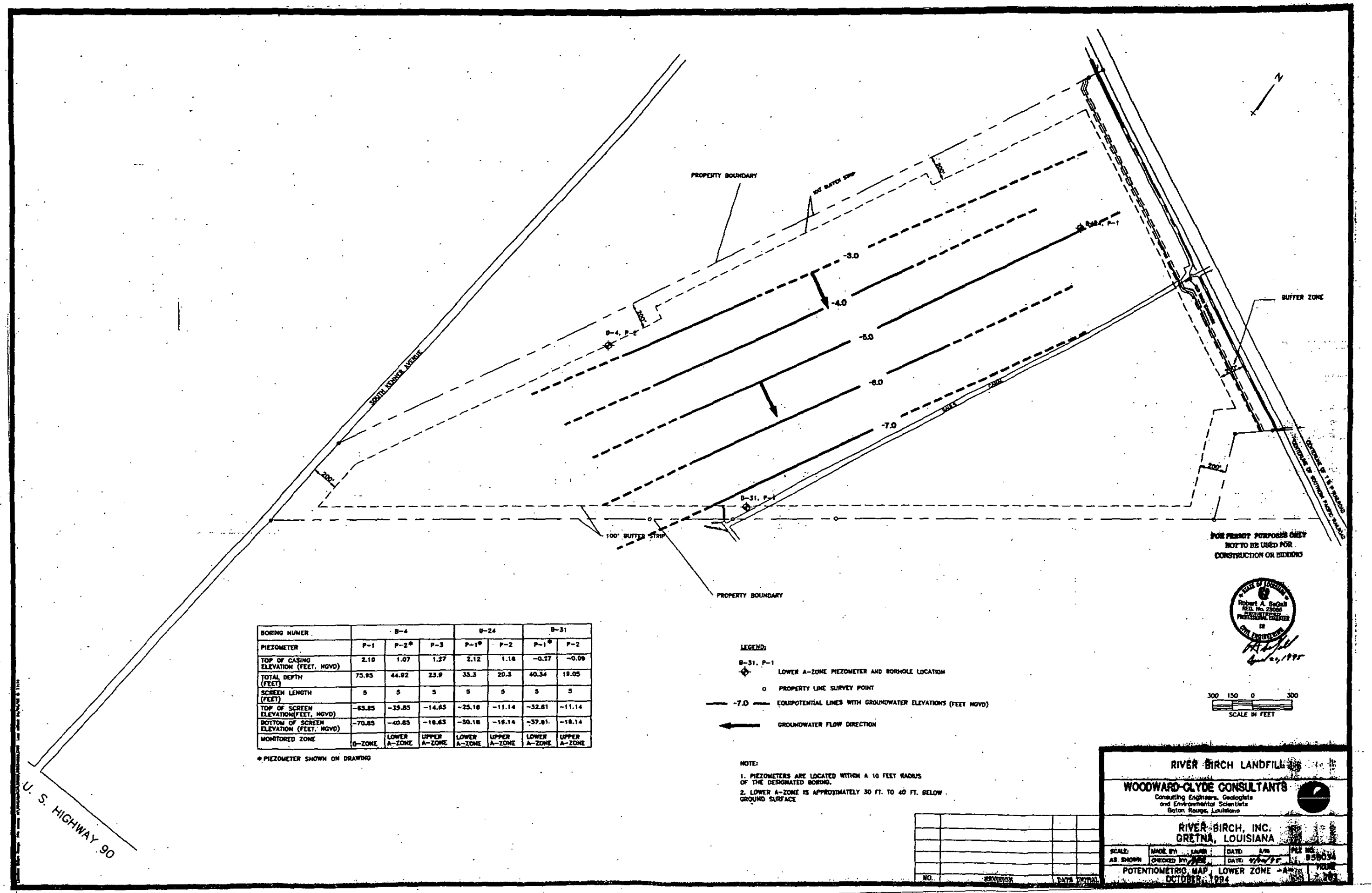
DATE: 4/95
DATE: 4/29/95
FILE NO.: 95B03
FIGURE NO.: 3

POTENTIOMETRIC MAP, UPPER ZONE - A
OCTOBER, 1994



BORING NUMER	B-4			B-24		B-31	
PIEZOMETER	P-1	P-2*	P-3	P-1*	P-2	P-1*	P-2
TOP OF CASING ELEVATION (FEET, NGVD)	2.10	1.07	1.27	2.12	1.16	-0.27	-0.09
TOTAL DEPTH (FEET)	75.95	44.92	23.9	35.3	20.3	40.34	19.05
SCREEN LENGTH (FEET)	5	5	5	5	5	5	5
TOP OF SCREEN ELEVATION(FEET, NGVD)	-65.85	-39.85	-14.63	-25.18	-11.14	-32.61	-11.14
BOTTOM OF SCREEN ELEVATION (FEET, NGVD)	-70.85	-40.85	-18.63	-30.18	-16.14	-37.61	-16.14
MONITORED ZONE	B-ZONE	LOWER A-ZONE	UPPER A-ZONE	LOWER A-ZONE	UPPER A-ZONE	LOWER A-ZONE	UPPER A-ZONE

* PIEZOMETER SHOWN ON DRAWING

LEGEND:

B-31, P-1 — LOWER A-ZONE PIEZOMETER AND BORHOLE LOCATION

o — PROPERTY LINE SURVEY POINT

-7.0 — EQUIPOTENTIAL LINES WITH GROUNDWATER ELEVATIONS (FEET NGVD)

GROUNDWATER FLOW DIRECTION

NOTE:

1. PIEZOMETERS ARE LOCATED WITHIN A 10 FEET RADIUS OF THE DESIGNATED BORING.
2. LOWER A-ZONE IS APPROXIMATELY 30 FT. TO 40 FT. BELOW GROUND SURFACE

NO.	REVISION	DATE	INITIAL

RIVER BIRCH LANDFILL

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana

RIVER BIRCH, INC.
GRETNA, LOUISIANA

SCALE: AS SHOWN | MADE BY: LMAB | DATE: 8/96 | FILE NO. 958034
CHECKED BY: RAS | DATE: 11/04/95

POTENTIOMETRIC MAP, LOWER ZONE -A-
OCTOBER, 1994

FIGURE 2B3

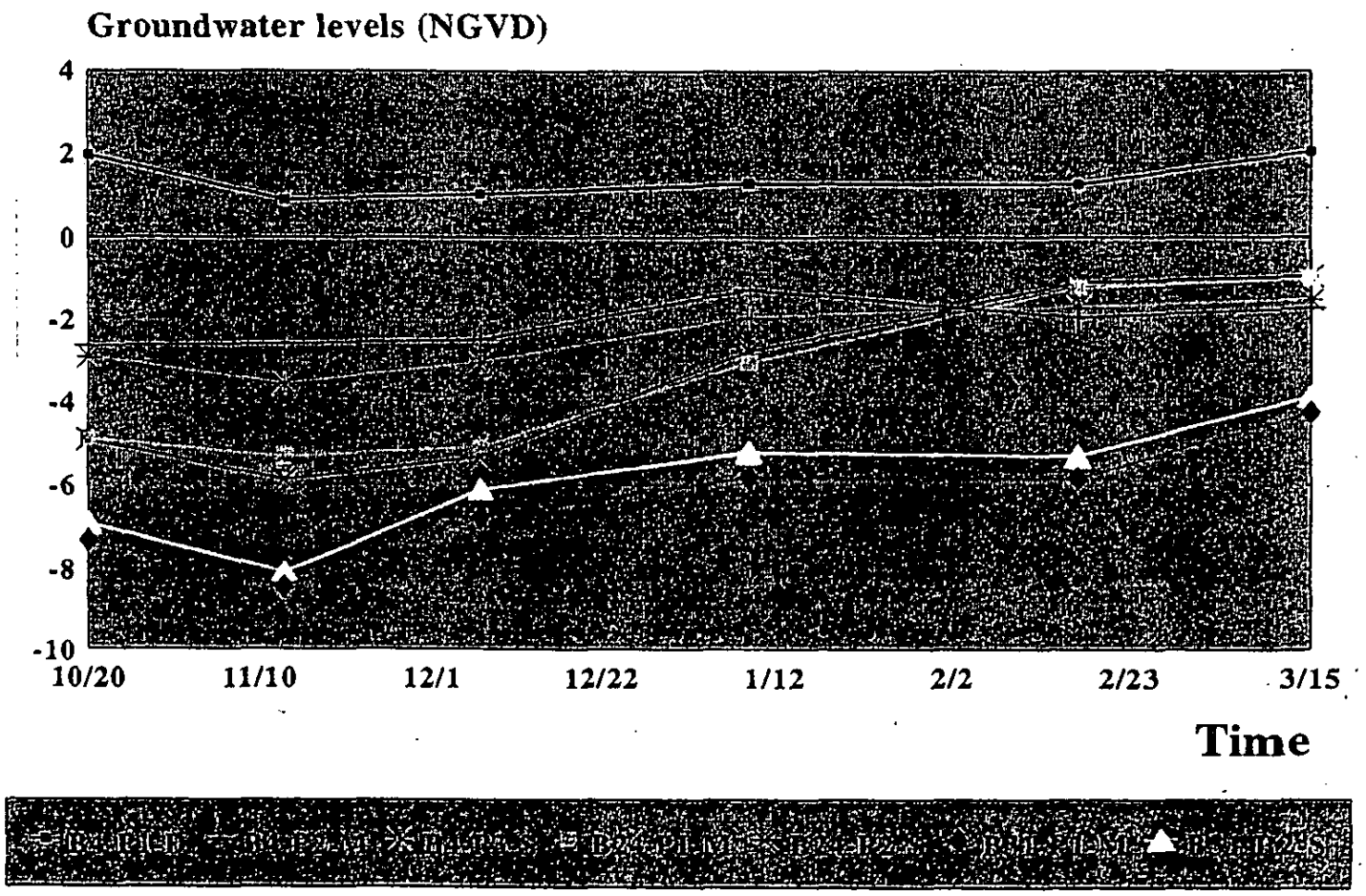
BEST COPY

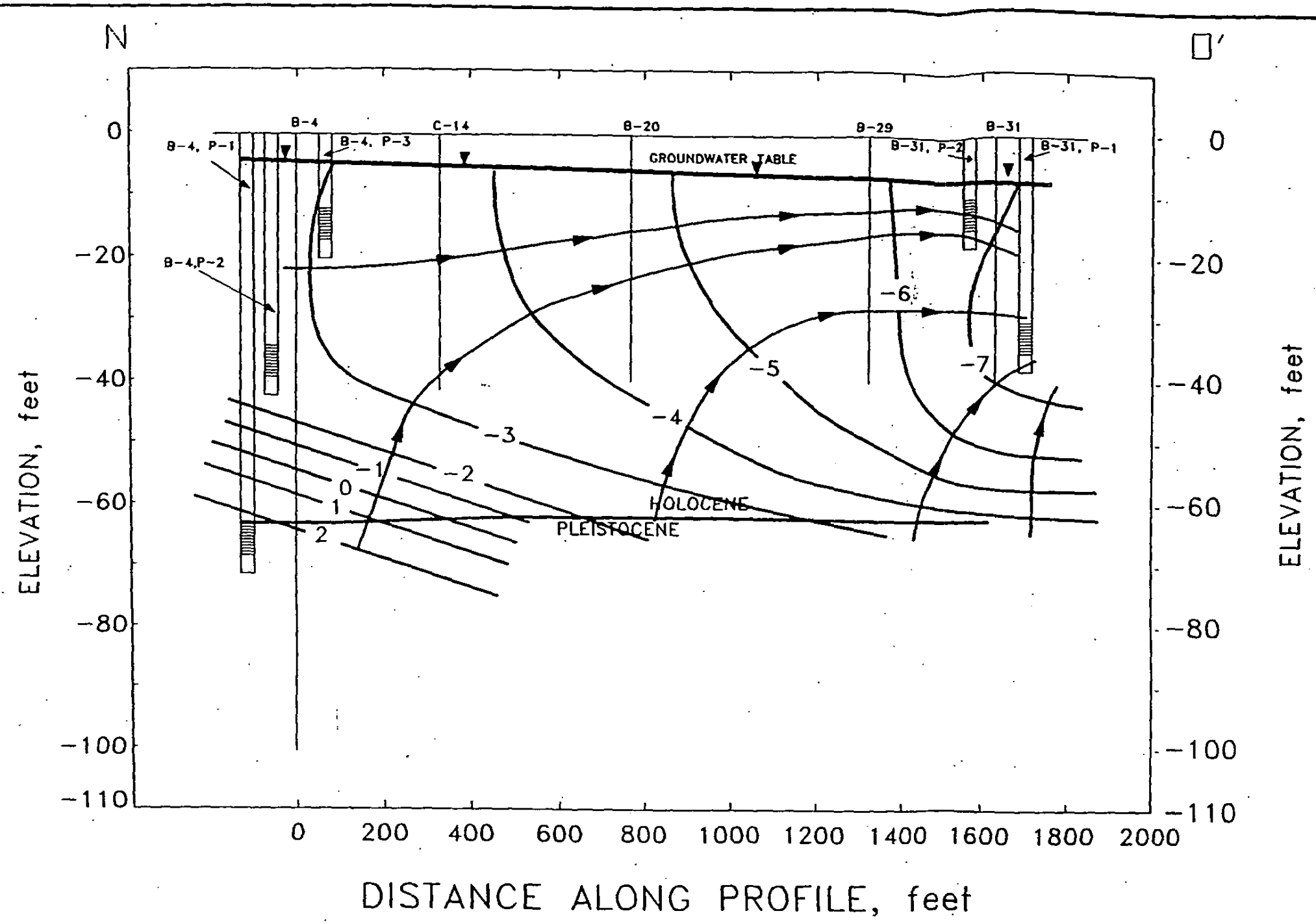
FIGURE 27

RIVER BIRCH LANDFILL

HYDROGRAPH

B





STATE OF LOUISIANA
Robert A. McGall
REG. No. 23086
REGISTERED
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

April 20, 1995

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LEGEND

—— -4 —— EQUIPOTENTIAL LINE (ELEVATION IN FT.)

——→ GROUNDWATER FLOW PATH

BORING NUMER	B-4			B-24		B-31	
PIEZOMETER	P-1	P-2	P-3	P-1	P-2	P-1	P-2
TOP OF CASING ELEVATION (FEET, NGVD)	2.10	1.07	1.27	2.12	1.16	-0.27	-0.09
TOTAL DEPTH (FEET)	75.95	44.92	23.9	35.3	20.3	40.34	19.05
SCREEN LENGTH (FEET)	5	5	5	5	5	5	5
TOP OF SCREEN ELEVATION(FEET, NGVD)	-65.85	-35.85	-14.63	-25.18	-11.14	-32.61	-11.14
BOTTOM OF SCREEN ELEVATION (FEET, NGVD)	-70.85	-40.85	-19.63	-30.18	-16.14	-37.61	-16.14
MONITORED ZONE	B-ZONE	LOWER A-ZONE	UPPER A-ZONE	LOWER A-ZONE	UPPER A-ZONE	LOWER A-ZONE	UPPER A-ZONE

NOTE: PIEZOMETERS ARE LOCATED WITHIN A 10 FEET RADIUS OF THE DESIGNATED BORING.

NOTES:
1. STRATIFICATION BETWEEN BORINGS IS LINEARLY INFERRED BY CORRELATION OF SIMILAR SOIL CLASSIFICATIONS IN ADJACENT BORINGS. SUCH CORRELATIONS ONLY REPRESENT OUR OPINION REGARDING THE CONTINUITY OF STRATIFICATION WITH RESPECT TO THE ENGINEERING AND GEOLOGIC CHARACTERISTICS OF SOIL MATERIALS SAMPLED. ACTUAL SUBSURFACE STRATIFICATIONS MAY DIFFER FROM THE CONDITIONS REPRESENTED ON THE PROFILE AND BETWEEN SAMPLES ON THE BORING LOGS.
2. ALL DEPTHS ARE REFERENCED TO GROUND ELEVATION AT THE TIME BORINGS WERE MADE.
3. SCALES ARE AS SHOWN FOR EACH SECTION.
4. HOLOCENE AND PLEISTOCENE CORRELATION IS INFERRED FROM DEEP BORINGS IN THE SITE WIDE BORING PROGRAM.

DATE	REVISION	DRWN/CHKD

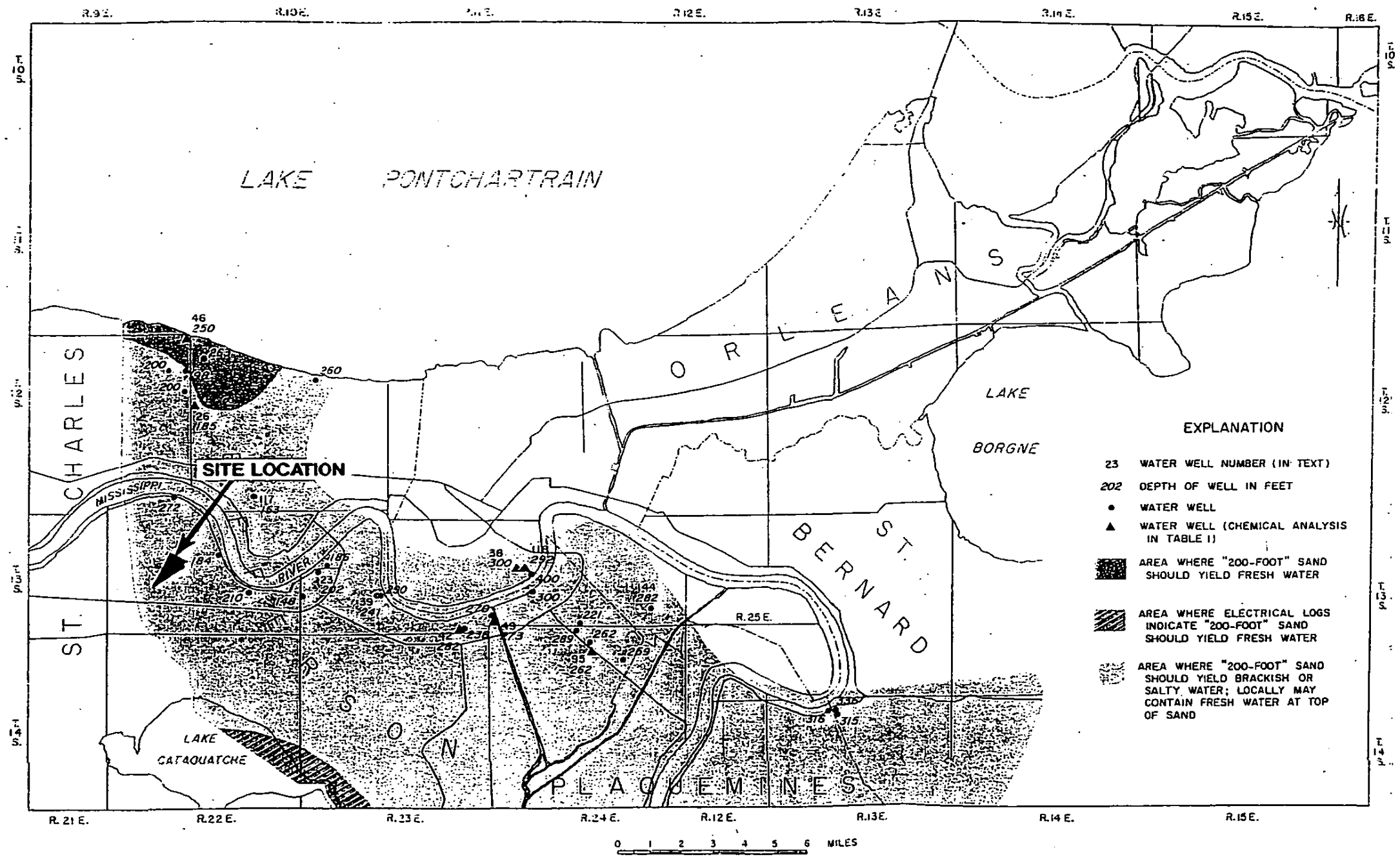
RIVERBIRCH LANDFILL

Woodward-Clyde Consultants
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana

RIVERBIRCH, INC.
GRETNA, LOUISIANA

SCALE: AS SHOWN	MADE BY: T. ALPERS	DATE: 4/95	FILE NO. 958034
	CHECKED BY:	DATE:	FIGURE 28

VERTICAL FLOW NET



SOURCE: LOUISIANA GEOLOGICAL SURVEY; GROUNDWATER RESOURCES OF THE GREATER NEW ORLEANS AREA, LOUISIANA, JULY 1966, PLATE 3.

SOLID WASTE PERMIT APPLICATION

Woodward-Clyde Consultants
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana

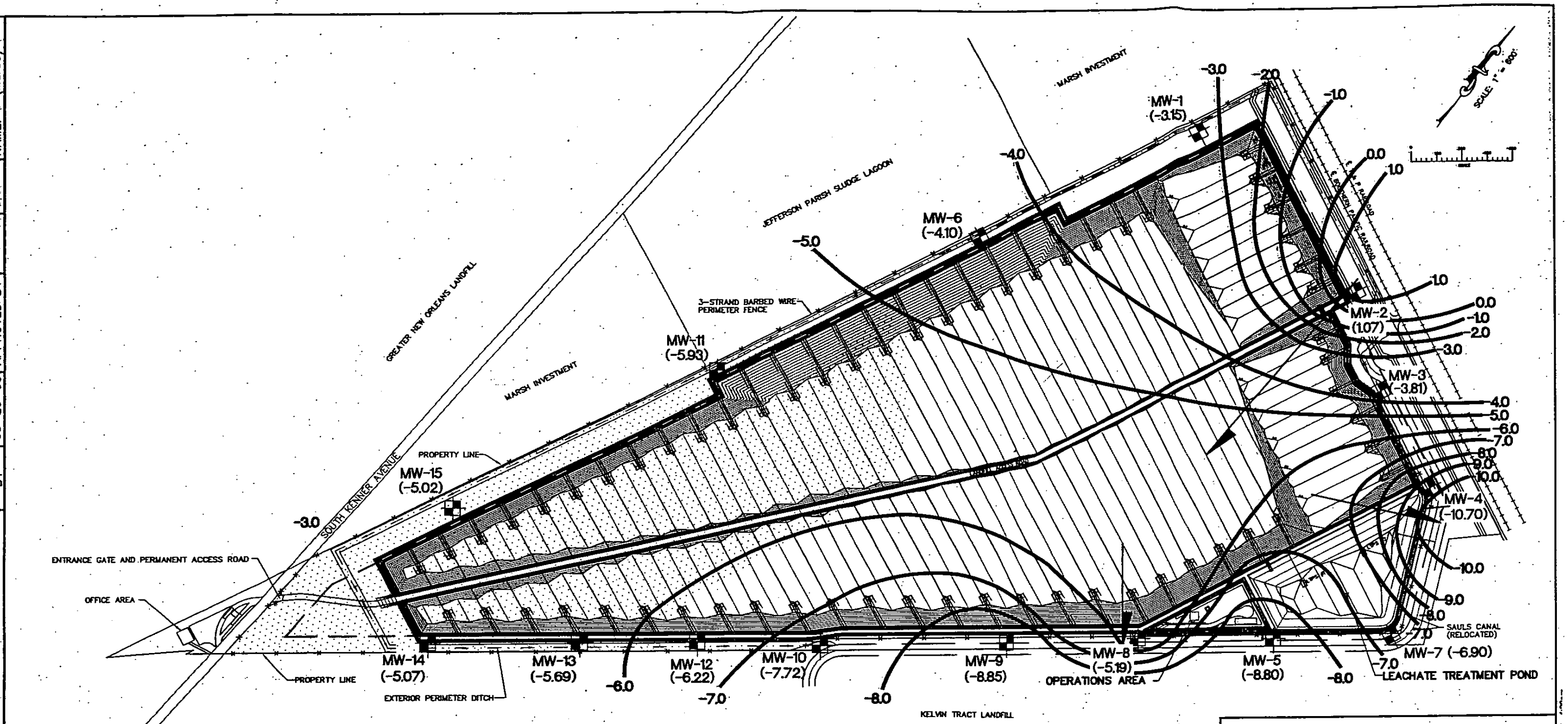
RIVER BIRCH LANDFILL
JEFFERSON PARISH, LOUISIANA

SCALE	MADE BY YQ	DATE 4/95	FILE NO 93B248C
AS SHOWN	CHECKED BY KPQ	DATE 4/95	

AREAL EXTENT OF 200-FOOT SAND

FIGURE 29

DRAWN BY	SWC	CHECKED BY		FILE NAME:	21140-fig3 (Mar05)
	05-29-05	APPROVED BY			



Legend

- MONITORING WELL LOCATION
- WETLANDS
- (-5.98) GROUNDWATER ELEVATION (ft MSL)
- -4.0 GROUNDWATER ELEVATION CONTOUR (ft MSL)
- GROUNDWATER FLOW DIRECTION

NOTE: MAP BASED ON FIGURE 31C-R1 OVERALL SITE PLAN PREPARED BY MADER-MIERS ENGINEERING, INC., DATED MAY 3, 1999.

GROUNDWATER ELEVATION CONTOUR MAP

(NOVEMBER 29-30, 2005)

RIVER BIRCH LANDFILL
2000 SOUTH KENNER ROAD
AVONDALE, LOUISIANA
LDEQ A.I. NO. 32219

PREPARED FOR

RIVER BIRCH, INC.
GRETNA, LOUISIANA

ENGINEERING ASSOCIATES, INC.
CONSULTING ENGINEERS
1415 Delplaza Dr., Ste. B
Baton Rouge, LA. 70815
(225) 926-2025

PART VIII

Geotechnical Report Landfill Expansion – Soil Testing Engineers, January 1999

STE
Soil Testing Engineers, Inc.
316 HIGHLANDIA DRIVE (70810) • P.O. BOX 83710 (70884) • BATON ROUGE, LOUISIANA
PHONE (225) 752-4790 • FAX (225) 752-4878

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DANIEL L. FRANKLIN, JR., MS
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DANIEL J. HOLDER, MS
KENNETH A. FLUKER, MS
ZIAD H. ALEM, MS
STEVE M. MEUNIER

REGISTERED PROFESSIONAL ENGINEERS

VERNON C. ASHWORTH, MS
MICHAEL J. ALLEN

CERTIFIED PROFESSIONAL GEOLOGISTS

BILLY SINGLETON, BS Geology

January 19, 1999

River Birch, Inc.
Post Office Box 1938
Gretna, LA 70054

Attn.: A. J. Ward, Jr.

Re: Geotechnical Report
River Birch Landfill
Avondale, Louisiana
STE File No. 98-1171

Dear Mr. Ward:

Soil Testing Engineers, Inc. (STE) has completed the pertinent geotechnical engineering analyses for the above mentioned site. The work was authorized by River Birch Inc. in October, 1998. Our findings are discussed and presented in the attached report.

Should you have any questions or need more information, please do not hesitate to call our offices.

Sincerely,
Soil Testing Engineers, Inc.

STATE OF LOUISIANA
ZIAD H. ALEM
REG. No. 26365
REGISTERED PROFESSIONAL ENGINEER IN CIVIL ENGINEERING

Ziad H. Alem, P.E.
Senior Geotechnical Engineer

Gordon P. Boutwell, Jr., P.E.
Senior Consultant

Attachments

cc: Paul Miers, P.E., Mader-Miers Engineers.

TABLE OF CONTENTS

Section		Page
1.0	INTRODUCTION	1
2.0	BASAL HEAVE	2
3.0	SLOPE STABILITY	3
3.1	Excavation Stability	4
3.2	Waste Stack Stability	5
3.2.1	Phase I - Zero Consolidation	5
3.2.2	Phase I - One-Year Consolidation	5
3.2.3	Phase II - Three-Year Consolidation	5
3.2.4	Phase III - Six-Year Consolidation	6
3.2.5	Phase III - Eight-Year Consolidation	6
3.2.6	Block Failure	6
4.0	SETTLEMENT	8
5.0	CONCLUSIONS	9

List of Attachments

1. Basal Heave Calculations
2. UTEXAS3 Sample Output File

List of Figures

60 Excavation Stability - Cell 1
61 Excavation Stability - General
62 Phase I - Zero Consolidation
63 Oxidation Pond Stability - Zero Consolidation
64 Phase I - One-Year Consolidation
65 Phase II - Three-Year Consolidation
66 Phase III - Six-Year Consolidation
67 Phase III - Eight-Year Consolidation
68 Oxidation Pond Stability - Eight-Year Consolidation
69 Block Failure
70 Settlement Contours

1.0 INTRODUCTION

Soil Testing Engineers, Inc. (STE) was retained by the River Birch Corporation in October of 1998 to provide geotechnical engineering assistance as part of the re-design of the River Birch Landfill in Avondale, Louisiana. STE's assignement was to investigate engineering concerns such as:

- basal heave to determine the minimum allowable excavation elevations (maximum depth of excavation);
- slope stability to address the stability of both excavation and waste slopes; and
- settlement to determine the loss of grade along the leachate lines due to the ensuing differential settlement.

These concerns are addressed in the following sections. Also, all the elevations mentioned in this report are relative to the National Geodetic Vertical Datum (NGVD).

2.0 BASAL HEAVE

The allowable depth of excavation is governed by several factors. Primary among these are the potential for bottom heave and the thickness of barrier clay remaining below the liner system. At a site underlain at depth by water-bearing permeable deposits, heave usually governs the depth of allowable excavation. Another consideration is control of seepage into the excavation during construction. The amount of seepage is controlled by the storativity and transmissivity of the water-bearing zone.

Soil conditions were obtained from the soil boring logs provided in the Permit Application dated October 5, 1995 and the soil behavior parameters from the provided strength data plus the cone penetrometer testing. Two water-bearing zones are identified. A shallow silt zone occurs sporadically at the site between elevations -22 feet and -8 feet. This zone consists of mostly silty soils of moderately low transmissivity. The deeper zone occurs below elevation -64 feet and is more permeable. The allowable excavation depths at the boring locations based on the shallow silt zone and deep permeable zone are presented in Attachment 1.

For excavations deeper than the allowable excavation depths governed by the shallow zone, basal heave should be controlled. This shallow silt zone is not a continuous stratum. Therefore, seepage cutoff using slurry wall technique would not be effective. The low transmissivity enables an adjustable groundwater control system by installing drains below the clay liner. The drains would lead to a sump or multiple sumps where the water can be pumped out effectively. The drains would be extended depending on the progress of the excavation. Pumping would be stopped once the liner is in place.

All design excavation depths are shallower than the maximum excavation depths dictated by the deep permable zone. Therefore, the deep permeable zone will not impact the excavation of the landfill.

3.0 SLOPE STABILITY

STE analyzed the stability of both the excavation and waste slopes in order to recommend design configurations that are considered safe under worst-case assumptions associated with the loading and waste-filling sequence. Loading and filling sequences are used in these analyses to evaluate the evolution of the strength of the underlying soils as the landfill is being loaded. This evolution is manifested as an increase in the strength of the underlying clays. This geotechnical engineering concept is explained herein.

Saturated cohesive soils undergo volume change in response to a change in stress caused by loading. This change in volume, which is caused by the squeezing of pore water out of the voids and into drainage layers and the subsequent closing of the voids, is more frequently referred to as *consolidation*; its surface manifestation is *settlement*. The rate of consolidation is related to the length of time it takes the water to leave the voids and reach the closest drainage layer. This rate of consolidation at a point in time is measured as a percent of the ultimate settlement, or the *degree of consolidation* at that specific point in time. In normally-consolidated soils, consolidation is accompanied by an increase in the strength of the consolidating soils. The amount of that increase is directly related to the degree of consolidation and is thus time-dependent:

- the amount of maximum possible strength gain increases with the applied load; and
- the amount of actual strength gain increases with time towards the maximum possible strength gain.

STE used the projected filling sequence (representing the worst-case or fastest loading scenario) to determine the gradual increase in strength of the underlying cohesive soils. STE first determined the stress distribution for the various loading configurations defined in the projected filling sequence. STE then determined the degree of consolidation at the center of any normally-consolidated cohesive layer for the duration of each specific loading configuration. The degree of consolidation is then multiplied by the stress increase due to the load to obtain the real stress change at that time. This real stress change is multiplied by the ratio of the undrained strength to the overburden pressure to determine the appropriate strength increase. The strength increase is then added to the undrained strength to determine the partially drained strength at the center of any normally consolidated cohesive unit underlying the site for the duration of a specific loading configuration.

The stability of a slope is measured by its "safety factor", which is the ratio of the soil strength forces resisting movement to the gravitattional forces tending to produce movement. Each potential failure surface has its own safety factor. Numerous potential failure surfaces are analyzed until the one having the lowest safety factor is found. The safety factor on this "critical" surface governs stability.

The strength profile from each specific loading configuration is then used to help create a slope stability analysis model for that configuration. Each model is then analyzed using the computer program UTEXAS3 to determine the most critical potential failure surface and the governing safety factor for each loading configuration.

Three initial phases are defined in the projected filling sequence plan. Phase I will cover the area of Cell 1 with waste elevations of +45 feet and a lifetime of one year. Phase II will expand Phase I to the south by approximately 600 feet with maximum waste elevations at the stack center reaching +55 feet. Phase II will reach capacity in three years after which it will be expanded to the south by approximately 800 feet to create Phase III. Waste elevations in Phase III will ultimately reach +98 feet with a lifetime of eight years. These are conservative assumptions based on worst-case (fastest anticipated) filling scenarios. Furthermore, analyzing these phases is representative of the entire landfill.

The following sections present the various waste-filling models and the corresponding most critical safety factors. A sample UTEXAS3 output file is included in Attachment 2. The various models and the corresponding most critical failure surfaces and safety factors are presented in Figures 60 through 69. During the analyses, close liaison was maintained with the designers (Mader-Miers Engineering) to ensure that the configurations were such as to maintain safety factors within acceptable ranges (1.3 - 1.5).

3.1 Excavation Stability

STE analyzed the stability of the excavation slopes. Two minimum excavation elevations (maximum depth) were considered: -11' in Phase 1 & -16' in subsequent cells. Stability analyses for the short-term should and did use the soils undrained parameters (short-term strength). The analysis revealed most critical safety factors of 1.39 and 1.30 for Cell 1 and for subsequent cells, respectively. These safety factors are considered acceptable in the short term. These factors of safety will gradually increase as the cells fill up with waste and any concern will eventually disappear. The slope stability models for the excavation slopes are presented in Figures 60 and 61. These figures also

illustrate the critical failure surfaces and their corresponding governing safety factors.

3.2 Waste Stack Stability

3.2.1 Phase I - Zero Consolidation

STE performed analyses to determine the stability of the waste slopes in Phase I assuming that no consolidation has taken place. Although this assumption is unrealistic since it implies immediate loading to +45 feet, it nevertheless provides both an understanding of the undrained soil response to the new loads and a baseline for further analyses. The most critical safety factors for the undrained case were 1.29 and 1.18 for the stability of the exterior and interior working faces, respectively. The most critical surfaces, governing safety factors, and a listing of the strength parameters used in this analysis are presented on the Phase I loading model shown in Figure 62. The stability of the waste slopes adjacent to the planned oxidation pond was also investigated and a most critical (governing) factor of safety of 1.49 calculated. The most critical surface and governing safety factor for the oxidation pond are presented in Figure 63.

3.2.2 Phase I - One-Year Consolidation

In this model, the strengths of the underlying normally-consolidated cohesive materials were modified to account for the degree of consolidation at the end of one year, which is the projected lifetime of Phase I. Slope stability analyses were then performed and most critical (governing) safety factors of 1.42 and 1.34 were calculated for the stabilities of the exterior and interior working faces, respectively. The most critical surfaces, governing safety factors, and a listing of the strength parameters used in this analysis are presented on the Phase I loading model shown in Figure 64.

3.2.3 Phase II - Three-Year Consolidation

The projected lifetime of Phase II is approximately three years. Consequently, the strength profile for this model reflects a strength increase characterized by the degree of consolidation over that period of time. Critical (governing) safety factors of 1.46 and 1.31 were calculated for the stabilities of the exterior and interior working faces, respectively. The most critical surfaces, governing safety factors, and a listing of the strength parameters used in this analysis are presented on the Phase II loading model shown in Figure 65.

3.2.4 Phase III - Six-Year Consolidation

The projected lifetime of Phase III is approximately six years (including only the interior and exterior working faces). Consequently, the strength profile for this model reflects a strength increase characterized by the degree of consolidation six years following the completion of Phase II. Critical (governing) safety factors of 1.64 and 1.31 were calculated for the stabilities of the exterior and interior working faces, respectively. The most critical surfaces, governing safety factors, and a listing of the strength parameters used in this analysis are presented on the Phase III loading model shown in Figure 66.

3.2.5 Phase III - Eight-Year Consolidation

Phase III will be completed approximately eight years following its initiation as final cover is be applied on the perimeter slopes. The waste will be placed along 6H:1V interior and exterior slopes to a maximum elevation of 75 feet, followed by a 4% climb to a maximum elevation of 98 feet at the center of the waste stack. The strength profile was consequently modified to reflect the strength increase at the end of the two additional years during which the soils were allowed to consolidate under the increased loads. Critical (governing) safety factors of 1.61 and 1.33 were calculated for the stabilities of the final cover slopes and working interior faces, respectively. The most critical surfaces, governing safety factors, and a listing of the strength parameters used in this analysis are presented on the Phase III loading model shown in Figure 67. The stability of the waste slopes adjacent to the planned oxidation pond was also investigated and a most critical factor of safety of 1.57 calculated. The most critical surface, governing safety factor, and strength parameters used for this analysis are presented in Figure 68.

3.2.6 Block Failure

The bottom liner proposed for the landfill consists of, from top to bottom: one foot of drainage sand, 60-mil high-density polyethylene (HDPE), a geosynthetic clay liner, 40-mil HDPE, and a two-foot re-compacted clay liner. The friction angles along the interfaces between the various layers range from 10 to 20 degrees. The most critical interface is the one between the GCL and the HDPE where the most critical failure surface is expected to occur. The worst-case scenario for this type of failure is when the waste reaches its maximum elevation in Phase III. The analysis for this case yielded a critical (governing) safety factor of 2.42 against a block failure along the GCL-HDPE interface under maximum waste elevations. The model and results are presented in Figure 69.

4.0 SETTLEMENT

The settlement of the underlying soils under the closed landfill loads was calculated. The purpose of this analysis is to investigate the effect of differential settlement on leachate drainage and to consequently devise a grading plan that will account for the loss of gradient at the bottom of the leachate trenches due to differential settlement. Therefore, calculations were made for the settlement at numerous locations. A settlement of approximately 14 feet is expected under the highest landfill elevation (109 feet) with a settlement of approximately three feet at the location of the leachate sumps near the edge of the landfill. The resulting differential settlement is 11 feet over a distance of approximately 1,200 feet, resulting in a loss of gradient of approximately one percent at the bottom of the leachate trenches. A settlement contour map is presented in Figure 70.

5.0 CONCLUSIONS

Geotechnical engineering analyses were performed to evaluate designs for the proposed River Birch Landfill. These analyses included basal heave, slope stability, and settlement. These analyses took into consideration the current soil and hydrologic conditions and the impacts of both construction and waste placement of the strength profile of the underlying soils. Minimum excavation elevations based on two permeable strata were determined and are tabulated in Attachment 1. Most critical safety factors from slope stability analyses assuming both current and future strength conditions were determined. Most critical failure surfaces and the corresponding governing safety factors from these analyses are presented in Figures 60 through 69. Adequate stabilities are indicated. Finally, settlement calculations provided the expected loss of gradient due to differential settlement under design elevations. A settlement contours plan is presented in Figure 70. The ultimate settlement will result in a loss of gradient of about one percent from the as-constructed drainage pipe slope, which is 1.6%. Thus, positive drainage will still be maintained.

ATTACHMENT I
Basal Heave Calculations

RIVER BIRCH LANDFILL
AVONDALE, LOUISIANA
MINIMUM EXCAVATION ELEVATIONS
SHALLOW PERMEABLE ZONE

Boring	Water Elev. (ft MSL)	Top of Zone B Elev. (ft MSL)	Mean Soil Density (pcf)	Hw (ft)	Hs (ft)	Max. Excav. Depth (ft)	Min. Excav. Elev. (ft MSL)
B-1	-2.0	-40.2	97.5	38.2	26.9	13.1	-13.3
B-2	-2.0	-42	98	40.0	28.0	12.0	-14.0
B-3	-2.0	-42.5	98	40.5	28.4	11.6	-14.1
B-4	-2.0	-33.4	96	31.4	22.5	9.5	-10.9
B-5	-2.0	-39	95	37.0	26.7	11.3	-12.3
B-6	-2.0	-27	95	25.0	18.1	7.9	-8.9
B-7	-2.0	-40.7	95	38.7	28.0	12.0	-12.7
B-8	-2.0	-22.3	96	20.3	14.5	7.5	-7.8
B-9	-2.0	-40.2	100	38.2	26.2	13.8	-14.0
B-10	-2.0	-39.9	102	37.9	25.5	14.5	-14.4
B-11	-2.0	-40.5	100	38.5	26.4	13.6	-14.1
B-12	-2.0	-41.1	95	39.1	28.3	11.7	-12.8
B-13	-2.0	-41.2	100	39.2	26.9	13.1	-14.3
B-14	-2.0	-41.4	97	39.4	27.9	12.1	-13.5
B-15	-3.0	-42.9	96	39.9	28.5	11.5	-14.4
B-16	-2.0	-41.7	97	39.7	28.1	11.9	-13.6
B-17	-2.0	-41	100	39.0	26.8	13.2	-14.2
B-18	-2.5	-41.5	98	39.0	27.3	12.7	-14.2
B-19	-3.0	-42	95.5	39.0	28.0	12.0	-14.0
B-20	-4.0	-41.6	99.5	37.6	25.9	14.1	-15.7
B-21	-3.0	-41.5	100	38.5	26.4	13.6	-15.1
B-22	-2.0	-35.3	101	33.3	22.6	11.4	-12.7
B-23	-2.0	-41.2	95	39.2	28.3	11.7	-12.9
B-24	-2.0	-23.6	95	21.6	15.6	7.9	-8.0
B-25	-2.0	-39.7	98	37.7	26.4	13.6	-13.3
B-26	-2.0	-40.8	99.5	38.8	26.8	13.2	-14.0
B-27	-2.0	-41.5	95	39.5	28.5	11.5	-13.0
B-28	-3.5	-41.4	95	37.9	27.4	12.6	-14.0
B-29	-5.0	-41.4	99	36.4	25.2	14.8	-16.2
B-30	-4.5	-41.8	105	37.3	24.4	15.6	-17.4
B-31	-5.0	-41.9	99	36.9	25.6	14.4	-16.3
B-32	-5.0	-29.4	102	24.4	16.4	11.6	-13.0
B-33	-4.0	-41.7	95	37.7	27.2	12.8	-14.5

RIVER BIRCH LANDFILL
AVONDALE, LOUISIANA
MINIMUM EXCAVATION ELEVATIONS
SHALLOW PERMEABLE ZONE (CONT.)

Boring	Water Elev. (ft MSL)	Top of Zone B Elev. (ft MSL)	Mean Soil Density (pcf)	Hw (ft)	Hs (ft)	Max. Excav. Depth (ft)	Min. Excav. Elev. (ft MSL)
B-34	-3.0	-41.5	95	38.5	27.8	12.2	-13.7
B-35	-2.0	-40.7	95	38.7	28.0	12.0	-12.7
B-36	-2.0	-31.9	95	29.9	21.6	10.4	-10.3
B-37	-3.5	-40.7	103	37.2	24.8	15.2	-15.9
B-38	-4.5	-40.9	104	36.4	24.0	16.0	-16.9
B-39	-5.0	-22.8	108	17.8	11.3	10.7	-11.5
B-40	-5.0	-41.2	95	36.2	26.2	13.8	-15.0
B-41	-5.0	-40.6	95	35.6	25.7	14.3	-14.9
B-42	-4.0	-40.3	105	36.3	23.7	16.3	-16.6
B-43	-5.0	-40.6	104	35.6	23.5	16.5	-17.1
B-44	-5.0	-20.3	95	15.3	11.1	8.9	-9.2
C-1	-2.0	-40.2	100	38.2	26.2	13.8	-14.0
C-2	-2.0	-19.1	100	17.1	11.7	6.3	-7.4
C-3	-2.0	-19.25	100	17.3	11.8	5.2	-7.4
C-4	-2.0	-41.95	100	40.0	27.4	12.6	-14.5
C-5	-2.0	-17.2	100	15.2	10.4	5.6	-6.8
C-6	-2.0	-41	100	39.0	26.8	13.2	-14.2
C-7	-2.0	-33.85	100	31.9	21.9	11.1	-12.0
C-8	-2.0	-19.5	100	17.5	12.0	7.0	-7.5
C-9	-2.0	-14.2	100	12.2	8.4	5.6	-5.8
C-10	-2.0	-19.2	100	17.2	11.8	7.2	-7.4
C-11	-2.0	-19.3	100	17.3	11.9	6.6	-7.4
C-12	-2.0	-19.15	100	17.2	11.8	6.2	-7.4
C-13	-2.0	-18.3	100	16.3	11.2	5.8	-7.1
C-14	-3.0	-36.15	100	33.2	22.8	11.2	-13.4
C-15	-2.0	-41.3	100	39.3	27.0	12.0	-14.3
C-16	-2.0	-40.35	100	38.4	26.3	12.7	-14.0
C-17	-2.0	-41.25	100	39.3	26.9	13.1	-14.3
C-18	-4.0	-20.8	100	16.8	11.5	7.5	-9.3
C-19	-3.5	-38.55	100	35.1	24.1	12.9	-14.5
C-20	-2.0	-19.4	100	17.4	11.9	6.1	-7.5
C-21	-2.0	-15.3	100	13.3	9.1	4.9	-6.2
C-22	-2.0	-34.25	100	32.3	22.1	10.9	-12.1
C-23	-2.0	-40.65	100	38.7	26.5	13.5	-14.1
C-24	-2.0	-39.8	100	37.8	25.9	14.1	-13.9

RIVER BIRCH LANDFILL
AVONDALE, LOUISIANA
MINIMUM EXCAVATION ELEVATIONS
SHALLOW PERMEABLE ZONE (CONT.)

Boring	Water Elev. (ft MSL)	Top of Zone B Elev. (ft MSL)	Mean Soil Density (pcf)	Hw (ft)	Hs (ft)	Max. Excav. Depth (ft)	Min. Excav. Elev. (ft MSL)
C-25	-2.0	-18.25	100	16.3	11.2	6.8	-7.1
C-26	-2.0	-34.15	100	32.2	22.1	10.9	-12.1
C-27	-3.5	-12.3	100	8.8	6.0	4.0	-6.3
C-28	-4.0	-34.4	100	30.4	20.9	12.1	-13.5
C-29	-5.0	-18.6	100	13.6	9.3	7.7	-9.3
C-30	-3.5	-14.6	100	11.1	7.6	5.4	-7.0
C-31	-5.0	-19.85	100	14.9	10.2	7.8	-9.7
C-32	-5.0	-18.55	100	13.6	9.3	7.7	-9.2
C-33	-4.0	-10.6	100	6.6	4.5	4.5	-6.1
C-34	-3.5	-10.1	100	6.6	4.5	4.5	-5.6
C-35	-3.0	-22.8	100	19.8	13.6	9.4	-9.2
C-36	-4.0	-10.3	100	6.3	4.3	5.7	-6.0
C-37	-4.5	-40.8	100	36.3	24.9	15.1	-15.9
C-38	-5.0	-21	100	16.0	11.0	9.0	-10.0
C-39	-5.0	-21.4	100	16.4	11.3	8.7	-10.1
C-40	-5.0	-8	100	3.0	2.1	3.0	-4.0
C-41	-5.0	-19.9	100	14.9	10.2	8.8	-9.7
C-42	-4.0	-18.45	100	14.5	9.9	8.1	-8.5
C-43	-3.0	-20.1	100	17.1	11.7	8.3	-8.4
C-44	-2.0	-34.45	100	32.5	22.3	11.7	-12.2

* Boring is outside the cut area.

RIVER BIRCH LANDFILL
AVONDALE, LOUISIANA
MINIMUM EXCAVATION ELEVATIONS
DEEP PERMEABLE ZONE

Boring	Water Elev. (ft MSL)	Top of Zone B Elev. (ft MSL)	Mean Soil Density (pcf)	Hw (ft)	Hs (ft)	Max. Excav. Depth (ft)	Min. Excav. Elev. (ft MSL)
B-1	0.5	-75	97.5	75.5	53.2	21.6	-21.8
B-2	1.0	-75	98	76.0	53.2	19.8	-21.8
B-3	1.0	-70	98	71.0	49.7	17.8	-20.3
B-4	1.5	-73.4	96	74.9	53.6	18.4	-19.8
B-5	1.8	-70	95	71.8	51.9	17.1	-18.1
B-6	2.0	-70	95	72.0	52.0	17.0	-18.0
B-7	2.5	-70	95	72.5	52.4	16.9	-17.6
B-8	2.8	-69	96	71.8	51.3	17.4	-17.7
B-9	3.0	-67.2	100	70.2	48.2	18.8	-19.0
B-10	2.6	-70	102	72.6	48.9	21.2	-21.1
B-11	2.3	-72	100	74.3	51.0	20.5	-21.0
B-12	2.0	-70	95	72.0	52.0	16.9	-18.0
B-13	1.6	-70	100	71.6	49.1	19.7	-20.9
B-14	1.5	-70	97	71.5	50.6	18.0	-19.4
B-15	1.0	-70	96	71.0	50.8	16.3	-19.2
B-16	0.6	-70	97	70.6	50.0	18.3	-20.0
B-17	0.5	-75	100	75.5	51.8	22.2	-23.2
B-18	0.5	-65	98	65.5	45.9	17.6	-19.1
B-19	0.6	-65	95.5	65.6	47.1	15.9	-17.9
B-20	0.8	-65	99.5	65.8	45.4	18.0	-19.6
B-21	1.2	-73.5	100	74.7	51.3	20.7	-22.2
B-22	1.6	-70	101	71.6	48.7	20.0	-21.3
B-23	1.8	-75	95	76.8	55.5	18.3	-19.5
B-24	2.0	-70	95	72.0	52.0	17.9	-18.0
B-25	2.0	-75	98	77.0	53.9	21.4	-21.1
B-26	1.7	-75	99.5	76.7	52.9	21.3	-22.1
B-27	1.3	-75	95	76.3	55.1	18.4	-19.9
B-28	1.0	-70	95	71.0	51.3	17.3	-18.7
B-29	0.7	-65	99	65.7	45.6	18.0	-19.4
B-30	0.5	-63.8	105	64.3	42.0	20.0	-21.8
B-31	0.5	-65	99	65.5	45.4	17.7	-19.6
B-32	0.6	-65	102	65.6	44.1	19.5	-20.9
B-33	0.8	-101.7	95	102.5	74.1	25.9	-27.6
B-34	1.2	-80	95	81.2	58.7	19.8	-21.3

RIVER BIRCH LANDFILL
AVONDALE, LOUISIANA
MINIMUM EXCAVATION ELEVATIONS
DEEP PERMEABLE ZONE (CONT.)

Boring	Water Elev. (ft MSL)	Top of Zone B Elev. (ft MSL)	Mean Soil Density (pcf)	Hw (ft)	Hs (ft)	Max. Excav. Depth (ft)	Min. Excav. Elev. ((ft MSL)
B-35	1.6	-80	95	81.6	59.0	20.3	-21.0
B-36	1.4	-80	95	81.4	58.8	21.3	-21.2
B-37	1.0	-83.7	103	84.7	56.4	26.6	-27.3
B-38	0.7	-80	104	80.7	53.3	25.8	-26.7
B-39	0.5	-65	108	65.5	41.6	22.6	-23.4
B-40	0.5	-75	95	75.5	54.6	19.2	-20.4
B-41	0.6	-75	95	75.6	54.6	19.8	-20.4
B-42	0.9	-75	105	75.9	49.6	25.1	-25.4
B-43	0.5	-75	104	75.5	49.8	24.6	-25.2
B-44	0.6	-75	95	75.6	54.6	20.1	-20.4
E-1	3.0	-70	104	73.0	48.2	21.6	-21.8
E-2	0.5	-75	114	75.5	45.5	28.9	-29.5
E-3	0.5	-75	105	75.5	49.4	25.4	-25.6

* Boring is outside the cut area.

ATTACHMENT 2
UTEXAS3 Sample Output File

TABLE NO. 1

```
*****************************************
* COMPUTER PROGRAM DESIGNATION - UTEXAS3 *
* Originally Coded By Stephen G. Wright  *
* Version No. 1.120                      *
* Last Revision Date 10/08/92            *
* (C) Copyright 1985-1992 S. G. Wright   *
* All Rights Reserved                    *
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*****************************************************************
*                                                               *
*      RESULTS OF COMPUTATIONS PERFORMED USING THIS COMPUTER *
* PROGRAM SHOULD NOT BE USED FOR DESIGN PURPOSES UNLESS THEY *
* HAVE BEEN VERIFIED BY INDEPENDENT ANALYSES, EXPERIMENTAL   *
* DATA OR FIELD EXPERIENCE. THE USER SHOULD UNDERSTAND THE   *
* ALGORITHMS AND ANALYTICAL PROCEDURES USED IN THE COMPUTER  *
* PROGRAM AND MUST HAVE READ ALL DOCUMENTATION FOR THIS      *
* PROGRAM BEFORE ATTEMPTING ITS USE.                         *
*                                                               *
*      NEITHER THE UNIVERSITY OF TEXAS NOR STEPHEN G. WRIGHT *
* MAKE OR ASSUME LIABILITY FOR ANY WARRANTIES, EXPRESSED OR  *
* IMPLIED, CONCERNING THE ACCURACY, RELIABILITY, USEFULNESS  *
* OR ADAPTABILITY OF THIS COMPUTER PROGRAM.                  *
*                                                               *
*****************************************************************
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RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 2

****

* NEW PROFILE LINE DATA *
****

PROFILE LINE 1 - MATERIAL TYPE = 1
WASTE

Point	X	Y
1	337.000	45.000
2	1500.000	45.000

PROFILE LINE 3 - MATERIAL TYPE = 3
NON CONSOLIDATED CLAY

Point	X	Y
1	715.000	.720
2	760.000	.000
3	817.000	.000
4	877.000	-6.000

PROFILE LINE 4 - MATERIAL TYPE = 4
NON CONSOLIDATED CLAY

Point	X	Y
1	715.100	-6.000
2	877.000	-6.000
3	957.000	-14.000
4	1500.000	-14.000

PROFILE LINE 5 - MATERIAL TYPE = 5
CONSOLIDATED CLAY

Point	X	Y
1	640.000	-1.920
2	715.000	.720

3	715.100	-6.000
4	715.200	-16.000

PROFILE LINE 6 - MATERIAL TYPE = 6
CONSOLIDATED CLAY

Point	X	Y
1	565.000	-3.120
2	640.000	-1.920
3	640.100	-16.000

PROFILE LINE 7 - MATERIAL TYPE = 7
CONSOLIDATED CLAY

Point	X	Y
1	490.000	-4.320
2	565.000	-3.120
3	565.100	-6.000

PROFILE LINE 8 - MATERIAL TYPE = 8
CONSOLIDATED CLAY

Point	X	Y
1	337.000	-6.770
2	490.000	-4.320
3	490.100	-16.000

PROFILE LINE 9 - MATERIAL TYPE = 9
NON CONSOLIDATED CLAY

Point	X	Y
1	715.200	-16.000
2	1500.000	-16.000

PROFILE LINE 10 - MATERIAL TYPE = 10
CONSOLIDATED CLAY

Point	X	Y
1	640.100	-16.000
2	715.100	-16.000
3	715.200	-40.000

PROFILE LINE 11 - MATERIAL TYPE = 11
UNCONSOLIDATED CLAY

Point	X	Y
1	565.100	-16.000
2	640.100	-16.000
3	640.200	-40.000

PROFILE LINE 12 - MATERIAL TYPE = 12
CONSOLIDATED CLAY

Point	X	Y
1	490.100	-16.000
2	565.100	-16.000
3	565.200	-40.000

PROFILE LINE 13 - MATERIAL TYPE = 13
CONSOLIDATED CLAY

Point	X	Y
1	337.000	-16.000
2	490.100	-16.000

PROFILE LINE 14 - MATERIAL TYPE = 14
CONSOLIDATED CLAY

Point	X	Y
1	640.200	-40.000
2	715.200	-40.000
3	715.300	-60.000

PROFILE LINE 15 - MATERIAL TYPE = 15
CONSOLIDATED CLAY

Point	X	Y
1	565.200	-40.000
2	640.200	-40.000
3	640.300	-60.000

PROFILE LINE 16 - MATERIAL TYPE = 16
CONSOLIDATED CLAY

Point	X	Y
1	490.200	-40.000
2	565.200	-40.000
3	565.300	-60.000

PROFILE LINE 17 - MATERIAL TYPE = 17
CONSOLIDATED CLAY

Point	X	Y
1	337.000	-40.000
2	490.200	-40.000

PROFILE LINE 18 - MATERIAL TYPE = 18
OVERCONSLIDATED CLAY

Point	X	Y
1	337.000	-60.000

2	1500.000	-60.000

All new profile lines defined - No old lines retained

1 UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 9
****
* NEW SLOPE GEOMETRY DATA *
****

All new data input - No old data retained

Slope Coordinates -

Point	X	Y
1	337.000	45.000
2	490.000	45.000
3	760.000	.000
4	817.000	.000
5	957.000	-14.000
6	1500.000	-14.000

1 UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 3
****
* NEW MATERIAL PROPERTY DATA - CONVENTIONAL/FIRST-STAGE COMPUTATIOI
****

DATA FOR MATERIAL TYPE 1

WASTE

Unit weight of material = 63.000

CONVENTIONAL (ISOTROPIC) SHEAR STRENGTHS
Cohesion - - - - - - - - - 300.000
Friction angle - - - - - 23.000 degrees

No (or zero) pore water pressures

DATA FOR MATERIAL TYPE 3
NON CONSOLIDATED CLAY

Unit weight of material = 109.000

CONVENTIONAL (ISOTROPIC) SHEAR STRENGTHS
Cohesion - - - - - - - - - 400.000
Friction angle - - - - - .000 degrees

No (or zero) pore water pressures

DATA FOR MATERIAL TYPE 5
CONSOLIDATED CLAY

Unit weight of material = 102.000

CONVENTIONAL (ISOTROPIC) SHEAR STRENGTHS
Cohesion - - - - - - - - - 302.000
Friction angle - - - - - .000 degrees

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 6
CONSOLIDATED CLAY

Unit weight of material = 102.000

CONVENTIONAL (ISOTROPIC) SHEAR STRENGTHS
Cohesion - - - - - - - - - 347.000
Friction angle - - - - - .000 degrees

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 7
CONSOLIDATED CLAY

Unit weight of material = 102.000

CONVENTIONAL (ISOTROPIC) SHEAR STRENGTHS
Cohesion - - - - - - - - - 419.000
Friction angle - - - - - .000 degrees

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 8
CONSOLIDATED CLAY

Unit weight of material = 102.000

CONVENTIONAL (ISOTROPIC) SHEAR STRENGTHS
Cohesion - - - - - - - - - 6860.000
Friction angle - - - - - .000 degrees

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 9
NON CONSOLIDATED CLAY

Unit weight of material = 104.000

STRENGTH INCREASES LINEARLY WITH DEPTH BELOW PROFILE LINE
Strength at (along) profile line - - - - - - - - 160.000
Increase in strength per unit of depth - - - - 8.800

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 10
CONSOLIDATED CLAY

Unit weight of material = 104.000

STRENGTH INCREASES LINEARLY WITH DEPTH BELOW PROFILE LINE
Strength at (along) profile line - - - - - - - - 185.000
Increase in strength per unit of depth - - - - 8.800

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 11
CONSOLIDATED CLAY

Unit weight of material = 104.000

STRENGTH INCREASES LINEARLY WITH DEPTH BELOW PROFILE LINE
Strength at (along) profile line - - - - - - - - 217.000
Increase in strength per unit of depth - - - - 8.800

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 12
CONSOLIDATED CLAY

Unit weight of material = 104.000

STRENGTH INCREASES LINEARLY WITH DEPTH BELOW PROFILE LINE
Strength at (along) profile line - - - - - - - - 267.000
Increase in strength per unit of depth - - - - 8.800

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 13
CONSOLIDATED CLAY

Unit weight of material = 104.000

STRENGTH INCREASES LINEARLY WITH DEPTH BELOW PROFILE LINE
Strength at (along) profile line - - - - - - - - 469.000
Increase in strength per unit of depth - - - - 8.800

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 14
CONSOLIDATED CLAY

Unit weight of material = 104.000

STRENGTH INCREASES LINEARLY WITH DEPTH BELOW PROFILE LINE
Strength at (along) profile line - - - - - - - - 388.000
Increase in strength per unit of depth - - - - 8.800

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 15

CONSOLIDATED CLAY

Unit weight of material = 104.000

STRENGTH INCREASES LINEARLY WITH DEPTH BELOW PROFILE LINE
Strength at (along) profile line - - - - - - - - 402.000
Increase in strength per unit of depth - - - - 8.800

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 16
CONSOLIDATED CLAY

Unit weight of material = 104.000

STRENGTH INCREASES LINEARLY WITH DEPTH BELOW PROFILE LINE
Strength at (along) profile line - - - - - - - - 424.000
Increase in strength per unit of depth - - - - 8.800

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 17
CONSOLIDATED CLAY

Unit weight of material = 104.000

STRENGTH INCREASES LINEARLY WITH DEPTH BELOW PROFILE LINE
Strength at (along) profile line - - - - - - - - 514.000
Increase in strength per unit of depth - - - - 8.800

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 18
OVER CONSOLIDATED PLEISTOCENE

Unit weight of material = 104.000

STRENGTH INCREASES LINEARLY WITH DEPTH BELOW PROFILE LINE
Strength at (along) profile line - - - - - - - - 1500.000
Increase in strength per unit of depth - - - - 8.800

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

DATA FOR MATERIAL TYPE 4
NON CONSOLIDATED CLAY

Unit weight of material = 102.000

CONVENTIONAL (ISOTROPIC) SHEAR STRENGTHS
Cohesion - - - - - - - - - 280.000
Friction angle - - - - - .000 degrees

Pore water pressures defined by piezometric line
Number of the piezometric line used = 1
Negative pore pressures set to zero

All new material properties defined - No old data retained
1 UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 5
****
* NEW PIEZOMETRIC LINE DATA - CONVENTIONAL/FIRST-STAGE COMPUTATIONS *
****

Line No.	Point	X	Y
1 - Unit weight of water =			62.40
1	1	337.000	-4.000
1	2	857.000	-4.000
1	3	957.000	-14.000
1	4	1500.000	-14.000

All new piezometric lines defined - No old lines retained

1 UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT

Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP

RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 15

```
**********************************
* NEW ANALYSIS/COMPUTATION DATA *
**********************************
```

Circular Shear Surface(s)

Automatic Search Performed

Starting Center Coordinate for Search at -

X = 700.000
Y = 50.000

Required accuracy for critical center (= minimum spacing between grid points) = 1.000

Critical shear surface not allowed to pass below Y = -60.000

For the initial mode of search
all circles are tangent to horizontal line at -

Y = -60.000

Short form of output will be used for search

Procedure used to compute the factor of safety: SPENCER

THE FOLLOWING REPRESENT EITHER DEFAULT OR PREVIOUSLY DEFINED VALUES

Initial trial estimate for the factor of safety = 3.000

Initial trial estimate for side force inclination = 15.000 degrees
(Applicable to Spencer's procedure only)

Maximum number of iterations allowed for
calculating the factor of safety = 40

Allowed force imbalance for convergence = 100.000

Allowed moment imbalance for convergence = 100.000

Initial trial values for factor of safety (and side force inclinati
for Spencer's procedure) will be kept constant during search

Maximum subtended angle to be used for subdivision of the
circle into slices = 3.00 degrees

Depth of crack = .000

Search will be continued to locate a more critical shear
surface (if one exists) after the initial mode is complete

Depth of water in crack = .000

Unit weight of water in crack = 62.400

Seismic coefficient = .000

Conventional (single-stage) computations to be performed
UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT

Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 20

****
* SHORT-FORM TABLE FOR SEARCH WITH CIRCULAR SHEAR SURFACES *
****

Mode		Center Coordinates of Critical Circle X	Y	Radius	1-Stage Factor of Safety	Side Force Inclin
2	Tangent Line at Y = -60.0	639.000	167.000	227.000	1.355	-3.04
3	Constant Radius of R = 227.0	632.000	173.000	227.000	1.341	-3.02
2	Tangent Line at Y = -54.0	632.000	173.000	227.000	1.341	-3.02

TABLE NO. 21

***** 1-STAGE FINAL CRITICAL CIRCLE INFORMATION *****

X Coordinate of Center - - - - - - - - 632.000
Y Coordinate of Center - - - - - - - - 173.000
Radius - - - - - - - - - - - - - - - - 227.000
Factor of Safety - - - - - - - - - - - 1.341
Side Force Inclination - - - - - - - - -3.02

Number of circles tried - - - - - - - - 141
No. of circles F calc. for - - - - - - 134

1 UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT

Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 26

```
*****************************************************************
*  Coordinate, Weight, Strength and Pore Water Pressure         *
*  Information for Individual Slices for Conventional           *
*  Computations or First Stage of Multi-Stage Computations.     *
*  (Information is for the Critical Shear Surface in the        *
*  Case of an Automatic Search.)                                *
*****************************************************************
```

Slice No.	X	Y	Slice Weight	Matl. Type	Cohesion	Friction Angle	Pore Pressu
	444.5	45.0					
1	448.0	40.2	2111.4	1	300.00	23.00	.
	451.5	35.4					
2	455.2	30.7	6696.1	1	300.00	23.00	.
	458.9	26.1					
3	462.9	21.7	11644.6	1	300.00	23.00	.
	466.9	17.2					
4	471.1	13.0	16871.2	1	300.00	23.00	.
	475.2	8.8					
5	479.6	4.8	22288.7	1	300.00	23.00	.
	484.0	.8					
6	487.0	-1.6	17098.2	1	300.00	23.00	.
	489.9	-4.0					
7	489.9	-4.1	391.6	1	300.00	23.00	.
	490.0	-4.1					
8	490.0	-4.1	309.6	1	300.00	23.00	.
	490.1	-4.2					
9	490.2	-4.2	310.0	1	300.00	23.00	.
	490.2	-4.3					
10	490.2	-4.3	209.1	1	300.00	23.00	.
	490.3	-4.3					
11	495.0	-7.9	32432.2	7	419.00	.00	243.
	499.7	-11.5					
12	503.0	-13.7	25723.0	7	419.00	.00	608.
	506.3	-16.0					

13	511.3	-19.2	44450.1	12	294.81	.00	946.
	516.3	-22.3					
14	521.5	-25.2	51338.0	12	348.08	.00	1323.
	526.7	-28.1					
15	532.0	-30.7	57770.3	12	396.57	.00	1667.
	537.4	-33.3					
16	542.8	-35.7	63637.2	12	440.15	.00	1976.
	548.3	-38.0					
17	550.9	-39.0	31673.6	12	469.45	.00	2184.
	553.5	-40.0					
18	559.1	-41.9	71020.9	16	440.79	.00	2365.
	564.8	-43.8					
19	564.9	-43.9	1488.2	16	457.89	.00	2486.
	565.0	-43.9					
20	565.0	-43.9	645.8	16	458.34	.00	2489.
	565.1	-43.9					
21	565.2	-43.9	646.4	16	458.61	.00	2491.
	565.2	-43.9					

UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 26

```
*****************************************************************
*  Coordinate, Weight, Strength and Pore Water Pressure         *
*  Information for Individual Slices for Conventional           *
*  Computations or First Stage of Multi-Stage Computations.     *
*  (Information is for the Critical Shear Surface in the        *
*  Case of an Automatic Search.)                                *
*****************************************************************
```

Slice No.	X	Y	Slice Weight	Matl. Type	Cohesion	Friction Angle	Pore Pressure
	565.2	-43.9					
22	565.2	-44.0	127.8	16	441.36	.00	2493.(

CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 26

```
*************************************************************
*  Coordinate, Weight, Strength and Pore Water Pressure     *
*  Information for Individual Slices for Conventional       *
*  Computations or First Stage of Multi-Stage Computations. *
*  (Information is for the Critical Shear Surface in the    *
*  Case of an Automatic Search.)                            *
*************************************************************
```

Slice No.	X	Y	Slice Weight	Matl. Type	Cohesion	Friction Angle	Pore Pressu
	565.2	-43.9					
22	565.2	-44.0	127.8	16	441.36	.00	2493.
	565.2	-44.0					
23	565.3	-44.0	518.4	15	436.91	.00	2493.
	565.3	-44.0					
24	571.0	-45.6	75257.3	15	451.07	.00	2594.
	576.7	-47.2					
25	582.5	-48.5	78421.0	15	476.52	.00	2774.
	588.3	-49.8					
26	594.2	-50.8	80665.0	15	496.62	.00	2917.
	600.1	-51.7					
27	606.0	-52.4	81948.2	15	511.33	.00	3021.
	611.9	-53.1					
28	617.8	-53.5	82244.6	15	520.60	.00	3087.
	623.7	-53.8					
29	627.9	-53.9	56899.1	15	524.54	.00	3115.
	632.0	-54.0					
30	636.0	-53.9	54410.3	15	524.58	.00	3115.
	640.0	-53.9					
31	640.0	-53.9	675.2	15	523.94	.00	3111.
	640.1	-53.9					
32	640.2	-53.9	675.5	15	523.91	.00	3110.
	640.2	-53.9					
33	640.2	-53.8	467.3	15	462.94	.00	3110.
	640.3	-53.8					
34	640.3	-53.8	207.7	14	509.85	.00	3110.
	640.3	-53.8					
35	646.2	-53.5	78966.9	14	506.59	.00	3087.

	652.2	-53.1					
36	658.1	-52.4	76028.2	14	497.30	.00	3021
	664.0	-51.7					
37	669.8	-50.7	72167.3	14	482.58	.00	2917
	675.7	-49.8					
38	681.5	-48.5	67437.9	14	462.46	.00	2774
	687.3	-47.2					
39	693.0	-45.6	61908.5	14	437.00	.00	2593
	698.7	-44.0					
40	704.4	-42.1	55661.0	14	406.26	.00	2375
	710.0	-40.2					
41	710.2	-40.1	2303.0	14	388.79	.00	2252
	710.5	-40.0					
42	712.7	-39.1	20584.7	10	388.64	.00	2192
	715.0	-38.3					

1 UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 26

```
*************************************************************
*  Coordinate, Weight, Strength and Pore Water Pressure     *
*  Information for Individual Slices for Conventional       *
*  Computations or First Stage of Multi-Stage Computations. *
*  (Information is for the Critical Shear Surface in the    *
*  Case of an Automatic Search.)                            *
*************************************************************
```

Slice No.	X	Y	Slice Weight	Matl. Type	Cohesion	Friction Angle	Pore Pressu
	715.0	-38.3					
43	715.0	-38.3	447.0	10	380.91	.00	2138
	715.1	-38.2					
44	715.1	-38.2	413.3	10	282.87	.00	2135
	715.2	-38.2					
45	715.2	-38.2	33.3	5	302.00	.00	2134
	715.2	-38.2					
46	715.3	-38.2	448.3	9	355.21	.00	2133
	715.3	-38.2					

47	720.8	-35.8	45697.0	9	334.59	.00	1986.
	726.2	-33.5					
48	731.6	-30.9	37843.4	9	291.18	.00	1679.
	736.9	-28.3					
49	742.1	-25.4	29660.1	9	242.86	.00	1336.
	747.3	-22.5					
50	752.3	-19.4	21276.1	9	189.76	.00	959.
	757.4	-16.2					
51	757.6	-16.1	594.1	9	161.01	.00	756.
	757.7	-16.0					
52	758.9	-15.2	3652.0	4	280.00	.00	701.
	760.0	-14.5					
53	764.8	-11.0	11208.5	4	280.00	.00	436.
	769.6	-7.5					
54	770.6	-6.8	1435.7	4	280.00	.00	172.
	771.6	-6.0					
55	772.9	-5.0	1377.4	3	400.00	.00	.
	774.1	-4.0					
56	776.5	-2.0	1055.7	3	400.00	.00	.
	779.0	.0					

UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 27

```
*************************************************************
*  Seismic Forces and Forces Due to Surface Pressures for   *
*  Individual Slices for Conventional  Computations or the  *
*  First Stage of Multi-Stage Computations.                 *
*  (Information is for the Critical Shear Surface in the    *
*  Case of an Automatic Search.)                            *
*************************************************************
```

						FORCES DUE TO SURFACE PRESSURES	
Slice No.	X	Seismic Force	Y for Seismic Force	Normal Force	Shear Force	X	Y
1	448.0	0.	42.6	0.	0.	.0	.(
2	455.2	0.	37.9	0.	0.	.0	.(

3	462.9	0.	33.3	0.	0.	.0
4	471.1	0.	29.0	0.	0.	.0
5	479.6	0.	24.9	0.	0.	.0
6	487.0	0.	21.7	0.	0.	.0
7	489.9	0.	20.5	0.	0.	.0
8	490.0	0.	20.4	0.	0.	.0
9	490.2	0.	20.4	0.	0.	.0
10	490.2	0.	20.3	0.	0.	.0
11	495.0	0.	17.1	0.	0.	.0
12	503.0	0.	12.3	0.	0.	.0
13	511.3	0.	8.1	0.	0.	.0
14	521.5	0.	3.5	0.	0.	.0
15	532.0	0.	-.6	0.	0.	.0
16	542.8	0.	-4.2	0.	0.	.0
17	550.9	0.	-6.6	0.	0.	.0
18	559.1	0.	-8.8	0.	0.	.0
19	564.9	0.	-10.3	0.	0.	.0
20	565.0	0.	-10.3	0.	0.	.0
21	565.2	0.	-10.3	0.	0.	.0
22	565.2	0.	-10.3	0.	0.	.0
23	565.3	0.	-10.3	0.	0.	.0
24	571.0	0.	-11.6	0.	0.	.0
25	582.5	0.	-13.9	0.	0.	.0
26	594.2	0.	-15.9	0.	0.	.0
27	606.0	0.	-17.5	0.	0.	.0
28	617.8	0.	-18.8	0.	0.	.0
29	627.9	0.	-19.7	0.	0.	.0
30	636.0	0.	-20.2	0.	0.	.0
31	640.0	0.	-20.4	0.	0.	.0
32	640.2	0.	-20.4	0.	0.	.0
33	640.2	0.	-20.4	0.	0.	.0
34	640.3	0.	-20.4	0.	0.	.0
35	646.2	0.	-20.6	0.	0.	.0
36	658.1	0.	-20.7	0.	0.	.0
37	669.8	0.	-20.5	0.	0.	.0
38	681.5	0.	-20.0	0.	0.	.0
39	693.0	0.	-19.2	0.	0.	.0
40	704.4	0.	-18.0	0.	0.	.0

1 UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF

CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 27

```
*****************************************************************
*  Seismic Forces and Forces Due to Surface Pressures for       *
*  Individual Slices for Conventional  Computations or the      *
*  First Stage of Multi-Stage Computations.                     *
*  (Information is for the Critical Shear Surface in the        *
*  Case of an Automatic Search.)                                *
*****************************************************************
```

Slice No.	X	Seismic Force	Y for Seismic Force	FORCES DUE TO SURFACE PRESSURE Normal Force	Shear Force	X	Y
41	710.2	0.	-17.3	0.	0.	.0	.
42	712.7	0.	-17.0	0.	0.	.0	.
43	715.0	0.	-16.6	0.	0.	.0	.
44	715.1	0.	-16.5	0.	0.	.0	.
45	715.2	0.	-16.4	0.	0.	.0	.
46	715.3	0.	-16.5	0.	0.	.0	.
47	720.8	0.	-15.6	0.	0.	.0	.
48	731.6	0.	-13.8	0.	0.	.0	.
49	742.1	0.	-11.6	0.	0.	.0	.
50	752.3	0.	-9.2	0.	0.	.0	.
51	757.6	0.	-7.8	0.	0.	.0	.
52	758.9	0.	-7.4	0.	0.	.0	.
53	764.8	0.	-5.4	0.	0.	.0	.
54	770.6	0.	-3.4	0.	0.	.0	.
55	772.9	0.	-2.5	0.	0.	.0	.
56	776.5	0.	-1.0	0.	0.	.0	.

1 UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 29

```
*******************************************************************
*  Information Generated During Iterative Solution for the Factor *
*  of Safety and Side Force Inclination by Spencer's Procedure    *
```

```
*****************************************************************************

        Trial     Trial
       Factor   Side Force    Force      Moment                    Delta
Iter-    of    Inclination  Imbalance  Imbalance   Delta-F         Theta
ation  Safety   (degrees)     (lbs.)    (ft.-lbs.)                (degrees

   1   3.00000   -15.0000  -.3818E+05  -.3861E+07
First-order corrections to F and THETA .........  -.539E+01  .215E+0
Values factored by  .928E-01 - Deltas too large   -.500E+00  .199E+0

   2   2.50000   -13.0061  -.3235E+05  -.3709E+07
First-order corrections to F and THETA .........  -.292E+01  .163E+0
Values factored by  .171E+00 - Deltas too large   -.500E+00  .280E+0

   3   2.00000   -10.2070  -.2277E+05  -.3289E+07
First-order corrections to F and THETA .........  -.120E+01  .100E+0
Values factored by  .418E+00 - Deltas too large   -.500E+00  .420E+0

   4   1.50000    -6.0047  -.5053E+04  -.1895E+07
First-order corrections to F and THETA .........  -.186E+00  .317E+0
Second-order correction - Iteration   1 ........  -.166E+00  .317E+0
Second-order correction - Iteration   2 ........  -.166E+00  .317E+0
Second-order correction - Iteration   3 ........  -.166E+00  .317E+0

   5   1.33391    -2.8331   .1710E+03   .1312E+06
First-order corrections to F and THETA .........   .752E-02 -.191E+0
Second-order correction - Iteration   1 ........   .756E-02 -.191E+0
Second-order correction - Iteration   2 ........   .756E-02 -.191E+0

   6   1.34147    -3.0240  -.2930E-01   .2367E+03
First-order corrections to F and THETA .........   .105E-04 -.342E-0
Second-order correction - Iteration   1 ........   .105E-04 -.343E-0

   7   1.34148    -3.0243  -.8789E-02  -.6803E+00
First-order corrections to F and THETA .........  -.117E-06  .108E-0

Factor of Safety - - - - - - - -     1.341
Side Force Inclination - - - - -     -3.02
Number of Iterations - - - - - -     7
UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date:  1:12:1999   Time: 16:41:28   Input file: CON451YW.INP
```

RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 38

```
*****************************************************************
*  Final Results for Stresses Along the Shear Surface           *
*  (Results for Critical Shear Surface in Case of a Search.)    *
*****************************************************************
```

SPENCER'S PROCEDURE USED TO COMPUTE FACTOR OF SAFETY
Factor of Safety = 1.341 Side Force Inclination = -3.02 Degre

-------- VALUES AT CENTER OF BASE OF SLICE---------

Slice No.	X-center	Y-center	Total Normal Stress	Effective Normal Stress	Shear Stress
1	448.0	40.2	3.7	3.7	224.8
2	455.2	30.7	438.7	438.7	362.4
3	462.9	21.7	882.0	882.0	502.7
4	471.1	13.0	1329.1	1329.1	644.2
5	479.6	4.8	1775.6	1775.6	785.5
6	487.0	-1.6	2139.9	2139.9	900.7
7	489.9	-4.1	2284.1	2284.1	946.4
8	490.0	-4.1	2289.0	2289.0	947.9
9	490.2	-4.2	2292.9	2292.9	949.2
10	490.2	-4.3	2296.3	2296.3	950.2
11	495.0	-7.9	3079.9	2836.4	312.3
12	503.0	-13.7	3609.1	3001.0	312.3
13	511.3	-19.2	4152.6	3206.6	219.8
14	521.5	-25.2	4676.8	3353.1	259.5
15	532.0	-30.7	5151.6	3484.0	295.6
16	542.8	-35.7	5574.2	3597.7	328.1
17	550.9	-39.0	5855.8	3671.5	349.9
18	559.1	-41.9	6106.7	3741.2	328.6
19	564.9	-43.9	6265.4	3778.7	341.3
20	565.0	-43.9	6269.5	3779.6	341.7
21	565.2	-43.9	6272.0	3780.2	341.9
22	565.2	-44.0	6310.1	3817.2	329.0
23	565.3	-44.0	6270.6	3776.7	325.7

24	571.0	-45.6	6403.8	3809.5	336.2
25	582.5	-48.5	6622.5	3847.7	355.2
26	594.2	-50.8	6780.2	3862.8	370.2
27	606.0	-52.4	6875.5	3853.8	381.2
28	617.8	-53.5	6907.3	3819.9	388.1
29	627.9	-53.9	6888.0	3772.7	391.0
30	636.0	-53.9	6835.2	3719.6	391.0
31	640.0	-53.9	6801.1	3690.0	390.6
32	640.2	-53.9	6800.1	3689.2	390.5
33	640.2	-53.8	6842.4	3731.8	345.1
34	640.3	-53.8	6687.0	3576.5	380.1
35	646.2	-53.5	6723.7	3636.4	377.6
36	658.1	-52.4	6542.4	3521.0	370.7
37	669.8	-50.7	6294.7	3377.6	359.7
38	681.5	-48.5	5980.3	3205.9	344.7
39	693.0	-45.6	5599.1	3005.2	325.8
40	704.4	-42.1	5151.0	2775.1	302.8

1

-------- VALUES AT CENTER OF BASE OF SLICE---------

Slice No.	X-center	Y-center	Total Normal Stress	Effective Normal Stress	Shear Stress
41	710.2	-40.1	4898.2	2646.1	289.8
42	712.7	-39.1	4781.6	2588.8	289.7
43	715.0	-38.3	4694.9	2557.0	283.9
44	715.1	-38.2	4690.8	2555.4	210.9
45	715.2	-38.2	4240.7	2106.5	225.1
46	715.3	-38.2	4700.2	2567.1	264.8
47	720.8	-35.8	4396.0	2409.2	249.4
48	731.6	-30.9	3758.1	2079.1	217.1
49	742.1	-25.4	3053.9	1717.5	181.0
50	752.3	-19.4	2283.1	1323.3	141.5
51	757.6	-16.1	1864.9	1108.9	120.0
52	758.9	-15.2	1825.4	1124.4	208.7
53	764.8	-11.0	1377.4	941.1	208.7
54	770.6	-6.8	941.6	769.5	208.7
55	772.9	-5.0	831.5	831.5	298.2
56	776.5	-2.0	502.0	502.0	298.2

CHECK SUMS - (ALL SHOULD BE SMALL)
SUM OF FORCES IN VERTICAL DIRECTION = .04 (= .368E-01)
SHOULD NOT EXCEED .100E+03
SUM OF FORCES IN HORIZONTAL DIRECTION = .12 (= .117E+00)
SHOULD NOT EXCEED .100E+03
SUM OF MOMENTS ABOUT COORDINATE ORIGIN = .29 (= .293E+00)
SHOULD NOT EXCEED .100E+03
SHEAR STRENGTH/SHEAR FORCE CHECK-SUM = .01 (= .110E-01)
SHOULD NOT EXCEED .100E+03

1 UTEXAS3 - VER. 1.120 - 10/08/92 - (C) 1985-1992 S. G. WRIGHT
Date: 1:12:1999 Time: 16:41:28 Input file: CON451YW.INP
RIVER BIRCH LANDFILL - WASTE ELEVATION @ 45 FEET
PHASE 1 - STRENGTH INCREASE AFTER 1 YEAR OF
CONSOLIDATION UNDER STAGE 1 LOADING - WORKING FACE

TABLE NO. 39

```
*****************************************************************
*  Final Results for Side Forces and Stresses Between Slices.   *
*  (Results for Critical Shear Surface in Case of a Search.)    *
*****************************************************************
```

SPENCER'S PROCEDURE USED TO COMPUTE FACTOR OF SAFETY
Factor of Safety = 1.341 Side Force Inclination = -3.02 Degree

---------- VALUES AT RIGHT SIDE OF SLICE ----------

Slice No.	X-Right	Side Force	Y-Coord. of Side Force Location	Fraction of Height	Sigma at Top	Sigma at Bottom
1	451.5	-1530.	40.0	.481	-140.4	-176.7
2	458.9	-167.	113.6	ABOVE	-227.6	209.9
3	466.9	3666.	17.3	.001	-262.7	526.5
4	475.2	9480.	14.4	.153	-282.4	805.7
5	484.0	16740.	9.9	.204	-292.7	1049.8
6	489.9	21857.	6.9	.223	-295.4	1186.3
7	490.0	21970.	6.9	.223	-295.4	1189.1
8	490.1	22058.	6.8	.223	-295.3	1191.4
9	490.2	22147.	6.8	.224	-295.2	1193.8
10	490.3	22207.	6.7	.224	-295.2	1195.3
11	499.7	41372.	-.4	.201	-595.8	2101.8

12	506.3	55628.	-4.1	.203	-743.4	2649.5
13	516.3	79700.	-9.1	.210	-939.3	3468.7
14	526.7	104099.	-13.4	.220	-1057.7	4161.4
15	537.4	127945.	-17.1	.230	-1123.0	4750.4
16	548.3	150417.	-20.4	.240	-1150.0	5248.9
17	553.5	160260.	-21.8	.244	-1152.5	5453.7
18	564.8	179890.	-24.6	.252	-1151.6	5857.1
19	565.0	180259.	-24.6	.252	-1151.4	5864.4
20	565.1	180419.	-24.7	.252	-1151.3	5867.6
21	565.2	180578.	-24.7	.252	-1151.1	5870.8
22	565.2	180603.	-24.7	.252	-1151.1	5871.3
23	565.3	180739.	-24.7	.252	-1151.1	5874.0
24	576.7	197363.	-27.0	.259	-1131.9	6203.9
25	588.3	210413.	-29.0	.265	-1094.5	6456.6
26	600.1	219508.	-30.5	.271	-1042.2	6634.2
27	611.9	224389.	-31.6	.277	-977.4	6738.2
28	623.7	224923.	-32.3	.282	-902.0	6769.5
29	632.0	222725.	-32.5	.286	-843.8	6748.6
30	640.0	218627.	-32.5	.289	-783.4	6695.3
31	640.1	218563.	-32.5	.289	-782.6	6694.4
32	640.2	218500.	-32.5	.289	-781.8	6693.5
33	640.3	218427.	-32.5	.289	-781.4	6692.6
34	640.3	218439.	-32.5	.289	-781.1	6692.8
35	652.2	208936.	-32.2	.294	-687.7	6558.7
36	664.0	195610.	-31.5	.299	-586.3	6353.3
37	675.7	178902.	-30.3	.305	-476.9	6076.4
38	687.3	159378.	-28.7	.311	-358.7	5727.9
39	698.7	137730.	-26.7	.318	-230.2	5307.1
40	710.0	114766.	-24.3	.327	-88.7	4813.3

1

---------- VALUES AT RIGHT SIDE OF SLICE ----------

Slice No.	X-Right	Side Force	Y-Coord. of Side Force Location	Fraction of Height	Sigma at Top	Sigma at Bottom
41	710.5	113737.	-24.2	.328	-82.0	4789.7
42	715.0	104200.	-23.1	.332	-16.8	4562.5
43	715.1	103987.	-23.1	.332	-15.3	4557.2
44	715.2	103766.	-23.0	.332	-14.1	4552.1
45	715.2	103779.	-23.0	.332	-14.0	4552.4

46	715.3	103567.	-23.0	.332	-12.5	4547.2
47	726.2	80370.	-20.0	.346	160.5	3940.3
48	736.9	58422.	-16.5	.367	362.8	3266.9
49	747.3	38903.	-12.7	.398	607.8	2544.5
50	757.4	23066.	-8.9	.441	891.7	1872.4
51	757.7	22594.	-8.8	.443	903.5	1851.7
52	760.0	19323.	-7.8	.450	905.9	1689.2
53	769.6	7714.	-3.8	.488	953.4	1097.1
54	771.6	5877.	-3.1	.491	925.3	1030.8
55	774.1	3457.	-1.9	.532	1028.8	697.1
56	779.0	0.	177.9	ABOVE	.0	.0

CHECK SUMS - (ALL SHOULD BE SMALL)
SUM OF FORCES IN VERTICAL DIRECTION = .04 (= .368E-01)
SHOULD NOT EXCEED .100E+03
SUM OF FORCES IN HORIZONTAL DIRECTION = .12 (= .117E+00)
SHOULD NOT EXCEED .100E+03
SUM OF MOMENTS ABOUT COORDINATE ORIGIN = .29 (= .293E+00)
SHOULD NOT EXCEED .100E+03
SHEAR STRENGTH/SHEAR FORCE CHECK-SUM = .01 (= .110E-01)
SHOULD NOT EXCEED .100E+03

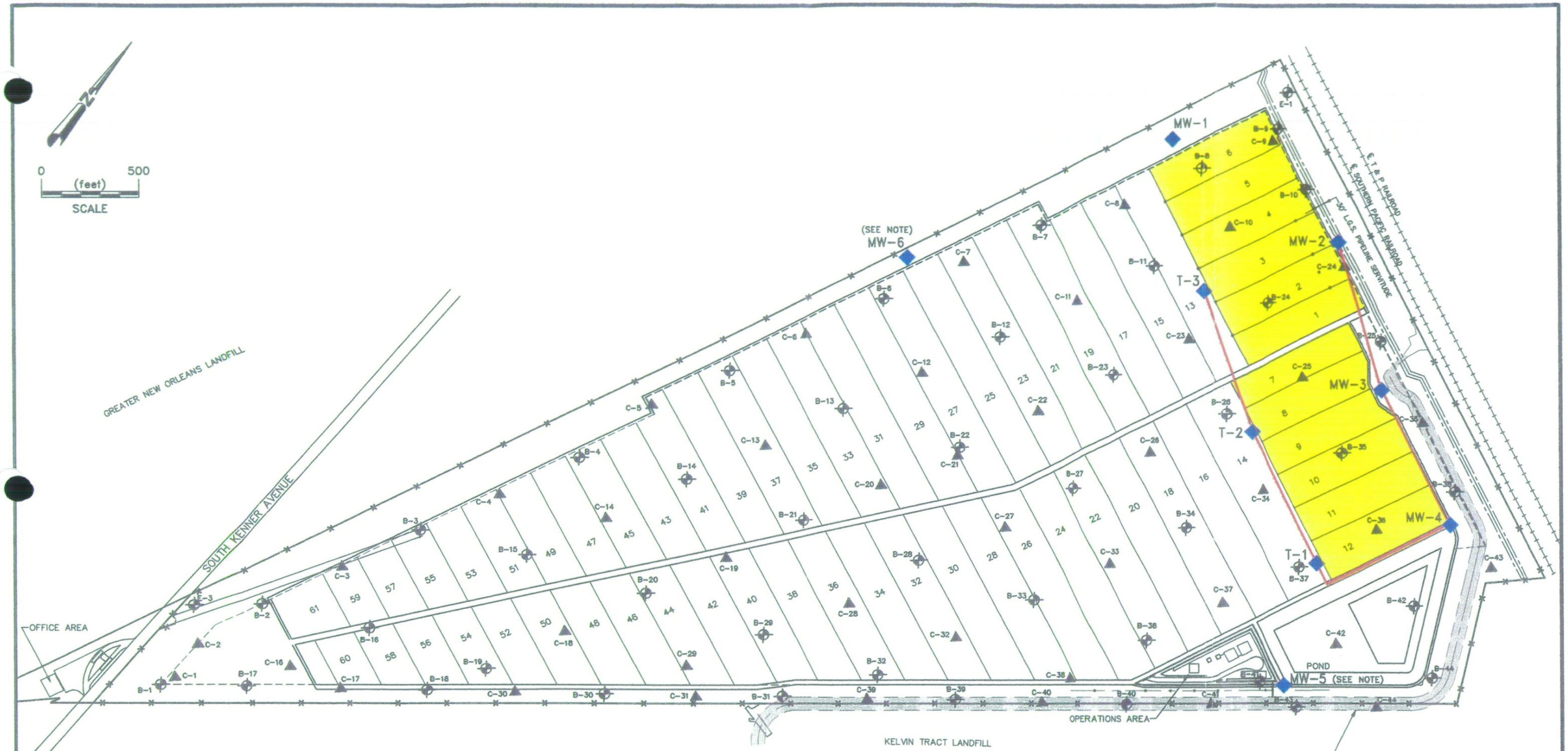
***** CAUTION ***** FORCES BETWEEN SLICES ARE NEGATIVE AT POINTS ALONG THE UPPER ONE-HALF OF THE SHEAR SURFACE - A TENSION CRACK MAY BE NEEDED.

***** CAUTION ***** SOME OF THE FORCES BETWEEN SLICES ACT AT POINTS ABOVE THE SURFACE OF THE SLOPE OR BELOW THE SHEAR SURFACE - EITHER A TENSION CRACK MAY BE NEEDED OR THE SOLUTION MAY NOT BE A VALID SOLUTION.

END-OF-FILE ENCOUNTERED WHILE READING COMMAND
WORDS - END OF PROBLEM(S) ASSUMED

PART IX

Monitoring Well Plans, Excavation Stability and Consolidation Figures and Settlement Plan for Cells 1-30 from Soil Testing Engineers Geotechnical Report and Letter of Explanation for Well Spacing Between Wells MW-9 and MW-10



LEGEND:

- POINT (PLANE) OF COMPLIANCE
- NEW ACTIVE WELL THIS PHASE
- ACTIVE OR CLOSED LANDFILL/POND AREA AT THIS PHASE

MONITORING WELL PLAN - PHASE I

(Time Approx. 0 Years)

NOTE:
MW-5 and MW-6 are to check for potential contaminants from offsite. They will be sampled during the initial event only until they become active (MW-5; Phase IA, MW-6; Phase II).

RIVERBIRCH LANDFILL
AVONDALE, LOUISIANA

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OWNER
GRETNA, LOUISIANA

mader-miers
ENGINEERING, INC.
LAFAYETTE, LOUISIANA

STE
Soil Testing Engineers, Inc.
Baton Rouge, LA Lake Charles, LA

Project Engineer:	Drawn by:	Checked by:
G.P. Boutwell	DMS	
File No.: 98-1171	Date: 1-07-99	Figure No.: 54

Title: **MONITORING WELL PLAN PHASE I**

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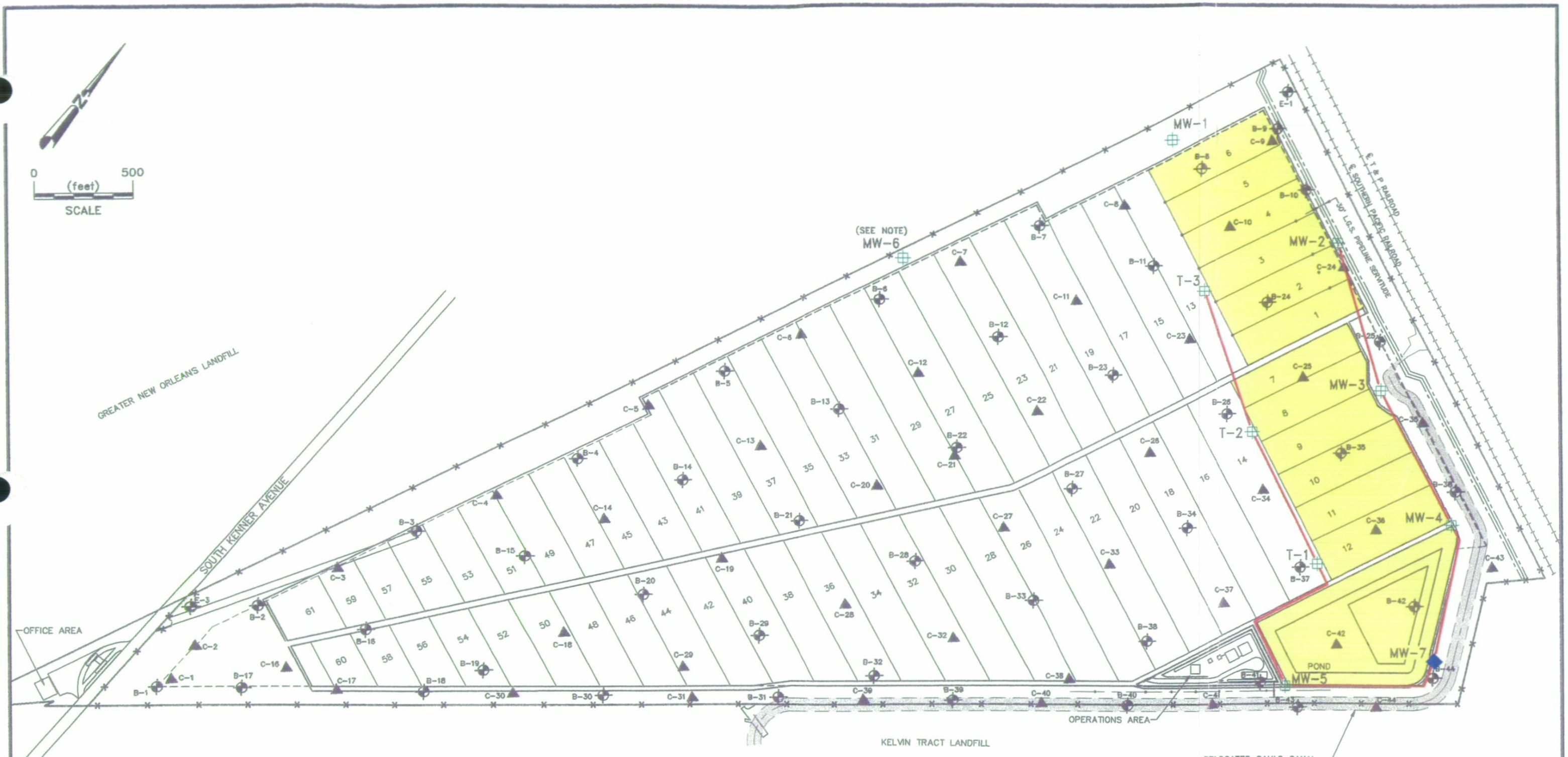

LEGEND:

- POINT (PLANE) OF COMPLIANCE
- NEW ACTIVE WELL THIS PHASE
- OLD ACTIVE WELL THIS PHASE
- ACTIVE OR CLOSED LANDFILL/POND AREA AT THIS PHASE

MONITORING WELL PLAN - PHASE IA

(Time Approx. 0-1 Years)

NOTE:
MW-6 not yet active. Used for potentiometric control.

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Baton Rouge, LA Lake Charles, LA

Project Engineer:	Drawn by:	Checked by:
G.P. Boutwell	DMS	
File No.: 98-1171	Date: 1-07-99	Figure No.: 55

Title: **MONITORING WELL PLAN PHASE IA**

SE1A.DWG\ 1-18-99.PLT

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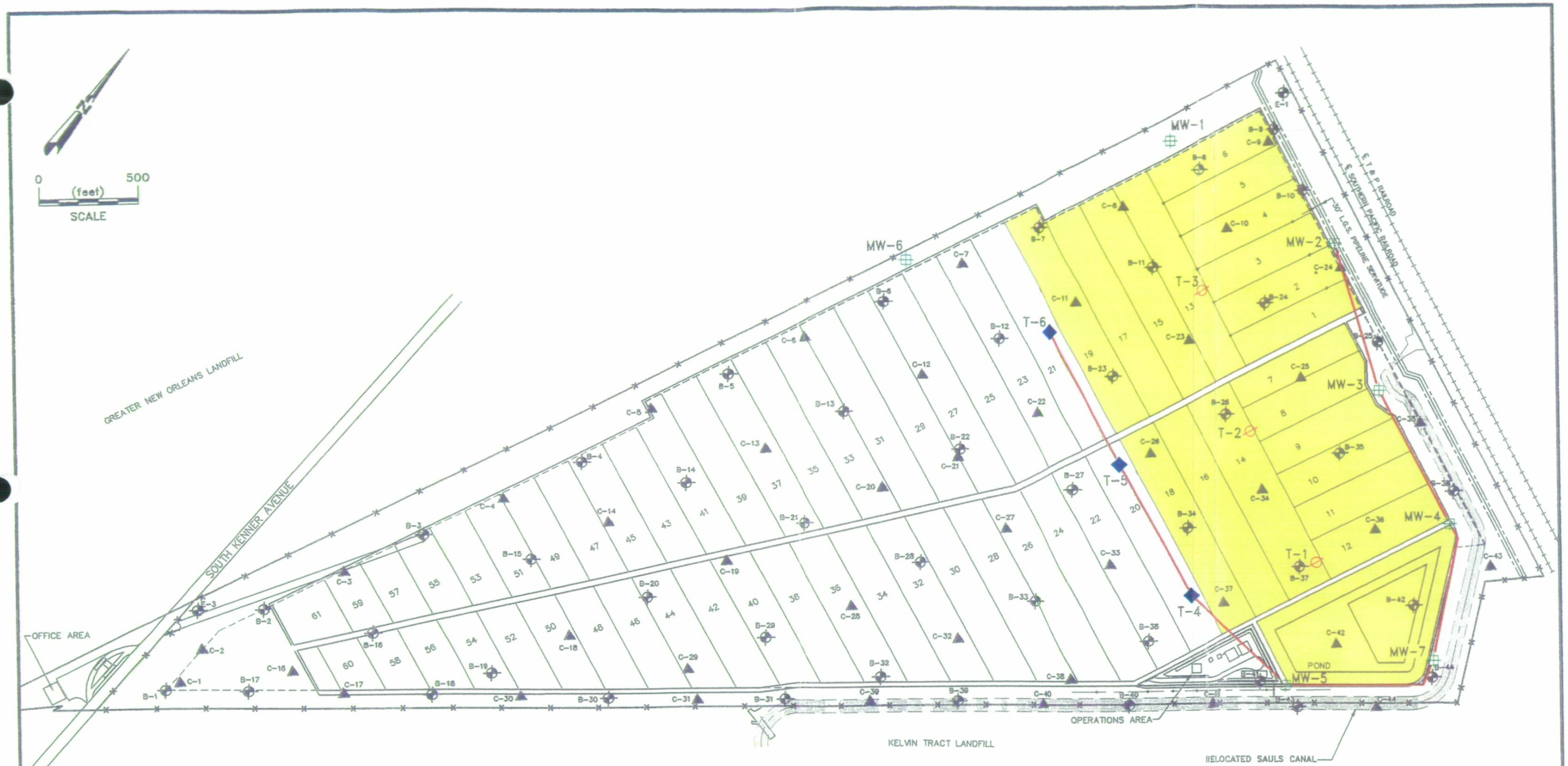

LEGEND:

- POINT (PLANE) OF COMPLIANCE
- NEW ACTIVE WELL THIS PHASE
- OLD ACTIVE WELL THIS PHASE
- WELL ABANDONED FOR THIS PHASE
- ACTIVE OR CLOSED LANDFILL/POND AREA AT THIS PHASE

MONITORING WELL PLAN - PHASE II

(Time Approx. 3 Years)

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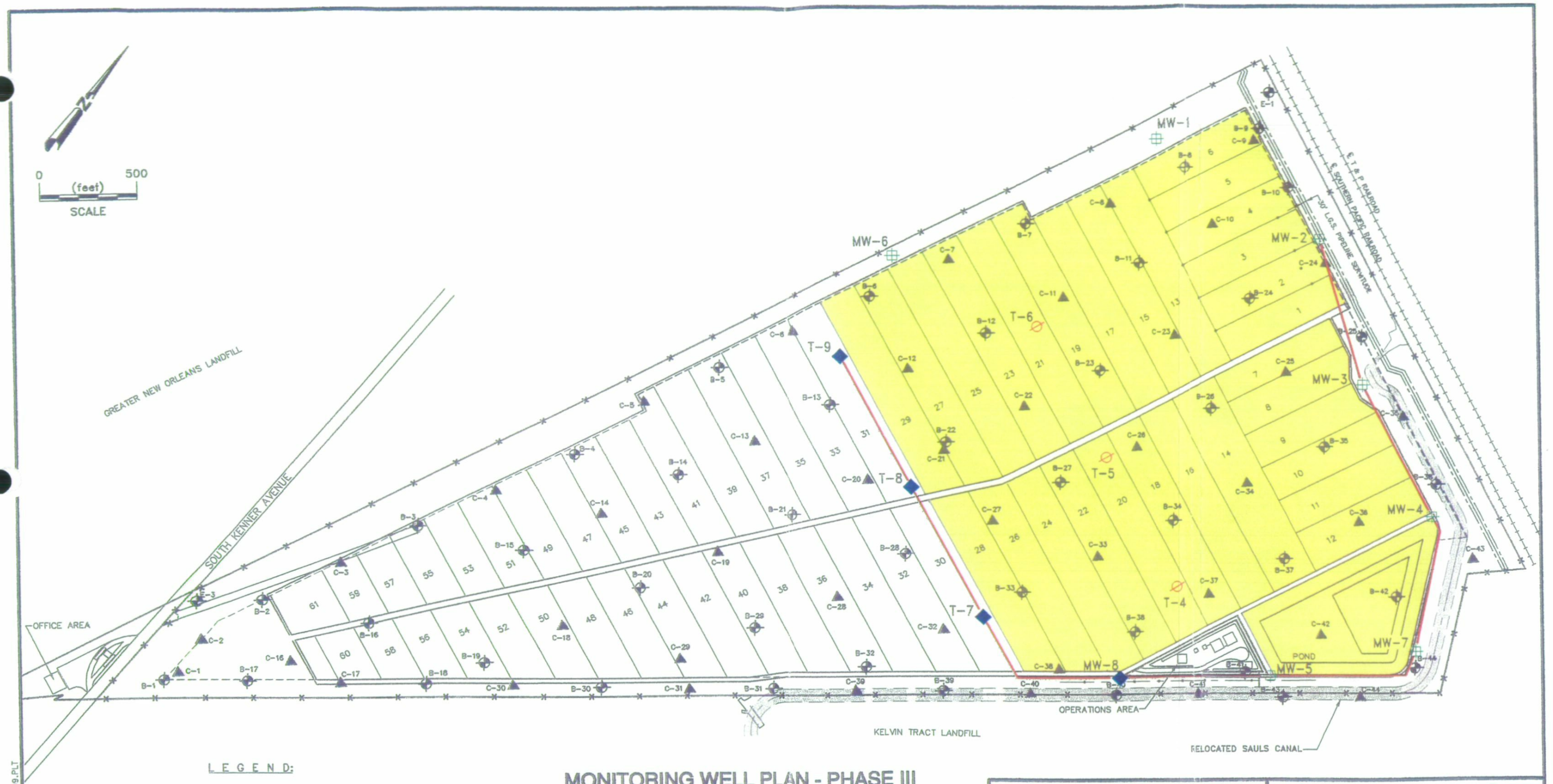
Baton Rouge, LA Lake Charles, LA

Project Engineer:	Drawn by:	Checked by:
G.P. Boutwell	DMS	
File No.: 98-1171	Date: 1-07-99	Figure No.: 56

Title: **MONITORING WELL PLAN PHASE II**

C:\98-1171\1E2.DWG\1-18-99.PLT



LEGEND:

- POINT (PLANE) OF COMPLIANCE
- NEW ACTIVE WELL THIS PHASE
- OLD ACTIVE WELL THIS PHASE
- WELL ABANDONED FOR THIS PHASE
- ACTIVE OR CLOSED LANDFILL/POND AREA AT THIS PHASE

MONITORING WELL PLAN - PHASE III

(Time Approx. 10 Years)

RIVERBIRCH LANDFILL
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LAFAYETTE, LOUISIANA

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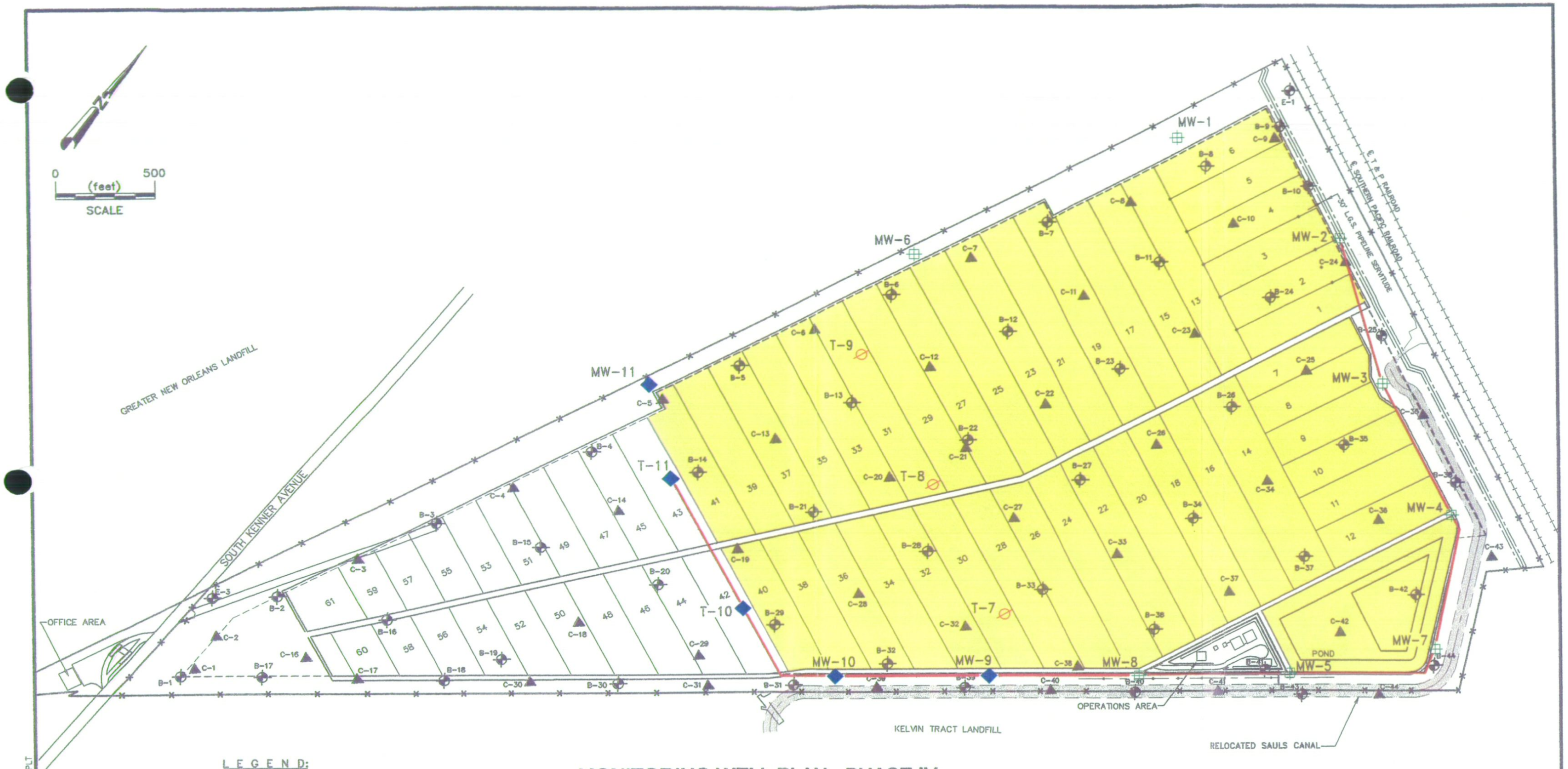
Soil Testing Engineers, Inc.
Baton Rouge, LA Lake Charles, LA

Project Engineer:	Drawn by:	Checked by:
G.P. Boutwell	DMS	
File No.: 98-1171	Date: 1-07-99	Figure No.: 57

Title: **MONITORING WELL PLAN PHASE III**

C:\98-1171\JE3.DWG\1-18-99.PLT



LEGEND:

- POINT (PLANE) OF COMPLIANCE
- NEW ACTIVE WELL THIS PHASE
- OLD ACTIVE WELL THIS PHASE
- WELL ABANDONED FOR THIS PHASE
- ACTIVE OR CLOSED LANDFILL/POND AREA AT THIS PHASE

MONITORING WELL PLAN - PHASE IV

(Time Approx. 15? Years)

NOTE:
Included for completeness. Permit life is 10 years.

RIVERBIRCH LANDFILL
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OWNER
GRETNA, LOUISIANA

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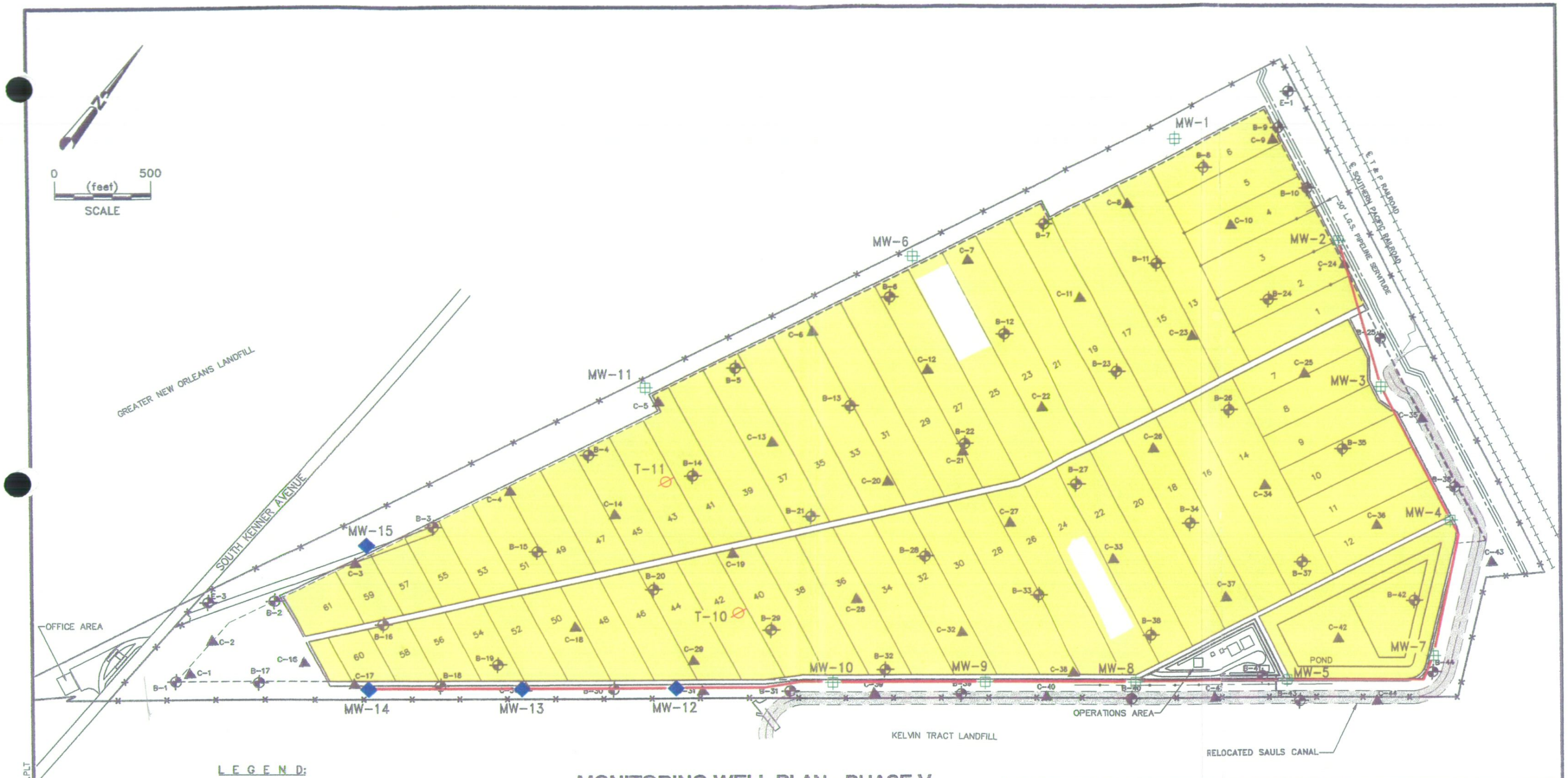
ENGINEERING, INC.
LAFAYETTE, LOUISIANA

STE
Soil Testing Engineers, Inc.
Baton Rouge, LA Lake Charles, LA

Project Engineer:	Drawn by:	Checked by:
G.P. Boutwell	DMS	
File No.: 98-1171	Date: 1-07-99	Figure No.: 58

Title: **MONITORING WELL PLAN PHASE IV**

C:\98-1171\SE4.DWG\1-18-99.PLT



LEGEND:

- POINT (PLANE) OF COMPLIANCE
- NEW ACTIVE WELL THIS PHASE
- OLD ACTIVE WELL THIS PHASE
- WELL ABANDONED FOR THIS PHASE
- ACTIVE OR CLOSED LANDFILL/POND AREA AT THIS PHASE

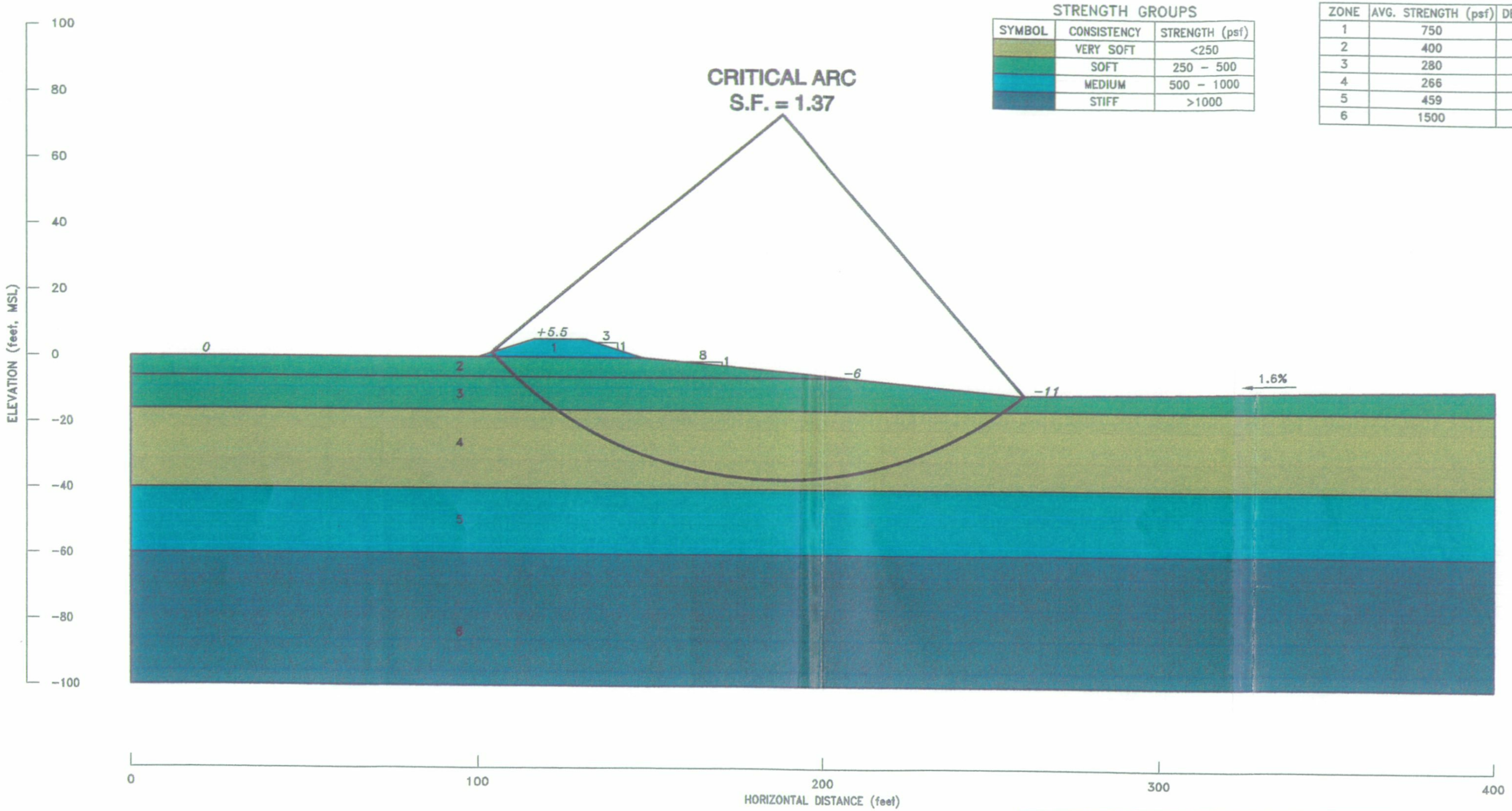
MONITORING WELL PLAN - PHASE V

(Time Approx. 20? Years)

NOTE:
Included for completeness. Permit life is 10 years.

RIVERBIRCH LANDFILL AVONDALE, LOUISIANA	STE Soil Testing Engineers, Inc. Baton Rouge, LA Lake Charles, LA		
RIVERBIRCH, INC. OWNER GRETNA, LOUISIANA	Project Engineer: G.P. Boutwell	Drawn by: DMS	Checked by:
mader-miers ENGINEERING, INC. LAFAYETTE, LOUISIANA	File No.: 98-1171	Date: 1-07-99	Figure No.: 59
	Title: MONITORING WELL PLAN PHASE V		

C:\98-1171\3E5.DWG\1-18-99.PLT



STRENGTH GROUPS

SYMBOL	CONSISTENCY	STRENGTH (psf)
	VERY SOFT	<250
	SOFT	250 - 500
	MEDIUM	500 - 1000
	STIFF	>1000

ZONE	AVG. STRENGTH (psf)	DENSITY (pcf)
1	750	110
2	400	109
3	280	102
4	266	102
5	459	102
6	1500	104

RIVERBIRCH LANDFILL
AVONDALE, LOUISIANA

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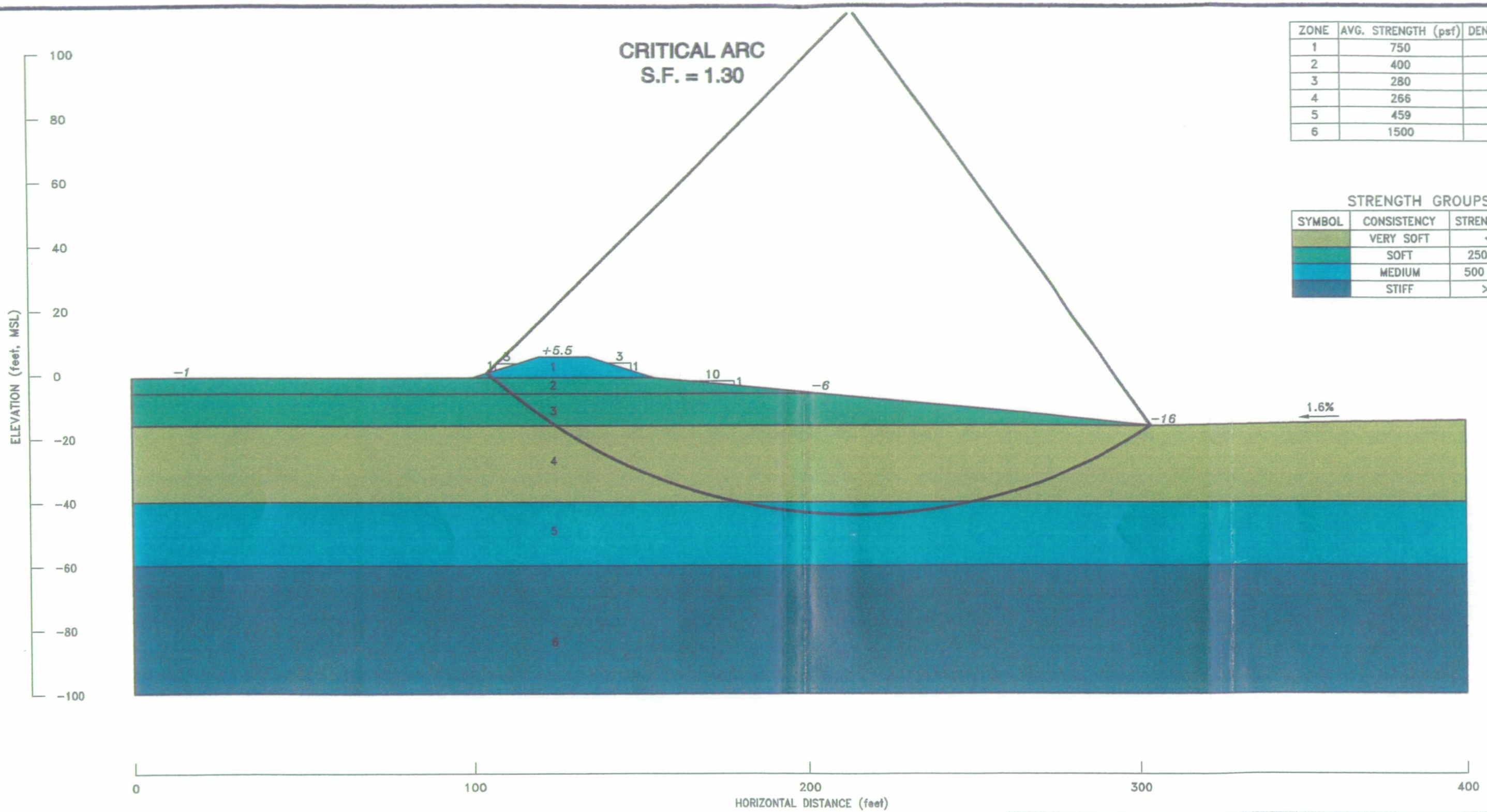
Soil Testing Engineers, Inc.
Baton Rouge, LA Lake Charles, LA

Project Engineer:	Drawn by:	Checked by:
Z. Alem	DMS	
File No.: 98-1171	Date: 12-04-98	Figure No.: 60

Title: **EXCAVATION STABILITY CELL 1**

C:\98-1 1.DWG\1-19-99.PLT



ZONE	AVG. STRENGTH (psf)	DENSITY (pcf)
1	750	110
2	400	109
3	280	102
4	266	102
5	459	102
6	1500	104

STRENGTH GROUPS

SYMBOL	CONSISTENCY	STRENGTH (psf)
	VERY SOFT	<250
	SOFT	250 - 500
	MEDIUM	500 - 1000
	STIFF	>1000

RIVERBIRCH LANDFILL
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STE
Soil Testing Engineers, Inc.
Baton Rouge, LA Lake Charles, LA

Project Engineer:	Drawn by:	Checked by:
Z. Alem	DMS	
File No.: 98-1171	Date: 12-07-98	Figure No.: 61

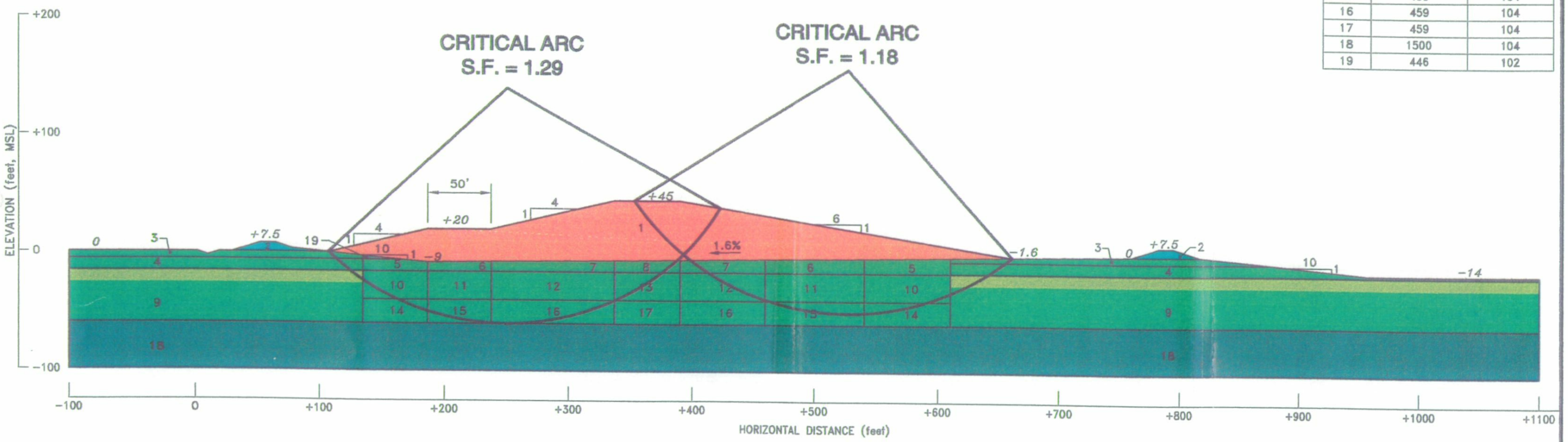
Title: **EXCAVATION STABILITY GENERAL CELLS**

C:\98-4.DWG\1-19-99.PLT

STRENGTH GROUPS

SYMBOL	CONSISTENCY	STRENGTH (psf)
	VERY SOFT	<250
	SOFT	250 - 500
	MEDIUM	500 - 1000
	STIFF	>1000

ZONE	STRENGTH (psf)	DENSITY (pcf)
1	c=300, ø=23°	63
2	750	110
3	400	109
4	280	102
5	280	102
6	280	102
7	280	102
8	280	102
9	354	104
10	266	104
11	266	104
12	266	104
13	266	104
14	459	104
15	459	104
16	459	104
17	459	104
18	1500	104
19	446	102



NOTE:
Assumes landfill built to +45 in zero time.
Extremely conservative – not possible in reality.

PHASE I - INSTANTANEOUS LOADING
STAGE I LOADING - ZERO CONSOLIDATION ASSUMPTION

RIVERBIRCH LANDFILL
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LAFAYETTE, LOUISIANA

STE
Soil Testing Engineers, Inc.
Baton Rouge, LA Lake Charles, LA

Project Engineer:	Drawn by:	Checked by:
Z. Alem	DMS	
File No.: 98-1171	Date: 1-08-99	Figure No.: 62

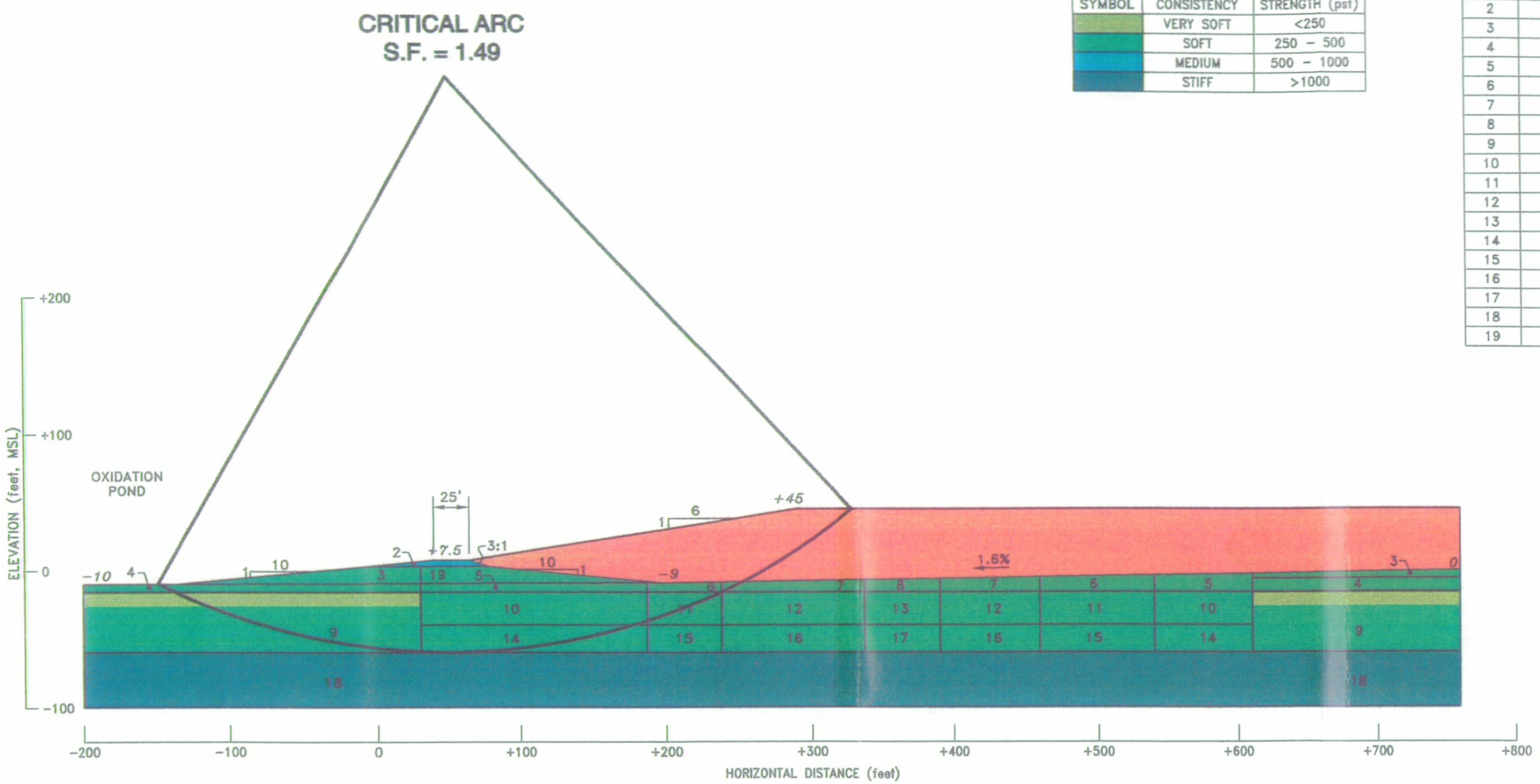
Title:
PHASE I - ZERO CONSOLIDATION

C:\98-1 OR.DWG\1-19-99.PLT

STRENGTH GROUPS

SYMBOL	CONSISTENCY	STRENGTH (psf)
	VERY SOFT	<250
	SOFT	250 – 500
	MEDIUM	500 – 1000
	STIFF	>1000

ZONE	STRENGTH (psf)	DENSITY (pcf)
1	c=300, ø=23°	63
2	750	110
3	400	109
4	280	102
5	280	102
6	280	102
7	280	102
8	280	102
9	354	104
10	266	104
11	266	104
12	266	104
13	266	104
14	459	104
15	459	104
16	459	104
17	459	104
18	1500	104
19	446	102



NOTE:
Assumes landfill built to +45 in zero time.
Extremely conservative – not possible in reality.

STABILITY ADJACENT TO THE POND
UNDRAINED CASE - ZERO CONSOLIDATION

RIVERBIRCH LANDFILL
AVONDALE, LOUISIANA

RIVERBIRCH, INC.
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GRETNA, LOUISIANA

mader-miers
ENGINEERING, INC.
LAFAYETTE, LOUISIANA

STE
Soil Testing Engineers, Inc.
Baton Rouge, LA Lake Charles, LA

Project Engineer:	Drawn by:	Checked by:
Z. Alem	DMS	
File No.: 98-1171	Date: 1-15-99	Figure No.: 63

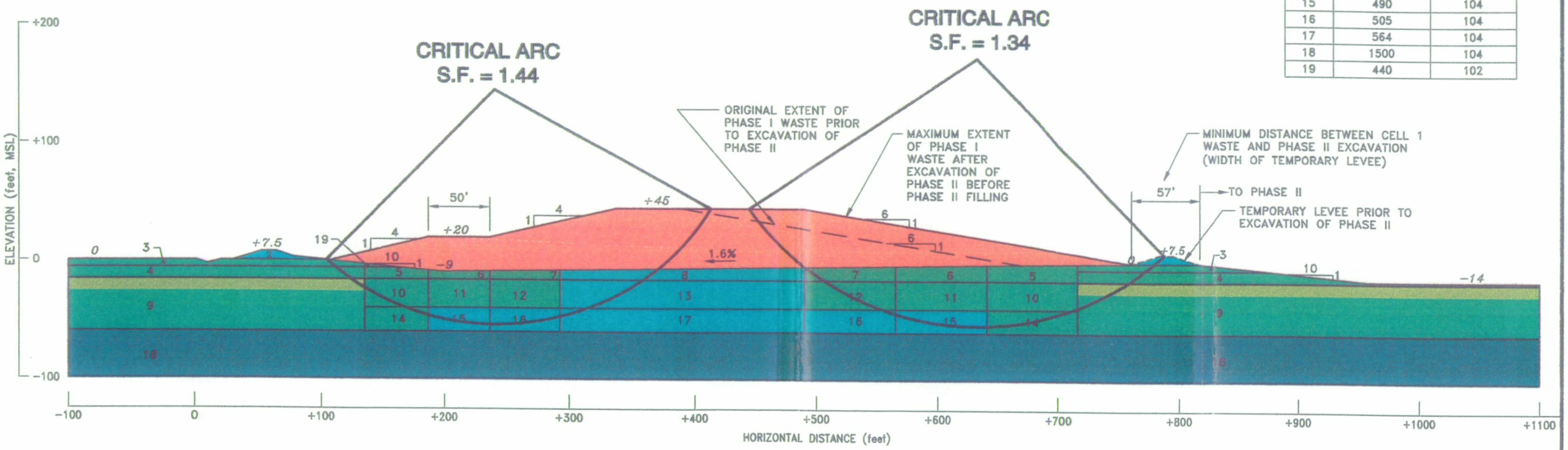
Title: OXIDATION POND STABILITY
ZERO CONSOLIDATION

C:\98-1 0.DWG\1-19-99.PLT

STRENGTH GROUPS

SYMBOL	CONSISTENCY	STRENGTH (psf)
	VERY SOFT	<250
	SOFT	250 - 500
	MEDIUM	500 - 1000
	STIFF	>1000

ZONE	STRENGTH (psf)	DENSITY (pcf)
1	c=300, ø=23°	63
2	750	110
3	400	109
4	280	102
5	315	102
6	347	102
7	396	102
8	550	102
9	354	104
10	302	104
11	336	104
12	373	104
13	502	104
14	481	104
15	490	104
16	505	104
17	564	104
18	1500	104
19	440	102



PHASE I - STAGE I LOADING IN CELL 1 AT ACTUAL COMPLETION

(1-Year Consolidation)

RIVERBIRCH LANDFILL
AVONDALE, LOUISIANA

RIVERBIRCH, INC.
OWNER
GRETNA, LOUISIANA

mader-miers
ENGINEERING, INC.
LAFAYETTE, LOUISIANA

STE
Soil Testing Engineers, Inc.
Baton Rouge, LA Lake Charles, LA

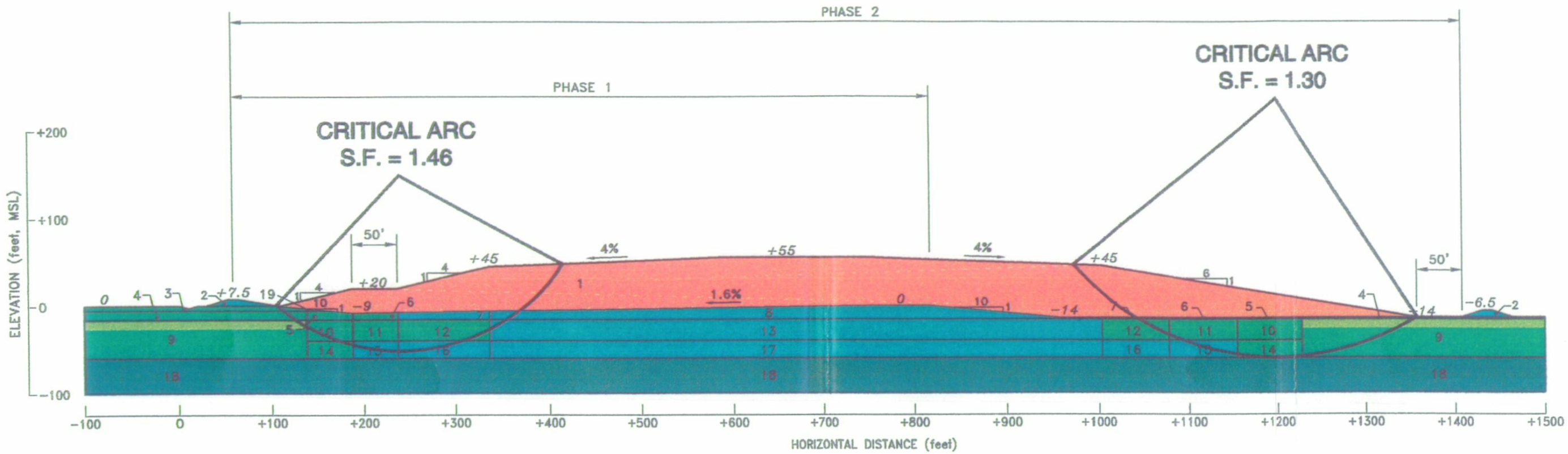
Project Engineer:	Drawn by:	Checked by:
Z. Alem	DMS	
File No.: 98-1171	Date: 1-08-99	Figure No.: 64

Title: **PHASE I - AT ACTUAL COMPLETION**

C:\98-1 YRR.DWG\1-19-99.PLT

STRENGTH GROUPS

SYMBOL	CONSISTENCY	STRENGTH (psf)
	VERY SOFT	<250
	SOFT	250 – 500
	MEDIUM	500 – 1000
	STIFF	>1000



ZONE	STRENGTH (psf)	DENSITY (pcf)
1	c=300, ø=23°	63
2	750	110
3	400	109
4	280	102
5	318	102
6	395	102
7	517	102
8	686	102
9	354	104
10	315	104
11	356	104
12	441	104
13	574	104
14	482	104
15	505	104
16	543	104
17	602	104
18	1500	104
19	454	102

PHASE II
STAGE II LOADING TO 55 FEET MAXIMUM
(3-Year Consolidation)

RIVERBIRCH LANDFILL
AVONDALE, LOUISIANA

RIVERBIRCH, INC.
OWNER
GRETNA, LOUISIANA

mader-miers
ENGINEERING, INC.
LAFAYETTE, LOUISIANA

STE
Soil Testing Engineers, Inc.
Baton Rouge, LA Lake Charles, LA

Project Engineer:	Drawn by:	Checked by:
Z. Alem	DMS	
File No.: 98-1171	Date: 1-13-99	Figure No.: 65

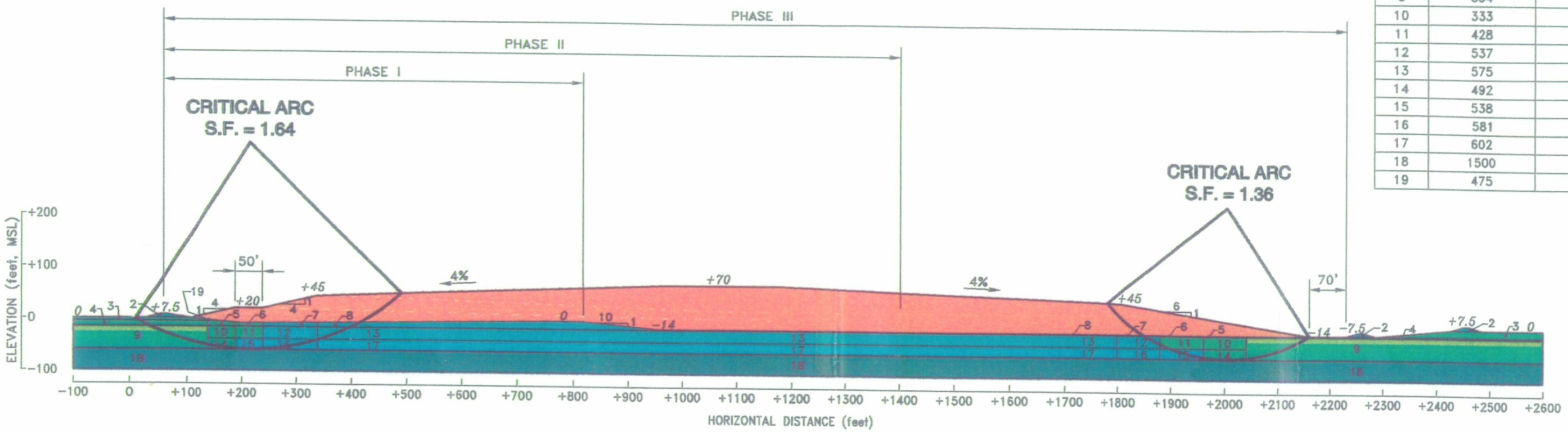
Title: PHASE II - THREE-YEAR CONSOLIDATION

C:\98-12.DWG\1-19-99.PLT

STRENGTH GROUPS

SYMBOL	CONSISTENCY	STRENGTH (psf)
	VERY SOFT	<250
	SOFT	250 – 500
	MEDIUM	500 – 1000
	STIFF	>1000

ZONE	STRENGTH (psf)	DENSITY (pcf)
1	c=300, ø=23°	63
2	750	110
3	400	109
4	280	102
5	355	102
6	486	102
7	596	102
8	686	102
9	354	104
10	333	104
11	428	104
12	537	104
13	575	104
14	492	104
15	538	104
16	581	104
17	602	104
18	1500	104
19	475	102



PHASE III
STAGE III LOADING TO 70 FEET MAXIMUM
(6–Year Consolidation)

RIVERBIRCH LANDFILL
AVONDALE, LOUISIANA

RIVERBIRCH, INC.
OWNER
GRETNA, LOUISIANA

mader-miers
ENGINEERING, INC.
LAFAYETTE, LOUISIANA

STE
Soil Testing Engineers, Inc.
Baton Rouge, LA Lake Charles, LA

Project Engineer:	Drawn by:	Checked by:
Z. Alem	DMS	
File No.: 98–1171	Date: 1–13–99	Figure No.: 66

Title: PHASE III - 6-YEAR CONSOLIDATION

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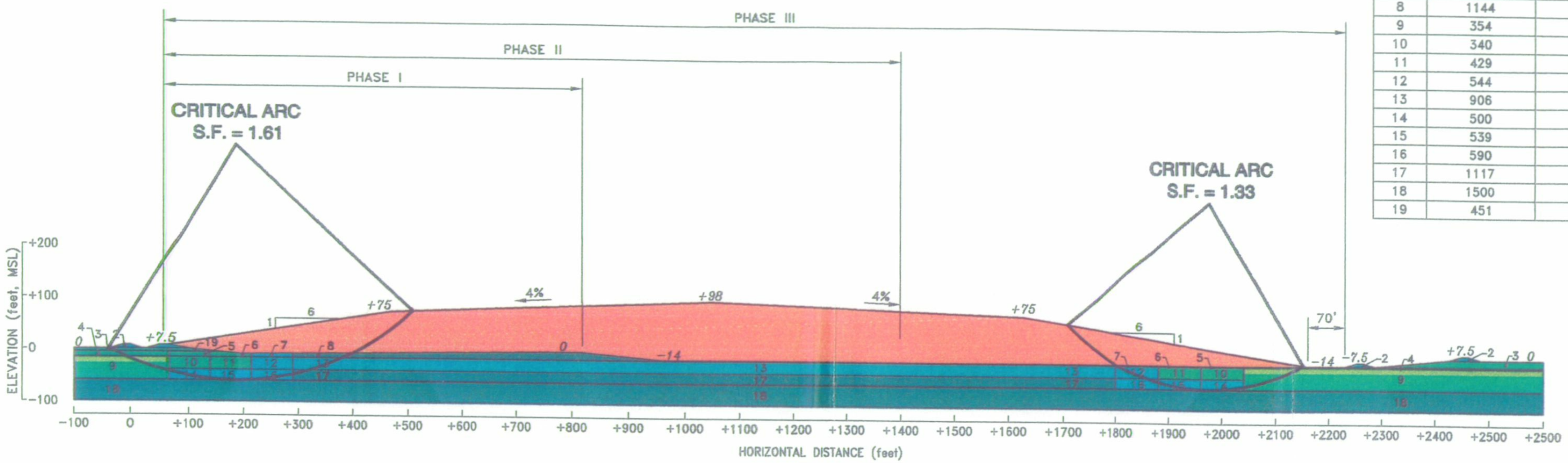
STRENGTH GROUPS

SYMBOL	CONSISTENCY	STRENGTH (psf)
	VERY SOFT	<250
	SOFT	250 – 500
	MEDIUM	500 – 1000
	STIFF	>1000

ZONE	STRENGTH (psf)	DENSITY (pcf)
1	c=300, ø=23°	63
2	750	110
3	400	109
4	280	102
5	363	102
6	480	102
7	632	102
8	1144	102
9	354	104
10	340	104
11	429	104
12	544	104
13	906	104
14	500	104
15	539	104
16	590	104
17	1117	104
18	1500	104
19	451	102



PHASE III - AT ACTUAL COMPLETION
STAGE III LOADING TO 98 FEET MAXIMUM
(8–Year Consolidation)

RIVERBIRCH LANDFILL
AVONDALE, LOUISIANA

RIVERBIRCH, INC.
OWNER
GRETNA, LOUISIANA

mader-miers
ENGINEERING, INC.
LAFAYETTE, LOUISIANA

STE
Soil Testing Engineers, Inc.
Baton Rouge, LA Lake Charles, LA

Project Engineer:	Drawn by:	Checked by:
Z. Alem	DMS	
File No.: 98–1171	Date: 1–13–99	Figure No.: 67

Title: PHASE III - 8-YEAR CONSOLIDATION

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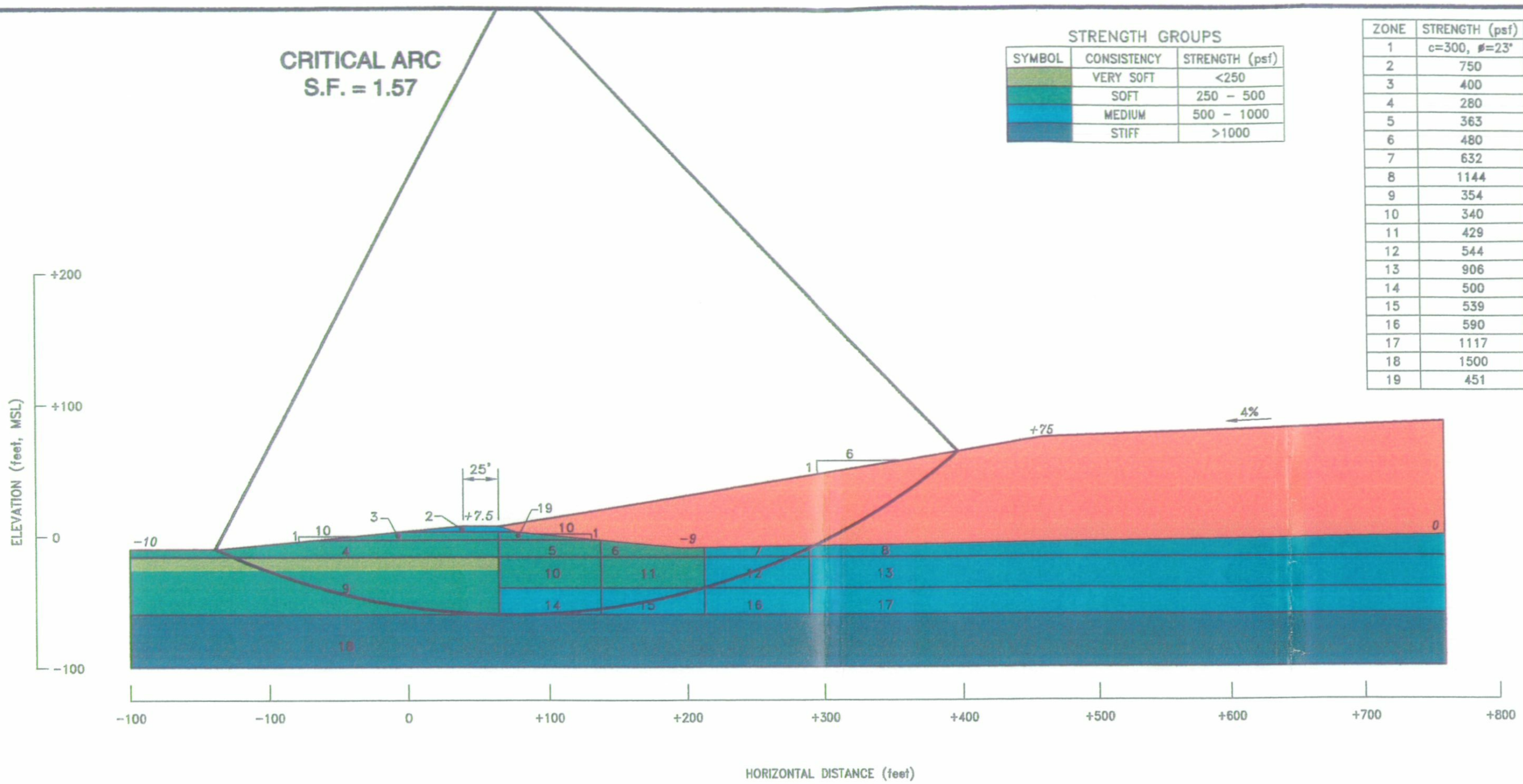


STRENGTH GROUPS

SYMBOL	CONSISTENCY	STRENGTH (psf)
	VERY SOFT	<250
	SOFT	250 - 500
	MEDIUM	500 - 1000
	STIFF	>1000

ZONE	STRENGTH (psf)	DENSITY (pcf)
1	c=300, ø=23°	63
2	750	110
3	400	109
4	280	102
5	363	102
6	480	102
7	632	102
8	1144	102
9	354	104
10	340	104
11	429	104
12	544	104
13	906	104
14	500	104
15	539	104
16	590	104
17	1117	104
18	1500	104
19	451	102

STABILITY ADJACENT TO OXIDATION POND
8-YEAR CONSOLIDATION

RIVERBIRCH LANDFILL
AVONDALE, LOUISIANA

RIVERBIRCH, INC.
OWNER
GRETNA, LOUISIANA

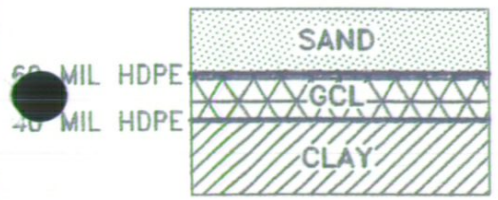
mader-miers
ENGINEERING, INC.
LAFAYETTE, LOUISIANA

STE
Soil Testing Engineers, Inc.
Baton Rouge, LA Lake Charles, LA

Project Engineer:	Drawn by:	Checked by:
Z. Alem	DMS	
File No.: 98-1171	Date: 1-15-99	Figure No.: 68

Title: OXIDATION POND STABILITY
8-YEAR CONSOLIDATION

C:\98-1 3YR.DWG\1-19-99.PLT



LINER SECTION
(NOT TO SCALE)

INTERFACE FRICTION ANGLES

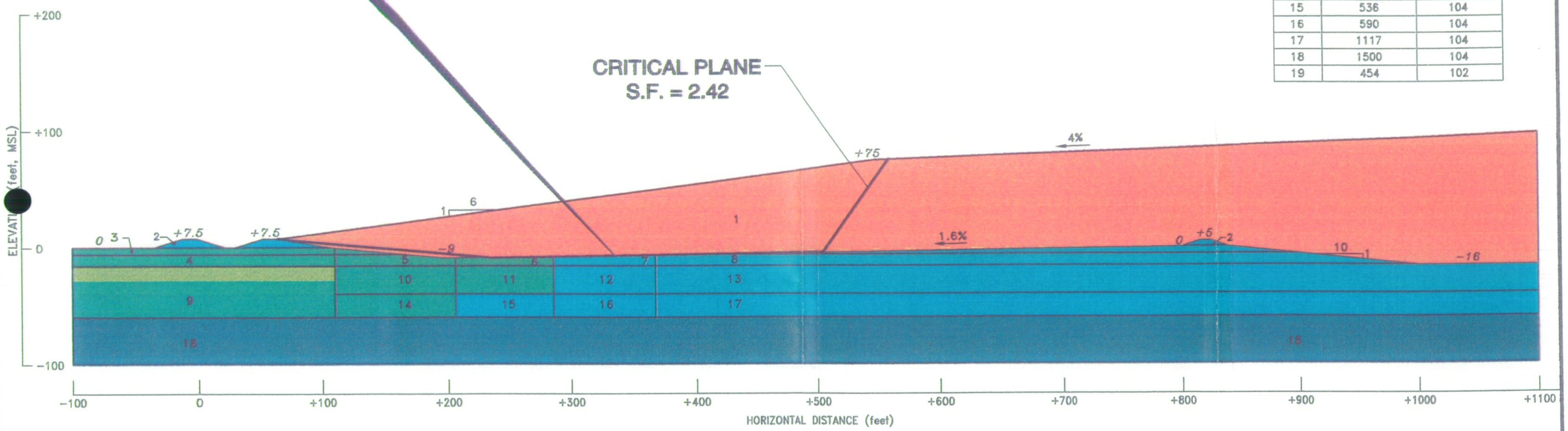
SAND–HDPE	20°
HDPE–GCL	10°*
HDPE–CLAY	18°

*: Failure plane is through the HDPE–GCL interface.

STRENGTH GROUPS

SYMBOL	CONSISTENCY	STRENGTH (psf)
	VERY SOFT	<250
	SOFT	250 – 500
	MEDIUM	500 – 1000
	STIFF	>1000

ZONE	STRENGTH (psf)	DENSITY (pcf)
1	c=300, ø=23°	63
2	750	110
3	400	109
4	280	102
5	363	102
6	406	102
7	632	102
8	1144	102
9	354	104
10	340	104
11	429	104
12	544	104
13	906	104
14	500	104
15	536	104
16	590	104
17	1117	104
18	1500	104
19	454	102



BLOCK FAILURE

RIVERBIRCH LANDFILL
AVONDALE, LOUISIANA

RIVERBIRCH, INC.
OWNER
GRETNA, LOUISIANA

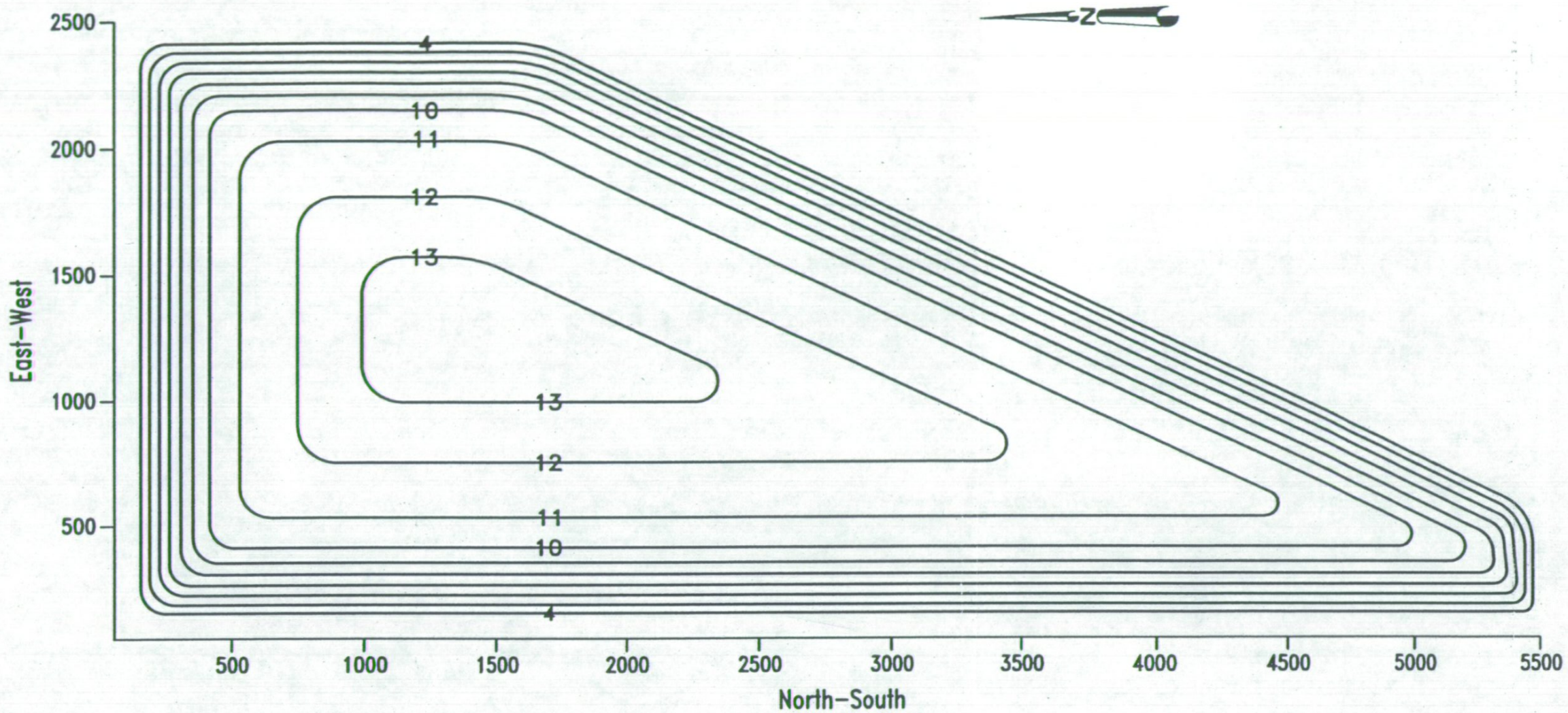
mader-miers
ENGINEERING, INC.
LAFAYETTE, LOUISIANA

STE
Soil Testing Engineers, Inc.
Baton Rouge, LA Lake Charles, LA

Project Engineer:	Drawn by:	Checked by:
Z. Alem	DMS	
File No.: 98-1171	Date: 12-07-98	Figure No.: 69

Title: **BLOCK FAILURE**

C:\98-CL1.DWG\1-19-99.PLT



NOTE:
Maximum settlement = 13.9 feet.
Settlement at toe of Cell 1 side slopes = 3.3 feet.
Settlement at toe of other side slopes = 5 feet.

LEGEND:

SETTLEMENT CONTOURS (feet)

Maximum elevation = 109 ft.

RIVERBIRCH LANDFILL
AVONDALE, LOUISIANA

RIVERBIRCH, INC.
OWNER
GRETNA, LOUISIANA

mader-miers ENGINEERING, INC.
LAFAYETTE, LOUISIANA

STE
Soil Testing Engineers, Inc.
Baton Rouge, LA Lake Charles, LA

Project Engineer:	Drawn by:	Checked by:
Z. Alem	DMS	
File No.: 98-1171	Date: 1-18-99	Figure No.: 70

Title:
SETTLEMENT CONTOURS

C:\98-1171\STLCONT.DWG\1-19-99.PLT

River Birch
INCORPORATED

2000 South Kenner Rd
Kenner, LA 70094
504.468.1288

September 28, 2006

Mr. Steve Burnham
Engineering Associates
1415 Delplaza Drive, Suite B
Baton Rouge, LA 70815

Re: Additional Information for Responses to LDEQ Notice of Deficiency-Permit Renewal Application, Technical Review #2

Dear Steve:

This letter is in response to your request for additional information regarding the deficiencies noted in the above referenced Technical Review.

521.F.5.c Well spacing exceeds 800 feet between downgradient wells MW-9 and MW-10.

The following information was obtained from Mr. Clem Betpouey, Construction Manager for River Birch, Inc., who was present during the monitor well installations. At and around the selected location for MW-10 (800 feet south of MW-9), there were three, relatively large, interconnecting ditches that fed into the Saul's Canal. Therefore, the selected location was bordered on all sides by water-bearing canals that made access to this location difficult and, depending on the amount of rain, hazardous. Therefore MW-10 was repositioned another 150 feet south, directly on the south side of the southernmost ditch that ran east-west.

Steve, if you require additional information please contact me at your convenience.

Best Regards,

Victor C. Culpepper, Sc.D
Technical Director

PART X

Eustis Engineering
Geotechnical Investigation
January 6, 2006
and
Table 1-Relationship of
Subsurface Stratigraphic Units

EUSTIS ENGINEERING COMPANY, INC.
3011 28TH STREET
METAIRIE, LOUISIANA 70002-6019
PN 504-834-0157 / FN 504-834-0354
EMAIL: INFO@EUSTISENG.COM / SITE: WWW.EUSTISENG.COM

6 January 2003

River Birch, Incorporated
Post Office Box 1938
Gretna, Louisiana 70054

Attention Mr. A. J. Ward

Gentlemen:

Geotechnical Investigation
River Birch Landfill
West Expansion
Jefferson Parish, Louisiana
Eustis Engineering Project No. 17543

Transmitted is one bound copy of our engineering report covering a geotechnical investigation performed for the subject project. A bound copy is being forwarded to Mr. Paul Miers representing Mader-Miers Engineering, Inc.

Thank you for asking us to perform these services.

Yours very truly,

EUSTIS ENGINEERING COMPANY, INC.

CHRIS L. SAUCIER, P.E.

CLS:ejg/mcp

STATE OF LOUISIANA
CHRISTOPHER L. SAUCIER
REG. NO. 26121
REGISTERED
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

GEOTECHNICAL INVESTIGATION

RIVER BIRCH LANDFILL

WEST EXPANSION

JEFFERSON PARISH, LOUISIANA

EUSTIS ENGINEERING PROJECT NO. 17543

FOR
RIVER BIRCH, INC.
GRETNA, LOUISIANA

By
Eustis Engineering Company, Inc.
Metairie, Louisiana

6 JANUARY 2003

TABLE OF CONTENTS

	PAGE
INTRODUCTION	1
SCOPE OF SERVICES	2
SUBSURFACE EXPLORATION PROGRAM	3
General	3
Soil Borings	4
Cone Penetrometer Tests	5
LABORATORY TESTS	6
DESCRIPTION OF SITE CONDITIONS	6
Surface Conditions	6
Site Geology	7
Ground Water	9
FOUNDATION ANALYSIS	10
Furnished Information	10
Foundation Recommendations	10
Slope Stability	11
Ground Water Control	14
Stability Monitoring Program	16
GEOTECHNICAL SERVICES DURING CONSTRUCTION	17
FIGURES 1 THROUGH 19	
APPENDICES I THROUGH III	

GEOTECHNICAL INVESTIGATION
RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA
EUSTIS ENGINEERING PROJECT NO. 17543

INTRODUCTION

1. This report contains the results of a geotechnical investigation performed for the proposed expansion to the west side of the existing River Birch Landfill in Jefferson Parish, Louisiana. The investigation was performed in accordance with the scope of services described in the proposal for geotechnical services submitted by Eustis Engineering Company, Inc., to River Birch, Incorporated, on 22 July 2002. Authorization to proceed with the investigation was provided by signed acceptance of the letter of proposal by Mr. A. J. Ward, President of River Birch.

2. This report has been prepared in accordance with generally accepted geotechnical engineering practice for the exclusive use of River Birch, Mader-Miers Engineers, Inc., and their designated representatives for specific application at the site investigated for this project. In the event of any changes in the nature, design, or location of the landfill features, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report are modified and verified in writing. Should these data be used by anyone other than River Birch, Mader-Miers Engineers, or their designated representatives, the user should contact Eustis Engineering for an interpretation of the data and recommendations included herein and to obtain any other information which may be pertinent to the project.

3. The recommendations and conclusions contained in this report were developed primarily for the use of the design engineer. Reasonable attempts have been made to consider or specify construction procedures. However, by necessity, this report does not fully anticipate or dictate the specific means and methods which will be used to construct the project. Additional geotechnical engineering analyses may be required to address temporary or permanent landfill configurations not considered in this report. The subsurface information included in this report should only be interpreted by a registered professional engineer familiar with the development, interpretation, and usage of soil mechanics test data of the types presented in this report.

4. It should further be noted that the analyses and recommendations included in this report are based, in part, on data obtained from the soil borings. The records of the soil borings and in situ tests presented in this report are considered representative of subsurface conditions at their respective locations on the dates completed. No warranty is given that these logs are representative of subsurface conditions at other locations or times. The nature and extent of potential variations in subsurface conditions between and away from the boring and test locations may not become evident until construction. If such variations then appear, it will be necessary to reevaluate the recommendations and conclusions contained in this report.

SCOPE OF SERVICES

5. The investigation included the drilling of soil test borings at designated locations to determine subsurface conditions and stratification, and to obtain samples of the various substrata. Additional subsurface information was obtained from in situ cone penetrometer tests. In situ tests and soil mechanics laboratory tests performed on samples obtained from the borings were used to evaluate the physical properties of the subsoils. Engineering analyses, based on the information collected during the field and laboratory investigations, were completed to estimate the geotechnical

stability of the landfill during various stages of construction and to estimate settlements of the landfill.

SUBSURFACE EXPLORATION PROGRAM

General

6. A total of 21 undisturbed sample type soil test borings were drilled within the area of the proposed west expansion during the period 30 July through 5 December 2002 at the locations shown on Figure 1. These borings were supplemented by a total of 24 cone penetrometer tests in the west expansion area as shown on Figure 1. The soil borings and cone penetrometer tests were arranged on an approximate 450' x 450' grid within the footprint of the proposed landfill expansion. Thirty-six additional cone penetrometer tests were completed within the undeveloped (inactive) area of the existing River Birch Landfill. These tests were also arranged in a 450' x 450' grid pattern.

7. Two soil borings (EE-B-6-02 and EE-B-12-02) were completed to a depth of 160 feet below the existing ground surface. Three cone penetrometer tests (EE-C-13-02, EE-C-27-02, and EE-C-31-02) were completed to depths of 100 feet below the existing ground surface. The remaining borings and cone penetrometer tests were completed to a depth of 70 feet below the existing ground surface.

8. Upon completion of drilling operations, all bore holes and test holes were backfilled with a cement-bentonite grout in accordance with current regulations. Descriptive logs of the undisturbed sample type borings and the cone penetrometer tests are shown in both tabular and graphical form in the Appendices I and II.

Soil Borings

9. With the exception of five borings, all borings were drilled with a truck mounted wet rotary drill rig. The remaining five borings (EE-B-5-02, EE-B-26-02, EE-B-28-02, EE-B-30-02, and EE-B-32-02) were drilled with a track mounted wet rotary drill rig. At all boring locations, undisturbed samples of cohesive and semi-cohesive subsoils were obtained using a 3-in. diameter thinwall tube sampling barrel. Samples were collected continuously within the uppermost 70 feet of all borings and at 5-ft intervals for greater depths.

10. Samples obtained in thinwall tubes were immediately extruded from the sampling barrel, inspected, and visually classified by Eustis Engineering's soil technician. A portion of each undisturbed sample was retained in the sampling tubes and were transported to Eustis Engineering's soil mechanics laboratory for extrusion. Pocket penetrometer tests were performed on the soil samples extruded in the field to provide a general indication of the soil shear strength or consistency. The results of these tests are shown on the boring logs under the column heading "PP." Representative portions of field extruded samples were then placed in moisture proof containers and sealed for transport to Eustis Engineering's laboratory.

11. Samples of cohesionless soils were obtained during the performance of in situ Standard Penetration Tests. This test consists of driving a 2-in. diameter splitspoon sampler 1 foot into the soil after first seating the sampler 6 inches. A 140-lb weight dropped 30 inches is used to advance the sampler. The number of blows required to drive the sampler through the final 1-ft increment is indicative of the relative density or approximate consistency of the subsoils tested. The results of the Standard Penetration Tests are recorded on the boring logs under the column heading "SPT." Once the sampler was retrieved from the bore hole, the sampler was opened, and the materials within the sampler were visually classified by the soil technician on site. As with undisturbed samples, representative portions of the

disturbed samples obtained during the Standard Penetration Tests were retained in moisture proof containers.

Cone Penetrometer Tests

12. Sixty-one in situ cone penetrometer tests with pore pressure measurements (CPT) were performed at the locations shown on Figure 1. Fifty-three of the CPTs were completed to a depth of 70 feet below the existing ground surface. Test EE-C-75-02 was completed to a depth of 85 feet below the existing ground surface. The remaining CPTs (EE-C-13-02, EE-C-27-02, EE-C-31-02, EE-C-47-02, EE-C-53-02, EE-C-65-02, and EE-C-78-02) were completed to a depth of 100 feet below the existing ground surface. All CPT locations were accessible to our 20-ton track mounted cone penetrometer.

13. The cone penetrometer used for the project is an electronic piezocone capable of recording 5 tons of total resistance on the tip and the sleve. This piezocone has a 10-cm^2 cross-sectional area with a 60° apex angle and a 150-cm^2 friction sleeve area. The compressive force at the cone tip, termed the tip resistance, is measured by a compression load cell within the cone housing. The friction acting on the barrel-shaped surface of the cone, termed the sleeve friction, is measured by a separate tension load cell within the same housing. Finally, a transducer measures the pore water pressure at a filter located behind the cone and in front of the friction sleeve (termed the u_2 position).

14. During testing, the penetrometer was hydraulically advanced a rate of 2 cm/sec. Cone tip resistance (q_c), sleeve friction (f_s), and pore water pressure (u_2) were recorded at 5-cm intervals as the cone was advanced. Descriptive logs of the CPTs are included in Appendix II. Upon withdrawal of the cone at the end of each test, a mixture of two parts bentonite to one part Portland Cement Concrete was pumped into the vacated bore hole in accordance with current state requirements.

LABORATORY TESTS

15. A series of soil mechanics laboratory tests was performed on samples obtained from the borings. These tests consisted primarily of natural water content measurements, unit weight determinations, unconfined compression shear tests (UC), and unconsolidated undrained triaxial compression tests (OB). These tests were heavily supplemented by Atterberg liquid and plastic limit determinations to aid in soil classification. The results of these laboratory tests are shown on the boring logs included in Appendix I. In addition, 18 flexible wall permeability tests were performed on samples obtained from the borings. The results of these tests are tabulated in Appendix III.

DESCRIPTION OF SITE CONDITIONS

Surface Conditions

16. The site of the proposed landfill expansion abuts the western side of the existing River Birch Landfill. The proposed expansion site is a triangular shaped plot that is currently a heavily wooded area. A small fenced and cleared parcel exists within the site in an area that was formerly a Jefferson Parish sludge disposal lagoon. The site of the proposed landfill expansion is bounded on the west side by South Kenner Road and the existing Kelvin Landfill, and is bounded on the east side by the existing River Birch Landfill. An existing railroad track, owned and operated by the Canadian National/Illinois Central Railroad, bounds the northern edge of the site. The ground surface at the site typically varies from el -1 to el -3 (NGVD) with the topography generally sloping from northeast to southwest.

Site Geology

17. General Lithology. As indicated on the cross-sections shown on Figures 2 through 10, the site is comprised of Holocene Age sediments overlying Pleistocene Age sediments (Saucier, 1994). The uppermost 15 to 20 feet of Holocene deposits are backswamp deposits having a high content of decayed wood and organic matter. The backswamp deposits overlie a sequence of interdistributary deposits which accreted in a variety of fluvial depositional environments associated with meandering, overbank flooding, and other processes. For this reason, some variability exists within the interdistributary deposits, though these soils can generally be characterized as clays with interbedded lenses of silty clays and silts. At depths between 50 and 55 feet, prodelta clays and silty clays underlie the interdistributary deposits. These soils are relatively homogeneous and were commonly found to contain shell fragments.

18. The most recent Pleistocene surface was generally contacted between 65 and 70 feet, though localized depressions as much as 15 feet below that level were observed. The uppermost 3 to 4 feet of the Pleistocene commonly contained a high content of wood and organic matter, and swamp gas was frequently observed at these depths. A pressurized deposit of marsh gas was encountered near the Holocene-Pleistocene interface at the location of Boring EE-B-26-02. Bubbles of marsh gas were commonly noted at other boring locations, but none of the other bore holes produced a consistent flow of gas.

19. The underlying Pleistocene soils generally consisted of a 5 to 10-ft veneer of stiff silty clay overlying 5 to 10 feet of interbedded strata of clayey silt, sandy silt, and silty sand. These deposits transition into more uniform clay strata that extend 125 to 130 feet below the ground surface. At these depths, massive strata of fine sand were encountered and found to extend at least 160 feet below the existing ground surface.

20. Spatial variation of the various lithologic units can be seen in the isometric subsurface profile shown on Figure 11. The sequence described above and shown on Figures 2 through 10 generally agrees with published geologic information in the vicinity of the site, as shown on Figure 12 (May, et al, 1984). It should be noted that the geologic section shown on Figure 12 indicates natural levee deposits at the ground surface. This can be attributed to the fact that transection Line A-A' of the referenced geologic report is located closer to the Mississippi River than the River Birch Landfill site.

21. The generalized lithology described above was used to develop design profiles for various physical properties of the subsurface soils. Summaries of several pertinent physical properties measured in laboratory tests are shown on Figure 13.

22. Seismicity. The largest known fault line is the Baton Rouge Fault, which is a series of discrete faults within a zone centered along a line between Baton Rouge, Louisiana, and a point several miles south of Slidell, Louisiana. Geologic studies of the area indicate the fault runs from the east-southeast toward the west-northwest at a distance approximately 30 miles north of the landfill. The system of faults exhibit normal dip-slip displacement patterns, with the footwall positioned on the northern side of the fault line.

23. Other minor faults, notably the Lac Des Allemands and Thibodaux Faults, are known to exist. These minor faults originate from downwarping of the ground surface associated with sediment accumulation in the lower Mississippi valley. They are not related to tectunic activity. The Lac Des Allemands Fault is located approximately four miles north-northwest of the site, and the Thibodeaux Fault is located approximately two miles south of the site. These run northeast to southwest and dip southeastward (Gagliano, 2001). Geologic studies indicate movements along these faults are generally manifested as progressive, non-seismic creep. The

faults exhibit normal dip-slip movement with the footwall postitioned on the northern side of each fault.

24. The landfill is located 11 miles north of the Bayou Couba Salt Dome, a dome-shaped diapir located approximately 10,000 feet below the existing ground surface. The upward thrusting of the salt dome produces a pattern of local faults with dip-slip and strike-slip movement, though the exact locations and extent of these faults have not been mapped to date. As with movement associated with downwarping of Holocene sediments, displacements along faults associated with salt diapir intrusion are generally non-seismic.

25. Current regulations define "seismic impact zones" as those areas in which a 10% probability exists that the peak horizontal ground accelaration will exceed 0.1 times the earth's gravitational acceleration within a 250 year period (U.S.E.P.A., 1993). According to maps produce by the U.S. Environmental Protection Agency, the River Birch site does not exist within a seismic impact zone as defined by current regulations. The closest seismic impact zone is located approximately 250 miles north-northwest of the site.

Ground Water

26. The depth at which free water was first encountered in Borings EE-B-12-02, EE-B-16-02, and EE-B-22-02 was recorded. In these bore holes, ground water was first encountered at a depth of 4 feet below the existing ground surface. Subsequent observation of the water level in bore hole EE-B-22-02 indicated a water level 5 feet, 3 inches below the existing ground surface. These observations correspond approximately to ground water levels at el -5 to el -6.3 MSL Datum.

27. Potentiometric studies have been performed for the existing River Birch landfill. These studies indicate ground water typically varies from el -3 to el -6 along the

edge of the existing landfill nearest the proposed expansion. The existing potentiometric studies further indicate a slight upward gradient when observations in deep monitoring wells at the site are compared with observations in shallower wells. In general, the depth to ground water should be anticipated to vary with climatic conditions, changes in site topography or drainage conditions, seasonal river stages, and other factors. Because of its potential impact upon construction operations, the depth to ground water should be determined by those persons responsible for construction immediately prior to beginning work.

FOUNDATION ANALYSIS

Furnished Information

28. The existing River Birch Landfill began accepting waste materials in Cells 1 through 6 during June 1998. These six cells were filled to a level 40 feet above the existing ground surface by May 1999. Waste placement began in Cells 7 through 12 in May 1999 and continued until May 2001, at which time the cells were filled to a level 45 feet above the existing ground surface. At that time, waste placement was initiated in Cells 14, 16, 18, and 20. Placement in these cells continued until September 2002, when waste placement was initiated in Cells 13, 15, 17, and 19. To date, all cells have been constructed to have a sump at approximately el -15. At the owner's request, the current report investigates the possibility of excavating a sump to el -40. Maximum ultimate waste heights for the landfill were then estimated for the condition of excavation to el -40 within the waste cells.

Foundation Recommendations

29. Foundation soils below the proposed excavation level and landfill consist of low permeability soils. Seepage from the foundation soils, driven by excess pore water pressures during landfill construction, may occur along discontinuous lenses of

lower permeability soil. However, it is our opinion that relief of foundation pore water pressures will occur primarily in the vertical direction. For this reason, relief of excess pore water pressures within the foundation soils occurs very slowly, so that no significant strengthening of the foundation soils can be considered during construction of the landfill.

30. Excavation of future cells to el -40 may be accommodated provided sufficient distance is present between existing waste cells and the proposed excavations. Side slopes for excavations to el -40 must be no steeper than 1 vertical on 8 horizontal, and side slopes for future waste placement must be no steeper than 1 vertical on 6 horizontal to provide adequate stability against failure of materials (natural soil and/or adjacent waste cells) into the excavations.

31. Based on disposal volumes and tonnage provided by Mr. Paul Miers of Mader-Miers Engineering, the waste was assumed to have a unit weight of 61 pcf. Waste was further assumed to have a friction angle of 23°, and an effective cohesion of 200 psf. These parameters are not based on site-specific test data. Instead, strength values were assumed from previously published studies regarding the shear strength of municipal wastes (Howland and Landva, 1992). The assumed unit weight of the waste is substantially lower than the total unit weight of soil being excavated to form the sumps and cell bottoms. Because the total weight of material acting to destabilize the landfill is decreased (through the replacement of soil with waste), we estimate that final configurations of the landfill are more stable against failure outside the perimeter of the landfill for deeper sump excavations.

Slope Stability

32. General. Analyses were performed using assumed circular slip surfaces in combination with the assumptions of the Simplified Bishop Method. Soil shearing strength profiles were developed based on existing test data and calibrated to

consider strength gains which may occur during construction. Assuming waste in any given cell would be constructed to el 45 and permitted to remain in place for a period of 15 years prior to additional waste placement in that cell, no significant strength gain was estimated to occur. Subsequent analyses considered a soil shear strength profile corresponding to the end of construction of the initial placement of material to el 45 within each cell.

33. Stability of Exterior Slopes of Proposed Cells During Excavation of Proposed Cells. The analysis presented on Figure 14 corresponds to the excavation of a slope from the existing ground surface to el -40. This condition occurs when a cell is initially excavated for construction of the sump and liner system. The top of the slope considered in this analysis represents the local ground surface outside the perimeter of the landfill, and the bottom of the cut represents excavation to the sump elevation. When cut to a slope of 1 vertical on 8 horizontal, this slope provides a factor of safety of 1.3 against global failure of the slope. It should be noted that the stability of excavation slopes during construction generally decreases with increasing excavation depths, and with closer proximity of the excavations to existing waste piles.

34. Stability of Interior Slopes of Existing Cells During Excavation of Proposed Cells. The analysis presented on Figure 15 corresponds to the excavation of a slope adjacent to an existing cell. The existing cell is assumed to have waste present to el 45 at a slope of 1 vertical on 4.5 horizontal. The assumed side slopes of the existing waste correspond to those presented on an aerial survey of the site completed in November 2001. The base of the waste was assumed at el -6, corresponding approximately with the average bottom elevation of the existing cells. We estimate that the existing slope provides a factor of safety of approximately 1.15 for a failure surface erupting at the toe of the existing slope. The geometry of the excavation of the new cell shown on Figure 15 was selected from geometries that would not lower the factor of safety below the existing level of 1.15. That is, the

geometry of the excavation shown on Figure 15 corresponds to the steepest and closest excavation which would not lower the factor of safety below its current existing level. Therefore the excavation should be positioned no closer to the existing landfill as shown on Figure 15. Because failure of the existing slope at the toe of the slope was forced to govern the stability of the overall slope and excavation, we estimate the factor of safety for this geometry is approximately 1.15.

35. Stability of Interior Slopes of Proposed Cells During Excavation of Subsequent Cells. The analysis presented on Figure 16 corresponds to a proposed cell which has been constructed to the maximum height at el 210. An excavation for a subsequent cell has proceeded to el -40. The critical slip surface corresponding to the minimum factor of safety exits the slope at the toe of the waste slope. The factor of safety for this surface is 1.26. The slope of the excavation was established to ensure that the previously described failure surface remains critical during excavation to el -40. For this requirement, we recommend a minimum distance of 30 feet be present at el 0 between the toe of the waste slope and the top of the excavation for the adjacent cell.

36. Stability of Exterior Slopes of Proposed Cells For Final Configuration. The analysis presented on Figure 17corresponds to the construction of a proposed cell to the maximum permissible height. We recommend the 1 vertical on 6 horizontal waste slope be constructed no higher than el 170. At greater elevations, waste should be placed below a line corresponding to a 20% slope upward from el 170. We estimate the maximum height for waste placement should be limited to el 210. For these conditions, we estimate the factor of safety against failure of the landfill foundation and slopes as 1.26.

37. Stability of Exterior Slopes of Existing Cells for Final Configuration. The analysis presented on Figure 18 corresponds to conditions which will exist along the western, northern, and eastern exterior slopes of cells which have already been constructed

to el 45. In these cells, excavation within the cells extended to a much smaller depth than that which is currently proposed for additional cells. A greater portion of the forces driving instability of the landfill in these locations is attributable to the weight of foundation soils when compared to proposed cell configurations. Because these existing cells receive less benefit from the reduction in driving forces associated with substituting waste for soil, the factors of safety for a given slope geometry are commensurately lower. For this reason, a series of benches will be required in the waste side slopes to maintain stability of the landfill in these areas as shown on Figure 18. The toe of the 1 vertical on 6 horizontal side slopes should be located no closer than 100 feet from the top of the existing slopes at el 40. A second bench, 180 feet wide, should be constructed at el 75. Above el 75, the recommended slope geometry will match the slope profiles recommended for all other exterior slopes.

Ground Water Control

38. Construction Conditions. Natural soils excavated for construction of landfill cells generally have high water contents. For this reason, significant water quantities may flow into the cells during excavation. However, natural soils being excavated from the cells also generally have low permeabilities so that water flow into the excavation should be expected to decrease with time for a given excavation depth. In addition, the low permeabilities of the natural soils minimize the distance over which ground water levels are drawn down by excavation. In general, a system of pumped sumps or pumped collection ponds should be sufficient to dewater the excavation during construction.

39. Thin lenses of sand and silt were commonly observed within the natural soils in the depths from which soil will be excavated. Based on the boring logs and cone penetrometer tests, these lenses are not continuous or extensive. While these seams have high permeabilities relative to the massive clay strata in which they are

interbedded, the small thicknesses of these soils drastically reduce their capacity for water transmission. During construction, we anticipate water will flow from these soils, though the flow should decrease with time. In addition, exposure of these soils should provide adequate release of water pressures within the lenses, so that hydrostatic heave of overlying soils or liner systems should not be sufficient to damage the integrity of the containment system.

40. Underdrain System. It is our understanding that an underdrain system will be provided between natural soils at the site and the clay liner system for the landfill. Water infiltrating into the underdain system will be drained by gravity and collected in sumps. The sumps will be pumped to ensure ground water within the underdrain system is relieved of excessive pressures that might cause hydrostatic heave of the clay liner.

41. Swamp Gas Heave Pressures. Swamp gas was encountered at several locations during subsurface exploration. In at least one boring location, the swamp gas was found to have a substantial pressure and volume. Pressurized gas may also be released during excavation of the cells as existing overburden pressures are decreased. Based on limited experience at this site, we anticipate that these releases would consist of localized flows that may continue for several days. If larger areas are encountered, these may have to be vented by temporary wells or casings. However, we do not anticipate large scale releases that could not be controlled or would prove catastrophic to the integrity of the landfill, the liner, or the foundation soils.

Stability Monitoring Program

42. General. Stability analyses included in this report have relied upon estimates of the physical properties of the foundation soils. Slope stability analyses, based upon these estimates, were performed to establish geometries which conform to generally accepted safety requirements. To ensure that conditions in the foundation soils adhere to the assumptions used to estimate stability of the landfill, we recommend a program of geotechnical instrumentation and monitoring.

43. Settlement Points. To ensure ground movements are not causing movements of critical utilities in the vicinity of the project (e.g. the railroad and underground gas pipeline along the northern side of the proposed landfill), we recommend these structures be surveyed at regular intervals during construction and operation of the landfill. Specifically, we recommend survey points be established along that portion of the pipeline immediately north of the project area. These points should be surveyed on a periodic basis, and the results should be transmitted to Eustis Engineering for evaluation.

44. Inclinometers. Slope inclinometers are used to provide a measurement of lateral flow which may develop at low factors of safety. We recommend a minimum of nine inclinometers be installed at the locations shown on Figure 19. Each inclinometer should be anchored a minimum of 150 feet below the existing ground surface. Not all of the inclinometers will be required for initial stages of construction so that a fraction of the minimum recommended number of inclinometers may be installed. The remaining inclinometers can then be installed to coincide with critical stages of landfill construction. All inclinometers should be monitored at a regular schedule to be established once specific construction sequences have been proposed for the landfill construction.

45. Pneumatic Piezometers. Pneumatic piezometers are used to provide a measure of pore water pressure within the foundation soils. These observations further provide indicators of instability within the foundation soils associated with undrained shearing. In addition, rates of changes in undrained shearing strengths may be assessed from observed changes in the pore water pressure with time. We recommend that a minimum of nine pneumatic piezometers be installed for the existing landfill and a minimum of nine pneumatic piezometers be installed for the proposed west expansion. These piezometers should be grouped in nests of three piezometers each as shown on Figure 19. Not all of the pneumatic piezometers will be required for initial stages of construction, so that a fraction of the remaining recommended number may be installed at the initiation of construction. The remaining nests of pneumatic piezometers can then be installed to coincide with critical stages of construction. The frequency of monitoring should be established once the construction sequence has been adequately determined for the landfill.

GEOTECHNICAL SERVICES DURING CONSTRUCTION

46. In order to provide continuity between the investigation, design, and construction phases, Eustis Engineering can provide additional geotechnical services which may include consultation during design and construction. We further offer a full range of materials testing and construction inspection services for soil, asphalt, concrete, and steel. For the current project, inspection services may include reviews of design plans and specifications, additional subsurface exploration by wet rotary drilling and sampling and by cone penetrometer testing, installation and monitoring of geotechnical instrumentation, and any other soils or materials testing services which will provide quality control during construction and conformance to design specifications.

47. In summary, Eustis Engineering should be retained to monitor all geotechnical related work performed during project construction. This monitoring provides a

measure of security that the project is constructed to meet or exceed conditions assumed for the geotechnical design. If construction problems arise, Eustis Engineering should be notified immediately to assess the potential impacts of these problems upon the recommendations included in this report. Such notification will permit the geotechnical engineer to quickly evaluate the effects of unanticipated conditions and to assist in developing solutions that remain consistent with the recommendations of this report. The geotechnical engineer may further be able to assess the manner in which site specific soil and ground water conditions will affect the success of proposed construction methods and sequences.

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Saucier, R.T. (1994). " Geomorphology and Quaternary Geologic History of the Lower Mississippi Valley," U. S. Army Corps of Engineers, Waterway Experiment Station, Volume 1.

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TABLE 1

RELATIONSHIP OF SUBSURFACE STRATIGRAPHIC UNITS

TABLE 1

RELATIONSHIP OF SUBSURFACE STRATIGRAPHIC UNITS

	EUSTIS Soil Description	Interval (+/-)	Interval (+/-)	WOODWARD-CLYDE Soil Description	
HOLOCENE	I. So, G, Br, Bk, cl-OH	0'-18'	0'-18'	So-Vso	
	II. So, G, cl and si Cl w/lenses	18'-50'	18'-55'	So, G cl, lam w/sms	A
	III. Med St, G cl and si cl w/shells	50'-60'	30'-60'	G cl	
PLEISTOCENE	IVA St-Vst, Gr-G cl, T cl and si cl	60'-66'	60'-75'	St, Gr-G si cl	
	IVB Med compact T cl si and sa si, De si sa	60'-	75'-90'	T & L cl si	B
	IVC St Gr-G cl	60'-	90'-100'	St, T and L cl	
	IVD De-V De Sa	60'-			

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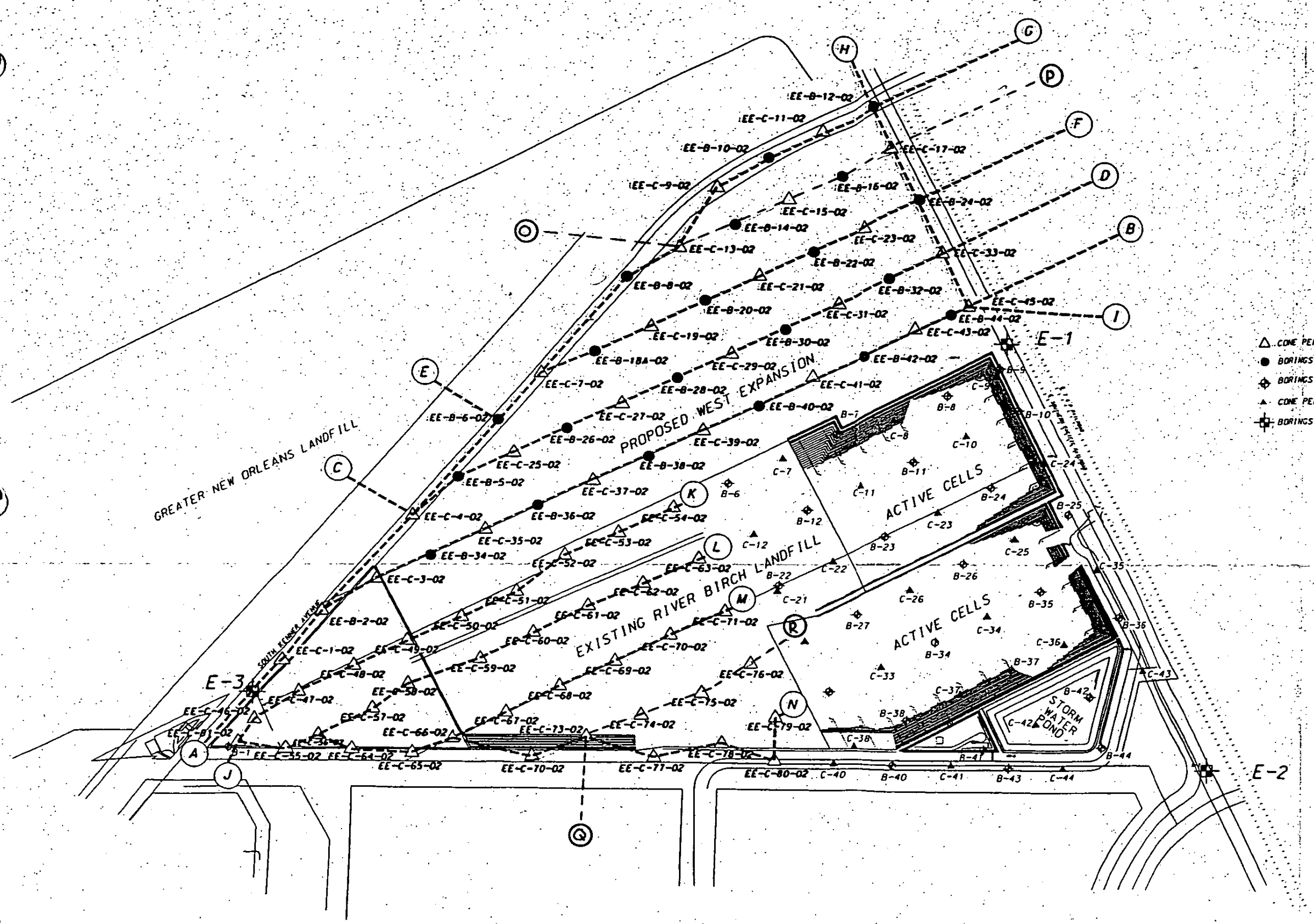
PART XI

Figures from Eustis Engineering Geotechnical Investigation January 6, 2003 (Boring Location Plan Revised by Engineering Associates, November, 2006) and Monitoring Well Cross-Sections



N

LEGEND

- △ CONE PENETROMETER TESTS PERFORMED BY EUSTIS ENGINEERING. 13-16 AUGUST 2002
- ● BORINGS DRILLED BY EUSTIS ENGINEERING. 30 JULY SEPTEMBER 2002
- ◆ BORINGS DRILLED BY WOODWARD-CLYDE CONSULTANTS. OCTOBER 1993
- ▲ CONE PENETROMETER TESTS PERFORMED BY WOODWARD-CLYDE CONSULTANTS. OCTOBER 1993
- ⊕ BORINGS DRILLED BY EUSTIS ENGINEERING. SEPTEMBER 1990

800' 0 800'
SCALE

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
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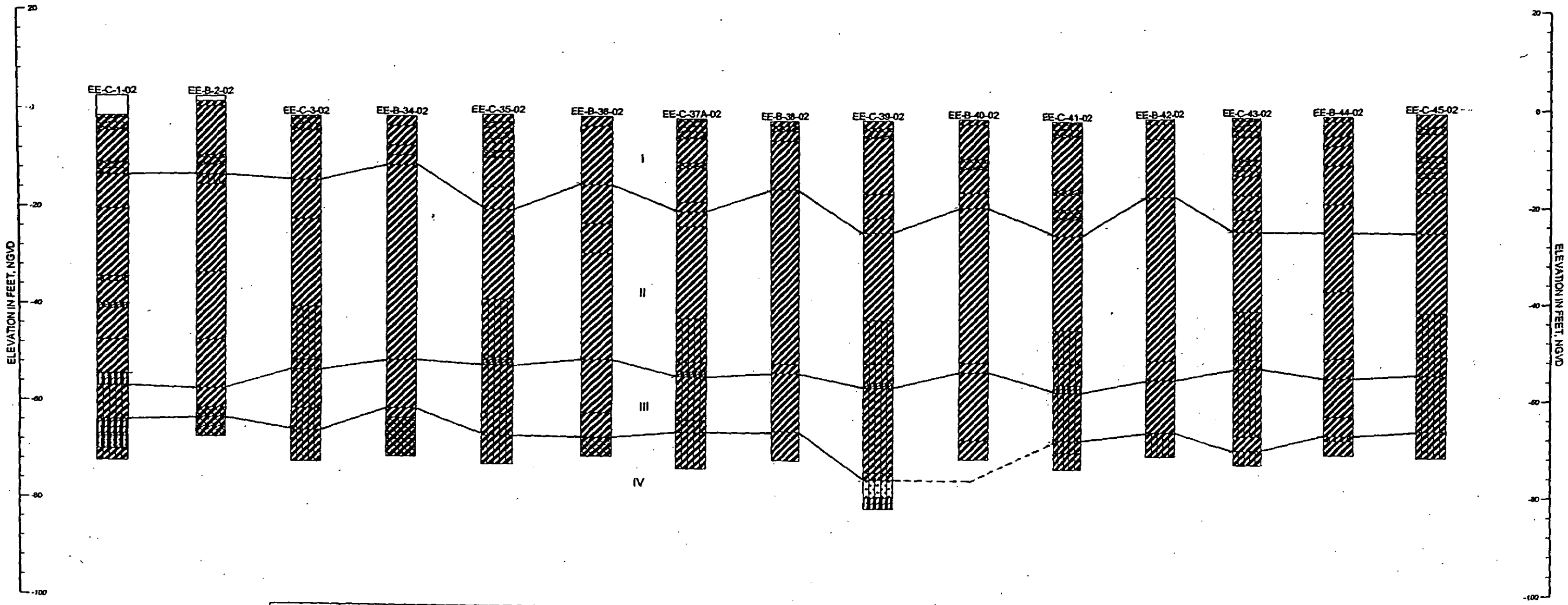
BORING LOCATION PLAN

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: D. LAFONT	PLOT DATE: 16 OCT. 02	CADD FILE: FIGURE 1.DGN
CHECKED BY: C.L.S.	JOB NO.: 17543	FIGURE 1



STRATA GROUP NUMBER	NAME	DESCRIPTION
I	INLAND BACKSWAMP DEPOSITS (HOLOCENE)	EXTREMELY SOFT TO MEDIUM STIFF GRAY, BROWN, AND BLACK CLAY AND ORGANIC CLAY WITH WOOD
II	INTERDISTRIBUTARY DEPOSITS (HOLOCENE)	VERY SOFT TO SOFT GRAY CLAY AND SILTY CLAY WITH LENTICULAR INTERRUPTIONS OF LOOSE CLAYEY SILT
III	PRODELTA DEPOSITS (HOLOCENE)	MEDIUM STIFF GRAY CLAY AND SILTY CLAY WITH SHELL FRAGMENTS
IV	PLEISTOCENE PRAIRIE DEPOSITS (PLEISTOCENE)	STIFF TO VERY STIFF GREENISH-GRAY AND TAN SILTY CLAY, MEDIUM COMPACT TAN CLAYEY SILT AND SANDY SILT, AND LOOSE TO MEDIUM DENSE TAN SILTY SAND.

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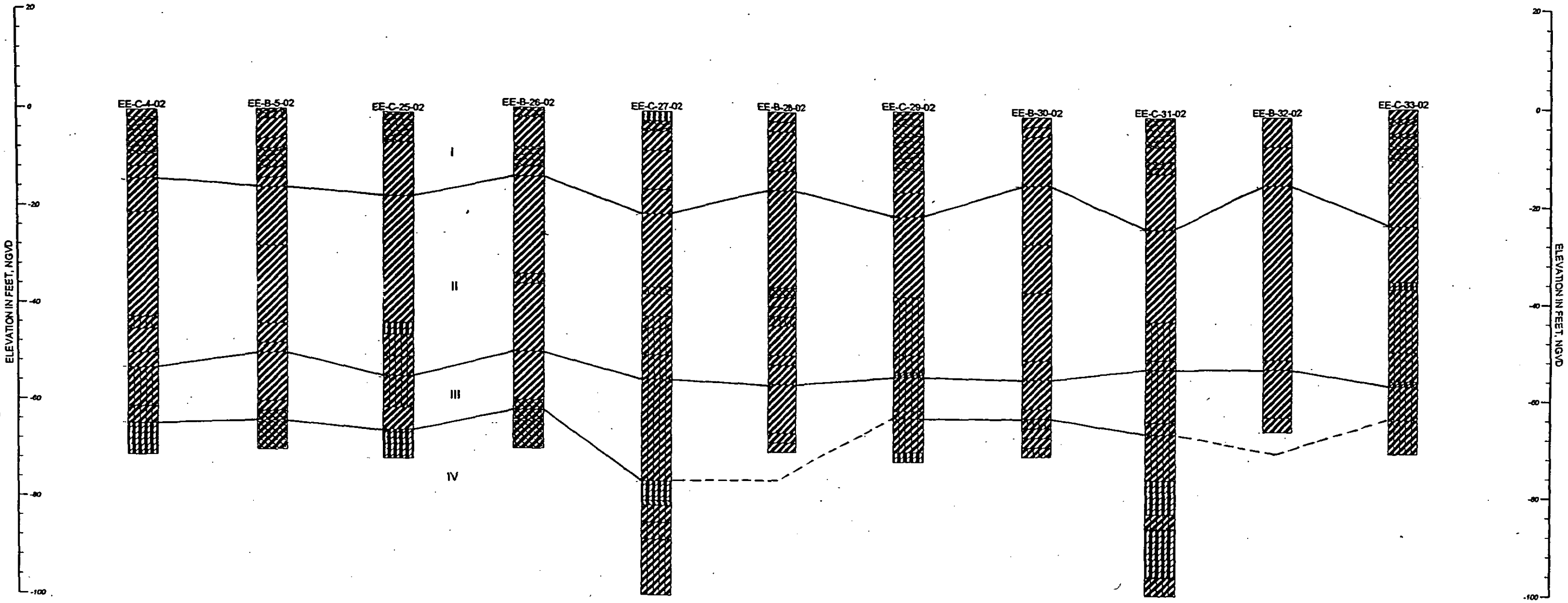
CROSS-SECTION A - B

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: CLS	DATE: 11 DEC 2002	FILENAME: XSECAB
CHECKED BY: WWG	JOB NO. 17543	FIGURE: 2



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CROSS-SECTION C - D

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

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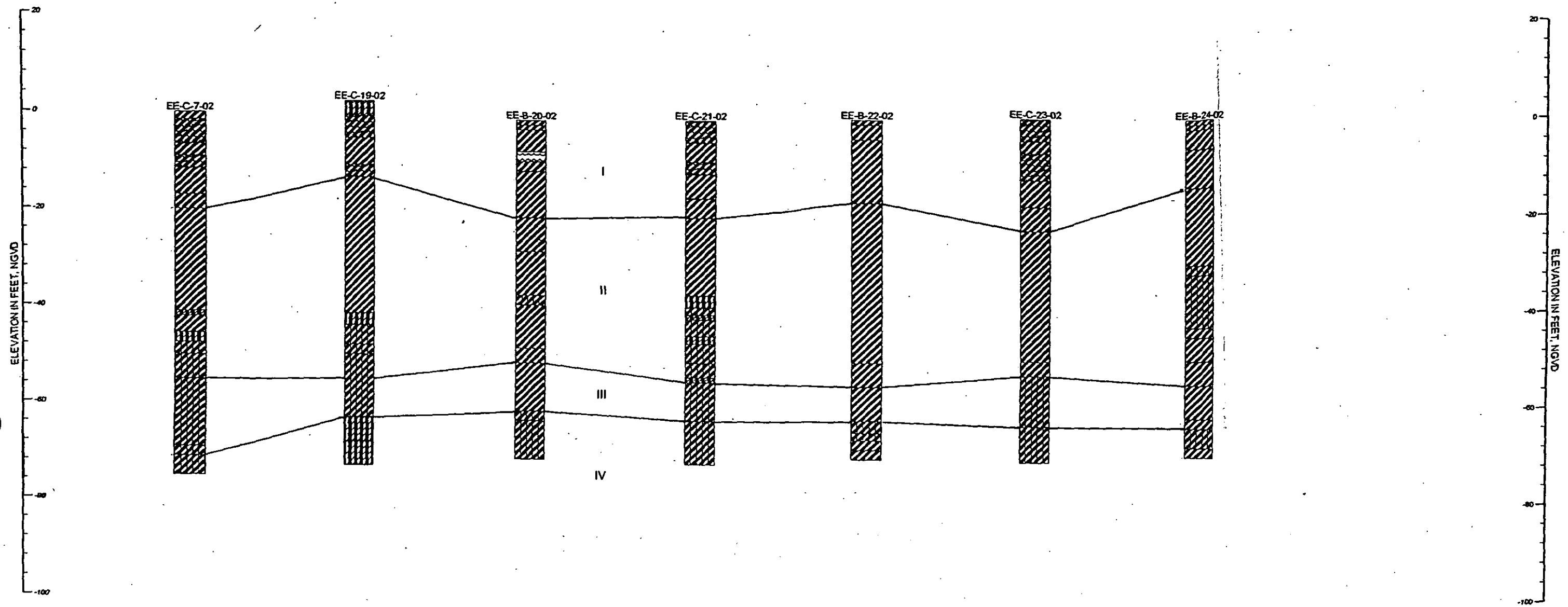
CHECKED BY: WWG	JOB NO. 17543	FIGURE: 3



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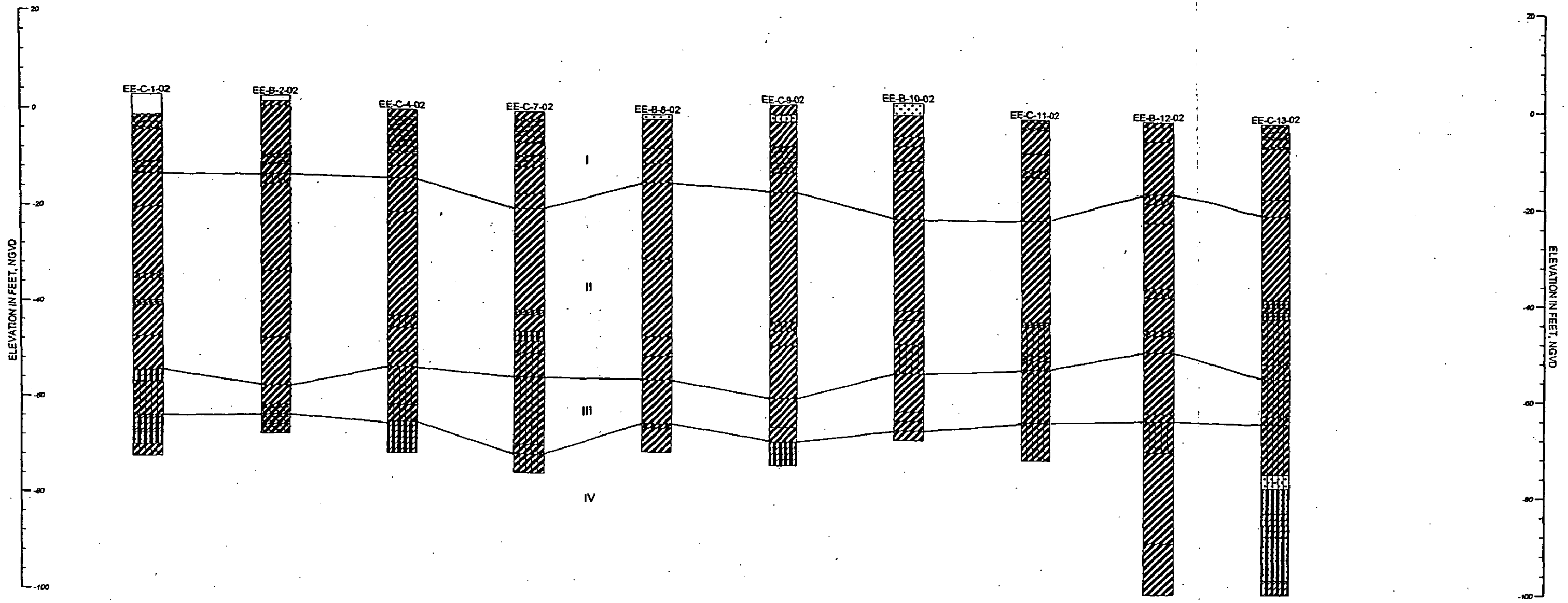
CROSS-SECTION E - F

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: CLS	DATE: 11 DEC 2002	FILENAME: XSECEF
CHECKED BY: WWG	JOB NO. 17543	FIGURE: 4



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CROSS-SECTION A - G

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

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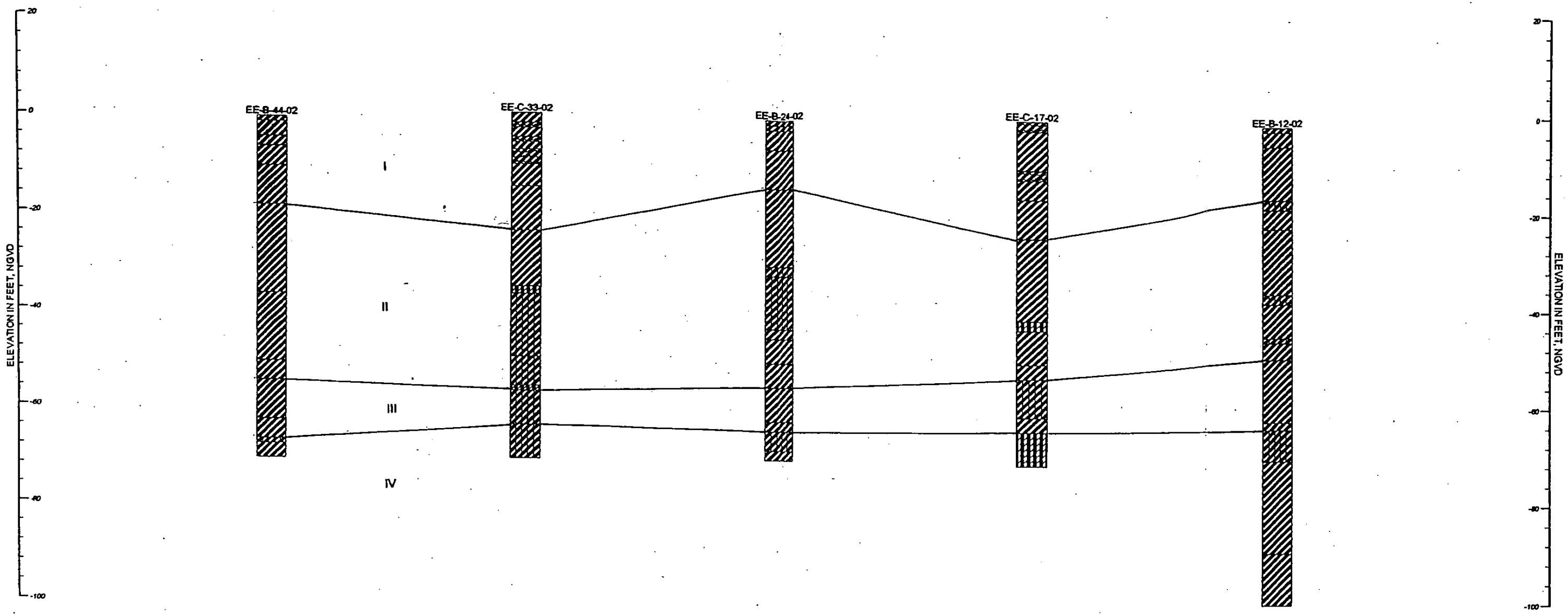
CHECKED BY: WWG	JOB NO. 17543	FIGURE: 5



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CROSS-SECTION H - I

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

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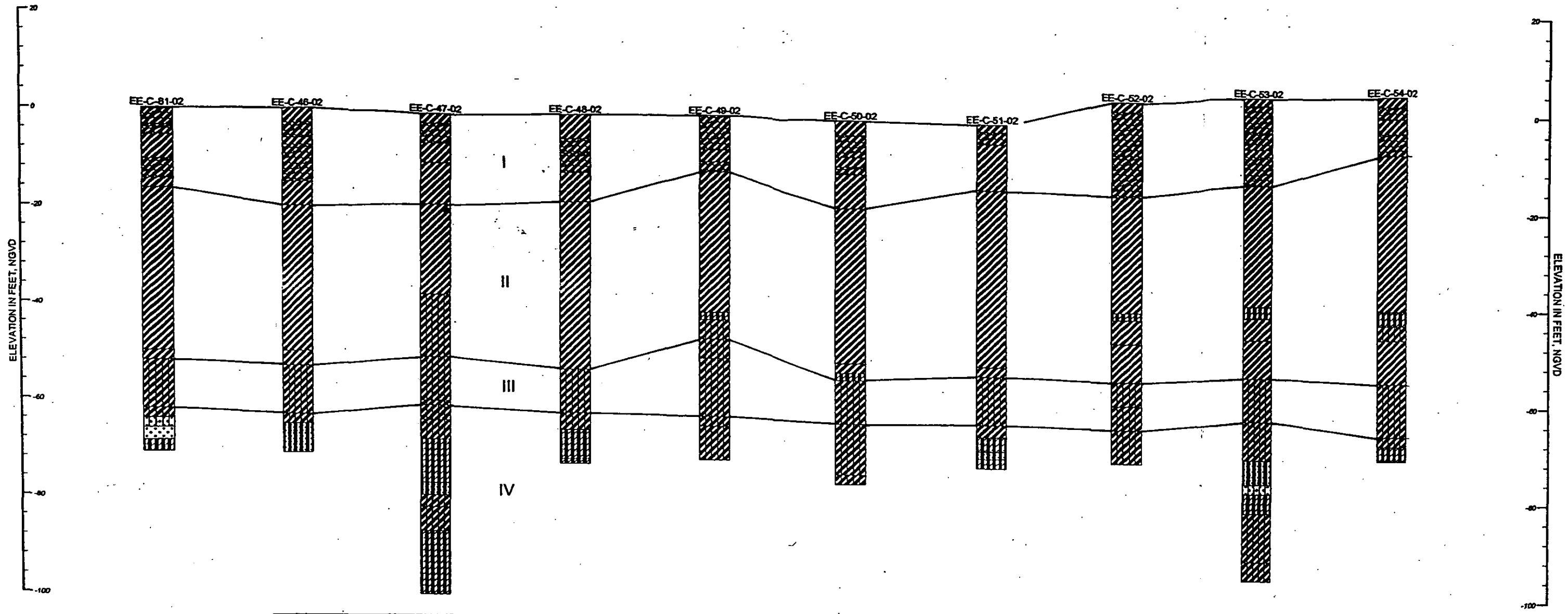
CHECKED BY: WWG	JOB NO. 17543	FIGURE: 6



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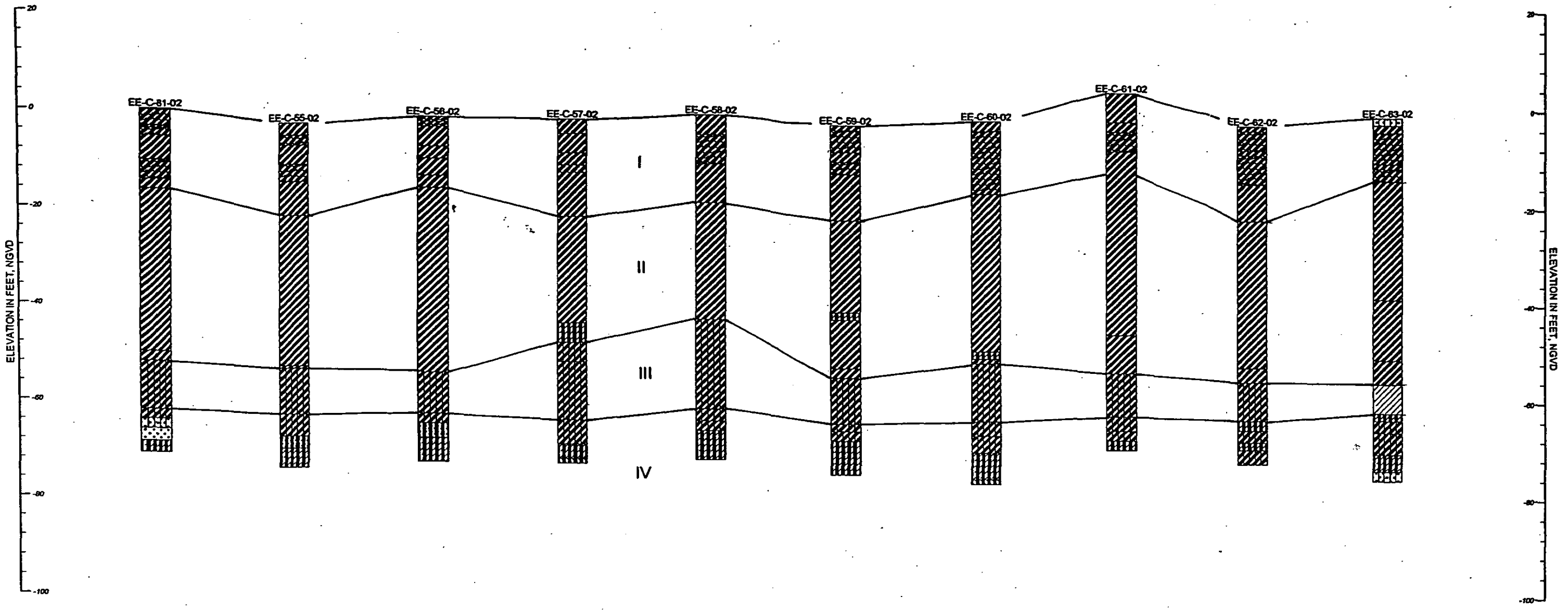
CROSS-SECTION J - K

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: CLS	DATE: 11 DEC 2002	FILENAME: XSECJK
CHECKED BY: WWG	JOB NO. 17543	FIGURE: 7



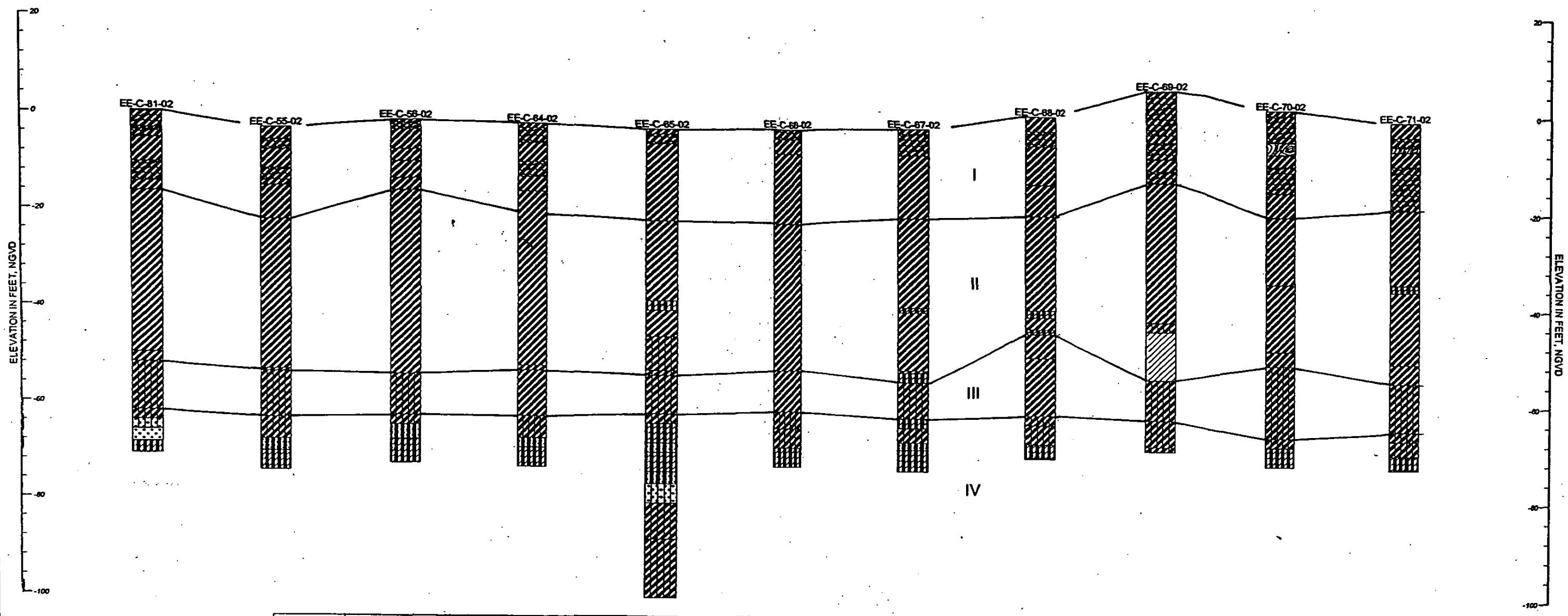
STRATA GROUP NUMBER	NAME	DESCRIPTION
I	INLAND BACKSWAMP DEPOSITS	EXTREMELY SOFT TO MEDIUM STIFF GRAY, BROWN, AND BLACK CLAY AND ORGANIC CLAY WITH WOOD
II	INTERDISTRIBUTARY DEPOSITS	VERY SOFT TO SOFT GRAY CLAY AND SILTY CLAY WITH LENTICULAR INTERRUPTIONS OF LOOSE CLAYEY SILT
III	PRODELTA DEPOSITS	MEDIUM STIFF GRAY CLAY WITH SHELL FRAGMENTS
IV	PLEISTOCENE PRAIRIE DEPOSITS	STIFF TO VERY STIFF GREENISH-GRAY AND TAN SILTY CLAY, MEDIUM COMPACT TAN CLAYEY SILT AND SANDY SILT, AND LOOSE TO MEDIUM DENSE TAN SILTY SAND.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28th STREET METAIRIE, LOUISIANA

CROSS-SECTION J - L

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: CLS	DATE: 11 DEC 2002	FILENAME: XSECJK
CHECKED BY: WWG	JOB NO. 17543	FIGURE: 8



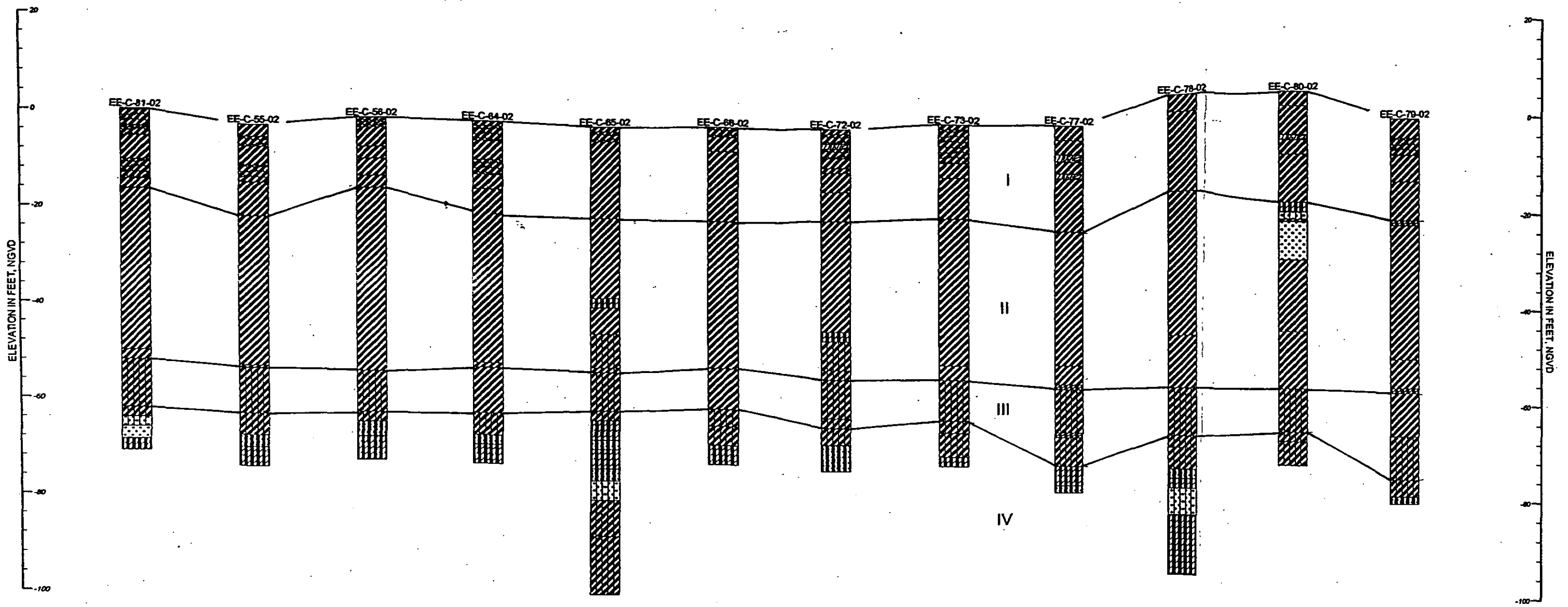
STRATA GROUP NUMBER	NAME	DESCRIPTION
I	INLAND BACKSWAMP DEPOSITS	EXTREMELY SOFT TO MEDIUM STIFF GRAY, BROWN, AND BLACK CLAY AND ORGANIC CLAY WITH WOOD
II	INTERDISTRIBUTARY DEPOSITS	VERY SOFT TO SOFT GRAY CLAY AND SILTY CLAY WITH LENTICULAR INTERRUPTIONS OF LOOSE CLAYEY SILT
III	PRODELTA DEPOSITS	MEDIUM STIFF GRAY CLAY WITH SHELL FRAGMENTS
IV	PLEISTOCENE PRAIRIE DEPOSITS	STIFF TO VERY STIFF GREENISH-GRAY AND TAN SILTY CLAY, MEDIUM COMPACT TAN CLAYEY SILT AND SANDY SILT, AND LOOSE TO MEDIUM DENSE TAN SILTY SAND.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28th STREET METAIRIE, LOUISIANA

CROSS-SECTION J - M

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: CLS	DATE: 11 DEC 2002	FILENAME: XSECJK
CHECKED BY: WWG	JOB NO. 17543	FIGURE: 9



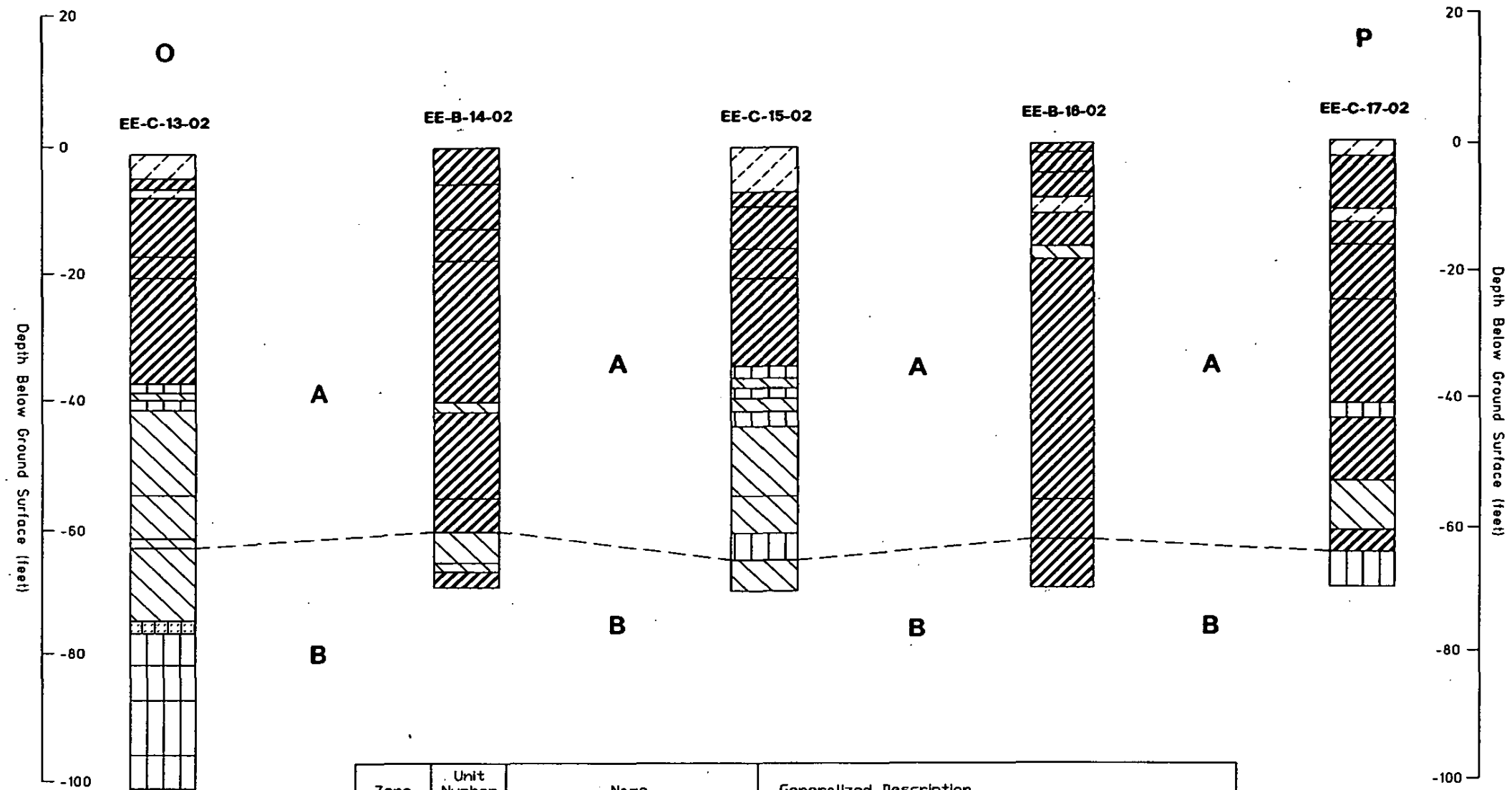
STRATA GROUP NUMBER	NAME	DESCRIPTION
I	INLAND BACKSWAMP DEPOSITS	EXTREMELY SOFT TO MEDIUM STIFF GRAY, BROWN, AND BLACK CLAY AND ORGANIC CLAY WITH WOOD
II	INTERDISTRIBUTARY DEPOSITS	VERY SOFT TO SOFT GRAY CLAY AND SILTY CLAY WITH LENTICULAR INTERRUPTIONS OF LOOSE CLAYEY SILT
III	PRODELTA DEPOSITS	MEDIUM STIFF GRAY CLAY WITH SHELL FRAGMENTS
IV	PLEISTOCENE PRAIRIE DEPOSITS	STIFF TO VERY STIFF GREENISH-GRAY AND TAN SILTY CLAY, MEDIUM COMPACT TAN CLAYEY SILT AND SANDY SILT, AND LOOSE TO MEDIUM DENSE TAN SILTY SAND.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28th STREET METAIRIE, LOUISIANA

CROSS-SECTION J - N

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: CLS	DATE: 11 DEC 2002	FILENAME: XSECJK
CHECKED BY: WWG	JOB NO. 17543	FIGURE: 10



LEGEND

▬	Indicates Bottom of Well
TD	Total Depth of Boring (feet)
TOC	Top of Casing Elevation (feet/NGVD)
	Loose Topsoil
	Peat & Highly Organic Material (PT)
	Clay (CH)
	Silty Clay (CL)
	Clayey Silt (ML)
	Silty Sand (SM)
	Clayey Sand (SC)
	Organic Clay (OH)

Zone	Unit Number	Name	Generalized Description
A	I	Inland Backswamp Deposits (Holocene)	Extremely Soft to Medium Stiff Gray, Brown and Black Clay and Organic Clay with Wood
	II	Interdistributary Deposits (Holocene)	Very Soft to Soft Gray Clay and Silty Clay With Lenticular Interruptions of Loose Clayey Silt
	III	Prodelta Deposits (Holocene)	Medium Stiff Gray Clay and Silty Clay with Shell Fragments
B	IV-A	Prairie Complex Topstratum A (Pleistocene)	Stiff to Very Stiff Greenish-Gray and Tan Clay and Silty Clay, Commonly With Roots and Organic Matter
	IV-B	Prairie Complex Topstratum B (Pleistocene)	Medium Compact Tan Clayey Silt and Sandy Silt, and Loose to Medium Dense Tan Silty Sand
	IV-C	Prairie Complex (Pleistocene)	Stiff Gray and Greenish-Gray Clay
	IV-D	Substratum Sand (Pleistocene)	Dense to very Dense Sand

0 feet 500
Horizontal Scale

Note: 1. Soil conditions interpolated between boring locations. Actual conditions may vary.

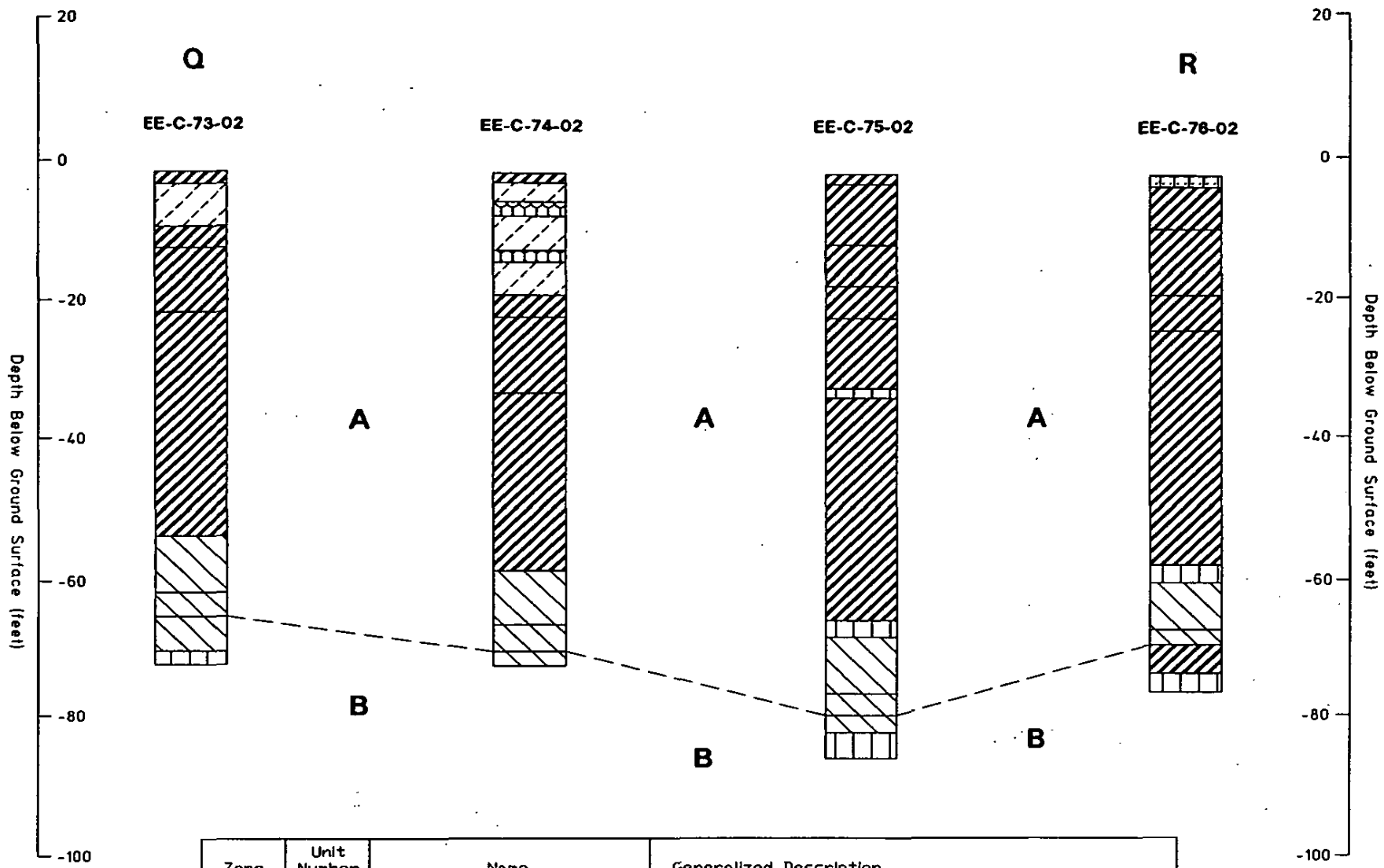
ENGINEERING ASSOCIATES, INC.
CONSULTING ENGINEERS
1415 DELPLAZA DRIVE
SUITE B
BATON ROUGE, LA 70815
PH: (225) 926-2025

Drawn By:	MCNAMARA	10/22/06		Project No.	21140				
Designer:				Drawing No.	21140DP.DWG				
P.E.	BURNHAM	10/22/06		Date Issued:	10/22/06				
Approved:	ELLIS	10/22/06		Plot Time:		DATE	NO.	REVISION	BY

RIVER BIRCH, INC.
GRETNA, LOUISIANA
CLIENT

RIVER BIRCH LANDFILL
2000 SOUTH KENNER ROAD
AVONDALE, LOUISIANA
LDEQ A.I. NO. 32219
PROJECT TITLE

CROSS-SECTION O-P



LEGEND

- Indicates Bottom of Well
- TD — Total Depth of Boring (feet)
- TOC — Top of Casing Elevation (feet/NGVD)
- Loose Topsoil
- Peat & Highly Organic Material (PT)
- Clay (CH)
- Silty Clay (CL)
- Clayey Silt (ML)
- Silty Sand (SM)
- Clayey Sand (SC)
- Organic Clay (OH)

Zone	Unit Number	Name	Generalized Description
A	I	Inland Backswamp Deposits (Holocene)	Extremely Soft to Medium Stiff Gray, Brown and Black Clay and Organic Clay with Wood
	II	Interdistributary Deposits (Holocene)	Very Soft to Soft Gray Clay and Silty Clay With Lenticular Interruptions of Loose Clayey Silt
	III	Prodelta Deposits (Holocene)	Medium Stiff Gray Clay and Silty Clay with Shell Fragments
B	IV-A	Prairie Complex Topstratum A (Pleistocene)	Stiff to Very Stiff Greenish-Gray and Tan Clay and Silty Clay, Commonly With Roots and Organic Matter
	IV-B	Prairie Complex Topstratum B (Pleistocene)	Medium Compact Tan Clayey Silt and Sandy Silt, and Loose to Medium Dense Tan Silty Sand
	IV-C	Prairie Complex (Pleistocene)	Stiff Gray and Greenish-Gray Clay
	IV-D	Substratum Sand (Pleistocene)	Dense to very Dense Sand

0 feet 500
Horizontal Scale

Note: 1. Soil conditions interpolated between boring locations. Actual conditions may vary.

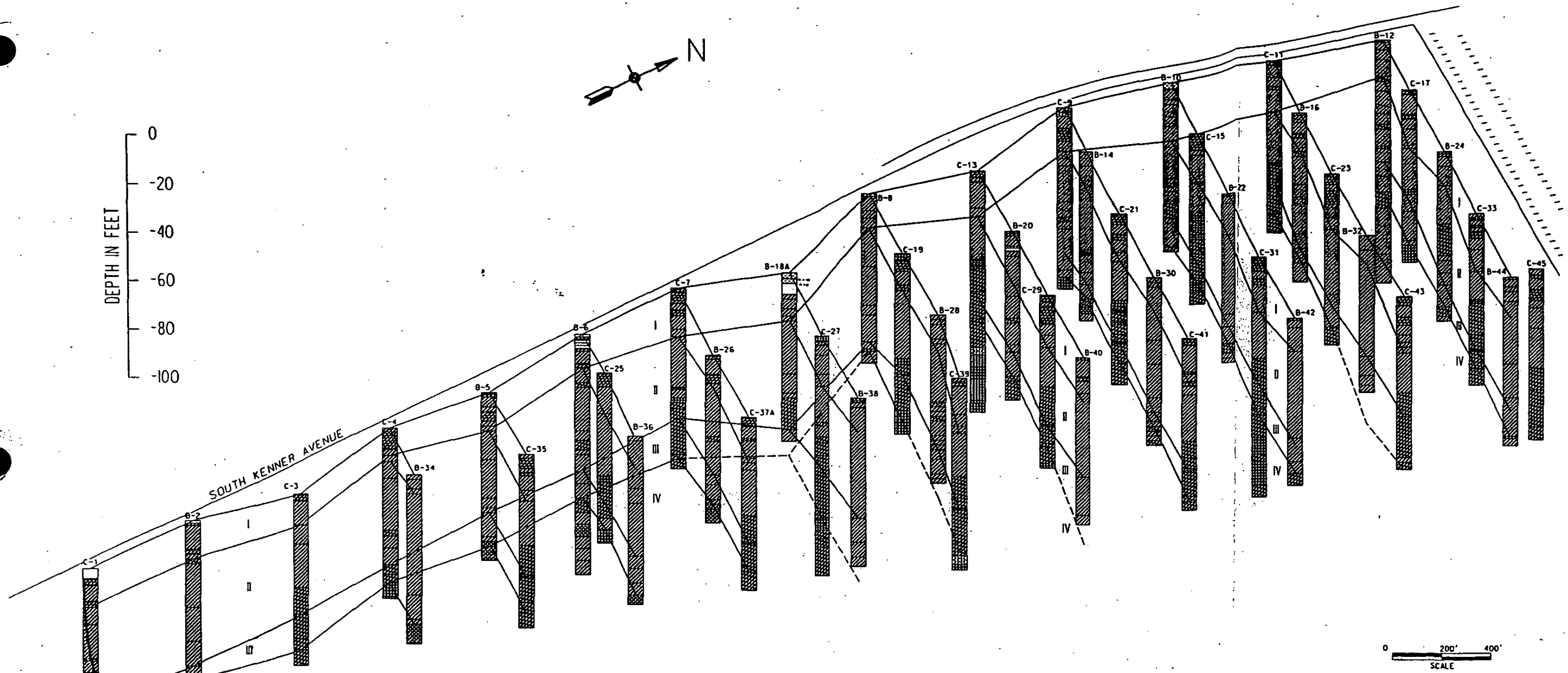
ENGINEERING ASSOCIATES, INC.
CONSULTING ENGINEERS
1415 DELPLAZA DRIVE
SUITE B
BATON ROUGE, LA 70815
PH: (225) 926-2025

Drawn By:	MCNAMARA	10/22/06		Project No.	21140			
Designer:				Drawing No.	21140QR.DWG			
P.E.	BURNHAM	10/22/06		Date Issued:	10/22/06			
Approved:	ELLIS	10/22/06		Plot Time:		DATE	NO.	REVISION	BY

RIVER BIRCH, INC.
GRETNA, LOUISIANA
CLIENT

RIVER BIRCH LANDFILL
2000 SOUTH KENNER ROAD
AVONDALE, LOUISIANA
LDEQ A.I. NO. 32219
PROJECT TITLE

CROSS-SECTION Q-R



STRATA GROUP NUMBER	NAME	DESCRIPTION
I	INLAND SWAMP DEPOSITS	EXTREMELY SOFT TO MEDIUM STIFF GRAY, BROWN, AND BLACK CLAY AND ORGANIC CLAY WITH WOOD
II	INTERDISTRIBUTARY DEPOSITS	VERY SOFT TO SOFT GRAY CLAY AND SILTY CLAY WITH LENTICULAR INTERRUPTIONS OF LOOSE CLAYEY SILT
III	PRODELTA DEPOSITS	MEDIUM STIFF GRAY CLAY WITH SHELL FRAGMENTS
IV	PLEISTOCENE PRAIRIE DEPOSITS	STIFF TO VERY STIFF GREENISH-GRAY AND TAN SILTY CLAY MEDIUM COMPACT TAN CLAYEY SILT AND SANDY SILT, AND LOOSE TO MEDIUM DENSE TAN SILTY SAND

NOTE: SOME STRATIGRAPHIC LINES OMITTED FOR CLARITY.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28TH STREET METAIRIE, LOUISIAN

ISOMETRIC SOIL PROFILE

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: D. LAFONT	PLOT DATE: 12 NOV. 02	CADD FILE: FIGURE LOGH
CHECKED BY: C.L.S.	JOB NO.: 17543	FIGURE 11

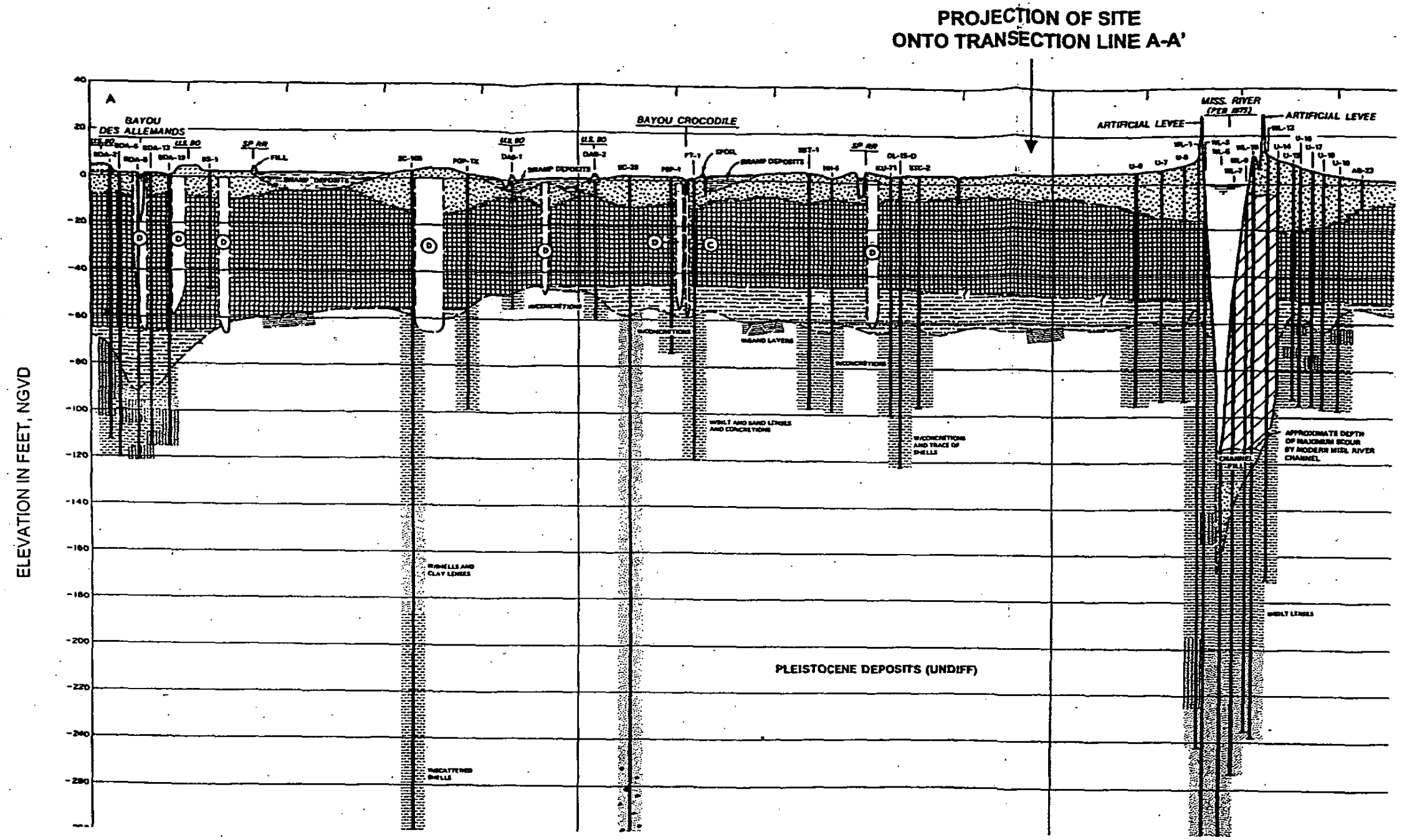
LEGEND

ENVIRONMENTS OF DEPOSITION

- NATURAL LEVEE
- INTERDISTRIBUTARY UNDIFFERENTIATED
- (C) CREVASSE CHANNEL
- PRODELTA
- (D) ABANDONED DISTRIBUTARY
- UPPER FINE-GRAINED PLEISTOCENE SURFACE

LITHOLOGIC TYPES

- SAND
- CLAY
- SILTY SAND
- SILT
- SAND AND GRAVEL



REFERENCE:

May, J.R., Britsch, L.D., Dunbar, J.D., Rodrigues, J.P., and Wlosinski, L.B. (1984). "Geological Investigation of the Mississippi River Deltaic Plain," U.S. Army Corps of Engineers, Waterways Experiment Station Technical Report GL-84-15, Volume 1.

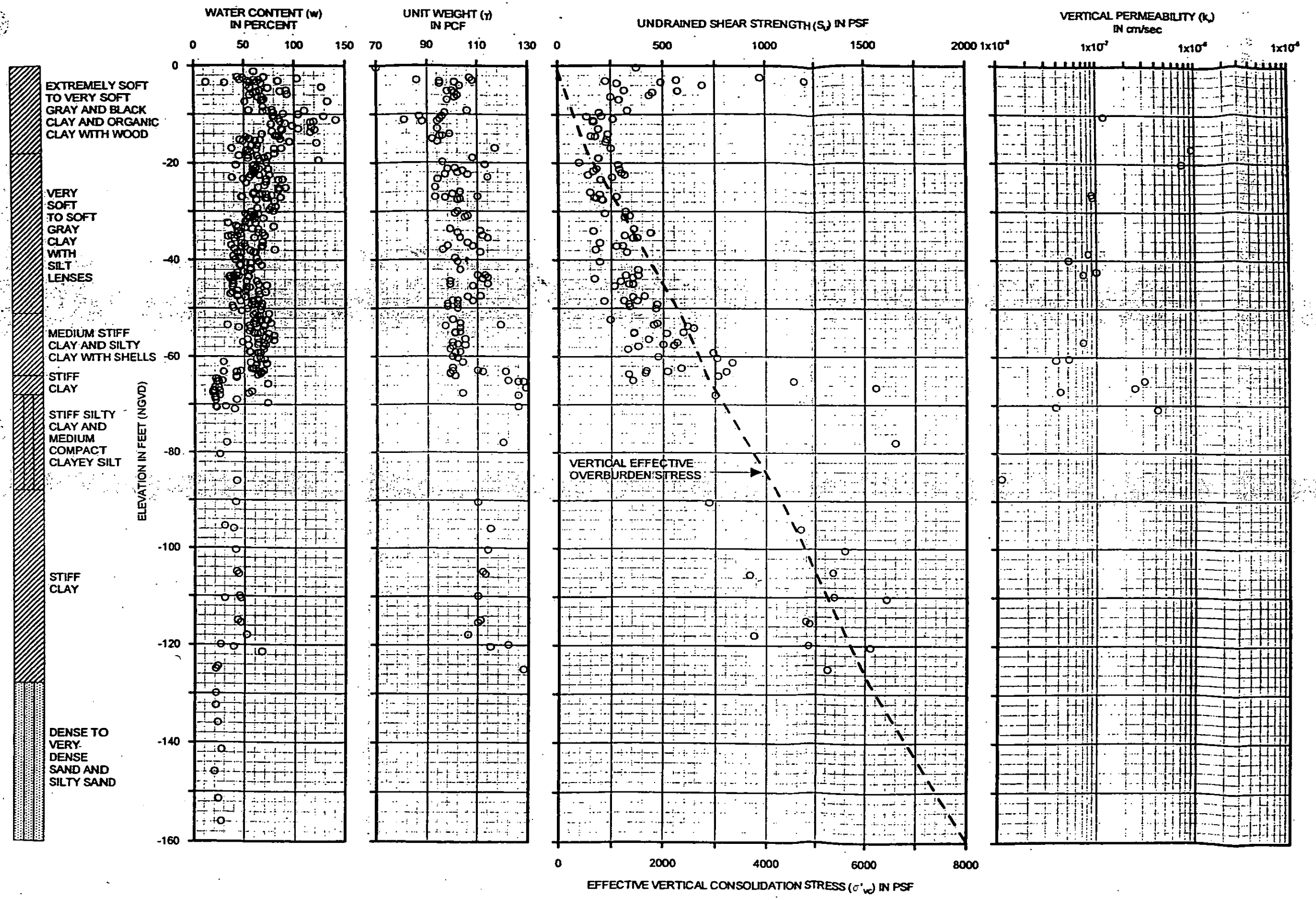
Section A-A' excerpted from Hahnville Quadrangle.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28th STREET METAIRIE, LOUISIANA

GEOLOGIC
CROSS-SECTION

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: CLS	DATE: 11 DEC 2002	FILENAME: GXSEC
CHECKED BY: WWG	JOB NO. 17543	FIGURE: 12



NOTES:

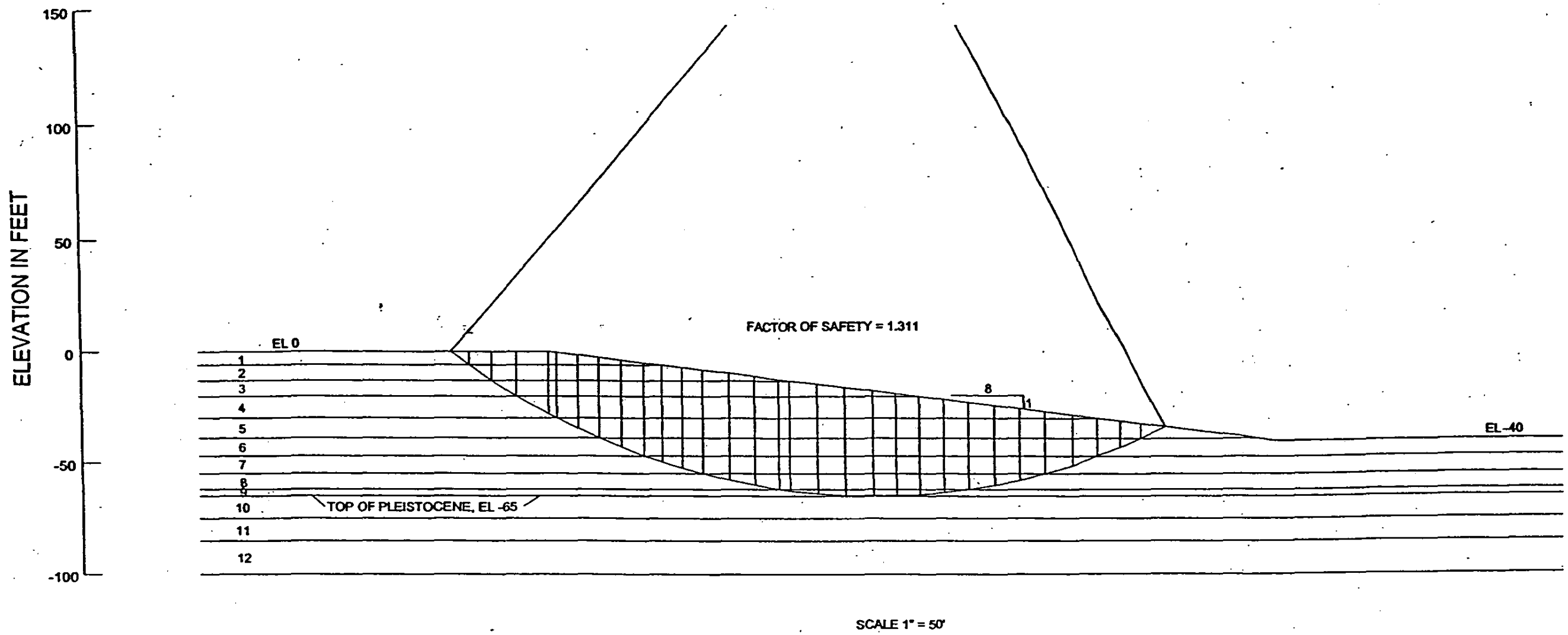
1. LOGS OF SOIL BORINGS AND CONE PENETROMETER TESTS ARE PROVIDED IN APPENDICES.
2. UNIT WEIGHTS SHOWN ARE TOTAL UNIT WEIGHTS AND MUST BE APPROPRIATELY REDUCED TO ESTIMATE EFFECTIVE STRESS STATES.
3. DESIGN PROFILES SHOWN CAN NOT FULLY ANTICIPATE ALL PARAMETERS WHICH MAY INFLUENCE SELECTION OF DESIGN VALUES FOR A SPECIFIC ANALYSIS. FOR THIS REASON; THE USER SHOULD CONTACT EUSTIS ENGINEERING COMPANY, INC. PRIOR TO USE OF DESIGN PROFILES IN ANY ANALYSES.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28TH STREET METAIRIE, LOUISIANA

SUMMARY OF SUBSOIL PROPERTIES

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: C.L.S.	16 OCT 2002	FILE: GSPROFIL.GF
CHECKED BY: W.W.G.	JOB NO.: 17543	FIGURE 13



SOIL NO.	DESCRIPTION	UNIT WEIGHT IN PCF	FRICTION ANGLE IN DEGREES	UNDRAINED SHEAR STRENGTH IN PSF	
				AVERAGE	BASE
1	CLAY	100	0	400	400
2	ORGANIC CLAY	90	0	190	190
3	CLAY	109	0	207.5	255
4	CLAY	106	0	258	258
5	CLAY	106	0	315	360
6	CLAY	110.5	0	402.5	445
7	CLAY	101.5	0	482.5	520
8	CLAY	102.5	0	550	550
9	PLEISTOCENE	123.5	0	550	550
10	PLEISTOCENE	123.5	0	670	670
11	PLEISTOCENE	123.5	0	1600	1600
12	PLEISTOCENE	115	0	1040	1040

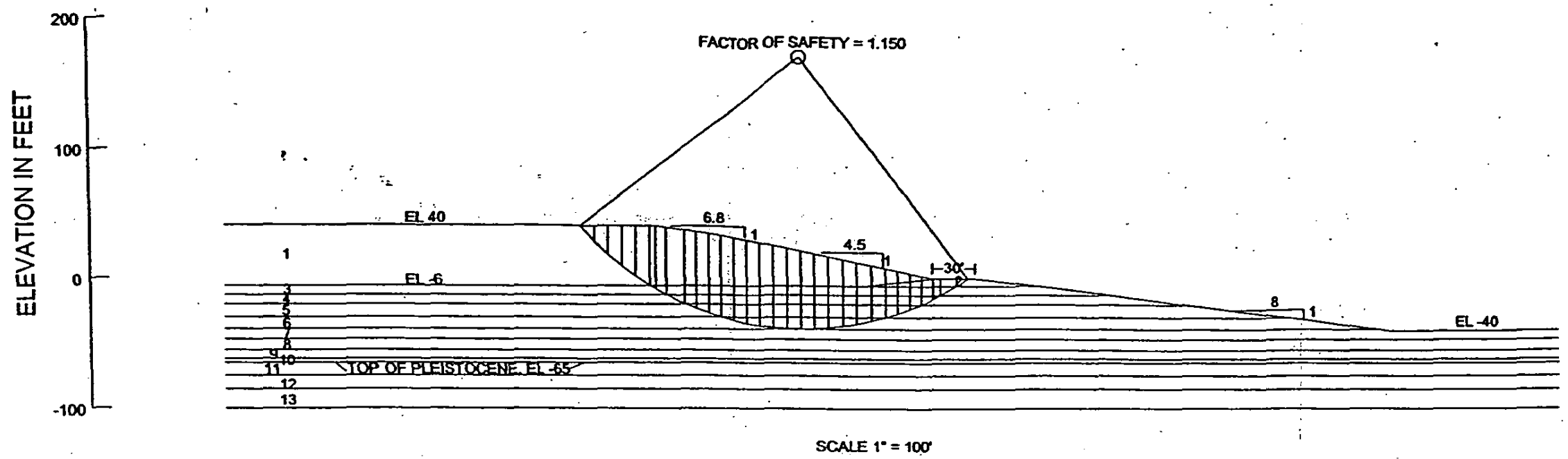
NOTE: UNDRAINED STRENGTH RATIO OF 0.23 USED FOR SOILS 1 THROUGH 19 IN STRENGTH-GAIN ANALYSES.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28TH STREET METAIRIE, LOUISIANA

EXTERIOR SLOPES OF PROPOSED CELLS DURING EXCAVATION

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: D. LAFONT	PLOT DATE: 4 SEPT. 02	CADD FILE:
CHECKED BY: C.L.S.	JOB NO.: 17543	FIGURE 14



SCALE 1" = 100'

SOIL NO.	DESCRIPTION	UNIT WEIGHT IN PCF	FRICTION ANGLE IN DEGREES	UNDRAINED SHEAR STRENGTH IN PSF	
				AVERAGE	BASE
1	GARBAGE	61	23	200	200
2	CLAY	100	0	400	400
3	ORGANIC CLAY	90	0	190	190
4	CLAY	109	0	207.5	255
5	CLAY	106	0	258	258
6	CLAY	106	0	315	362
7	CLAY	110.5	0	402.5	445
8	CLAY	101.5	0	482.5	520
9	CLAY	102.5	0	550	550
10	PLEISTOCENE	123.5	0	550	550
11	PLEISTOCENE	123.5	0	670	670
12	PLEISTOCENE	115	0	1600	1600
13	PLEISTOCENE	115	0	1040	1040

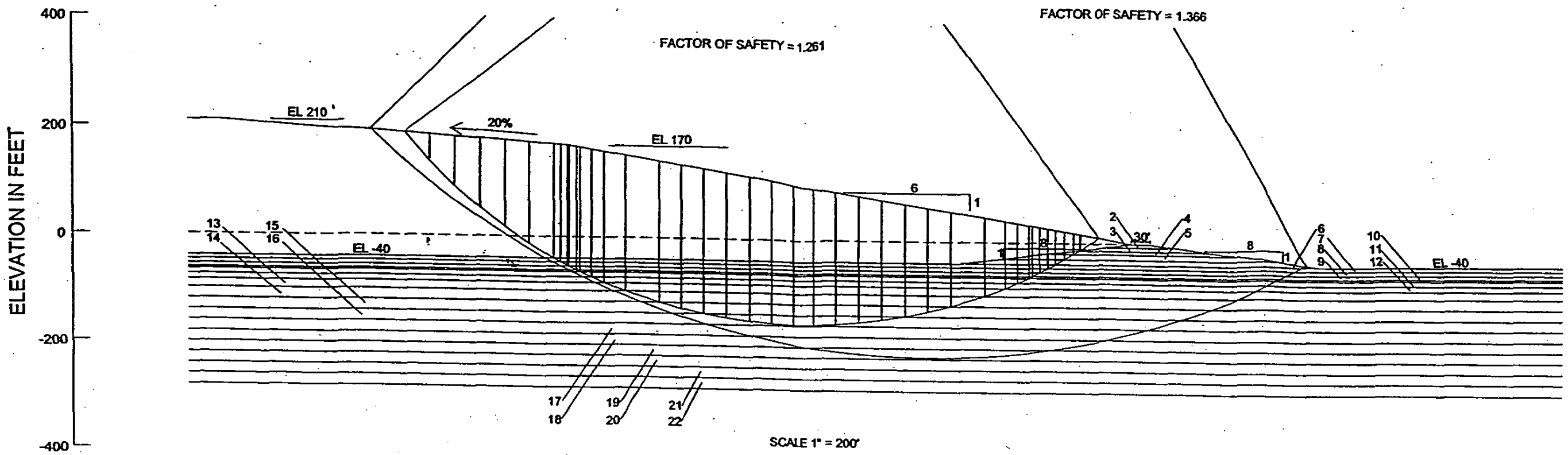
NOTE: UNDRAINED STRENGTH RATIO OF 0.23 USED FOR SOILS 1 THROUGH 19 IN STRENGTH-GAIN ANALYSES.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28TH STREET METAIRIE, LOUISIA

INTERIOR SLOPES OF EXISTING CELL
DURING EXCAVATION IN ADJACENT CELL

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: D. LAFONT	PLOT DATE: 4 SEPT. 02	CADD FILE:
CHECKED BY: C.L.S.	JOB NO.: 17543	FIGURE 1



SOIL NO.	DESCRIPTION	UNIT WEIGHT IN PCF	FRICTION ANGLE IN DEGREES	INITIAL UNDRAINED SHEAR STRENGTH STRENGTH IN PSF	
				AVERAGE	BASE
1	GARBAGE	61	23	200	200
2	CLAY	100	0	400	400
3	ORGANIC CLAY	90	0	190	190
4	CLAY	109	0	207.5	255
5	CLAY	106	0	258	258
6	CLAY	106	0	315	360
7	CLAY	110.5	0	402.5	445
8	CLAY	101.5	0	482.5	520
9	CLAY	102.5	0	550	550
10	PLEISTOCENE	123.5	0	550	550
11	PLEISTOCENE	123.5	0	670	670
12	PLEISTOCENE	123.5	0	1600	1600
13	PLEISTOCENE	115	0	1040	1040
14	PLEISTOCENE	115	0	1282	1282
15	PLEISTOCENE	115	0	1489	1489
16	PLEISTOCENE	115	0	1696	1696
17	PLEISTOCENE	115	0	1903	1903
18	PLEISTOCENE	115	0	2110	2110
19	PLEISTOCENE	115	0	2317	2317
20	SAND	120	30	0	0
21	SAND	120	30	0	0
22	SAND	120	30	0	0

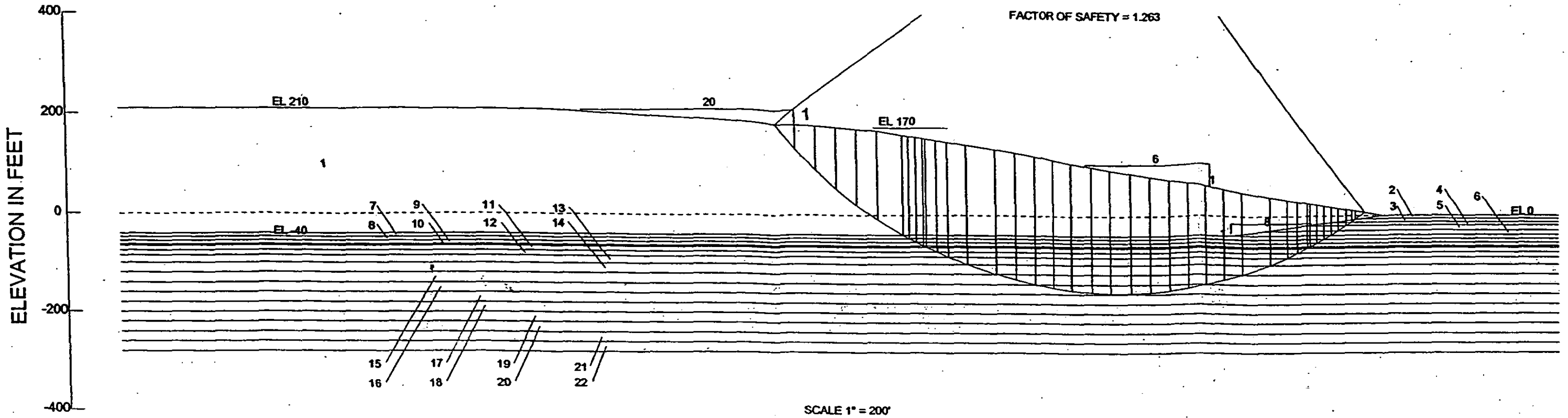
NOTE: UNDRAINED STRENGTH RATIO OF 0.23 USED FOR SOILS 1 THROUGH 19 IN STRENGTH ANALYSES.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28TH STREET METAIRIE, LOUISIANA

INTERIOR SLOPES OF PROPOSED CELLS DURING EXCAVATION OF SUBSEQUENT CELLS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: D. LAFONT	PLOT DATE: 4 SEPT. 02	CADD FILE:
CHECKED BY: C.L.S.	JOB NO.: 17543	FIGURE 16



SOIL NO.	DESCRIPTION	UNIT WEIGHT IN PCF	FRICTION ANGLE IN DEGREES	INITIAL UNDRAINED SHEAR STRENGTH STRENGTH IN PSF	
				AVERAGE	BASE
1	GARBAGE	61	23	200	200
2	CLAY	100	0	400	400
3	ORGANIC CLAY	90	0	190	190
4	CLAY	109	0	207.5	255
5	CLAY	106	0	258	258
6	CLAY	106	0	315	360
7	CLAY	110.5	0	402.5	445
8	CLAY	101.5	0	482.5	520
9	CLAY	102.5	0	550	550
10	PLEISTOCENE	123.5	0	550	550
11	PLEISTOCENE	123.5	0	670	670
12	PLEISTOCENE	123.5	0	1600	1600
13	PLEISTOCENE	115	0	1040	1040
14	PLEISTOCENE	115	0	1282	1282
15	PLEISTOCENE	115	0	1489	1489
16	PLEISTOCENE	115	0	1696	1696
17	PLEISTOCENE	115	0	1903	1903
18	PLEISTOCENE	115	0	2110	2110
19	PLEISTOCENE	115	0	2317	2317
20	SAND	120	30	0	0
21	SAND	120	30	0	0
22	SAND	120	30	0	0

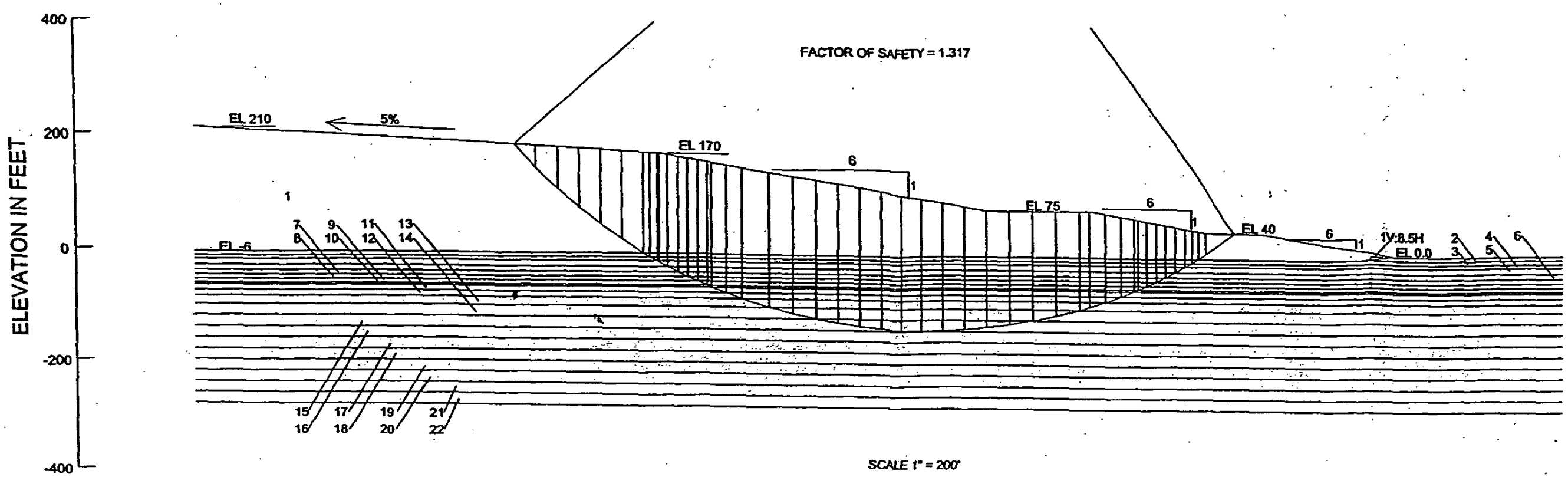
NOTE: UNDRAINED STRENGTH RATIO OF 0.23 USED FOR SOILS 1 THROUGH 19 IN STRENGTH ANALYSES.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28TH STREET METAIRIE, LOUISIANA

EXTERIOR SLOPES OF PROPOSED CELLS
FINAL CONFIGURATION

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: G. LAFONT	PLOT DATE: 4 SEPT. 02	CADD FILE:
CHECKED BY: C.L.S.	JOB NO.: 17543	FIGURE 17



SOIL NO.	DESCRIPTION	UNIT WEIGHT IN PCF	FRICTION ANGLE IN DEGREES	INITIAL UNDRAINED SHEAR STRENGTH IN PSF	
				AVERAGE	BASE
1	GARBAGE	61	23	200	200
2	CLAY	100	0	400	400
3	ORGANIC CLAY	90	0	190	190
4	CLAY	109	0	207.5	255
5	CLAY	106	0	258	258
6	CLAY	106	0	315	360
7	CLAY	110.5	0	402.5	445
8	CLAY	101.5	0	482.5	520
9	CLAY	102.5	0	550	550
10	PLEISTOCENE	123.5	0	550	550
11	PLEISTOCENE	123.5	0	670	670
12	PLEISTOCENE	123.5	0	1600	1600
13	PLEISTOCENE	115	0	1040	1040
14	PLEISTOCENE	115	0	1282	1282
15	PLEISTOCENE	115	0	1489	1489
16	PLEISTOCENE	115	0	1696	1696
17	PLEISTOCENE	115	0	1903	1903
18	PLEISTOCENE	115	0	2110	2110
19	PLEISTOCENE	115	0	2317	2317
20	SAND	120	30	0	0
21	SAND	120	30	0	0
22	SAND	120	30	0	0

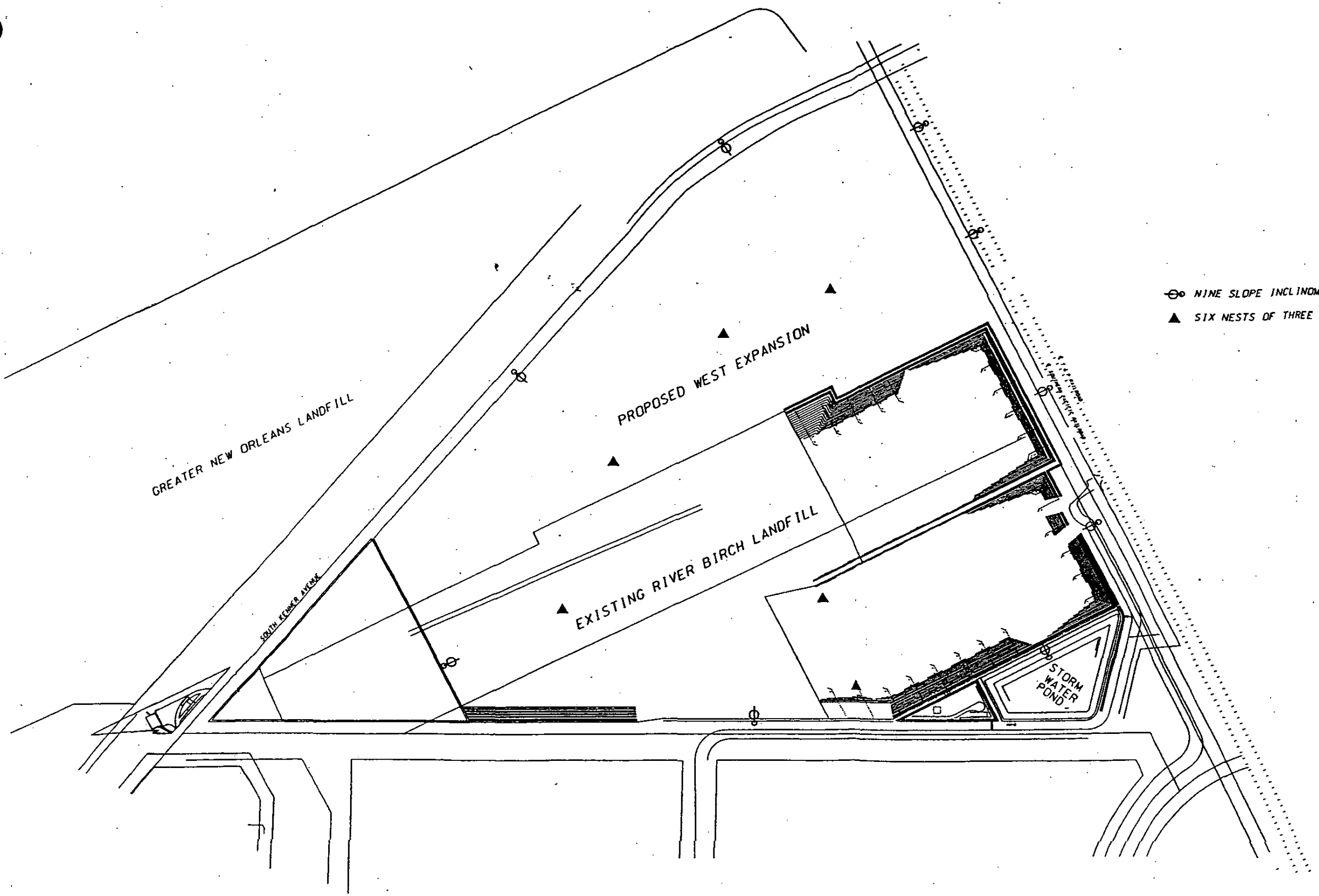
NOTE: UNDRAINED STRENGTH RATIO OF 0.23 USED FOR SOILS 1 THROUGH 19 IN STRENGTH ANALYSES.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28TH STREET METAIRIE, LOUISIANA

EXTERIOR SLOPES OF EXISTING CELLS
FINAL CONFIGURATION

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: D. LAFONT	PLOT DATE: 4 SEPT. 02	CADD FILE:
CHECKED BY: C.L.S.	JOB NO.: 17543	FIGURE 1E



N

LEGEND

NINE SLOPE INCLINOMETERS TO 150 FEET WITH PRIMARY MEASUREMENT DIRECTION SHOWN

SIX NESTS OF THREE PNEUMATIC PIEZOMETERS

800' 0 800'

SCALE

EUSTIS ENGINEERING COMPANY, INC.

GEOTECHNICAL ENGINEERS

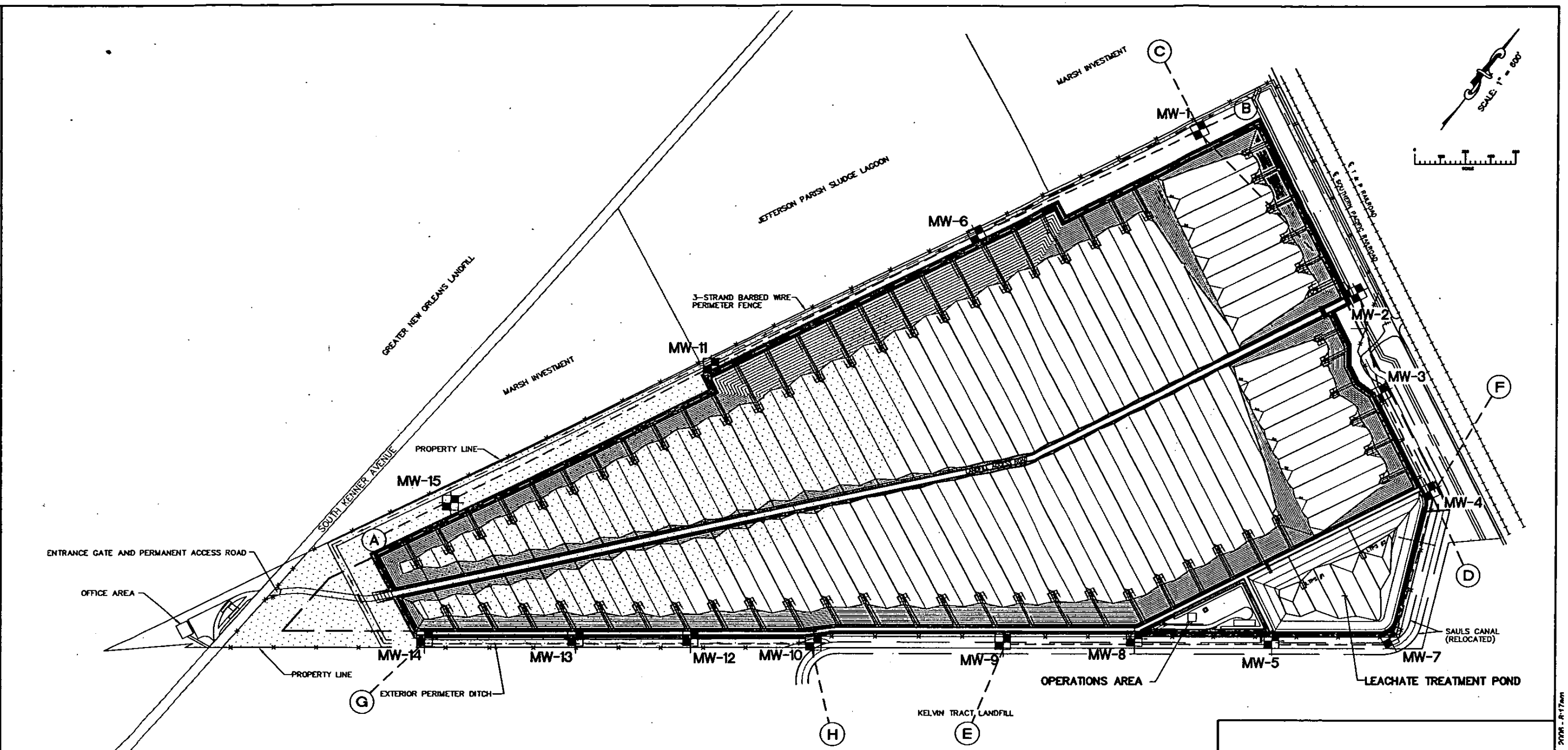
3011 28TH STREET METAIRIE, LOUISIANA

INSTRUMENTATION PLAN FOR
STABILITY MONITORING PROGRAM

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
WEST AVONDALE, LOUISIANA

DRAWN BY: D. LAFONT	PLOT DATE: 16 OCT. 02	CADD FILE: FIGURE 13.DGN
CHECKED BY: C.L.S.	JOB NO.: 17543	FIGURE 19

DRAWN BY	SWC	CHECKED BY	ST	12/14/07	FILE NAME:	21140-fig2 (DEC03)
	12-11-03	APPROVED BY				



Legend

MONITORING WELL LOCATION

WETLANDS

NOTE: MAP BASED ON FIGURE 31C-R1 OVERALL SITE PLAN PREPARED BY MADER-MIERS ENGINEERING, INC., DATED MAY 3,. 1999.

MONITORING WELL NOTES

PHASE I: INSTALL MW 1 – MW 6 AND T 1 – T 3

PHASE IA: INSTALL MW 7

PHASE II: PLUG & ABANDON T 1 – T 3 AND INSTALL T 4 – T 6

PHASE III: PLUG & ABANDON T 4 – T 6 AND INSTALL T 7 – T 9 AND MW 8

PHASE IV: PLUG & ABANDON T 7 – T 9 AND INSTALL MW 9 – MW 11

PHASE V: PLUGE & ABANDON T 10, T 11 AND INSTALL MW 12 – MW 15

MONITORING WELL LOCATION AND CROSS SECTION MAP

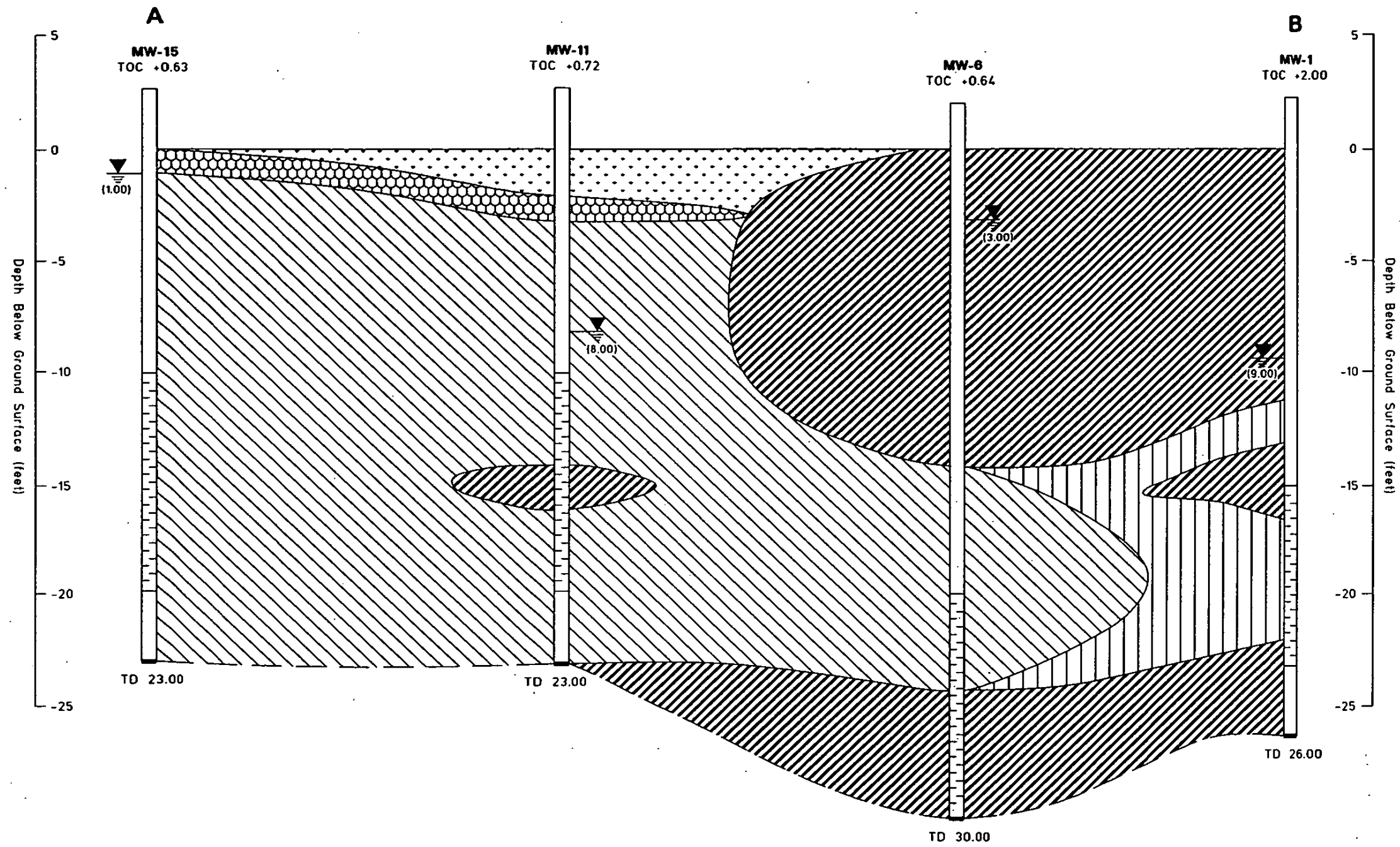
RIVER BIRCH LANDFILL
2000 SOUTH KENNER ROAD
AVONDALE, LOUISIANA
LDEQ A.I. NO. 32219

PREPARED FOR

RIVER BIRCH, INC.
GRETNA, LOUISIANA

ENGINEERING ASSOCIATES, INC.
CONSULTING ENGINEERS
1415 Delplaza Dr., Ste. B
Baton Rouge, LA. 70815
(225) 926-2025

F:\PROJECTS\21140\21140FIG2\TP\21140 Nov 08 2008 - 8:17am



LEGEND

▬	Indicates Bottom of Well
TD	Total Depth of Boring (feet)
TOC	Top of Casing Elevation (feet/NGVD)
	Loose Topsoil
	Peat & Highly Organic Material (PT)
	Clay (CH)
	Silty Clay (CL)
	Clayey Silt (ML)
	Silty Sand (SM)
	Clayey Sand (SC)
▼	Static Water Level Elevation Measured After 15 Minutes (feet below ground surface)
	Screen Interval

0 feet 500
Horizontal Scale

Note: 1. Soil conditions interpolated between boring locations. Actual conditions may vary.

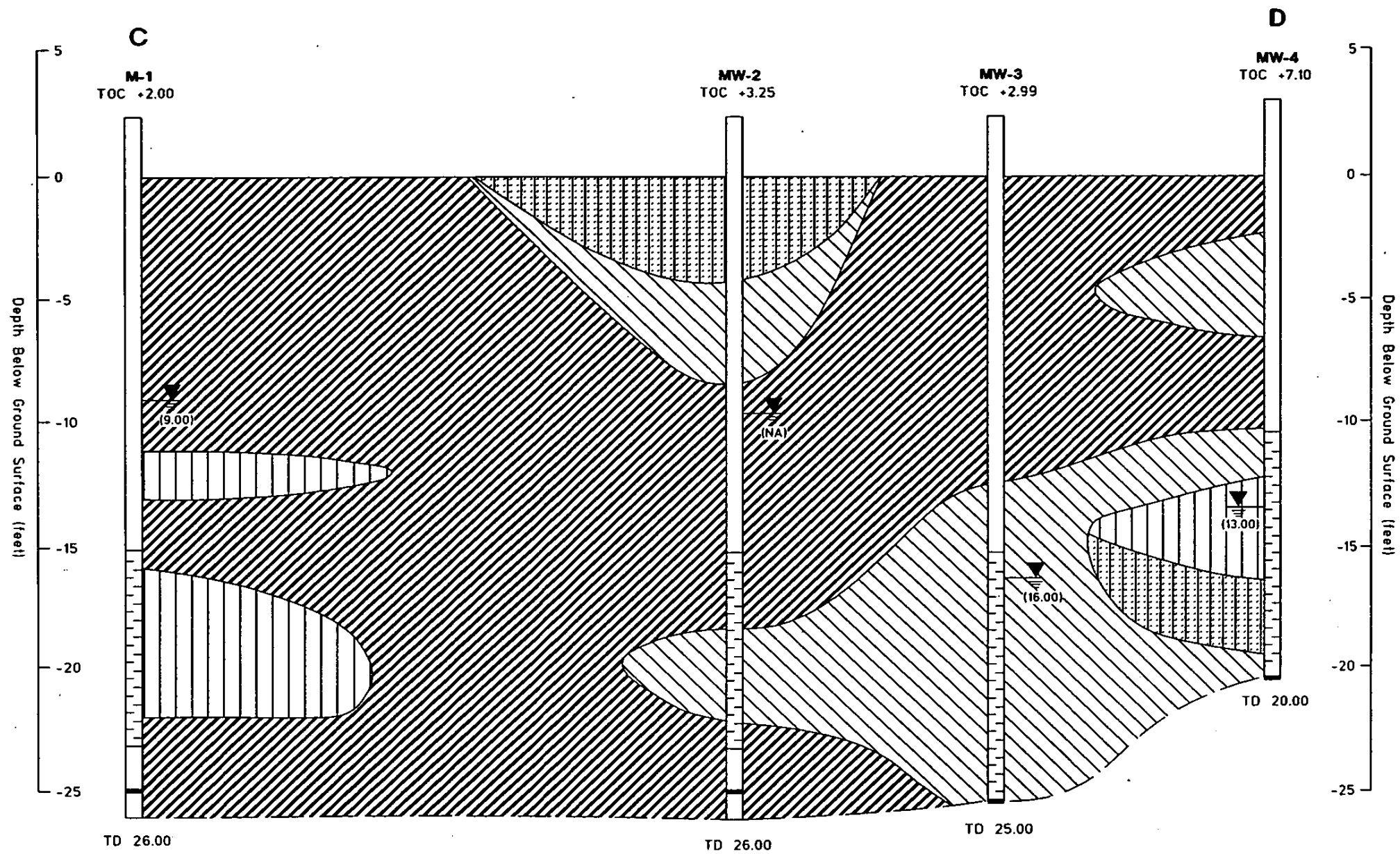
ENGINEERING ASSOCIATES, INC.
CONSULTING ENGINEERS
1415 DELPLAZA DRIVE
SUITE B
BATON ROUGE, LA 70815
PH: (225) 926-2025

Drawn By:	MCNAMARA	10/22/06		Project No.	21140			
Designer:				Drawing No.	21140AB.DWG			
P.E.	BURNHAM	10/22/06		Date Issued:	10/22/06			
Approved:	ELLIS	10/22/06		Plot Time:		DATE	NO.	REVISION	BY

RIVER BIRCH, INC.
GRETNA, LOUISIANA
CLIENT

RIVER BIRCH LANDFILL
2000 SOUTH KENNER ROAD
AVONDALE, LOUISIANA
LDEQ A.I. NO. 32219
PROJECT TITLE

CROSS-SECTION A-B



LEGEND

- Indicates Bottom of Well
- TD — Total Depth of Boring (feet)
- TOC — Top of Casing Elevation (feet/NGVD)
- Loose Topsoil
- Peat & Highly Organic Material (PT)
- Clay (CH)
- Silty Clay (CL)
- Clayey Silt (ML)
- Silty Sand (SM)
- Clayey Sand (SC)
- Static Water Level Elevation Measured After 15 Minutes (feet below ground surface)
- Screen Interval

0 feet 500
Horizontal Scale

Note: 1. Soil conditions interpolated between boring locations. Actual conditions may vary.

ENGINEERING ASSOCIATES, INC.
CONSULTING ENGINEERS
1415 DELPLAZA DRIVE
SUITE B
BATON ROUGE, LA 70815
PH: (225) 926-2025

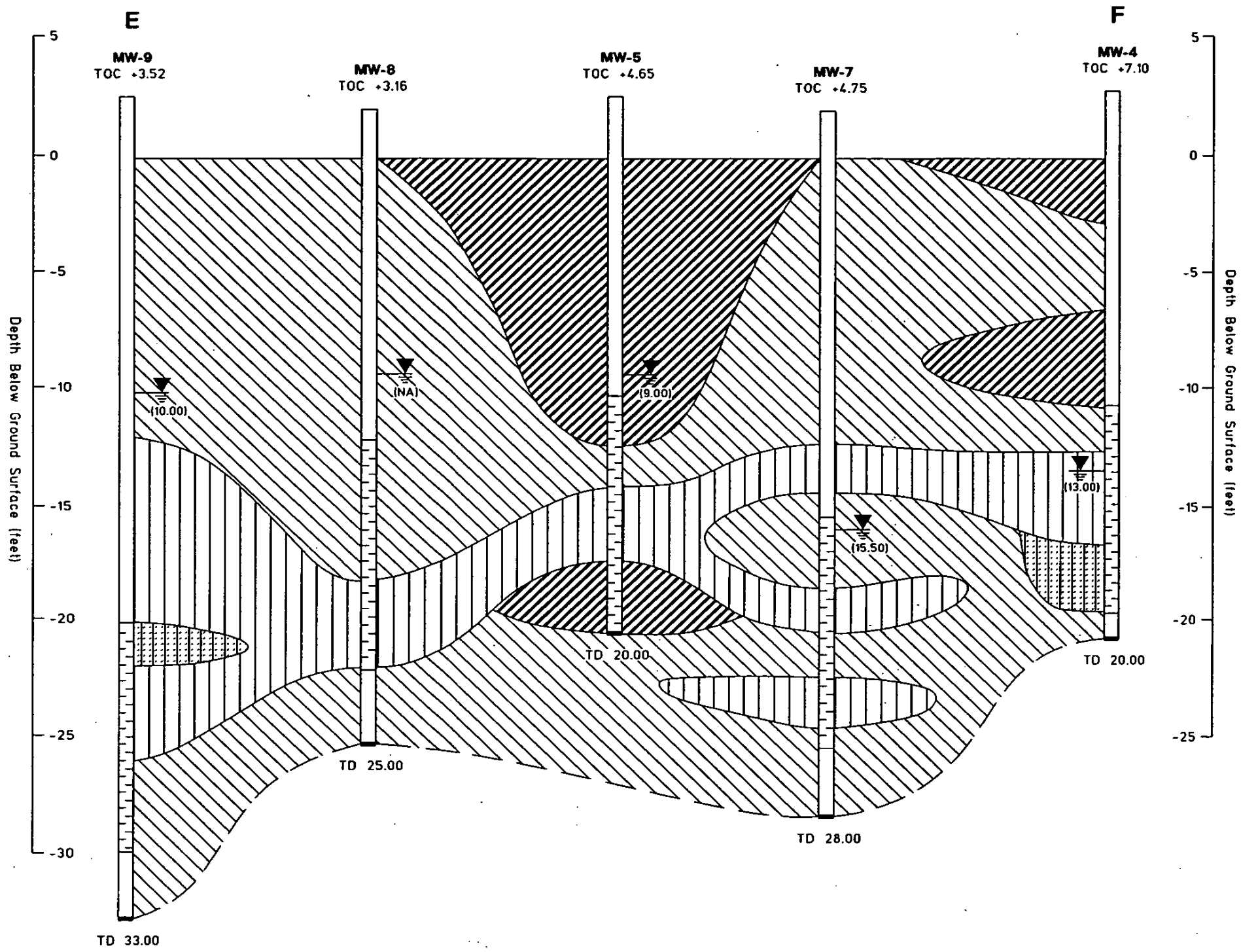
Drawn By:	MCNAMARA	10/22/06	Project No.	21140	
Designer:			Drawing No.	21140CD.DWG	
P.E.	BURNHAM	10/22/06	Date Issued:	10/22/06	
Approved:	ELLIS	10/22/06	Plot Time:		

DATE	NO.	REVISION	BY

RIVER BIRCH, INC.
GRETNA, LOUISIANA
CLIENT

RIVER BIRCH LANDFILL
2000 SOUTH KENNER ROAD
AVONDALE, LOUISIANA
LDEQ A.I. NO. 32219
PROJECT TITLE

CROSS-SECTION C-D



LEGEND

- Indicates Bottom of Well
- TD — Total Depth of Boring (feet)
- TOC — Top of Casing Elevation (feet/NGVD)
- Loose Topsoil
- Peat & Highly Organic Material (PT)
- Clay (CH)
- Silty Clay (CL)
- Clayey Silt (ML)
- Silty Sand (SM)
- Clayey Sand (SC)
- Static Water Level Elevation Measured After 15 Minutes (feet below ground surface)
- Screen Interval

0 feet 500
Horizontal Scale

Note: 1. Soil conditions interpolated between boring locations. Actual conditions may vary.

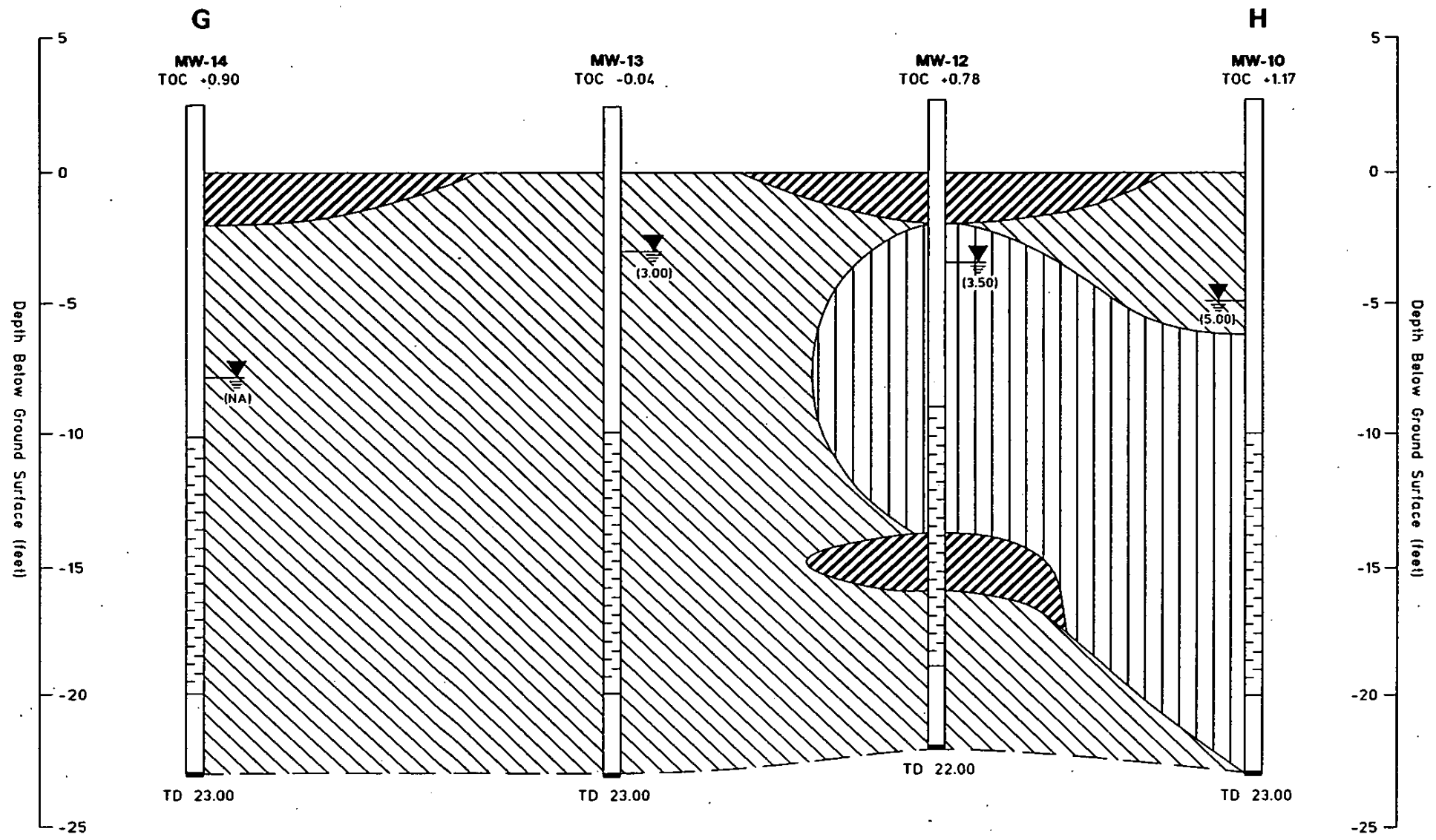
Drawn By:	MCNAMARA	10/22/06		Project No.	21140				
Designer:				Drawing No.	21140EF.DWG				
P.E.	BURNHAM	10/22/06		Date Issued:	10/22/06				
Approved:	ELLIS	10/22/06		Plot Time:		DATE	NO.	REVISION	BY

RIVER BIRCH, INC.
GRETNA, LOUISIANA
CLIENT

RIVER BIRCH LANDFILL
2000 SOUTH KENNER ROAD
AVONDALE, LOUISIANA
LDEQ A.I. NO. 32219
PROJECT TITLE

ENGINEERING ASSOCIATES, INC.
CONSULTING ENGINEERS
1415 DELPLAZA DRIVE
SUITE B
BATON ROUGE, LA 70815
PH: (225) 926-2025

CROSS-SECTION E-F



LEGEND

- Indicates Bottom of Well
- TD — Total Depth of Boring (feet)
- TOC — Top of Casing Elevation (feet/NGVD)
- Loose Topsoil
- Peat & Highly Organic Material (PT)
- Clay (CH)
- Silty Clay (CL)
- Clayey Silt (ML)
- Silty Sand (SM)
- Clayey Sand (SC)
- Static Water Level Elevation Measured After 15 Minutes (feet below ground surface)
- Screen Interval

0 feet 500
Horizontal Scale

Note: 1. Soil conditions interpolated between boring locations. Actual conditions may vary.

Drawn By:	MCNAMARA	10/22/06		Project No.	21140			
Designer:				Drawing No.	21140GH.DWG			
P.E.	BURNHAM	10/22/06		Date Issued:	10/22/06			
Approved:	ELLIS	10/22/06		Plot Time:		DATE	NO.	REVISION	BY

RIVER BIRCH, INC.
GRETNA, LOUISIANA
CLIENT

RIVER BIRCH LANDFILL
2000 SOUTH KENNER ROAD
AVONDALE, LOUISIANA
LDEQ A.I. NO. 32219
PROJECT TITLE

ENGINEERING ASSOCIATES, INC.
CONSULTING ENGINEERS
1415 DELPLAZA DRIVE
SUITE B
BATON ROUGE, LA 70815
PH: (225) 926-2025

CROSS-SECTION G-H

PART XII

Log of Borings and Test Results
Eustis Engineering
Geotechnical Investigation
January 6, 2003

LEGEND AND NOTES FOR
LOG OF BORING AND TEST RESULTS

PP — Pocket penetrometer resistance in tons per square foot

TV — Torvane shear strength in tons per square foot

SPT — Standard Penetration Test. Number of blows of a 140-lb. hammer dropped 30 inches required to drive 2-in O.D., 1.4-in. I.D. sampler a distance of one foot into the soil, after first seating it 6 inches

SPLR — Type of Sampling: Shelby, SPT, Auger, No Sample

SYMBOL — Clay, Silt, Sand, Humus. Predominant type shown heavy; Modifying type shown light

DENSITY — Unit weight in pounds per cubic foot

USC — Unified Soil Classification

TYPE

UC	Unconfined compression shear
OB	Unconsolidated undrained triaxial compression shear on one specimen confined at the approximate overburden pressure
UU	Unconsolidated undrained triaxial compression shear
CU	Consolidated undrained triaxial compression shear
DS	Direct shear
CON	Consolidation
PD	Particle size distribution
k	Coefficient of permeability in centimeters per second
SP	Swelling pressure in pounds per square foot

ϕ — Angle of internal friction in degrees

c — Cohesion in pounds per square foot

Other laboratory test results reported on separate figure

Ground Water Measurements — Initial, Final

GENERAL NOTES

(1) At the time the borings were made, ground water levels were measured below existing ground surface. These observations are shown on the boring logs. However, ground water levels may vary due to seasonal and other factors. If important to construction, the depth to ground water should be determined by those persons responsible for construction, immediately prior to beginning work.

(2) While the individual logs of borings are considered to be representative of subsurface conditions at their respective locations on the dates shown, it is not warranted that they are representative of subsurface conditions at other locations and times.

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: 2.51 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/15/02 **Boring:** EE-C-1-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests e	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Test hole cased														
					Soft organic clay	OH													
					Very soft to soft clay w/wood	CH													
10																			
					Very soft organic clay	OH													
					Very soft clay w/wood & organic matter	CH													
20																			
					Soft clay w/silt lenses	CH													
30																			
					Soft silty clay	CL													
					Soft clay	CH													
40																			
					Loose clayey silt	ML													
					Medium stiff clay w/silt lenses	CH													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: 2.51 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/15/02 **Boring:** EE-C-1-02 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium stiff clay w/silt lenses	CH													
					Loose clayey silt	ML													
60					Medium stiff silty clay	CL													
					Loose clayey silt	ML													
70					Medium dense sandy silt	ML													
					Very stiff silty clay	CL													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: 2.33 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/15-16/02 **Boring:** EE-B-2-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Crushed limestone		1	0-1											
					Soft light brown clay w/gravel	CH	2	1-2											
	0.00				Very soft to soft gray & brown clay w/peat & roots	CH	3	3-4											
	0.25						4	5-6	84	51	95	UC	–	225					
	0.25						5	7-8											
10	0.25						6	9-10											
	0.25						7	11-12	55	69	106	UC	–	330					
	0.00				Soft black organic clay w/peat, roots, & organic matter	OH	8	13-14	173						178	40	138		
	0.25				Soft gray clay w/peat, roots, & organic matter	CH	9	15-16											
	0.25				Soft gray silty clay w/shell fragments	CL	10	17-18	46						43	18	25		
20	0.25				Very soft gray clay w/silt lenses	CH	11	19-20											
	0.25						12	21-22											
	0.25						13	23-24	65	61	101	UC	–	180					
	0.25						14	25-26											
	0.25						15	27-28											
30	0.25						16	29-30	71	57	97	UC	–	230	81	23	58		
	0.25						17	31-32											
	0.25						18	33-34											
	0.25				w/silty sand lenses		19	35-36	65	60	99	UC	–	180					
	0.25				Soft gray clay w/trace of silt	CH	20	37-38											
40	0.25						21	39-40	47	74	108	UC	–	275	55	19	36		
	0.25						22	41-42							53	19	34		PERM
	0.25						23	43-44											
	0.25						24	45-46	42	78	110	UC	–	380	50	18	32		
	0.25						25	47-48											
50	0.25						26	49-50											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: 2.33 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/15-16/02 **Boring:** EE-B-2-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50	0.25				Soft gray clay w/organic matter & trace of wood	CH	27	51-52	57	65	102	UC	–	470	83	23	60		
	0.25						28	53-54											
	0.25						29	55-56											
	0.25						30	57-58	63	62	101	UC	–	360					
60	0.25						31	59-60											
	0.25				Medium stiff gray clay w/silt lenses & shell fragments	CH	32	61-62	63	62	101	UC	–	740	87	24	63		
	0.25						33	63-64							80	22	58		PERM
	0.25				Extremely soft gray sandy clay w/shell fragments	CL	34	65-66	42	79	112	UC	–	65					
	1.25				Stiff greenish-gray sandy clay w/clayey silt lenses	CL	35	67-68	22	103	126				37	12	25		
70	4.00				Extremely stiff greenish-gray & tan sandy clay w/sand lenses	CL	36	69-70	18						36	13	23		PERM
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/15/02 **Boring:** EE-C-2-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium dense silty sand	SM													
					Medium stiff clay	CH													
					Very soft to soft organic clay w/wood	OH													
10					Soft clay	CH													
					Very soft to soft organic clay	OH													
					Very soft to soft clay w/wood	CH													
20					Soft clay w/silt lenses	CH													
30																			
40																			
					Medium stiff silty clay	CL													
50					Medium stiff clay	CH													

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/15/02 **Boring:** EE-C-2-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium stiff clay	CH													
					Medium stiff silty clay	CL													
60																			
					Soft silty clay w/wood	CL													
					Loose to medium dense clayey silt	ML													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.88 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/15/02 **Boring:** EE-C-3-02 **Refer to "Legends & Notes"**

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Soft to medium stiff organic clay	OH													
					Very soft to soft clay w/wood & organic matter	CH													
10																			
					Soft clay	CH													
20					Soft to medium stiff clay w/silt lenses	CH													
30																			
40					Medium stiff silty clay w/silt lenses	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.88 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/15/02 **Boring:** EE-C-3-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium stiff silty clay w/silt lenses	CL													
					Medium stiff silty clay	CL													
60					Medium stiff silty clay w/wood	CL													
					Stiff to very stiff silty clay	CL													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.54 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/15/02 **Boring:** EE-C-4-02 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Very soft organic clay	OH													
10					Very soft clay	CH													
					Very soft to soft clay w/wood & organic matter	CH													
					Very soft to soft clay	CH													
20					Soft clay w/silt lenses	CH													
30																			
40																			
					Medium stiff silty clay	CL													
					Soft to medium stiff clay w/silt lenses	CH													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.54 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/15/02 **Boring:** EE-C-4-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft to medium stiff clay w/silt lenses	CH													
					Medium stiff silty clay	CL													
60					Medium stiff silty clay w/wood	CL													
					Loose to medium dense clayey silt	ML													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

(Sheet 1 of 2)

Ground Elev.: -0.54 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 9/04-05/02 **Boring:** EE-B-5-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff brown clay w/organic matter, roots & wood	CH	1	0-0.5											
						OH	2	0.5-2											
	0.30				Soft black organic clay w/roots & silt pockets	CH	3	2-4	81						106	27	79		
	0.30				Medium stiff gray clay w/roots, wood, & silt pockets		4	4-6											
	0.25				Soft gray clay w/organic matter & roots	CH	5	6-8											
	0.20				Very soft dark gray organic clay w/roots	OH	6	8-10	229										
10							NR	10-12											
	0.20				Soft gray clay w/organic matter & roots	CH	7	12-14	78										
	0.20				Very soft gray clay w/silt layers & wood	CH	8	14-16											
	0.20				Soft gray clay w/silt lenses	CH	9	16-18											
	0.20						10	18-20	66										
20	0.25						11	20-22											
	0.25						12	22-24											
	0.25						13	24-26	84						87	24	63		
	0.25						14	26-28											
	0.30				Very soft gray clay w/wood	CH	15	28-30											
30					Very soft gray clay		16	30-32											
							17	32-34	58										
							18	34-36											
							19	36-38											
					w/silty clay layers		20	38-40	46										
40							21	40-42											
							22	42-44											
					Soft gray clay	CH	23	44-46	52										
							24	46-48											
50					Medium stiff gray clay w/silt lenses	CH	25	48-50	66										

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.54 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 9/04-05/02 **Boring:** EE-B-5-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium stiff gray clay w/shell fragments, sand pockets, & lenses	CH	26	50-52											
							27	52-54	55										
							28	54-56											
							29	56-58	71										
							30	58-60											
60					Medium stiff dark gray clay w/organic matter, silty clay layers, & shells	CH	31	60-62	72										
					Soft to medium stiff gray sandy clay w/shells	CL	32	62-64											
					Very stiff greenish-gray & tan sandy clay	CL	33	64-66											
							34	66-68	18										
70							35	68-70											
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/14 & 12/05/02 **Boring:** EE-B-6-02 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Crushed limestone		1	0-1											
					Soft gray clay w/gravel	CH	2	1-2											
					Soft brown humus	PI	3	3-4	243	20	70	UC	–	375					
							4	5-6											
					Very soft dark brown & gray clay w/wood, humus, & organic matter	CH	5	7-8	127										
					Soft gray clay w/wood, organic matter, & roots	CH	6	9-10	68	60	101	UC	–	250					
10							7	11-12											
					Very soft brown & dark gray organic clay w/humus	OH	8	13-14	•						215	56	159		PERM
					Very soft gray clay	CH	9	15-16											
							10	17-18	81	53	96	UC	–	155					
							11	19-20											
20					Very soft gray silty clay	CL	12	21-22	54						49	17	32		
					Very soft gray clay	CH	13	23-24											
							14	25-26	75	56	97	UC	–	140					
							15	27-28											
							16	29-30	•						94	24	70		PERM
30							17	31-32											
							18	33-34	64	62	101	UC	–	220					
							19	35-36											
							20	37-38	64										
							21	39-40											
40					Soft gray clay	CH	22	41-42	43	78	111	UC	–	325					
							23	43-44											
					Soft to very soft gray silty clay	CL	24	45-46	•						49	18	31		PERM
							25	47-48	38	83	115	UC	–	295	47	17	30		
					Very soft to soft gray clay	CH	26	49-50	64										
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/14 & 12/05/02 **Boring:** EE-B-6-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Very soft to soft gray clay	CH	27	51-52	58	65	102	UC	–	375					
							28	53-54											
							29	55-56	73										
					w/trace of shell fragments		30	57-58											
							31	59-60	53	69	105	UC	–	430					
60					w/clayey silt lenses		33	61-62											
	0.25				Medium stiff gray clay w/shell fragments & organic matter	CH	34	63-64	*						97	23	74		PERM
	0.25						35	65-66	61	62	100	UC	–	585					
	0.25						36	67-68											
					Soft greenish-gray silty clay w/sand lenses	CL													
70	0.25				Very stiff greenish-gray silty clay	CL	37	69-70	24						28	15	13		PERM
	2.25						38	73-74	21	104	126	UC	–	2440					
					Very stiff greenish-gray & tan clay w/clayey silt lenses	CH													
	3.25						39	78-79											
80					Medium dense tan clayey sand	SC													
							40	83-84	25										
					Stiff tan & gray clay w/sand pockets	CH													
	1.50						41	88-89											PERM
90					Medium stiff tan & light gray clay w/fissures	CH													
	1.50						42	93-94	41	78	110	UC	–	720	78	19	59		
					Soft gray & tan clay w/clayey silt lenses	CH													
100	0.25						43	98-99	30										

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/14 & 12/05/02 **Boring:** EE-B-6-02 **Refer to "Legends & Notes**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
100					Stiff gray clay w/sand pockets	CH													
	1.00						44	103-104	41	81	114	UC	--	1400	75	20	55		
	1.20				w/shell fragments		45	108-109	44	79	113	UC	--	920					
110																			
	1.05						46	113-114	46	75	110	UC	--	1605					
	1.05						47	118-119	46	75	110	UC	--	1215	78	19	59		
120																			
	1.05						48	123-124	39	83	115	UC	--	1525					
	1.50				Stiff dark gray & brown clay w/decayed wood & organic matter	CH	49	124-125	67										
	1.50				Medium dense light gray clayey sand	SC	50	127-128	23										
130		28			Medium dense light gray fine sand w/clayey sand layers	SP	51	129-130											
		50=11"			Very dense gray fine sand	SP	52	132-133											
		50=9"					53	135-136	21										
140		50					54	139-140											
		50=6"					55	144-145	27										
150		50=8"					56	149-150											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/14 & 12/05/02 **Boring:** EE-B-6-02 **Refer to "Legends & Notes"**

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
150					Very dense gray fine sand	SP													
		50=9"	X				57	154-155	24										
		50=6"	X				58	159-160											
160																			
170																			
180																			
190																			
200																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.49 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/15/02 **Boring:** EE-C-7-02 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Extremely soft to very soft organic clay w/wood	OH													
					Very soft clay	CH													
10					Very soft organic clay w/wood	OH													
					Very soft clay	CH													
					Very soft clay w/wood & organic matter	CH													
20					Very soft to soft clay w/silt lenses	CH													
30																			
40					Loose clayey silt	ML													
					Soft to medium stiff clay w/silt lenses	CH													
					Medium compact clayey silt	ML													
					Medium stiff silty clay w/silt lenses	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.49 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/15/02 **Boring:** EE-C-7-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium stiff silty clay w/silt lenses	CL													
					Medium stiff silty clay	CL													
60																			
					Soft silty clay w/wood	CL													
70					Stiff silty clay	CL													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.97 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/06-07/02 **Boring:** EE-B-8-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Loose dark brown sand	SP	1	0-1											
	0.25				Soft dark brown clay w/wood & organic matter	CH	2	1-2											
	0.25				w/decayed wood & roots		3	3-4	56										
	0.25						4	5-6											
	0.25				Soft to medium stiff gray clay w/wood, organic matter, & silt pockets	CH	5	7-8	69										
10	0.25				w/roots, organic matter, & organic clay layers		6	9-10	79						106	29	77		
	0.25				Very soft to soft gray clay w/roots, organic matter, & silt pockets	CH	7	11-12											
	0.25						8	13-14	85	51	95	UC	–	175					
	0.25				Very soft to soft gray clay w/silt lenses & organic matter	CH	9	15-16											
	0.25						10	17-18	63										
20	0.25						11	19-20											
	0.25						12	21-22	65						83	25	58		
	0.25						13	23-24											
	0.25						14	25-26	65	61	100	UC	–	195					
	0.25						15	27-28											
30	0.25						16	29-30											
	0.25				Soft gray clay w/sand lenses & layers	CH	17	31-32	55						87	25	62		
	0.25						18	33-34											
	0.25						19	35-36	47	72	106	UC	–	195					
	0.25						20	37-38											
40	0.25						21	39-40	51										
	0.25						22	41-42											
	0.25						23	43-44											
	0.25						24	45-46	51										
	0.25				Soft gray clay	CH	25	47-48	46	74	108	UC	–	215					
50	0.25						26	49-50	47						59	21	38		

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.97 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/06-07/02 **Boring:** EE-B-8-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50	0.25				Soft gray clay	CH	27	51-52											
	0.25						28	53-54	68										
	0.25				Soft gray clay w/shell fragments	CH	29	55-56											
	0.25						30	57-58	69	59	99	UC	–	330					
60	0.25						31	59-60											
	0.25						32	61-62	57						82	24	58		
	0.25						33	63-64											
	1.25				Stiff gray & tan sandy clay	CL	34	65-66	20	108	129	UC	–	1555					
	3.00				Very stiff greenish-gray & tan clay w/silty clay	CH	35	67-68											
70	3.00						36	69-70											
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: 1.50 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/12/02 **Boring:** EE-C-9-02 **Refer to "Legends & Notes"**

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff to stiff clay	CH													
					Medium dense silty sand	SM													
					Soft to medium stiff clay	CH													
10					Soft organic clay w/wood	OH													
					Soft clay w/roots & organic matter	CH													
20					Very soft clay w/organic matter	CH													
					Very soft to soft clay w/silt lenses	CH													
30																			
40																			
					Soft silty clay w/silt lenses	CL													
					Soft to medium stiff clay w/silt lenses	CH													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: 1.50 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/12/02 **Boring:** EE-C-9-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
50					Soft to medium stiff clay w/silt lenses	CH													
60					Medium stiff gray clay	CH													
					Soft to medium stiff clay	CH													
70					Medium dense clayey silt	ML													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

(Sheet 1 of 2)

Ground Elev.: 1.90 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/05/02 **Boring:** EE-B-10-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Loose brown fine sand w/roots, clay pockets, gravel, shells, & brick fragments	SP	1	0-0.5											
							2	1-2	12										
						CH	3	2-3											
	0.50				Medium stiff gray clay w/wood & organic matter		4	3-4											
	0.50						5	5-6	51										
	0.25				Soft gray clay w/wood, humus, brick fragments, & roots	CH	6	7-8	69										
10	0.25				Very soft gray clay w/wood, roots, & organic matter	CH	7	9-10	86	51	94	UC	–	165	139	27	112		
	0.25						8	11-12											
	0.50				Medium stiff gray clay w/wood & silt pockets	CH	9	13-14	61										
	0.25				Soft gray clay	CH	10	15-16											
	0.25				w/wood & organic clay layers	CH	11	17-18	124										
20	0.25				Very soft to soft gray clay w/wood, silt pockets & lenses, organic matter & roots		12	19-20											
	0.25						13	21-22	88	50	94	UC	–	200					
	0.25						14	23-24							98	26	72		
	0.25				Soft gray clay w/silt lenses & pockets	CH	15	25-26											
	0.25						16	27-28											
30	0.25				w/silt lenses		17	29-30	69										
	0.25						18	31-32											
	0.25						19	33-34	60	64	103	UC	–	375					
	0.25						20	35-36											
	0.25						21	37-38	45										
40	0.25						22	39-40											
	0.25						23	41-42	54						60	20	40		
	0.25				Soft gray clay w/wood, silt pockets, & roots	CH	24	43-44	38	78	108	UC	–	265					
	0.25				Soft gray clay w/silt lenses	CH	25	45-46											
	0.25						26	47-48	38										
50	0.25						27	49-50											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: 1.90 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/05/02 **Boring:** EE-B-10-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50	0.25				Soft gray silty clay	CL	28	51-52	33	89	119	UC	–	455	41	18	23		
	0.25						29	53-54											
	0.25				w/clay layers		30	55-56							38	21	17		
	0.25				Soft to medium stiff gray clay w/silt lenses	CH	31	57-58											
60	0.50						32	59-60	72										
	0.50						33	61-62	66	60	99	UC	–	415					
	0.50						34	63-64							94	31	63		
	0.50				Medium stiff gray clay w/shell fragments	CH	35	65-66											
	0.50				Medium stiff brown & gray clay	CH	36	67-68											
70	1.50				Stiff light green clay	CH	37	69-70											
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

(Sheet 1 of 2)

Ground Elev.: -1.29 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/13/02 **Boring:** EE-C-11-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff organic clay	OH													
					Soft to medium stiff clay	CH													
					Very soft to soft clay	CH													
10					Very soft organic clay	OH													
					Soft clay w/wood & organic matter	CH													
20					Soft clay w/silt lenses	CH													
30																			
40					Loose clayey silt	ML													
					Soft to medium stiff silty clay w/silt lenses	CL													
50					Medium stiff silty clay w/silt	CL													

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.29 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/13/02 **Boring:** EE-C-11-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium stiff silty clay w/silt	CL													
					Medium stiff silty clay	CL													
60																			
					Very stiff silty clay	CL													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.44 **Datum:** **Gr. Water Depth:** 4 **Job No.:** 17543 **Date Drilled:** 7/30 & 12/04/02 **Boring:** EE-B-12-02 *Refer to "Legends & Notes"*

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0	2.00				Stiff dark gray clay w/vegetation	CH	1	0-1											
					Medium stiff tan & gray clay w/wood, silt pockets, roots, & fissures	CH	2	1-2	46	74	108	UC	–	565	116	24	92		
	0.25						3	3-4											
					Soft gray clay w/silt pockets, roots, concretions, organic matter, & wood	CH	4	5-6	70										
							5	7-8											
10							6	9-10	84	51	95	UC	–	260	120	26	94		
							7	11-12											
					w/wood, silty clay lenses, & roots		8	13-14	55										
					Soft gray silty clay	CL	9	15-16	38	85	117	OB	–	250	32	22	10		PERM
					Soft gray clay w/silt lenses & pockets	CH	10	17-18	70										
20					w/silt lenses		11	19-20											
					Soft gray clay w/silty sand layers & lenses	CH	12	21-22	38	83	114	UC	–	255	51	20	31		
					w/silt lenses & pockets		13	23-24											
							14	25-26	48										PERM
							15	27-28											
30							16	29-30	53	70	106	UC	–	340	63	23	40		
	0.25						17	31-32	42										
	0.25						18	33-34	37										
	0.25				Soft gray silty clay w/clay layers	CL	19	35-36	37						40	17	23		
	0.25				Soft gray clay w/silt pockets & roots	CH	20	37-38											
40	0.25						21	39-40	46										
	0.25						22	41-42											PERM
	0.25				Soft gray silty clay	CL	23	43-44	38	83	114	UC	–	355	47	16	31		
	0.25				Soft gray clay w/silt pockets	CH	24	45-46											
	0.25						25	47-48	67										
50	0.25				Soft gray clay w/silt poc & sh frag	CH	26	49-50											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.44 **Datum:** **Gr. Water Depth:** 4 **Job No.:** 17543 **Date Drilled:** 7/30 & 12/04/02 **Boring:** EE-B-12-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50	0.25						27	51-52											
	0.25						28	53-54	59	65	103	UC	–	595	85	19	66		
	0.25						29	55-56											PERM
	0.25						30	57-58	55										
60	0.25						31	59-60											
	2.00				Stiff greenish-gray clay w/silt pockets	CH	32	61-62	46	76	110	UC	–	420	69	17	52		
	2.00				Very stiff greenish-gray silty clay	CL	33	63-64											PERM
	4.50+						34	65-66	19										
	4.50+				Very stiff greenish-gray clay	CH	35	67-68											
70					Stiff gray & tan clay w/sandy silt layers	CH	36	69-70	40						55	21	34		PERM
	2.00				w/silt pockets		37	76-77	32	91	120	UC	–	1650	70	18	52		
80	1.50				Compact gray & tan clayey silt w/clay lenses	ML	38	79-80											
	2.00				Stiff gray & tan clay w/silt pockets & lenses	CH	39	84-85	42										
90	0.25				Stiff greenish-gray clay w/wood & silt pockets	CH	40	89-90											
	1.50						41	94-95	39	82	115	UC	–	1170	63	14	49		
100							42	99-100											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.44 **Datum:** **Gr. Water Depth:** 4 **Job No.:** 17543 **Date Drilled:** 7/30 & 12/04/02 **Boring:** EE-B-12-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
100					Stiff greenish-gray clay w/shell fragments	CH													
	0.90						43	103-104	42	79	112	UC	--	1340	71	19	52		
					Stiff gray clay w/silt pockets	CH													
	1.00						44	108-109	45	75	110	UC	--	1345					
110																			
	1.00						45	113-114	43	78	111	UC	--	1195	74	19	55		
	0.50				Medium stiff dark gray clay w/organic matter & wood	CH	46	116-117	52	70	106	UC	--	940					
	1.40				Stiff gray clay w/silty sand pockets	CH	47	118-119	26	97	122	UC	--	1210					
120																			
					Stiff light gray silty clay w/clayey sand layers	CL													
	2.85						48	123-124	21	106	128	UC	--	1310	31	14	17		
					Very dense gray fine sand	SP	49	126-127											
		50=8"					50	128-129	21										
130																			
		50=7"					51	131-132											
		50=8"					52	134-135	23										
		50=6"					53	139-140											
140																			
		50=6"					54	144-145	20										
150		50					55	149-150											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.44 **Datum:** **Gr. Water Depth:** 4 **Job No.:** 17543 **Date Drilled:** 7/30 & 12/04/02 **Boring:** EE-B-12-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
150					Very dense gray fine sand	SP													
		50=6"	X				56	154-155	27										
		50=6"	X				57	159-160											
160																			
170																			
180																			
190																			
200																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -2.02 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/13/02 **Boring:** EE-C-13-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Soft organic clay w/wood	OH													
					Soft clay	CH													
					Very soft to soft organic clay w/wood	OH													
					Very soft clay	CH													
10																			
					Very soft to soft clay w/wood & organic matter	CH													
20					Soft clay w/silt lenses	CH													
30																			
					Loose clayey silt	ML													
					Soft silty clay	CL													
40					Loose clayey silt	ML													
					Soft to medium stiff silty clay w/silt lenses	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -2.02 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/13/02 **Boring:** EE-C-13-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft to medium stiff silty clay w/silt lenses	CL													
					Medium stiff silty clay	CL													
60					Soft to medium stiff silty clay	CL													
					Stiff silty clay	CL													
70					Dense silty sand	SM													
					Compact sandy silt	ML													
80					Loose to medium compact clayey silt	ML													
					Loose to medium compact sandy silt	ML													
90					Loose to medium compact clayey silt	ML													
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.66 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/07/02 **Boring:** EE-B-14-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0	1.00				Medium stiff dark gray & tan clay w/roots, organic matter, & wood	CH	1	0-1											
	1.00						2	1-2	54										
	1.00						3	3-4	65	59	98	UC	--	570					
	0.25				Very soft dark brown & gray clay w/roots, organic matter, & wood	CH	4	5-6	67						103	32	71		
	0.25						5	7-8											
10	0.25						6	9-10	141	34	81	UC	--	165					
	0.25						7	11-12	120						164	39	125		
	0.25				Soft gray clay w/silt lenses & roots	CH	8	13-14											
	0.25						9	15-16	62										
	0.25				Soft gray clay w/silt lenses	CH	10	17-18											
20	0.25						11	19-20	74	58	98	UC	--	290					
	0.25						12	21-22											
	0.25						13	23-24	85										
	0.25						14	25-26											
	0.25						15	27-28											
30	0.25						16	29-30	55	68	105	UC	--	315	64	19	45		
	0.25						17	31-32	44										
	0.25						18	33-34											
	0.25						19	35-36											
	0.25						20	37-38	39										
40	0.25						21	39-40											
	0.25				Soft gray silty clay	CL	22	41-42	39	81	113	UC	--	320	46	17	29		
	0.25				Soft gray clay w/silt lenses	CH	23	43-44											
	0.25						24	45-46	43										
	0.25						25	47-48											
50	0.25						26	49-50											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.66 Datum: Gr. Water Depth: See Text Job No.: 17543 Date Drilled: 8/07/02 Boring: EE-B-14-02 Refer to "Legends & N

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50	0.25				Soft gray clay w/clayey silt lenses	CH	27	51-52	61						87	22	65		
	0.25						28	53-54	60	63	101	UC	–	515					
	0.25				Soft gray clay w/silt lenses & shell fragments	CH	29	55-56											
	0.25						30	57-58	66										
60	0.25						31	59-60											
	0.25				Stiff greenish-gray & tan silty clay	CL	32	61-62											
	0.25						33	63-64	24	103	128	UC	–	1135					
	0.25				Very stiff greenish-gray & tan sandy clay	CL	34	65-66	20						45	16	29		
	2.50				Very stiff greenish-gray clay w/clayey silt pockets	CH	35	67-68											
70	2.50						36	69-70											
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.39 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/13/02 **Boring:** EE-C-15-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Very soft to soft organic clay	OH													
					Very soft clay w/wood & organic matter	CH													
10					Very soft clay w/organic matter	CH													
					Very soft clay w/wood & organic matter	CH													
20					Very soft to soft clay w/silt lenses	CH													
30					Loose clayey silt	ML													
					Medium stiff silty clay	CL													
					Loose clayey silt	ML													
40					Medium stiff silty clay	CL													
					Loose clayey silt	ML													
					Medium stiff silty clay w/silt lenses	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.39 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/13/02 **Boring:** EE-C-15-02 Refer to "Legends & Note

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium stiff silty clay w/silt lenses	CL													
					Medium stiff silty clay	CL													
60					Medium stiff silty clay w/silt lenses	CL													
					Medium compact clayey silt	ML													
					Stiff to very stiff silty clay	CL													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.91 **Datum:** **Gr. Water Depth:** 4 **Job No.:** 17543 **Date Drilled:** 7/31/02 **Boring:** EE-B-16-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0	1.00				Medium stiff dark gray clay w/roots	CH	1	0-1											
	1.00				Medium stiff brown & gray clay w/silt pockets & roots	CH	2	1-2	44	74	107	UC	--	975					
	0.50						3	3-4											
	0.25				Soft gray clay w/silt pockets & roots	CH	4	5-6	64										
	0.25						5	7-8											
10					Very soft gray organic clay	OH	6	9-10	129	38	87	UC	--	135	176	41	135		
					Soft gray clay w/roots & organic matter	CH	7	11-12											
							8	13-14	83										
							9	15-16											
					Soft gray silty clay w/clay lenses & concretions	CL	10	17-18	45										
					Soft gray clay w/silt lenses	CH	11	19-20											
20							12	21-22	57	68	106	UC	--	315	59	22	37		
							13	23-24											
							14	25-26	72										
							15	27-28											
30					w/silt lenses, wood, & clayey silt layers		16	29-30	51										
					w/silt lenses		17	31-32											
							18	33-34	68	60	102	UC	--	440	87	24	63		
							19	35-36											
							20	37-38	61										
40							21	39-40											
					w/silt lenses & wood		22	41-42	49										
					w/silt lenses		23	43-44											
							24	45-46											
					w/silt pockets		25	47-48	64	61	100	UC	--	310					
50							26	49-50											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.91 **Datum:** **Gr. Water Depth:** 4 **Job No.:** 17543 **Date Drilled:** 7/31/02 **Boring:** EE-B-16-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft gray clay w/silt pockets	CH	27	51-52											
							28	53-54											
							29	55-56	63										
					Soft gray clay w/silt pockets & shell fragments	CH	30	57-58											
60							31	59-60	66						100	20	80		
							32	61-62											
					Stiff gray clay w/silt lenses	CH	33	63-64											
	1.50						34	65-66											
	1.50						35	67-68											
	1.50						36	69-70											
70	1.50																		
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.83 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/13/02 **Boring:** EE-C-17-02 *Refer to "Legends & No*

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Medium stiff organic clay w/wood	OH													
					Soft to medium stiff clay w/wood & organic matter	CH													
10					Soft organic clay w/wood	OH													
					Very soft clay	CH													
					Soft clay w/wood & organic matter	CH													
20																			
					Soft to medium stiff clay w/silt lenses	CH													
30																			
40					Loose clayey silt	ML													
					Medium stiff clay w/silt lenses	CH													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.83 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/13/02 **Boring:** EE-C-17-02 Refer to "Legends & No

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium stiff clay w/silt lenses	CH													
					Medium stiff silty clay	CL													
60					Soft clay	CH													
					Medium compact clayey silt	ML													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/05-06/02 **Boring:** EE-B-18A-02 *Refer to "Legends & Notes"*

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Loose tan fine sand	SP	1	0-0.5											
							2	1-2											
		10			Loose gray fine sand	SP	3	3-4											
		2			Very soft black sludge		4	5-6											
	0.25				w/shells		5	7-8											
10	0.25				Soft gray clay w/silt pockets, roots, organic matter, & sludge	CH	6	9-10	93										
	0.25				Soft gray clay w/silt pockets, organic matter & roots	CH	7	11-12											
	0.25						8	13-14	89						111	28	83		
	0.25				Very soft gray clay w/black substance & wood	CH	9	15-16	91										
	0.25						10	17-18											
20	0.25				Soft gray & dark brown clay w/organic matter & roots	CH	11	19-20	122						160	33	127		
	0.25				Very soft gray clay w/silt lenses	CH	12	21-22											
	0.25						13	23-24	72	56	96	UC	–	100					
	0.25						14	25-26											
	0.25						15	27-28	72										
30	0.25						16	29-30											
	0.25						17	31-32	80	53	96	UC	–	180					
	0.25						18	33-34	79						95	24	71		
	0.25						19	35-36											
	0.25						20	37-38											
40	0.25						21	39-40											
	0.25						22	41-42	80	53	96	UC	–	175					
	0.25				Soft gray clay w/silt lenses	CH	23	43-44	41										
	0.25						24	45-46											
	0.25				w/wood & silty clay layers		25	47-48	36	83	112	UC	–	170	39	17	22		
50	0.25						26	49-50											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/05-06/02 **Boring:** EE-B-18A-62 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50	0.25				Soft gray clay w/silty clay layers	CH	27	51-52											
	0.25				Soft gray silty clay	CL	28	53-54	39										
	1.00				Soft gray clay	CH	29	55-56											
	1.00				w/silt pockets		30	57-58	44						65	21	44		
60	1.00						31	59-60											
	1.00				w/silty sand lenses		32	61-62	69	59	100	UC	–	380					
	1.00						33	63-64											
	1.00				Soft gray clay w/shell fragments & silt lenses	CH	34	65-66	61										
	1.00						35	67-68											
70	1.00				w/silt lenses & concretions		36	69-70	63						90	23	67		
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: 1.62 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/13/02 **Boring:** EE-C-19-02 Refer to "Legends & Not

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium stiff silty clay w/silt lenses	CL													
					Medium stiff silty clay	CL													
60																			
					Medium compact to compact clayey silt	ML													
70					Compact clayey silt	ML													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.97 **Datum:** **Gr. Water Depth:** 3.5 **Job No.:** 17543 **Date Drilled:** 8/02/02 **Boring:** EE-B-20-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0	1.50				Medium stiff dark gray clay w/roots & organic matter	CH	1	0-1											
	0.50				Stiff dark gray & tan clay w/roots, trace of organic matter, & decayed wood	CH	2	1-2	56										
	0.30				Soft gray & tan clay w/roots & decayed wood	CH	3	3-4	62	62	101	UC	--	450					
	0.20				Very soft dark gray humus	Pt	4	5-6											
10	0.20				Very soft dark gray clay w/roots & organic matter	CH	5	7-8	240						232	63	169		
					Very soft gray clay w/silt lenses, pockets, & layers	CH	6	9-10	119	40	88	UC	--	170					
	0.20						7	11-12											
	0.20						8	13-14	49										
	0.20						9	15-16	52										
20	0.25				Very soft gray clay w/organic matter	CH	10	17-18											
	0.25						11	19-20	58						71	23	48		
	0.25						12	21-22	84										
	0.25						13	23-24											
30	0.25				Soft gray clay w/silt lenses & pockets	CH	14	25-26	62	64	103	UC	--	205					
	0.25						15	27-28											
	0.25						16	29-30	60										
	0.25						17	31-32											
	0.25						18	33-34	40	81	114	UC	--	355					
40	0.25				Soft gray silty clay	CL	19	35-36											
	0.25				Soft gray clay	CH	20	37-38							40	18	22		
	0.25						21	39-40											
	0.25						22	41-42	35										
	0.25						23	43-44											
	0.25						24	45-46	43	78	111	UC	--	410	57	19	38		
50	0.25				Medium stiff gray clay w/silty sand lenses, pockets, & shell fragments	CH	25	47-48											
	0.25						26	49-50	65										

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.97 **Datum:** **Gr. Water Depth:** 3.5 **Job No.:** 17543 **Date Drilled:** 8/02/02 **Boring:** EE-B-20-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests s	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium stiff gray clay w/silty sand lenses, pockets, & shell fragments	CH	27	51-52	69						95	29	66		
							28	53-54											
							29	55-56	63	62	102	UC	–	500					
							30	57-58											
							31	59-60											
60					Stiff light gray silty clay	CL	32	61-62							43	15	28		
	2.00				Very stiff greenish-gray & tan silty clay	CL	33	63-64											
	2.00						34	65-66							42	17	25		
	2.00						35	67-68											
70	2.00						36	69-70											
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.90 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/13/02 **Boring:** EE-C-21-02 Refer to "Legends & Note

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Soft organic clay	OH													
					Very soft clay	CH													
10					Extremely soft to very soft organic clay	OH													
					Very soft clay w/organic matter	CH													
					Very soft to soft clay w/wood & organic matter	CH													
20					Soft clay w/silt lenses	CH													
30																			
					Loose clayey silt	ML													
					Soft silty clay	CL													
40					Loose clayey silt	ML													
					Medium stiff silty clay w/silt lenses	CL													
					Loose clayey silt	ML													
					Medium stiff silty clay w/silt lenses	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.90 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/13/02 **Boring:** EE-C-21-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ε	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium stiff silty clay w/silt lenses	CL													
					Loose clayey silt	ML													
					Medium stiff silty clay	CL													
60																			
					Stiff silty clay w/silt lenses	CL													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.48 **Datum:** **Gr. Water Depth:** 5.25 **Job No.:** 17543 **Date Drilled:** 8/01/02 **Boring:** EE-B-22-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff black clay w/vegetation	CH	1	0-1											
	3.00				Stiff black & tan clay w/roots & wood	CH	2	1-2	60	54	86	UC	--	1195					
	2.00						3	3-4											
	0.25				Very soft to soft gray clay w/roots, wood, & organic matter	CH	4	5-6	68	59	98	UC	--	290	103	28	75		
	0.25						5	7-8											
	0.25						6	8-9	104										
	0.25						7	9-10											
10	0.20						8	11-12	87	50	94	UC	--	190					
	0.20						9	13-14											
	0.25						10	15-16	80						102	30	72		
	0.25				Soft gray clay w/silt lenses	CH	11	17-18	54	70	108	UC	--	190					
	0.25				w/shell fragments		12	19-20											
20	0.25						13	21-22	55										
	0.20						14	23-24											
	0.20				w/roots & organic matter		15	25-26	47	75	110	UC	--	275					
	0.20						16	27-28											
30					w/silty clay lenses		17	29-30	59						75	24	51		
	0.25						18	31-32											
	0.25				w/silt pockets		19	33-34	43	78	112	UC	--	315					
	0.25						20	35-36							88	25	63		CON
	0.25						21	37-38							52	21	31		
40	0.25						22	39-40											
	0.30						23	41-42											
	0.30						24	43-44	39	82	114	UC	--	335					
	0.30						25	45-46											
	0.40						26	47-48							81	27	54		
50	0.40						27	49-50											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.48 **Datum:** **Gr. Water Depth:** 5.25 **Job No.:** 17543 **Date Drilled:** 8/01/02 **Boring:** EE-B-22-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50	0.40				Soft gray clay w/silt pockets	CH	28	51-52											
	0.50						29	53-54	66	61	101	UC	–	360					
	0.75				Soft gray clay w/shell fragments	CH	30	55-56											
	0.75						31	57-58							93	29	64		CON
60	0.75						32	59-60											
	0.75						33	61-62											
	0.25				Soft light gray & tan silty clay	CL	34	63-64	28	95	122	UC	–	355					
	3.25				Very stiff tan & gray silty clay	CL	35	65-66							43	17	26		
	2.50				Very stiff tan & gray clay	CH	36	67-68											
70	1.50				Stiff tan & gray clay w/clayey silt layers & pockets	CH	37	69-70											
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.97 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/13/02 **Boring:** EE-C-23-02 Refer to "Legends & Note

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Soft organic clay	OH													
					Soft to medium stiff clay	CH													
					Extremely soft to very soft organic clay	OH													
10					Very soft clay w/silt lenses	CH													
					Very soft to soft clay w/wood & organic matter	CH													
20					Soft clay w/silt lenses	CH													
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.97 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/13/02 **Boring:** EE-C-23-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	e	C	LL	PL	PI		
50					Soft clay w/silt lenses	CH													
					Medium stiff silty clay	CL													
60																			
					Stiff silty clay	CL													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

(Sheet 1 of 2)

Ground Elev.: -0.84 **Datum:** **Gr. Water Depth:** 6.4 **Job No.:** 17543 **Date Drilled:** 8/01/02 **Boring:** EE-B-24-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0	1.90				Medium stiff dark gray clay w/roots & organic matter	CH	1	0-1											
	0.75					CH	2	1-2											
	0.75				Stiff tan & gray clay w/roots	CH	3	2-3	63	62	101	UC	--	490					
	0.50				Medium stiff tan & gray clay w/few roots, decayed wood, & concretions		4	3-4											
	0.50						5	4-5	63										
	0.25				Very soft to soft gray clay w/roots, wood, & organic matter	CH	6	5-6											
	0.25						7	6-7	133						167	42	125		
	0.25						8	7-8											
	0.25						9	8-9											
10	0.25						10	9-10	80	54	96	UC	--	205					
	0.25						11	11-12											
	0.25						12	13-14							135	38	97		
	0.20				Very soft to soft gray clay w/clayey silt lenses & trace of organic matter	CH	13	15-16	63										
	0.20				w/silt lenses		14	17-18											
20	0.20						15	19-20	42	79	113	UC	--	285					
	0.20						16	21-22							53	21	32		
	0.20						17	23-24											
	0.20						18	25-26	68										
	0.20						19	27-28	49	72	107	UC	--	225					
30	0.20						20	29-30											
	0.20				Soft gray silty clay w/alternating clay lenses	CL	21	31-32	34						38	22	16		
	0.20				Very soft to soft gray clay w/silt lenses & pockets	CL	22	33-34											
	0.25						23	35-36	68										
	0.25						24	37-38											
40	0.25						25	39-40	64	62	102	UC	--	195	87	20	67		
							NR	41-42											
	0.40				Soft gray clay alternating w/loose gray silt	CH	26	43-44	52										
	0.40				Soft gray clay w/silt pockets & trace of wood	CH	27	45-46	43										
	0.40						28	47-48							90	26	64		
50	0.40						29	49-50											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.84 **Datum:** **Gr. Water Depth:** 6.4 **Job No.:** 17543 **Date Drilled:** 8/01/02 **Boring:** EE-B-24-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50	0.40				Soft gray clay w/silt pockets & trace of wood	CH	30	51-52	66	61	100	UC	--	245					
	0.40						31	53-54											
	0.50				Medium stiff gray clay w/shell fragments & sandy silt lenses	CH	32	55-56	74										
	0.50						33	57-58							69	29	60		
60	0.70						34	59-60	62	63	102	UC	--	760					
	0.70						35	61-62											
	0.90				Medium stiff gray clay w/shell fragments & organic matter	CH	36	63-64	42										
	0.90				Very stiff greenish-gray silty clay w/silt pockets	CL	37	65-66	20										
	2.70						38	67-68											PERM
70	2.50				Very stiff light greenish-gray & tan clay w/sand lenses	CH	39	69-70	31						83	26	57		
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.21 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/16/02 **Boring:** EE-C-25-02 Refer to "Legends & Notes

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Soft organic clay w/wood	OH													
					Very soft to soft clay w/wood & organic matter	CH													
10																			
					Soft clay w/silt lenses	CH													
20																			
30																			
40																			
					Loose clayey silt	ML													
					Medium stiff silty clay w/silt lenses	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.21 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/16/02 **Boring:** EE-C-25-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium stiff silty clay w/silt lenses	CL													
					Medium stiff silty clay	CL													
60					Soft to medium stiff clay w/wood	CH													
					Loose clayey silt	ML													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.11 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 9/10/02 **Boring:** EE-B-26-02 Refer to "Legends & Note

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Soft dark gray organic clay	OH	1	0-2											
					Soft gray clay w/roots, silt pockets, & wood	CH	2	2-4											
							3	4-6	92										
							4	6-8											
					Soft dark gray organic clay w/roots	OH	5	8-10	163										
10							6	10-12											
					Soft gray clay w/organic matter & wood	CH	7	12-14											
					Soft gray clay w/silt lenses & pockets	CH	8	14-16	56										
							9	16-18											
							10	18-20	65										
20							11	20-22											
							12	22-24											
							13	24-26	84						72	21	51		
							14	26-28											
							15	28-30	77										
30							16	30-32											
							17	32-34											
					Soft gray silty clay	CL	18	34-36	34										
					Soft gray clay w/silt pockets & lenses	CH	19	36-38											
							20	38-40											
40							21	40-42	46										
							22	42-44											
							23	44-46											
							24	46-48	65										
50							25	48-50											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.11 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 9/10/02 **Boring:** EE-B-26-02 Refer to "Legends & Not

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium stiff gray clay w/silty sand lenses & shell fragments	CH	26	50-52	74										
							27	52-54	59	65	103	UC	–	470					
							28	54-56											
					w/shell fragments		29	56-58	69										
							30	58-60											
60					Medium stiff gray sandy clay w/shell fragments & organic matter	CL	31	60-62	29										
					Stiff greenish-gray & tan sandy clay w/sand lenses	CL	32	62-64	29	94	121	UC	–	805					
					Very stiff greenish-gray sandy clay	CL	33	64-66											
							34	66-68	25										
							35	68-70											
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.65 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/16/02 **Boring:** EE-C-27-02 Refer to "Legends & Note

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth, In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Loose sandy silt	ML													
					Soft organic clay	OH													
					Medium stiff clay	CH													
					Very soft to soft clay w/organic matter	CH													
10																			
					Very soft to soft clay w/wood & organic matter	CH													
20					Soft to medium stiff clay w/silt lenses	CH													
30																			
					Soft to medium stiff silty clay w/silt lenses	CL													
					Soft to medium stiff clay w/wood & organic matter	CH													
40																			
					Soft to medium stiff silty clay w/silt lenses	CL													
					Medium stiff silty clay w/silt lenses	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.65 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/16/02 **Boring:** EE-C-27-02 Refer to "Legends & Not

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium stiff silty clay w/silt lenses	CL													
					Medium stiff silty clay	CL													
60																			
70																			
					Loose to medium compact clayey silt	ML													
80					Medium compact sandy silt	ML													
					Very stiff silty clay	CL													
					Stiff silty clay	CL													
					Medium stiff silty clay w/silt lenses	CL													
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.65 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 9/16/02 **Boring:** EE-B-28-02 Refer to "Legends & Notes

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff gray & tan clay w/decayed wood	CH	1	0-2											
					Soft gray & tan clay w/roots & decayed wood	CH	2	2-4	67	57	95	UC	--	280	111	27	84		
					Very soft to soft gray clay w/roots, organic matter, & silt lenses	CH	3	4-6	60										
							4	6-8											
							5	8-10	79	54	97	UC	--	195					
10					Soft brown & gray clay w/organic clay layers & wood	CH	6	10-12	116										
					Very soft gray clay w/trace of organic matter & roots	CH	7	12-14	116						140	34	106		
							8	14-16	95	48	94	UC	--	225					
					Very soft gray clay	CH	9	16-18	56										
							10	18-20											
20							11	20-22	60	65	104	UC	--	165					
					w/silt pockets, trace of shells & roots		12	22-24											
							13	24-26							100	26	74		
							14	26-28	62	63	102	UC	--	210					
							15	28-30	75										
30							16	30-32											
							17	32-34	64	61	99	UC	--	360	60	25	55		
							18	34-36											
					Soft gray sandy clay w/clay lenses	CL	19	36-38	40										
					Extremely soft gray clay w/silty sand lenses	CH	20	38-40	62	62	101	UC	--	105					
40					Soft gray clay	CH	21	40-42	56										
					Soft gray silty clay	CL	22	42-44	40	82	114	UC	--	355					
					Soft gray clay w/silt lenses & pockets	CH	23	44-46	55										
							24	46-48	51	70	106	UC	--	355					
50							25	48-50	67	58	98	UC	--	340	95	24	71		

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.65 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 9/16/02 **Boring:** EE-B-28-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft gray clay	CH	26	50-52	63										
					Medium stiff gray clay	CH	27	52-54	70	67	97	UC	–	615					
							28	54-56	79										
					Medium stiff gray clay w/sandy silt lenses & shell fragments	CH	29	56-58	54	68	105	UC	–	550					
							30	58-60											
60							31	60-62	62										
							32	62-64	66	60	99	UC	–	335	94	26	68		
							33	64-66	73										
					Very soft gray clay w/shell fragments	CH	34	66-68	54	68	104	UC	–	135					
					Soft brown clay w/organic matter	CH	35	68-70	73										
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.49 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/14/02 **Boring:** EE-C-29-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Very soft to soft organic clay	OH													
					Very soft clay	CH													
					Extremely soft to very soft organic clay w/wood & organic matter	OH													
10					Very soft clay	CH													
					Very soft clay w/wood & organic matter	CH													
20					Soft clay w/silt lenses	CH													
30																			
					Soft silty clay w/silt lenses	CL													
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.49 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/14/02 **Boring:** EE-C-29-02 Refer to "Legends & Notes

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft silty clay w/silt lenses	CL													
					Loose clayey silt	ML													
					Medium stiff silty clay	CL													
60																			
					Soft silty clay	CL													
					Stiff silty clay	CL													
70					Medium compact clayey silt	ML													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.60 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 9/20/02 **Boring:** EE-B-30-02 Refer to "Legends & Note

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Stiff brown & gray clay	CH	1	0-2											
					Stiff gray & tan clay w/oxidation & roots	CH	2	2-4	74										
					Soft gray clay w/roots & wood	CH	3	4-6											
							4	6-8											
							5	8-10											
10							6	10-12	117										
							7	12-14											
					Soft gray clay w/silt lenses	CH	8	14-16											
							9	16-18	74										
							10	18-20											
20							11	20-22											
							12	22-24	70										
							13	24-26											
					Very soft gray clay w/silt lenses	CH	14	26-28							79	23	56		
							15	28-30	64										
30							16	30-32											
							17	32-34											
							18	34-36	50										
					Soft gray clay	CH	19	36-38											
							20	38-40											
40					w/silt pockets & roots		21	40-42	43										
							22	42-44											
					w/silty sand lenses & pockets, & roots		23	44-46	38										
							24	46-48											
50							25	48-50											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.60 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 9/20/02 **Boring:** EE-B-30-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft gray clay w/silty sand lenses & pockets, & roots	CH	26	50-52	60										
							27	52-54											
					Soft gray clay w/shell fragments	CH	28	54-56	79										
							29	56-58											
							30	58-60											
60					Medium stiff brown & gray clay w/shell fragments, organic matter, & sandy silt lenses	CH	31	60-62	59										
					Very stiff greenish-gray & tan silty clay	CL	32	62-64	21										
					Medium stiff greenish-gray clay	CH	33	64-66											
					Very stiff greenish-gray & tan clay w/silt layers & pockets, & fissures	CH	34	66-68	20										
70					Very stiff greenish-gray & tan silty clay	CL	35	68-70	22										
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

(Sheet 1 of 2)

Ground Elev.: -1.33 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/14/02 **Boring:** EE-C-31-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Soft organic clay w/wood	OH													
					Very soft clay w/wood & organic matter	CH													
10					Very soft organic clay	OH													
					Very soft to soft clay w/wood & organic matter	CH													
20																			
					Very soft to soft clay w/silt lenses	CH													
30																			
40																			
					Soft silty clay w/silt lenses	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.33 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/14/02 **Boring:** EE-C-31-02 Refer to "Legends & Notes

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft silty clay w/silt lenses	CL													
					Medium stiff silty clay	CL													
60																			
					Soft to medium stiff silty clay	CL													
					Stiff silty clay	CL													
70																			
					Loose clayey silt	ML													
80																			
					Stiff silty clay	CL													
					Loose to medium compact clayey silt	ML													
90																			
					Medium stiff to stiff silty clay	CL													
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.24 **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 9/18/02 **Boring:** EE-B-32-02 Refer to "Legends & Note

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff gray & tan clay w/decayed wood & roots	CH	1	0-2	60										
							2	2-4											
							3	4-6	86										
					Soft gray clay w/decayed wood, roots, & organic matter	CH	4	6-8											
							5	8-10	110										
10							6	10-12							124	28	96		
							7	12-14	88										
					Soft gray clay w/silt lenses & layers	CH	8	14-16											
							9	16-18	54										
							10	18-20											
20							11	20-22											
							12	22-24	49										
					w/wood		13	24-26											
							14	26-28	73										
							15	28-30											
30							16	30-32	56										
							17	32-34											
							18	34-36											
							19	36-38	51										
							20	38-40											
40							21	40-42											
							22	42-44	36										
							23	44-46											
							24	46-48											
50							25	48-50	60										

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.24 **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 9/18/02 **Boring:** EE-B-32-02 Refer to "Legends & Note

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft gray clay w/silt lenses	CH	26	50-52											
					Medium stiff gray clay w/sandy silt lenses & shell fragments	CH	27	52-54	62										
							28	54-56											
					w/silt pockets		29	56-58											
							30	58-60	64										
60							31	60-62	56	67	104	UC	–	835					
					Medium stiff dark gray clay w/organic matter & shell fragments	CH	32	62-64	67										
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: 0.21 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/14/02 **Boring:** EE-C-33-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Soft organic clay	OH													
					Soft clay	CH													
					Very soft organic clay	OH													
					Very soft clay	CH													
					Very soft organic clay	OH													
10					Very soft clay	CH													
					Soft clay w/wood & organic matter	CH													
20																			
					Soft clay w/silt lenses	CH													
30																			
					Loose clayey silt	ML													
					Soft to medium stiff silty clay w/silt lenses	CL													
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: 0.21 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/14/02 **Boring:** EE-C-33-02 Refer to "Legends & Notes

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
50					Soft to medium stiff silty clay w/silt lenses	CL													
					Loose clayey silt	ML													
					Medium stiff silty clay	CL													
60																			
					Stiff silty clay	CL													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.64 **Datum:** **Gr. Water Depth:** 2.25 **Job No.:** 17543 **Date Drilled:** 8/14/02 **Boring:** EE-B-34-02 *Refer to "Legends & Notes"*

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0	0.25				Soft dark gray clay w/roots	CH	1	0-1											
							2	1-2	103										
	0.25				Soft gray clay w/wood & roots	CH	3	3-4											
	0.25						4	5-6											
	0.25				Soft brown & gray clay w/wood, roots, & organic matter	CH	5	7-8	154										
	0.25				Soft gray clay w/wood, roots, & organic matter	CH	6	9-10											
10	0.25				Soft gray clay w/silt lenses	CH	7	11-12											
	0.25						8	13-14	52										
	0.25						9	15-16											
	0.25						10	17-18											
20	0.25						11	19-20	59										
	0.25						12	21-22											
	0.25						13	23-24											
	0.25						14	25-26	77						84	27	57		
	0.25						15	27-28											
30	0.25				w/roots		16	29-30	60										
	0.25						17	31-32											
	0.25				w/sandy silt lenses		18	33-34	46										
	0.25						19	35-36											
	0.25						20	37-38											
40	0.25				w/clayey silt lenses		21	39-40	56										
	0.25						22	41-42											
	0.25						23	43-44											
	0.25						24	45-46	71						91	25	66		
	0.25						25	47-48	59										
50	0.25						26	49-50											

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.64 **Datum:** **Gr. Water Depth:** 2.25 **Job No.:** 17543 **Date Drilled:** 8/14/02 **Boring:** EE-B-34-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50	0.25				Soft gray clay w/shell fragments	CH	27	51-52											
	0.25						28	53-54	55										
	0.25						29	55-56											
	0.25						30	57-58											
	0.26						31	59-60	70						90	21	69		
60	0.25				Soft greenish-gray & tan clay w/clayey silt lenses	CH	32	61-62											
	0.25				Very stiff greenish-gray & tan sandy clay	CL	33	63-64	23										
	0.25						34	65-66											
	3.00				w/concretions		35	67-68	21										
70	3.50						36	69-70	22										
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.22 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/15/02 **Boring:** EE-C-35-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Extremely soft to very soft organic clay	OH													
					Very soft clay	CH													
					Very soft organic clay	OH													
10					Very soft clay	CH													
					Very soft to soft clay w/wood & organic matter	CH													
20					Soft clay w/silt lenses	CH													
30																			
40					Soft to medium stiff silty clay w/silt lenses	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.22 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/15/02 **Boring:** EE-C-35-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft to medium stiff silty clay w/silt lenses	CL													
					Loose clayey silt	ML													
					Medium stiff silty clay w/silt lenses	CL													
60					Medium stiff silty clay	CL													
					Very stiff silty clay	CL													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

(Sheet 1 of 2)

Ground Elev.: -2.28 **Datum:** **Gr. Water Depth:** 3 **Job No.:** 17543 **Date Drilled:** 8/12/02 **Boring:** EE-B-38-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests e	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0	0.25				Stiff dark gray clay w/roots	CH	1	0-1											
	0.25				Soft dark brown & black organic clay w/roots & wood	OH	2	1-2	151										
	0.25				Soft gray & tan clay w/roots & wood	CH	3	3-4											
	0.25				Soft gray clay w/roots, wood, & organic matter	CH	4	5-6											
	0.25						5	7-8	73										
10	0.25						6	9-10											
	0.25						7	11-12											
	0.25				w/silty sand layers, silt lenses, & organic matter		8	13-14	66										
	0.25				Soft gray clay w/silt lenses	CH	9	15-16											
	0.25						10	17-18											
20	0.25						11	19-20											
	0.25						12	21-22	72										
	0.25						13	23-24											
	0.25						14	25-26											
	0.25						15	27-28	63										
30	0.25						16	29-30											
	0.25						17	31-32	51						60	21	39		
	0.25						18	33-34											
	0.25				w/silt lenses, wood, & organic matter		19	35-36	67										
	0.25						20	37-38											
40	0.25						21	39-40											
	0.25				w/silty sand layers, lenses, & pockets		22	41-42	44										
	0.25						23	43-44	72						91	25	66		
	0.25						24	45-48											
	0.25						25	47-48											
50	0.25						26	49-50	59										

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -2.28 **Datum:** **Gr. Water Depth:** 3 **Job No.:** 17543 **Date Drilled:** 8/12/02 **Boring:** EE-B-38-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50	0.25				Soft gray clay	CH	27	51-52											
	0.25				Medium stiff gray clay w/shell fragments	CH	28	53-54	74										
	0.25						29	55-56											
	0.25						30	57-58	66										
60	0.25						31	59-60											
	0.25						32	61-62	66										
	0.25						33	63-64											
	0.25				Soft gray clay w/wood & organic matter	CH	34	65-66	57						90	24	66		
	0.25						35	67-68											
70	0.25						36	69-70											
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -2.00 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/15/02 **Boring:** EE-C-37A-02 Refer to "Legends & Nota

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Very soft organic clay w/wood	OH													
					Very soft clay w/wood & organic matter	CH													
10					Extremely soft to very soft organic clay	OH													
					Extremely soft to very soft clay	CH													
					Very soft clay w/wood & organic matter	CH													
20					Very soft clay	CH													
					Very soft clay w/silt lenses	CH													
30																			
40					Soft silty clay w/silt lenses	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -2.00 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/15/02 **Boring:** EE-C-37A-02 Refer to "Legends & Note

Scale in Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft silty clay w/silt lenses	CL													
					Loose clayey silt	ML													
					Medium stiff silty clay	CL													
60																			
					Soft silty clay	CL													
					Very stiff silty clay	CL													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -2.28 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/12/02 **Boring:** EE-B-38-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Stiff dark gray clay w/roots	CH	1	0-1											
	0.25				Soft dark brown & black organic clay w/roots & wood	OH	2	1-2	151										
	0.25				Soft gray & tan clay w/roots & wood	CH	3	3-4											
	0.25				Soft gray clay w/roots, wood, & organic matter	CH	4	5-6											
	0.25						5	7-8	73										
10	0.25						6	9-10											
	0.25						7	11-12											
	0.25				w/silty sand layers, silt lenses, & organic matter		8	13-14	66										
	0.25				Soft gray clay w/silt lenses	CH	9	15-16											
	0.25						10	17-18											
20	0.25						11	19-20											
	0.25						12	21-22	72										
	0.25						13	23-24											
	0.25						14	25-26											
	0.25						15	27-28	63										
30	0.25						16	29-30											
	0.25						17	31-32	51						60	21	39		
	0.25						18	33-34											
	0.25				w/silt lenses, wood, & organic matter		19	35-36	67										
	0.25						20	37-38											
40	0.25						21	39-40											
	0.25				w/silty sand layers, lenses, & pockets		22	41-42	44										
	0.25						23	43-44	72						91	25	66		
	0.25						24	45-46											
	0.25						25	47-48											
50	0.25						26	49-50	59										

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -2.28 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/12/02 **Boring:** EE-B-38-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft gray clay	CH													
	0.25						27	51-52											
					Medium stiff gray clay w/shell fragments	CH													
	0.25						28	53-54	74										
	0.25						29	55-56											
	0.25						30	57-58	66										
60	0.25						31	59-60											
	0.25						32	61-62	66										
	0.25						33	63-64											
					Soft gray clay w/wood & organic matter	CH													
	0.25						34	65-66	57						90	24	66		
	0.25						35	67-68											
70	0.25						36	69-70											
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -2.18 Datum: Gr. Water Depth: See Text Job No.: 17543 Date Drilled: 8/15/02 Boring: EE-C-39-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Very soft organic clay	OH													
					Very soft to soft clay w/organic matter	CH													
10																			
					Very soft clay w/wood & organic matter	CH													
20					Very soft clay w/organic matter	CH													
					Soft clay w/silt lenses	CH													
30																			
40					Soft to medium stiff silty clay w/silt lenses	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -2.18 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/15/02 **Boring:** EE-C-39-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft to medium stiff silty clay w/silt lenses	CL													
					Loose clayey silt	ML													
					Medium stiff silty clay w/silt lenses	CL													
60																			
70																			
					Very stiff silty clay	CL													
					Dense silty sand	SM													
					Loose to medium compact clayey silt	ML													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.96 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/09/02 **Boring:** EE-B-40-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0	0.00				Stiff dark gray clay w/roots	CH	1	0-1											
	0.25				Soft dark gray & black clay w/roots & wood	CH	2	1-2	65										
	0.00						3	3-4											
	0.00				w/roots, wood, & organic clay layers		4	5-6	69										
	0.00						5	7-8											
	0.00				Soft brown organic clay w/roots & wood	OH	6	9-10	268										
10	0.25				Soft dark gray clay w/roots & wood	CH	7	11-12											
	0.25						8	13-14											
	0.25				Soft gray clay w/roots & organic matter	CH	9	15-16	87										
	0.25						10	17-18											
20	0.25				Soft gray clay w/sandy silt lenses & lenses & concretions	CH	11	19-20	62						70	22	48		
	0.25						12	21-22											
	0.25						13	23-24	64										
	0.25						14	25-26											
	0.25						15	27-28	81										
30	0.25						16	29-30											
	0.25						17	31-32											
	0.25						18	33-34	70										
	0.25						19	35-36											
	0.25						20	37-38											
40	0.25				w/silty sand layers & silt pockets		21	39-40	45										
	0.25						22	41-42											
	0.25						23	43-44											
	0.25						24	45-46	36										
	0.25						25	47-48											
50	0.25						26	49-50	61						95	24	71		

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.96 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/09/02 **Boring:** EE-B-40-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50	0.25				Soft gray clay	CH	27	51-52											
	0.25				Soft gray clay w/silty sand lenses & shell fragments	CH	28	53-54	66										
	0.25						29	55-56	48										
	0.25						30	57-58											
60	0.25						31	59-60											
	0.25						32	61-62	69										
	0.25						33	63-64											
	0.25						34	65-66											
	0.25				Medium stiff gray clay	CH	35	67-68	42						62	16	46		
70	0.25				w/sand pockets		36	69-70											
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -2.06 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/14/02 **Boring:** EE-C-41-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Soft to medium stiff organic clay w/wood	OH													
					Very soft to soft clay w/wood & organic matter	CH													
10																			
					Very soft organic clay w/wood	OH													
					Very soft clay	CH													
					Very soft organic clay w/wood	OH													
20					Very soft clay w/wood & organic matter	CH													
					Very soft to soft clay w/silt lenses	CH													
30																			
40																			
					Soft silty clay w/silt lenses	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -2.06 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/14/02 **Boring:** EE-C-41-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft silty clay w/silt lenses	CL													
					Loose clayey silt	ML													
					Medium stiff silty clay	CL													
60																			
					Soft silty clay	CL													
					Very stiff silty clay	CL													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.38 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/08/02 **Boring:** EE-B-42-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Stiff dark gray clay w/roots	CH	1	0-1											
	0.25				Soft black, gray, & tan clay w/roots, wood, & organic clay layers	CH	2	1-2	70										
	0.25						3	3-4											
	0.00				Very soft to soft gray & brown clay w/wood, roots, & organic matter	CH	4	5-6											
	0.25						5	7-8	191										
10	0.00						6	9-10											
	0.00						7	11-12	98						134	29	105		
	0.00						8	13-14											
	0.00						9	15-16	58										
	0.25				Soft gray clay w/silty sand lenses	CH	10	17-18											
20	0.25						11	19-20	60										
	0.25						12	21-22											
	0.25						13	23-24											
	0.25				w/silt lenses & pockets		14	25-26	59						87	24	63		
	0.25						15	27-28											
30	0.25						16	29-30											
	0.25						17	31-32	61										
	0.25						18	33-34											
	0.25						19	35-36											
	0.25						20	37-38	59										
40	0.25						21	39-40											
	0.25						22	41-42											
	0.25						23	43-44	62						65	18	47		
	0.25						24	45-46											
	0.25						25	47-48											
50	0.25						26	49-50	66										

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.38 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/08/02 **Boring:** EE-B-42-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50	0.25				Medium stiff gray clay w/few silty sand lenses	CH	27	51-52	71										
	0.25						28	53-54											
	0.25				Medium stiff gray clay w/silty sand lenses & shell fragments	CH	29	55-56	63										
	0.25						30	57-58											
60	0.25						31	59-60											
	0.25						32	61-62	59										
	0.25						33	63-64											
	2.00				Stiff greenish-gray & tan silty clay	CL	34	65-66											
	2.00						35	67-68	21										
70	2.00						36	69-70											
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.06 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/14/02 **Boring:** EE-C-43-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Soft to medium stiff organic clay	OH													
					Soft to medium stiff clay w/wood & organic matter	CH													
10					Very soft organic clay	OH													
					Very soft clay w/organic matter	CH													
					Very soft clay w/wood & organic matter	CH													
20					Very soft clay w/organic matter	CH													
					Very soft to soft clay w/wood & organic matter	CH													
					Very soft to soft clay w/silt lenses	CH													
30																			
40					Soft to medium stiff silty clay w/silt lenses	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.06 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/14/02 **Boring:** EE-C-43-02 *Refer to "Legends & Notes"*

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft to medium stiff silty clay w/silt lenses	CL													
					Medium stiff silty clay	CL													
60																			
					Soft clay w/silt lenses	CH													
70					Stiff silty clay	CL													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.05 **Datum:** **Gr. Water Depth:** 5 **Job No.:** 17543 **Date Drilled:** 8/08/02 **Boring:** EE-B-44-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests s	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Stiff dark gray clay w/roots	CH	1	0-1											
	0.50				Medium stiff brown, black, & gray clay w/roots, organic matter, & wood	CH	2	1-2	49										
	0.50						3	3-4	53	67	103	UC	--	690	110	26	84		
	0.50				Soft gray clay w/decayed wood & roots	CH	4	5-6	56	65	102	UC	--	435					
	0.25				Soft dark gray clay w/roots & organic matter	CH	5	7-8											
10	0.25						6	9-10	104										
	0.25				Very soft to soft gray clay w/silt pockets & roots	CH	7	11-12	77										
	0.25						8	13-14	68	59	99	UC	--	235	110	25	85		
	0.25						9	15-16											
	0.25				w/organic matter & clayey silt lenses		10	17-18	60										
20	0.25				Soft gray clay	CH	11	19-20											PERM
	0.25				w/silt lenses		12	21-22	60	64	102	UC	--	300	84	23	61		
	0.25				w/clayey silt layers		13	23-24	52										
	0.25				w/silt & sand lenses		14	25-26	60	64	103	UC	--	150					
	0.25						15	27-28											
30	0.25				w/silt lenses & pockets		16	29-30	57	65	102	UC	--	320	75	22	53		
	0.25						17	31-32	51										
	0.25						18	33-34	44	77	111	UC	--	165					
	0.25						19	35-36											
	0.25				Soft gray clay w/silt lenses	CH	20	37-38	56										
40	0.25						21	39-40											PERM
	0.25						22	41-42	56	66	103	UC	--	380					
	0.25						23	43-44											
	0.25						24	45-46	52										
	0.25						25	47-48	63										
50	0.25						26	49-50	53	67	102	UC	--	465	87	24	63		

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -1.05 **Datum:** **Gr. Water Depth:** 5 **Job No.:** 17543 **Date Drilled:** 8/08/02 **Boring:** EE-B-44-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50	0.25				Medium stiff gray clay	CH	27	51-52											
	0.25						28	53-54	56	66	103	UC	–	645					
	0.25				Medium stiff gray clay w/shell fragments	CH	29	55-56	71										
	0.25						30	57-58											
60	0.25						31	59-60	65	60	100	UC	–	475	100	23	77		
	0.25						32	61-62											
	0.25				Medium stiff clay w/shell fragments & trace of decayed wood	CH	33	63-64	42	71	101	UC	–	765					
	0.25						34	65-66											
	0.50				Medium stiff light gray & tan silty clay	CL	35	67-68	25	101	126	UC	–	750					
70	2.50				Very stiff light gray & tan clay w/clayey silt lenses	CH	36	69-70											
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/14/02 **Boring:** EE-C-44-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ε	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Very soft to medium stiff organic clay w/wood	OH													
					Soft clay	CH													
10					Very soft organic clay	OH													
					Very soft clay	CH													
					Very soft to soft clay w/wood & organic matter	CH													
20					Soft clay w/silt lenses	CH													
30																			
40					Soft to medium stiff silty clay w/silt lenses	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/14/02 **Boring:** EE-C-44-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ε	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft to medium stiff silty clay w/silt lenses	CL													
					Medium stiff silty clay	CL													
60					Medium stiff silty clay w/wood	CL													
					Very stiff silty clay	CL													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.66 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/14/02 **Boring:** EE-C-45-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay w/wood & organic matter	CH													
					Medium stiff organic clay	OH													
					Soft to medium stiff clay w/wood & organic matter	CH													
10					Very soft to soft organic clay	OH													
					Very soft clay	CH													
					Very soft clay w/wood & organic matter	CH													
20																			
					Soft clay w/silt lenses	CH													
30																			
40					Soft to medium stiff silty clay w/silt lenses	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: -0.66 **Datum:** **Gr. Water Depth:** See Text **Job No.:** 17543 **Date Drilled:** 8/14/02 **Boring:** EE-C-45-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft to medium stiff silty clay w/silt lenses	CL													
					Medium stiff silty clay	CL													
60																			
					Very stiff silty clay	CL													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/22/02 Boring: EE-C-46-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Very soft organic clay	OH													
					Medium stiff clay	CH													
					Very soft organic clay	OH													
10																			
					Very soft clay w/wood	CH													
20					Very soft to soft clay	CH													
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/22/02 Boring: EE-C-46-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Very soft to soft gray clay	CH													
					Medium stiff silty clay	CL													
60																			
					Very stiff silty clay	CL													
					Loose to medium compact sandy silt	ML													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/22/02 Boring: EE-C-47-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Very soft organic clay	OH													
					Very soft clay w/organic clay layers	CH													
10					Very soft to soft clay w/wood	CH													
20					Very soft to soft clay	CH													
30																			
					Soft to medium stiff silty clay	CL													
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/22/02 Boring: EE-C-47-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft to medium stiff silty clay	CL													
60					Medium stiff silty clay	CL													
					Soft silty clay	CL													
					Very stiff silty clay	CL													
					Loose to medium compact clayey silt	ML													
70																			
					Loose sandy silt	ML													
					Medium stiff silty clay	CL													
80					Stiff silty clay	CL													
					Loose clayey silt	ML													
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/22/02 Boring: EE-C-48-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay w/wood	CH													
					Very soft organic clay	OH													
					Extremely soft to soft organic clay	OH													
10					Very soft clay w/wood	CH													
					Very soft to soft clay	CH													
20																			
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/22/02 Boring: EE-C-48-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50																			
					Medium stiff silty clay	CL													
60																			
					Soft to medium stiff silty clay	CL													
					Medium compact clayey silt	ML													
70																			
					Loose to medium compact clayey silt	ML													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/22/02 Boring: EE-C-49-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Extremely soft to very soft organic clay w/ wood	OH													
					Soft clay	CH													
10					Very soft organic clay	OH													
					Very soft to soft clay	CH													
20																			
30																			
40					Loose gray clayey silt	ML													
					Soft silty clay	CL													
					Medium stiff silty clay	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/22/02 Boring: EE-C-49-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests s	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium stiff silty clay	CL													
60					Soft to medium stiff silty clay	CL													
					Very stiff silty clay	CL													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/22/02 Boring: EE-C-50-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Very soft organic clay	OH													
					Extremely soft to very soft clay	CH													
10					Very soft organic clay	OH													
					Very soft clay w/wood	CH													
					Very soft to soft clay	CH													
20																			
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/22/02 Boring: EE-C-50-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Very soft to soft clay	CH													
					Loose clayey silt	ML													
					Medium stiff silty clay	CL													
60																			
					Soft to medium stiff silty clay w/wood	CL													
70																			
					Very stiff silty clay	CL													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/26/02 **Boring:** EE-C-51-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	s	C	LL	PL	PI		
0					Medium stiff clay	CH													
					Soft organic clay	OH													
					Soft clay w/wood & organic matter	CH													
10																			
					Soft clay w/silt lenses	CH													
20																			
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/26/02 **Boring:** EE-C-51-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft clay w/silt lenses	CH													
					Medium stiff silty clay	CL													
60																			
					Soft clay w/organic matter	CH													
					Compact clayey silt	ML													
					Compact sandy silt	ML													
70					Compact clayey silt	ML													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

(Sheet 1 of 2)

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/26/02 **Boring:** EE-C-52-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Very soft to soft organic clay w/wood	OH													
10					Very soft organic clay	OH													
20					Very soft clay	CH													
30																			
40																			
					Loose clayey silt	ML													
					Soft clay	CH													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/26/02 Boring: EE-C-52-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft clay	CH													
60					Medium stiff silty clay	CL													
					Very soft silty clay	CL													
70					Very stiff silty clay	CL													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/26/02 Boring: EE-C-53-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Soft organic clay w/wood	OH													
					Very soft organic clay	OH													
10					Soft clay	CH													
					Very soft organic clay	OH													
					Very soft clay	CH													
20																			
30																			
40																			
					Loose clayey silt	ML													
					Soft clay	CH													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/26/02 **Boring:** EE-C-53-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft clay	CH													
60					Medium stiff silty clay	CL													
					Very stiff silty clay	CL													
70					Compact sandy silt	ML													
80					Medium dense silty sand	SM													
					Medium compact clayey silt	ML													
					Very stiff silty clay	CL													
90																			
					Stiff silty clay	CL													
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/26/02 Boring: EE-C-54-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Medium stiff organic clay w/wood	OH													
					Medium stiff clay	CH													
					Soft organic clay w/wood	OH													
10					Soft clay	CH													
20																			
30																			
40					Loose clayey silt	ML													
					Soft silty clay	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/26/02 Boring: EE-C-54-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					*Soft clay*	CH													
60					Medium stiff silty clay	CL													
70					Very stiff silty clay	CL													
					Medium compact clayey silt	ML													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

(Sheet 1 of 2)

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 12/03/02 Boring: EE-C-55-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay w/wood	CH													
					Soft organic clay w/wood	OH													
					Soft clay w/wood	CH													
10					Extremely soft to very soft organic clay	OH													
					Very soft clay w/wood	CH													
20					Very soft to soft clay	CH													
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 12/03/02 **Boring:** EE-C-55-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Very soft to soft clay	CH													
					Medium stiff silty clay	CL													
60					Very stiff silty clay	CL													
					Medium compact sandy silt	ML													
					Loose to medium compact clayey silt	ML													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/22/02 **Boring:** EE-C-56-02 Refer to "Legends & Note

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Soft organic clay	OH													
					Soft organic clay w/wood	OH													
					Soft organic clay	CH													
					Soft clay w/wood	CH													
10					Very soft organic clay	CH													
					Very soft clay w/wood	CH													
					Very soft to soft clay	CH													
20																			
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/22/02 Boring: EE-C-56-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium stiff silty clay	CL													
60					Very stiff silty clay	CL													
					Medium compact sandy silt	ML													
					Loose to medium compact clayey silt	ML													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/22/02 **Boring:** EE-C-57-02 Refer to "Legends & Notes

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Soft clay	CH													
					Very soft clay	CH													
10					Very soft clay w/wood	CH													
					Very soft clay w/wood	CH													
20					Very soft to soft clay	CH													
30																			
40					Loose clayey silt	ML													
					Soft to medium stiff silty clay	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/22/02 **Boring:** EE-C-57-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft to medium stiff silty clay	CL													
60					Very stiff silty clay	CL													
					Loose to medium compact clayey silt	ML													
70					Loose sandy silt	ML													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/22/02 Boring: EE-C-58-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests e	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay w/wood	CH													
					Extremely soft to very soft organic clay w/ wood	OH													
10					Very soft clay w/wood	CH													
					Very soft to soft clay	CH													
20																			
30																			
40																			
					Soft to medium stiff silty clay	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/22/02 **Boring:** EE-C-58-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50																			
60					Soft silty clay	CL													
					Very stiff silty clay	CL													
					Loose to medium compact clayey silt	ML													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/25/02 Boring: EE-C-59-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Soft organic clay	OH													
					Very soft clay	CH													
					Very soft organic clay	OH													
10					Very soft clay w/wood & organic matter	CH													
20					Very soft to soft clay	CH													
30																			
40					Loose clayey silt	ML													
					Soft to medium stiff clay	CH													
50																			

Comments:

:USTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

;round Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/25/02 Boring: EE-C-59-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft to medium stiff clay	CH													
					Medium stiff silty clay	CL													
60					Soft silty clay	CL													
					Very stiff silty clay	CL													
					Loose clayey silt	ML													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/25/02 Boring: EE-C-60-02 *Refer to "Legends & Notes"*

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Very soft organic clay	OH													
10																			
					Soft clay	CH													
20																			
30																			
40																			
					Loose clayey silt	ML													
50					Medium stiff silty clay	CL													

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/25/02 **Boring:** EE-C-60-02 Refer to "Legends & Note

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium stiff silty clay	CL													
60					Soft silty clay	CL													
					Very stiff silty clay	CL													
70					Loose clayey silt	ML													
					Loose sandy silt	ML													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/27/02 **Boring:** EE-C-61-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Clay w/wood	CH													
10					Extremely soft to very soft organic clay	OH													
					Soft clay	CH													
20																			
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/27/02 **Boring:** EE-C-61-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft clay	CH													
60					Medium stiff silty clay	CL													
					Soft silty clay w/wood	CL													
70					Very stiff silty clay	CL													
					Medium compact clayey silt	ML													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/26/02 **Boring:** EE-C-62-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Very soft to soft organic clay	OH													
					Clay w/wood	CH													
					Very soft organic clay	OH													
10																			
					Very soft clay w/wood	CH													
20					Soft clay	CH													
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/26/02 **Boring:** EE-C-62-02 Refer to "Legends & Notes

Scale In Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft clay	CH													
					Medium stiff silty clay	CL													
60					Soft silty clay w/wood	ML													
					Very stiff silty clay	CL													
					Medium compact clayey silt	ML													
					Very stiff silty clay	CL													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/26/02 Boring: EE-C-63-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium dense silty sand	SM													
					Medium stiff clay	CH													
					Soft organic clay	OH													
10					Soft clay	CH													
					Very soft organic clay	OH													
					Very soft to soft clay	CH													
20																			
30																			
					Soft to medium stiff clay	CH													
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/26/02 **Boring:** EE-C-63-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft to medium stiff clay	CH													
					Medium stiff silty clay	CL													
60					Loose clayey silt	ML													
					Soft silty clay w/wood	CL													
					Very stiff silty clay	CL													
70					Medium compact clayey silt	ML													
					Medium dense silty sand	SM													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 12/03/02 Boring: EE-C-64-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Soft to medium stiff organic clay w/wood	OH													
					Very soft clay w/wood	CH													
					Extremely soft to very soft organic clay	OH													
10					Very soft clay w/wood	CH													
					Very soft to soft clay	CH													
20																			
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 12/03/02 Boring: EE-C-64-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ε	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Very soft to soft clay	CH													
					Medium stiff clay	CH													
60					Very stiff silty clay	CL													
					Medium compact sandy silt	ML													
					Loose to medium compact clayey silt	ML													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 12/03/02 **Boring:** EE-C-65-02 Refer to "Legends & Note

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay w/wood	CH													
					Soft organic clay	OH													
					Soft clay w/wood	CH													
10																			
20					Very soft to soft clay	CH													
30																			
					Loose clayey silt	ML													
					Soft to medium stiff clay	CH													
40																			
					Medium stiff silty clay	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 12/03/02 **Boring:** EE-C-65-02 Refer to "Legends & Note

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium stiff silty clay	CL													
					Soft to medium stiff silty clay	CL													
60					Stiff silty clay	CL													
					Medium compact clayey silt	ML													
					Compact sandy silt	ML													
					Loose to medium compact clayey silt	ML													
70					Medium compact sandy silt	ML													
					Dense silty sand	SM													
					Very stiff silty clay	CL													
80																			
					Stiff silty clay	CL													
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 12/02/02 **Boring:** EE-C-66-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Soft organic clay	OH													
					Soft clay w/wood	CH													
					Very soft clay w/wood	CH													
10																			
20					Soft clay	CH													
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 12/02/02 **Boring:** EE-C-66-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
50					Soft clay	CH													
60					Soft silty clay	CL													
					Very stiff silty clay	CL													
					Loose to medium compact clayey silt	ML													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 12/03/02 **Boring:** EE-C-67-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay w/wood	CH													
					Very soft organic clay w/wood	OH													
					Very soft clay w/wood	CH													
10																			
					Very soft clay	CH													
20																			
30																			
					Loose clayey silt	ML													
					Soft clay	CH													
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 12/03/02 **Boring:** EE-C-67-02 Refer to "Legends & Notes

Scale In Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft clay	CH													
					Loose clayey silt	ML													
					Soft to medium stiff silty clay	CL													
60					Loose clayey silt	ML													
					Very stiff silty clay	CL													
					Medium compact sandy silt	ML													
					Loose to medium compact clayey silt	ML													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/25/02 **Boring:** EE-C-68-02 Refer to "Legends & Notes

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Soft organic clay	OH													
					Soft clay w/wood	CH													
10																			
					Very soft clay w/wood	CH													
20					Very soft to soft clay	CH													
30																			
40					Loose clayey silt	ML													
					Soft clay	CH													
					Loose clayey silt	ML													
					Soft to medium stiff clay	CH													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/25/02 Boring: EE-C-68-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests e	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft to medium stiff clay	CH													
60					Soft silty clay	CL													
					Very stiff silty clay	CH													
					Loose clayey silt	ML													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/25/02 **Boring:** EE-C-69-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Very soft organic clay w/wood	OH													
10					Soft clay	CH													
					Very soft organic clay	OH													
					Extremely soft to very soft clay w/wood	CH													
					Extremely soft organic clay	OH													
20					Very soft clay	CH													
30																			
40																			
50					Soft to medium stiff silty clay	CL													

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/25/02 Boring: EE-C-69-02 Refer to "Legends & Notes

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft to medium stiff silty clay	CL													
60					Medium stiff silty clay	CL													
70					Medium stiff silty clay w/wood	CL													
					Very stiff silty clay	CL													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/25/02 Boring: EE-C-70-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Very soft organic clay w/wood	OH													
					Wood	Wd													
10					Very soft clay	CH													
					Extra soft to soft organic clay	OH													
					Very soft clay w/wood	CH													
20					Soft clay	CH													
30																			
					Soft to medium stiff clay	CH													
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/25/02 **Boring:** EE-C-70-02 *Refer to "Legends & Notes"*

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft to medium stiff clay	CH													
					Medium stiff silty clay	CL													
60																			
					Very stiff silty clay	CL													
70					Loose to medium dense clayey silt	ML													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/25/02 Boring: EE-C-71-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Soft organic clay	OH													
					Wood	Wd													
					Soft organic clay w/wood	CH													
10					Extremely soft to very soft organic clay w/ wood	OH													
					Very soft clay	CH													
20																			
30																			
					Loose clayey silt	ML													
					Soft to medium stiff clay	CH													
40																			
50																			

Comments:

:USTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/25/02 Boring: EE-C-71-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft to medium stiff clay	CH													
					Medium stiff silty clay	CL													
60																			
					Soft to medium stiff silty clay	CL													
					Very stiff silty clay	CL													
70					Loose to medium compact clayey silt	ML													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 12/02/02 **Boring:** EE-C-72-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests φ	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Soft organic clay	OH													
					Wood	Wd													
					Very soft organic clay	OH													
					Very soft clay w/wood	CH													
					Very soft clay w/wood	CH													
10					Soft clay w/wood	CH													
					Very soft clay w/wood	CH													
20					Very soft to soft clay	CH													
30																			
40					Loose clayey silt	ML													
					Medium stiff silty clay	CL													
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 12/02/02 Boring: EE-C-72-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests e	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Medium stiff silty clay	CL													
					Medium stiff silty clay	CL													
60					Soft silty clay	CL													
					Very stiff silty clay	CL													
					Medium compact sandy silt	ML													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 12/02/02 **Boring:** EE-C-73-02 Refer to "Legends & Notes

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Soft organic clay w/wood	OH													
					Medium stiff gray clay w/wood	CH													
10					Very soft clay w/wood	CH													
20					Soft clay	CH													
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 12/02/02 Boring: EE-C-73-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft clay	CH													
					Medium stiff silty clay	CL													
60																			
					Soft to medium stiff silty clay	CL													
					Very stiff silty clay	CL													
70					Medium compact clayey silt	ML													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 12/02/02 **Boring:** EE-C-74-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Soft to medium stiff clay	CH													
					Extremely soft to very soft organic clay w wood	OH													
					Wood	Wd													
					Very soft organic clay w/wood	OH													
10					Wood	Wd													
					Extremely soft to very soft clay w/wood	OH													
					Extra soft to soft clay w/wood	CH													
20					Very soft clay	CH													
30					Soft to medium stiff clay	CH													
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 12/02/02 Boring: EE-C-74-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft to medium stiff clay	CH													
					Medium stiff silty clay	CL													
60																			
					Soft silty clay	CL													
					Very stiff silty clay	CL													
70																			
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 12/02/02 **Boring:** EE-C-75-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Soft clay w/wood	CH													
					Very soft clay w/wood	CH													
10					Soft clay w/wood	CH													
					Extremely soft to very soft clay	CH													
20					Very soft clay	CH													
30					Loose clayey silt	ML													
					Soft clay	CH													
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/27/02 Boring: EE-C-76-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50																			
					Loose clayey silt	ML													
					Medium stiff silty clay	CL													
60																			
					Soft silty clay	CL													
					Very stiff clay	CH													
70																			
					Medium compact clayey silt	ML													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 12/02/02 Boring: EE-C-77-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	Ch													
					Soft clay w/wood	Ch													
					Wood	Wd													
					Soft clay w/wood	CH													
10					Wood	Wd													
					Very soft clay w/wood	CH													
20					Soft clay	CH													
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 12/02/02 Boring: EE-C-77-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft clay	CH													
					Loose clayey silt	ML													
					Medium stiff silty clay	CL													
60																			
					Loose clayey silt	ML													
					Medium stiff silty clay	CL													
70																			
					Loose to medium compact clayey silt	ML													
					Medium compact sandy silt	ML													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

(Sheet 1 of 2)

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/27/02 Boring: EE-C-78-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Medium stiff clay w/wood	CH													
					Soft to medium stiff clay w/wood	CH													
10																			
20					Very soft clay	CH													
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/27/02 **Boring:** EE-C-78-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Very soft clay	CH													
60					Medium stiff silty clay	CL													
70					Soft silty clay	CL													
					Very stiff silty clay	CL													
					Loose sandy silt	ML													
80					Medium compact clayey silt	ML													
					Medium dense silty sand w/silt lenses	SM													
					Loose to compact clayey silt	ML													
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

(Sheet 1 of 2)

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/27/02 **Boring:** EE-C-79-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Soft organic clay	OH													
					Soft clay w/wood	CH													
10																			
					Very soft clay	CH													
20																			
					Loose clayey silt	ML													
					Soft clay	CH													
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/27/02 **Boring:** EE-C-79-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft clay	CH													
					Loose clayey silt	ML													
					Soft to medium stiff clay	CH													
60																			
					Medium stiff silty clay	CL													
70																			
					Very stiff silty clay	CL													
					Medium compact sandy silt	ML													
80																			
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

(Sheet 1 of 2)

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/27/02 **Boring:** EE-C-80-02 *Refer to "Legends & Notes"*

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Medium stiff clay	CH													
					Soft clay w/wood	CH													
10					Wood	Wd													
					Very soft clay	CH													
					Very soft to soft clay w/silt layers & wood	CH													
20					Loose clayey silt	ML													
					Loose clayey silt	SM													
					Soft to medium stiff clay	CH													
					Medium dense sand	SP													
30																			
					Soft clay	CH													
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 11/27/02 **Boring:** EE-C-80-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft clay	CH													
60					Medium stiff silty clay	CL													
70					Soft silty clay	CL													
					Very stiff silty clay	CL													
80																			
90																			
100																			

Comments:

:USTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 12/03/02 Boring: EE-C-81-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Organic clay w/wood	OH													
					Organic clay w/wood	OH													
					Very soft organic clay	OH													
					Very soft to soft clay w/wood	CH													
10					Extremely soft to very soft organic clay w/ wood	OH													
					Extremely soft to very soft clay w/wood	CH													
					Very soft to soft clay	CH													
20																			
30																			
40																			
50																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 12/03/02 Boring: EE-C-81-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Very soft to soft clay	CH													
					Soft to medium stiff silty clay	CL													
60																			
					Very stiff silty clay	CL													
					Medium stiff silty sand	SM													
					Medium dense sand	SP													
70					Loose to medium compact clayey silt	ML													
80																			
90																			
100																			

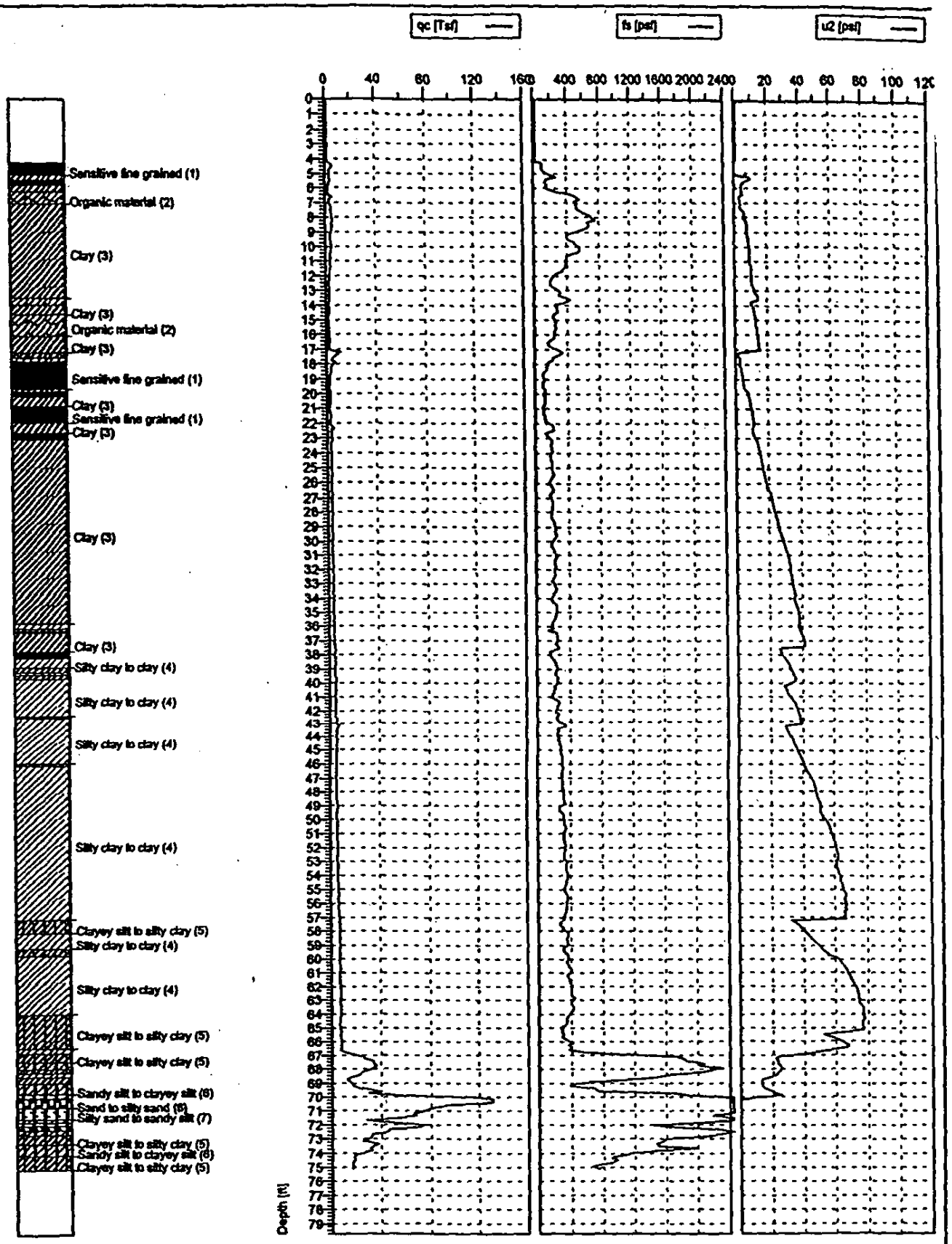
Comments:

PART XIII

Log of Cone Penetrometer Test Results
Eustis Engineering
Geotechnical Investigation
January 6, 2003

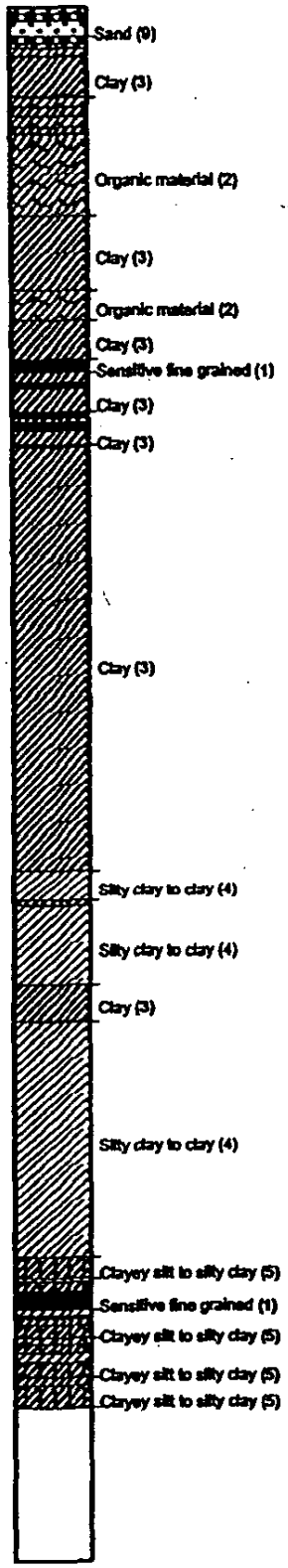
LEGEND FOR LOG OF CONE PENETROMETER TEST RESULTS

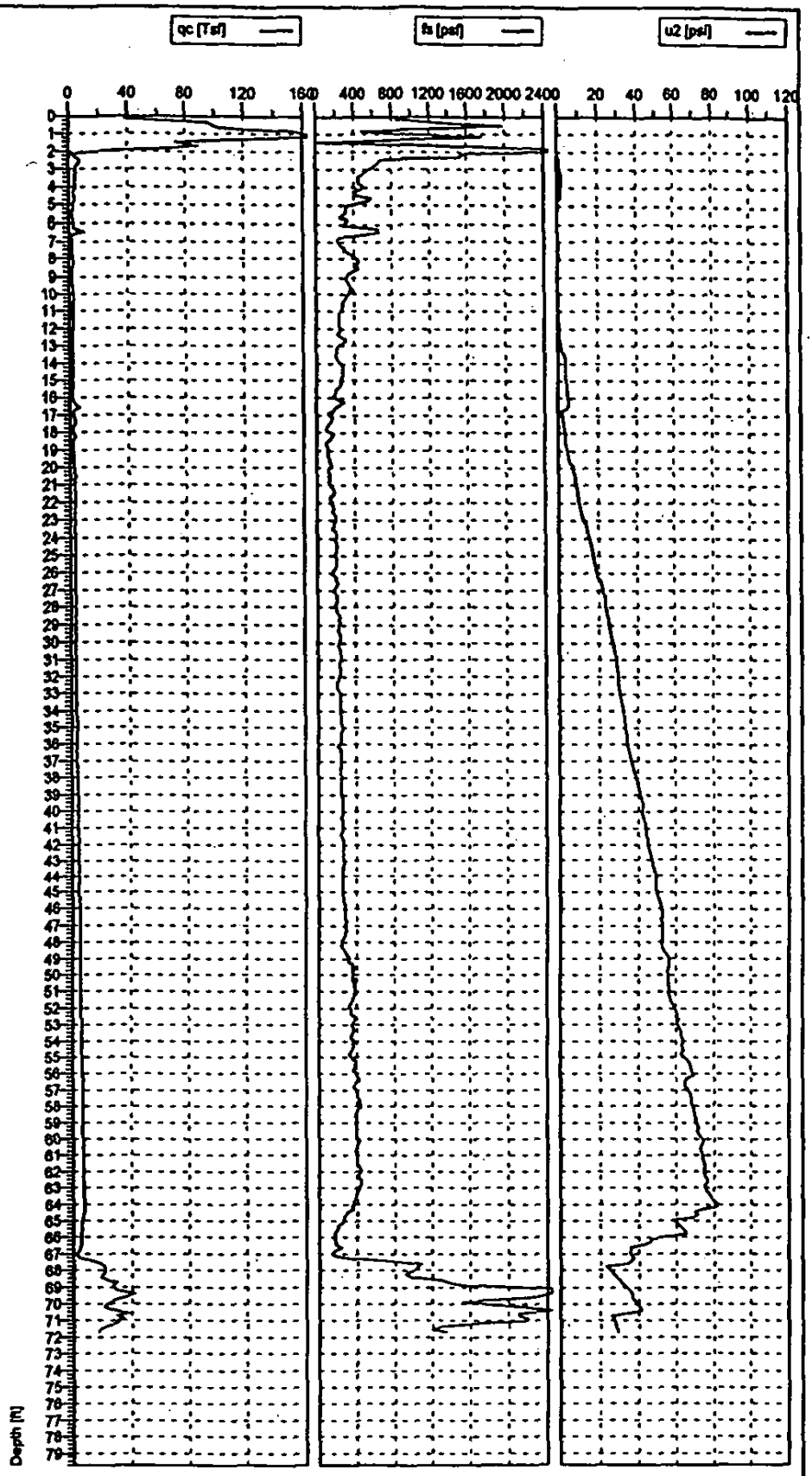
SYMBOL	SOIL TYPE
	SENSITIVE FINE GRAINED (1)
	ORGANIC MATERIAL (2)
	CLAY (3)
	SILTY CLAY TO CLAY (4)
	CLAYEY SILT TO SILTY CLAY (5)
	SANDY SILT TO CLAYEY SILT (6)
	SILTY SAND TO SANDY SILT (7)
	SAND TO SILTY SAND (8)
	SAND (9)
	GRAVELLY SAND TO SAND (10)



Test no: EE-C-1-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-15-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
PREDRILL = 4 FEET		File: 220-21.cpd	

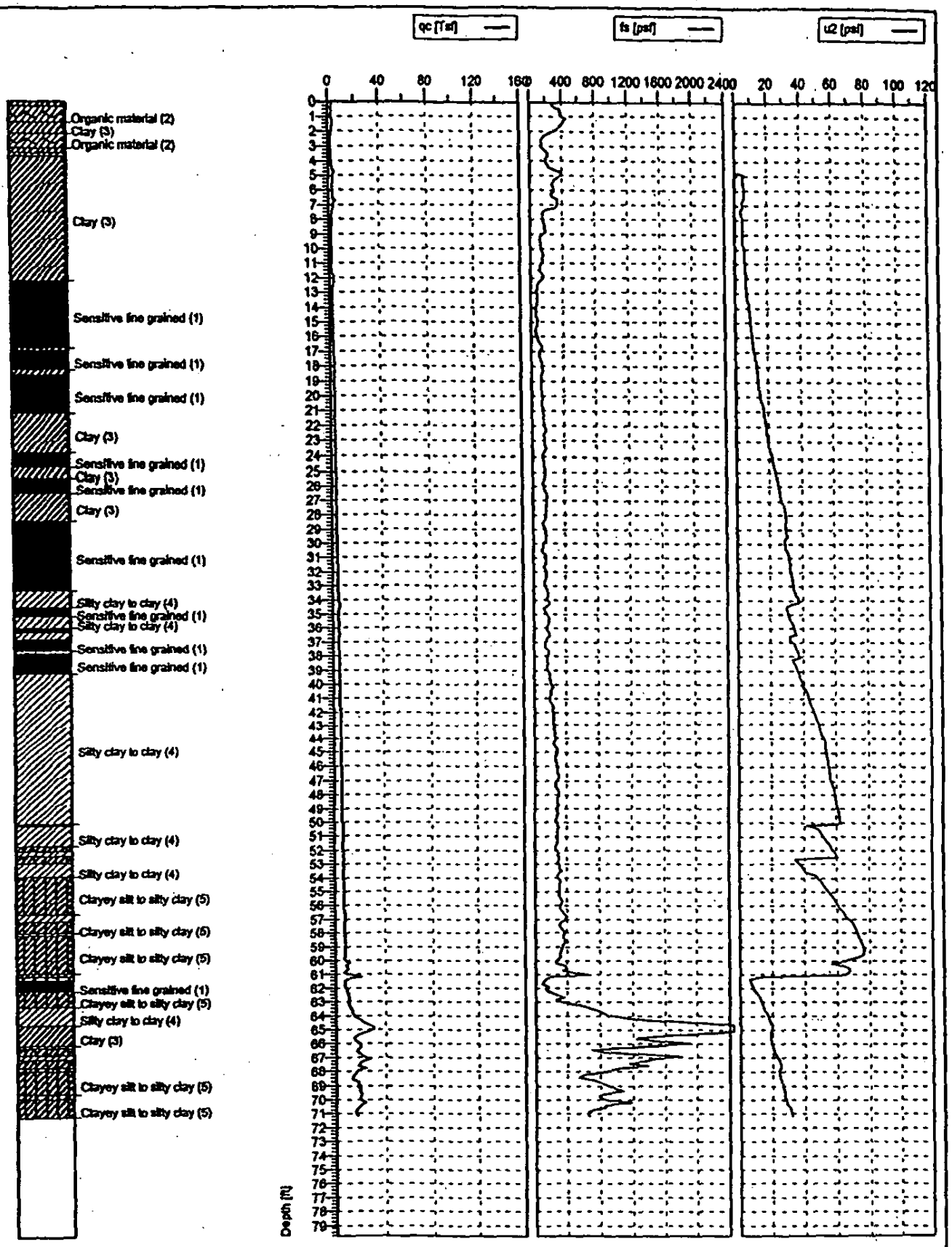
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150





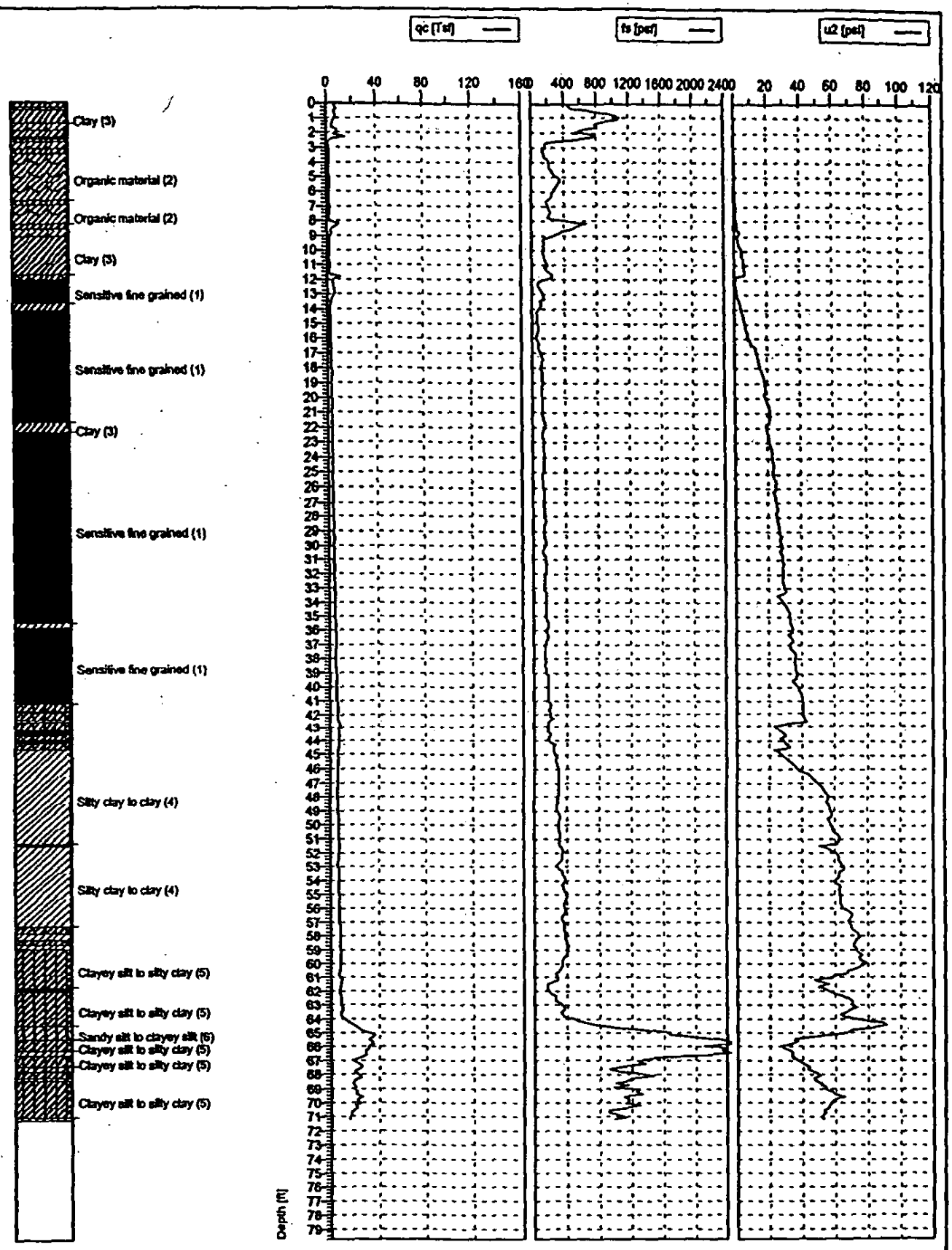
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-2-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-15-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: 220-20.cpd	



Test no: EE-C-3-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-15-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: 220-19.cpd	

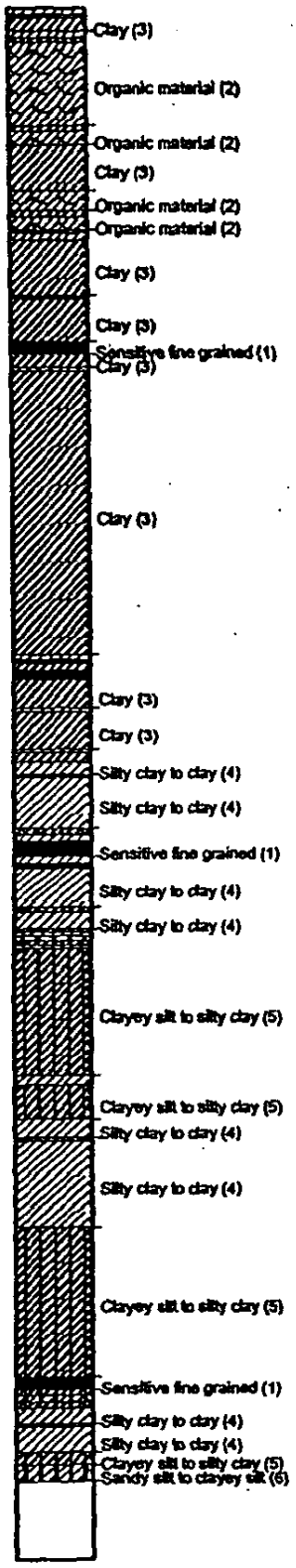
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

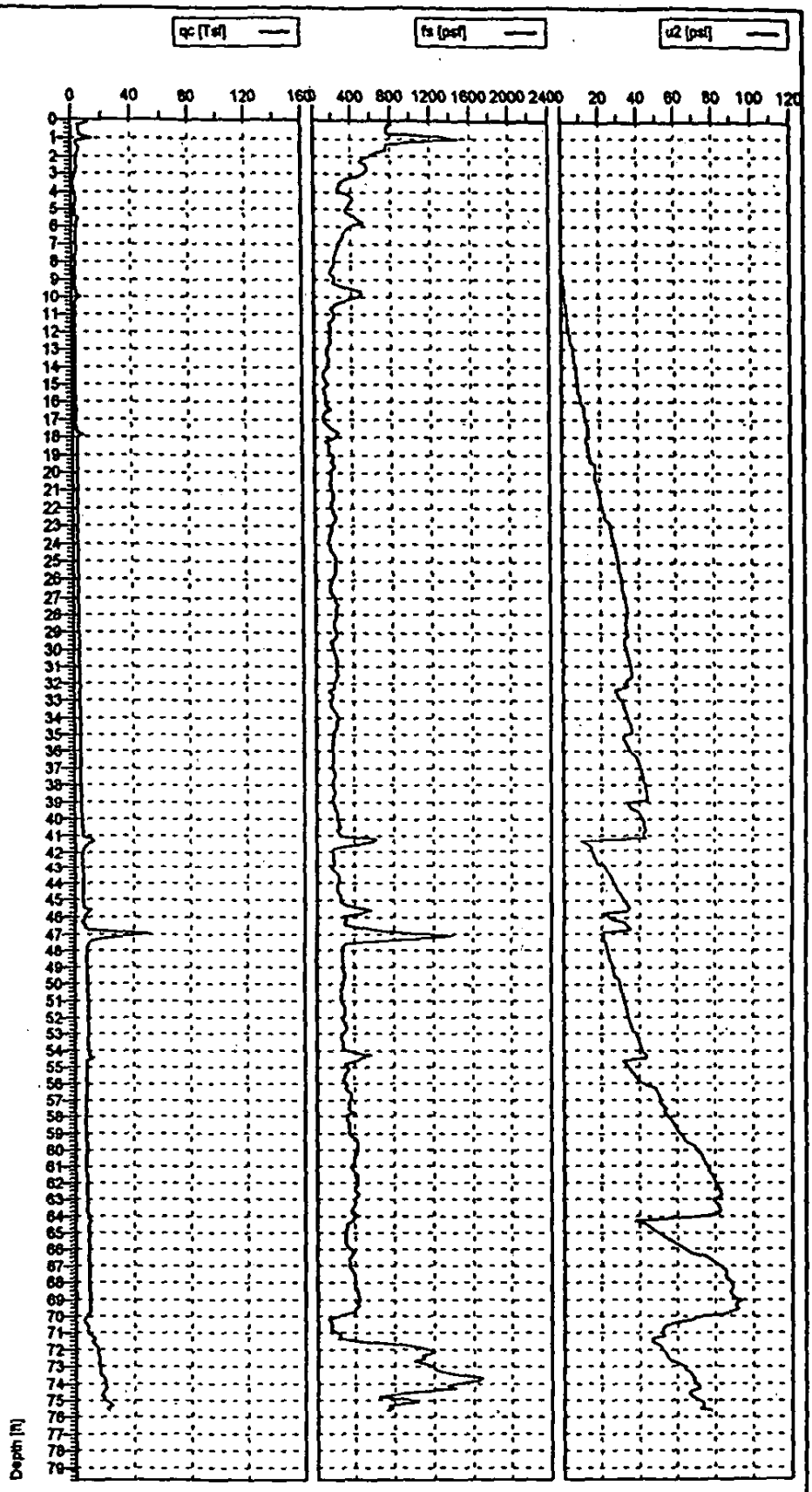


Test no: EE-C-4-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-15-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: 220-22.cpd	

u2

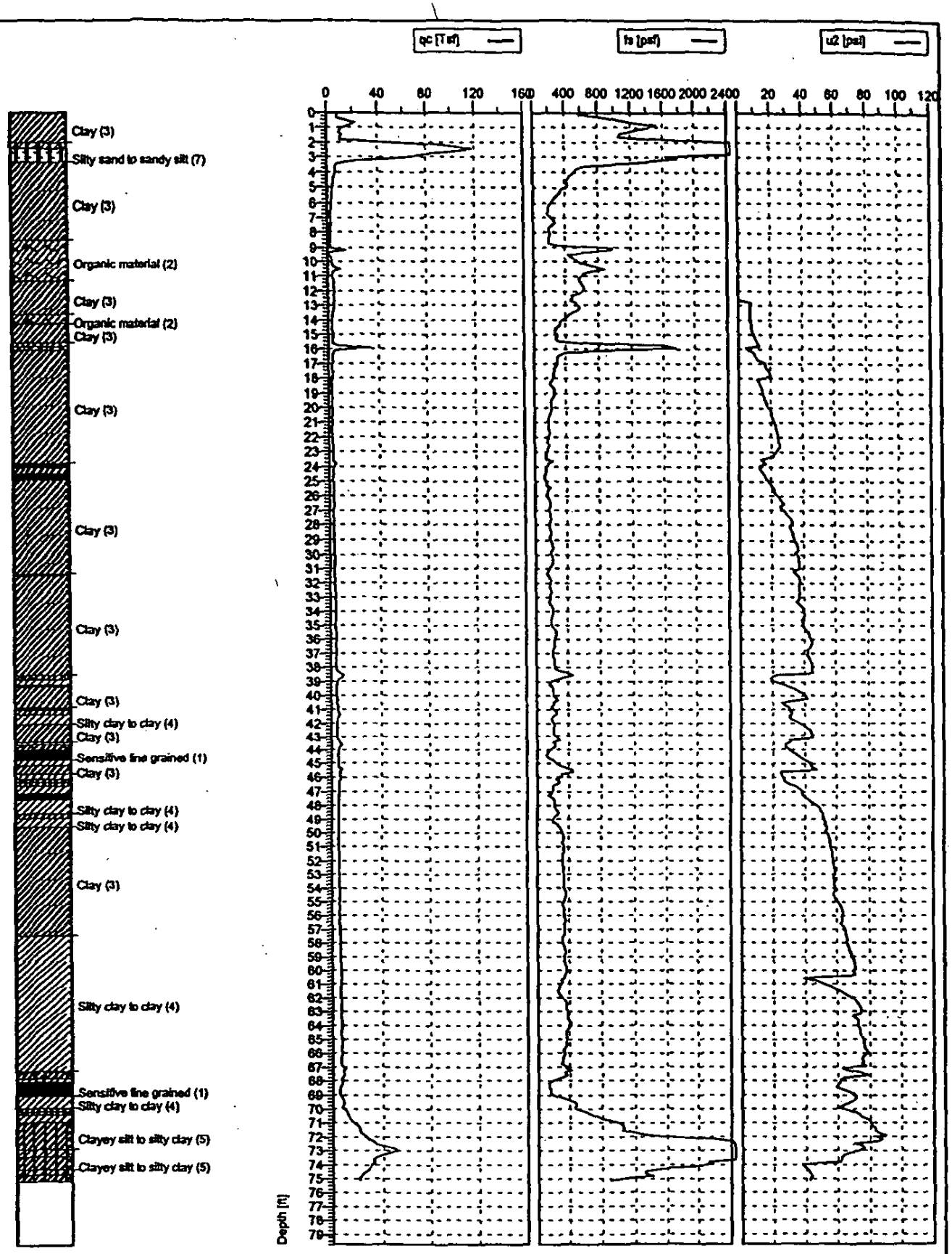
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150





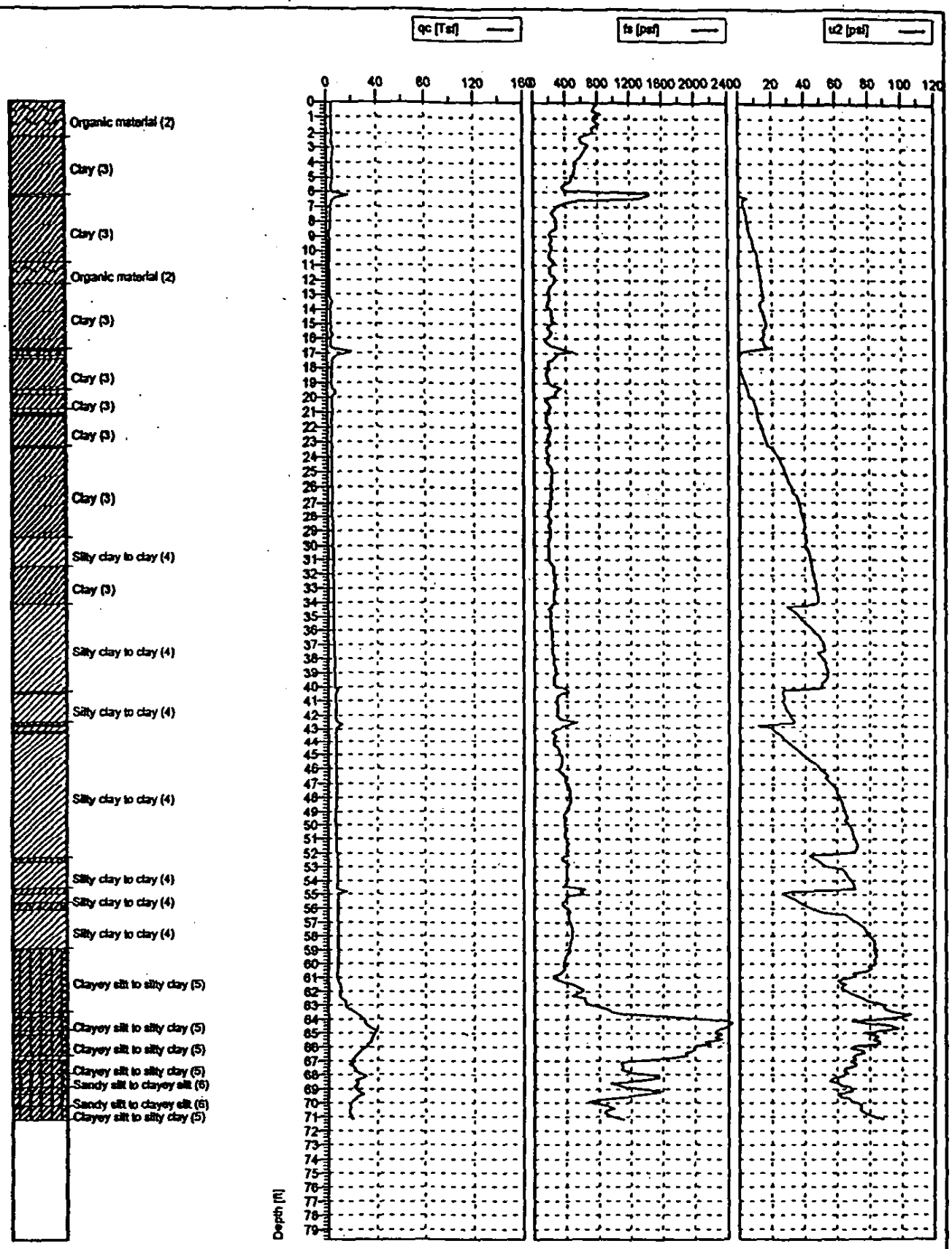
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-7-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-15-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: 220-23.cpd	



Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

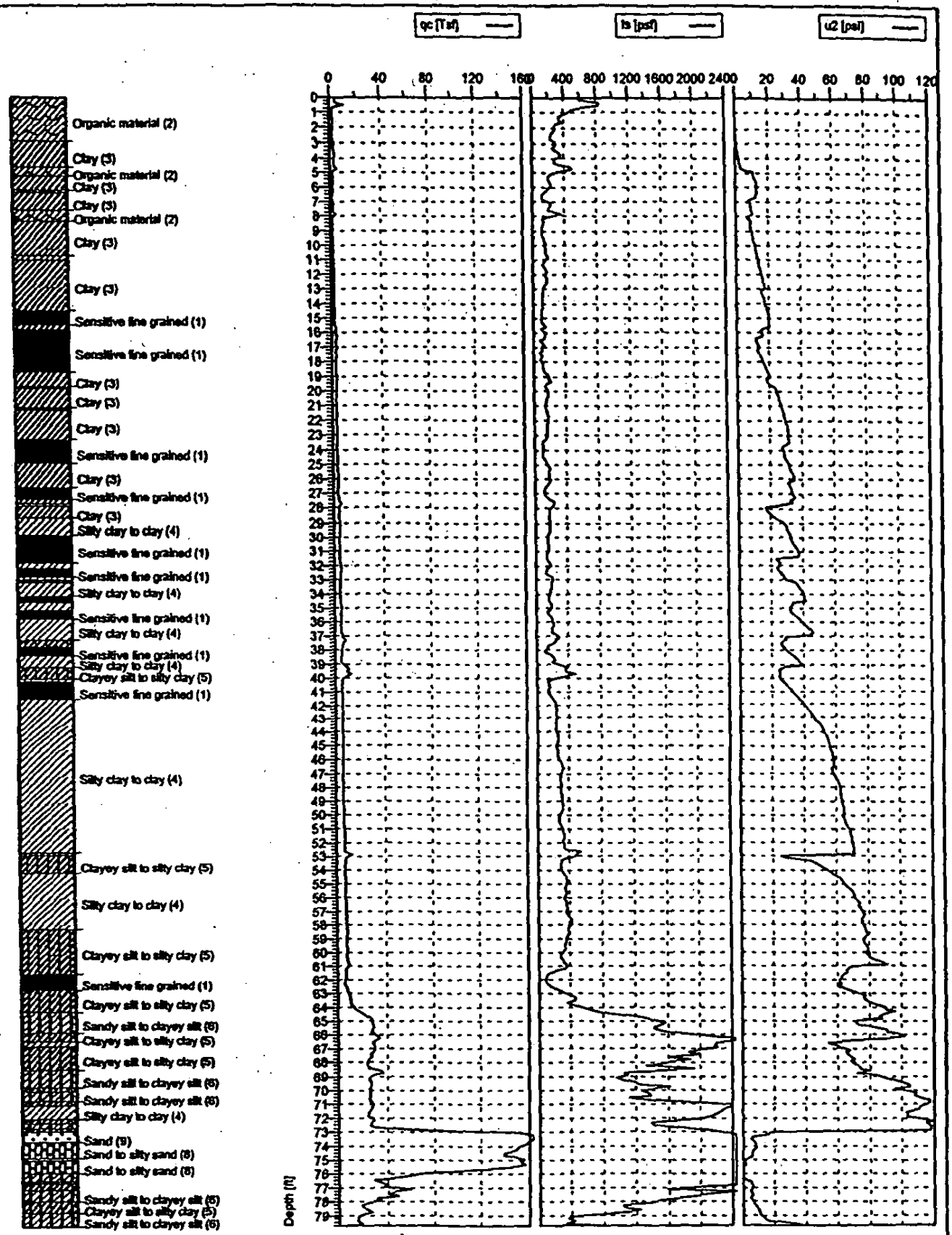
Test no: EE-C-9-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-12-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: 220-01.cpd	



u2

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

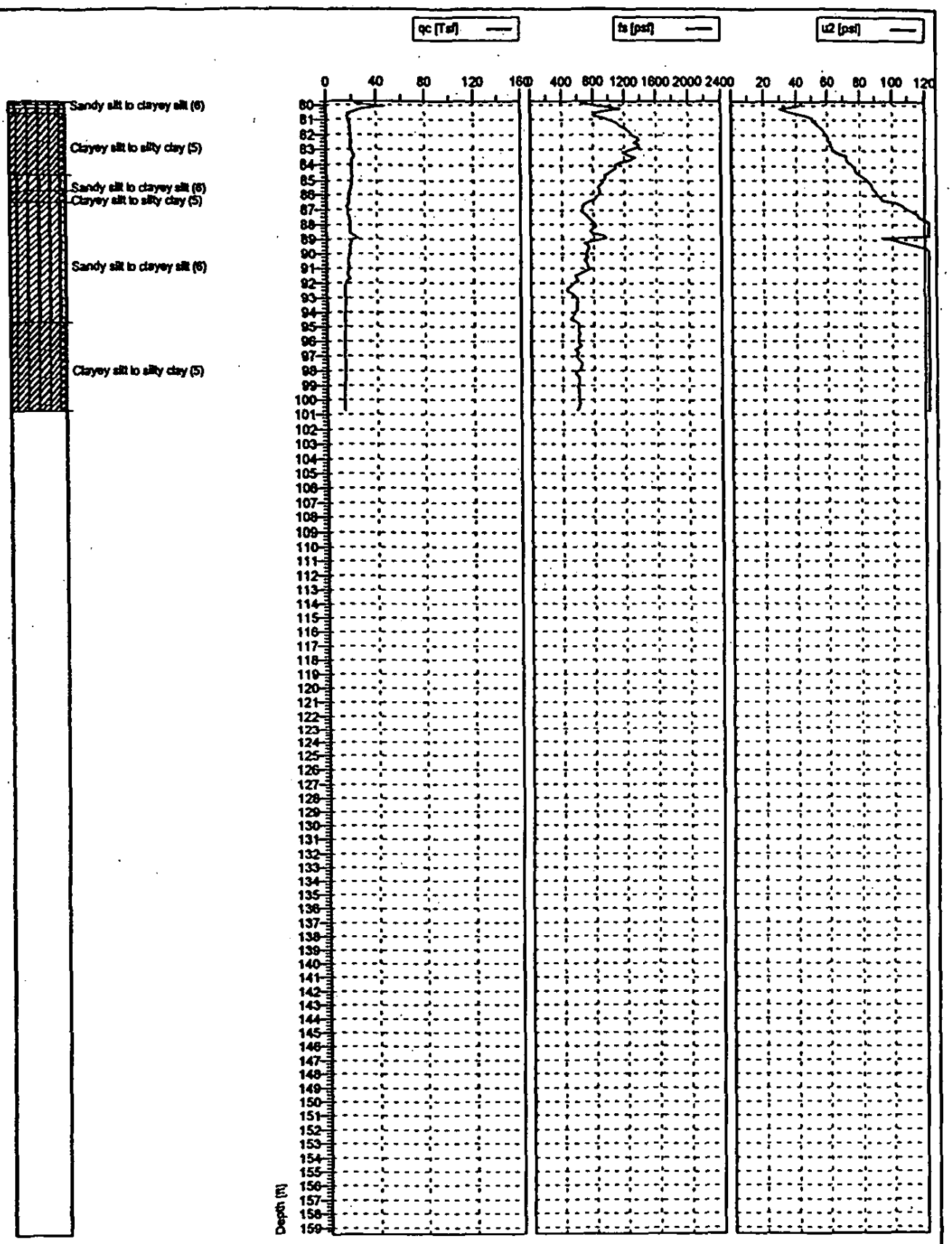
Test no: EE-C-11-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-13-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: 220-02.cpd	



Test no: EE-C-13-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-13-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/2	Fig:
		File: 220-05.cpd	

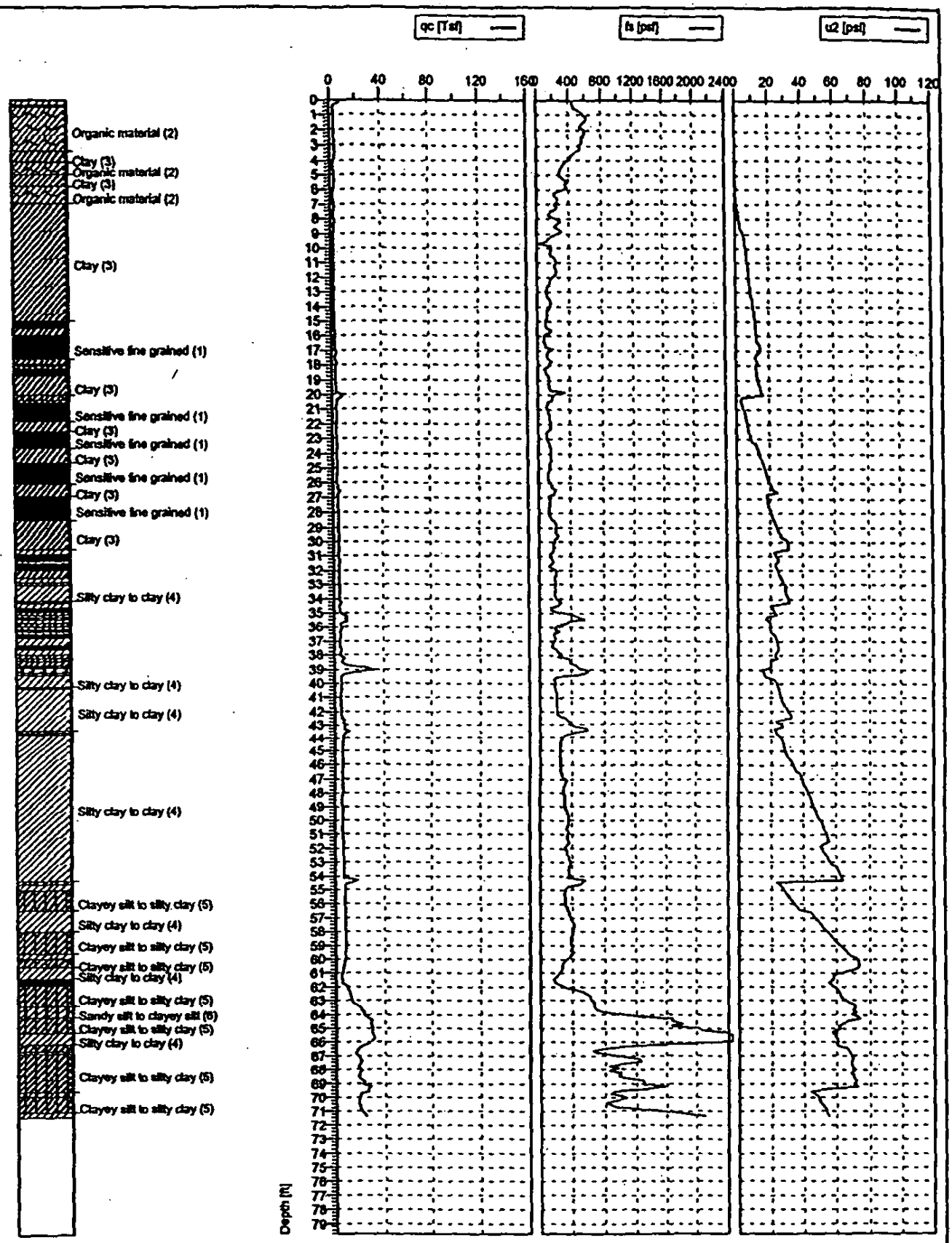
u2

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150



Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

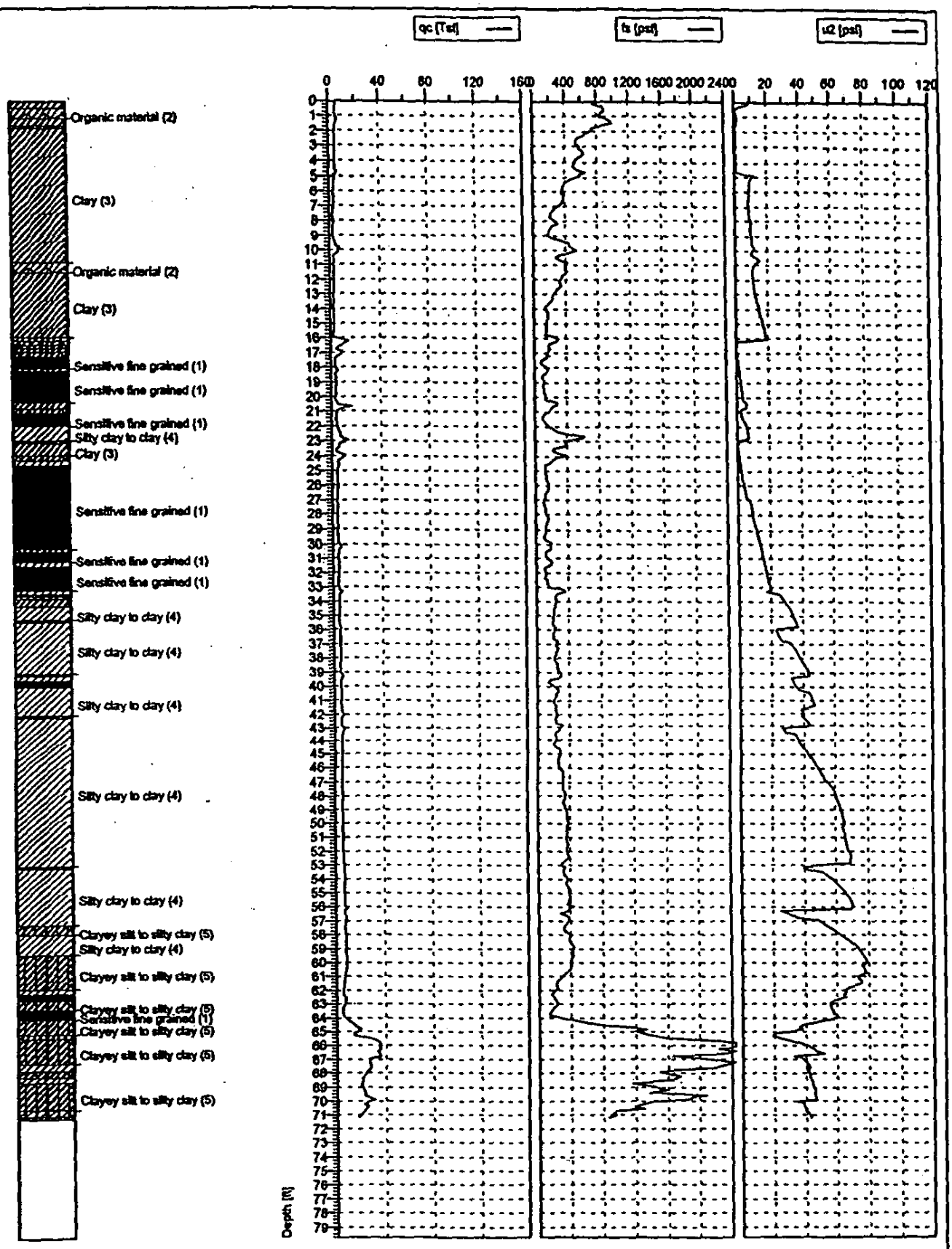
Test no: EE-C-13-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-13-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 2/2	Fig:
		File: 220-05.cpt	



u2

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

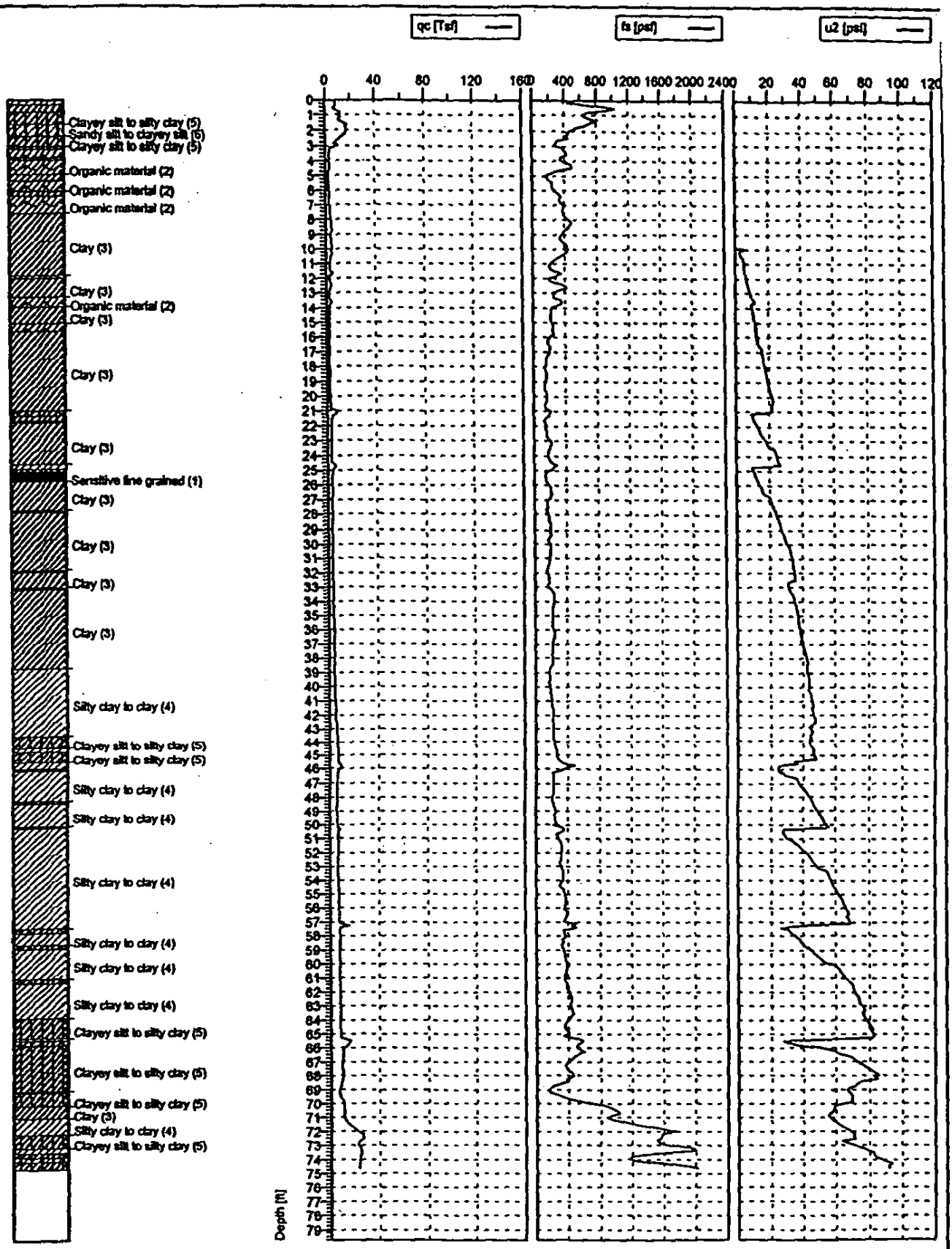
Test no: EE-C-15-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-13-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: 220-04.cpd	



u2

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

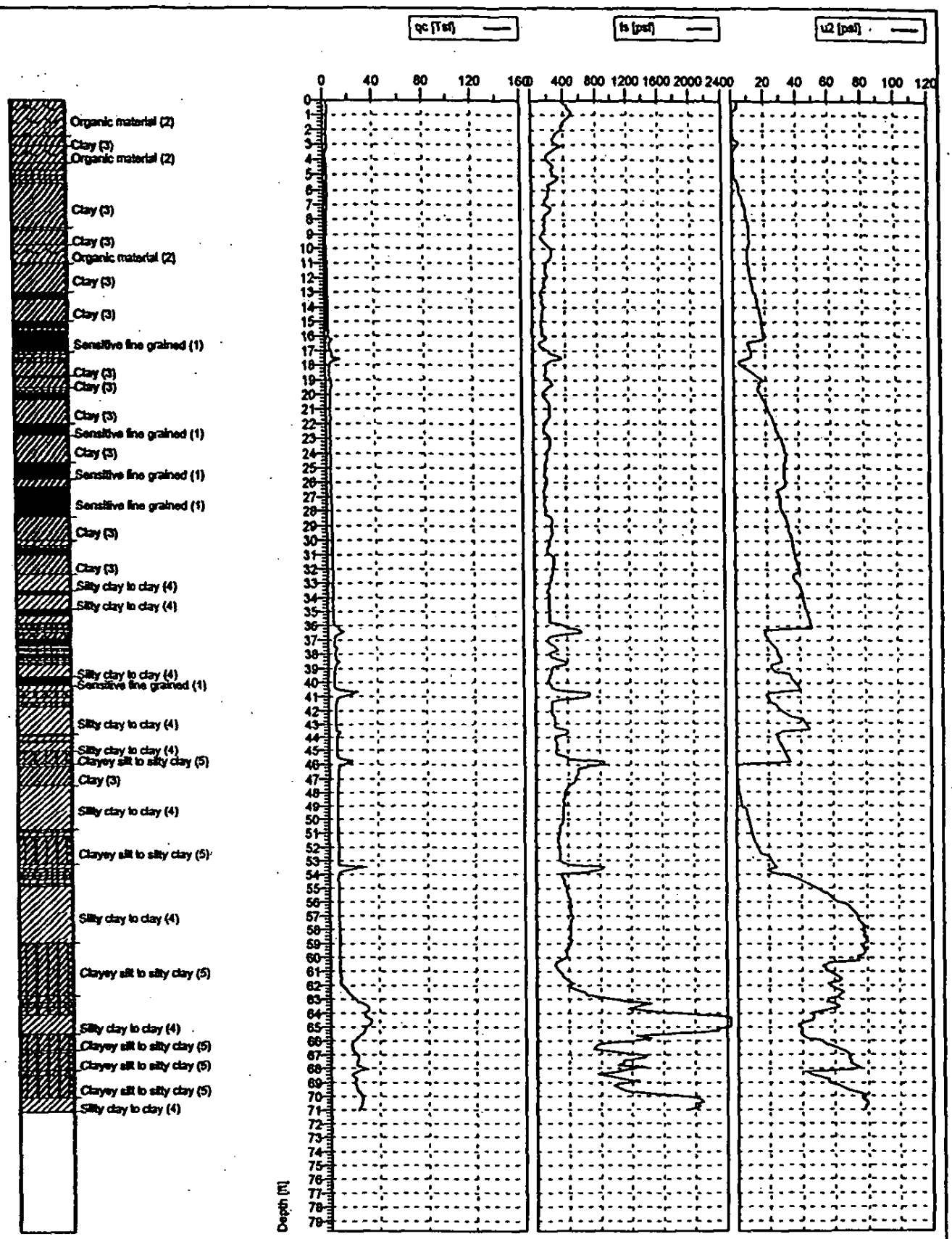
Test no: EE-C-17-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-13-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: 220-03.cpd	



u2

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

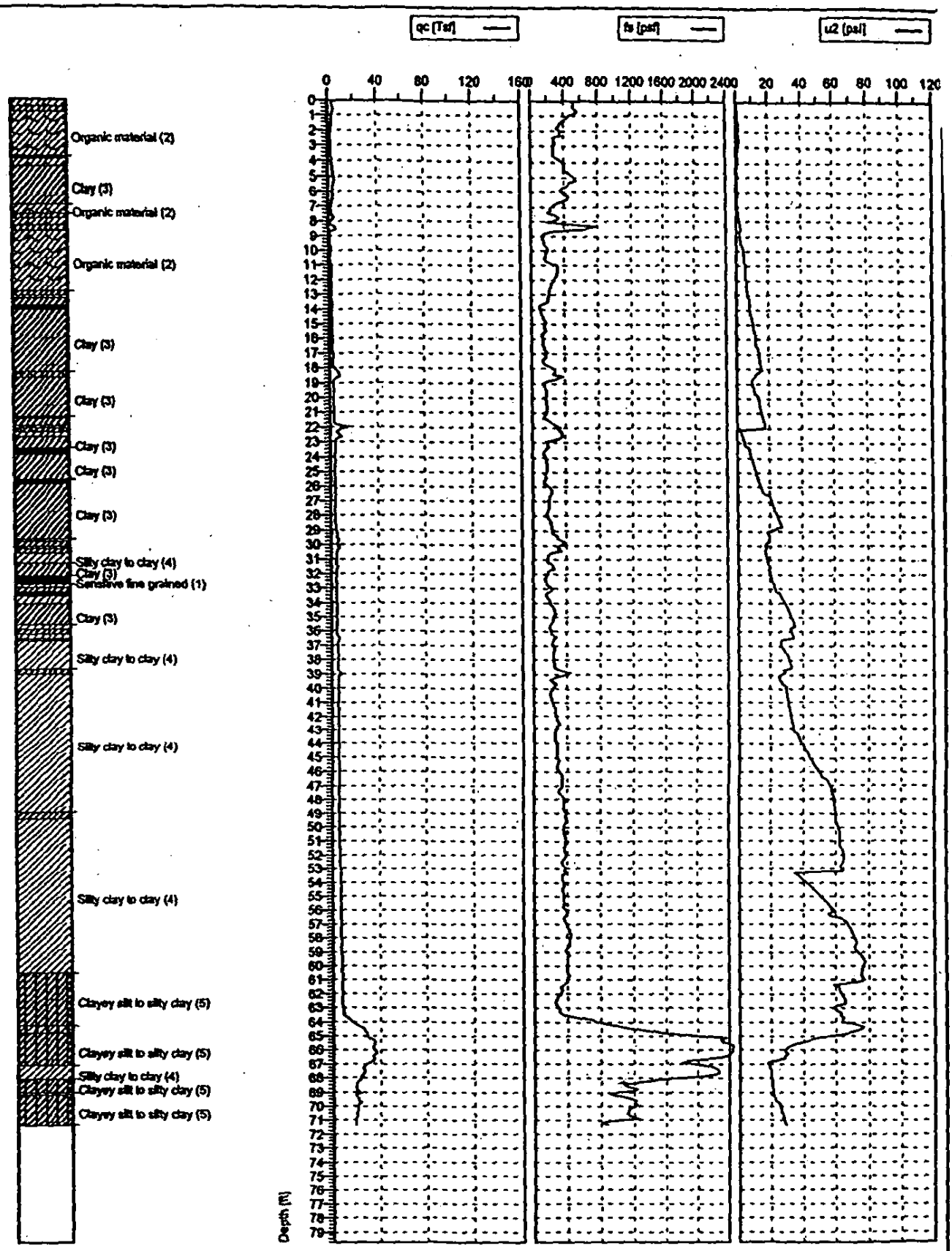
Test no: EE-C-19-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-13-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: 220-06.cpd	



u2

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

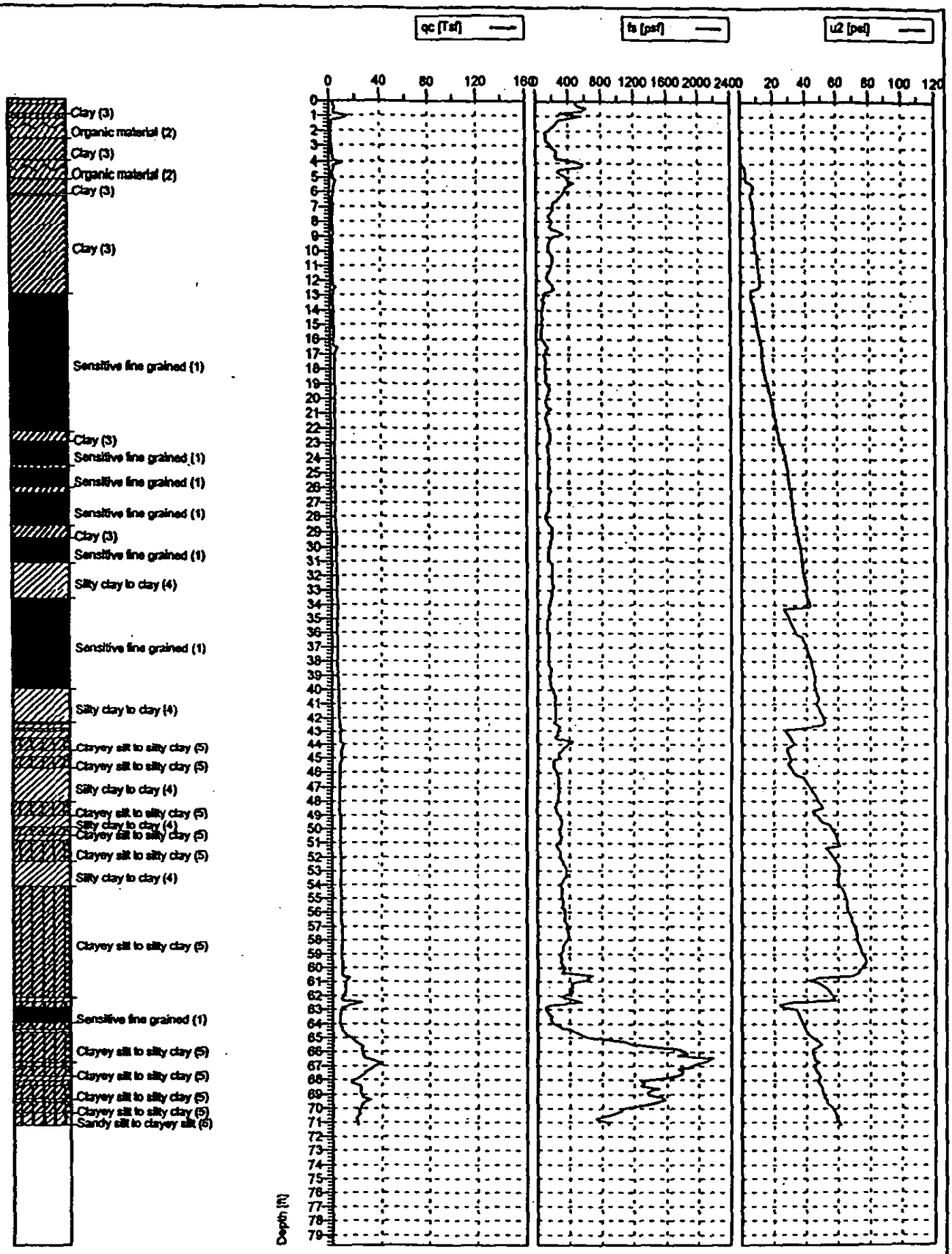
Test no: EE-C-21-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-13-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: 220-07.cpd	



u2

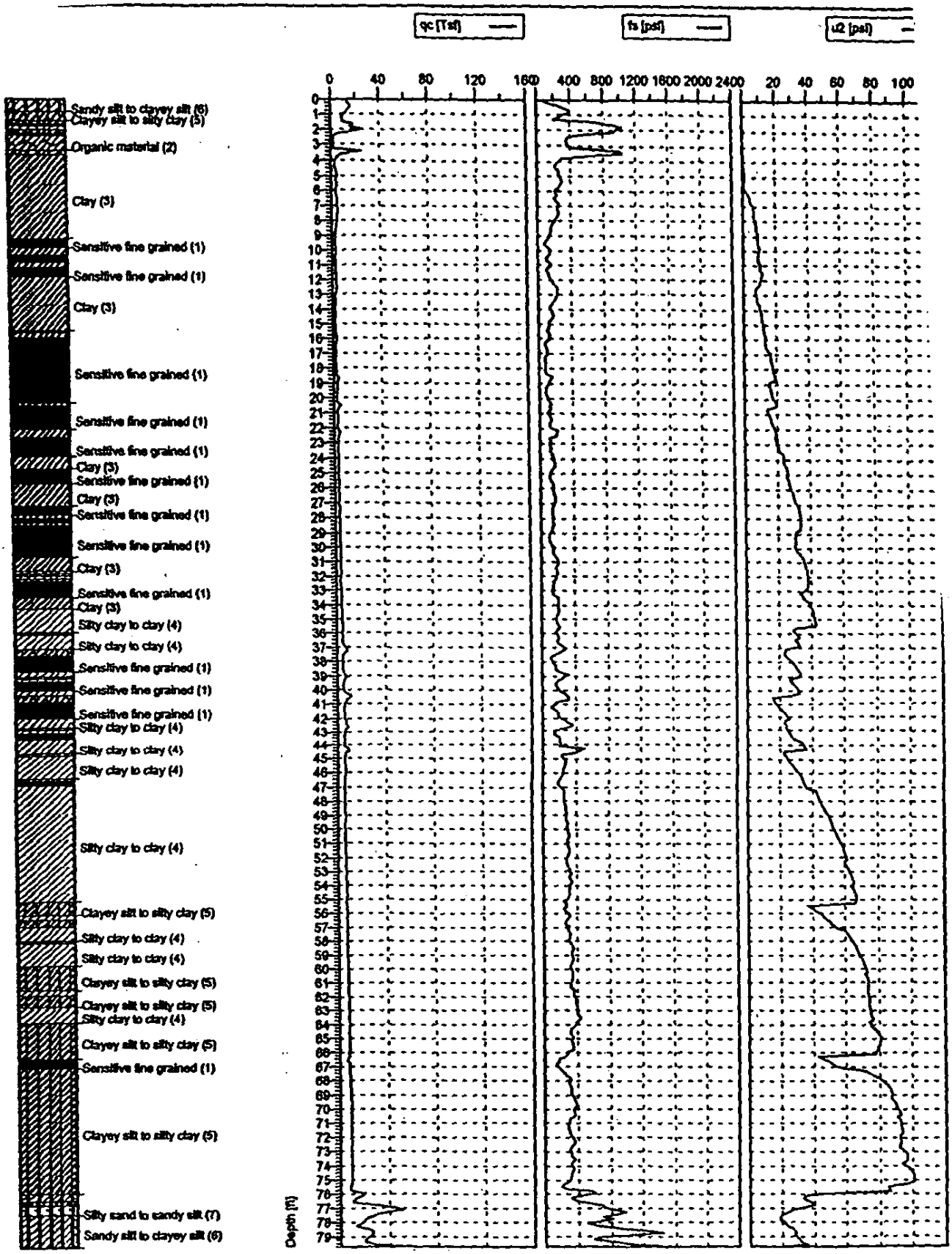
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-23-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-13-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: 220-08.cpt	



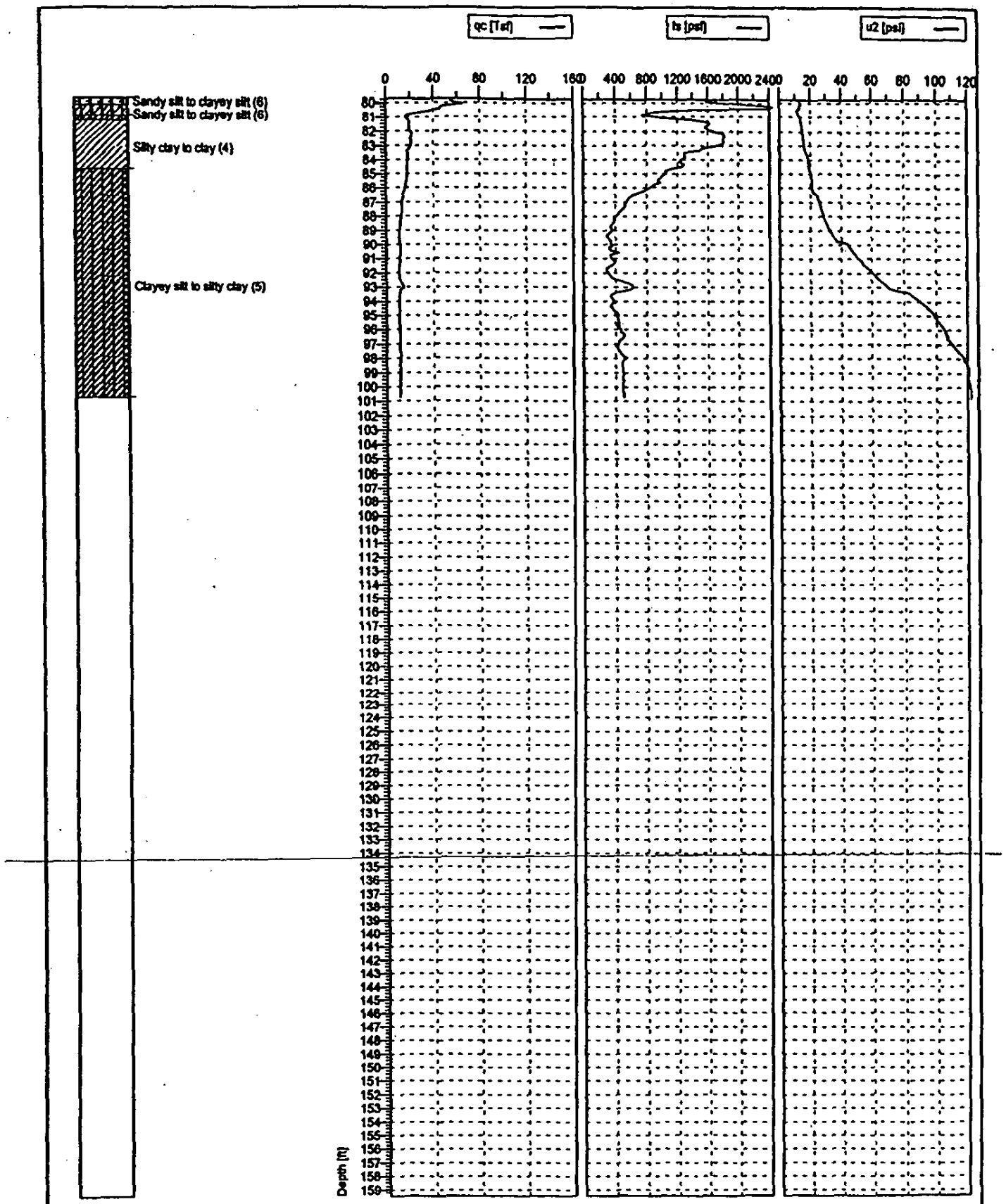
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-25-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-16-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: 220-25.cpd	



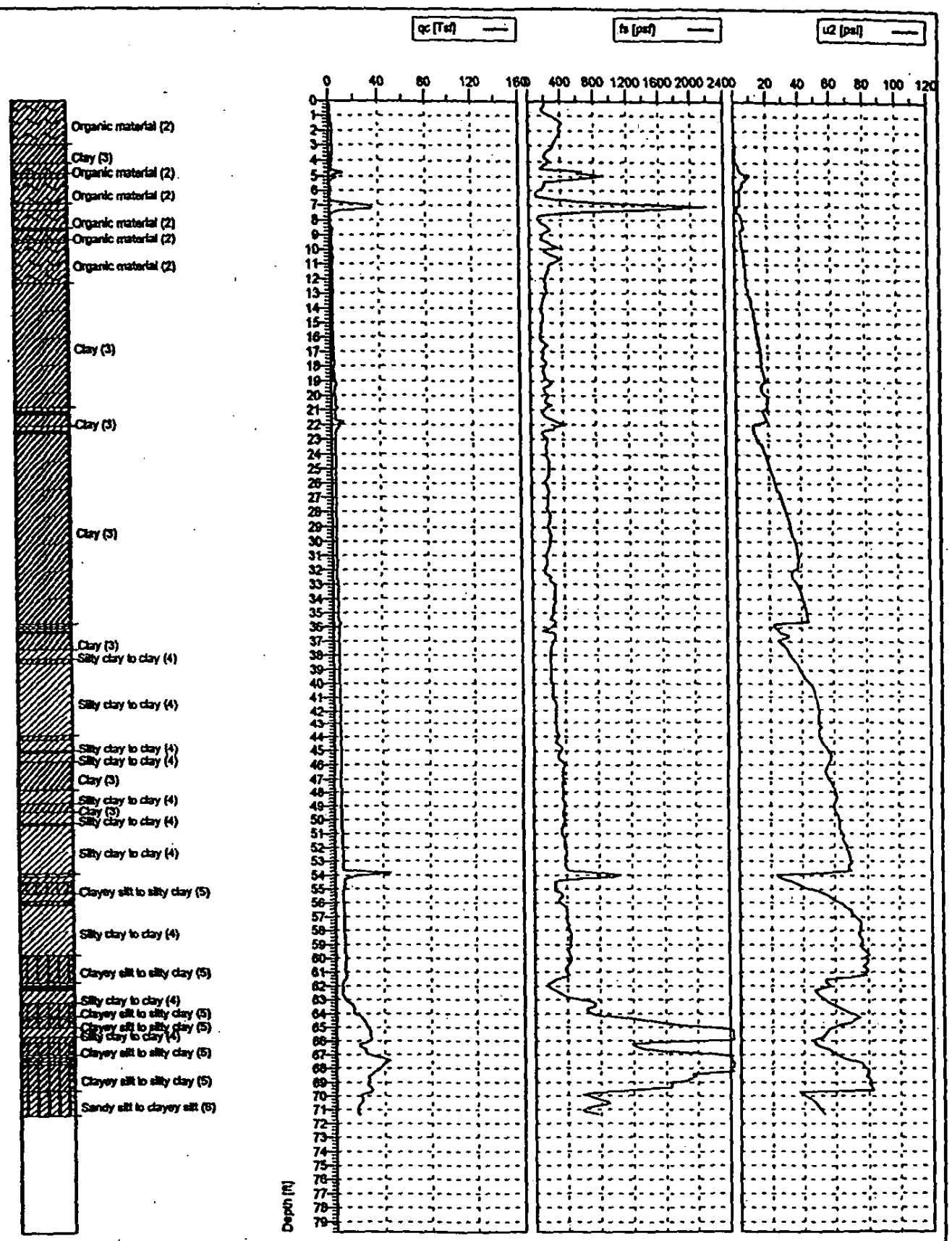
Cone No: 7027C
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-27-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-16-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/2	Fig:
		File: 220-24.cpd	



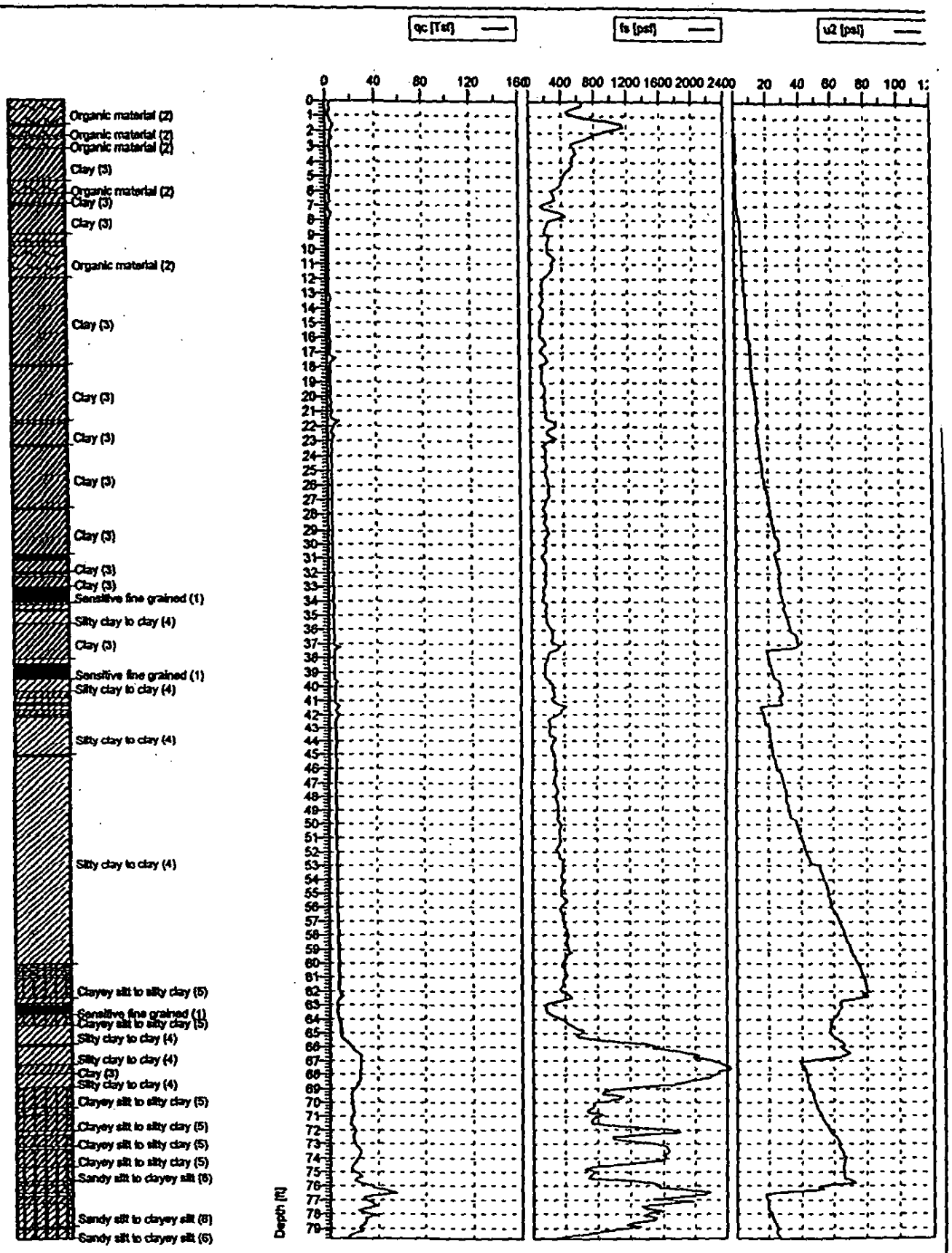
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-27-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-16-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 2/2	Fig:
		File: 220-24.cpd	



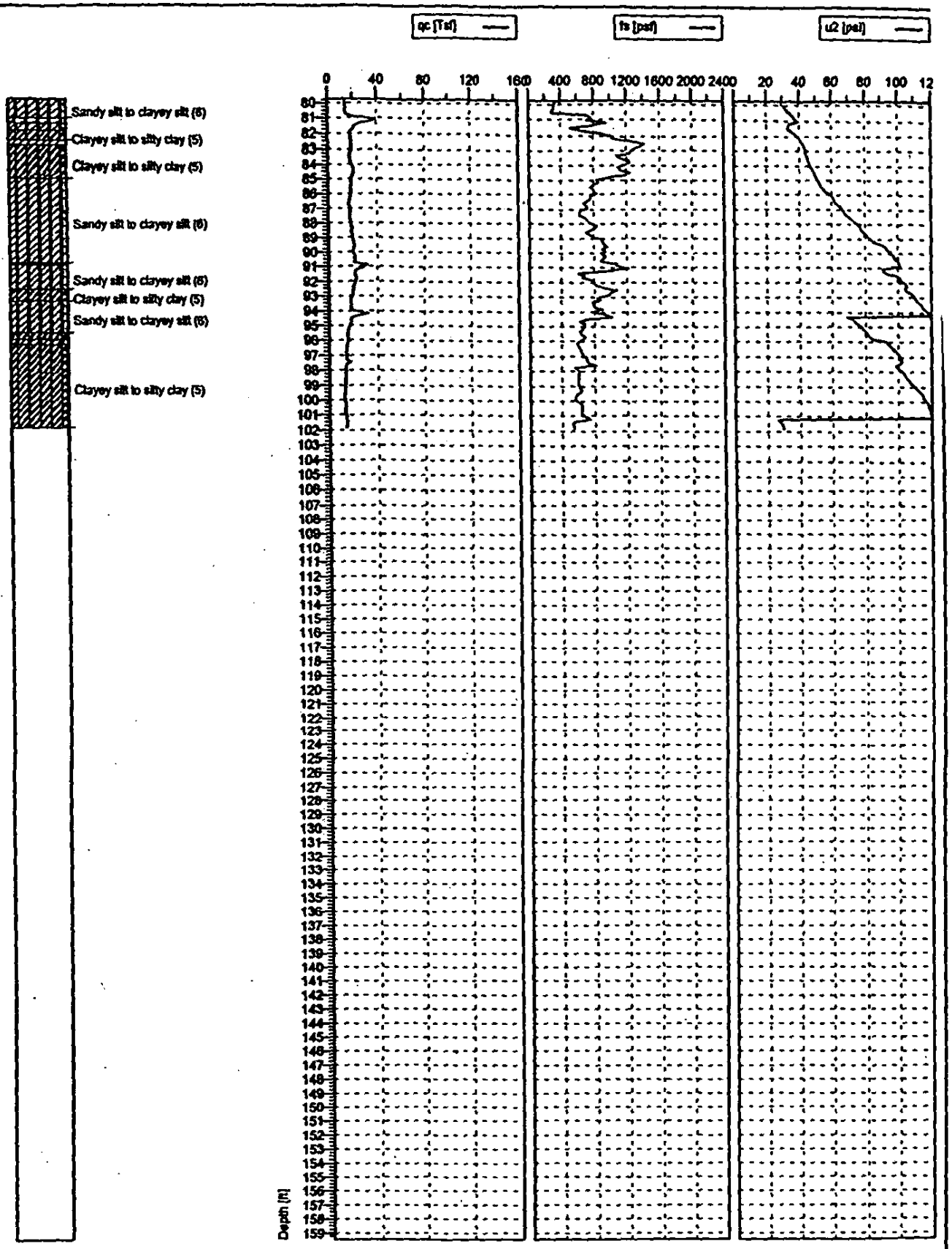
Test no: EE-C-29-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-14-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: 220-09.cpd	

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150



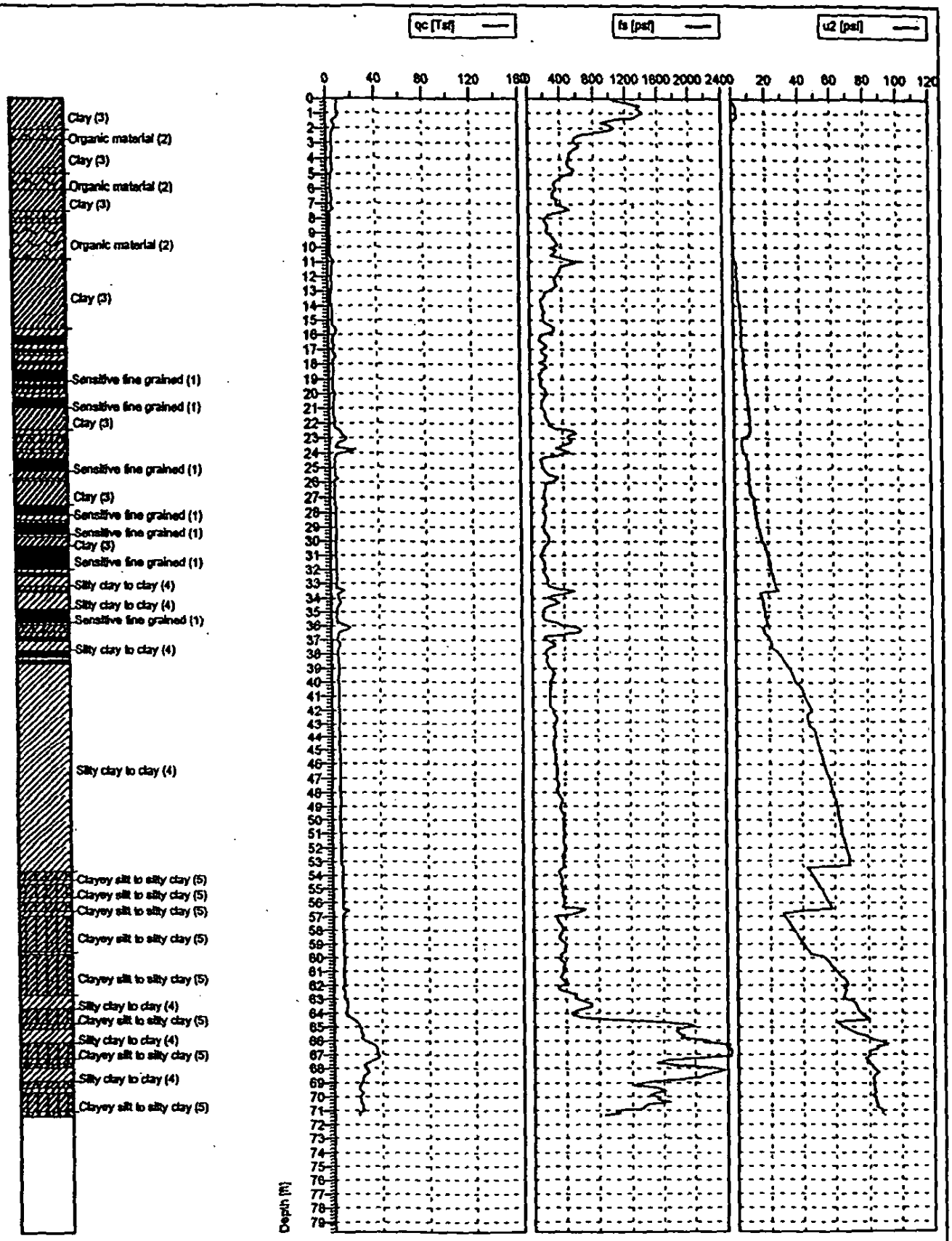
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-31-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-14-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/2	Fig:
		File: 220-10.cpd	



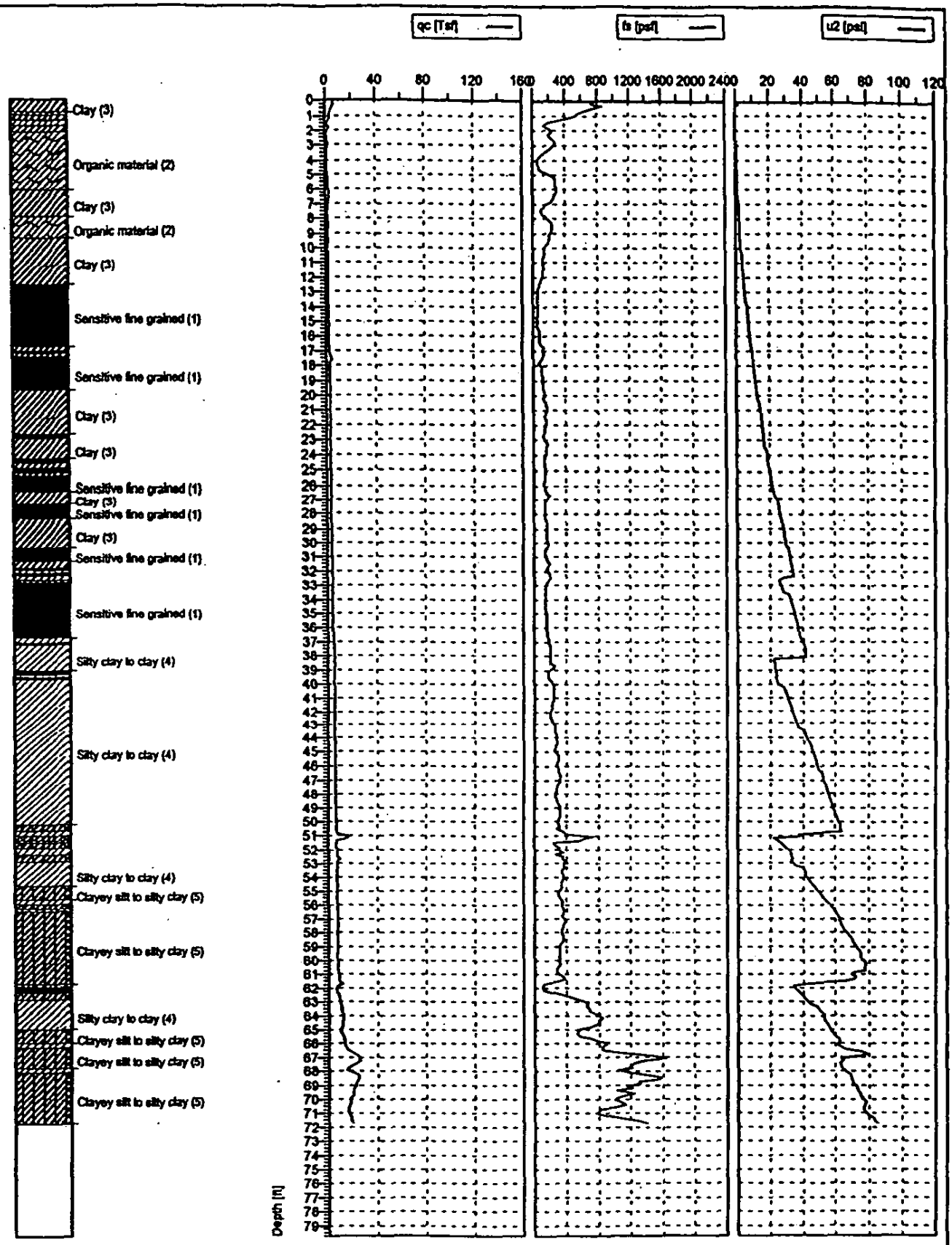
Test no: EE-C-31-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-14-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 2/2	Fig:
		File: 220-10.cpd	

Cone No: 7027C
Tip area [cm2]: 10
Sleeve area [cm2]: 150



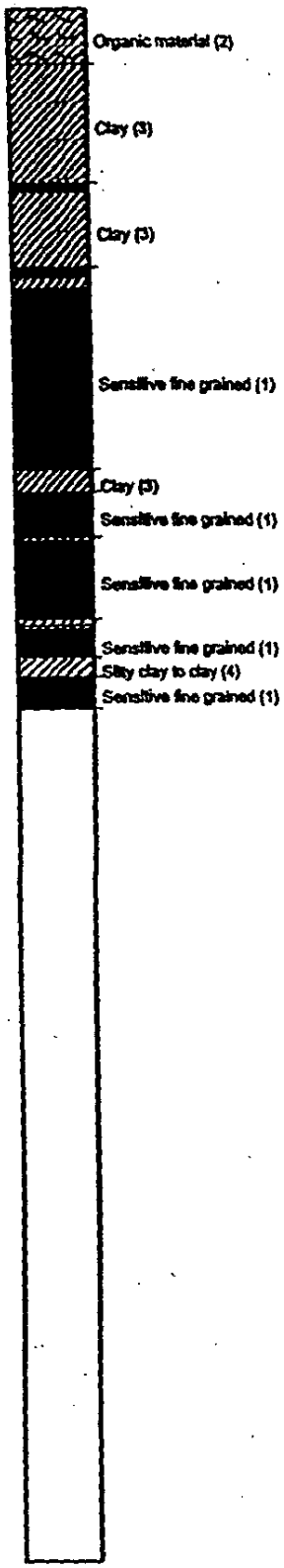
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

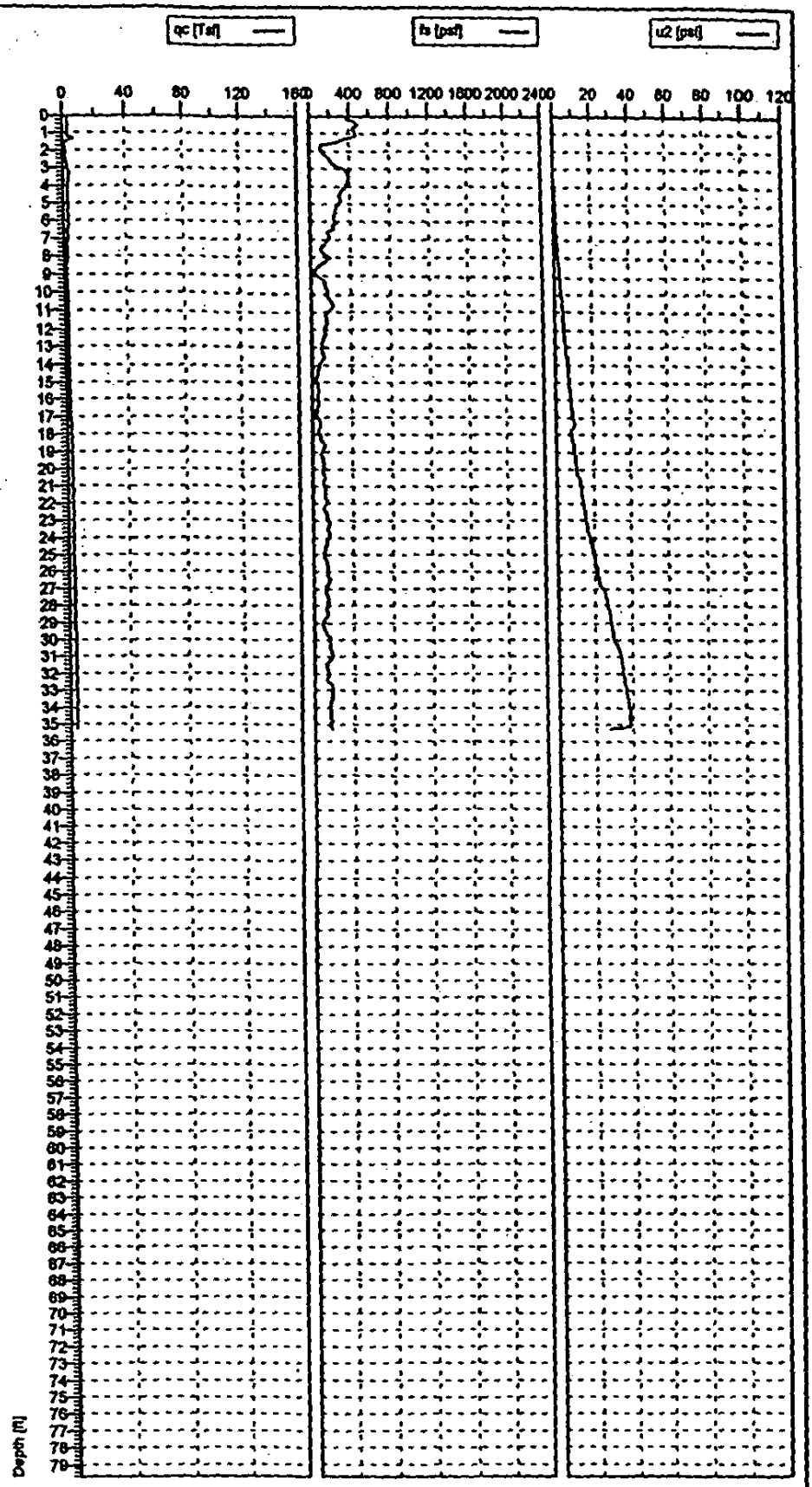
Test no: EE-C-33-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-14-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: 220-11.cpd	



Test no: EE-C-35-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-15-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: 220-18.cpd	

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150





Test no: EE-C-37-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-15-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
TERMINATED DUE TO EXCESSIVE INCLINATION AT 35 FE		File: 220-17.cpd	

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 17543 **Date Drilled:** 12/02/02 **Boring:** EE-C-75-02 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	S P L R	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
50					Soft clay	CH													
60																			
					Loose clayey silt	ML													
					Medium stiff silty clay	CL													
70																			
					Soft to medium stiff silty clay	CL													
					Very stiff silty clay	CL													
80					Loose to medium dense clayey silt	ML													
90																			
100																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

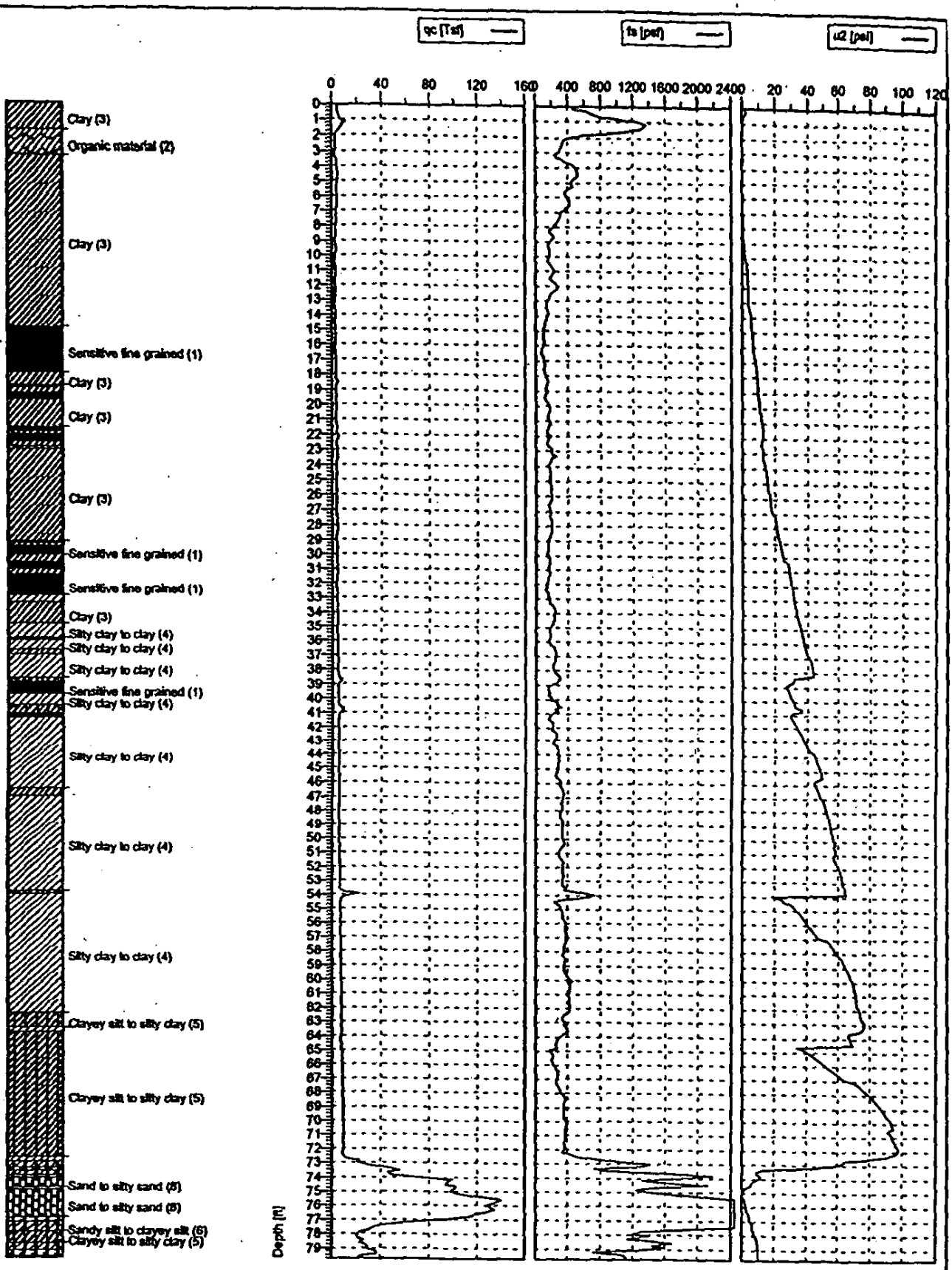
RIVER BIRCH LANDFILL
WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

(Sheet 1 of 2)

Ground Elev.: Datum: Gr. Water Depth: Job No.: 17543 Date Drilled: 11/27/02 Boring: EE-C-76-02 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth in Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Dense silty sand	SM													
					Medium stiff clay w/wood	CH													
					Soft clay w/wood	CH													
10																			
					Very soft clay w/wood	CH													
20					Soft clay	CH													
30																			
40																			
50																			

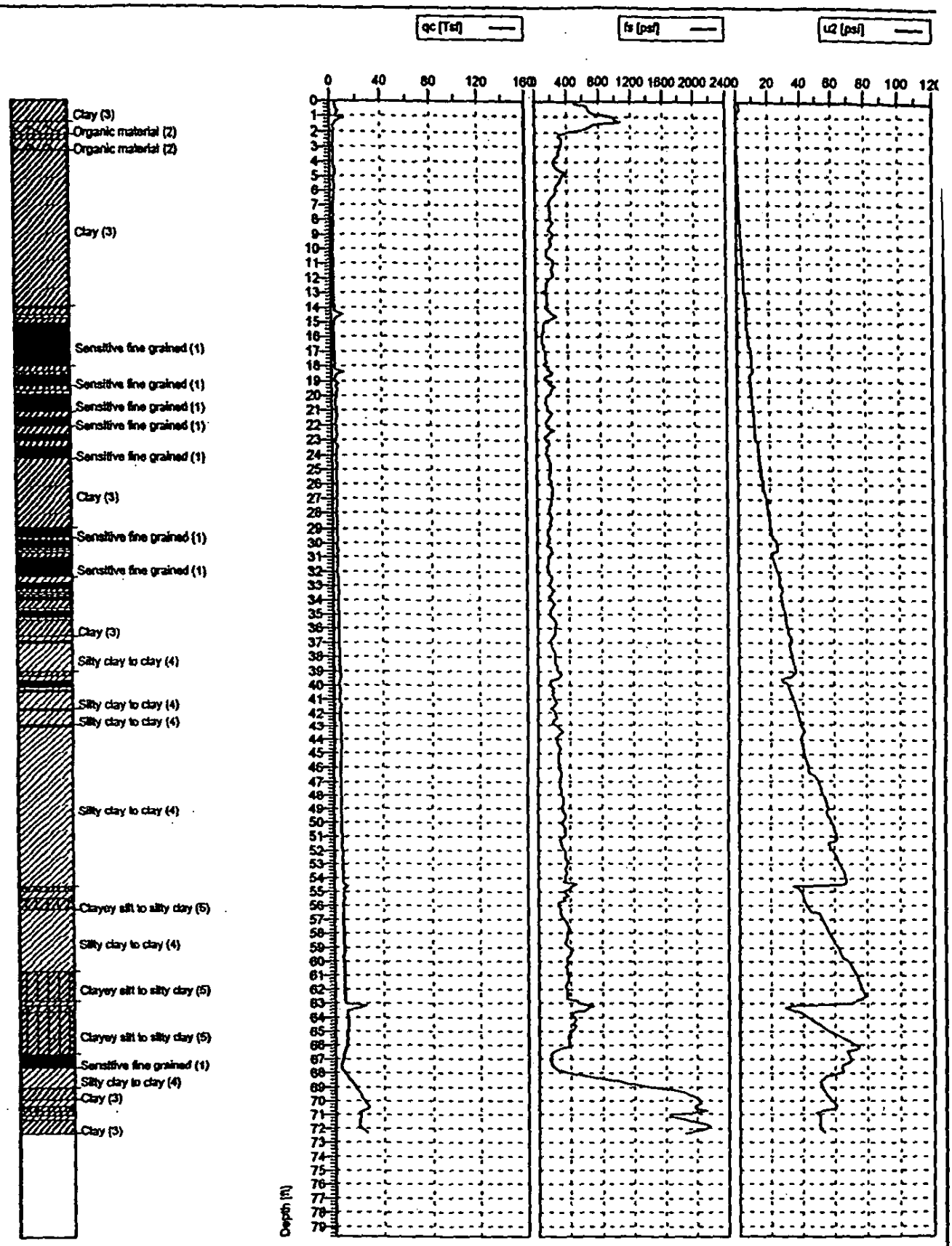
Comments:



u2

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

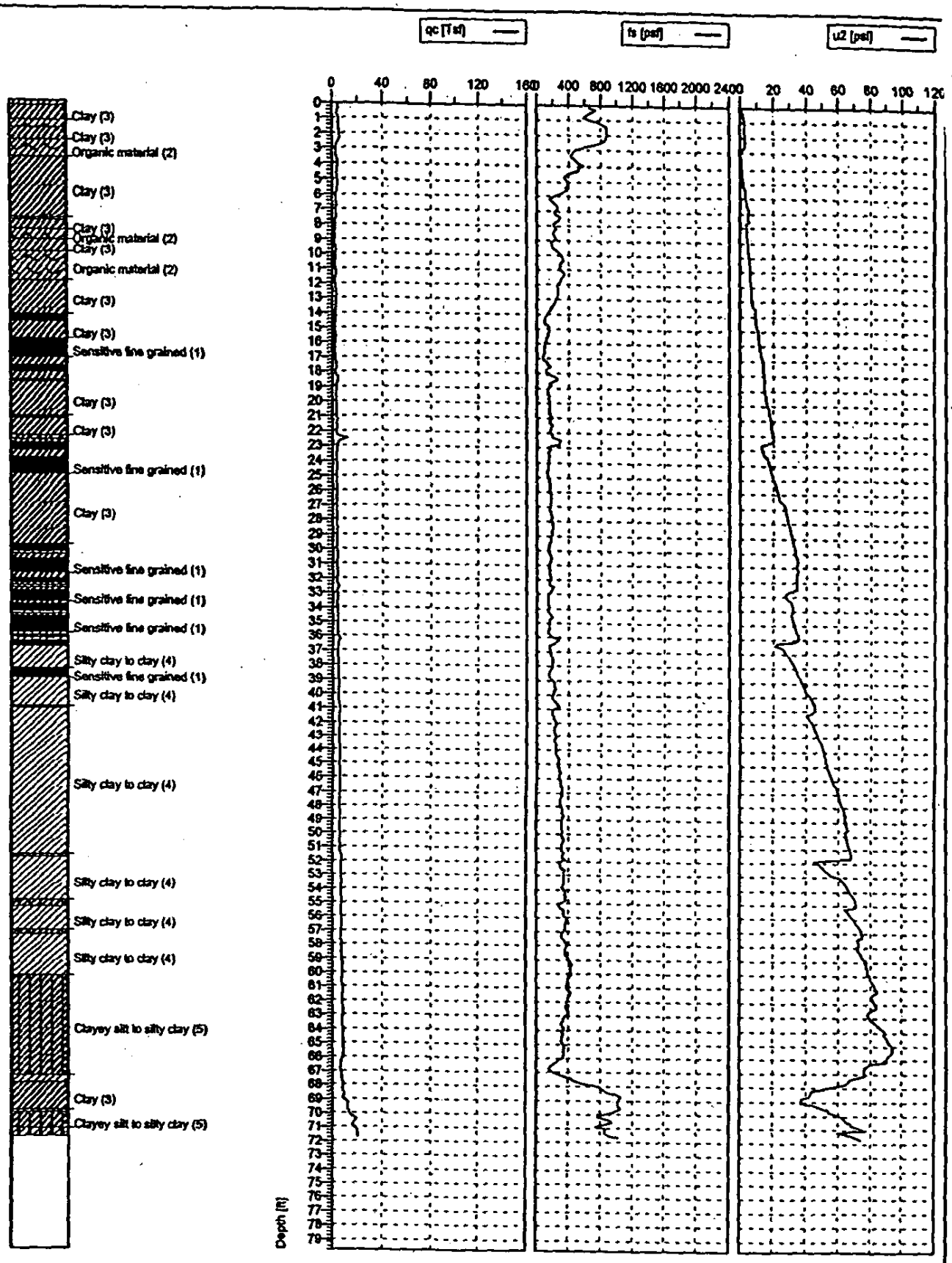
Test no: EE-C-39-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-15-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: 220-16.cpd	



Test no: EE-C-41-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-14-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: 220-15.cpd	

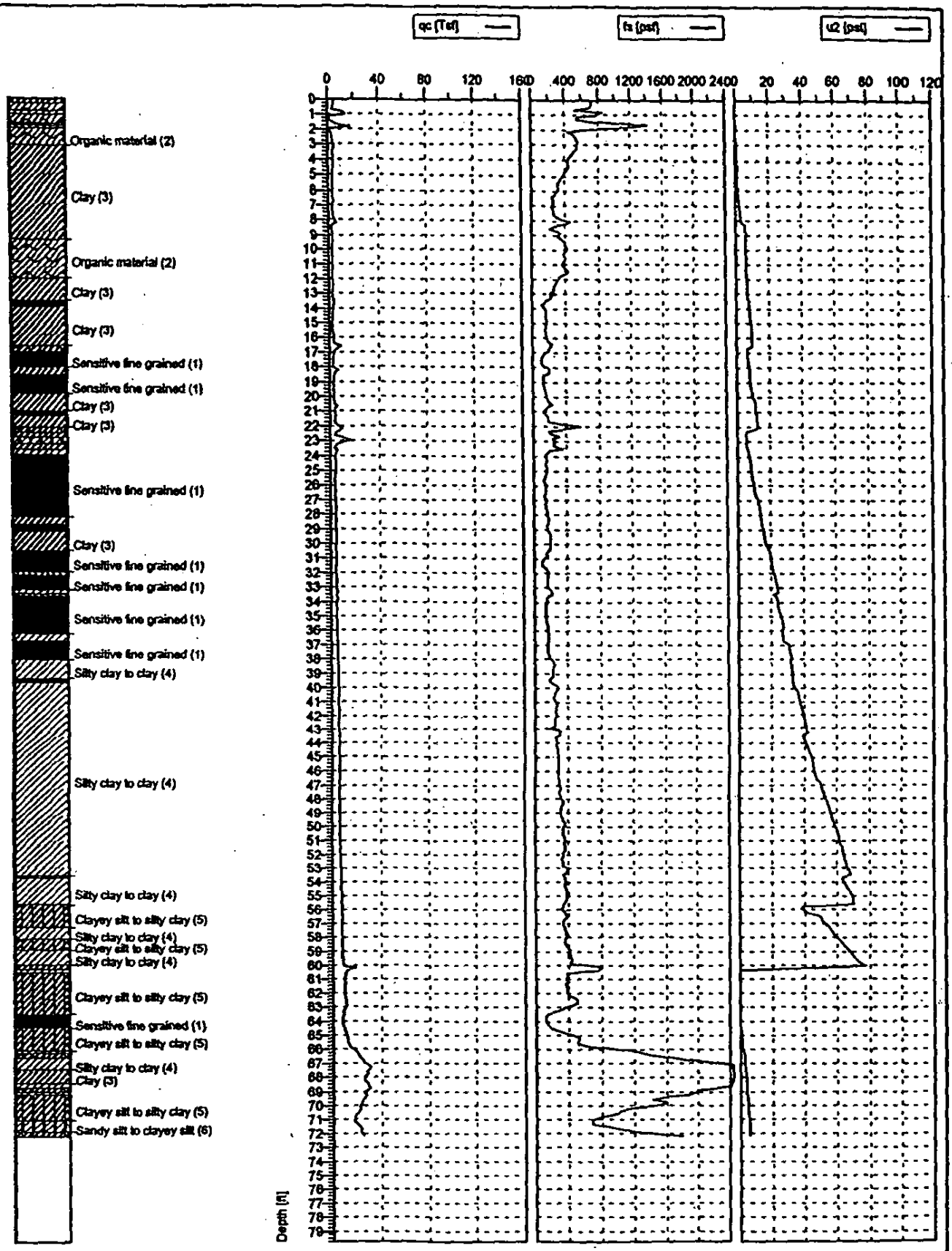
u2

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150



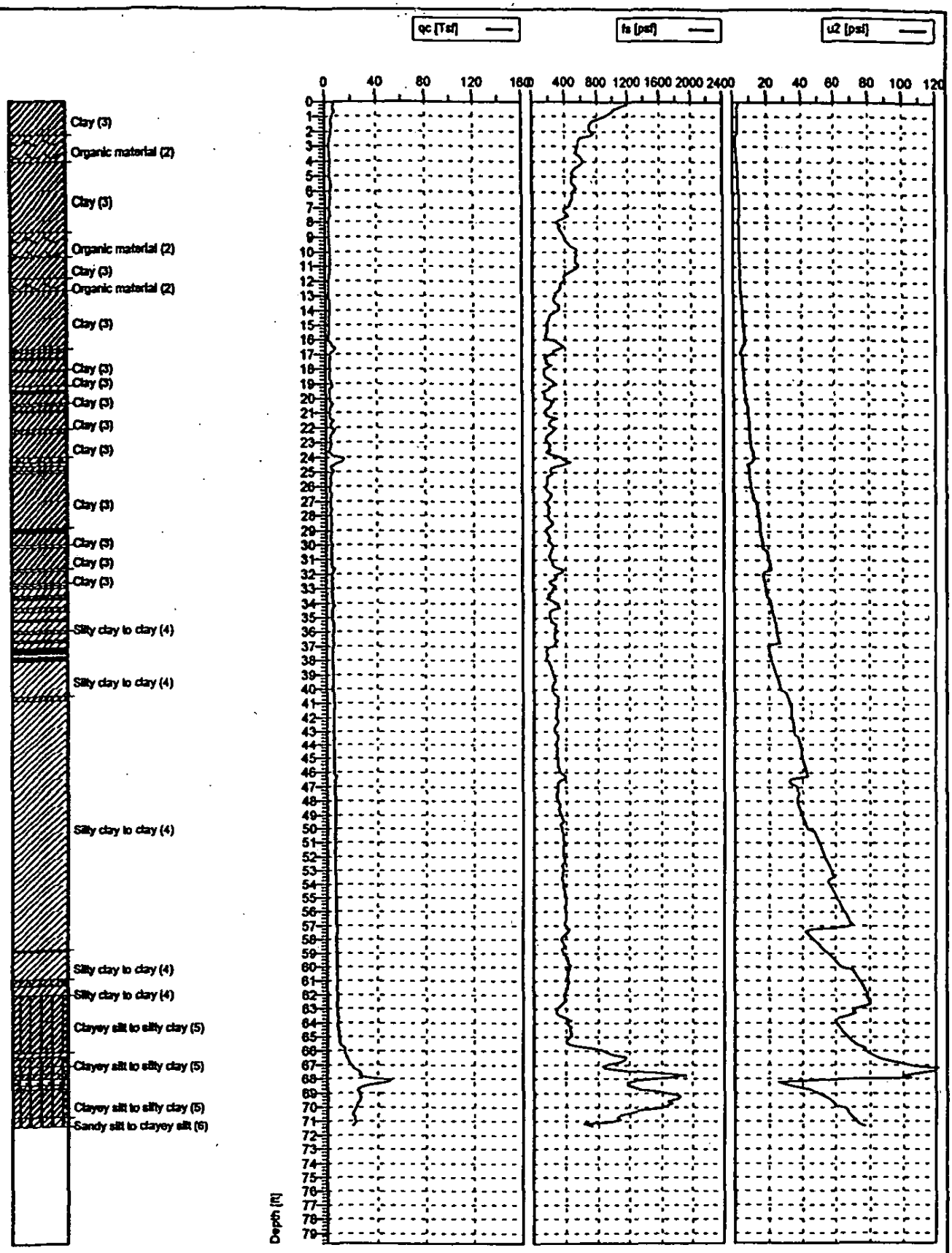
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-43-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-14-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: 220-14.cpd	



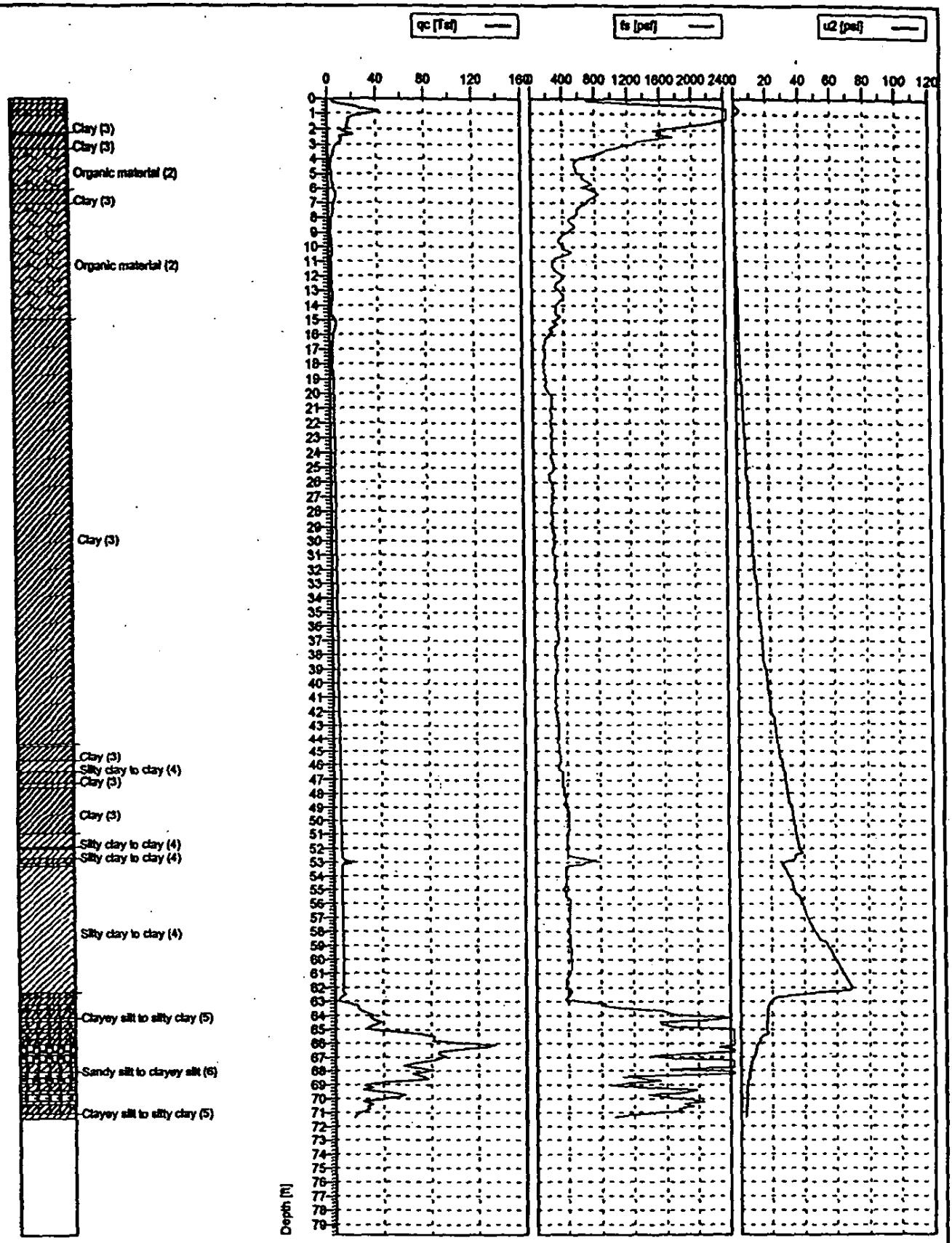
Test no: EE-C-44-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-14-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: 220-13.cpd	

Core No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150



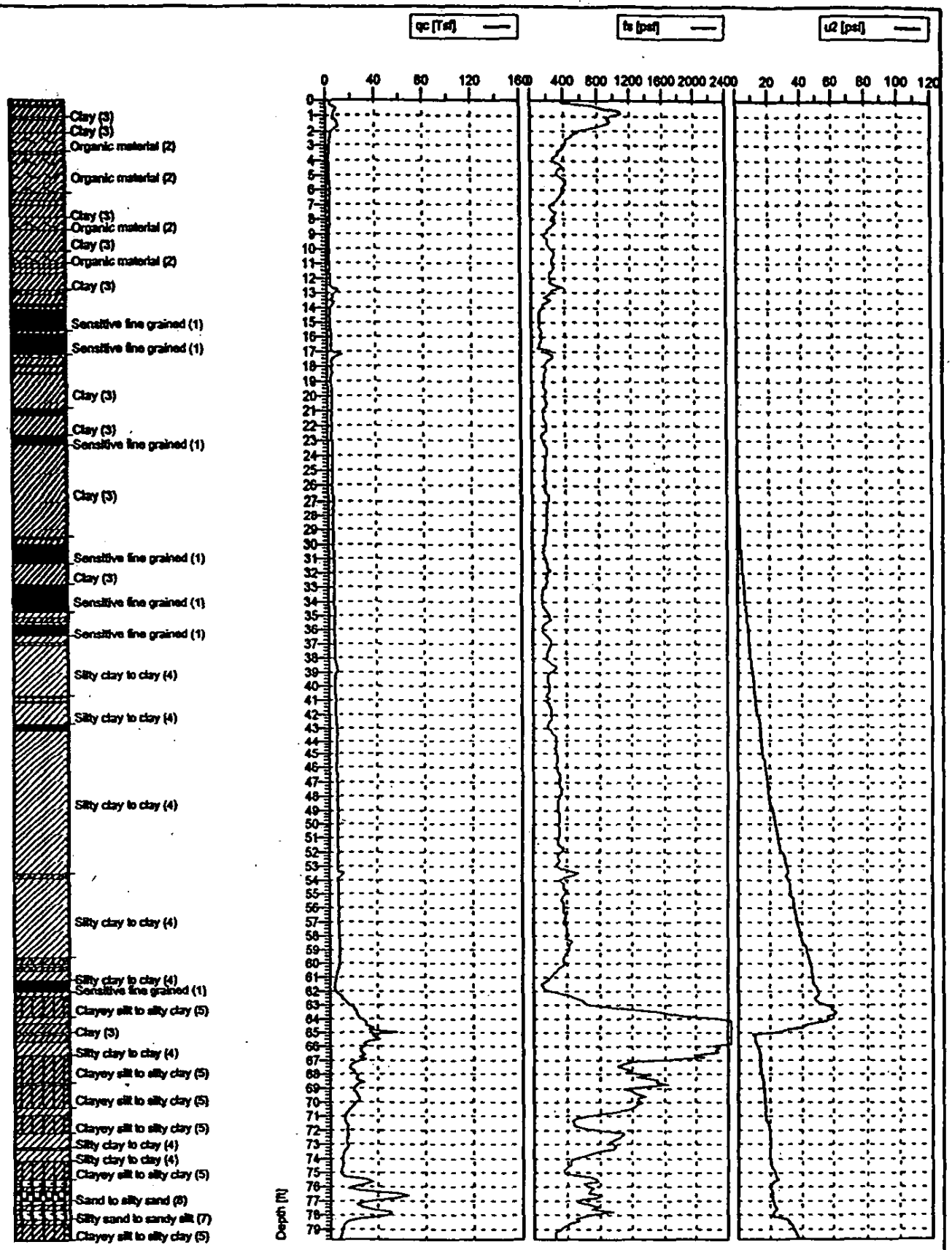
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-45-02	Position:	Ground level:	
Client: RIVER BIRCH LANDFILL - WEST EXPANSION		Date: 08-14-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: 220-12.cpd	



Test no: EE-C-46-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-22-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb46.cpd	

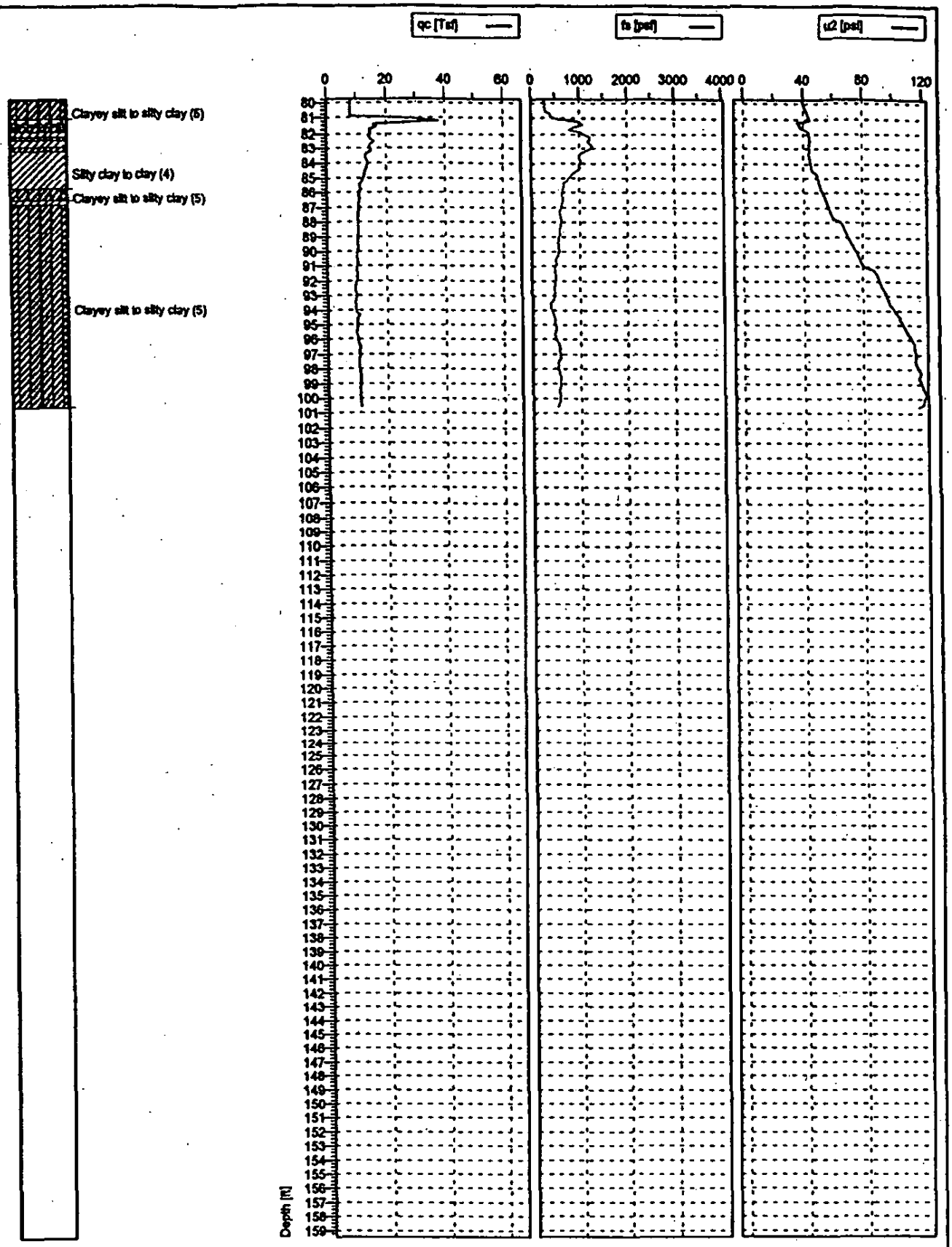
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150



u2

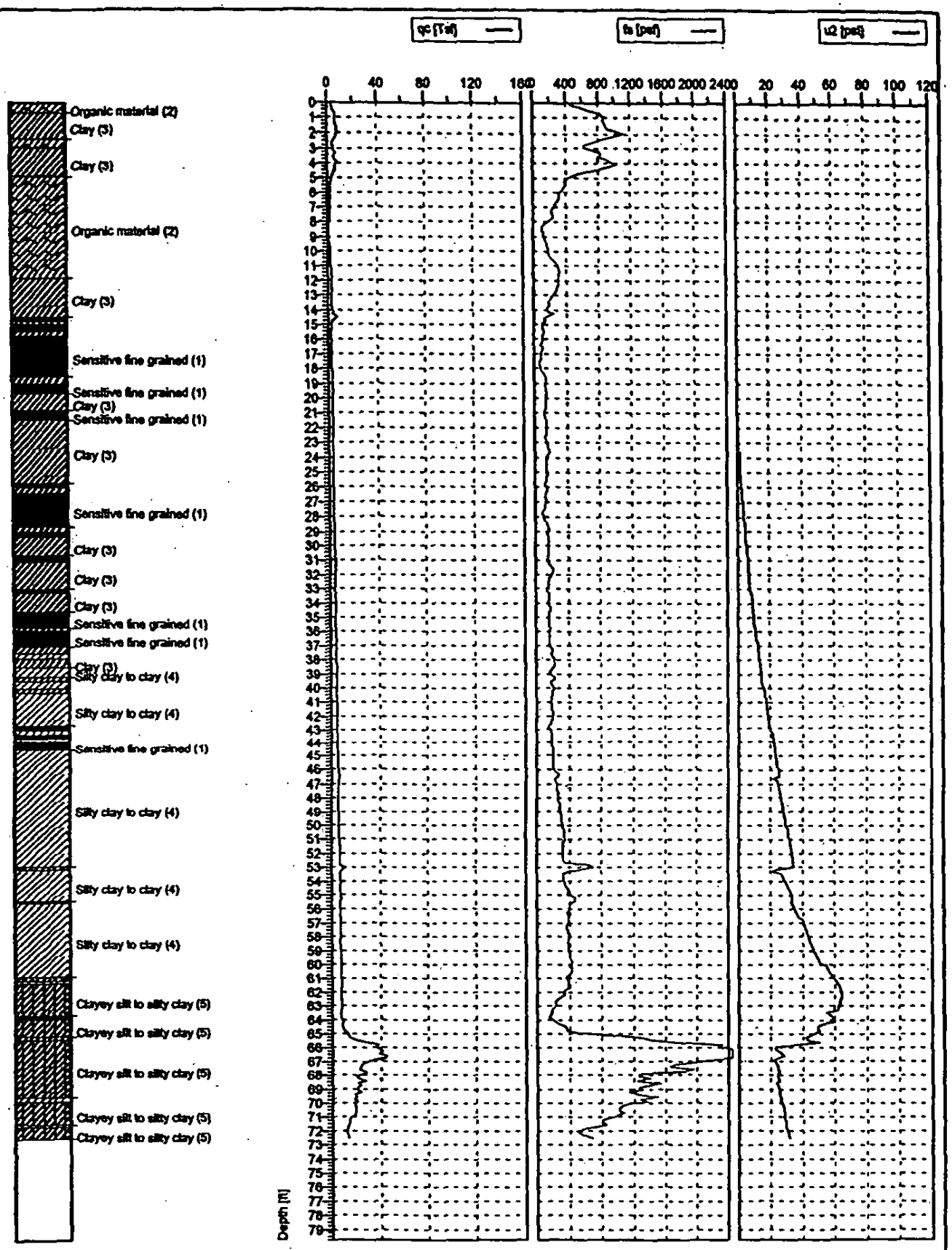
Core No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-47-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-22-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/2	Fig:
		File: Rb47.cpd	



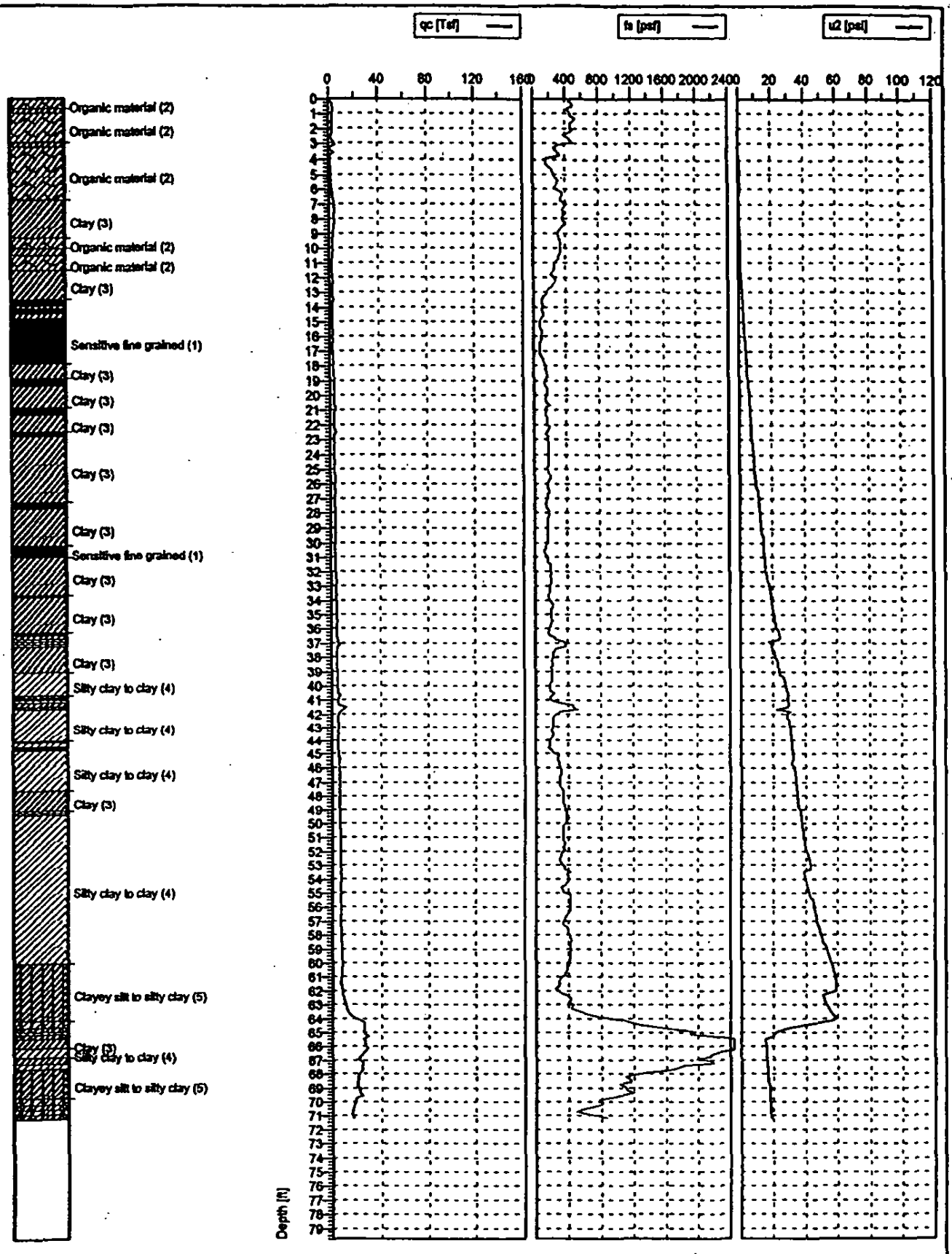
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-47-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-22-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 2/2	Fig:
		File: Rb47.cpd	



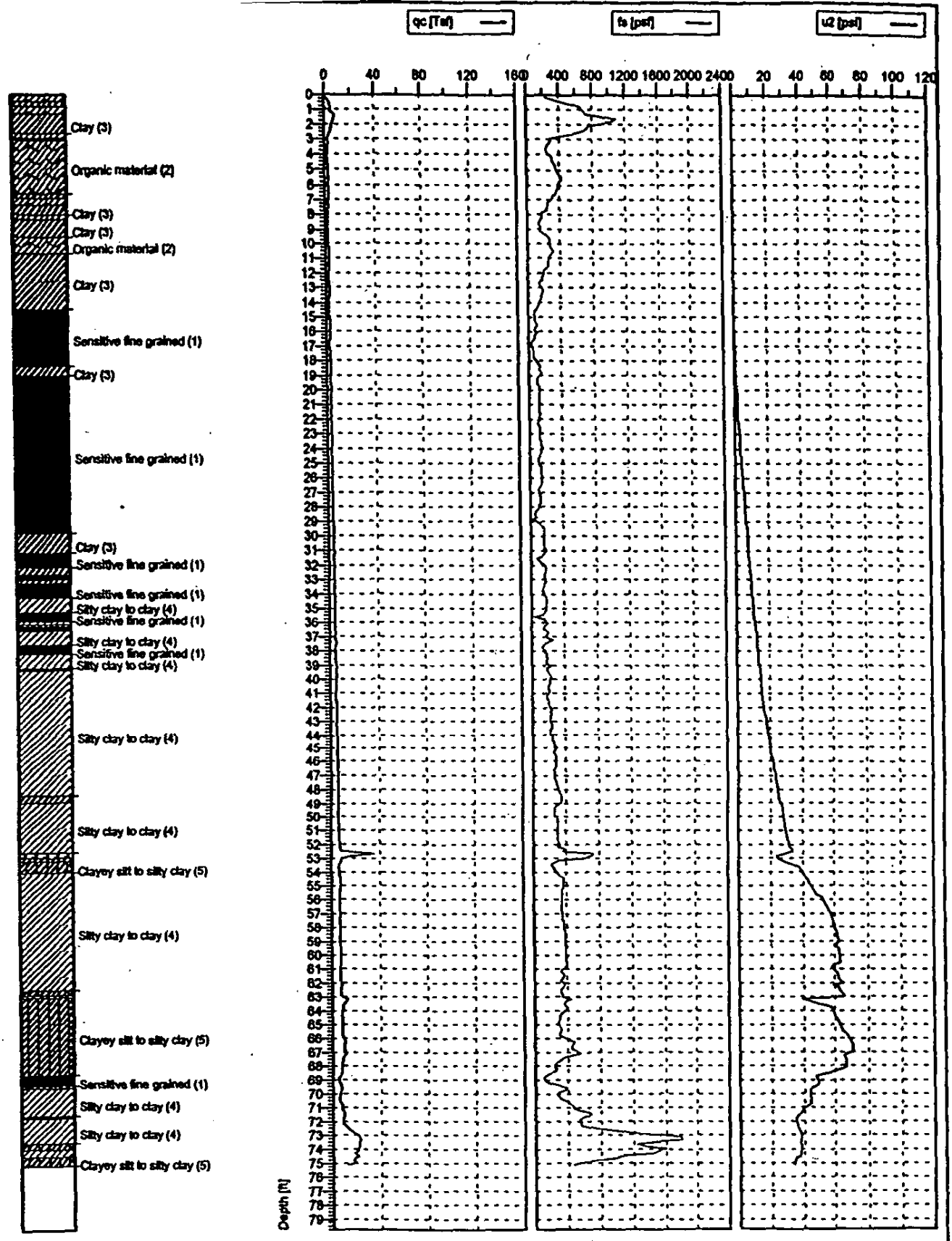
Test no: EE-C-48-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-22-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb48.cpd	

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150



Test no: EE-C-49-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-22-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb49.cpd	

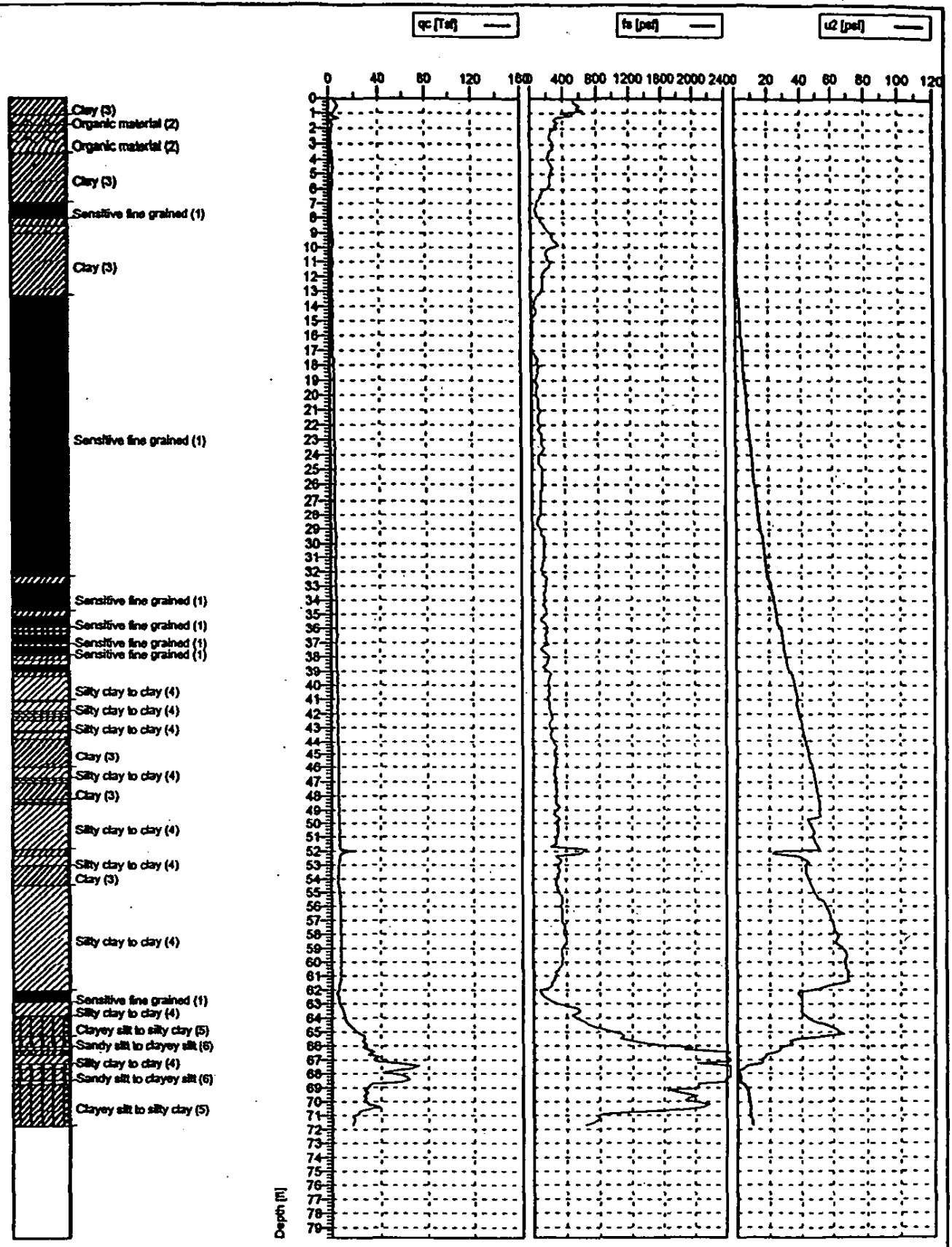
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150



u2

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

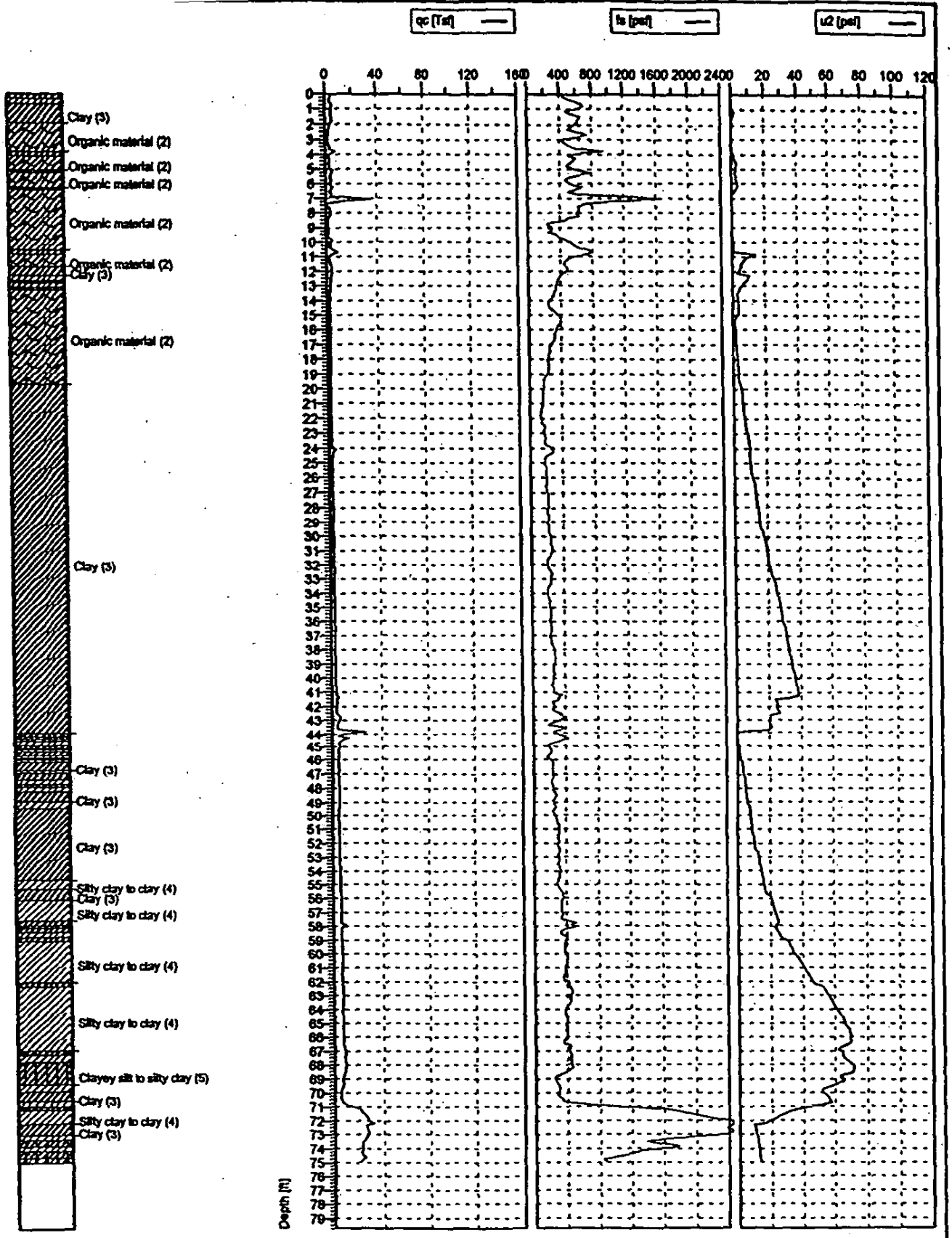
Test no: EE-C-50-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-22-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb50.cpd	



u2

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

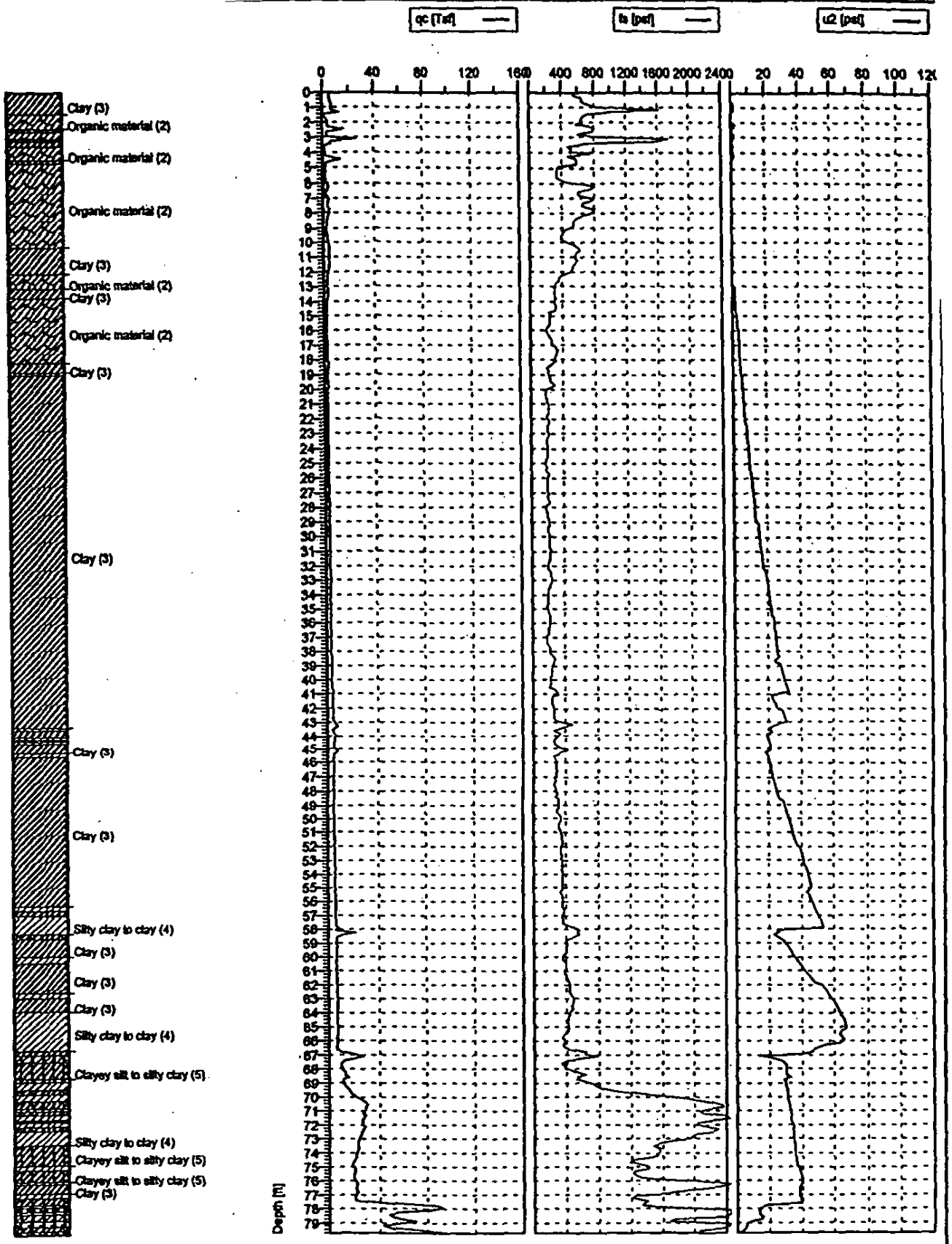
Test no: EE-C-51-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-26-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb51.cpd	



u2

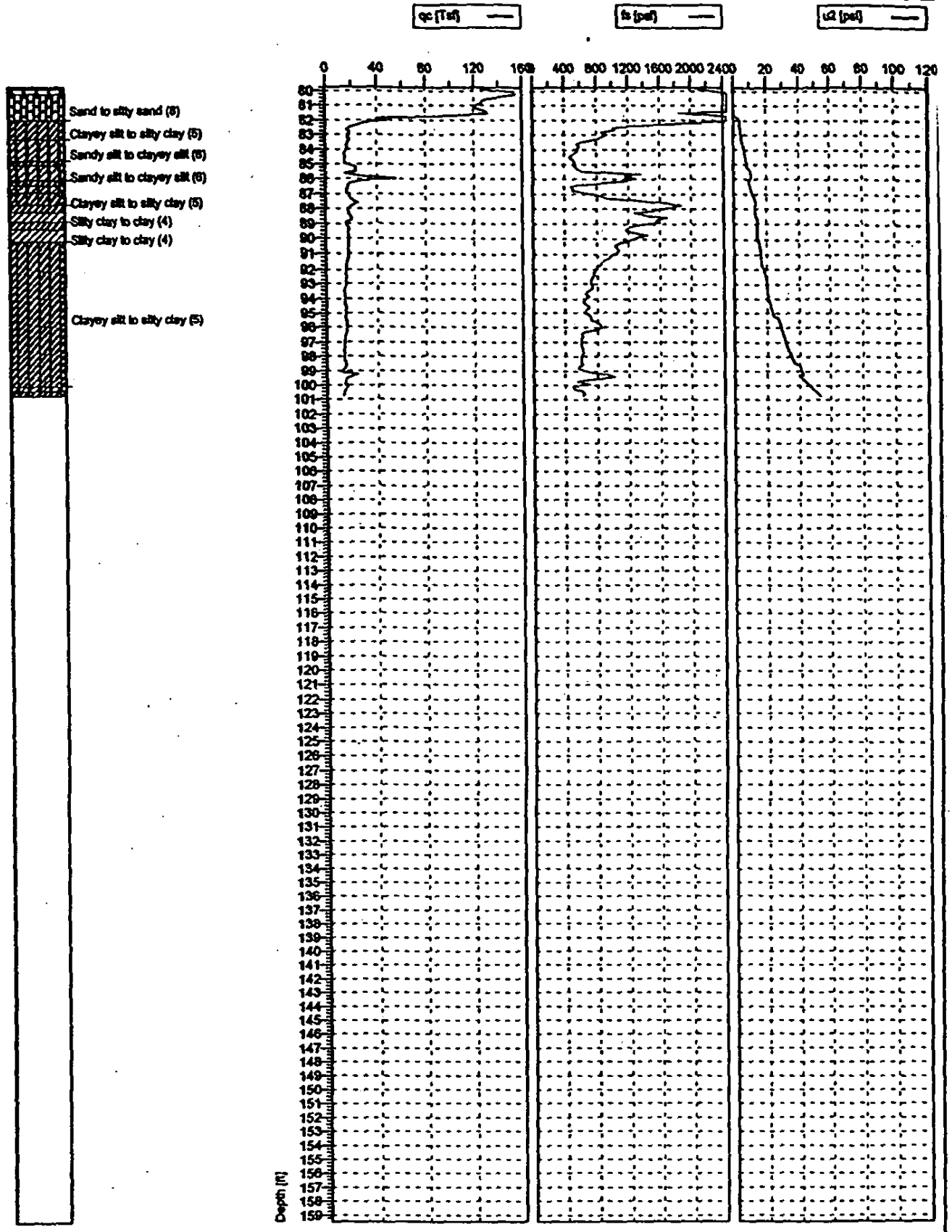
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-52-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-26-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb52.cpd	



Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

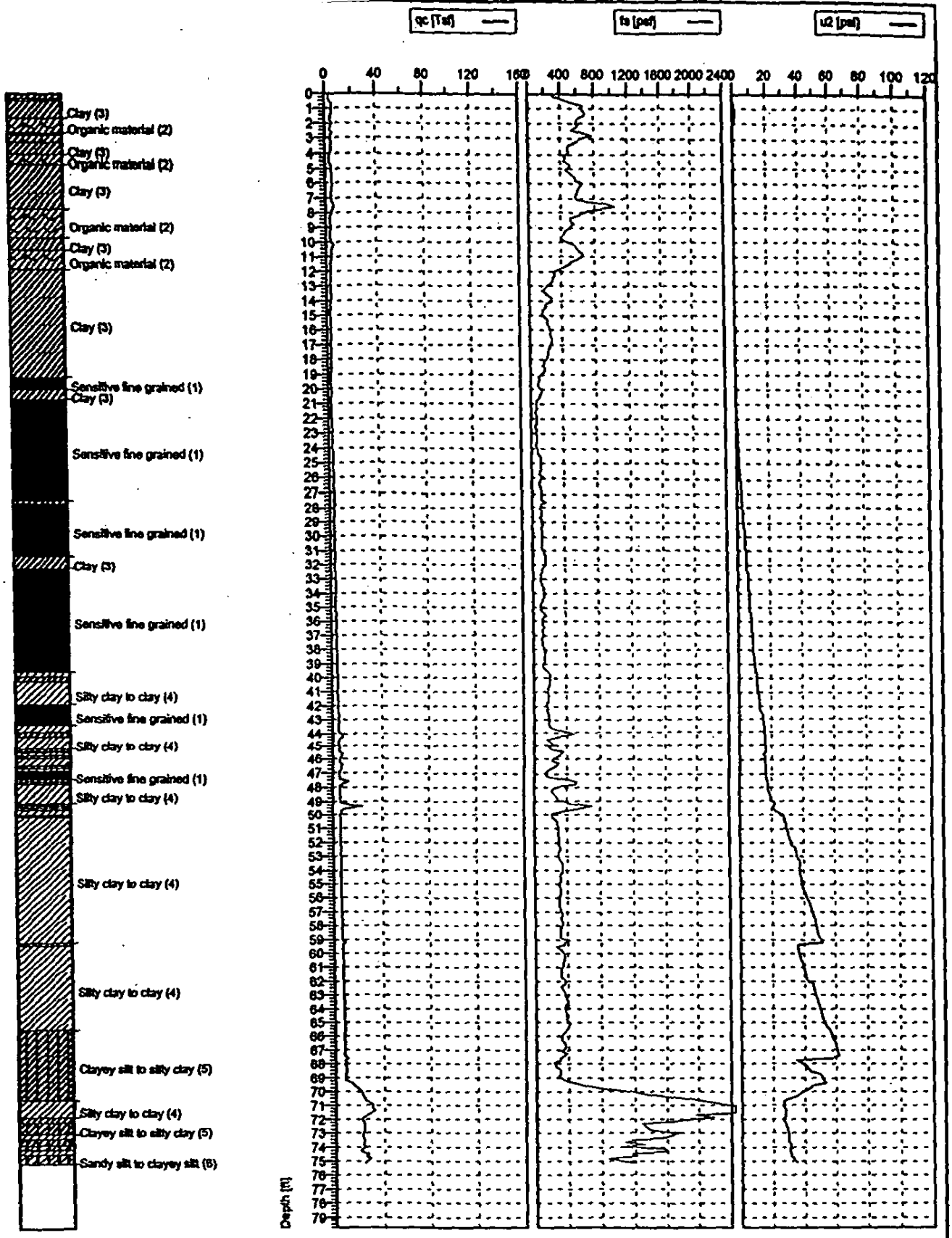
Test no: EE-C-53-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-26-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/2	Fig:
		File: Rb53.cpd	



u2

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

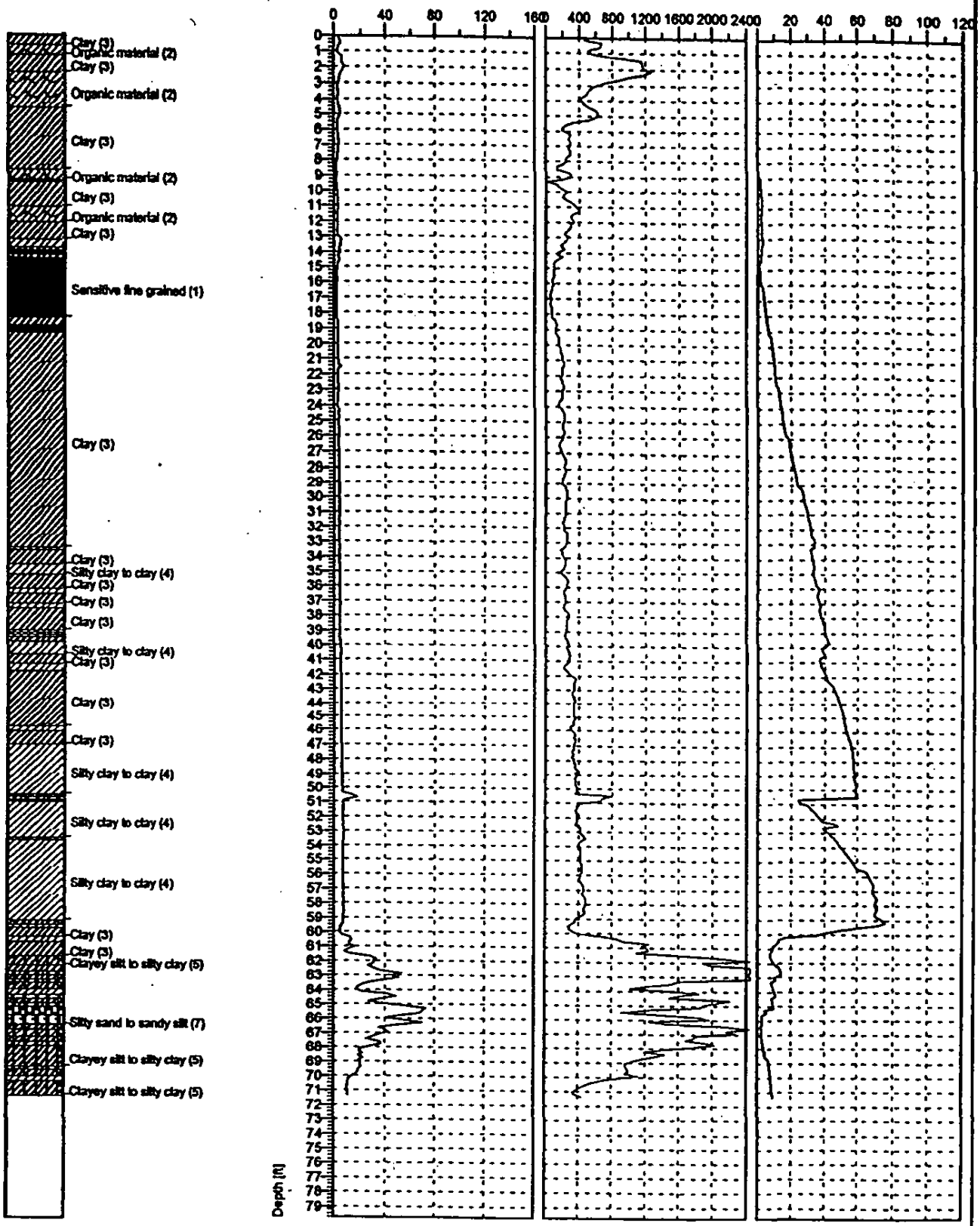
Test no: EE-C-53-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-26-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 2/2	Fig:
		File: Rb53.cpd	



u2

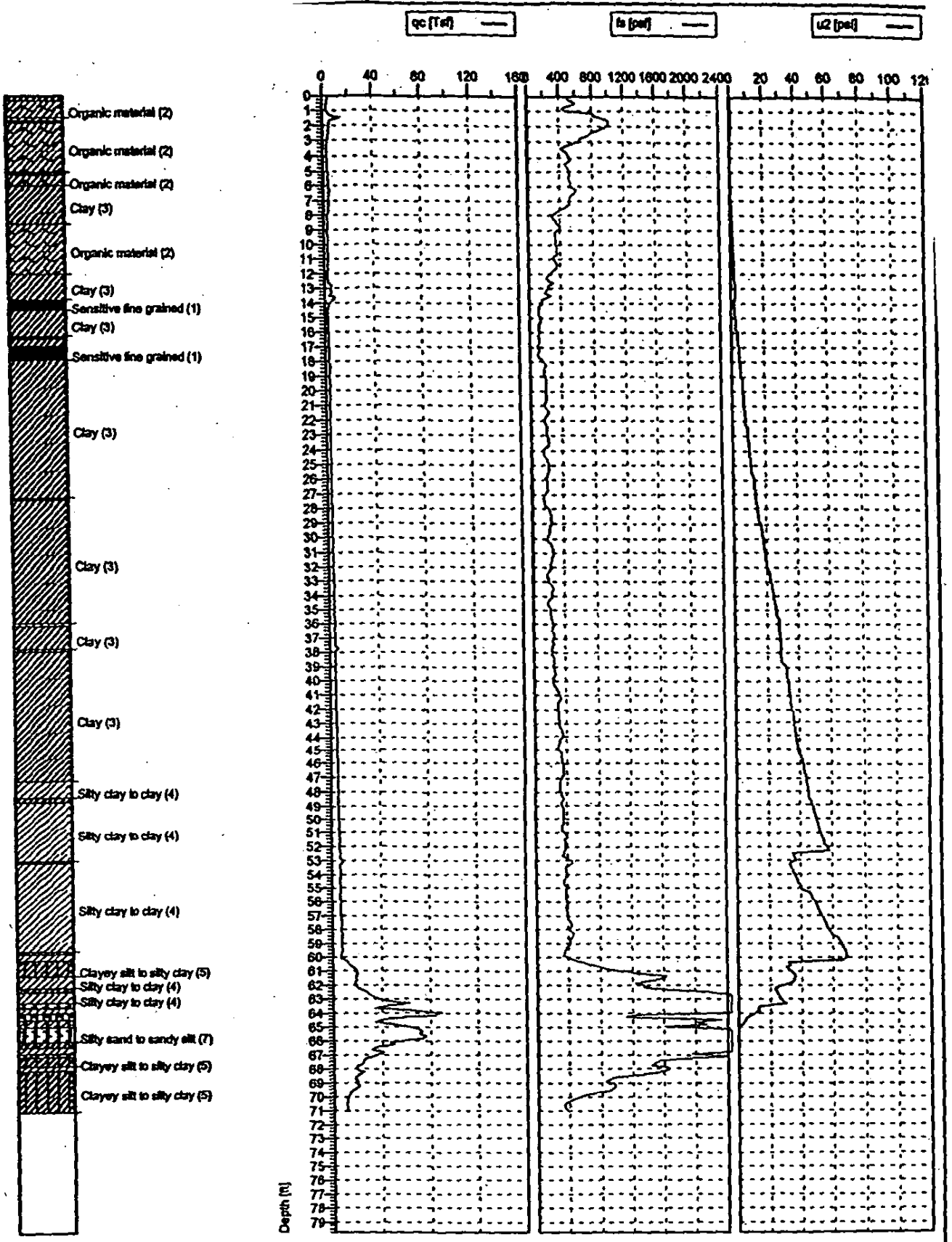
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-54-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-26-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb54.cpd	



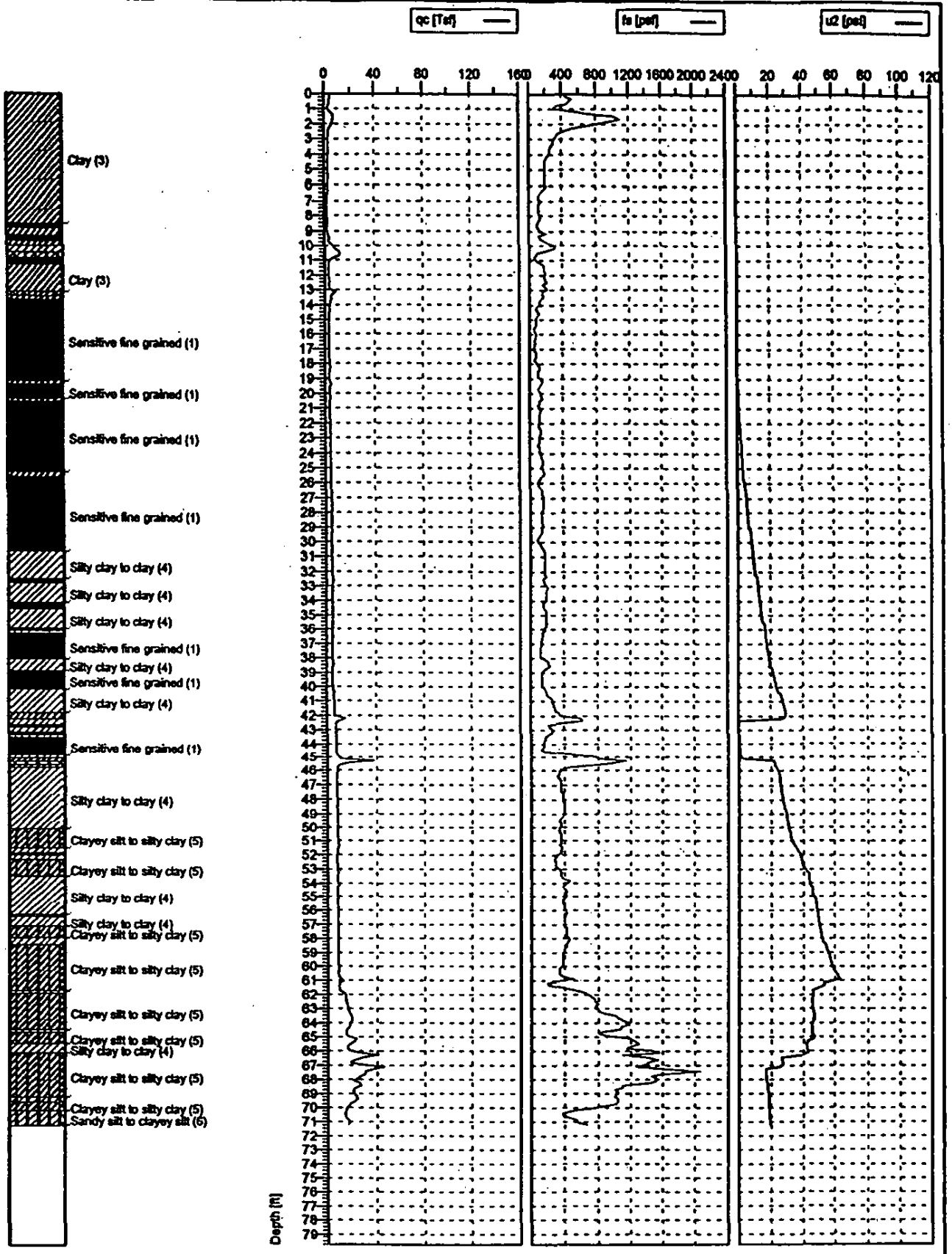
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-55-02	Position:	Ground level:	
Client: RIVERIRCH LANDFILL - WEST EXPANSION		Date: 12-03-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb55b.cpd	



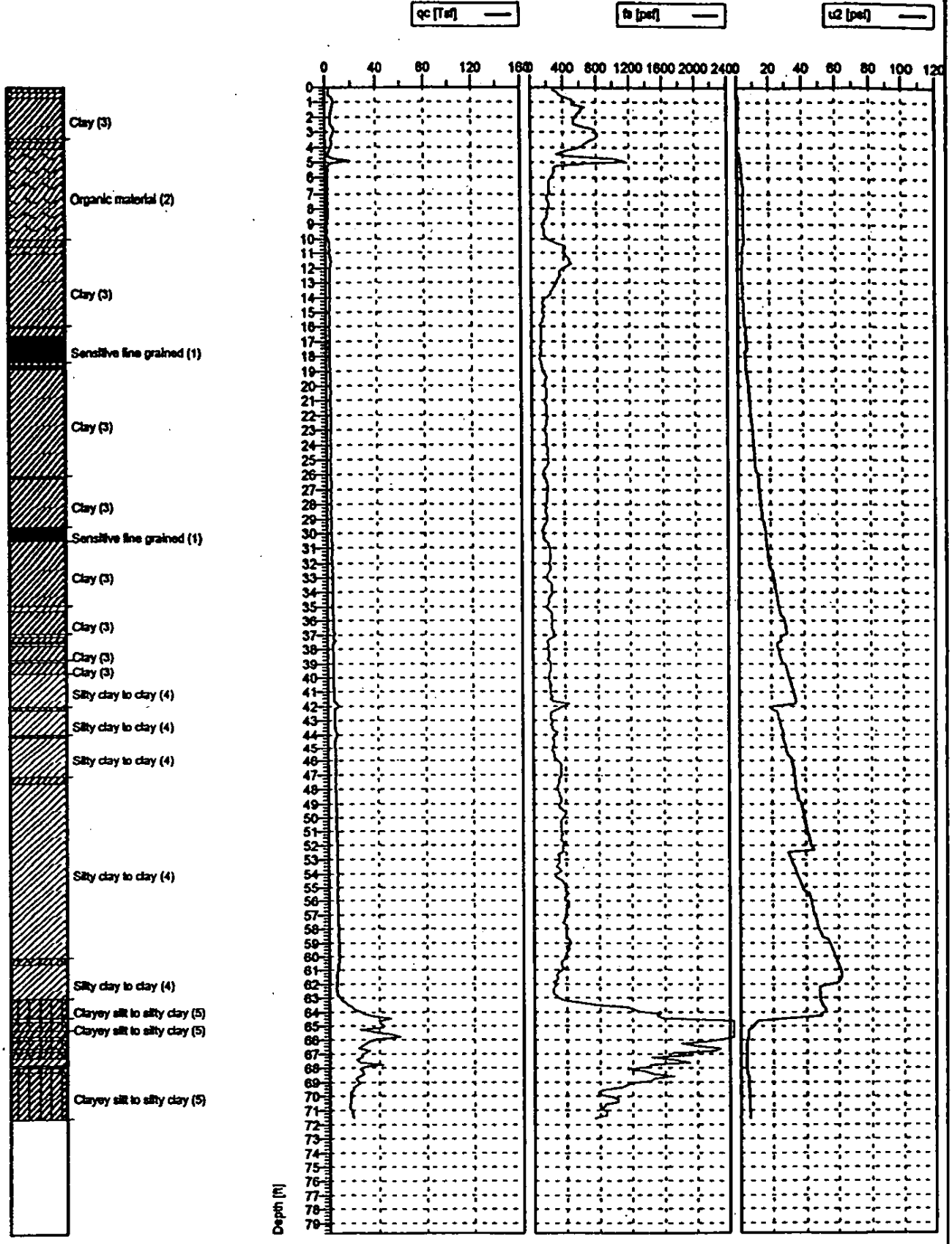
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-56-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-22-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb56.cpd	



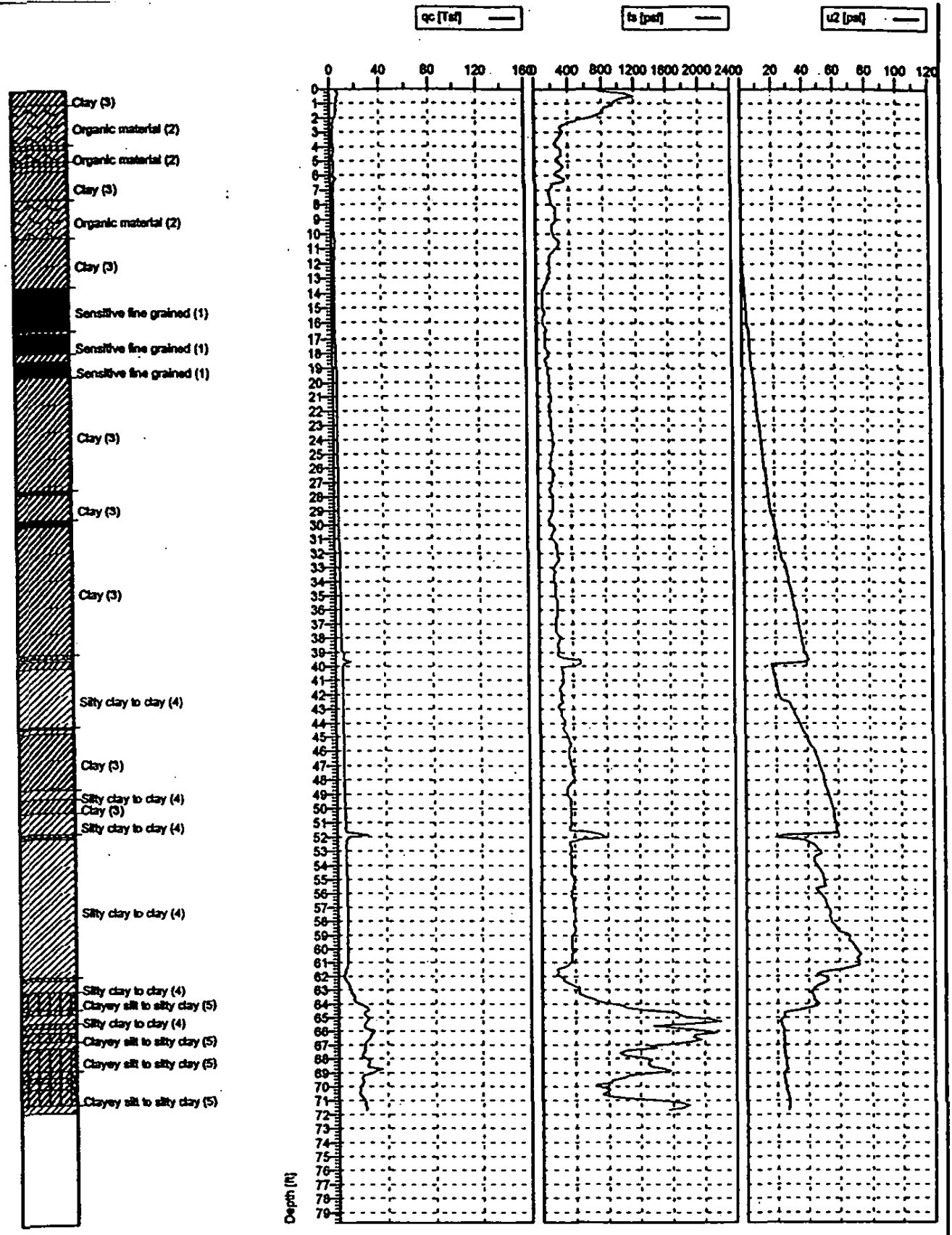
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-57-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-22-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb57.cpd	



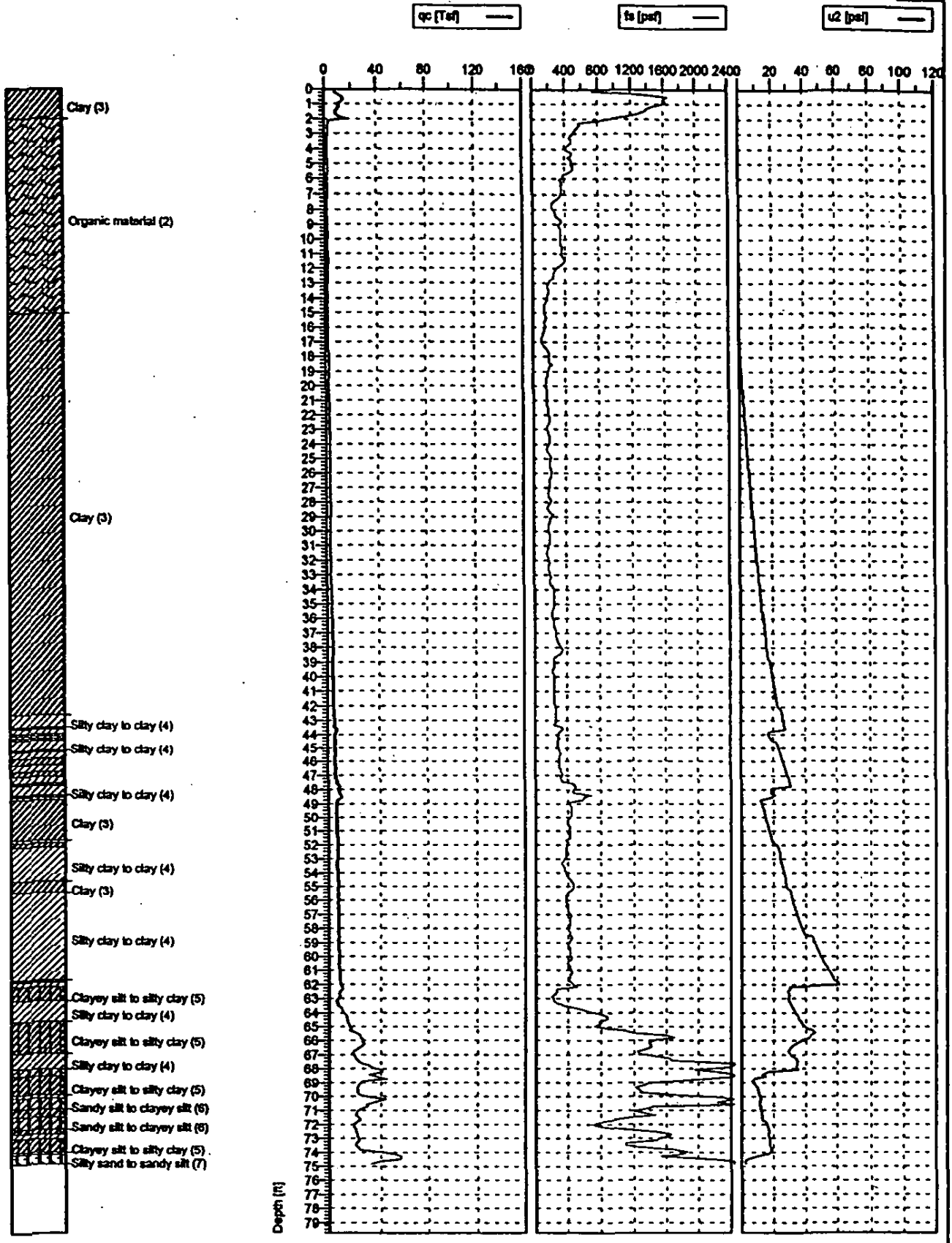
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-58-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-22-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb58.cpt	



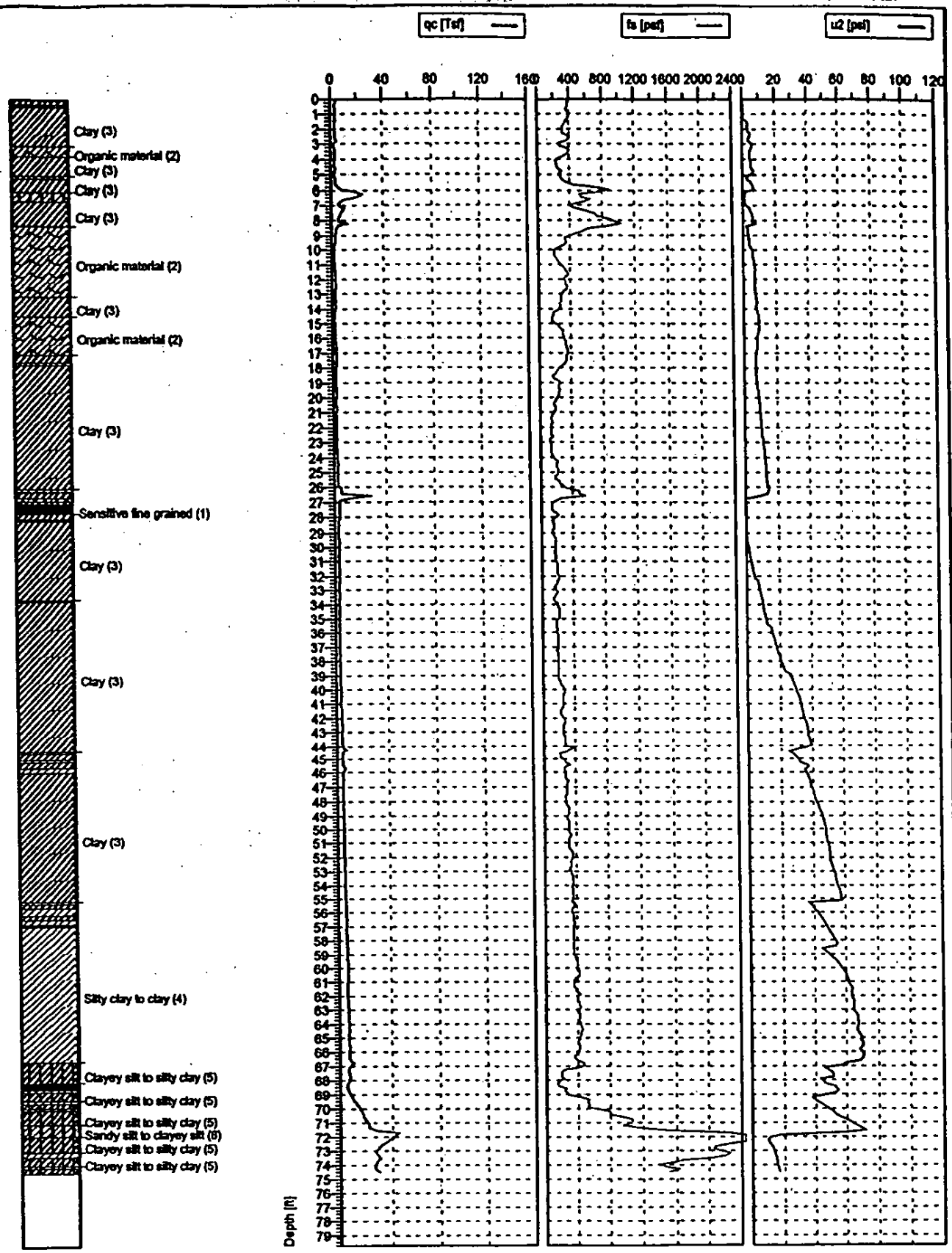
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-59-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-25-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb59.cpd	



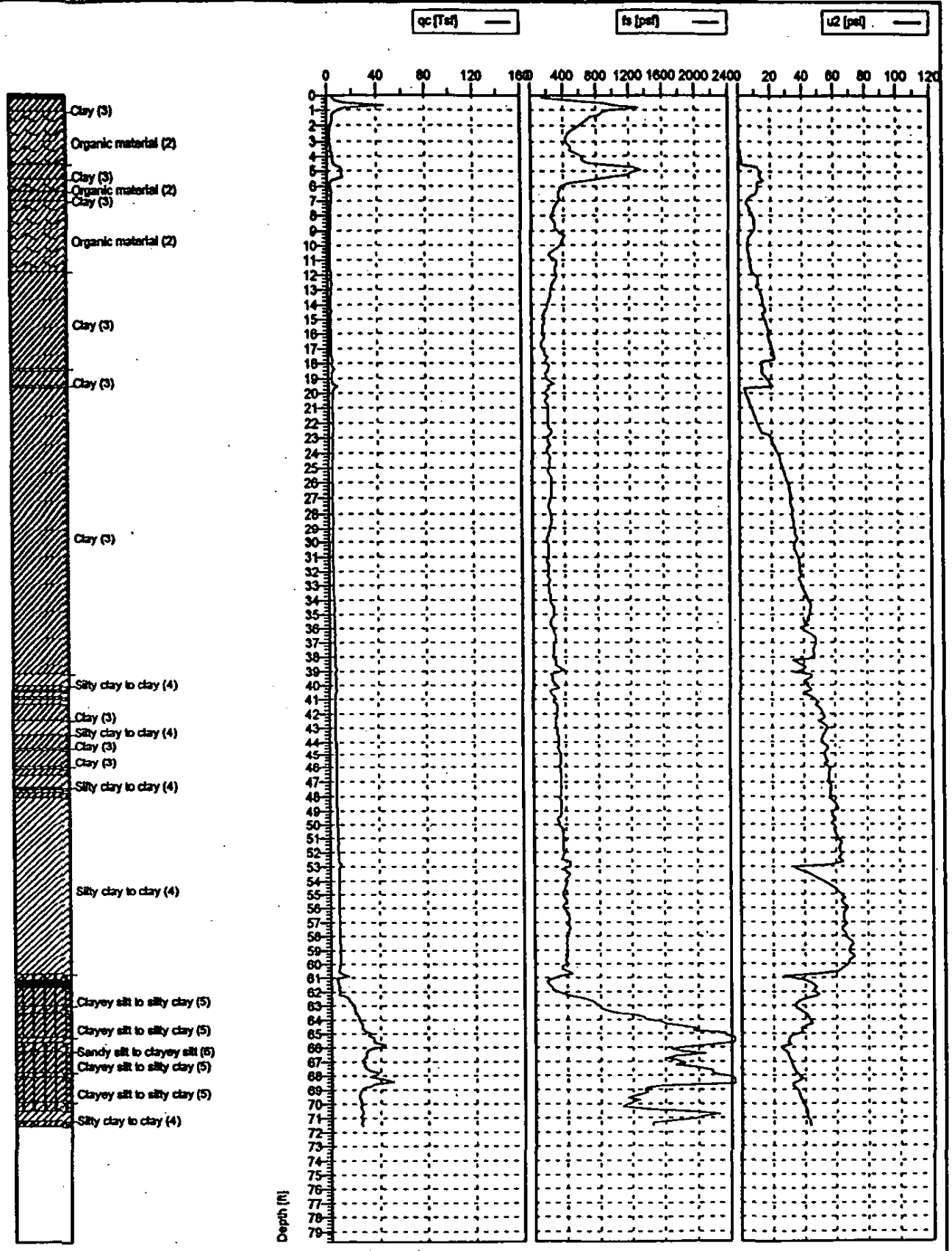
Cone No: 7021C
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-60-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-25-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb60x.cpd	



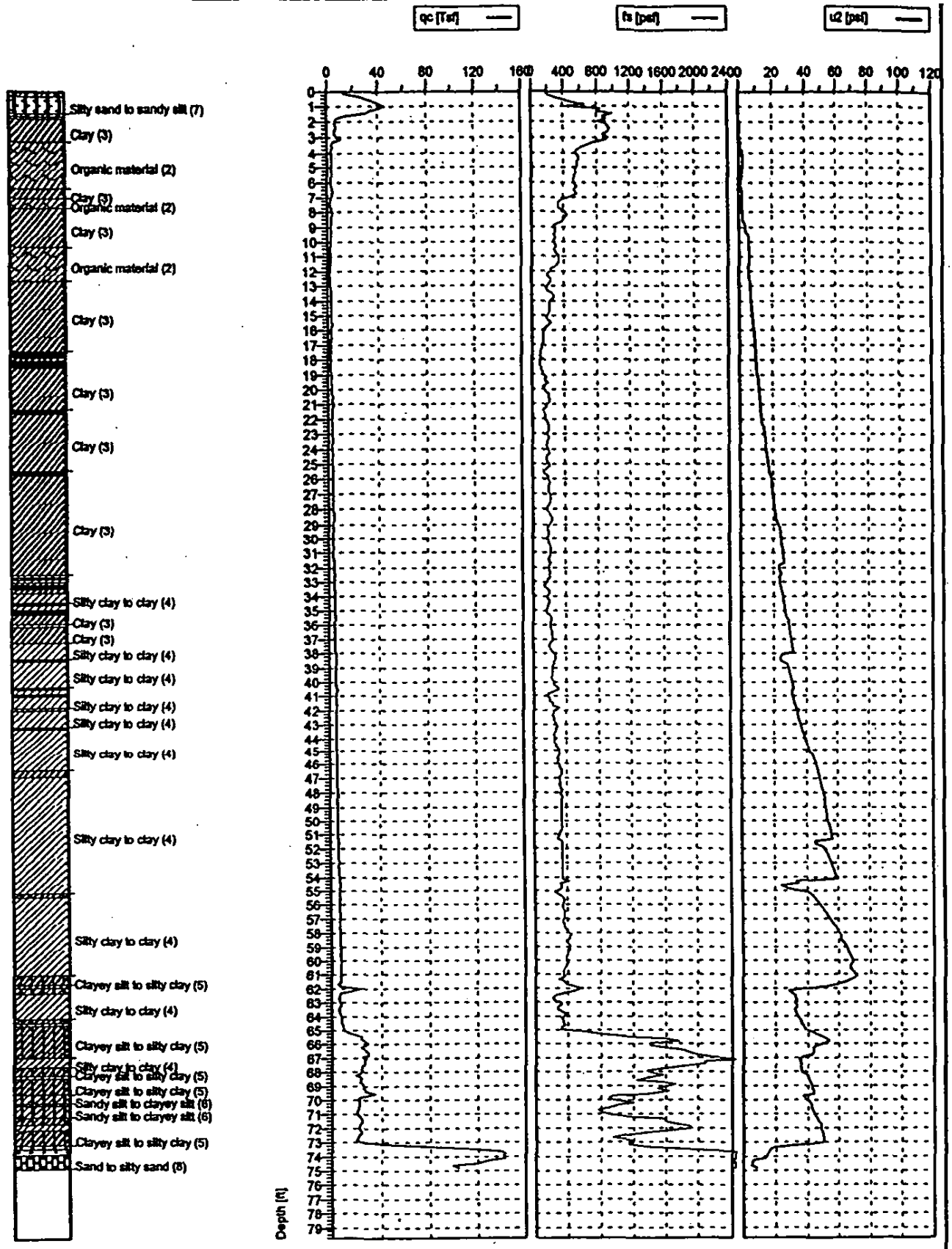
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-61-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-27-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb14m.cpd	



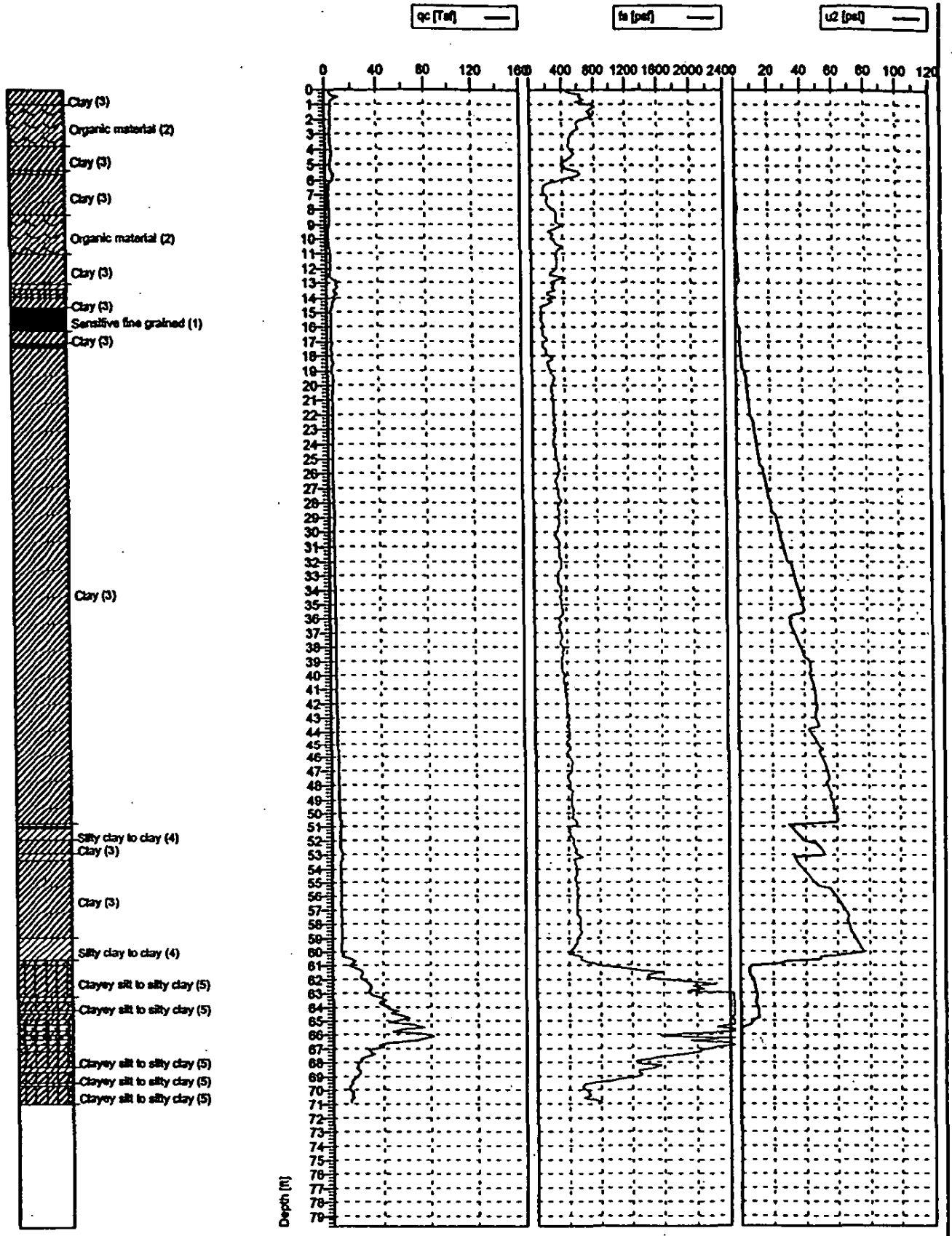
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 130

Test no: EE-C-62-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-26-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb62.cpd	



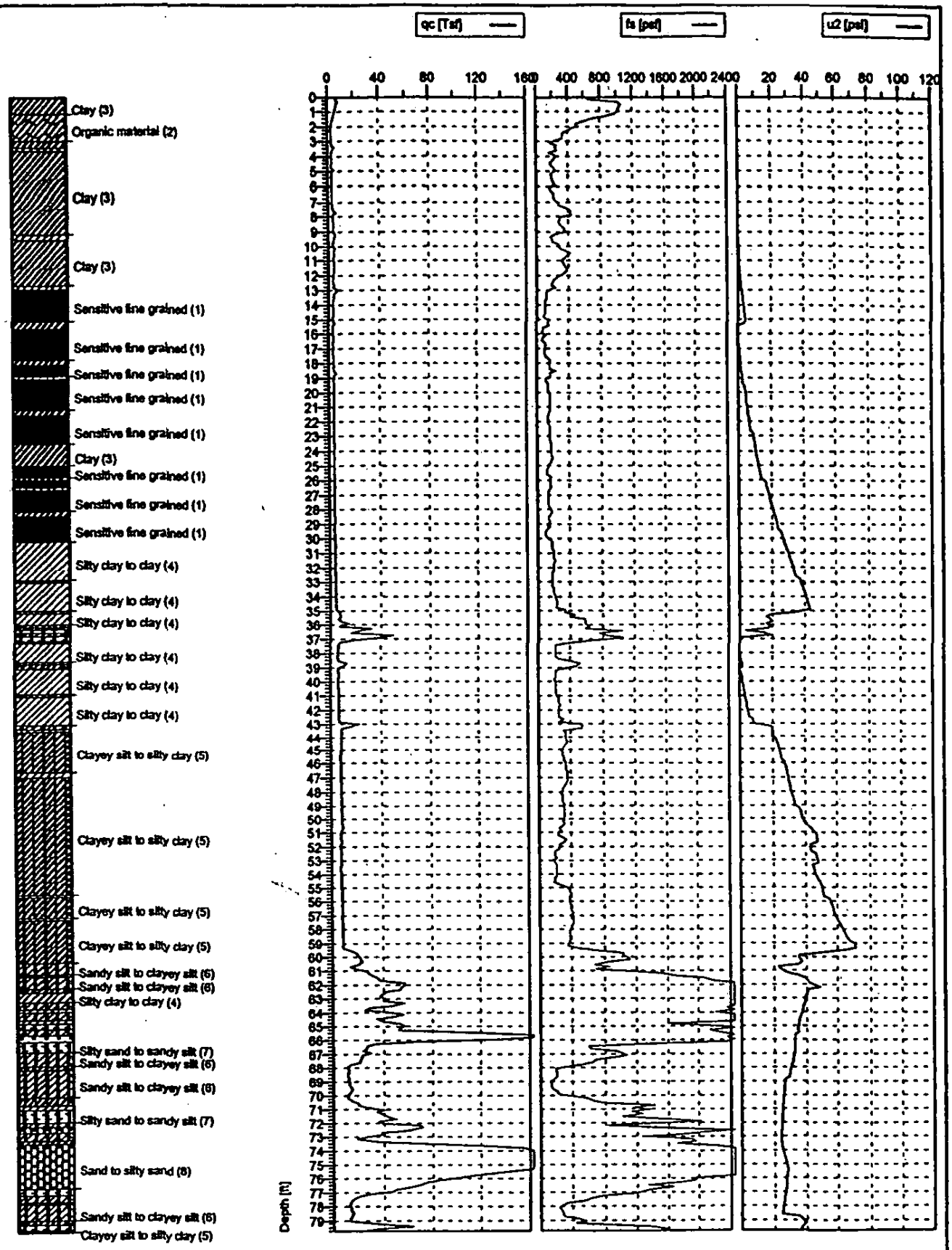
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-63-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-26-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb63.cpt	



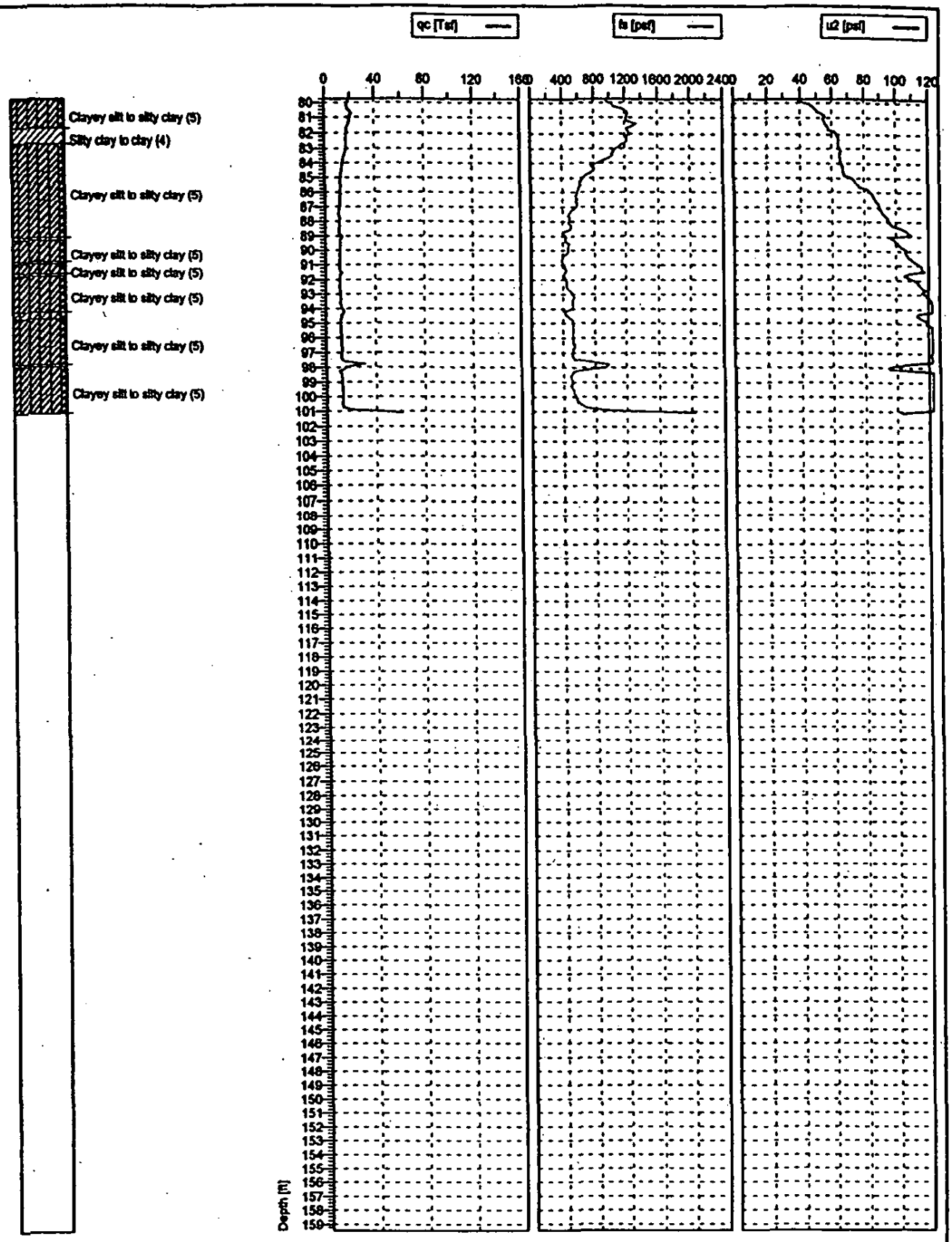
Test no: EE-C-64-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 12-03-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb64.cpd	

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150



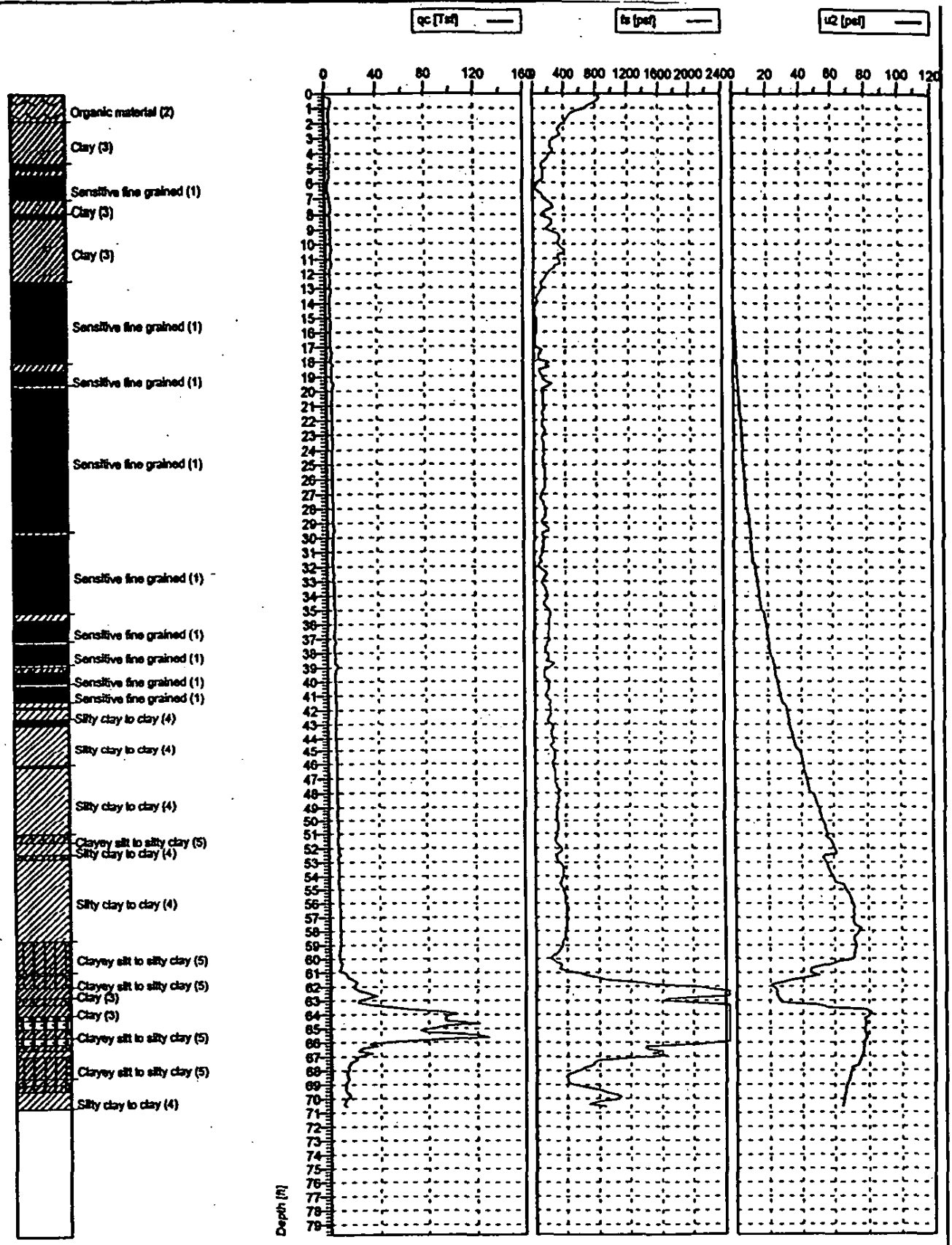
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-65-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 12-03-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/2	Fig:
		File: Rb65.cpt	



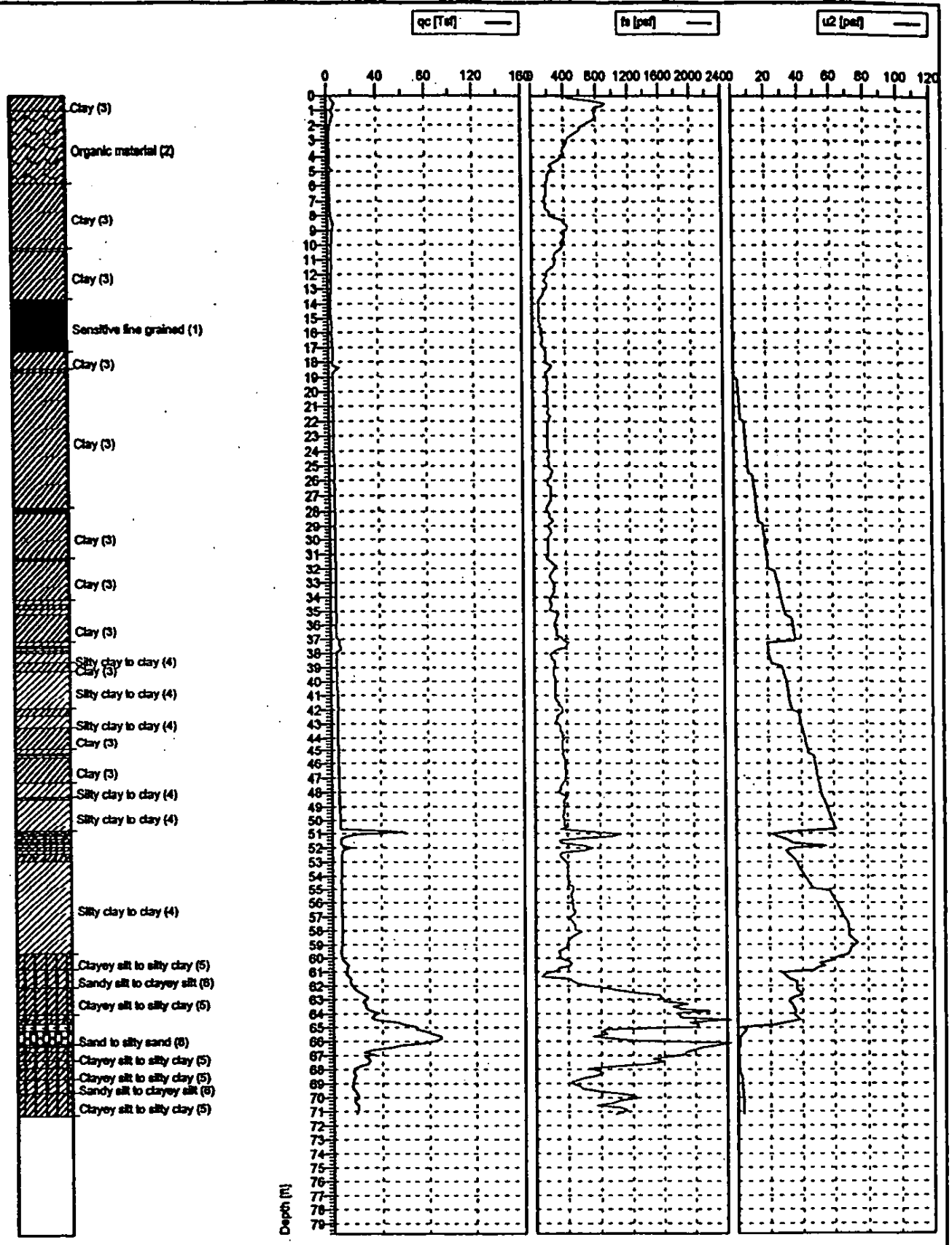
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-65-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 12-03-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 2/2	Fig:
		File: Rb65.cpd	



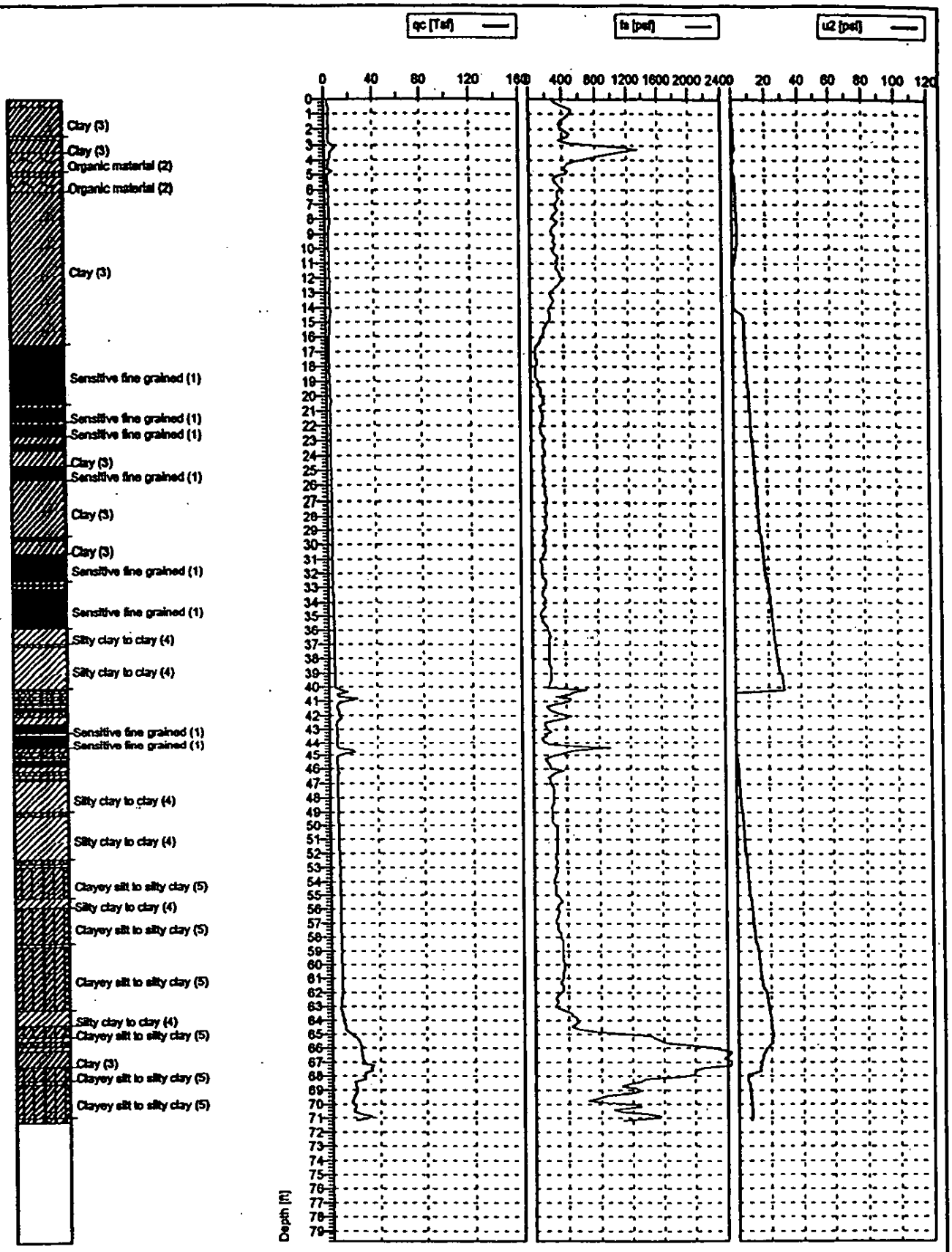
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-66-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 12-2-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb66.cpd	



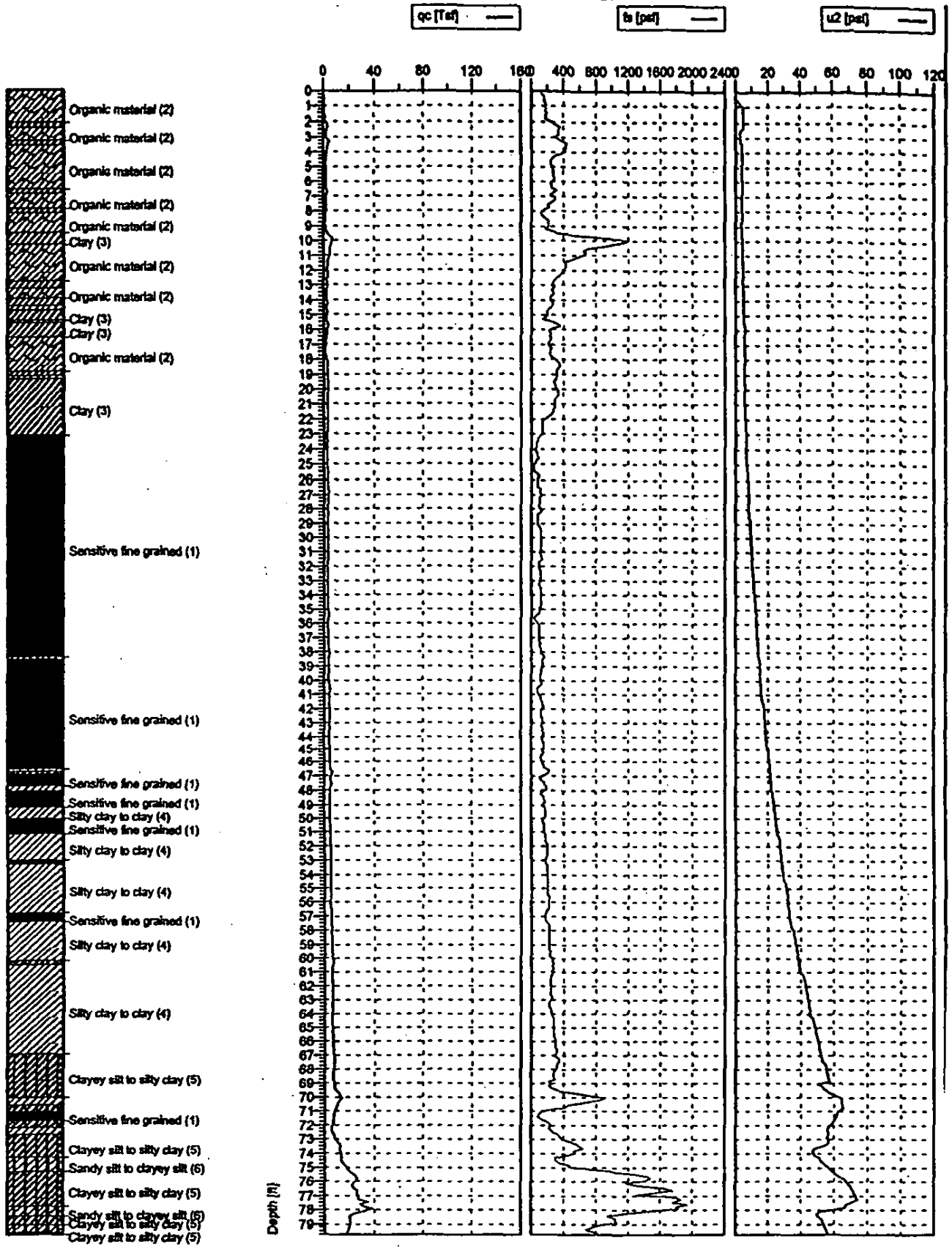
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-67-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 12-03-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb67x.cpd	



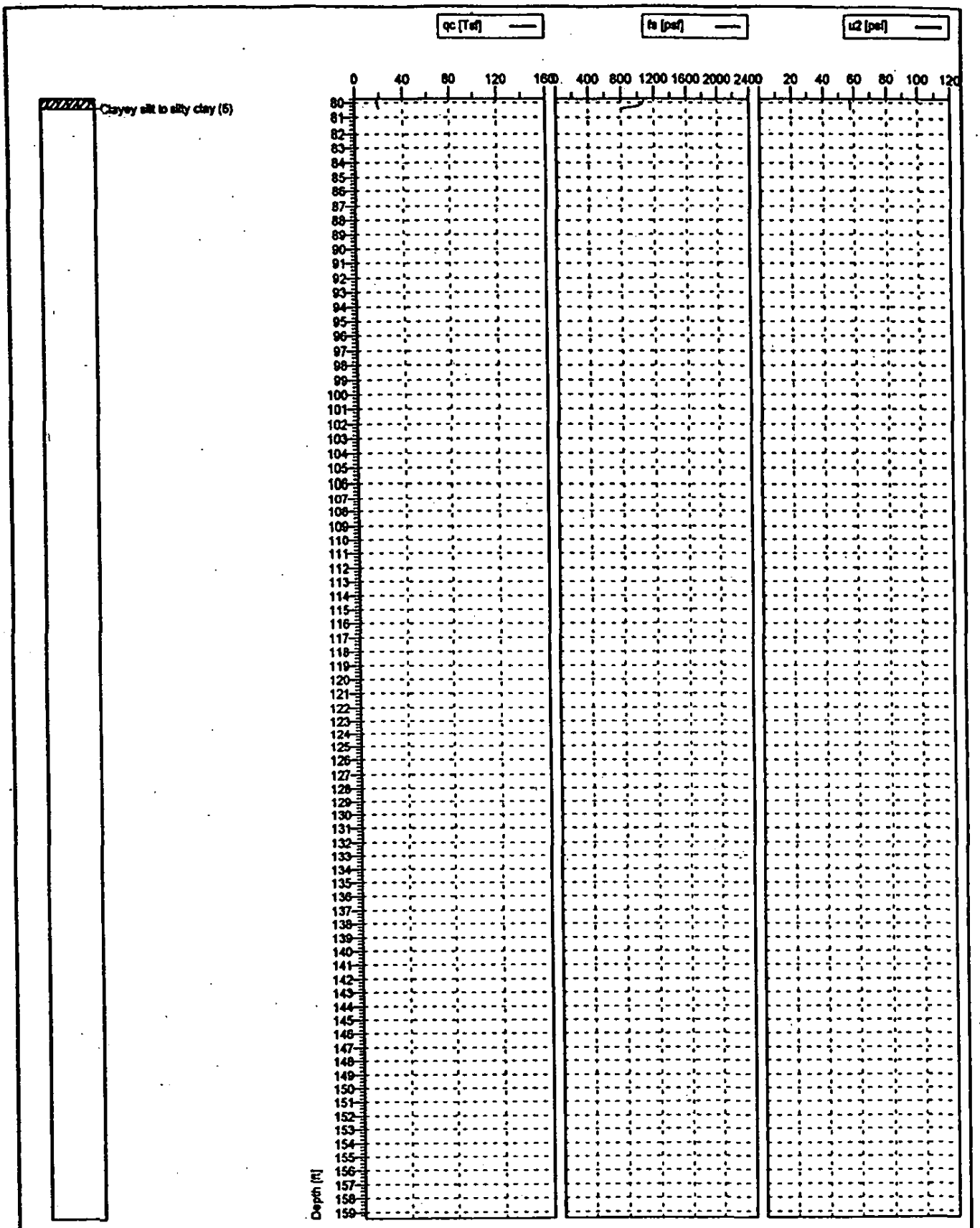
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-68-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-25-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb60.cpt	

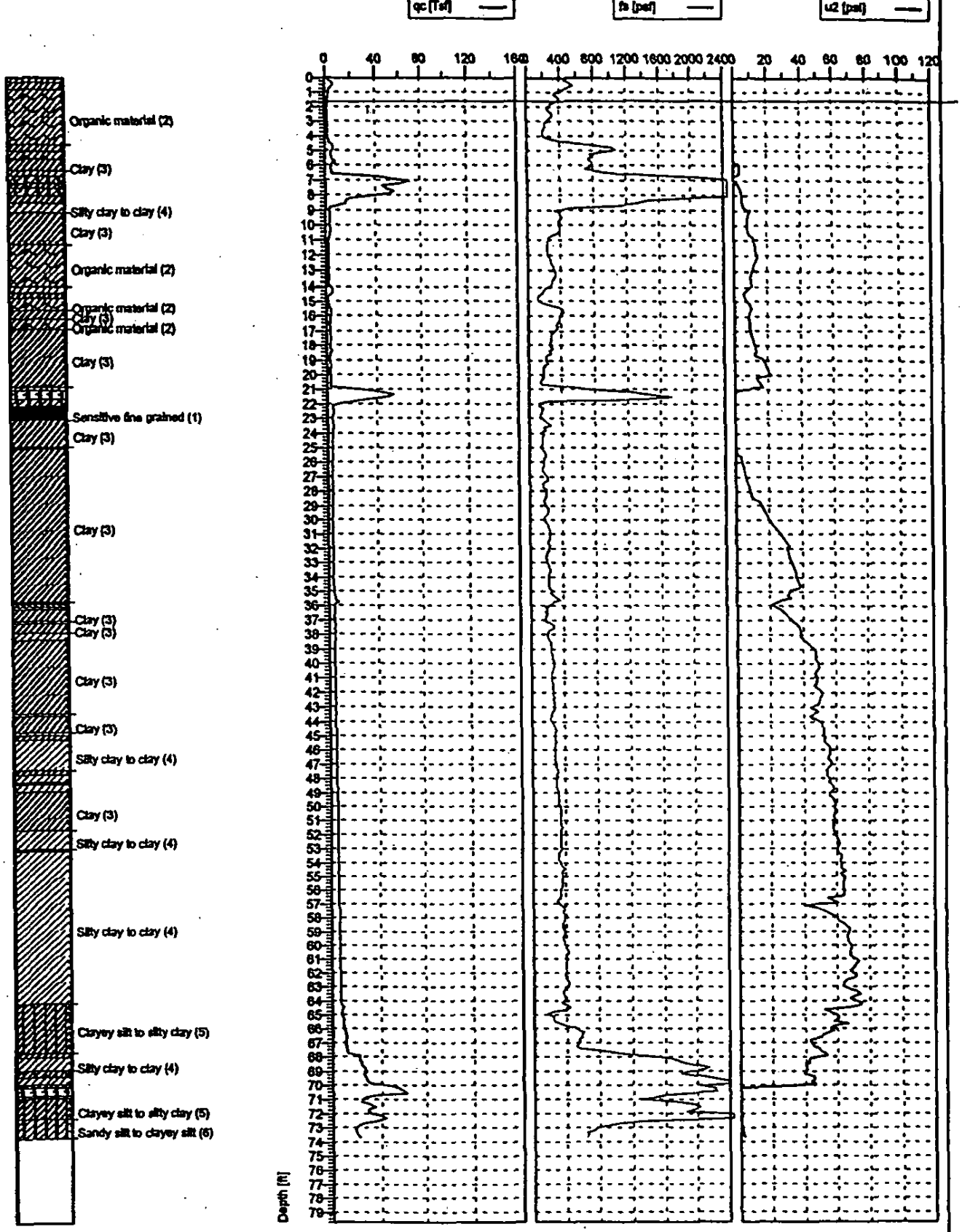


Cone No: 7027TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-69-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-25-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/2	Fig:
		File: Rb69b.cpd	



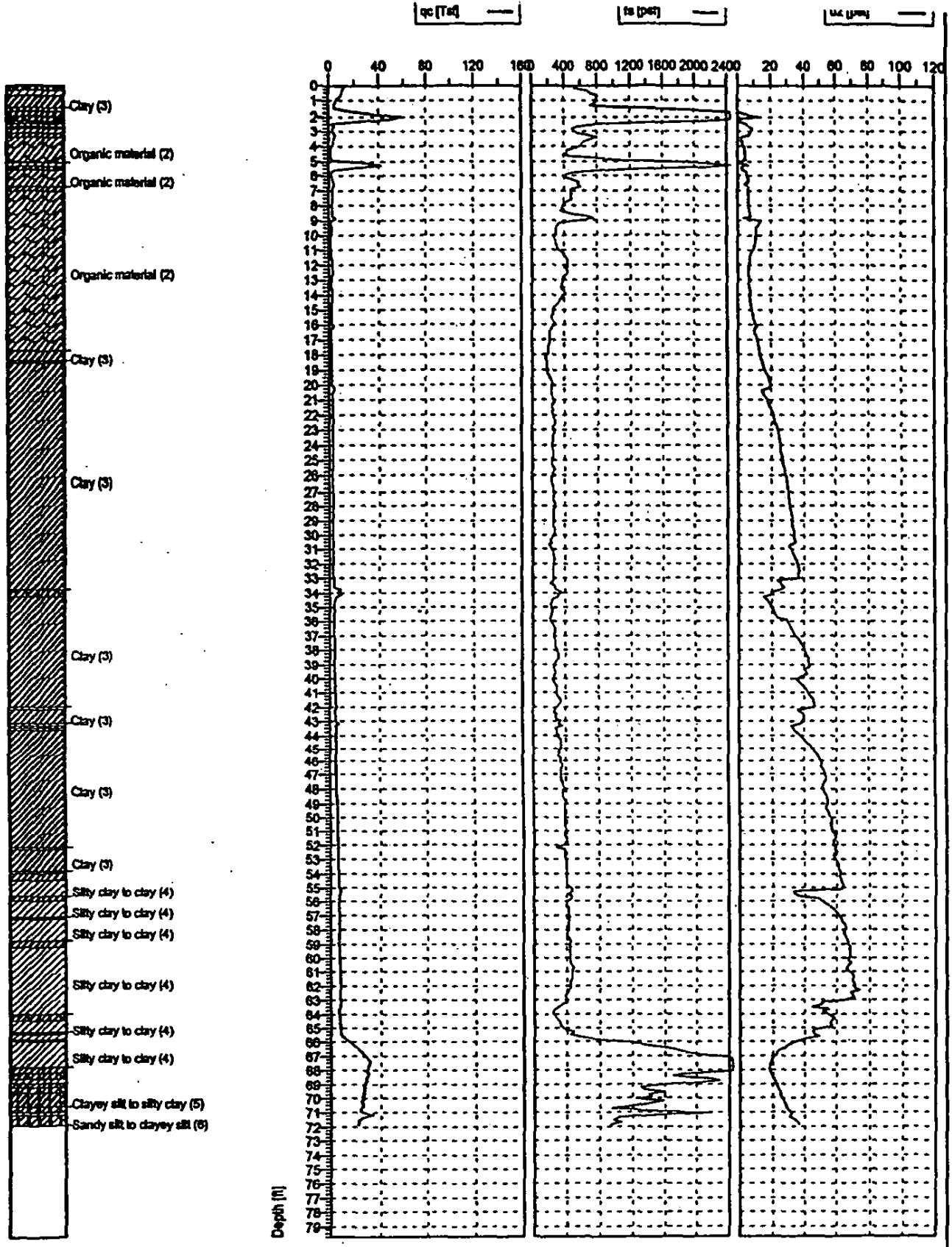
Test no: EE-C-69-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-25-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 2/2	Fig:
		File: Rb69h.cpd	



u2

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

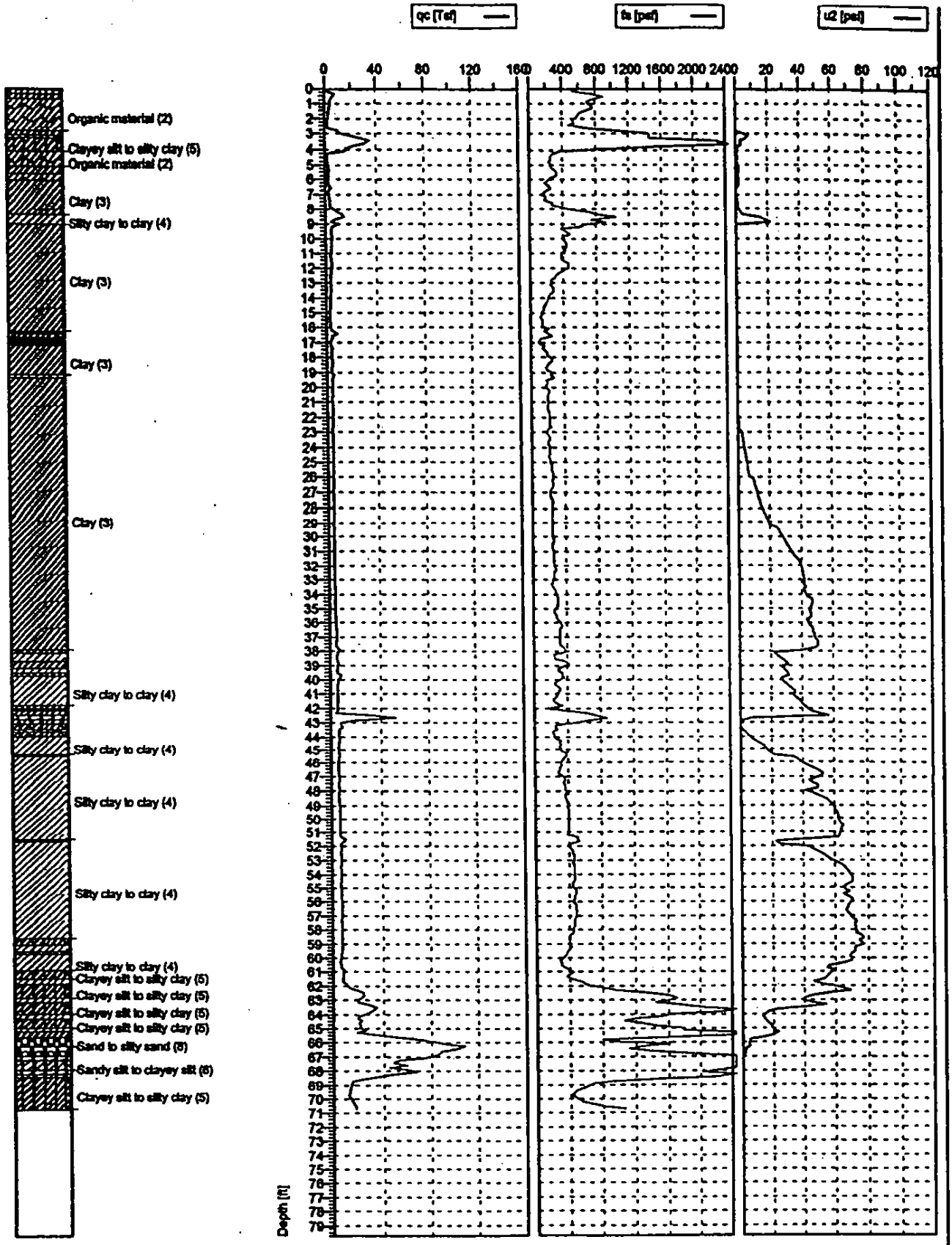
Test no: EE-C-70-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-25-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb70.cpd	



Test no: EE-C-71-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-25-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb71.cpd	

u2

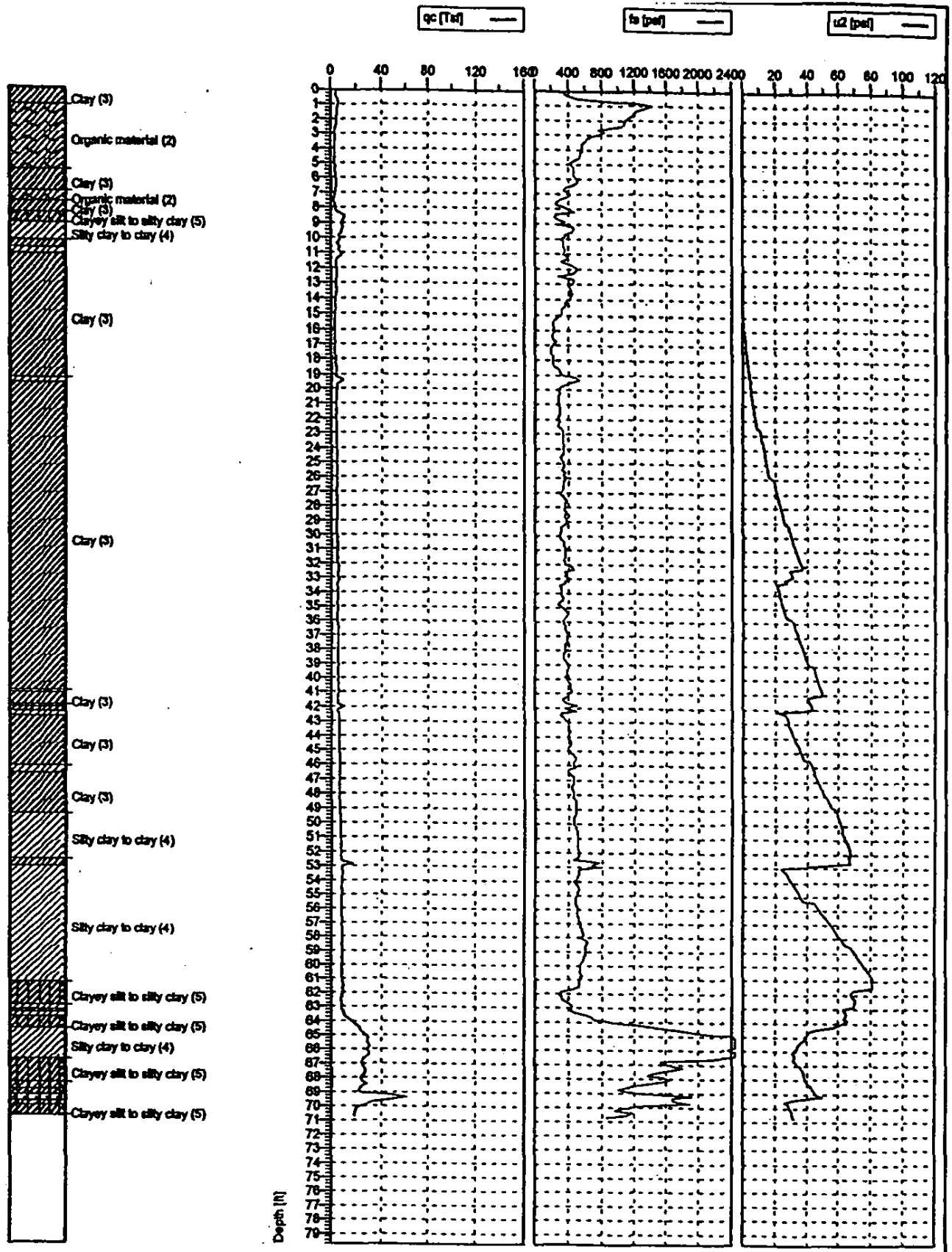
Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150



u2

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

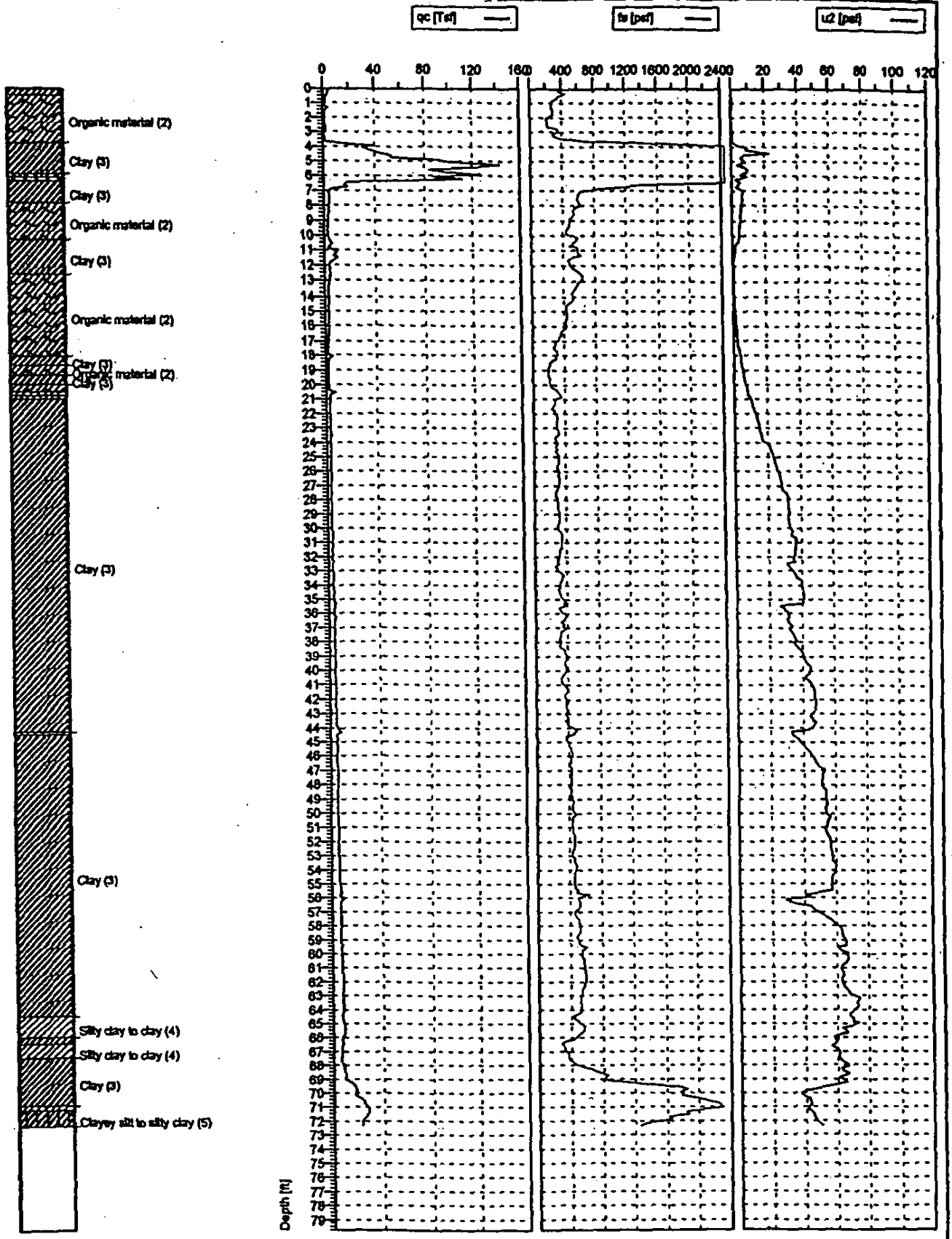
Test no: EE-C-72-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 12-02-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb72.cpd	



u2

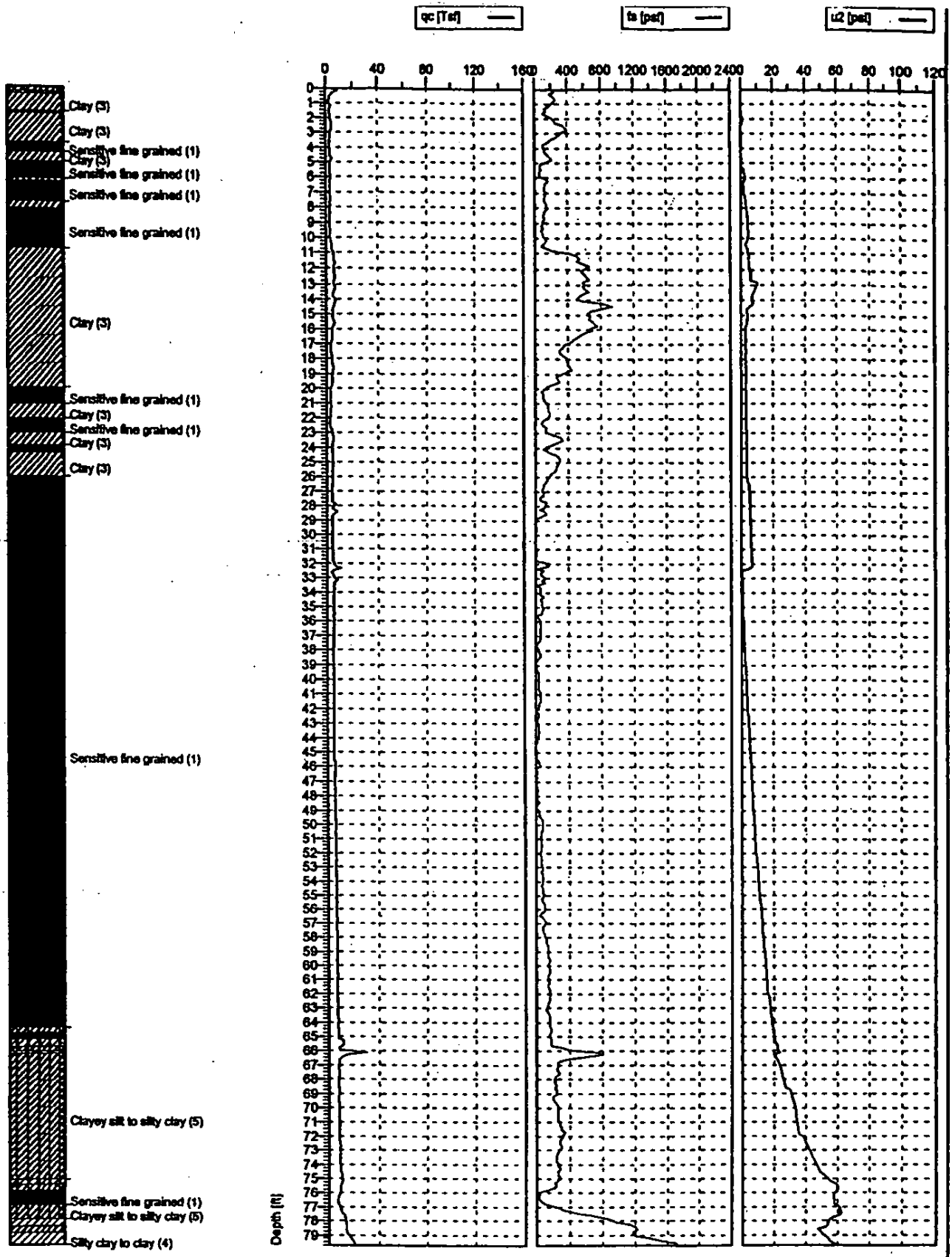
Cone No: 7027TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-73-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 12-02-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb73.cpd	



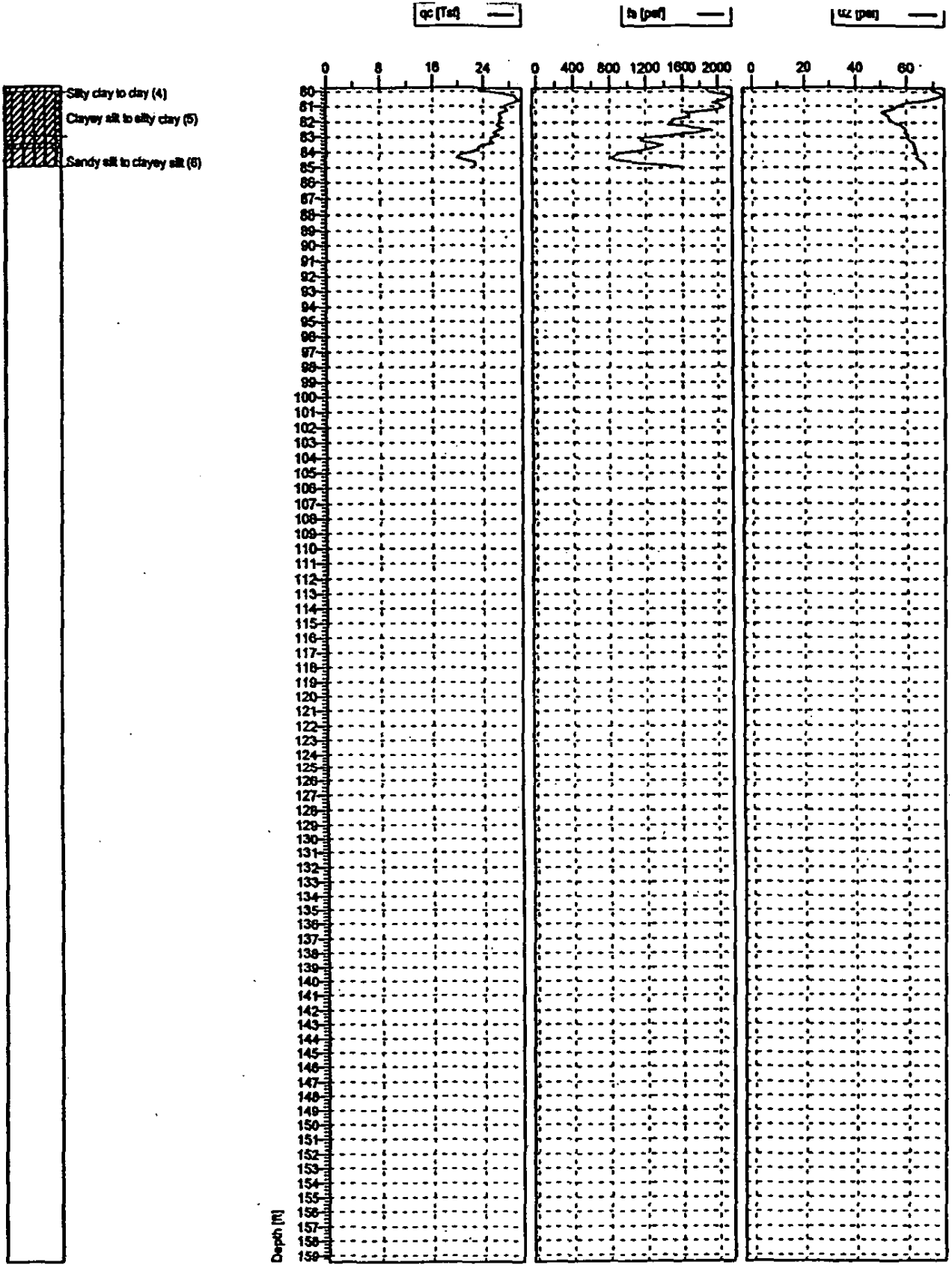
Test no: EE-C-74-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 12-02-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb74.cpd	

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150



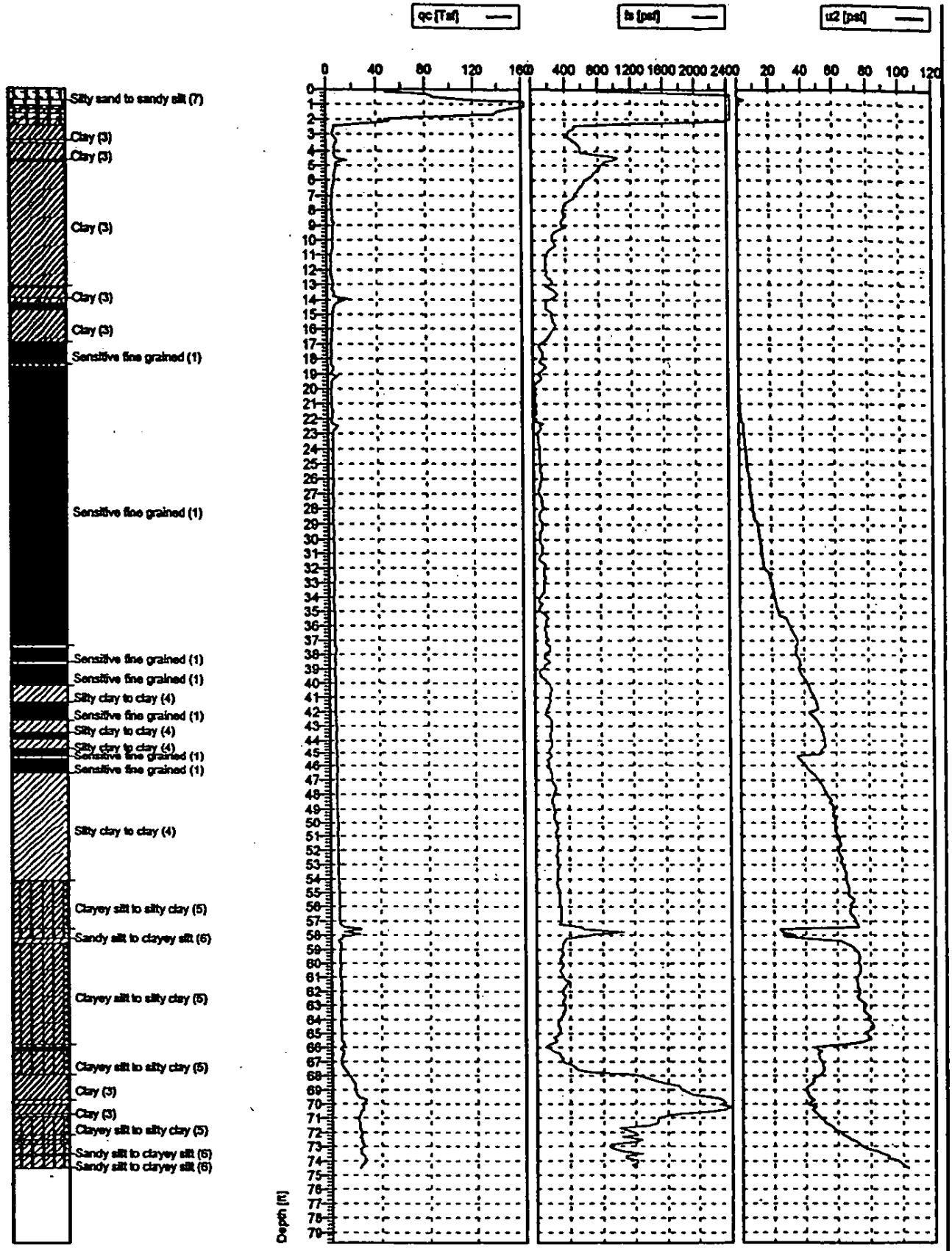
Test no: EE-C-75-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 12-02-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/2	Fig:
		File: Rb75.cpd	

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150



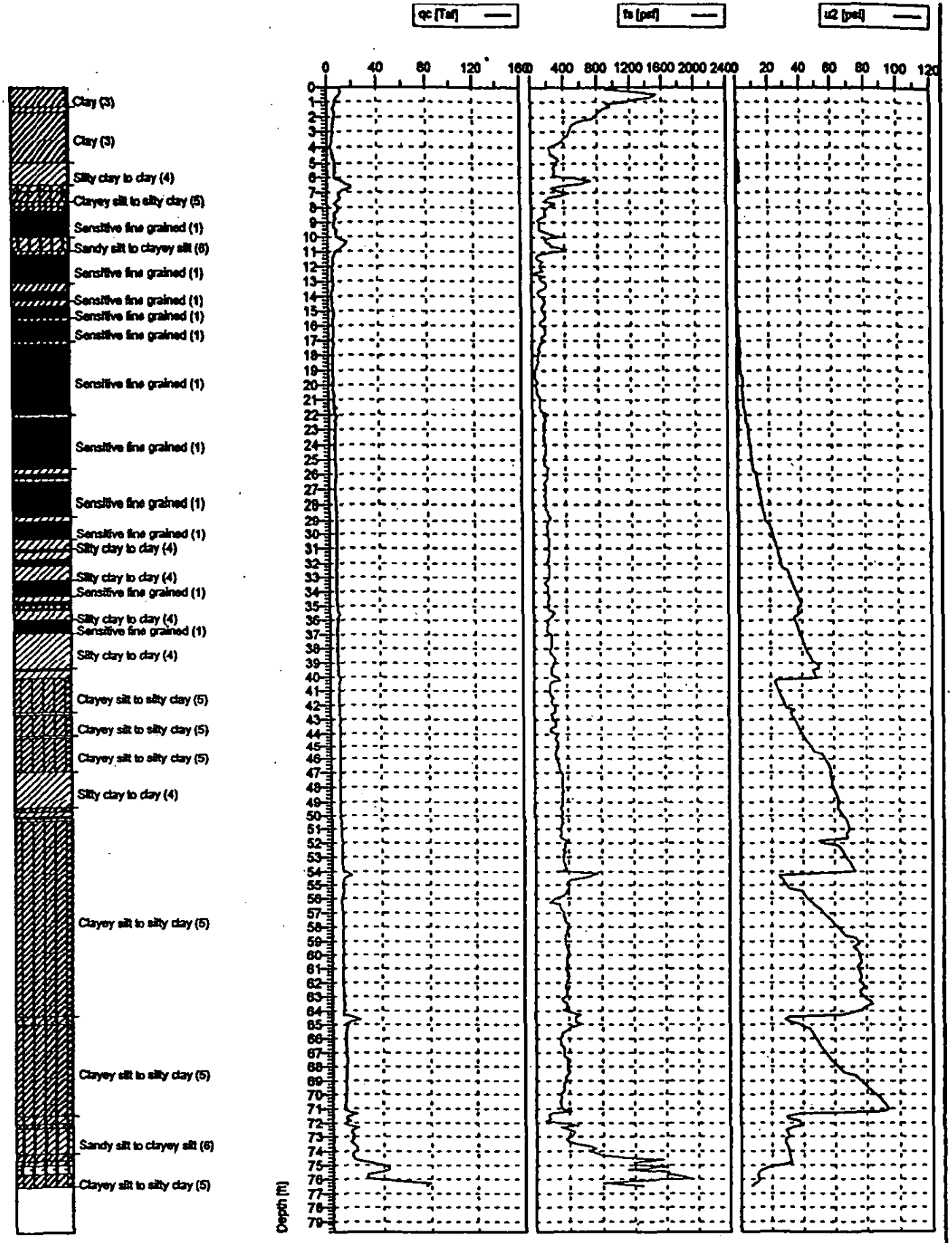
Test no: EE-C-75-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 12-02-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 2/2	Fig:
		File: Rb75.cpt	

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150



Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

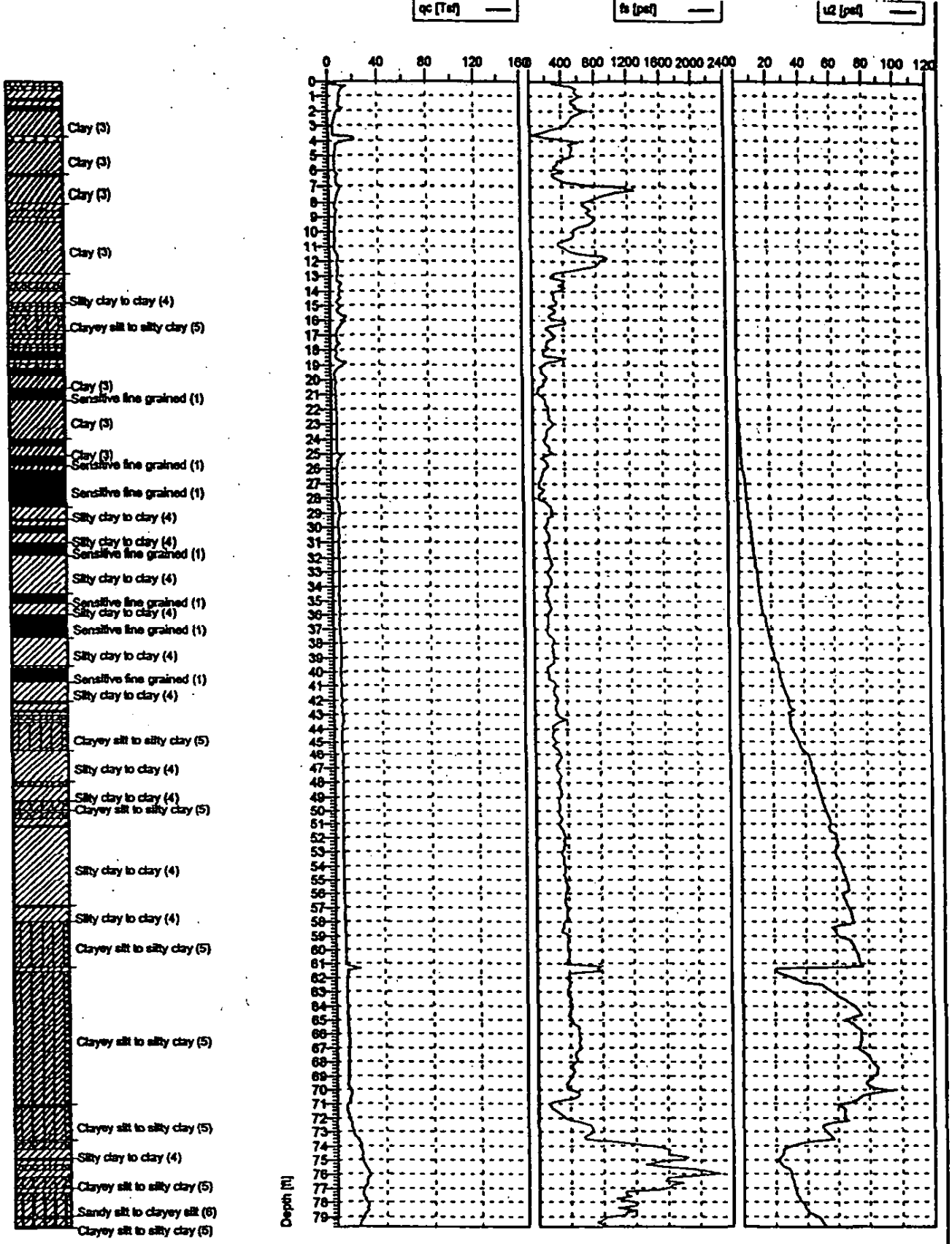
Test no: EE-C-76-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-27-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb76.cpd	



u2

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-77-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 12-02-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/1	Fig:
		File: Rb77.cpd	



u2

Cone No: 702TC
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Test no: EE-C-78-02	Position:	Ground level:	
Client: RIVERBIRCH LANDFILL - WEST EXPANSION		Date: 11-27-02	Scale: 1 : 120
Project: JEFFERSON PARISH, LOUISIANA		Page: 1/2	Fig:
		File: Rb78.cpt	

PART XIV

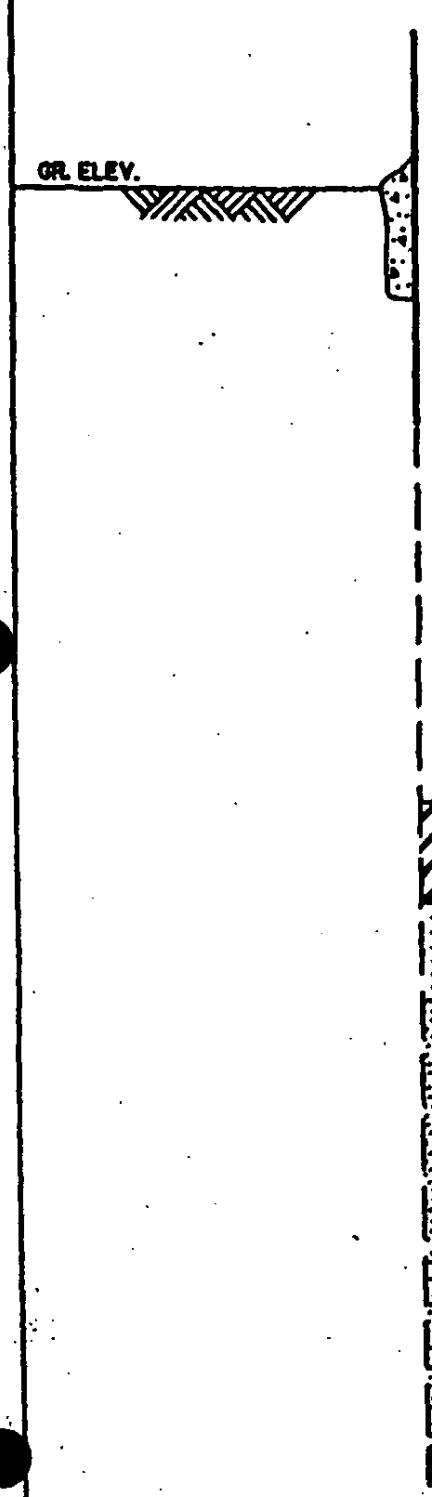
Well Report for Piezometers
P1 thru P6
Eustis Engineering
Geotechnical Investigation
January 6, 2003
and
Boring Logs for Piezometers
EAI-P-1-06 and EAI-P-3-06
Installed by Engineering Associates, Inc.
October 2006

GEOTECHNICAL ENGINEERS
METAIRIE, LOUISIANA

WELL REPORT

NAME OF PROJECT River Bend Landfill

WELL NO. P-1 SOIL TECHNICIAN _____ DATE 12-3-02



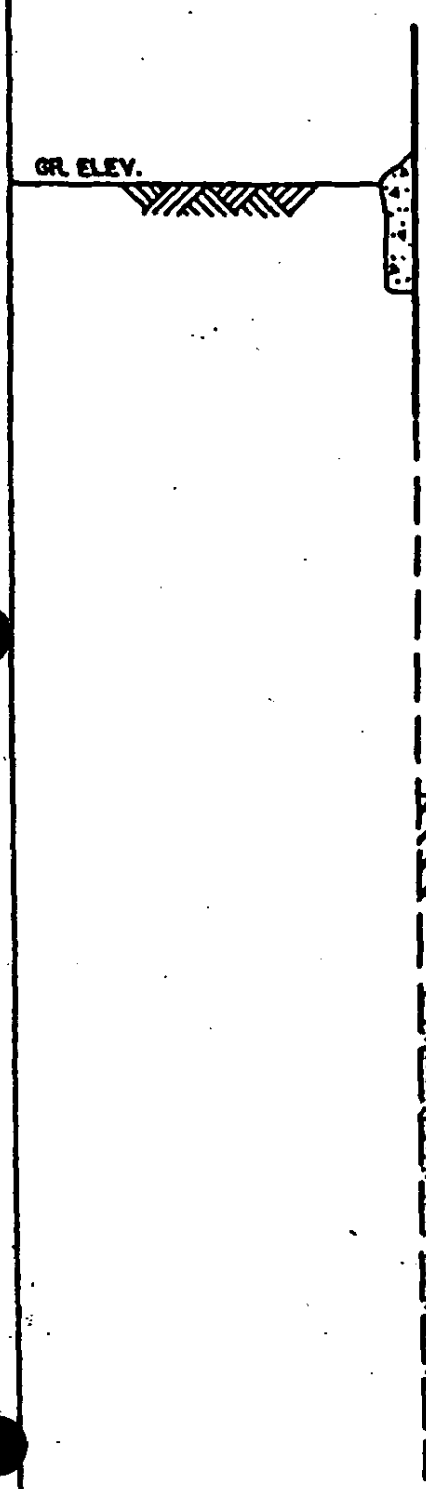
ELEV. TOP OF RISER PIPE	2.5' above Ground
ELEV. TOP OF SURFACE CASING	
LENGTH OF RISER ABOVE GROUND	
LENGTH OF CASING ABOVE GROUND	
TYPE SURFACE SEAL	None
DEPTH OF SURFACE SEAL BELOW GROUND	
TYPE SURFACE CASING	None
I.D. OF SURFACE CASING	
DEPTH OF CASING BELOW GROUND	
TYPE RISER PIPE	1-10', 1-5', 1-2.5'
I.D. OF RISER PIPE	
DIAMETER OF BOREHOLE	6"
TYPE BACKFILL	
ELEV./DEPTH TOP OF SEAL	0'
TYPE SEAL	Grout
ELEV./DEPTH BOTTOM OF SEAL	14.0'
TYPE INTERMEDIATE PACK	Pellets
ELEV./DEPTH TOP OF SAND PACK	14.0'
TYPE SAND PACK	20/80
ELEV./DEPTH TOP OF SCREEN	15.0'
TYPE SCREEN	5'-PVC
SCREEN OPENINGS	.010
I.D. OF SCREEN	2"
ELEV./DEPTH BOTTOM OF SCREEN	20.0'
LENGTH OF SUMP SECTION	30' with cap
ELEV./DEPTH PLUGGED BOTTOM	23.0'
TYPE BACKFILL BELOW PIPE	
ELEV./DEPTH BOTTOM OF HOLE	23.0'

GEOTECHNICAL ENGINEERS
METAIRIE, LOUISIANA

WELL REPORT

NAME OF PROJECT River Bench Landfill

WELL NO. P-2 SOIL TECHNICIAN _____ DATE 12-3-02



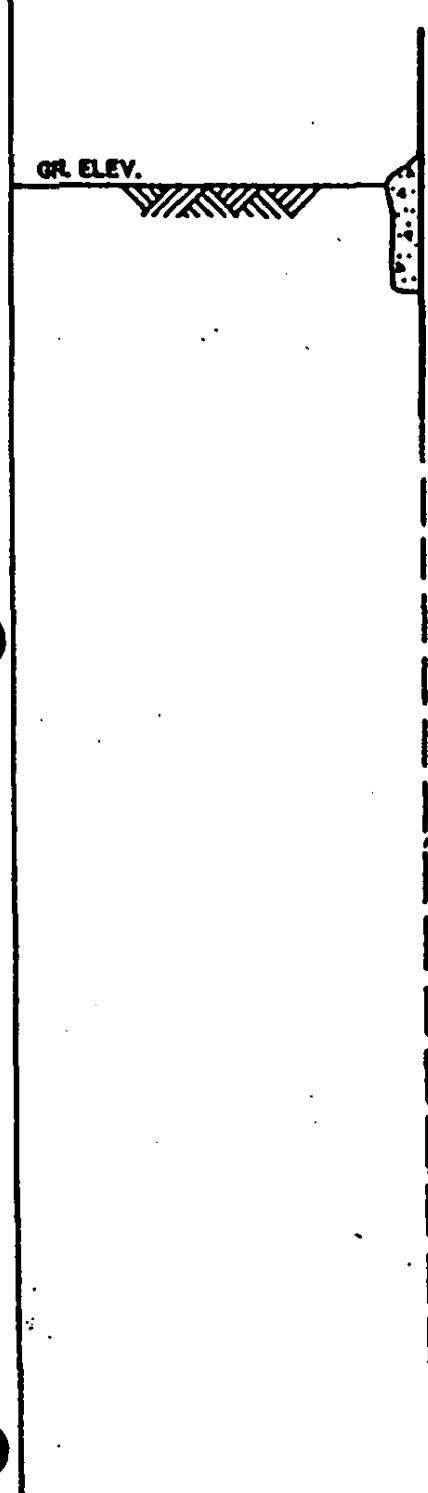
ELEV. TOP OF RISER PIPE	2.5 above Ground
ELEV. TOP OF SURFACE CASING	
LENGTH OF RISER ABOVE GROUND	
LENGTH OF CASING ABOVE GROUND	
TYPE SURFACE SEAL	None
DEPTH OF SURFACE SEAL BELOW GROUND	
TYPE SURFACE CASING	None
I.D. OF SURFACE CASING	
DEPTH OF CASING BELOW GROUND	
TYPE RISER PIPE	3-10', 1-2.5'
I.D. OF RISER PIPE	2"
DIAMETER OF BOREHOLE	6"
TYPE BACKFILL	
ELEV./DEPTH TOP OF SEAL	0'
TYPE SEAL	Grout
ELEV./DEPTH BOTTOM OF SEAL	26.0'
TYPE INTERMEDIATE PACK	Pellets
ELEV./DEPTH TOP OF SAND PACK	29.0'
TYPE SAND PACK	30/80
ELEV./DEPTH TOP OF SCREEN	30.0'
TYPE SCREEN	10' PVC - 2"
SCREEN OPENINGS	.010
I.D. OF SCREEN	2"
ELEV./DEPTH BOTTOM OF SCREEN	40.0
LENGTH OF SUMP SECTION	3.0' with c
ELEV./DEPTH PLUGGED BOTTOM	43.0'
TYPE BACKFILL BELOW PIPE	
ELEV./DEPTH BOTTOM OF HOLE	43.0'

GEOTECHNICAL ENGINEERS
METAIRIE, LOUISIANA

WELL REPORT

NAME OF PROJECT River Beach Land Fill

WELL NO. P-3 SOIL TECHNICIAN _____ DATE 11-25-02



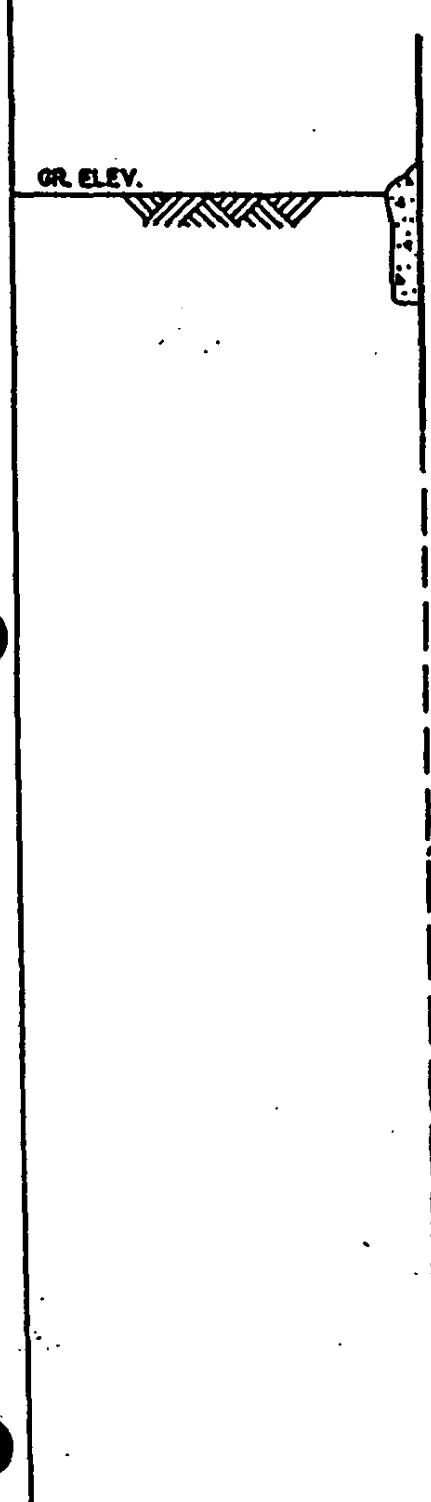
ELEV. TOP OF RISER PIPE	2.5' above G.
ELEV. TOP OF SURFACE CASING	
LENGTH OF RISER ABOVE GROUND	
LENGTH OF CASING ABOVE GROUND	
TYPE SURFACE SEAL	None
DEPTH OF SURFACE SEAL BELOW GROUND	
TYPE SURFACE CASING	None
I.D. OF SURFACE CASING	
DEPTH OF CASING BELOW GROUND	
TYPE RISER PIPE	1-10', 1-5', 1-2½'
I.D. OF RISER PIPE	
DIAMETER OF BOREHOLE	6"
TYPE BACKFILL	
ELEV./DEPTH TOP OF SEAL	0'
TYPE SEAL	Grout
ELEV./DEPTH BOTTOM OF SEAL	11'
TYPE INTERMEDIATE PACK	Pellets
ELEV./DEPTH TOP OF SAND PACK	14'
TYPE SAND PACK	20/40
ELEV./DEPTH TOP OF SCREEN	15'
TYPE SCREEN	5'- PVC
SCREEN OPENINGS	.010
I.D. OF SCREEN	2"
ELEV./DEPTH BOTTOM OF SCREEN	20.0'
LENGTH OF SUMP SECTION	2.5'
ELEV./DEPTH PLUGGED BOTTOM	22.5'
TYPE BACKFILL BELOW PIPE	
ELEV./DEPTH BOTTOM OF HOLE	22.5'

GEOTECHNICAL ENGINEERS
METAIRIE, LOUISIANA

WELL REPORT

NAME OF PROJECT River Birch Landfill

WELL NO. P-4 SOIL TECHNICIAN _____ DATE 11-25-02



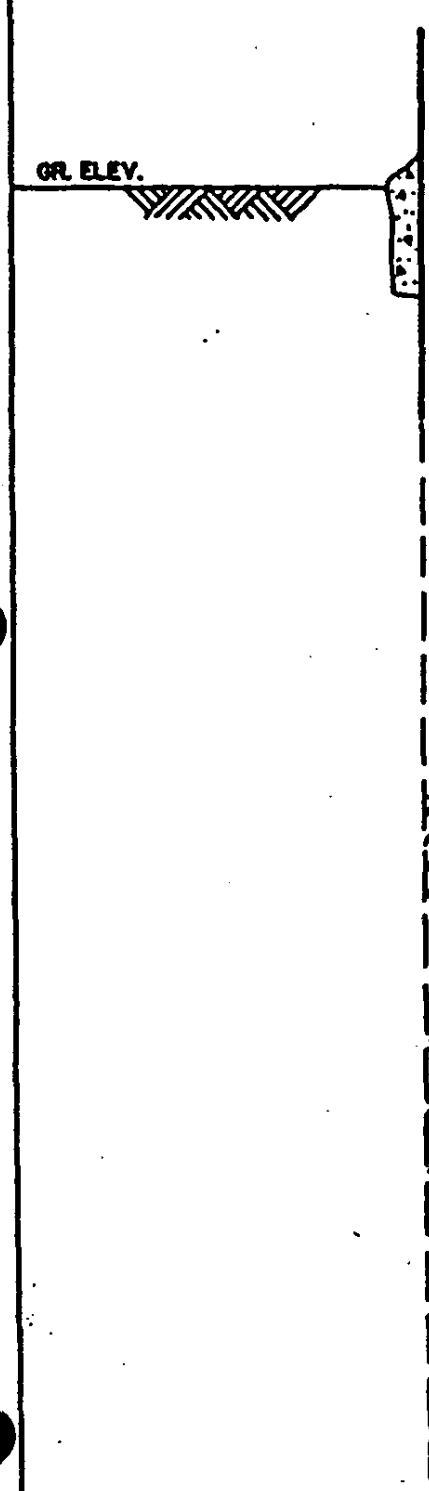
ELEV. TOP OF RISER PIPE	2.5 above Grou
ELEV. TOP OF SURFACE CASING	
LENGTH OF RISER ABOVE GROUND	
LENGTH OF CASING ABOVE GROUND	
TYPE SURFACE SEAL	
DEPTH OF SURFACE SEAL BELOW GROUND	
TYPE SURFACE CASING	None
I.D. OF SURFACE CASING	
DEPTH OF CASING BELOW GROUND	
TYPE RISER PIPE	3-10', 1-2.5'
I.D. OF RISER PIPE	2"
DIAMETER OF BOREHOLE	8"
TYPE BACKFILL	
ELEV./DEPTH TOP OF SEAL	0'
TYPE SEAL	Grout
ELEV./DEPTH BOTTOM OF SEAL	26'
TYPE INTERMEDIATE PACK	Pellets
ELEV./DEPTH TOP OF SAND PACK	29'
TYPE SAND PACK	20/40
ELEV./DEPTH TOP OF SCREEN	30.0'
TYPE SCREEN	10' PVC
SCREEN OPENINGS	.010
I.D. OF SCREEN	2"
ELEV./DEPTH BOTTOM OF SCREEN	40.0'
LENGTH OF SUMP SECTION	2.5
ELEV./DEPTH PLUGGED BOTTOM	2.5
TYPE BACKFILL BELOW PIPE	
ELEV./DEPTH BOTTOM OF HOLE	42.5

GEOTECHNICAL ENGINEERS
METAIRIE, LOUISIANA

WELL REPORT

NAME OF PROJECT *River Birch Landfill*

WELL NO. *P-5* SOIL TECHNICIAN _____ DATE *12-2-02*



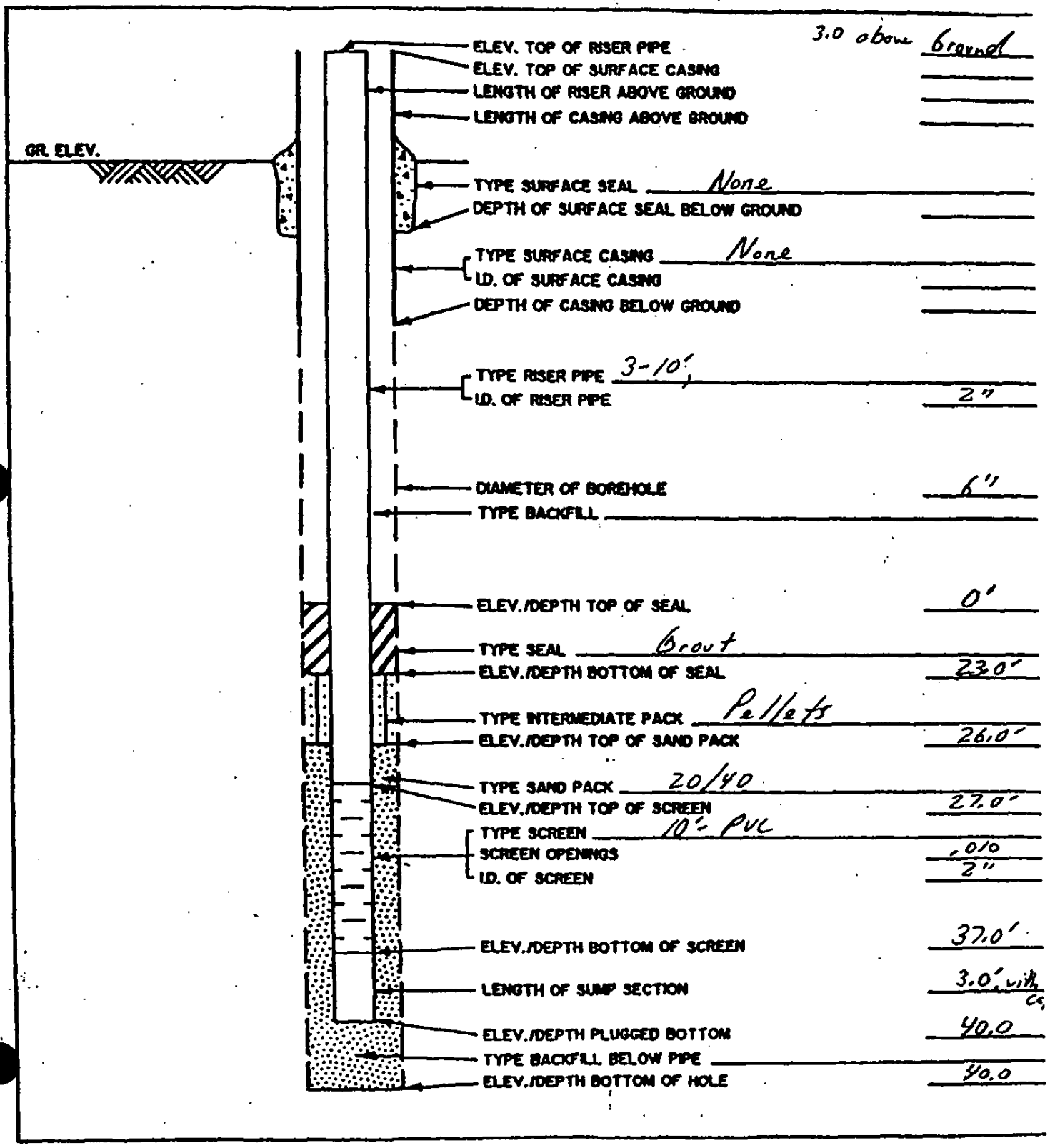
ELEV. TOP OF RISER PIPE	*3.0 above Ground*
ELEV. TOP OF SURFACE CASING	
LENGTH OF RISER ABOVE GROUND	
LENGTH OF CASING ABOVE GROUND	
TYPE SURFACE SEAL	*None*
DEPTH OF SURFACE SEAL BELOW GROUND	
TYPE SURFACE CASING	*None*
I.D. OF SURFACE CASING	
DEPTH OF CASING BELOW GROUND	
TYPE RISER PIPE	*1-10', 1-5'*
I.D. OF RISER PIPE	*2"*
DIAMETER OF BOREHOLE	*6"*
TYPE BACKFILL	
ELEV./DEPTH TOP OF SEAL	*0.0'*
TYPE SEAL	*Grout*
ELEV./DEPTH BOTTOM OF SEAL	*8.0'*
TYPE INTERMEDIATE PACK	*Pellets*
ELEV./DEPTH TOP OF SAND PACK	*11.0'*
TYPE SAND PACK	*20/40*
ELEV./DEPTH TOP OF SCREEN	*12.0'*
TYPE SCREEN	*5' - PVC*
SCREEN OPENINGS	*.010*
I.D. OF SCREEN	*2"*
ELEV./DEPTH BOTTOM OF SCREEN	*17.0'*
LENGTH OF SUMP SECTION	*3.0' with*
ELEV./DEPTH PLUGGED BOTTOM	*20.0*
TYPE BACKFILL BELOW PIPE	
ELEV./DEPTH BOTTOM OF HOLE	*20.0'*

GEOTECHNICAL ENGINEERS
METAIRIE, LOUISIANA

WELL REPORT

NAME OF PROJECT *River Birch Land Fill*

WELL NO. *P-6* SOIL TECHNICIAN _____ DATE *12-02-02*



ELEV. TOP OF RISER PIPE	3.0 above Ground
ELEV. TOP OF SURFACE CASING	
LENGTH OF RISER ABOVE GROUND	
LENGTH OF CASING ABOVE GROUND	
TYPE SURFACE SEAL	None
DEPTH OF SURFACE SEAL BELOW GROUND	
TYPE SURFACE CASING	None
I.D. OF SURFACE CASING	
DEPTH OF CASING BELOW GROUND	
TYPE RISER PIPE	3-10'
I.D. OF RISER PIPE	2"
DIAMETER OF BOREHOLE	6"
TYPE BACKFILL	
ELEV./DEPTH TOP OF SEAL	0'
TYPE SEAL	Grout
ELEV./DEPTH BOTTOM OF SEAL	23.0'
TYPE INTERMEDIATE PACK	Pellets
ELEV./DEPTH TOP OF SAND PACK	26.0'
TYPE SAND PACK	20/40
ELEV./DEPTH TOP OF SCREEN	27.0'
TYPE SCREEN	10' PVC
SCREEN OPENINGS	.010
I.D. OF SCREEN	2"
ELEV./DEPTH BOTTOM OF SCREEN	37.0'
LENGTH OF SUMP SECTION	3.0' with Cap
ELEV./DEPTH PLUGGED BOTTOM	40.0
TYPE BACKFILL BELOW PIPE	
ELEV./DEPTH BOTTOM OF HOLE	40.0

BORING LOGS FOR PIEZOMETERS EAI-P-1-06 AND EAI-P-3-06

SOIL BORING LOG

PROJECT NUMBER: *21140*	**PROJECT NAME:** *River Birch Landfill*				
BORING NUMBER: *EAI-P-1-06*	**COORDINATES:** *NA*			**DATE:**	*10/28/06*
ELEVATION : *NA*	**GWL: DEPTH:** *12 ft bgs*		**TIME:**	**DATE STARTED:**	*10/28/06*
ENGINEERING ASSOCIATES PERSONNEL:	*S. Funderburk*			**DATE COMPLETED:**	*10/28/06*
DRILLING METHOD: *Direct Push*				**PAGE 1 OF 2**	

DEPTH FEET	SAMPLE METHOD & NO	SAMPLE TIME & % RECOVERY	DESCRIPTION	USCS SYMBOL	PID (ppm)
	0'-2'		(0'-1') Stiff, brown CLAY, dry, root fragments		
			(1'-5') Soft, brown CLAY, wood and root fragments		
	2'-4'				
5	4'-6'			CL	
			(5'-9.5') Soft, gray CLAY, moist		
	6'-8'				
	8'-10'		(9.5'-10') Soft, brown peat with root fragments		
10				PT	
	10'-12'		(10'-13') Soft, gray CLAY, wet at 12 ft	CH	NA
	12'-14'				
15	14'-16'		piezometer set at 13 ft bgs-8ft screen, 5ft riser		
	16'-18'				
	18'-20'				
	20'-22'				
	22'-24'				

Notes: *Static water level from TOC = 10.59 on 10/26/06*

NA = Not Available
NR = No Recovery
ft bgs = feet below ground surface
** Sample selected for lab analysis*
PID = Photoionization Detector

Drilling Subcontractor:
Driller:

*QA Approved by:*_____

SOIL BORING LOG

PROJECT NUMBER: *21140*	**PROJECT NAME:** *River Birch Landfill*				
BORING NUMBER: *EAI-P-3-06*	**COORDINATES:** *NA*			**DATE:**	*10/28/06*
ELEVATION : *NA*	**GWL: DEPTH:** *11 ft bgs*		**TIME:**	**DATE STARTED:**	*10/28/06*
ENGINEERING ASSOCIATES PERSONNEL:	*S. Funderburk*			**DATE COMPLETED:**	*10/28/06*
DRILLING METHOD: *Direct Push*				**PAGE 1 OF 1**	

DEPTH FEET	SAMPLE METHOD & NO	SAMPLE TIME & % RECOVERY	DESCRIPTION	USCS SYMBOL	PID (ppm)
	0'-2'		*(0'-1') Stiff, brown CLAY, with wood and root fragments*		
			(1'-4.5') Soft, gray CLAY, with wood and root fragments		
	2'-4'				
			(4.5'-4.6') Wood		
5	4'-6'		*(4.6'-11') Soft, gray CLAY with root fragments*	*CL*	
			(5'-9.5') Soft, gray CLAY, moist		
	6'-8'				
	8'-10'				
10					
	10'-12'				*NA*
			(11'-16') Soft, gray CLAY, wet		
	12'-14'			*CH*	
15	14'-16'				
	16'-18'		*2" piezometer set at 16 ft bgs-10ft screen, 7ft riser*		
	18'-20'				
	20'-22'				
	22'-24'				

Notes: *Static water level from TOC = 14.10 on 10/26/06*

NA = Not Available
NR = No Recovery
ft bgs = feet below ground surface
** Sample selected for lab analysis*
PID = Photoionization Detector

Drilling Subcontractor:
Driller:

*QA Approved by:*_____

PART XV

Supplemental Geotechnical Information
Eustis Engineering
January 10, 2003

EUSTIS ENGINEERING COMPANY, INC.
3011 28TH STREET
METAIRIE, LOUISIANA 70002-6019
PN 504-834-0157 / FN 504-834-0354
EMAIL: INFO@EUSTISENG.COM / SITE: WWW.EUSTISENG.COM

10 January 2003

River Birch, Inc.
Post Office Box 1938
Gretna, Louisiana 70054

Attention Mr. A. J. Ward

Gentlemen:

Supplemental Geotechnical Information
River Birch Landfill
West Expansion
Jefferson Parish, Louisiana
Eustis Engineering Project No. 17543

Reference our geotechnical report dated 6 January 2003 recently completed for the West Expansion of River Birch Landfill. This letter transmits hydrogeologic information developed after the report of the geotechnical investigation was assembled. Specifically, presented herein are the results of ground water flow studies completed for the project.

Data collected during the ground water flow studies is best communicated in the context of the site geology. The geologic framework presented in the geotechnical report emphasized site characterization with respect to subsoil properties that influence the stability of the landfill. This letter emphasizes the character of the site lithology with respect to the presence and conduction of ground water. This letter further provides greater detail of site lithology than that provided in the geotechnical report.

Enclosure 1 shows the locations of soil borings and cone penetrometer tests (CPTu) completed for the project. Procedures used to drill the soil borings, push the cone penetrometer, and plug all bore holes have been previously described in the geotechnical report of 6 January 2003. Enclosure 1 also identifies the locations of geologic cross-sections through the site. These cross-sections are shown on Enclosures 2 through 11.

The site is generally comprised of Holocene Age sediments overlying Pleistocene Age sediments. The uppermost 10 to 24 feet of Holocene Deposits are backswamp deposits.

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These soils typically consist of extremely soft to soft gray and brown clay and organic clays having a high content of decayed wood and organic matter. As indicated on the boring logs transmitted with the geotechnical report, decayed wood filled the sample tube in some instances during the continuous sampling operations within the backswamp deposits. Backswamp deposits have been designated as lithologic Unit I in the geotechnical report and this designation is preserved in this letter (see Enclosures 2 through 11).

The backswamp deposits are underlain by a sequence of interdistributary deposits which accreted in a variety of fluvial depositional environments associated with stream meandering, overbank flooding, and other processes. The variety of depositional environments which may have been present at any single plan location dictates that significant variability exists with depth within the interdistributary deposits. In general, these soils can be characterized as very soft to soft gray clays with interbedded lenses of soft gray silty clay and loose gray silt or clayey silt. The interdistributary deposits were interpreted to extend to depths of 50 to 60 feet below the existing ground surface. These soils were identified as lithologic Unit II in figures presented in the geotechnical report and this designation is also preserved in this letter.

At depths varying between 50 and 60 feet below the existing ground surface, prodelta clays and silty clays were encountered. These soils consist of relatively homogeneous deposits of soft to medium stiff gray clay and silty clay containing shells or shell fragments. The Holocene prodelta deposits were identified as lithologic Unit III in the geotechnical report and may be referenced as such in this letter.

The Holocene prodelta deposits were generally found to extend to depths of 65 to 70 feet below the existing ground surface. The base of the Holocene prodelta marks the interface between soils of Holocene Age and those of the Pleistocene Epoch. Localized depressions as much as 15 feet below the general level of the Pleistocene contact were observed at the site (see Boring Nos. EE-C-39-02, EE-B-40-02, EE-C-27-02, and EE-B-28-02).

In the geotechnical report of 6 January 2003, all Pleistocene deposits were identified as Unit IV-A. While that simplification is adequate for describing site geology as it would affect geotechnical stability of the landfill, it was not judged adequate for characterizing ground water flow at the site. In this letter, Pleistocene deposits are divided into four distinct units.

The uppermost 3 to 4 feet of the Pleistocene deposits typically consisted of stiff gray and brown clay containing a high content of wood and organic matter, and gas was frequently encountered in varying volumes within these deposits. These deposits were interpreted to be relic backswamp deposits. At some boring locations, stiff gray and tan clay

approximately 5 to 10 feet thick were encountered in addition to or in lieu of the Pleistocene backswamp deposits. The aggregation of Pleistocene backswamp deposits and stiff gray and tan clay were defined as Lithologic Unit IV-A.

The veneer of stiff clay that forms Unit IV-A was generally underlain by 5 to 20 feet of interbedded clayey silt, sandy silt, and silty sand that are designated as Unit IV-B. It should be noted that the surface of these soils was present as the uppermost Pleistocene surface at several boring locations (see Boring/CPTu Nos. EE-C-1-02, EE-C-4-02, EE-B-5-02, EE-C-9-02, EE-C-19-02, EE-C-25-02, EE-B-26-02, EE-C-27-02, and EE-C-39-02). The soils in Unit IV-B were typically encountered between 65 and 80 feet below the existing ground surface. However, several of the borings and CPTu terminating at a depth of 70 feet below the existing ground surface never contacted Unit IV-B (see, for example, EE-B-10-02, EE-C-11-02, EE-C-33-02, or EE-B-44-02).

The interbedded silts and sands of Unit IV-B were underlain by relatively homogeneous deposits of stiff gray or gray and brown clay and silty clay. These stiff clay strata were designated as Unit VI, and these soils were found to extend 125 to 130 feet below the existing ground surface.

At these depths, massive deposits of dense to very dense gray fine sand and silty sand were encountered in Borings EE-6-02 and EE-B-12-02. These soils have been identified as the "200-ft" sand strata in previous characterizations of the site. In this letter, these sand strata are referenced as Unit VII. Figure 12 of the geotechnical report of 6 January 2003 indicates that these sand strata are typically encountered 200 to 220 feet below the ground surface near the currently active channel of the Mississippi River. However, the figure further indicates the sand strata were encountered at the Pleistocene interface at a depth of approximately 60 feet below the ground surface at a distance of 7000 feet from the Mississippi River along Transection Line A-A. This indicates a rise in the surface of the sand strata that is consistent with the sand being encountered at a depth of approximately 130 feet below the ground surface at the River Birch site.

From this generalized lithology, the nature of ground water flow at the site may be characterized. Because the water table is typically encountered at shallow depths in the vicinity of the site, Unit I may be considered the first occurrence of ground water at the site. Laboratory tests on samples of these soils yielded hydraulic conductivities of 1×10^{-6} cm/s or less. While in situ permeabilities within these soils may be increased by the presence of roots or lenses of more permeable soils, the deposits generally exhibit poor water transmission characteristics. The unit is hydrologically significant as the first zone in which downward flowing seepage would contact ground water. For this reason, this zone was monitored as the first water bearing stratum.

Three temporary standpipe piezometers (EE-P-1-02, EE-P-3-02, and EE-P-5-02) were installed at the locations shown on Enclosure 1 to monitor ground water flow in Unit I. For each of these piezometers a 6-inch bore hole was drilled to a depth of 20 feet below the ground surface using wet rotary techniques. A 2-in. diameter PVC pipe was assembled and inserted into the bore hole. The lowermost sections of the pipe consisted of a 6-in. end cap and a 5-ft slotted screen segment. Solid PVC riser sections were added until the pipe extended from the bottom of the hole to a point approximately 3 feet above the ground surface.

A sand filter was then placed around the 5-ft piezometer screen by tremie. Sufficient sand was placed so that the filter extended a minimum of 1 foot above the top of the screen. Bentonite pellets were then poured into the annulus between the pipe and the bore hole wall and tamped with a steel rod until a 3-ft bentonite plug was created above the sand filter pack. The temporary piezometer was grouted in place by pumping a mixture of 1 part cement to 2 parts bentonite into the annulus between the pipe and bore hole wall. Installation records for these piezometers are provided in Appendix I of this letter.

The ground water levels within these piezometers were recorded on 4 December 2002, 9 December 2002, 17 December 2002, and 3 January 2003. Contours of ground water elevations for each of these dates are shown on Enclosure 11. These contours indicate that ground water flow in Unit I within the area of the proposed west landfill expansion is generally from the northeast to the southwest. This pattern indicates flow away from the Mississippi River. In addition, this pattern confirms prior observations of ground water flow taken for permitting of the existing landfill.

The average gradient of hydraulic head within Unit I was estimated from Enclosure 11 as 1 foot per 2800 feet. Assuming a hydraulic conductivity of 1×10^{-6} cm/s, we estimate the specific discharge (or "Darcy velocity") of ground water in Unit I is 4×10^{-4} ft/yr. Assuming these soils have an average porosity of 70 percent, we estimate the average linear velocity (or "macroscopic velocity) of ground water in Unit I is 5×10^{-4} ft/yr. Secondary permeability introduced by root systems was not considered.

Units II through IV generally consist of massive deposits of relatively impervious subsoils. Laboratory-measured hydraulic conductivities in these units were typically 1×10^{-7} cm/s or less. Because of these low permeabilities, substantial equilibrium times would be required to establish new pore water pressures within Units II through IV in response to pore water pressure changes in Units I or V. That is, these units (Units II through IV) may be effectively considered a single aquitard that is hydrologically independent of the overlying and underlying units (Units I and V, respectively).

The assumption that Unit II (and underlying units) is not hydraulically connected to Unit I was confirmed by additional ground water observations. Three standpipe piezometers (EE-P-2-02, EE-P-4-02, and EE-P-6-02) were installed to a depth of 40 feet at the locations shown on Enclosure 1. Procedures used to install these piezometers were identical to those described previously for the piezometers in Unit I with the exception that the screens were 10 feet long for all piezometers in Unit II. Installation records for these piezometers are included in Appendix I.

Observations of ground water levels for all piezometers in Unit II are shown on Enclosure 12. These observations indicate that ground water within Unit II generally flows from northeast to southwest. The general plan direction for ground water flow is away from the Mississippi River. It should be noted that small upward ground water gradients appear to exist between Units I and II at the locations of piezometers EE-P-1-02, EE-P-2-02, EE-P-3-02, and EE-P-4-02. This upward gradient was not present at the location of piezometers EE-P-5-02 and EE-P-6-02. Upward ground water gradients were observed between piezometers seated in Units I, II, and V in ground water flow studies completed for permitting of the existing landfill.

While Unit V is not encountered within all borings and CPTu locations at the site, its presence is consistent enough that it may be considered continuous. This unit is the first zone in which soils having relatively high hydraulic conductivities exist in substantial thickness. While the volume of water which may be transmitted through this unit is greatly limited by the thickness of the unit (generally 5 to 10 feet) and its low permeability, Unit V may be considered as a permeable zone relative to overlying and underlying lithologic units. Laboratory-measured hydraulic conductivities within these soils were measured at 4×10^{-7} cm/s.

The homogeneous clay strata forming Unit VI should be considered an aquitard having significantly lower hydraulic conductivity than the overlying and underlying units. A single laboratory test in these soils indicated a hydraulic conductivity of 1×10^{-8} cm/s.

Finally, the massive sand strata of Unit VII should be considered an aquifer. No laboratory tests were performed in these soils, though we estimate the hydraulic conductivity of these strata will vary between 1×10^{-4} and 1×10^{-2} cm/s. This sand is the first aquifer specifically identified in local maps of ground water resources. The extent of the "200-ft Sand" (Unit VII) within the project area has been provided in a previous permit application for the River Birch Landfill.

The proposed landfill construction should be expected to temporarily alter the current ground water flow patterns, at least within the footprint of the existing landfill and proposed west expansion. Specifically, the early stages of cell construction will consist of opening

relatively large excavations as much as 40 feet deep. These excavations will function as ground water "sinks" (areas of reduced hydraulic head) that will cause ground water to flow toward the excavations. In areas where ground water currently flows away from the landfill, the flow may be reversed to flow toward the excavations during these phases. If, after construction, the landfill is operated with a pumped underdrain system, these flow reversals may continue indefinitely.

Further temporary modification of the current ground water flow patterns may occur as the accumulated weight of refuse within the landfill mobilizes shear-induced excess pore water pressures in the foundation soils. It should be noted that these pore water pressures are most pronounced in clayey soils that typically function as aquitards (e.g., Units II through IV). Shear-induced excess pore water pressures should be expected to function as a "mound" of increased ground water pressure within the footprint of the landfill. Ground water flow induced by excess pore water pressures may be extremely complex, so that the exact nature of this modification can not be confidently stated. The pressurized ground water should be expected to temporarily flow laterally away from the loaded area (the area causing pressurization of the pore water). Ground water may temporarily flow upward and/or downward to more permeable zones in which pore water pressures have equalized to lower levels than those present within massive clay strata at the site. In any case, the influence of excess pore water pressures on ground water flow should be localized within the footprint of the landfill and should be expected to diminish with time.

If you have any questions, please contact us.

Yours very truly,

EUSTIS ENGINEERING COMPANY, INC.

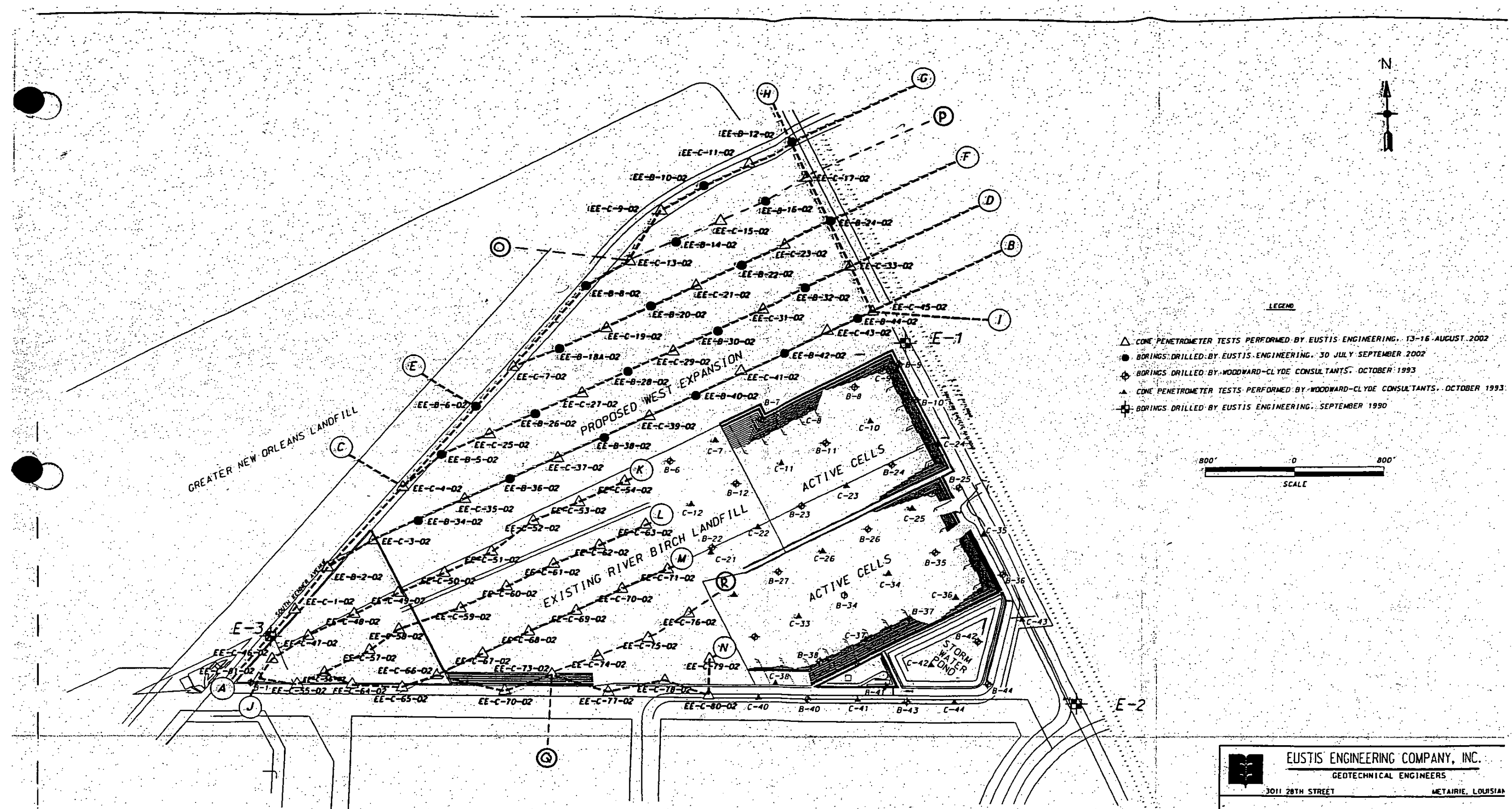
CHRIS L. SAUCIER, P.E.

CLS:ken/

PART XVI

Supplemental Enclosures
From
Eustis Engineering
Geotechnical Information
January 10, 2003

(Boring Location Plan Revised by Engineering Associates, November, 2006)



EUSTIS ENGINEERING COMPANY, INC.

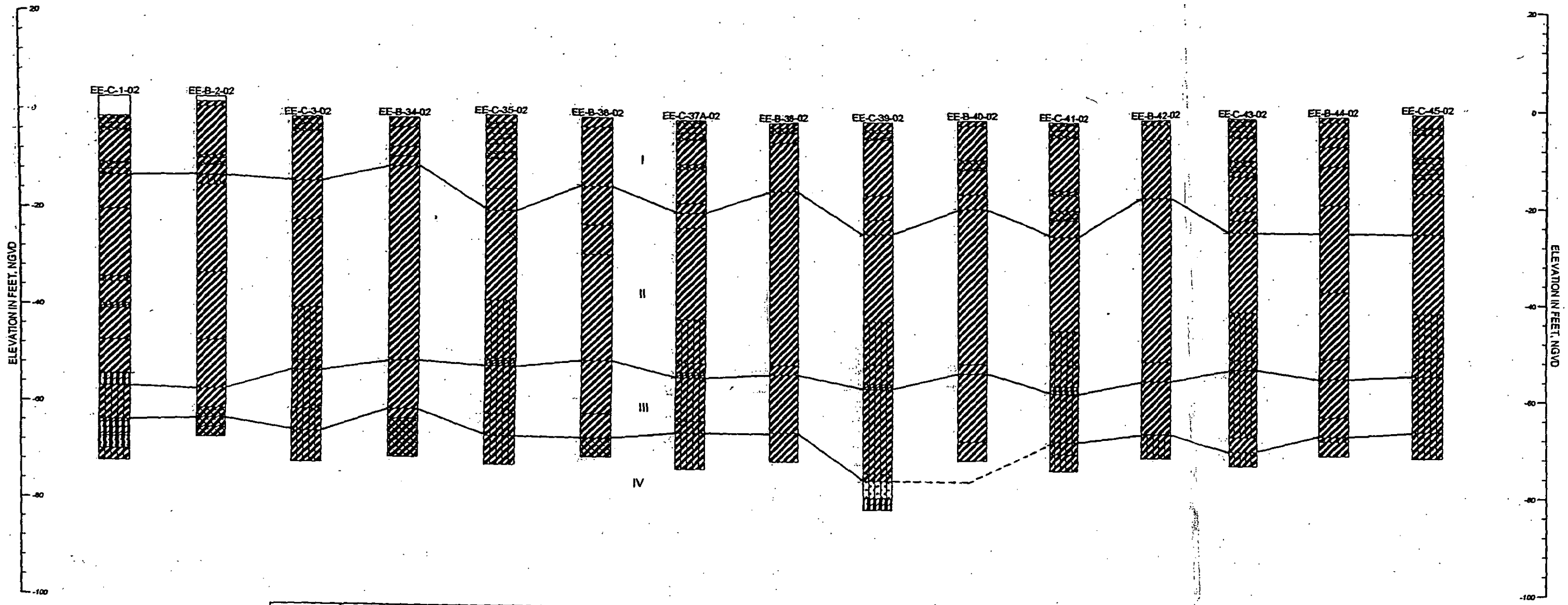
GEOTECHNICAL ENGINEERS

3011 28TH STREET METAIRIE, LOUISIANA

BORING LOCATION PLAN

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: D. LAFONT	PLOT DATE: 16 OCT. 02	CADD FILE: FIGURE 1.DGN
CHECKED BY: C.L.S.	JOB NO.: 17543	FIGURE 1



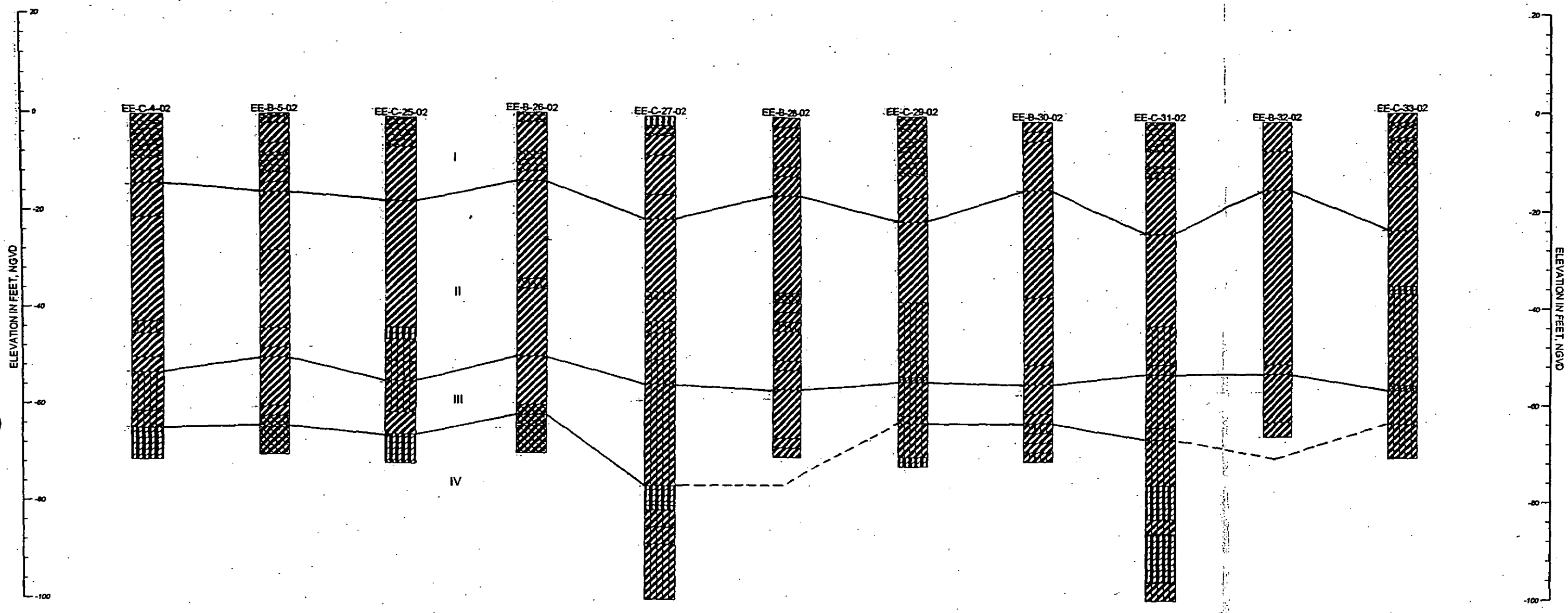
STRATA GROUP NUMBER	NAME	DESCRIPTION
I	INLAND BACKSWAMP DEPOSITS (HOLOCENE)	EXTREMELY SOFT TO MEDIUM STIFF GRAY, BROWN, AND BLACK CLAY AND ORGANIC CLAY WITH WOOD
II	INTERDISTRIBUTARY DEPOSITS (HOLOCENE)	VERY SOFT TO SOFT GRAY CLAY AND SILTY CLAY WITH LENTICULAR INTERRUPTIONS OF LOOSE CLAYEY SILT
III	PRODELTA DEPOSITS (HOLOCENE)	MEDIUM STIFF GRAY CLAY AND SILTY CLAY WITH SHELL FRAGMENTS
IV	PLEISTOCENE PRAIRIE DEPOSITS (PLEISTOCENE)	STIFF TO VERY STIFF GREENISH-GRAY AND TAN SILTY CLAY, MEDIUM COMPACT TAN CLAYEY SILT AND SANDY SILT, AND LOOSE TO MEDIUM DENSE TAN SILTY SAND

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28th STREET METAIRIE, LOUISIANA

CROSS-SECTION A - B

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: CLS	DATE: 11 DEC 2002	FILENAME: XSECAB
CHECKED BY: WWG	JOB NO. 17543	FIGURE: 2



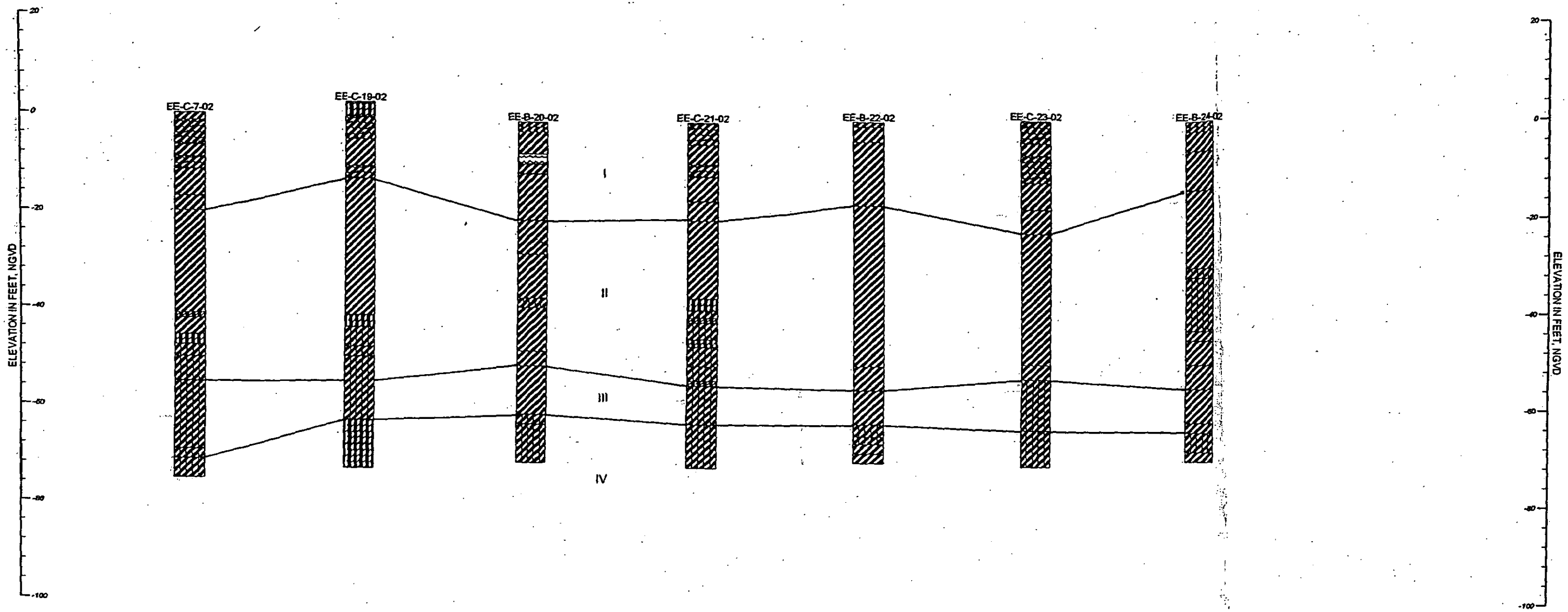
STRATA GROUP NUMBER	NAME	DESCRIPTION
I	INLAND BACKSWAMP DEPOSITS (HOLOCENE)	EXTREMELY SOFT TO MEDIUM STIFF GRAY, BROWN, AND BLACK CLAY AND ORGANIC CLAY WITH WOOD
II	INTERDISTRIBUTARY DEPOSITS (HOLOCENE)	VERY SOFT TO SOFT GRAY CLAY AND SILTY CLAY WITH LENTICULAR INTERRUPTIONS OF LOOSE CLAYEY SILT
III	PRODELTA DEPOSITS (HOLOCENE)	MEDIUM STIFF GRAY CLAY AND SILTY CLAY WITH SHELL FRAGMENTS
IV	PLEISTOCENE PRAIRIE DEPOSITS (PLEISTOCENE)	STIFF TO VERY STIFF GREENISH-GRAY AND TAN SILTY CLAY, MEDIUM COMPACT TAN CLAYEY SILT AND SANDY SILT, AND LOOSE TO MEDIUM DENSE TAN SILTY SAND.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28th STREET METAIRIE, LOUISIANA

CROSS-SECTION C - D

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: CLS	DATE: 11 DEC 2002	FILENAME: XSECCD
CHECKED BY: WWG	JOB NO. 17543	FIGURE: 3



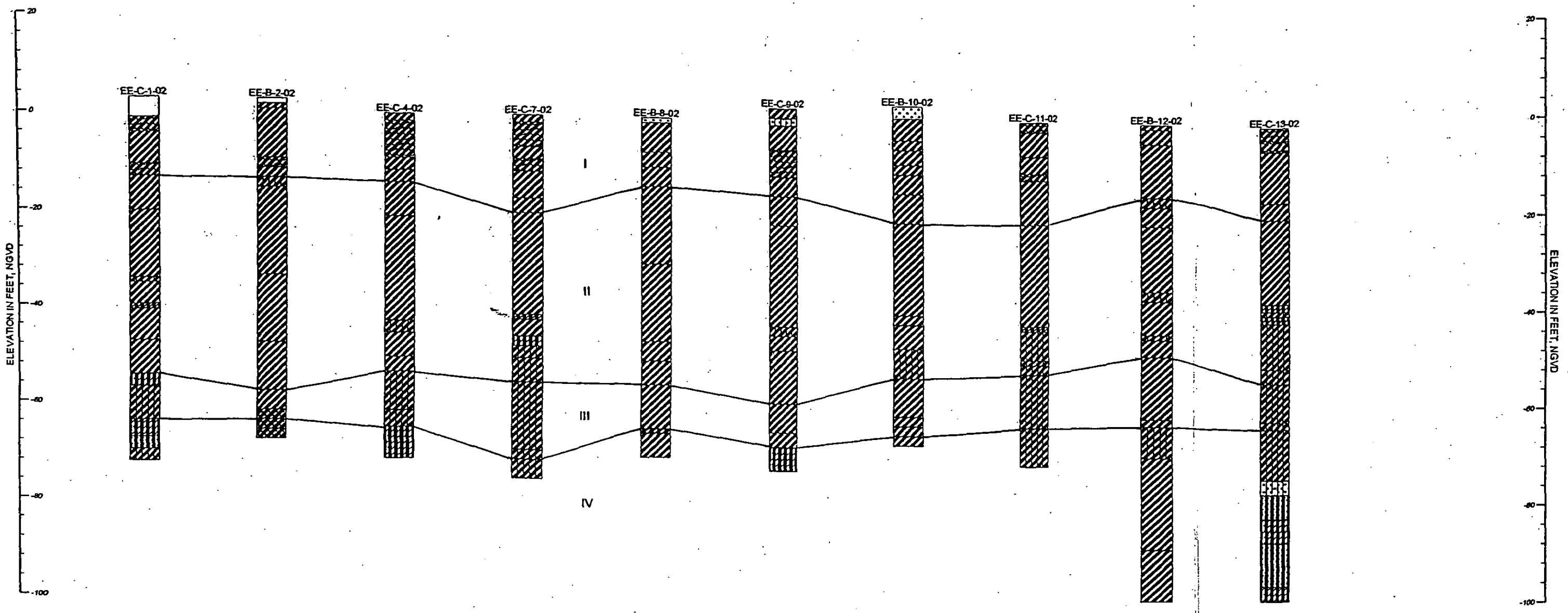
STRATA GROUP NUMBER	NAME	DESCRIPTION
I	INLAND BACKSWAMP DEPOSITS (HOLOCENE)	EXTREMELY SOFT TO MEDIUM STIFF GRAY, BROWN, AND BLACK CLAY AND ORGANIC CLAY WITH WOOD
II	INTERDISTRIBUTARY DEPOSITS (HOLOCENE)	VERY SOFT TO SOFT GRAY CLAY AND SILTY CLAY WITH LENTICULAR INTERRUPTIONS OF LOOSE CLAYEY SILT
III	PRODELTA DEPOSITS (HOLOCENE)	MEDIUM STIFF GRAY CLAY AND SILTY CLAY WITH SHELL FRAGMENTS
IV	PLEISTOCENE PRAIRIE DEPOSITS (PLEISTOCENE)	STIFF TO VERY STIFF GREENISH-GRAY AND TAN SILTY CLAY, MEDIUM COMPACT TAN CLAYEY SILT AND SANDY SILT, AND LOOSE TO MEDIUM DENSE TAN SILTY SAND.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28th STREET METAIRIE, LOUISIANA

CROSS-SECTION E - F

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: CLS	DATE: 11 DEC 2002	FILENAME: XSECEF
CHECKED BY: WWG	JOB NO. 17543	FIGURE: 4



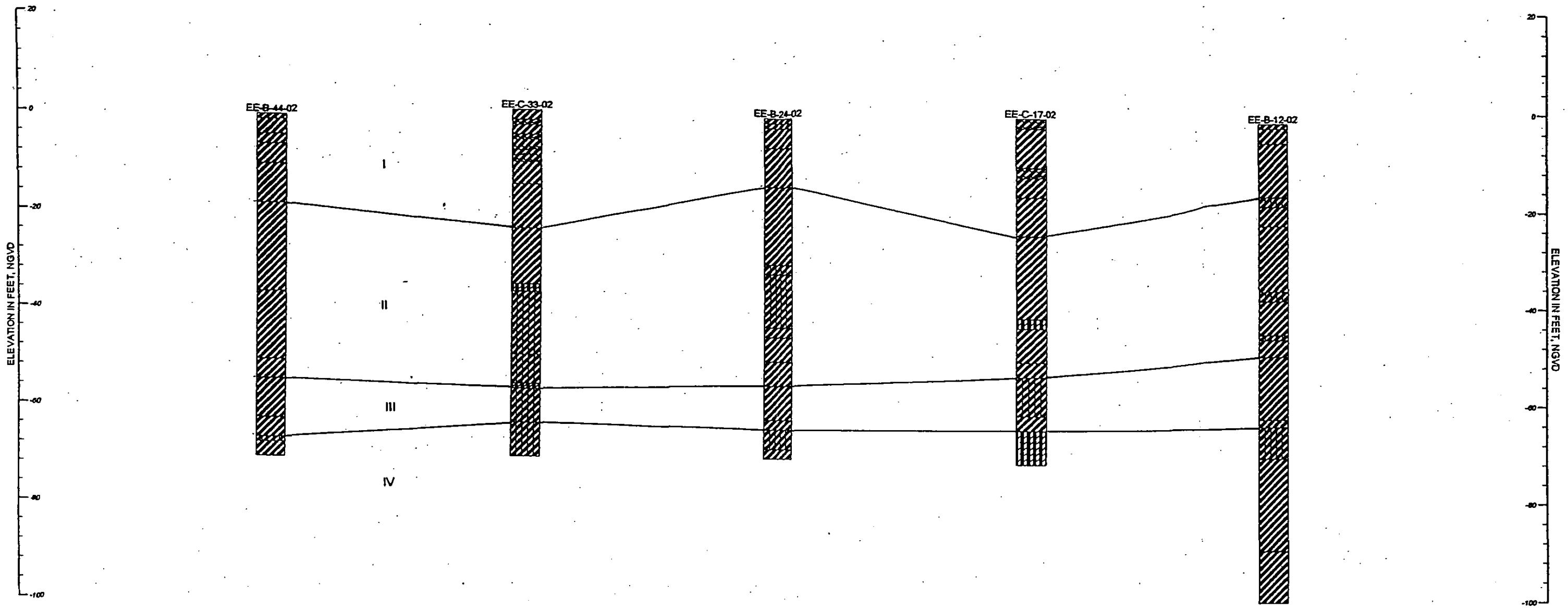
STRATA GROUP NUMBER	NAME	DESCRIPTION
I	INLAND BACKSWAMP DEPOSITS (HOLOCENE)	EXTREMELY SOFT TO MEDIUM STIFF GRAY, BROWN, AND BLACK CLAY AND ORGANIC CLAY WITH WOOD
II	INTERDISTRIBUTARY DEPOSITS (HOLOCENE)	VERY SOFT TO SOFT GRAY CLAY AND SILTY CLAY WITH LENTICULAR INTERRUPTIONS OF LOOSE CLAYEY SILT
III	PRODELTA DEPOSITS (HOLOCENE)	MEDIUM STIFF GRAY CLAY AND SILTY CLAY WITH SHELL FRAGMENTS
IV	PLEISTOCENE PRAIRIE DEPOSITS (PLEISTOCENE)	STIFF TO VERY STIFF GREENISH-GRAY AND TAN SILTY CLAY, MEDIUM COMPACT TAN CLAYEY SILT AND SANDY SILT, AND LOOSE TO MEDIUM DENSE TAN SILTY SAND.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28th STREET METAIRIE, LOUISIANA

CROSS-SECTION A - G

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: CLS	DATE: 11 DEC 2002	FILENAME: XSECAG
CHECKED BY: WWG	JOB NO. 17543	FIGURE: 5



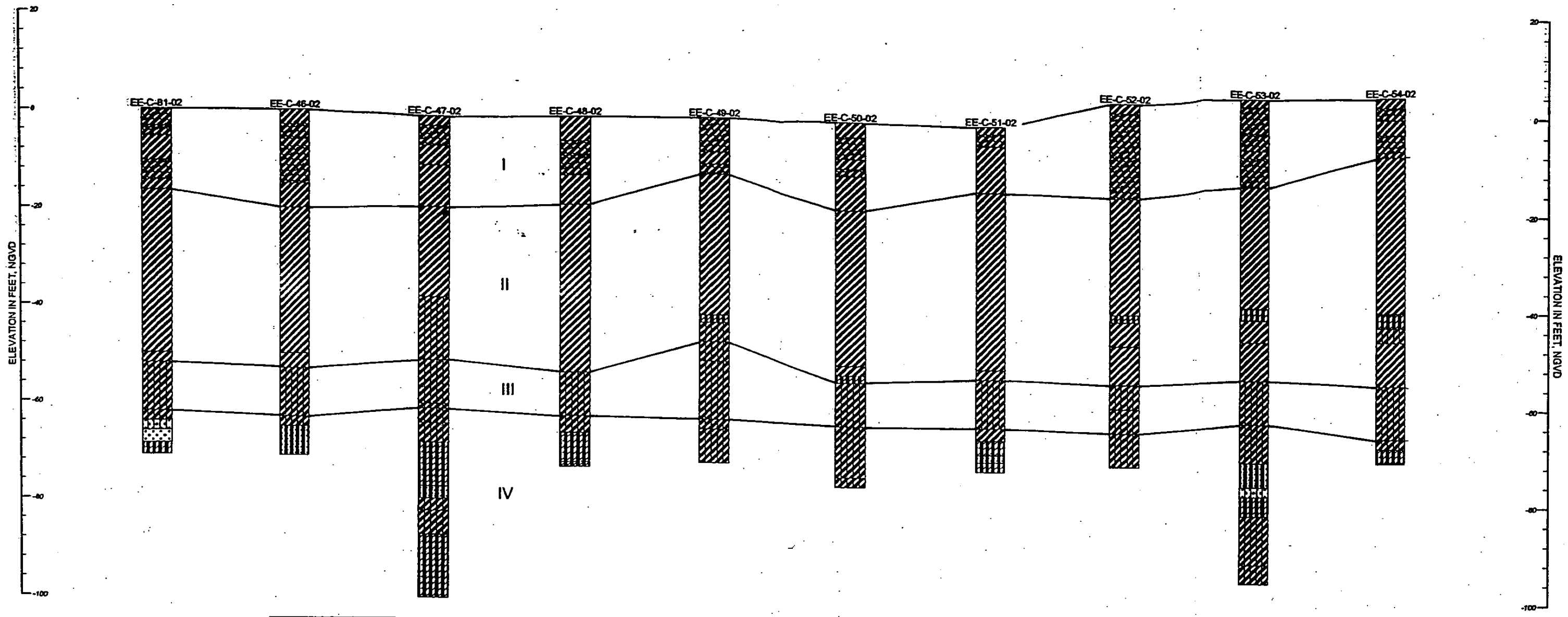
STRATA GROUP NUMBER	NAME	DESCRIPTION
I	INLAND BACKSWAMP DEPOSITS (HOLOCENE)	EXTREMELY SOFT TO MEDIUM STIFF GRAY, BROWN, AND BLACK CLAY AND ORGANIC CLAY WITH WOOD
II	INTERDISTRIBUTARY DEPOSITS (HOLOCENE)	VERY SOFT TO SOFT GRAY CLAY AND SILTY CLAY WITH LENTICULAR INTERRUPTIONS OF LOOSE CLAYEY SILT
III	PRODELTA DEPOSITS (HOLOCENE)	MEDIUM STIFF GRAY CLAY AND SILTY CLAY WITH SHELL FRAGMENTS
IV	PLEISTOCENE PRAIRIE DEPOSITS (PLEISTOCENE)	STIFF TO VERY STIFF GREENISH-GRAY AND TAN SILTY CLAY, MEDIUM COMPACT TAN CLAYEY SILT AND SANDY SILT, AND LOOSE TO MEDIUM DENSE TAN SILTY SAND.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28th STREET METAIRIE, LOUISIANA

CROSS-SECTION H - I

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: CLS	DATE: 11 DEC 2002	FILENAME: XSECHI
CHECKED BY: WWG	JOB NO. 17543	FIGURE: 6



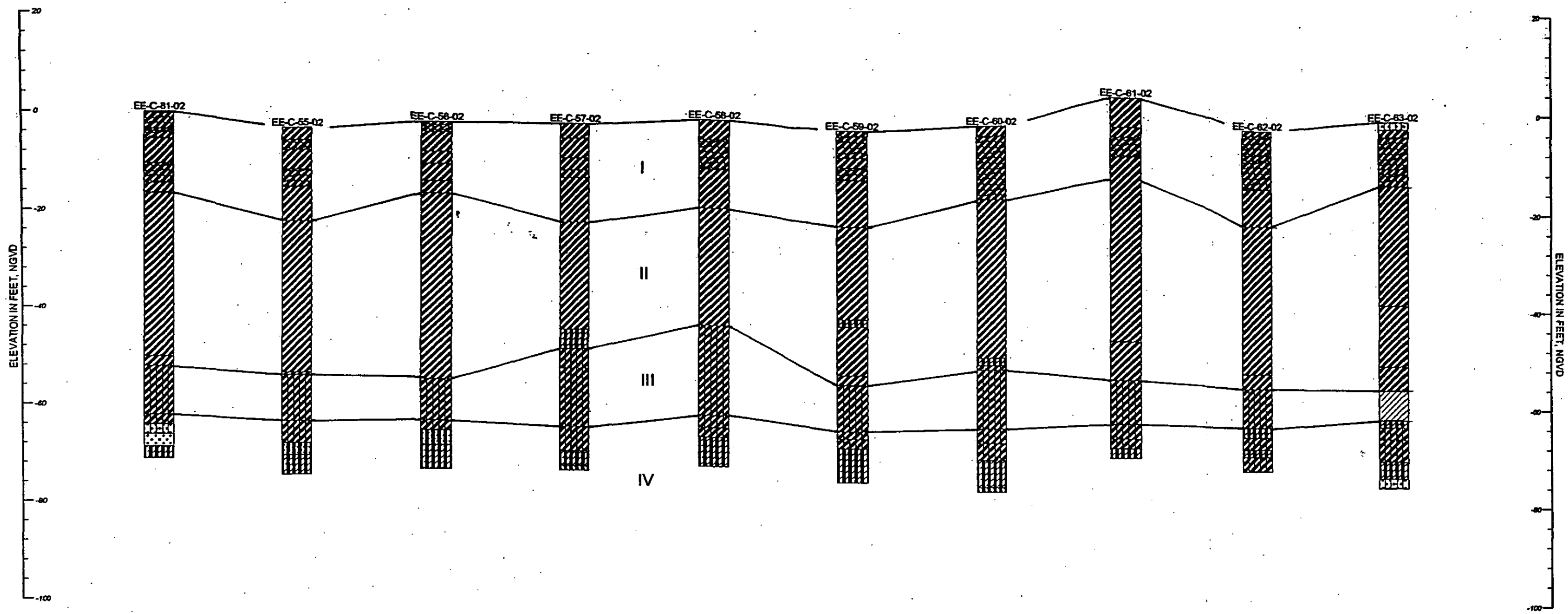
STRATA GROUP NUMBER	NAME	DESCRIPTION
I	INLAND BACKSWAMP DEPOSITS	EXTREMELY SOFT TO MEDIUM STIFF GRAY, BROWN, AND BLACK CLAY AND ORGANIC CLAY WITH WOOD
II	INTERDISTRIBUTARY DEPOSITS	VERY SOFT TO SOFT GRAY CLAY AND SILTY CLAY WITH LENTICULAR INTERRUPTIONS OF LOOSE CLAYEY SILT
III	PRODELTA DEPOSITS	MEDIUM STIFF GRAY CLAY WITH SHELL FRAGMENTS
IV	PLEISTOCENE PRAIRIE DEPOSITS	STIFF TO VERY STIFF GREENISH-GRAY AND TAN SILTY CLAY, MEDIUM COMPACT TAN CLAYEY SILT AND SANDY SILT, AND LOOSE TO MEDIUM DENSE TAN SILTY SAND.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28th STREET METAIRIE, LOUISIANA

CROSS-SECTION J - K

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: CLS	DATE: 11 DEC 2002	FILENAME: XSECJK
CHECKED BY: WWG	JOB NO. 17543	FIGURE: 7



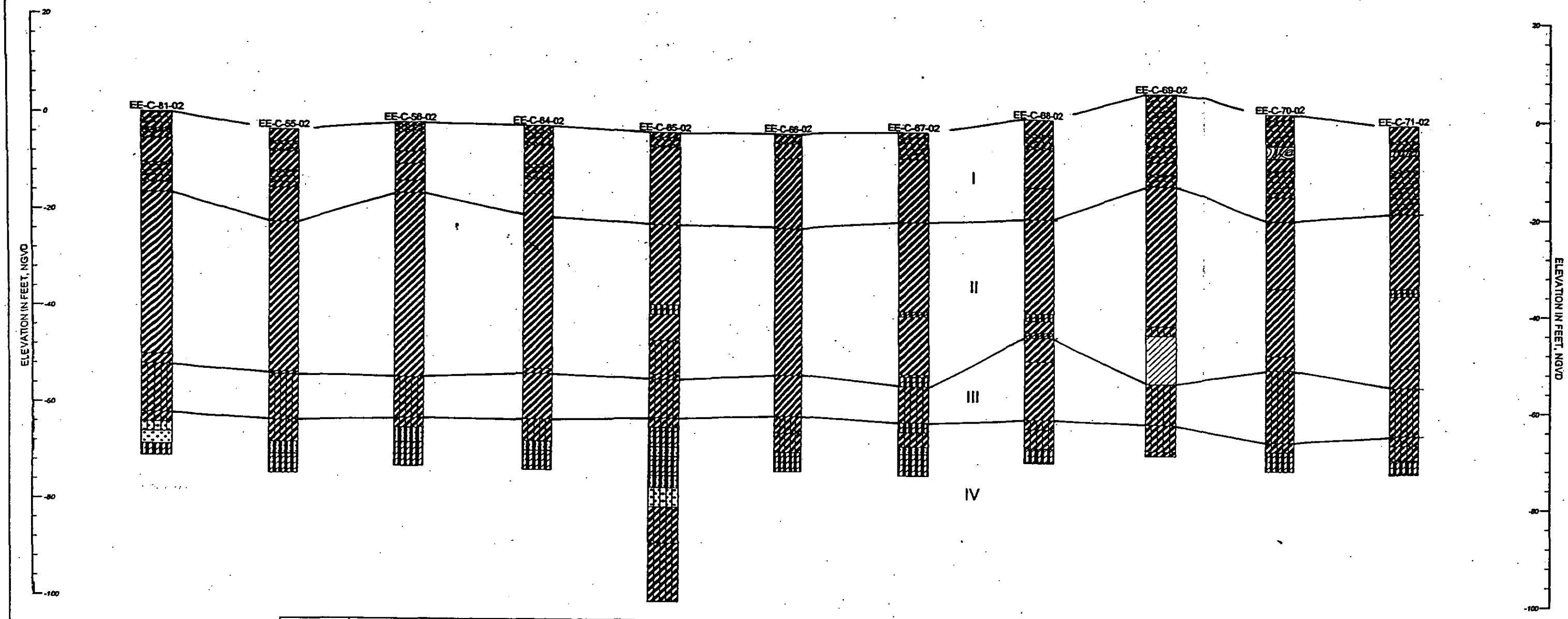
STRATA GROUP NUMBER	NAME	DESCRIPTION
I	INLAND BACKSWAMP DEPOSITS	EXTREMELY SOFT TO MEDIUM STIFF GRAY, BROWN, AND BLACK CLAY AND ORGANIC CLAY WITH WOOD
II	INTERDISTRIBUTARY DEPOSITS	VERY SOFT TO SOFT GRAY CLAY AND SILTY CLAY WITH LENTICULAR INTERRUPTIONS OF LOOSE CLAYEY SILT
III	PRODELTA DEPOSITS	MEDIUM STIFF GRAY CLAY WITH SHELL FRAGMENTS
IV	PLEISTOCENE PRAIRIE DEPOSITS	STIFF TO VERY STIFF GREENISH-GRAY AND TAN SILTY CLAY, MEDIUM COMPACT TAN CLAYEY SILT AND SANDY SILT, AND LOOSE TO MEDIUM DENSE TAN SILTY SAND.

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28th STREET METAIRIE, LOUISIANA

CROSS-SECTION J - L

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: CLS	DATE: 11 DEC 2002	FILENAME: XSECJK
CHECKED BY: WWG	JOB NO. 17543	FIGURE: 8



STRATA GROUP NUMBER	NAME	DESCRIPTION
I	INLAND BACKSWAMP DEPOSITS	EXTREMELY SOFT TO MEDIUM STIFF GRAY, BROWN, AND BLACK CLAY AND ORGANIC CLAY WITH WOOD
II	INTERDISTRIBUTARY DEPOSITS	VERY SOFT TO SOFT GRAY CLAY AND SILTY CLAY WITH LENTICULAR INTERRUPTIONS OF LOOSE CLAYEY SILT
III	PRODELTA DEPOSITS	MEDIUM STIFF GRAY CLAY WITH SHELL FRAGMENTS
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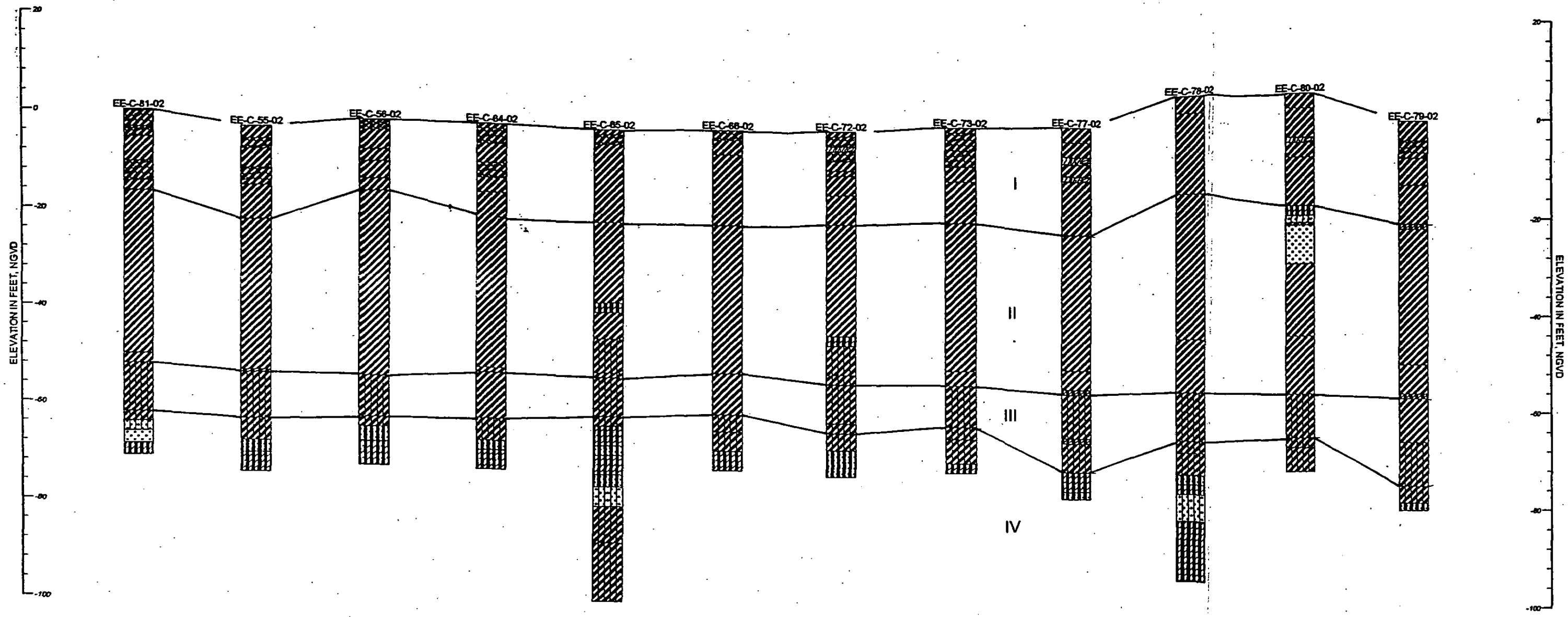
EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28th STREET METAIRIE, LOUISIANA

CROSS-SECTION J - M

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: CLS	DATE: 11 DEC 2002	FILENAME: XSECJK
CHECKED BY: WWG	JOB NO. 17543	FIGURE: 9



STRATA GROUP NUMBER	NAME	DESCRIPTION
I	INLAND BACKSWAMP DEPOSITS	EXTREMELY SOFT TO MEDIUM STIFF GRAY, BROWN, AND BLACK CLAY AND ORGANIC CLAY WITH WOOD
II	INTERDISTRIBUTARY DEPOSITS	VERY SOFT TO SOFT GRAY CLAY AND SILTY CLAY WITH LENTICULAR INTERRUPTIONS OF LOOSE CLAYEY SILT
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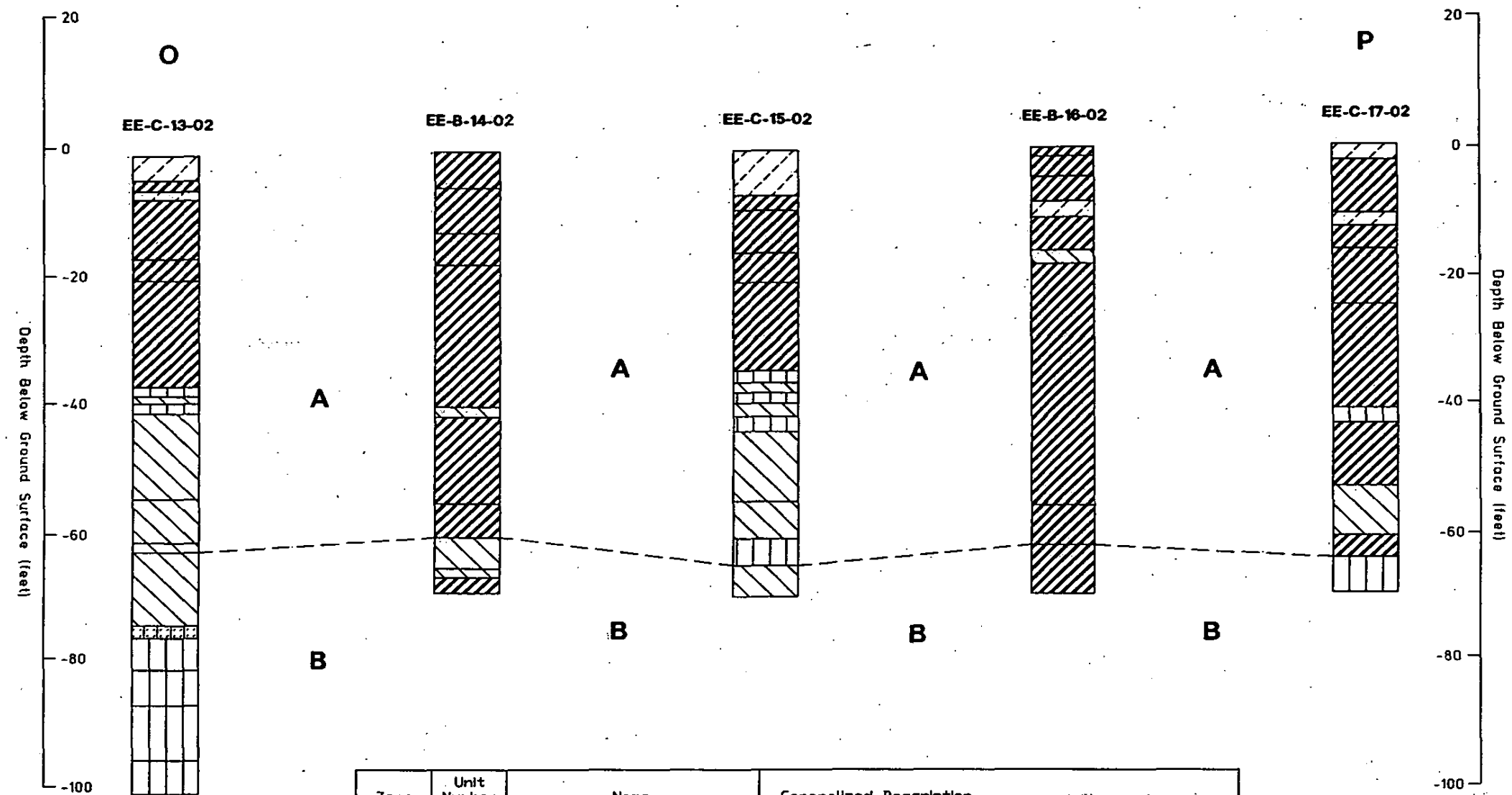
EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28th STREET METAIRIE, LOUISIANA

CROSS-SECTION J - N

RIVER BIRCH LANDFILL
PROPOSED WEST EXPANSION
JEFFERSON PARISH, LOUISIANA

DRAWN BY: CLS	DATE: 11 DEC 2002	FILENAME: XSECJK
CHECKED BY: WWG	JOB NO. 17543	FIGURE: 10



LEGEND

- Indicates Bottom of Well
- TD — Total Depth of Boring (feet)
- TOC — Top of Casing Elevation (feet/NGVD)
- Loose Topsoil
- Peat & Highly Organic Material (PT)
- Clay (CH)
- Silty Clay (CL)
- Clayey Silt (ML)
- Silty Sand (SM)
- Clayey Sand (SC)
- Organic Clay (OH)

Zone	Unit Number	Name	Generalized Description
A	I	Inland Backswamp Deposits (Holocene)	Extremely Soft to Medium Stiff Gray, Brown and Black Clay and Organic Clay with Wood
	II	Interdistributary Deposits (Holocene)	Very Soft to Soft Gray Clay and Silty Clay With Lenticular Interruptions of Loose Clayey Silt
	III	Prodelta Deposits (Holocene)	Medium Stiff Gray Clay and Silty Clay with Shell Fragments
B	IV-A	Prairie Complex Topstratum A (Pleistocene)	Stiff to Very Stiff Greenish-Gray and Tan Clay and Silty Clay, Commonly With Roots and Organic Matter
	IV-B	Prairie Complex Topstratum B (Pleistocene)	Medium Compact Tan Clayey Silt and Sandy Silt, and Loose to Medium Dense Tan Silty Sand
	IV-C	Prairie Complex (Pleistocene)	Stiff Gray and Greenish-Gray Clay
	IV-D	Substratum-Sand (Pleistocene)	Dense-to-very-Dense-Sand

Note: 1. Soil conditions interpolated between boring locations. Actual conditions may vary.

0 feet 500
Horizontal Scale

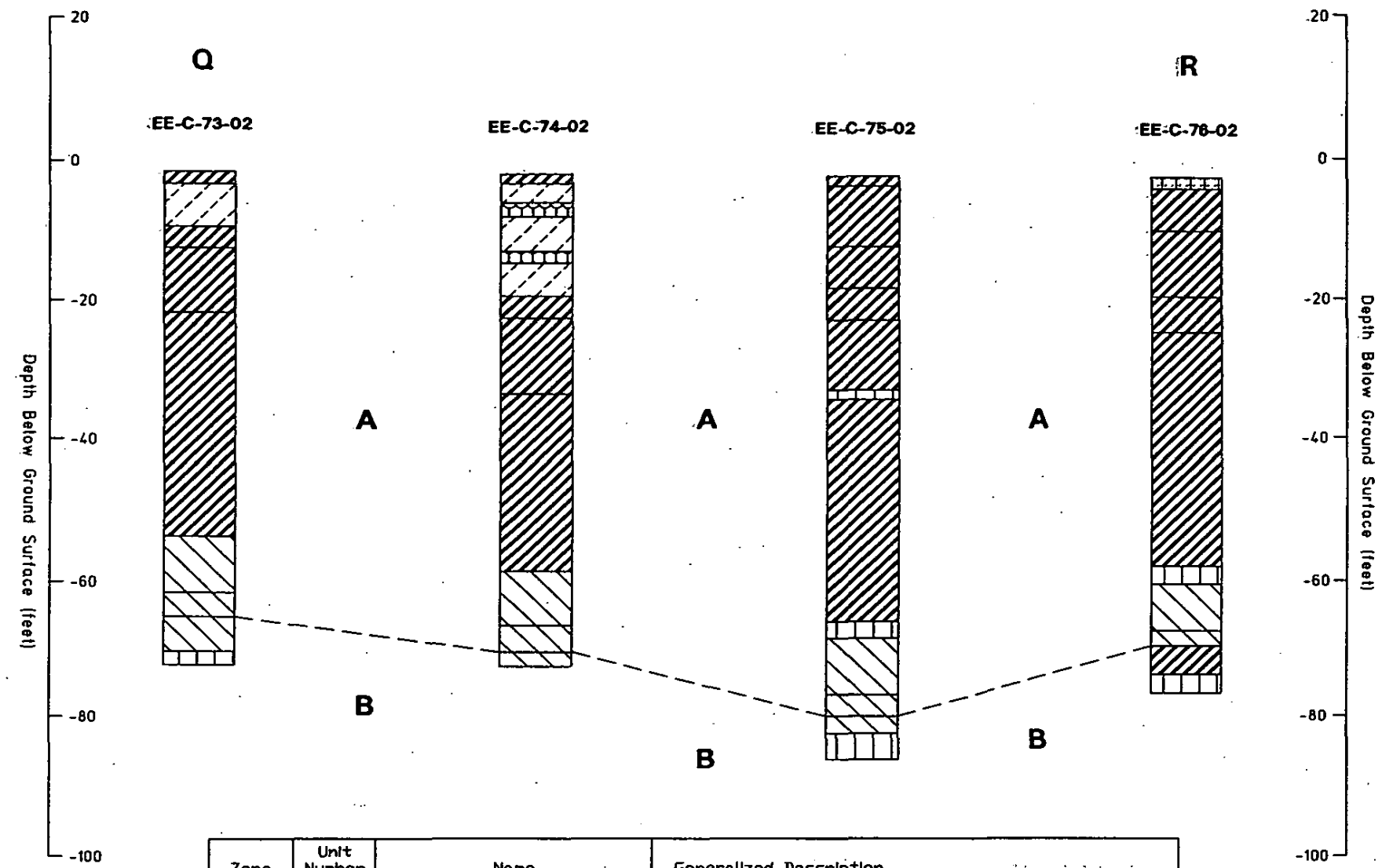
ENGINEERING ASSOCIATES, INC.
CONSULTING ENGINEERS
1415 DELPLAZA DRIVE
SUITE B
BATON ROUGE, LA 70815
PH: (225) 928-2025

Drawn By:	MCNAMARA	10/22/06		Project No.	21140			
Designer:				Drawing No.	21140OP.DWG			
P.E.	BURNHAM	10/22/06		Date Issued:	10/22/06			
Approved:	ELLIS	10/22/06		Plot Time:		DATE	NO.	REVISION	BY

RIVER BIRCH, INC.
GRETNA, LOUISIANA
CLIENT

RIVER BIRCH LANDFILL
2000 SOUTH KENNER ROAD
AVONDALE, LOUISIANA
LDEQ A.I. NO. 32219
PROJECT TITLE

CROSS-SECTION O-P



LEGEND

- Indicates Bottom of Well
- TD — Total Depth of Boring (feet)
- TOC — Top of Casing Elevation (feet/NGVD)
- Loose Topsoil
- Peat & Highly Organic Material (PT)
- Clay (CH)
- Silty Clay (CL)
- Clayey Silt (ML)
- Silty Sand (SM)
- Clayey Sand (SC)
- Organic Clay (OH)

Zone	Unit Number	Name	Generalized Description
A	I	Inland Backswamp Deposits (Holocene)	Extremely Soft to Medium Stiff Gray, Brown and Black Clay and Organic Clay with Wood
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B	IV-A	Prairie Complex Topstratum A (Pleistocene)	Stiff to Very Stiff Greenish-Gray and Tan Clay and Silty Clay, Commonly With Roots and Organic Matter
	IV-B	Prairie Complex Topstratum B (Pleistocene)	Medium Compact Tan Clayey Silt and Sandy Silt, and Loose to Medium Dense Tan Silty Sand
	IV-C	Prairie Complex (Pleistocene)	Stiff Gray and Greenish-Gray Clay
	IV-D	Substratum Sand (Pleistocene)	Dense to very Dense Sand

0 feet 500
Horizontal Scale

Note: 1. Soil conditions interpolated between boring locations. Actual conditions may vary.

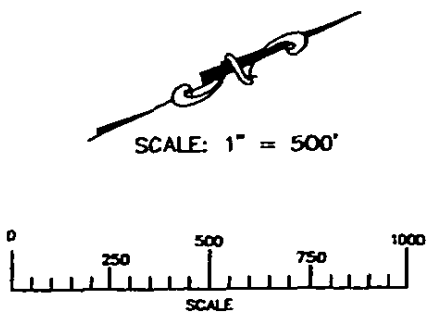
ENGINEERING ASSOCIATES, INC.
CONSULTING ENGINEERS
1415 DELPLAZA DRIVE
SUITE B
BATON ROUGE, LA 70815
PH: (225) 926-2025

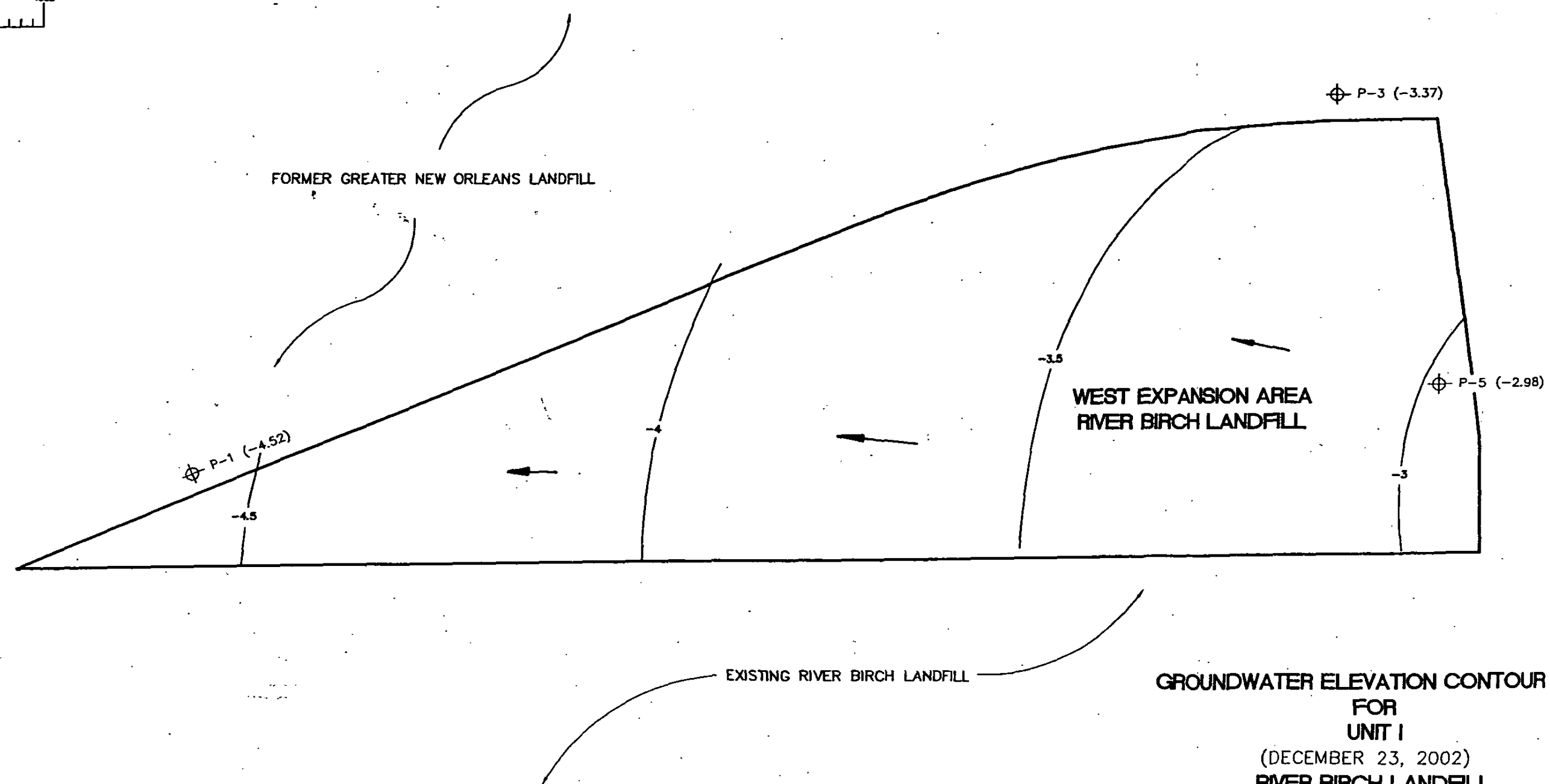
Drawn By:	MCNAMARA	10/22/06		Project No.	21140			
Designer:				Drawing No.	21140QR.DWG			
P.E.	BURNHAM	10/22/06		Date Issued:	10/22/06			
Approved:	ELLIS	10/22/06		Plot Time:		DATE	NO.	REVISION	BY

RIVER BIRCH, INC.
GRETNA, LOUISIANA
CLIENT

RIVER BIRCH LANDFILL
2000 SOUTH KENNER ROAD
AVONDALE, LOUISIANA
LDEQ A.I. NO. 32219
PROJECT TITLE

CROSS-SECTION Q-R





LEGEND

P-1	Piezometer Location Screened in Unit I
(-4.52)	Calculated Groundwater Elevation (ft)
—4—	Groundwater Elevation Contours (ft)
→	Direction of Groundwater Flow

Note: Piezometer Data provided by Eustis Engineering Company, Inc.

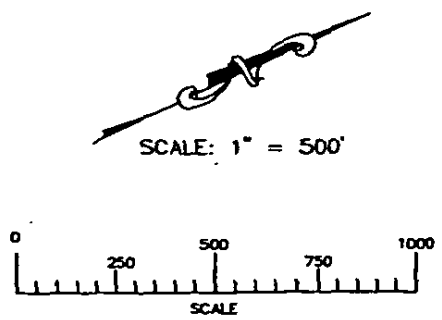
GROUNDWATER ELEVATION CONTOUR MAP FOR UNIT I

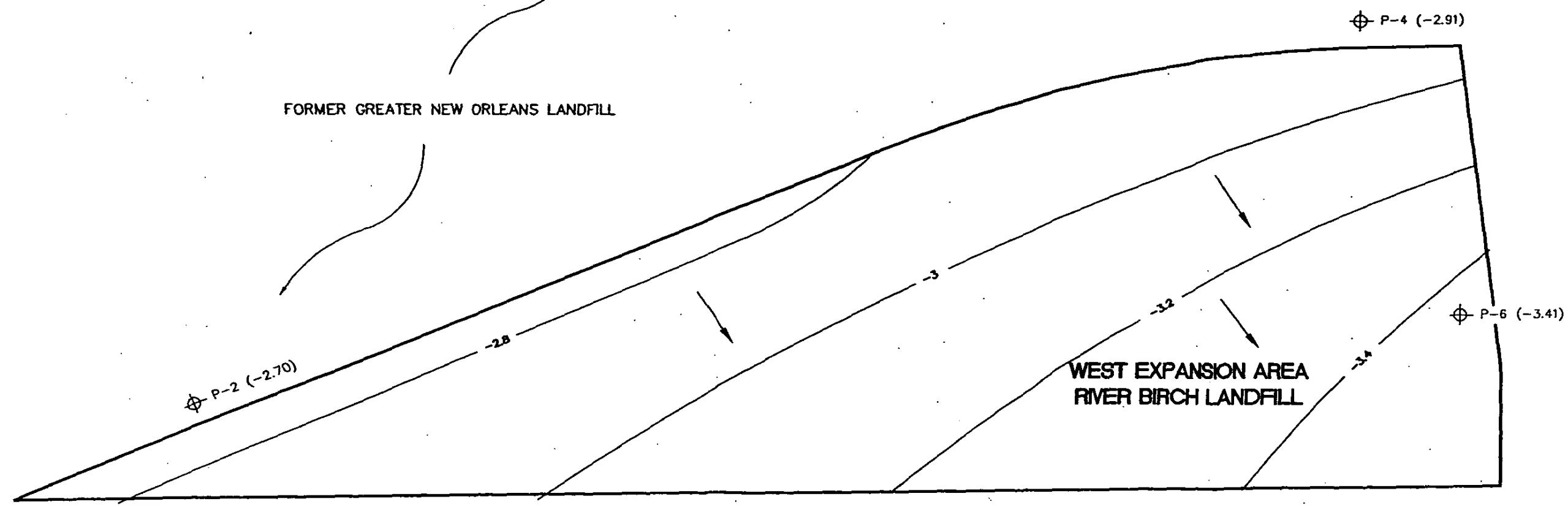
(DECEMBER 23, 2002)

RIVER BIRCH LANDFILL
PERPOSED WEST EXPANSION AREA
JEFFERSON PARISH, LA

ENGINEERING ASSOCIATES, INC.
CONSULTING ENGINEERS
1415 Delplaza Dr., Ste. B
Baton Rouge, LA. 70815
(225) 926-2025

F:\02020\007\4\21140\OVERALL_UNIT_I.dwg [Model] Sep 19, 2003 - 11:12am





LEGEND

⊕ P-2	Piezometer Location Screened in Unit II
(-2.70)	Calculated Groundwater Elevation (ft)
—3—	Groundwater Elevation Contours (ft)
→	Direction of Groundwater Flow

Note: Piezometer Data provided by Eustis Engineering Company, Inc.

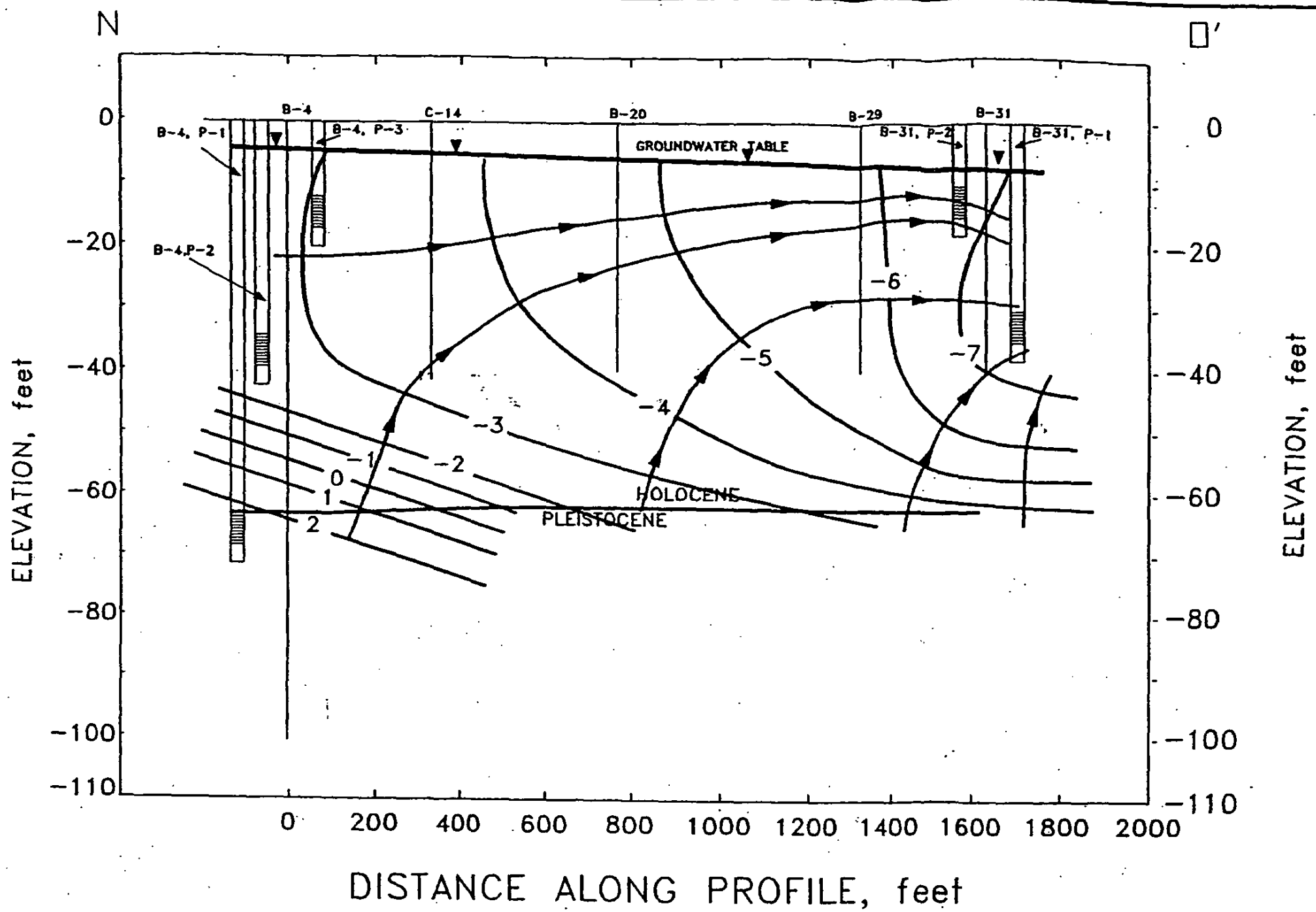
GROUNDWATER ELEVATION CONTOUR MAP FOR UNIT II

(DECEMBER 23, 2002)

RIVER BIRCH LANDFILL
WEST EXPANSION AREA
JEFFERSON PARISH, LA

ENGINEERING ASSOCIATES, INC.
CONSULTING ENGINEERS
1415 Delplaza Dr., Ste. B
Baton Rouge, LA. 70815
(225) 926-2025

F:\02020\0070412114O\OVERALL_UNIT_II.dwg [Model] Sep 19, 2003 - 11:14am



BORING NUMER	B-4			B-24		B-31	
PIEZOMETER	P-1	P-2	P-3	P-1	P-2	P-1	P-2
TOP OF CASING ELEVATION (FEET, NGVD)	2.10	1.07	1.27	2.12	1.16	-0.27	-0.09
TOTAL DEPTH (FEET)	75.95	44.92	23.9	35.3	20.3	40.34	19.05
SCREEN LENGTH (FEET)	5	5	5	5	5	5	5
TOP OF SCREEN ELEVATION(FEET, NGVD)	-65.85	-35.85	-14.63	-25.18	-11.14	-32.61	-11.14
BOTTOM OF SCREEN ELEVATION (FEET, NGVD)	-70.85	-40.85	-19.63	-30.18	-16.14	-37.61	-16.14
MONITORED ZONE	B-ZONE	LOWER A-ZONE	UPPER A-ZONE	LOWER A-ZONE	UPPER A-ZONE	LOWER A-ZONE	UPPER A-ZONE

NOTE: PIEZOMETERS ARE LOCATED WITHIN A 10 FEET RADIUS OF THE DESIGNATED BORING.

NOTES:
1. STRATIFICATION BETWEEN BORINGS IS LINEARLY INFERRED BY CORRELATION OF SIMILAR SOIL CLASSIFICATIONS IN ADJACENT BORINGS. SUCH CORRELATIONS ONLY REPRESENT OUR OPINION REGARDING THE CONTINUITY OF STRATIFICATION WITH RESPECT TO THE ENGINEERING AND GEOLOGIC CHARACTERISTICS OF SOIL MATERIALS SAMPLED. ACTUAL SUBSURFACE STRATIFICATIONS MAY DIFFER FROM THE CONDITIONS REPRESENTED ON THE PROFILE AND BETWEEN SAMPLES ON THE BORING LOGS.
2. ALL DEPTHS ARE REFERENCED TO GROUND ELEVATION AT THE TIME BORINGS WERE MADE.
3. SCALES ARE AS SHOWN FOR EACH SECTION.
4. HOLOCENE AND PLEISTOCENE CORRELATION IS INFERRED FROM DEEP BORINGS IN THE SITE WIDE BORING PROGRAM.

STATE OF LOUISIANA
Robert A. McGall
REG. No. 23086
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING
April 20, 1995

FOR PERMIT PURPOSES ONLY
NOT TO BE USED FOR
CONSTRUCTION OR BIDDING

LEGEND
—4— EQUIPOTENTIAL LINE (ELEVATION IN FT.)
GROUNDWATER FLOW PATH

DATE	REVISION	DRWN/CHKD

RIVERBIRCH LANDFILL

Woodward-Clyde Consultants
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana

RIVERBIRCH, INC.
GRETNA, LOUISIANA

SCALE: AS SHOWN	MADE BY: T. ALPERSON	DATE: 4/95	FILE NO. 958034
	CHECKED BY:	DATE:	

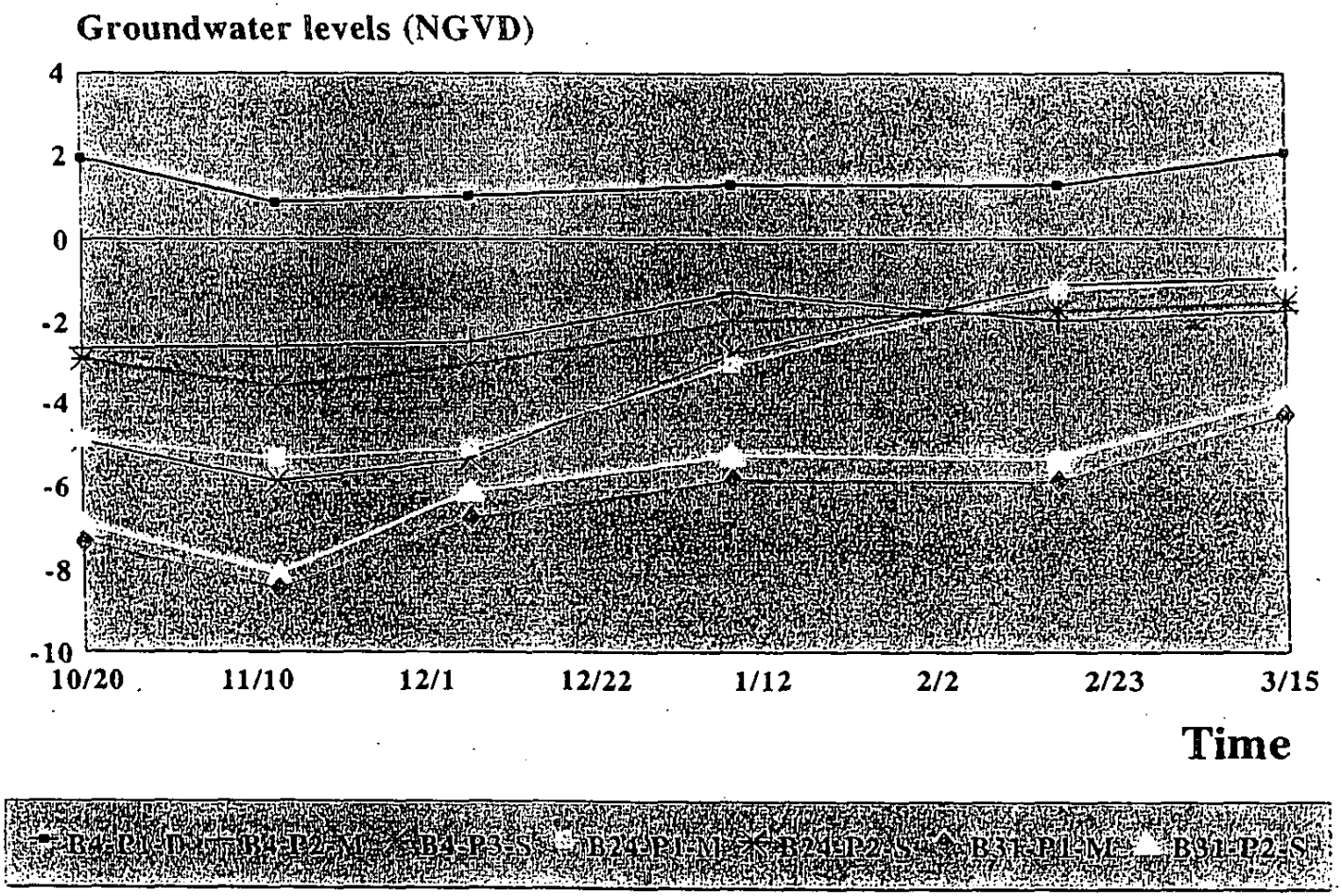
VERTICAL FLOW NET

FIGURE 28

BEST COPY

RIVER BIRCH LANDFILL

HYDROGRAPH



PIEZOMETERIC DATA SUMMARY
for
RiverBirch Landfill - West Expansion Area

Piezometer No.	Date	Top of Casing Elevation (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
P-1	12/03/02	3.08'	NA	NA
	12/04/02	3.08'	7.69	-4.61
	12/09/02	3.08'	7.62	-4.54
	12/17/02	3.08'	7.57	-4.49
	12/23/02	3.08'	7.60	-4.52
P-2	12/03/02	2.53'	NA	NA
	12/04/02	2.53'	3.97	-1.44
	12/09/02	2.53'	4.85	-2.32
	12/17/02	2.53'	5.12	-2.59
	12/23/02	2.53'	5.23	-2.70
P-3	12/03/02	5.08'	8.48	-3.40
	12/04/02	5.08'	NA	NA
	12/09/02	5.08'	8.47	-3.39
	12/17/02	5.08'	8.40	-3.32
	12/23/02	5.08'	8.45	-3.37
P-4	12/03/02	4.84'	7.92	-3.08
	12/04/02	4.84'	NA	NA
	12/09/02	4.84'	7.77	-2.93
	12/17/02	4.84'	7.71	-2.87
	12/23/02	4.84'	7.75	-2.91
P-5	12/03/02	1.52'	4.60	-3.08
	12/04/02	1.52'	NA	NA
	12/09/02	1.52'	4.59	-3.07
	12/17/02	1.52'	4.52	-3.00
	12/23/02	1.52'	4.50	-2.98
P-6	12/03/02	1.37'	5.18	-3.81
	12/04/02	1.37'	NA	NA
	12/09/02	1.37'	4.87	-3.50
	12/17/02	1.37'	4.75	-3.38
	12/23/02	1.37'	4.78	-3.41

Note: Data provided by Eustis Engineering Company, Inc.

ENGINEERING ASSOCIATES, INC.
CONSULTING ENGINEERS

PART XVII

Existing Monitoring Well Data

Monitoring Well Installation
Riverbirch Landfill
Avondale, LA

Riverbirch, Inc.
Mader-Miers Engineering

LOG OF SOIL BORING MW-1

STE
Soil Testing Engineers, Inc.

Sheet 1 of 1

File: 99-1069
Date: 06/08/99
Geol.: P. Ward
Driller: D. Robinson
Rig: CME 75

Location: See Plan

Surface Elevation: -0.9 (ft., NGVD)

Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Other	Soil Type	Description
			0.7 (P)									Soft brown, gray, and black CLAY (CH) w/roots - topsoil
			0.4 (P)									Very soft brown and dark gray CLAY (CH) w/roots, wood, and peat
	5		0.2 (P)									– w/silt lenses at 5 to 7 ft.
			0.2 (P)									
▽			0.1 (P)		82		132	35	97			
	10		~~0.1 (P)~~									Loose dark gray CLAYEY SILT (ML) w/roots
			~~0.2 (P)~~									
▽	15		0.1 (P)		72					GS1		Very soft dark gray CLAY (CH)
			0.1 (P)									Loose dark gray CLAYEY SILT (ML)
			0.2 (P)									– alternating 1/8-inch seams of silt and clay at 18 to 20 ft.
	20		0.2 (P)		54					GS2		
			0.2 (P)									Very soft dark gray CLAY (CH), jointed, w/ferrous nodules
	25		0.2 (P)									
												Boring completed at 26 ft.
	30											
	35											
	40											

Ground Water Level Data

▽ Free water first encountered
▽ Water level after 15 mins.

Boring Advancement Method

10" Hollow Stem Auger: Full Depth

Boring Abandonment Method

Completed as Well MW-1
Screen Interval at 15 to 23 ft.

Notes

Visual classifications (ASTM D2488) except where laboratory test data shown.
GS: Particle Size Analysis
GS1: Sand = 1%, Silt = 39%, Clay = 60%
GS2: Sand = 1%, Silt = 56%, Clay = 43%

Form LOG1995R 09/03/99

Strata Boundaries May Not Be Exact

Monitoring Well Installation
Riverbirch Landfill
Avondale, LA

Riverbirch, Inc.
Mader-Miers Engineering

LOG OF SOIL BORING MW-2

STE
Soil Testing Engineers, Inc.

Sheet 1 of 1

File: 99-1069
Date: 06/07/99
Geol.: P. Ward
Driller: D. Robinson
Rig: CME 75

Location: See Plan

Surface Elevation: +0.6 (ft., NGVD)

FIELD DATA				LABORATORY DATA								
Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL	PL	PI	Other	Soil Type	Description
			0.5 (P)									Loose brown CLAYEY SAND (SC) [roadway fill]
			0.6 (P)									
	5		0.6 (P)									Soft brown and gray SILTY CLAY (CL) w/wood and roots – w/sand lenses at 4 to 5 ft.
			0.8 (P)									
			0.3 (P)									Soft to very soft dark gray CLAY (CH) w/roots
	10		0.6 (P)									
			0.5 (P)									– jointed, w/sand pockets at 12 to 14 ft.
	15		0.1 (P)									Very soft gray CLAY (CH) w/wood and roots
			0.2 (P)		83		131	32	99			– w/silt pockets at 16 to 18 ft.
			0.2 (P)									Soft to very soft gray SILTY CLAY (CL) w/silt seams and ferrous nodules
	20		0.1 (P)		48					GS		
			0.1 (P)									Very soft gray CLAY (CH) w/sand pockets
	25		0.2 (P)									
												Boring completed at 26 ft.
	30											
	35											
	40											

Ground Water Level Data	Boring Advancement Method	Notes
	10" Hollow Stem Auger: Full Depth	Visual classifications (ASTM D2488) except where laboratory test data shown. GS: Particle Size Analysis Sand = 1%, Silt = 75%, Clay = 24%
	Boring Abandonment Method	
	Completed as Well MW-2 Screen Interval at 15 to 23 ft.	

Form LOG1995R 09/03/99

Strata Boundaries May Not Be Exact

Monitoring Well Installation
Riverbirch Landfill
Avondale, LA

Riverbirch, Inc.
Mader-Miers Engineering

LOG OF SOIL BORING MW-3

STE
Soil Testing Engineers, Inc.

Sheet 1 of 1

File: 99-1069
Date: 06/02/99
Geol.: P. Ward
Driller: D. Robinson
Rig: CME 75

Location: See Plan

Surface Elevation: 0.0 (ft., NGVD)

FIELD DATA				LABORATORY DATA								
Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL	PL	PI	Other	Soil Type	Description
			2.1 (P)									Stiff dark gray and brown CLAY (CH), dry, w/wood
			0.7 (P)									Soft dark gray CLAY (CH) w/wood
	5		0.2 (P)									-- brown and gray at 4 to 8 ft.
			0.9 (P)									
			0.5 (P)									-- w/silt pockets at 8 to 10 ft.
	10		0.6 (P)		51		79	28	51			
			0.7 (P)									Soft to medium dark gray SILTY CLAY (CL) w/wood and peat
	15		0.6 (P)									
▽			0.5 (P)									Soft to very soft dark gray SILTY CLAY (CL) w/wood
			0.3 (P)		44		40	20	20			-- w/silt lenses at 18 to 22 ft.
	20		0.3 (P)		48					GS		
			0.5 (P)									
	25		0.2 (P)									Boring completed at 25 ft.
	30											
	35											
	40											

Ground Water Level Data	Boring Advancement Method	Notes
▽ Free water first encountered, no change after 15 mins.	10" Hollow Stem Auger: Full Depth	Visual classifications (ASTM D2488) except where laboratory test data shown. GS: Particle Size Analysis Sand = 4%, Silt = 66%, Clay = 30%
	Boring Abandonment Method: Completed as Well MW-3 Screen Interval at 15 to 24 ft.	

Form LOG1995R 09/03/99

Strata Boundaries May Not Be Exact

Monitoring Well Installation
Riverbirch Landfill
Avondale, LA

Riverbirch, Inc.
Mader-Miers Engineering

LOG OF SOIL BORING MW-4

STE
Soil Testing Engineers, Inc.

Sheet 1 of 1

File: 99-1069
Date: 06/02/99
Geol.: P. Ward
Driller: D. Robinson
Rig: CME 75

Location: See Plan

Surface Elevation: +3.7 (ft., NGVD)

Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Other	Soil Type	Description
			3.7 (P)									Stiff brown and gray CLAY (CH), dry
			0.6 (P)									Soft gray SILTY CLAY (CL) w/wood
	5		0.2 (P)									– very soft at 4 to 6 ft.
			0.6 (P)									Soft dark gray and brown CLAY (CH) w/wood
			0.7 (P)		58		114	32	82			
	10		0.5 (P)									Soft gray and brown SILTY CLAY (CL) w/wood
▽			1.0 (P)		28					GS1		Loose gray and brown CLAYEY SILT (ML) w/wood and peat
▽	15		2.2 (P)									
			1.1 (P)		25					GS2		Loose gray and brown SILTY SAND (SM)
			0.2 (P)									Very soft gray SILTY CLAY (CL)
	20											Boring completed at 20 ft.
	25											
	30											
	35											
	40											

Ground Water Level Data

▽ Free water first encountered
▽ Water level after 15 mins.

Boring Advancement Method

10" Hollow Stem Auger:
Full Depth

Boring Abandonment Method

Completed as Well MW-4
Screen Interval at 10 to 19 ft.

Notes

Visual classifications (ASTM D2488) except where laboratory test data shown.
GS: Particle Size Analysis
GS1: Sand = 8%, Silt = 83%, Clay = 9%
GS2: Sand = 71%, Silt = 24%, Clay = 5%

Strata Boundaries May Not Be Exact

Form LOG1995R 09/03/99

Monitoring Well Installation
Riverbirch Landfill
Avondale, LA

Riverbirch, Inc.
Mader-Miers Engineering

LOG OF SOIL BORING MW-5

STE
Soil Testing Engineers, Inc.

Sheet 1 of 1

File: 99-1069
Date: 06/03/99
Geol.: P. Ward
Driller: D. Robinson
Rig: CME 75

Location: See Plan

Surface Elevation: +1.9 (ft., NGVD)

FIELD DATA				LABORATORY DATA								
Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL	PL	PI	Other	Soil Type	Description
			1.0 (P)									Medium brown and gray CLAY (CH) w/wood and silt pockets
			0.2 (P)									Very soft brown and gray CLAY (CH) w/wood
	5		0.1 (P)									
			0.2 (P)									– w/peat and silt streaks at 6 to 8 ft.
▽			0.7 (P)		61		105	31	74			Soft to very soft brown and gray CLAY (CH) w/wood and silt layers
	10		0.2 (P)									
			0.1 (P)		36					GS		Very soft brown and gray SILTY CLAY (CL)
▽	15		1.0 (P)									Loose gray CLAYEY SILT (ML) w/wood
												-- w/sand lenses at 16 to 17 ft.
			~~0.2 (P)~~		~~41~~							Soft to very soft gray CLAY (CH) w/wood and shells
			0.5 (P)									
	20											Boring completed at 20 ft.
	25											
	30											
	35											
	40											

Ground Water Level Data	Boring Advancement Method	Notes
▽ Free water first encountered ▽ Water level after 15 mins.	10" Hollow Stem Auger: Full Depth	Visual classifications (ASTM D2488) except where laboratory test data shown. GS: Particle Size Analysis Sand = 10%, Silt = 59%, Clay = 31%
	Boring Abandonment Method	
	Completed as Well MW-5 Screen Interval at 10 to 19 ft.	

Form LOG1995R 09/03/99

Strata Boundaries May Not Be Exact

Monitoring Well Installation
Riverbirch Landfill
Avondale, LA

Riverbirch, Inc.
Mader-Miers Engineering

LOG OF SOIL BORING MW-6

STE
Soil Testing Engineers, Inc.

Sheet 1 of 1

File: 99-1069
Date: 06/03/99
Geol.: P. Ward
Driller: D. Robinson
Rig: CME 75

Location: See Plan

Surface Elevation: -1.6 (ft., NGVD)

Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL	PL	PI	Other	Soil Type	Description
			0.5 (P)									Soft brown and gray CLAY (CH) w/peat
▽			0.5 (P)									
▽	5		No (P)									Soft to very soft gray and brown CLAY (CH) w/wood
			0.6 (P)									
			0.2 (P)									
	10		0.5 (P)									
			0.5 (P)		76		97	29	68			
	15		0.1 (P)									Very soft gray SILTY CLAY (CL) w/wood
			0.1 (P)									
			0.1 (P)		41					GS1		Very soft to soft gray VERY SILTY CLAY (CL-ML) w/wood
	20		0.8 (P)		47							-- w/sand seams at 18 to 20 ft.
			0.1 (P)									
	25		0.1 (P)		67					GS2		Very soft dark gray CLAY (CH)
			0.1 (P)									
			0.1 (P)									
	30											Boring completed at 30 ft.
	35											
	40											

Ground Water Level Data

▽ Free water first encountered
▽ Water level after 15 mins.

Boring Advancement Method

10" Hollow Stem Auger:
Full Depth

Boring Abandonment Method

Completed as Well MW-6
Screen Interval at 20 to 29 ft.

Notes

Visual classifications (ASTM D2488) except where laboratory test data shown.
GS: Particle Size Analysis
GS1: Sand = 4%, Silt = 73%, Clay = 23%
GS2: Sand = 0%, Silt = 29%, Clay = 71%

Strata Boundaries May Not Be Exact

Form LOG1995R 09/03/99

Riverbirch Landfill
Avondale, LA

LOG OF SOIL BORING MW-7

STE
Soil Testing Engineers, Inc.

File:	99-1069
Date:	11/09/99
Logged by:	P. Ward
Driller:	D. Robinson
Rig:	Ardco K-1000

Riverbirch Incorporated
Gretna, LA

Sheet 1 of 1

Location: See Figure 1

Surface Elevation: +2.3 (ft., NGVD)

FIELD DATA				LABORATORY DATA								
Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL	PL	PI	Other	Soil Type	Description
			1.25 (P)									Stiff gray and dark gray SILTY CLAY (CL) *w/roots and wood*
			1.5 (P)									
	5		0.75 (P)									
			0.75 (P)									– Becoming medium and partly tan, w/organics
			1.25 (P)									
	10		1.25 (P)									
			1.75 (P)									*Stiff gray SILTY CLAY - CLAYEY SILT* (CL-ML) w/silt seams
	15		6.75 (P)									Medium to stiff gray and dark gray SILTY CLAY (CL) w/organic traces
			1.25 (P)									
			1.0 (P)		36					GS1		Medium gray SILTY CLAY CLAYEY SILT (CL-ML) w/organics
	20		0.25 (P)									Very soft gray VERY SILTY CLAY (CL) w/organic traces
			1.0 (P)									Medium dense gray CLAYEY SILT (ML) w/organic traces
	25		0.5 (P)									Soft to very soft gray SILTY CLAY (CL) w/silt seams
			0.25 (P)									
	30											Boring completed at 28 ft.
	35											
	40											

Ground Water Level Data

Free water first encountered

Water level after 15 mins.

Boring Advancement Method

4" Nom. Dia. Short Flight Auger: 0 to 16 ft.
4" dia. Rotary Wash: 16 to 28 ft.

Boring Abandonment Method

Monitor Well installed
Screen interval from 15 to 28 ft.

Notes

Visual classification (ASTM D2488) except where laboratory test data shown.
GS: Particle Size Analysis
GS1: Sand = 1%, Silt = 91%, Clay = 8%

Strata Boundaries May Not Be Exact

LOG01 991069.GPJ LOG01.GDT 01/14/00

Riverbirch Landfill
Avondale, LA

LOG OF SOIL BORING MW-8

STE
Soil Testing Engineers, Inc.

File: 99-1069
Date:
Logged by: P. Ward
Driller: D. Robinson
Rig: Ardco K-1000

Riverbirch Incorporated
Gretna, LA

Sheet 1 of 1

Location: See Figure 1

Surface Elevation: +0.9 (ft., NGVD)

FIELD DATA				LABORATORY DATA								
Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL	PL	PI	Other	Soil Type	Description
			1.25 (P)									Stiff dark gray SILTY CLAY (CL) w/abundant organics and wood
			2.25 (P)									
	5		1.25 (P)									
			0.75 (P)									
			1.0 (P)									–becoming medium and partly tan
	10		1.0 (P)									
			1.25 (P)									
	15		0.75 (P)									
			0.75 (P)									
			1.5 (P)		42					GS1		Red dense gray CLAYEY SILTY (CL-ML)
	20		1.25 (P)									Stiff gray SILTY CLAY CLAYEY SILT (CL-ML)
			1.25 (P)									Medium gray SILTY CLAY (CL) w/silt pockets
	25		1.0 (P)									Boring completed at 25 ft.
	30											
	35											
	40											

Ground Water Level Data	Boring Advancement Method	Notes
	4" Nom. Dia. Short Flight Auger: 0 to 16 ft. 4" dia. Rotary Wash: 16 to 25 ft.	Visual classification (ASTM D2488) except where laboratory test data shown GS: Particle Size Analysis GS1: Sand = 1%, Silt = 73%, Clay = 26%
	Boring Abandonment Method Monitor Well Installed Screen interval from 12 to 22 ft.	Strata Boundaries May Not Be Exact

LOG01 991069.GPJ LOG01.GDT 01/14/00

Riverbirch Landfill
Avondale, LA

LOG OF SOIL BORING MW-9

STE
Soil Testing Engineers, Inc.

Riverbirch Incorporated
Gretna, LA

Sheet 1 of 1

File: 99-1069
Date: 11/15/99
Logged by: P. Ward
Driller: D. Robinson
Rig: Ardco K-1000

Location: See Figure 1

Surface Elevation: +0.7 (ft, NGVD)

FIELD DATA				LABORATORY DATA								
Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL	PL	PI	Other	Soil Type	Description
			2.25 (P)									Stiff dark tan and dark gray SILTY CLAY (CL) w/organics and peat
			1.75 (P)									
	5		1.25 (P)									– w/wood
			1.5 (P)									Stiff tan and dark gray SILTY CLAY (CL-ML) w/organics and ferrous streaks
			1.75 (P)									
▽	10		1.5 (P)									
▽		X	9 b/f 3-4-5									Loose dark gray CLAYEY SILT (ML) w/organics
	15	X	7 b/f 3-3-4									
		X	7 b/f 5-3-4									
		X	8 b/f 4-3-5									
	20	X	12 b/f 7-5-7		27					GS1		Medium dense dark gray SILTY SANDY (SM)
		X	10 b/f 6-5-5									Medium dense dark gray clayey silt (ML)
	25	X	5 b/f 2-2-3									becoming loose, w/clay seams
			0.75 (P)									Medium dark gray VERY SILTY CLAY (CL) w/silt layers
			1.0 (P)									
	30		0.75 (P)									
			0.75 (P)									– w/silt seams and lenses
	35											Boring completed at 33 ft.
	40											

Ground Water Level Data

▽ Free water first encountered

▽ Water level after 15 mins.

Boring Advancement Method

4" Nom. Dia. Short Flight Auger: 0 to 15 ft.
4" dia. Rotary Wash: 15 to 33 ft.

Boring Abandonment Method

Monitor Well installed
Screen interval from 20 to 30 ft.

Notes

Visual classification (ASTM D2488) except where laboratory test data shown
GS: Particle Size Analysis
GS1: Sand = 54%, Silt = 38%, Clay = 6%

Strata Boundaries May Not Be Exact

LOG01 991069.GPJ LOG01.GDT 01/14/00

Riverbirch Landfill
Avondale, LA

LOG OF SOIL BORING MW-10

STE
Soil Testing Engineers, Inc.

Riverbirch Incorporated
Gretna, LA

Sheet 1 of 1

File: 99-1069
Date: 11/15/99
Logged by: P. Ward
Driller: D. Robinson
Rig: Ardco K-1000

Location: See Figure 1

Surface Elevation: -1.8 (ft., NGVD)

FIELD DATA				LABORATORY DATA								
Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL	PL	PI	Other	Soil Type	Description
			2.0 (P)									Stiff tan and gray SILTY CLAY (CL) w/organics and peat
			1.75 (P)									
▽	5		1.5 (P)									
▽			0.5 (P)									Loose dark gray clayey silt (ML) w/organic trace
			1.75 (P)									
	10	X	8 b/f 4-4-4									
		X	7 b/f 5-3-4		30					GS1		
	15	X	6 b/f 1-3-3									
		X	9 b/f 7-4-5									
		X	11 b/f 4-6-5									--becoming medium dense
	20	X	10 b/f 4-5-5									
		X	8 b/f 3-4-4									--Becoming loose
	25											Boring completed at 23.5 ft.
	30											
	35											
	40											

Ground Water Level Data

▽ Free water first encountered

▽ Water level after 15 mins.

Boring Advancement Method

4" Nom. Dia. Short Flight Auger: 0 to 12 ft.
4" dia. Rotary Wash: 12 to 23.5 ft.

Boring Abandonment Method

Monitor Well installed
Screen interval from 10 to 20 ft.

Notes

Visual classification (ASTM D2488) except where laboratory test data shown
GS: Particle Size Analysis
GS1: Sand = 21%, Silt = 71%, Clay = 8%

Strata Boundaries May Not Be Exact

Riverbirch Landfill
Avondale, LA

LOG OF SOIL BORING MW-11

STE
Soil Testing Engineers, Inc.

File: 99-1069
Date: 11/18/99
Logged by: P. Ward
Driller: D. Robinson
Rig: Ardco K-1000

Riverbirch Incorporated
Gretna, LA

Sheet 1 of 1

Location: See Figure 1
Surface Elevation: -2.2 (ft., NGVD)

Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL	PL	PI	Other	Soil Type	Description
												Loose top soil
												Black PEAT (PT) & highly organic material
			0.75 (P)									Soft to medium gray SILTY CLAY (CL) w/wood and roots
	5		0.5 (P)									
▽			0.5 (P)									
			0.75 (P)									
▽	10		0.75 (P)									
			0.75 (P)									–w/peat seams
	15		0.05 (P)									Soft to medium dark gray CLAY (CH) w/organics and silt trace
			0.5 (P)		54	69	54	23	31	K1		Soft dark gray SILTY CLAY (CL) w/organics and silt trace
			0.25 (P)									
	20		0.5 (P)									
			0.5 (P)									
												Boring completed at 23 ft.
	25											
	30											
	35											
	40											

Ground Water Level Data

▽ Free water first encountered

Water level after 15 mins.

Boring Advancement Method

4" Nom. Dia. Short Flight Auger: 0 to 6 ft.
4" dia. Rotary Wash: 6 to 23 ft.

Boring Abandonment Method

Monitor Well installed
Screen interval from 10 to 20 ft.

Notes

Visual classification (ASTM D2488) except where laboratory test data shown
Flexible wall penetrometer test:
K1: Kv = 6.7 x 10(-7) cm/sec

Strata Boundaries May Not Be Exact

LOG01 9910 ~G01.GDT 01/14/00

Riverbirch Landfill
Avondale, LA

LOG OF SOIL BORING MW-12

STE
Soil Testing Engineers, Inc.

Riverbirch Incorporated
Gretna, LA

Sheet 1 of 1

File: 99-1069
Date: 11/16/99
Logged by: P. Ward
Driller: D. Robinson
Rig: Ardco K-1000

Location: See Figure 1

Surface Elevation: -2.1 (ft., NGVD)

Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Other	Soil Type	Description
			2.5 (P)									Very stiff gray and dark gray CLAY (CH) w/roots and wood
▽			2.0 (P)									Medium dense to loose tan and gray CLAYEY SILT (ML), w/organics
	5		2.0 (P)									
▽			5 B/F 2-2-3									
			7 B/F 5-3-4									
	10		9 b/f 4-5-4		33					GS1		
			3 b/f 2-1-2									–becoming very loose, w/clay seams
	15		0.75 (P)		42		54	19	35			Medium dark gray CLAY (CH) w/organic trace
			1.0 (P)									Medium to soft dark gray SILTY CLAY (CL) w/silty seams and lenses
			1.5 (P)									
	20		0.75 (P)									
			0.5 (P)									
												Boring completed at 23 ft.
	25											
	30											
	35											
	40											

Ground Water Level Data

▽ Free water first encountered

▽ Water level after 15 mins.

Boring Advancement Method

4" Nom. Dia. Short Flight Auger: 0 to 8 ft.
4" dia. Rotary Wash: 8 to 23 ft.

Boring Abandonment Method

Monitor Well installed screen interval from 9 to 23 ft.

Notes

Visual classification (ASTM D2488) except where laboratory test data shown
GS; Grain size analysis
GS1: Sand = 22%, Silt = 70%, Clay = 8%

Strata Boundaries May Not Be Exact

LOG01 99106 G01.GDT 01/14/00

Riverbirch Landfill
Avondale, LA

LOG OF SOIL BORING MW-13

STE
Soil Testing Engineers, Inc.

File:	99-1069
Date:	11/12/99
Logged by:	P. Ward
Driller:	D. Robinson
Rig:	Ardco K-1000

Riverbirch Incorporated
Gretna, LA

Sheet 1 of 1

Location: See Figure 1

Surface Elevation: -2.7 (ft., NGVD)

FIELD DATA				LABORATORY DATA								
Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL	PL	PI	Other	Soil Type	Description
			3.25 (P)									Very stiff dark gray and brown CLAY (CL) w/roots and wood
▽			0.75 (P)									Medium to soft gray SILTY CLAY (CL) w/roots
	5		0.75 (P)									
			0.5 (P)									
▽			1.0 (P)									
			1.0 (P)									
	10		0.5 (P)		46		44	20	24			
			0.75 (P)									--w/wood
	15		0.75 (P)									--w/silt seams
			0.5 (P)									
			0.75 (P)									
	20		0									
			75 (P)									
			0.5 (P)									
	25											
	30											
	35											
	40											

Ground Water Level Data	Boring Advancement Method	Notes
▽ Free water first encountered ▼ Water level after 15 mins.	4" Nom. Dia. Short Flight Auger: 0 to 8 ft. 4" dia. Rotary Wash: 8 to 23 ft. **Boring Abandonment Method** Monitor Well installed screen interval from 10 to 20 ft.	Visual classification (ASTM D2488) except where laboratory test data shown Strata Boundaries May Not Be Exact

LOG01 99106 301.GDT 01/14/00

Riverbirch Landfill
Avondale, LA

LOG OF SOIL BORING MW-14

STE
Soil Testing Engineers, Inc.

File:	99-1069
Date:	11/17/99
Logged by:	P. Ward
Driller:	D. Robinson
Rig:	Ardco K-1000

Riverbirch Incorporated
Gretna, LA

Sheet 1 of 1

Location: See Figure 1

Surface Elevation: -1.8 (ft., NGVD)

FIELD DATA				LABORATORY DATA								
Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL	PL	PI	Other	Soil Type	Description
			3.0 (P)									Very stiff to stiff tan and dark gray CLAY (CH) w/roots and wood
			1.5 (P)									
			1.5 (P)									Stiff to medium gray & dark gray SILTY CLAY (CL), w/wood, peat, and roots
	5		1.0 (P)									
			1.0 (P)									
			0.75 (P)									
	10		0.75 (P)									–becoming medium
			0.25 (P)			75	47	19	28	K1		Soft dark gray SILTY CLAY (CL) w/traces of organics
	15		0.25 (P)									
			0.5 (P)									–w/silt seams
			0.5 (P)									
	20		0.5 (P)									
			0.5 (P)									
	25											Boring completed at 23 ft.
	30											
	35											
	40											

Ground Water Level Data	Boring Advancement Method	Notes
	4" Nom. Dia. Short Flight Auger: 0 to 8 ft. 4" dia. Rotary Wash: 8 to 23 ft.	Visual classification (ASTM D2488) except where laboratory test data shown Flexible wall penetrometer test: K1: Kv = 1.5 x 10(-7) cm/sec
	Boring Abandonment Method	
	Monitor Well installed screen interval from 10 to 20 ft.	Strata Boundaries May Not Be Exact

LOG01.GDT 01/14/00

LOG01 991

Riverbirch Landfill
Avondale, LA

LOG OF SOIL BORING MW-15

STE
Soil Testing Engineers, Inc.

File: 99-1069
Date: 11/09/99
Logged by: P. Ward
Driller: D. Robinson
Rig: Ardco K-1000

Riverbirch Incorporated
Gretna, LA

Sheet 1 of 1

Location: See Figure 1

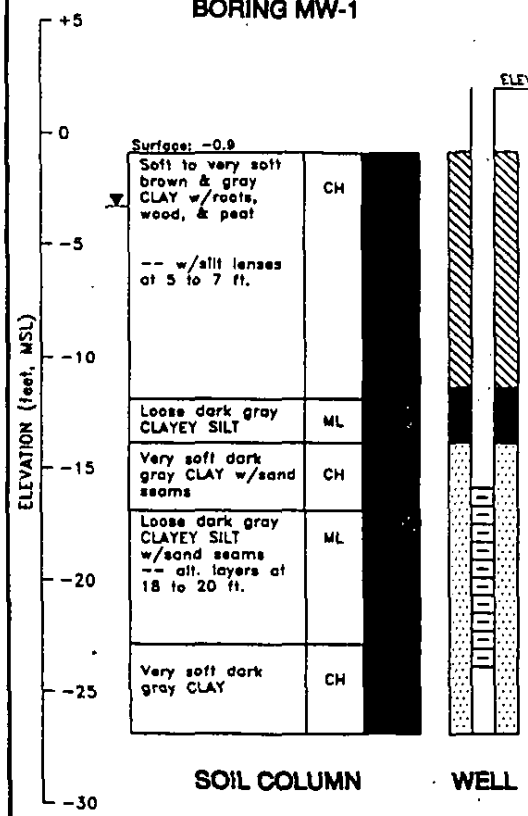
Surface Elevation: -2.3 (ft., NGVD)

FIELD DATA				LABORATORY DATA								
Ground Water Level	Depth (feet)	Samples	Field Test Results	Compressive Strength (tsf)	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL	PL	PI	Other	Soil Type	Description
▽			0.5 (P)									SAND and PEAT (PT)
▽			0.75 (P)									Medium to soft tan and gray SILTY CLAY (CL) w/wood and roots
			0.75 (P)									
	5		0.5 (P)									–w/peat
			~~0.5 (P)~~									
	10		0.25 (P)									Loose dark gray CLAYEY SILT (CL) w/roots and wood
			0.25 (P)									Very soft to soft dark gray SITLY CLAY (CL) w/trace of organics
			0.25 (P)		48		47	20	27			
	15		0.5 (P)		58					GS1		
			0.5 (P)									
	20		0.5 (P)									–w/silt seams
	25											Boring completed at 23 ft.
	30											
	35											
	40											

Ground Water Level Data	Boring Advancement Method	Notes
▽ Free water first encountered Water level after 15 mins.	4" Nom. Dia. Short Flight Auger: 0 to 5 ft. 4" dia. Rotary Wash: 5 to 23 ft.	Visual classification (ASTM D2488) except where laboratory test data shown GS: Particle Size Analysis gs1: Sand = 1%, Silt = 61%, Clay = 38%
	Boring Abandonment Method Monitor Well installed screen interval from 10 to 20 ft.	Strata Boundaries May Not Be Exact

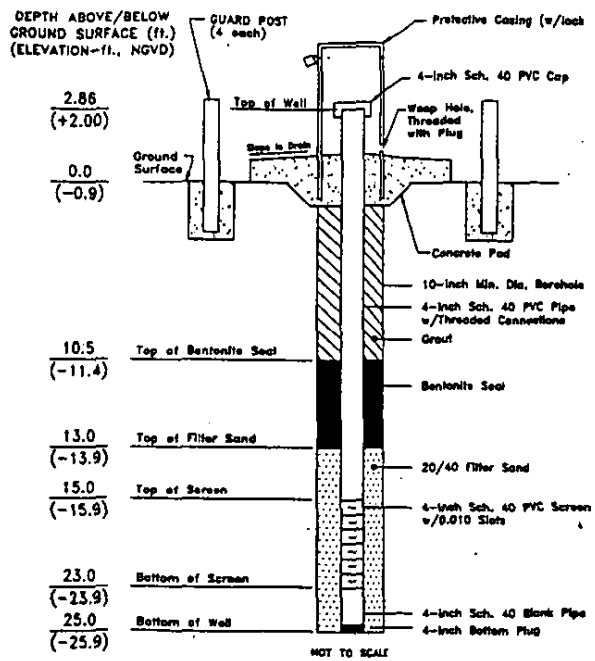
LOG01.GDT 01/14/00
LOG01 8910

BORING MW-1



SOIL COLUMN WELL

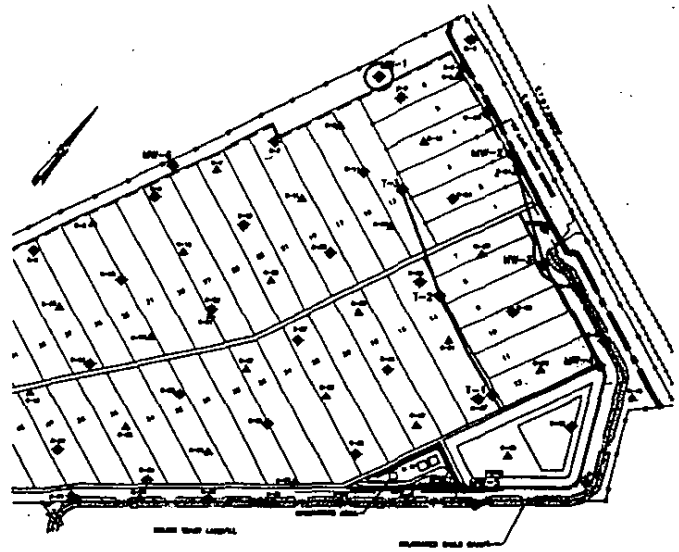
▼ WATER LEVEL OF JUNE 1999



WELL MW-1

GENERAL DATA

DATE SET	06/08/99
N-COORD (ft.)	16,351
E-COORD (ft.)	13,249
LATITUDE	29° 56' 15"
LONGITUDE	90° 15' 33"



WELL LOCATION PLAN

0 (feet) 1000
SCALE

RIVERBIRCH LANDFILL AVONDALE, LOUISIANA	STE Soil Testing Engineers, Inc. Baton Rouge, LA Lake Charles, LA		
RIVERBIRCH, INC. OWNER GRETNA, LOUISIANA	Project Engineer: G.P. Boutwell	Drawn by: DMS	Checked by:
mader-miers ENGINEERING, INC. LAFAYETTE, LOUISIANA	File No.: 99-1069	Date: 6-22-99	Figure No.: 2
	Title: WELL DIAGRAM WELL MW-1		

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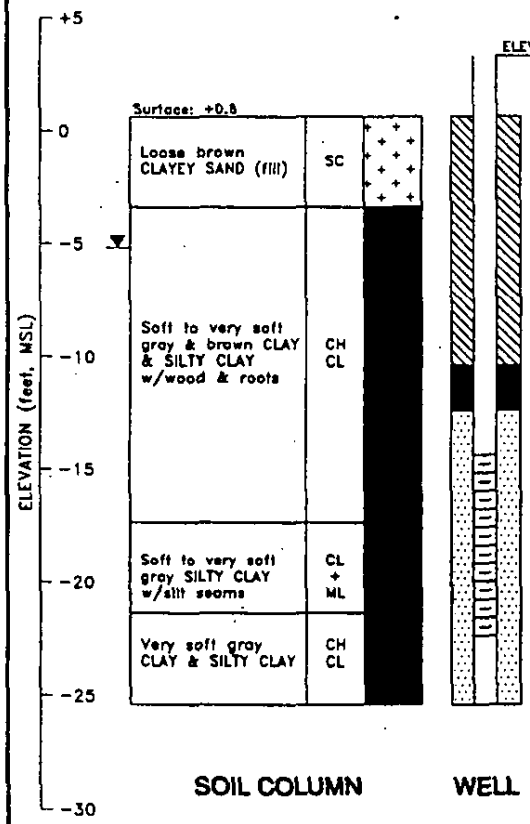
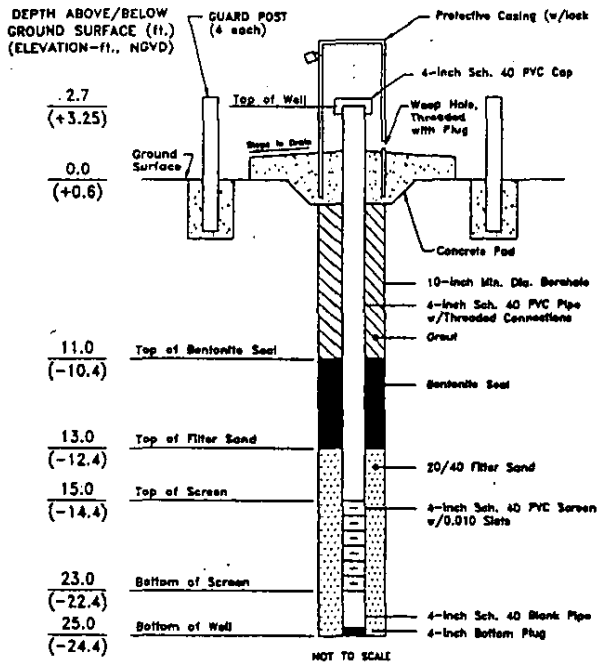
BORING MW-2



SOIL COLUMN

WELL

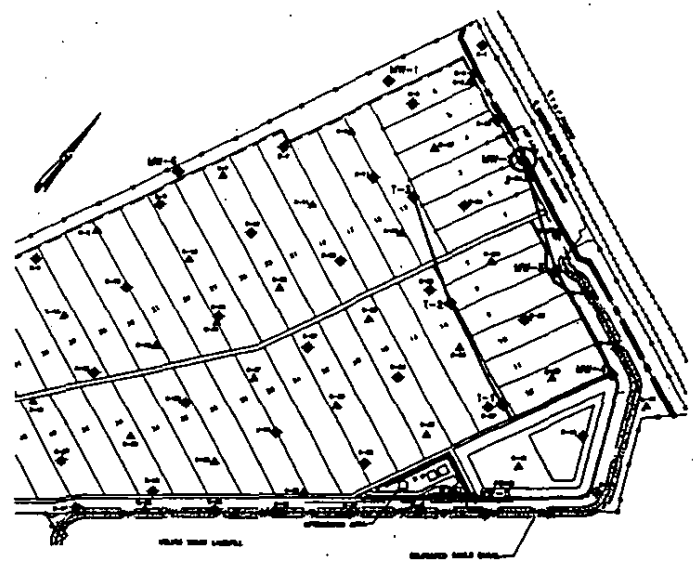
WATER LEVEL OF JUNE 1999



WELL MW-2

GENERAL DATA

DATE SET	06/07/99
N-COORD (ft.)	16,265
E-COORD (ft.)	14,246
LATITUDE	29° 56' 14"
LONGITUDE	90° 15' 21"



WELL LOCATION PLAN

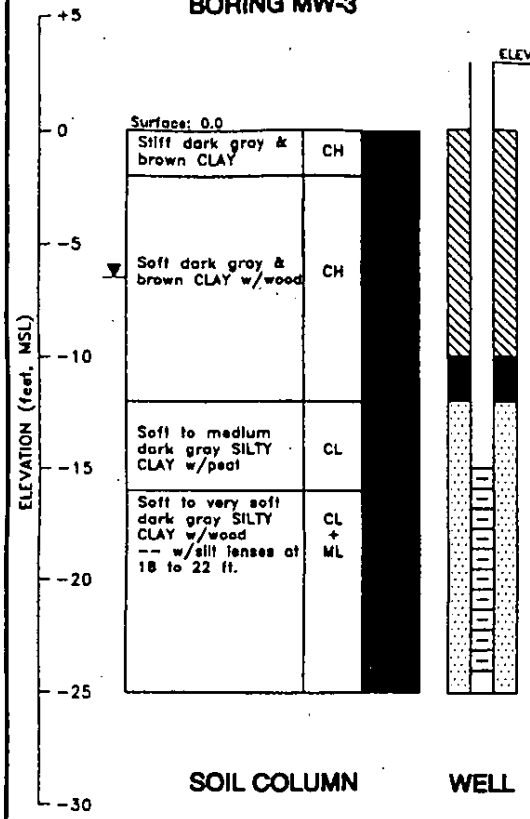
0 (feet) 1000

SCALE

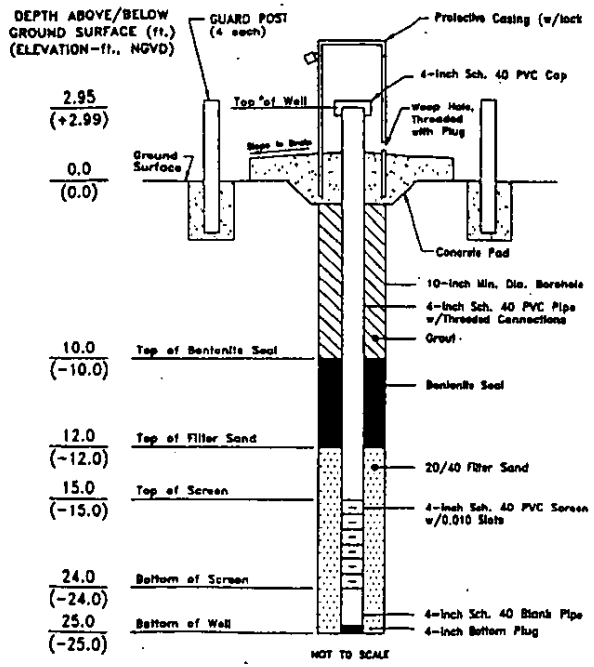
RIVERBIRCH LANDFILL AVONDALE, LOUISIANA	STE Soil Testing Engineers, Inc. Baton Rouge, LA Lake Charles, LA	
RIVERBIRCH, INC. OWNER GRETNA, LOUISIANA	Project Engineer: G.P. Boutwell	Drawn by: DMS	Checked by:
	File No.: 99-1069	Date: 6-22-99	Figure No.: 3
maden-miers ENGINEERING, INC. LAFAYETTE, LOUISIANA	Title: WELL DIAGRAM WELL MW-2		

C:\99-1069\MW-2.DWG\9-02-99.PLT

BORING MW-3



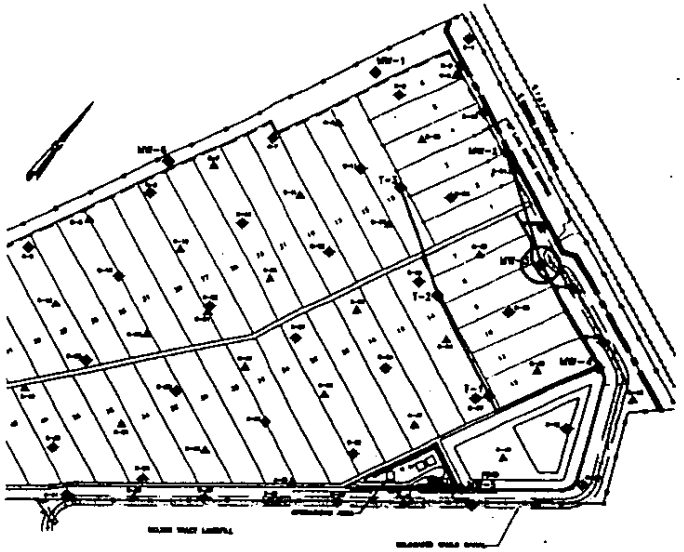
WATER LEVEL OF JUNE 1999



WELL MW-3

GENERAL DATA

DATE SET	06/02/99
N-COORD (ft.)	15,780
E-COORD (ft.)	14,876
LATITUDE	29° 56' 09"
LONGITUDE	90° 15' 14"



WELL LOCATION PLAN

0 (feet) 1000
SCALE

RIVERBIRCH LANDFILL AVONDALE, LOUISIANA	STE Soil Testing Engineers, Inc. Baton Rouge, LA Lake Charles, LA	
RIVERBIRCH, INC. OWNER GRETNA, LOUISIANA	Project Engineer: G.P. Boutwell	Drawn by: DMS / Checked by:
mader-miers ENGINEERING, INC. LAFAYETTE, LOUISIANA	File No.: 99-1069	Date: 6-22-99 / Figure No.: 4
	Title: WELL DIAGRAM WELL MW-3	

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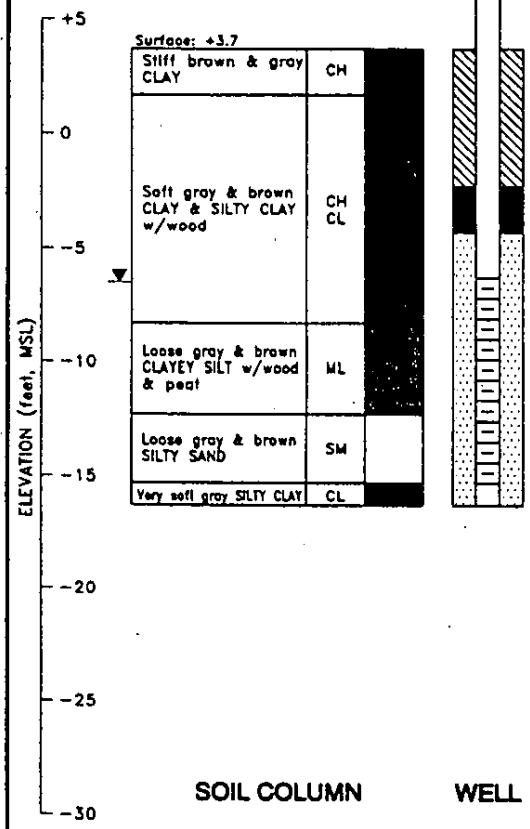
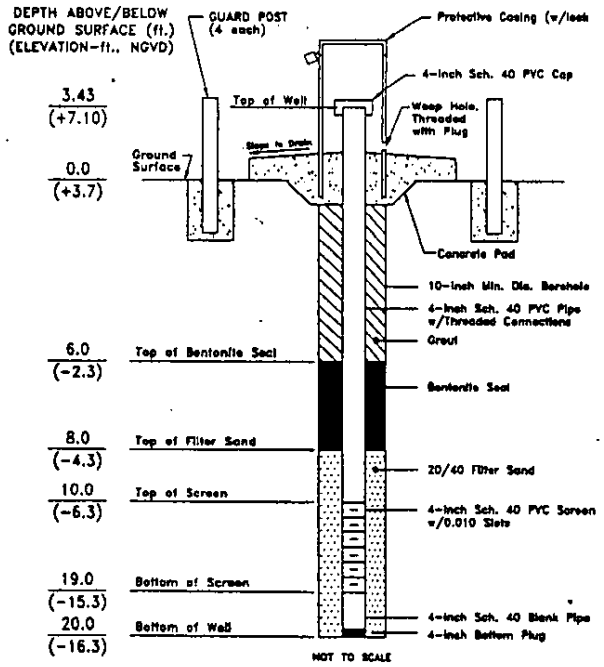
BORING MW-4



SOIL COLUMN WELL

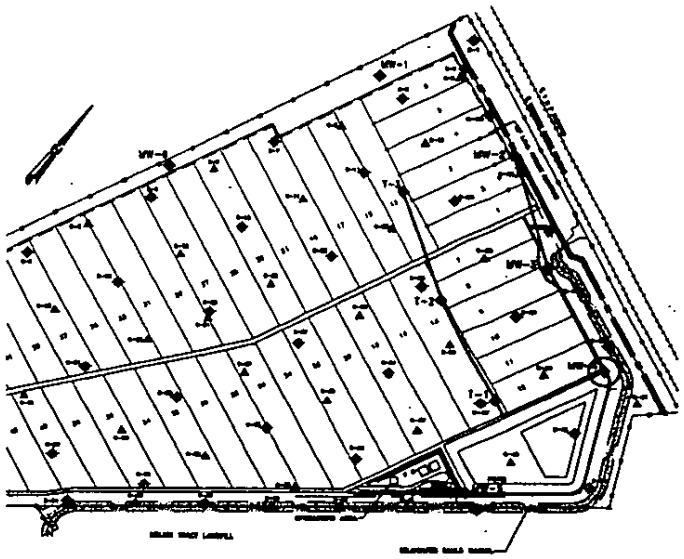
▼ WATER LEVEL OF JUNE 1999



WELL MW-4

GENERAL DATA

DATE SET	06/02/99
N-COORD (ft.)	15,443
E-COORD (ft.)	15,604
LATITUDE	29° 56' 06"
LONGITUDE	90° 15' 06"



WELL LOCATION PLAN

0 (feet) 1000

SCALE

RIVERBIRCH LANDFILL AVONDALE, LOUISIANA	STE Soil Testing Engineers, Inc. Baton Rouge, LA Lake Charles, LA		
RIVERBIRCH, INC. OWNER GRETNA, LOUISIANA	Project Engineer: G.P. Boutwell	Drawn by: DMS	Checked by:
mader-miers ENGINEERING, INC. LAFAYETTE, LOUISIANA	File No.: 99-1069	Date: 6-22-99	Figure No.: 5
	Title: WELL DIAGRAM WELL MW-4		

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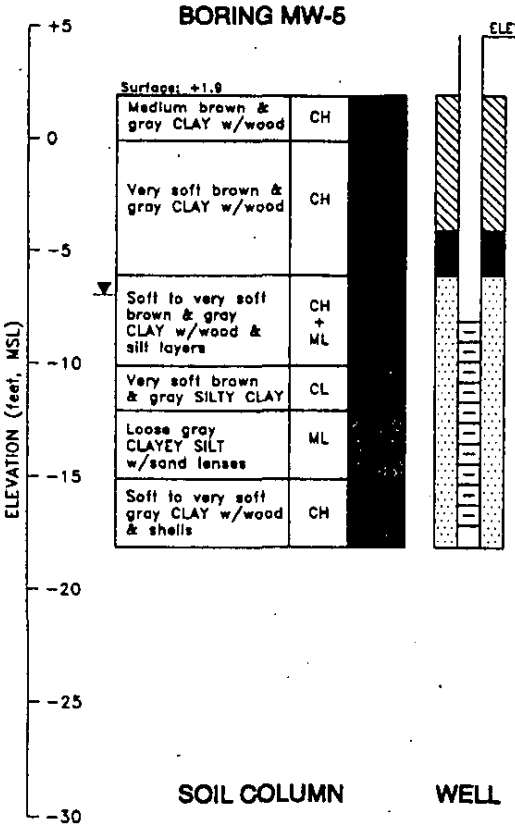
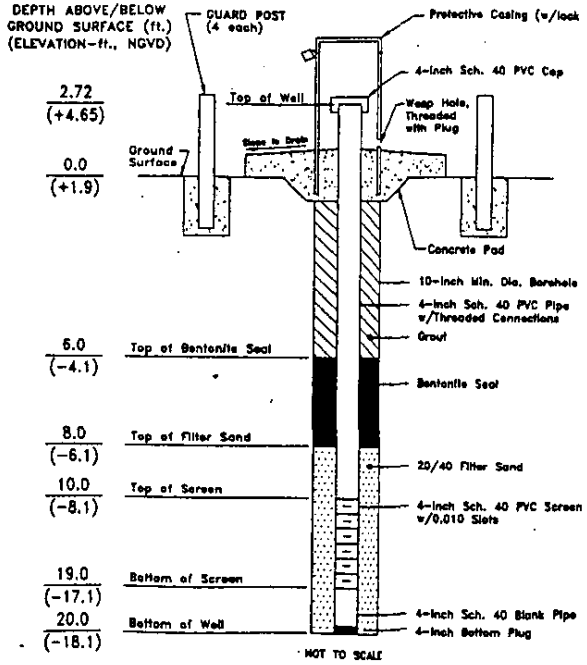
BORING MW-5

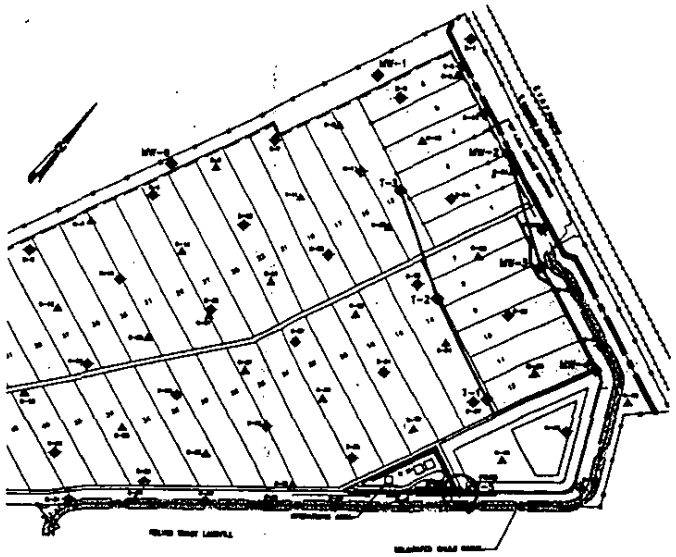




WELL MW-5

GENERAL DATA

DATE SET	06/03/99
N-COORD (ft.)	14,179
E-COORD (ft.)	15,399
LATITUDE	29° 55' 53"
LONGITUDE	90° 15' 08"



WELL LOCATION PLAN

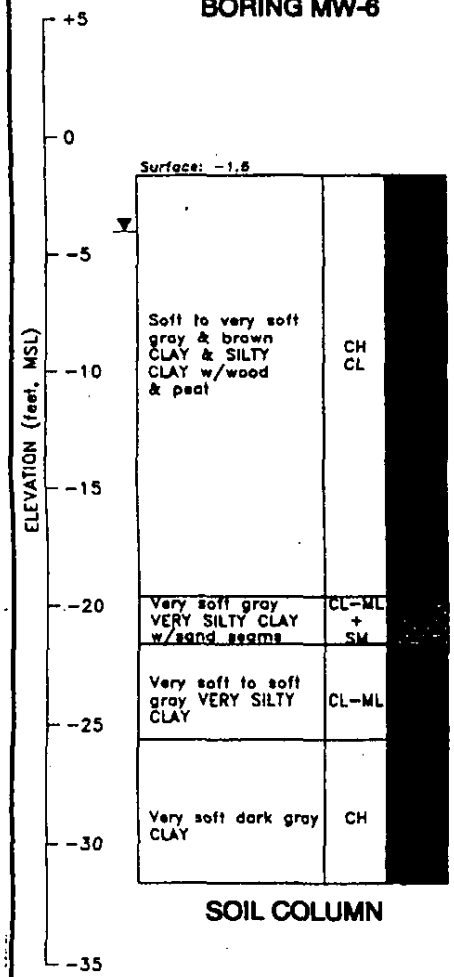
0 (feet) 1000
SCALE

▼ WATER LEVEL OF JUNE 1999

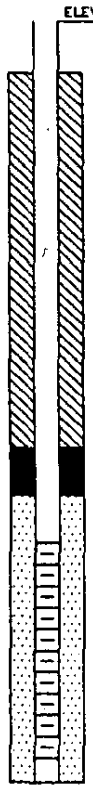
RIVERBIRCH LANDFILL AVONDALE, LOUISIANA	STE Soil Testing Engineers, Inc. Baton Rouge, LA Lake Charles, LA		
RIVERBIRCH, INC. OWNER GRETNA, LOUISIANA	Project Engineer: G.P. Boutwell	Drawn by: DMS	Checked by:
mader-miers ENGINEERING, INC. LAFAYETTE, LOUISIANA	File No.: 99-1069	Date: 6-22-99	Figure No.: 6
	Title: WELL DIAGRAM WELL MW-5		

C:\99-1069\MW-5.DWG\9-02-99.PLT

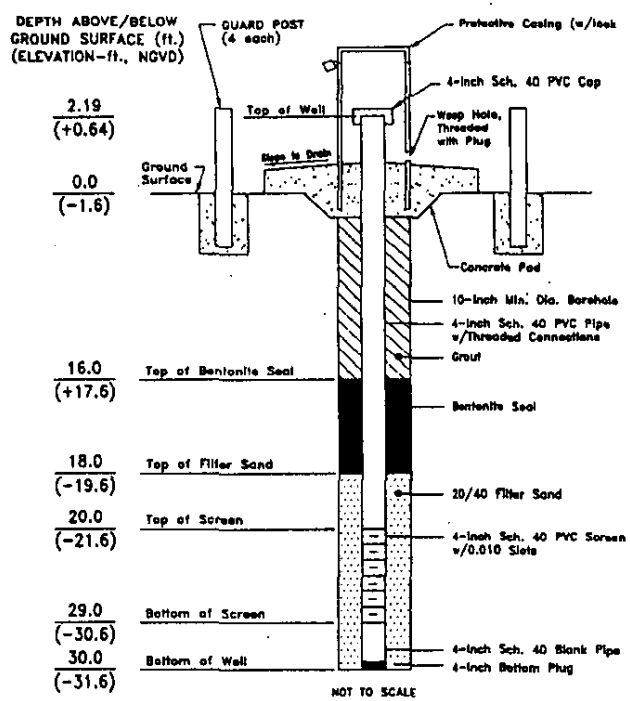
BORING MW-6



SOIL COLUMN



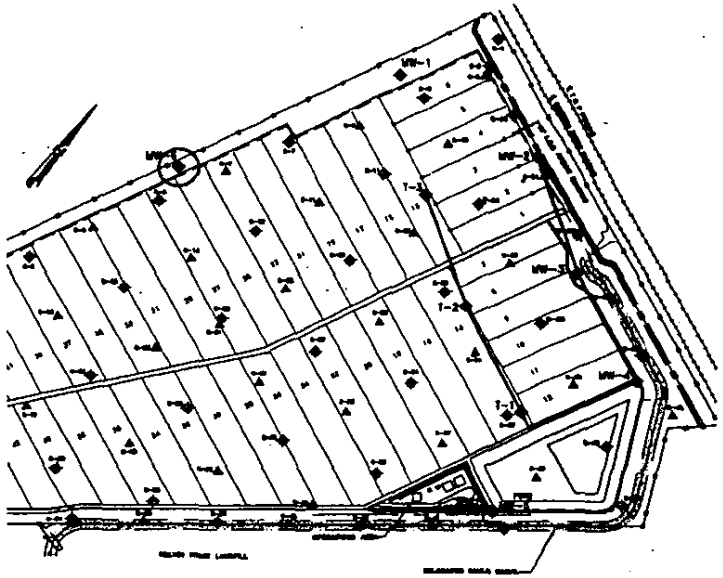
WELL



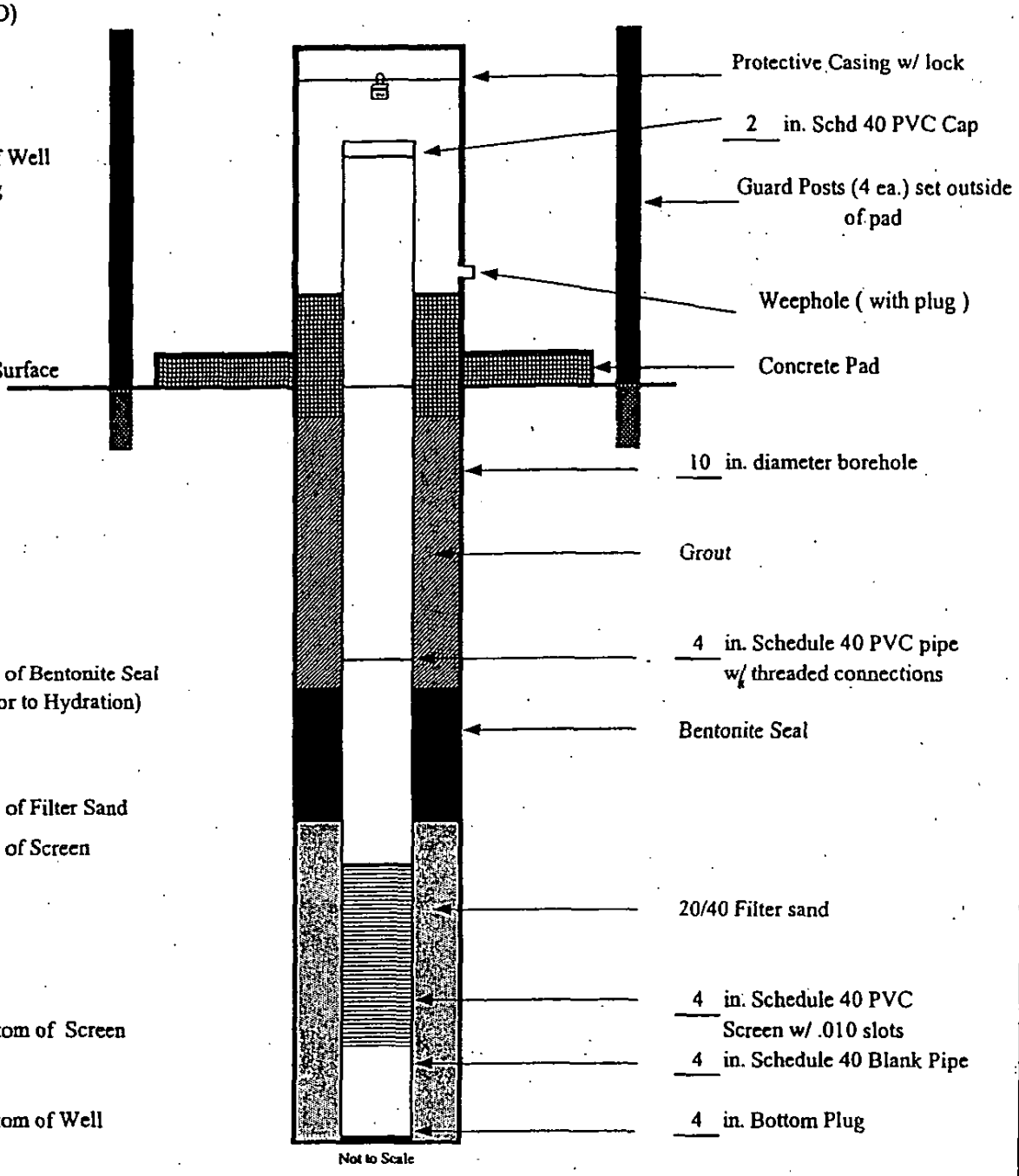
WELL MW-6

GENERAL DATA

DATE SET	06/04/99
N-COORD (ft.)	14,995
E-COORD (ft.)	12,460
LATITUDE	29° 56' 02"
LONGITUDE	90° 15' 42"



ove/Below Ground Surface , ft
n, ft NGVD)



MW-7

Monitor Well Number

PROJECT NAME: Well Installation

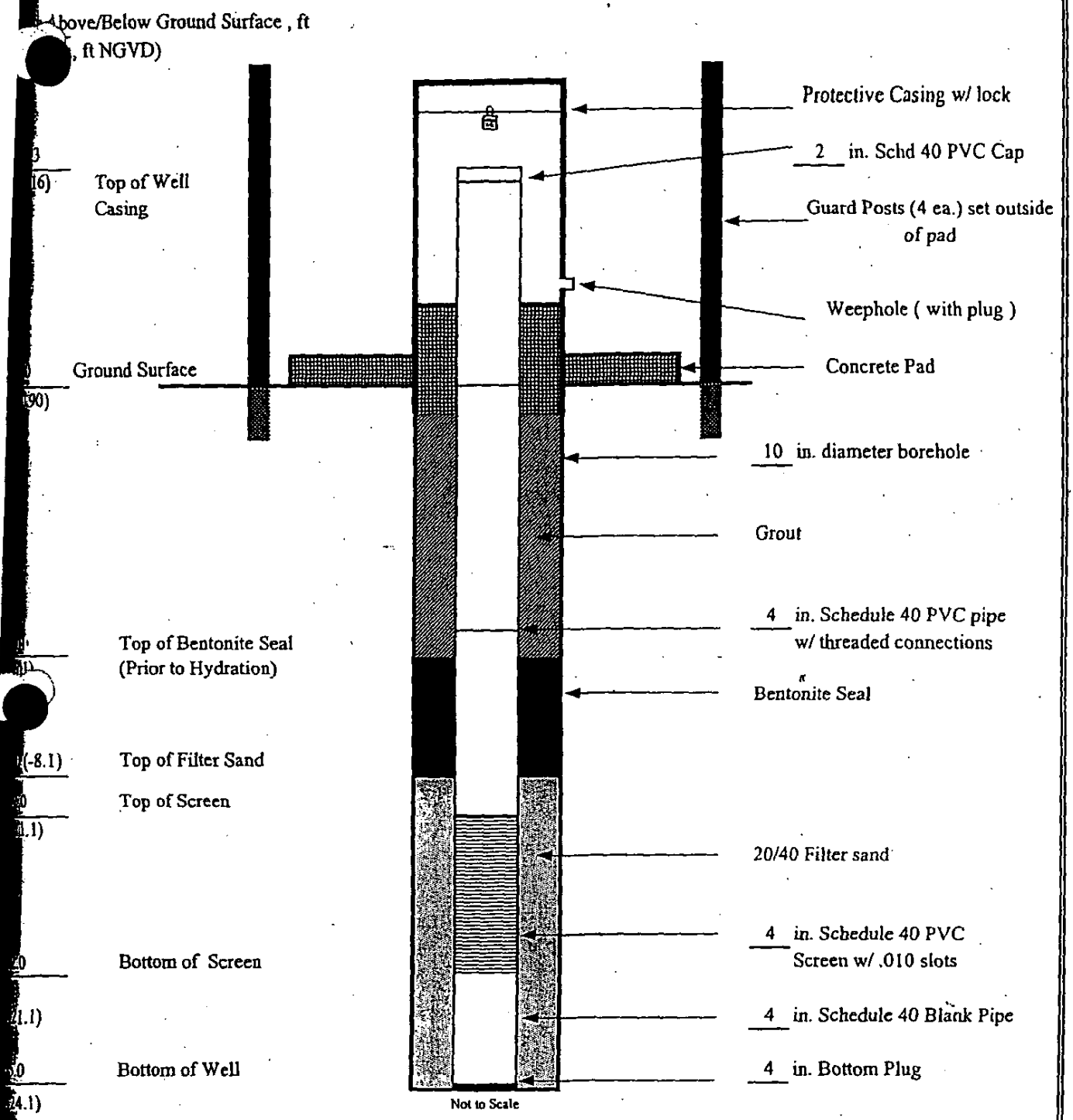
CLIENT: River Birch Corporation

INSTALLATION DATE: 11/10/99

ECT LOCATION: River Birch Landfill

STE PROJECT NO.: 99-1069

SOIL TESTING ENGINEERS, INC.



MW-8

Monitor Well Number

PROJECT NAME: Well Installation

ECT LOCATION: River Birch Landfill

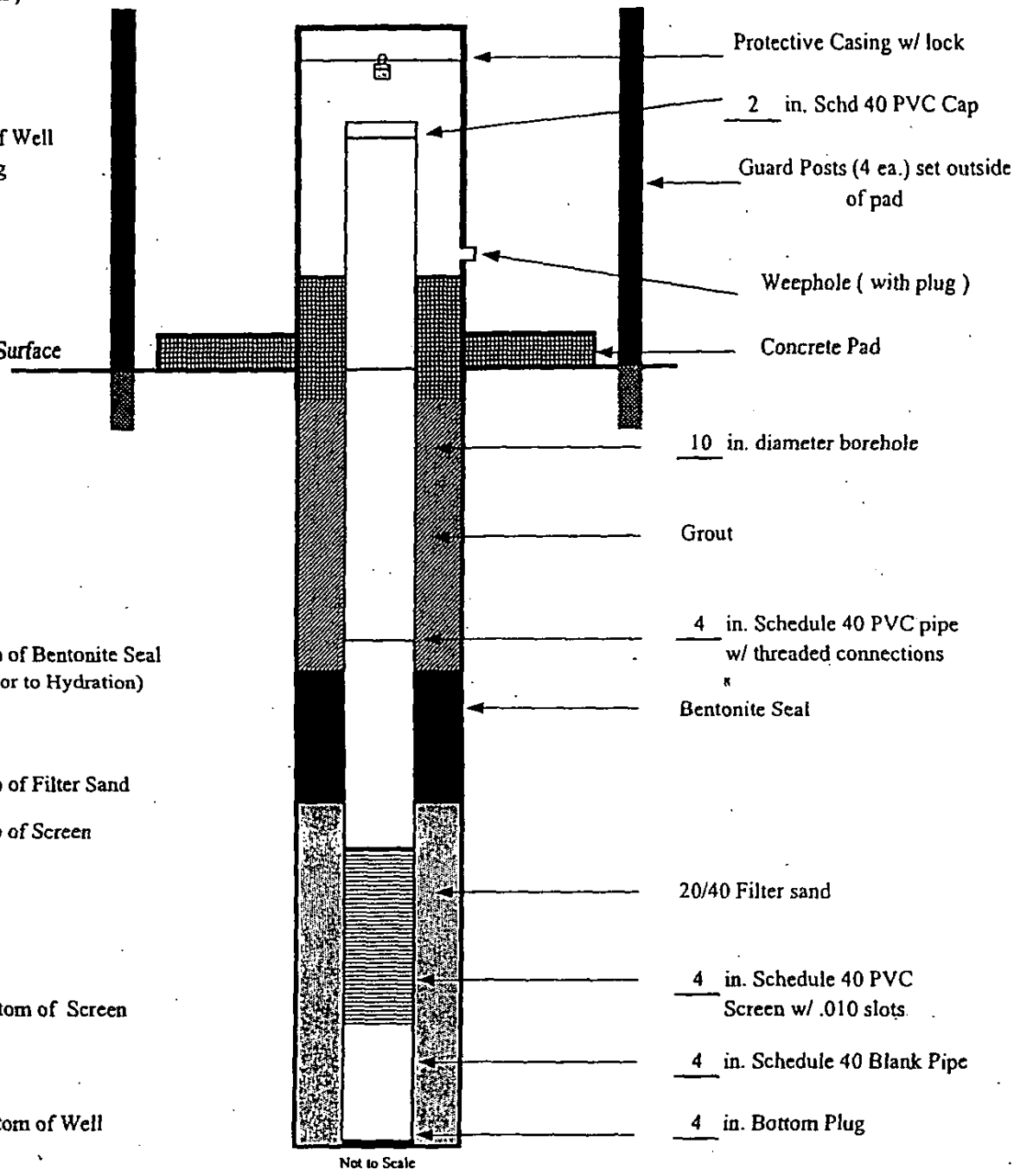
CLIENT: River Birch Corporation

INSTALLATION DATE: 11/11/99

STE PROJECT NO.: 99-1069

SOIL TESTING ENGINEERS, INC.

Above/Below Ground Surface , ft
on, ft NGVD)



MW-9

Monitor Well Number

PROJECT NAME: Well Installation

JECT LOCATION: River Birch Landfill

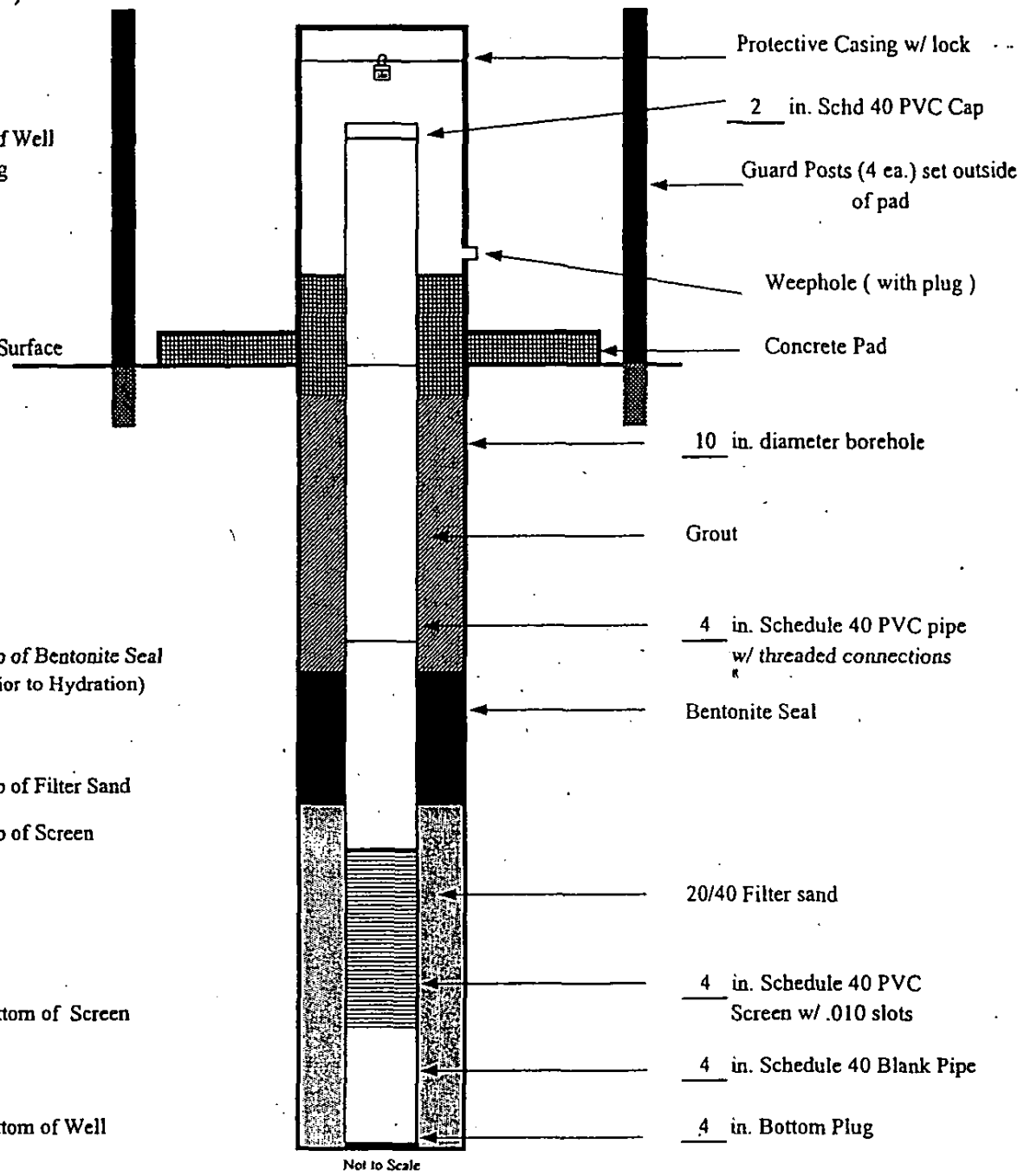
CLIENT: River Birch Corporation

INSTALLATION DATE: 11/15/99

STE PROJECT NO.: 99-1069

SOIL TESTING ENGINEERS, INC.

D Above/Below Ground Surface , ft
tion, ft NGVD)



MW-10

Monitor Well Number

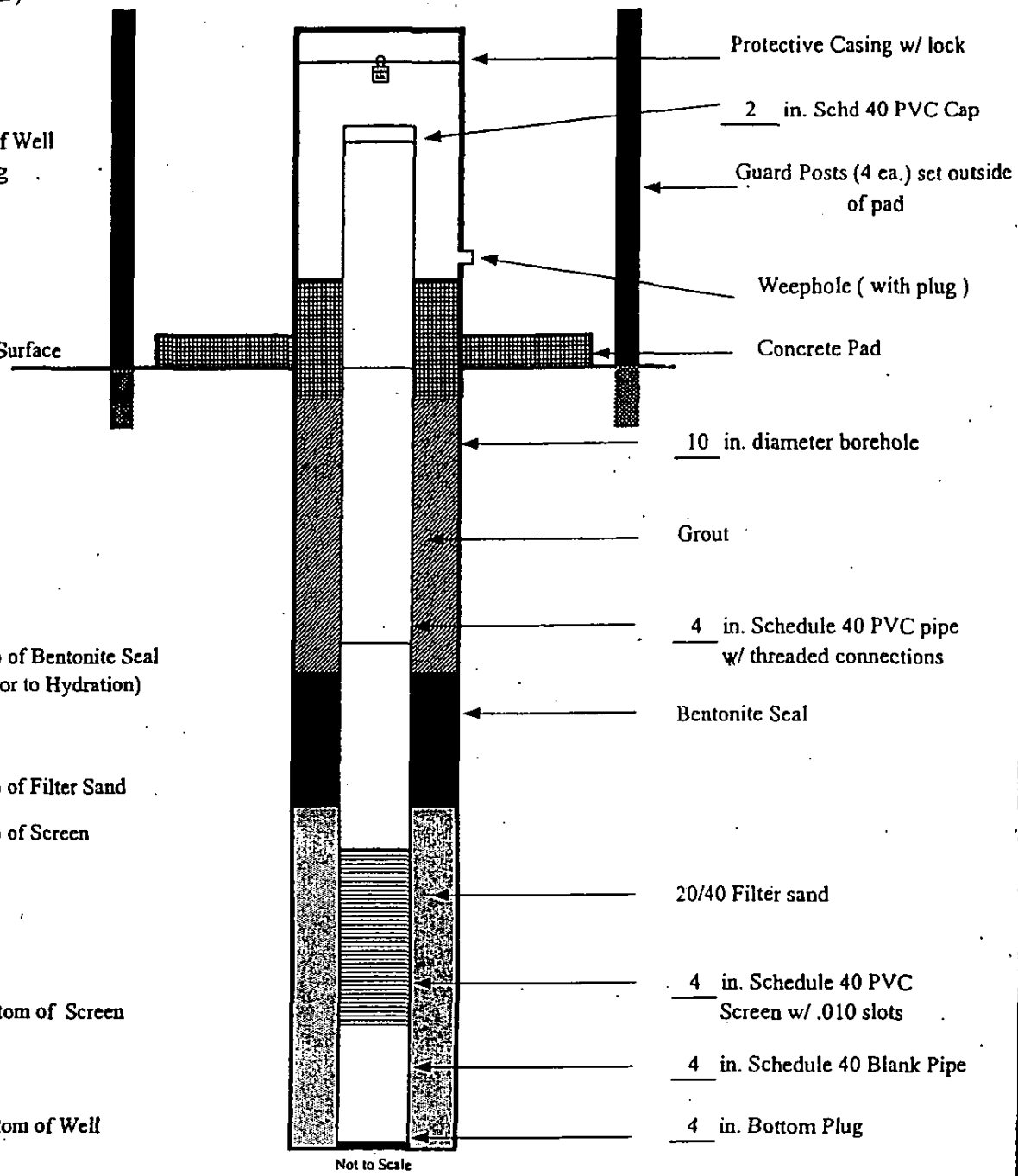
PROJECT NAME: Well Installation

ECT LOCATION: River Birch Landfill

CLIENT: River Birch Corporation
INSTALLATION DATE: 11/16/99
STE PROJECT NO.: 99-1069

SOIL TESTING ENGINEERS, INC.

Above/Below Ground Surface , ft
ion, ft NGVD)



MW-11

Monitor Well Number

PROJECT NAME: Well Installation

CT LOCATION: River Birch Landfill

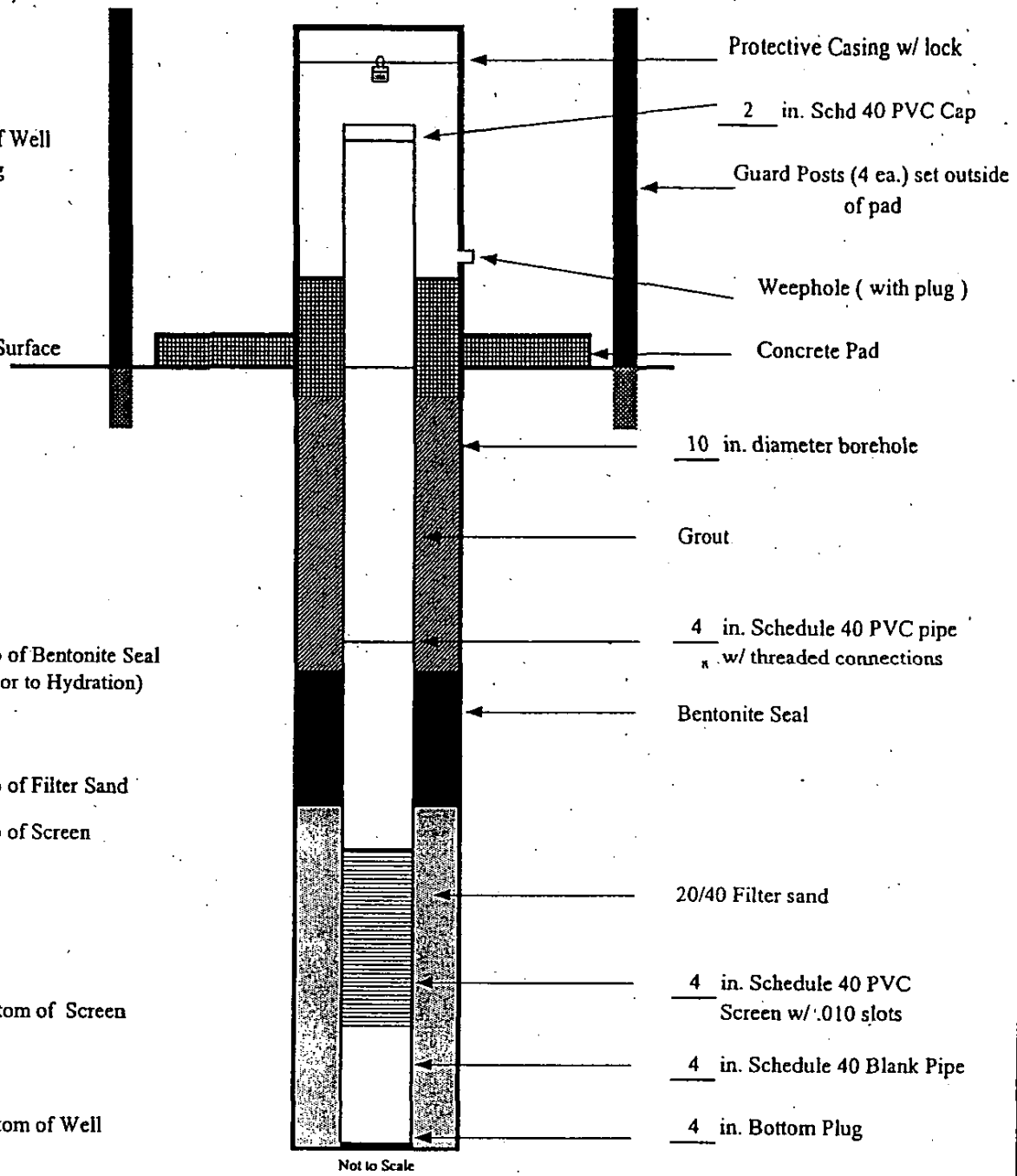
CLIENT: River Birch Corporation

INSTALLATION DATE: 11/17/99

STE PROJECT NO.: 99-1069

SOIL TESTING ENGINEERS, INC.

th Above/Below Ground Surface , ft
evation, ft NGVD)



MW-12

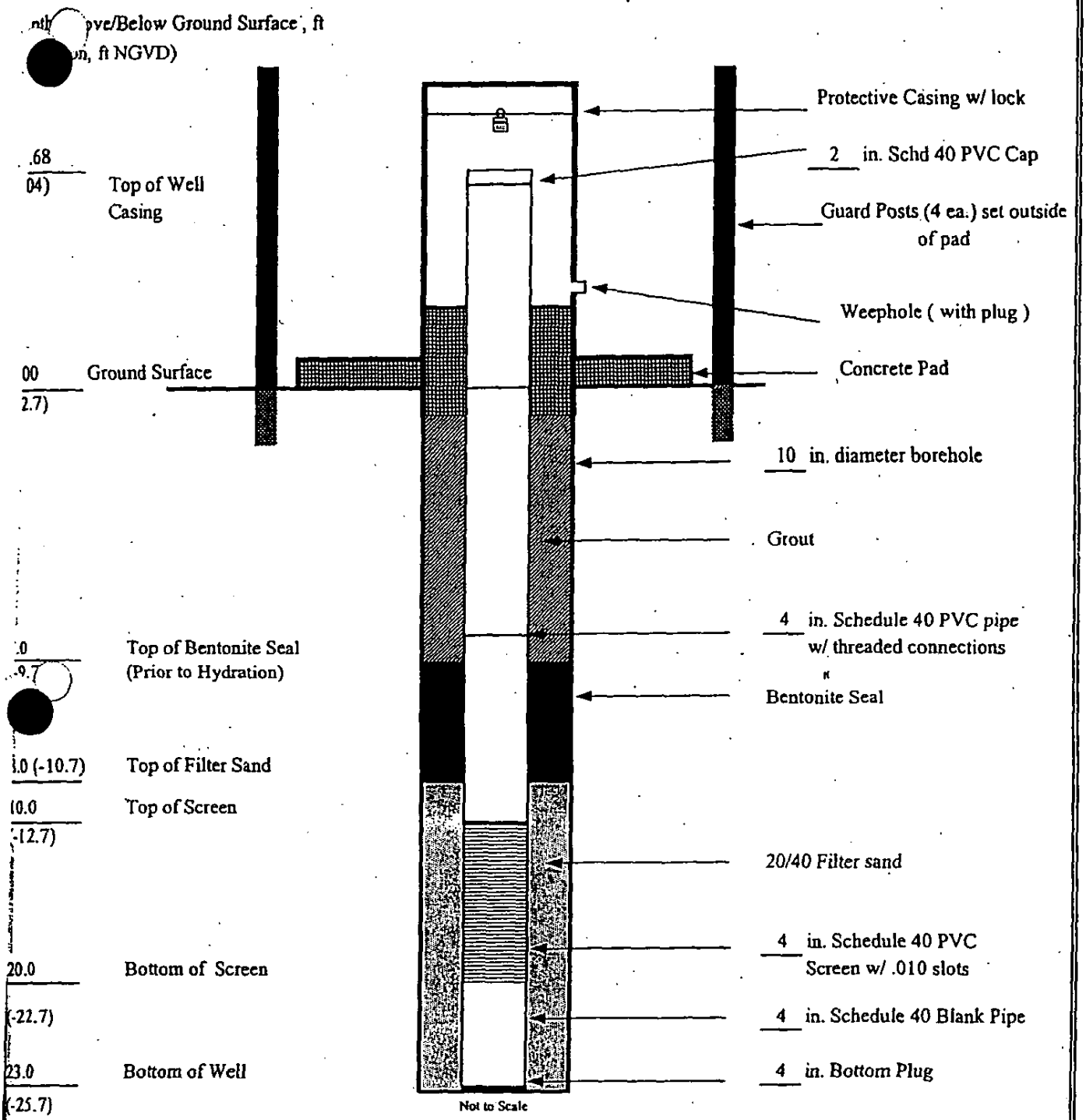
Monitor Well Number

PROJECT NAME: Well Installation

OJECT LOCATION: River Birch Landfill

CLIENT: River Birch Corporation
INSTALLATION DATE: 11/16/99
STE PROJECT NO.: 99-1069

SOIL TESTING ENGINEERS, INC.



MW-13

Monitor Well Number

PROJECT NAME: Well Installation

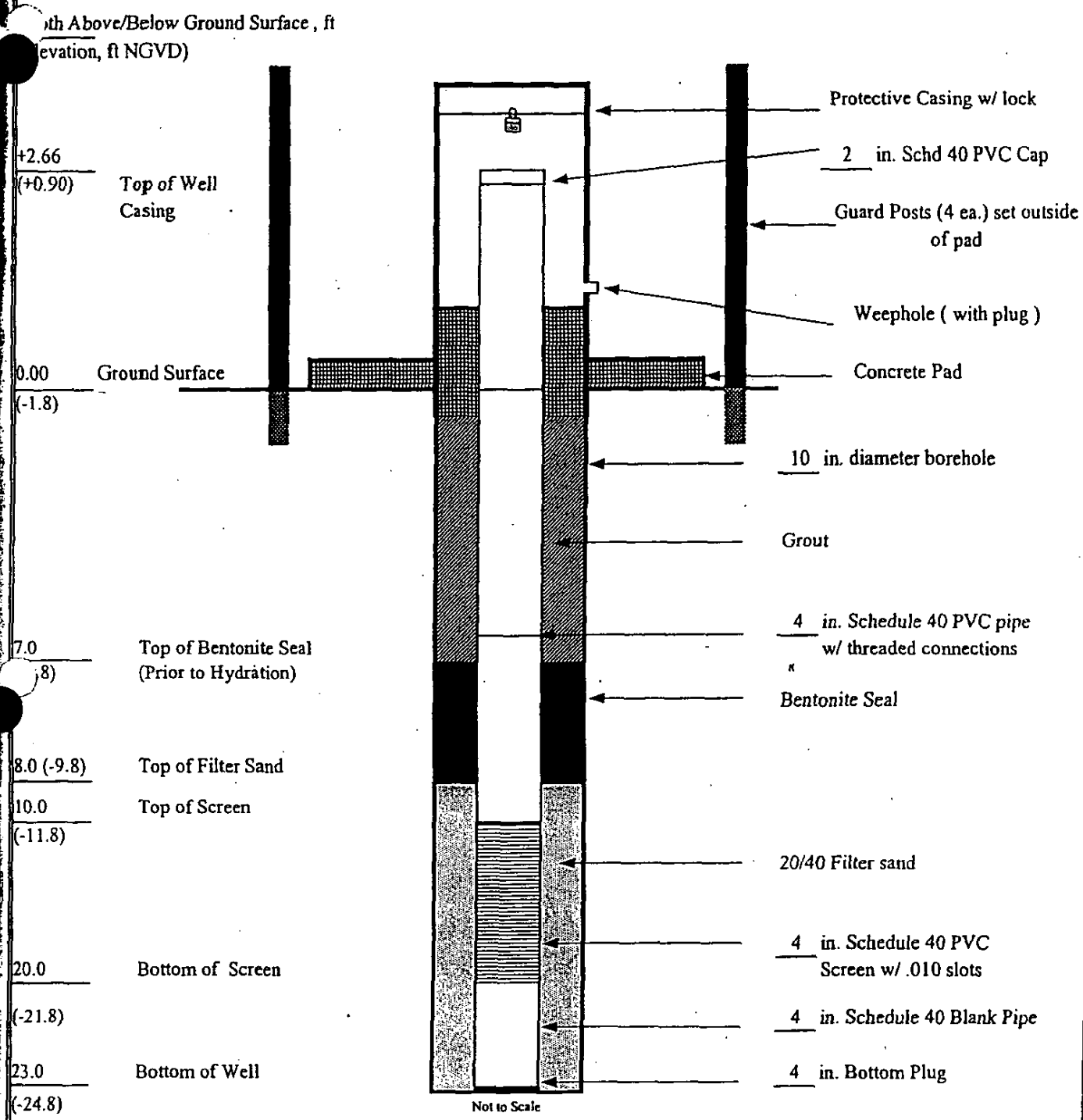
ECT LOCATION: River Birch Landfill

CLIENT: River Birch Corporation

INSTALLATION DATE: 11/17/99

STE PROJECT NO.: 99-1069

SOIL TESTING ENGINEERS, INC.



MW-14

Monitor Well Number

PROJECT NAME: Well Installation

PROJECT LOCATION: River Birch Landfill

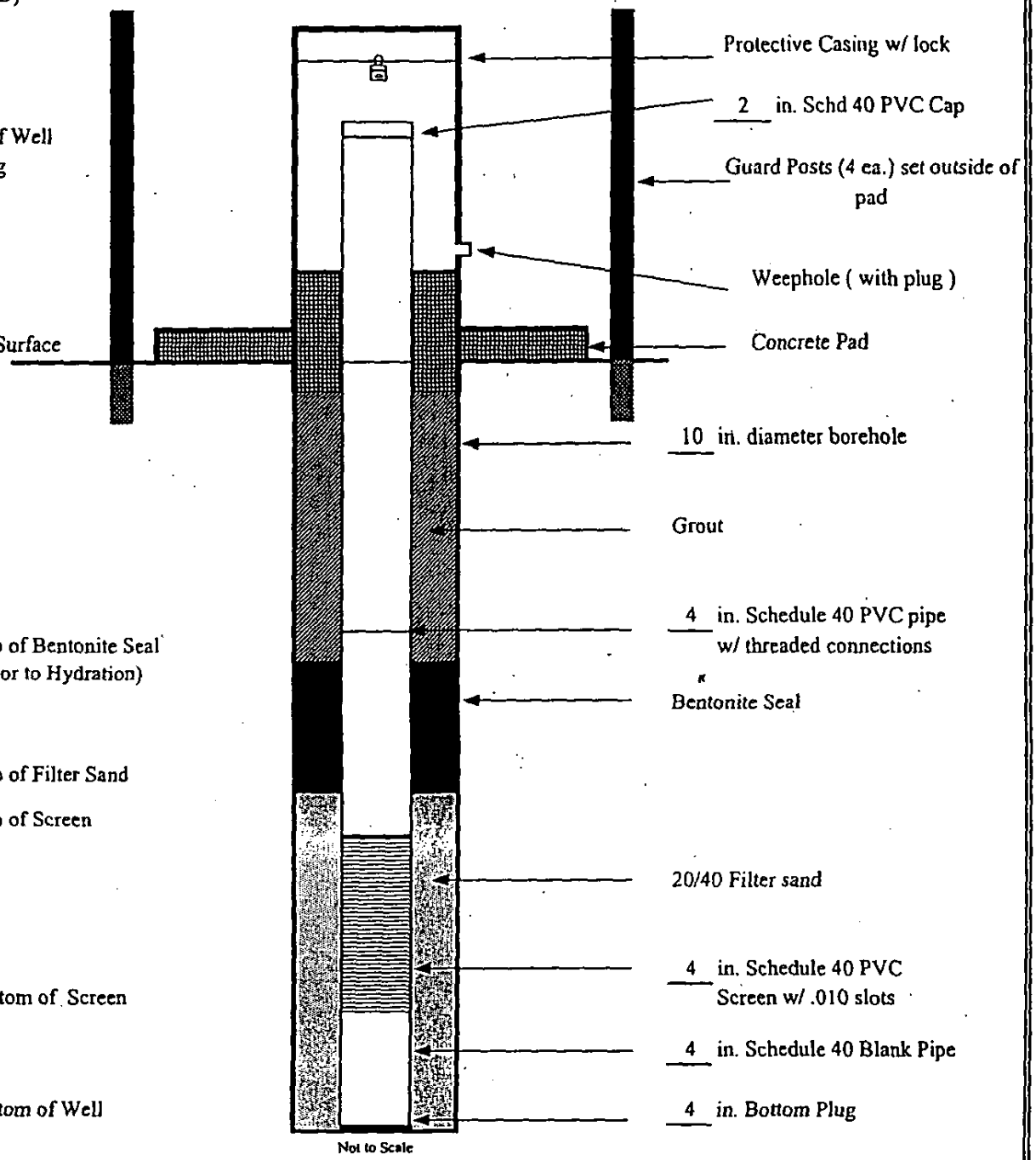
CLIENT: River Birch Corporation

INSTALLATION DATE: 11/17/99

STE PROJECT NO.: 99-1069

SOIL TESTING ENGINEERS, INC.

Above/Below Ground Surface , ft
tion, ft NGVD)



MW-15

Monitor Well Number

PROJECT NAME: Well Installation

OJECT LOCATION: River Birch Landfill

CLIENT: River Birch Corporation
INSTALLATION DATE: 11/19/99
STE PROJECT NO.: 99-1069

SOIL TESTING ENGINEERS, INC.

TABLE 1
MONITORING WELL CONSTRUCTION DETAILS

RIVER BIRCH LANDFILL
AVONDALE, LOUISIANA
JEFFERSON PARISH
(PAGE 1 OF 3)

MONITORING WELL NO.	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6
DOTD I.D. NO.	6522Z	6523Z	6524Z	6525Z	6526Z	6527Z
LATITUDE	29° 56' 15"	29° 56' 14"	29° 56' 09"	29° 56' 06"	29° 55' 53"	29° 56' 02"
LONGITUDE	90° 15' 33"	90°15' 21"	90° 15' 14"	90° 15' 06"	90°15' 08"	90°15' 42"
UNIT / AREA MONITORED	Phase I	Phase I	Phase I	Phase I	Phase II	Phase III
WELL TYPE / CASING MATERIAL	4" PVC	4" PVC	4" PVC	4" PVC	4" PVC	4" PVC
DATE COMPLETED	Jun-99	Jun-99	Jun-99	Jun-99	Jun-99	Jun-99
ZONE MONITORED	Strata I & II	Strata I & II	Strata I & II	Strata I & II	Strata I & II	Strata I & II
ELEV. OF MEASURING POINT (NGVD)	2.00	3.25	2.99	7.10	4.65	0.64
GROUND SURFACE ELEVATION (NGVD)	-0.9	0.6	0	3.7	1.9	-1.6
WELL DEPTH AT INSTALLATION (FEET BGS)	25	25	25	20	20	30
TOP OF SCREENED INTERVAL (FEET BGS)	15	15	15	10	10	20
BOTTOM OF SCREENED INTERVAL (FEET BGS)	23	23	24	19	19	29
TOP OF SCREENED INTERVAL (NGVD)	-15.9	-14.4	-15	-6.3	-8.1	-21.6
BOTTOM OF SCREENED INTERVAL (NGVD)	-23.9	-22.4	-24	-15.3	-17.1	-30.6
SUMP LENGTH (FEET)	2.0	2.0	1.0	1.0	1.0	1.0

TABLE 1
MONITORING WELL CONSTRUCTION DETAILS

RIVER BIRCH LANDFILL
AVONDALE, LOUISIANA
JEFFERSON PARISH
(PAGE 2 OF 3)

MONITORING WELL NO.	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12
DOTD I.D. NO.	6558Z	6559Z	6560Z	6561Z	6562Z	6563Z
LATITUDE	29° 55' 58"	29° 55' 48"	29° 55' 44"	29° 55' 38"	29° 55' 47"	29° 55' 33"
LONGITUDE	90°15' 02"	90° 15' 16"	90° 15' 23"	90°15' 33"	90° 15' 50"	90°15' 39"
UNIT / AREA MONITORED	Phase I	Phase III	Phase IV	Phase V	Phase IV	Phase V
WELL TYPE / CASING MATERIAL	4" PVC	4" PVC	4" PVC	4" PVC	4" PVC	4" PVC
DATE COMPLETED	Nov-99	Nov-99	Nov-99	Nov-99	Nov-99	Nov-99
ZONE MONITORED	Strata I & II	Strata I & II	Strata I & II	Strata I & II	Strata I & II	Strata I & II
ELEV. OF MEASURING POINT (NGVD)	4.75	3.16	3.52	1.13	0.72	0.78
GROUND SURFACE ELEVATION (NGVD)	2.3	0.9	0.7	-1.8	-2.2	-2.1
WELL DEPTH AT INSTALLATION (FEET BGS)	28	25	33	23	23	22
TOP OF SCREENED INTERVAL (FEET BGS)	15	12	20	10	10	9
BOTTOM OF SCREENED INTERVAL (FEET BGS)	25	22	30	20	20	19
TOP OF SCREENED INTERVAL (NGVD)	-12.7	-11.1	-19.3	-11.8	-12.2	-11.1
BOTTOM OF SCREENED INTERVAL (NGVD)	-22.7	-21.1	-29.3	-21.8	-22.2	-21.1
SUMP LENGTH (FEET)	3	3	3	3	3	3

TABLE 1
MONITORING WELL CONSTRUCTION DETAILS

RIVER BIRCH LANDFILL
AVONDALE, LOUISIANA
JEFFERSON PARISH
(PAGE 3 OF 3)

MONITORING WELL NO.	MW-13	MW-14	MW-15	T-7	T-8	T-9
DOTD I.D. NO.	6564Z	6565Z	6566Z	NA	NA	NA
LATITUDE	29° 55' 29"	29° 55' 24"	29° 55' 31"	NA	NA	NA
LONGITUDE	90° 15' 46"	90° 15' 55"	90° 15' 58"	NA	NA	NA
UNIT / AREA MONITORED	Phase VI	Phase VI	Phase VI	Phase V	Phase V	Phase V
WELL TYPE / CASING MATERIAL	4" PVC	4" PVC	4" PVC	4" PVC	4" PVC	4" PVC
DATE COMPLETED	Nov-99	Nov-99	Nov-99	Jun-00	Jun-00	Jun-00
ZONE MONITORED	Strata I & II	Strata I & II	Strata I & II	Strata I & II	Strata I & II	Strata I & II
ELEV. OF MEASURING POINT (NGVD)	-0.04	0.9	0.63	1	4.87	1.33
GROUND SURFACE ELEVATION (NGVD)	-2.7	-1.8	-2.3	-2	1.87	-1.67
WELL DEPTH AT INSTALLATION (FEET BGS)	23	23	23	25.5	25.5	25.5
TOP OF SCREENED INTERVAL (FEET BGS)	10	10	10	15	15	15
BOTTOM OF SCREENED INTERVAL (FEET BGS)	20	20	20	25	25	25
TOP OF SCREENED INTERVAL (NGVD)	-12.7	-11.8	-12.3	-17	-13.13	-16.67
BOTTOM OF SCREENED INTERVAL (NGVD)	-22.7	-21.8	-22.3	-27	-23.13	-26.67
SUMP LENGTH (FEET)	3	3	3	0.5	0.5	0.5

TABLE 3
GROUNDWATER ELEVATION DATA
RIVER BIRCH LANDFILL
AVONDALE, LOUISIANA
JEFFERSON PARISH

Monitoring Well No.	Monitoring Date	Depth to Groundwater from TOC (ft MSL)	TOC Elevation (ft MSL)	Groundwater Elevation (ft MSL)
MW-1	06/23/99	5.32	2.00	-3.32
	09/21/99	4.23	2.00	-2.23
	12/22/99	4.23	2.00	-2.23
	03/16/01	3.84	2.00	-1.84
	06/19/00	4.94	2.00	-2.94
	09/06/00	5.43	2.00	-3.43
	03/19/01	3.08	2.00	-1.08
	09/04/01	4.12	2.00	-2.12
	03/27/02	3.98	2.00	-1.98
	04/29/02	3.95	2.00	-1.95
	09/19/02	3.20	2.00	-1.20
	04/2-3/03	3.43	2.00	-1.43
MW-2	06/23/99	8.47	3.25	-5.22
	09/21/99	8.35	3.25	-5.10
	12/22/99	6.20	3.25	-2.95
	03/16/01	4.75	3.25	-1.50
	06/19/00	5.37	3.25	-2.12
	09/06/00	4.73	3.25	-1.48
	03/19/01	4.81	3.25	-1.56
	09/04/01	5.39	3.25	-2.14
	03/27/02	5.21	3.25	-1.96
	04/29/02	5.16	3.25	-1.91
	09/19/02	5.30	3.25	-2.05
	04/2-3/03	3.66	3.25	-0.41
MW-3	06/23/99	9.45	2.99	-6.46
	09/21/99	9.65	2.99	-6.66
	12/22/99	9.38	2.99	-6.39
	03/16/00	9.62	2.99	-6.63
	06/19/00	7.84	2.99	-4.85
	09/06/00	6.44	2.99	-3.45
	03/16/01	5.70	2.99	-2.71
	09/04/01	7.10	2.99	-4.11
	03/27/02	7.31	2.99	-4.32
	04/29/02	7.99	2.99	-5.00
	09/19/02	7.85	2.99	-4.86
	04/2-3/03	7.85	2.99	-4.86

ft MSL = feet below mean sea level elevation

TABLE 3
GROUNDWATER ELEVATION DATA
RIVER BIRCH LANDFILL
AVONDALE, LOUISIANA
JEFFERSON PARISH

Monitoring Well No.	Monitoring Date	Depth to Groundwater from TOC (ft MSL)	TOC Elevation (ft MSL)	Groundwater Elevation (ft MSL)
MW-4	06/23/99	13.62	7.10	-6.52
	09/21/99	12.51	7.10	-5.41
	12/22/99	12.65	7.10	-5.55
	03/16/01	13.11	7.10	-6.01
	06/19/00	12.80	7.10	-5.70
	09/06/00	11.87	7.10	-4.77
	03/19/01	10.91	7.10	-3.81
	09/05/01	12.59	7.10	-5.49
	03/27/02	13.10	7.10	-6.00
	04/29/02	13.42	7.10	-6.32
	09/19/02	13.25	7.10	-6.15
	04/2-3/03	12.63	7.10	-5.53
MW-5	06/23/99	11.60	4.65	-6.95
	09/21/99	11.44	4.65	-6.79
	12/22/99	11.30	4.65	-6.65
	03/14/00	11.33	4.65	-6.68
	09/06/00	11.75	4.65	-7.10
	03/19/01	10.04	4.65	-5.39
	09/05/01	11.34	4.65	-6.69
	03/27/02	11.10	4.65	-6.45
	04/29/02	12.61	4.65	-7.96
	09/19/02	11.55	4.65	-6.90
	04/2-3/03	10.85	4.65	-6.20
MW-6	06/23/99	4.63	0.64	-3.99
	09/21/99	3.61	0.64	-2.97
	12/22/99	4.13	0.64	-3.49
	03/19/01	4.64	0.64	-4.00
	06/19/00	5.75	0.64	-5.11
	09/06/00	5.95	0.64	-5.31
	03/19/01	2.99	0.64	-2.35
	09/04/01	5.07	0.64	-4.43
	03/27/02	5.16	0.64	-4.52
	04/29/02	5.62	0.64	-4.98
	09/19/02	5.80	0.64	-5.16
	04/2-3/03	5.10	0.64	-4.46
MW-7	12/22/99	11.26	4.75	-6.51
	03/14/00	11.27	4.75	-6.52
	06/19/00	10.94	4.75	-6.19
	09/06/00	11.50	4.75	-6.75
	03/19/01	10.11	4.75	-5.36
	09/05/01	10.60	4.75	-5.85
	03/27/02	11.13	4.75	-6.38
	04/29/02	11.61	4.75	-6.86
	09/19/02	11.55	4.75	-6.80
	04/2-3/03	11.06	4.75	-6.31

ft MSL = feet below mean sea level

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TABLE 3
GROUNDWATER ELEVATION DATA
RIVER BIRCH LANDFILL
AVONDALE, LOUISIANA
JEFFERSON PARISH

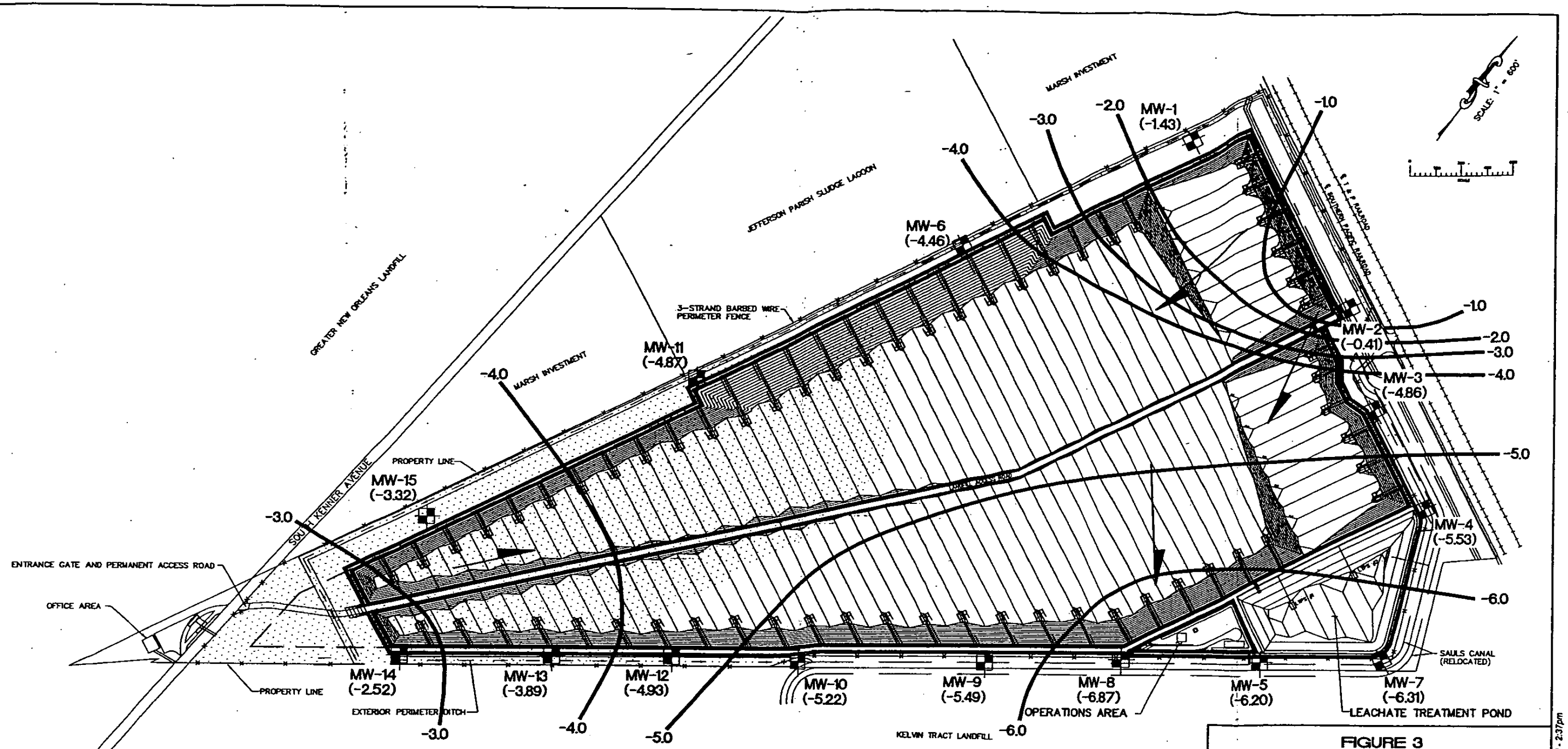
Monitoring Well No.	Monitoring Date	Depth to Groundwater from TOC (ft MSL)	TOC Elevation (ft MSL)	Groundwater Elevation (ft MSL)
MW-8	12/27/99	9.99	3.16	-6.83
	01/11/00	10.13	3.16	-6.97
	03/14/00	10.00	3.16	-6.84
	06/19/00	9.43	3.16	-6.27
	09/06/00	10.59	3.16	-7.43
	03/19/01	8.10	3.16	-4.94
	09/04/01	9.62	3.16	-6.46
	03/27/02	10.80	3.16	-7.64
	04/29/02	11.21	3.16	-8.05
	09/20/02	10.45	3.16	-7.29
	04/2-3/03	10.03	3.16	-6.87
MW-9	01/11/00	8.64	3.52	-5.12
	03/14/00	9.55	3.52	-6.03
	06/19/00	12.15	3.52	-8.63
	09/06/00	12.57	3.52	-9.05
	03/19/01	7.54	3.52	-4.02
	09/04/01	7.77	3.52	-4.25
	03/27/02	9.91	3.52	-6.39
	04/29/02	10.14	3.52	-6.62
	09/20/02	10.50	3.52	-6.98
	04/2-3/03	9.01	3.52	-5.49
MW-10	12/27/99	6.36	1.13	-5.23
	03/14/00	7.78	1.13	-6.65
	06/20/00	11.45	1.13	-10.32
	09/06/00	11.23	1.13	-10.10
	03/19/01	7.00	1.13	-5.87
	09/06/01	7.89	1.13	-6.76
	03/27/02	8.02	1.13	-6.89
	04/29/02	8.82	1.13	-7.69
	09/18/02	8.90	1.13	-7.77
	04/2-3/03	6.35	1.13	-5.22
MW-11	12/27/99	4.32	0.72	-3.60
	03/14/00	4.73	0.72	-4.01
	06/19/00	5.38	0.72	-4.66
	09/06/00	5.66	0.72	-4.94
	03/19/01	4.55	0.72	-3.83
	09/04/01	6.08	0.72	-5.36
	03/27/02	5.98	0.72	-5.26
	04/29/02	6.24	0.72	-5.52
	09/19/02	6.70	0.72	-5.98
	04/2-3/03	5.59	0.72	-4.87

ft MSL = feet below mean sea level

TABLE 3
GROUNDWATER ELEVATION DATA
RIVER BIRCH LANDFILL
AVONDALE, LOUISIANA
JEFFERSON PARISH

Monitoring Well No.	Monitoring Date	Depth to Groundwater from TOC (ft MSL)	TOC Elevation (ft MSL)	Groundwater Elevation (ft MSL)
MW-12	12/27/99	5.24	0.78	-4.46
	03/16/00	5.66	0.78	-4.88
	06/19/00	8.57	0.78	-7.79
	09/06/00	7.17	0.78	-6.39
	03/19/01	4.96	0.78	-4.18
	09/04/01	5.68	0.78	-4.90
	03/27/02	5.61	0.78	-4.83
	04/29/02	6.25	0.78	-5.47
	09/18/02	5.60	0.78	-4.82
	04/2-3/03	5.71	0.78	-4.93
MW-13	12/27/99	4.03	-0.04	-4.07
	03/16/00	4.20	-0.04	-4.24
	06/19/00	6.52	-0.04	-6.56
	09/06/00	8.78	-0.04	-8.82
	03/19/01	3.33	-0.04	-3.37
	09/04/01	4.38	-0.04	-4.42
	03/27/02	4.13	-0.04	-4.17
	04/29/02	4.94	-0.04	-4.98
	09/18/02	4.64	-0.04	-4.68
	04/2-3/03	3.85	-0.04	-3.89
MW-14	12/27/99	4.00	0.90	-3.10
	03/16/00	4.38	0.90	-3.48
	06/19/00	6.90	0.90	-6.00
	09/06/00	8.27	0.90	-7.37
	03/19/01	3.05	0.90	-2.15
	09/04/01	3.48	0.90	-2.58
	03/27/02	4.00	0.90	-3.10
	04/29/02	4.81	0.90	-3.91
	09/18/02	4.88	0.90	-3.98
	04/2-3/03	3.42	0.90	-2.52
MW-15	12/27/99	4.72	0.63	-4.09
	03/16/00	3.15	0.63	-2.52
	06/19/00	4.45	0.63	-3.82
	09/06/00	4.84	0.63	-4.21
	03/19/01	3.37	0.63	-2.74
	09/04/01	3.59	0.63	-2.96
	03/27/02	3.91	0.63	-3.28
	04/29/02	4.17	0.63	-3.54
	09/19/02	4.15	0.63	-3.52
	04/2-3/03	3.95	0.63	-3.32

ft MSL = feet below mean sea level elevation



Legend

- MONITORING WELL LOCATION
- WETLANDS
- (-5.98) GROUNDWATER ELEVATION (ft MSL)
- —4.0— GROUNDWATER ELEVATION CONTOUR (ft MSL)
- GROUNDWATER FLOW DIRECTION

NOTE: MAP BASED ON FIGURE 31C-R1 OVERALL SITE PLAN PREPARED BY MADER-MIERS ENGINEERING, INC., DATED MAY 3, 1999.

FIGURE 3

GROUNDWATER ELEVATION CONTOUR MAP

(APRIL 2-3, 2003)

RIVER BIRCH LANDFILL
2000 SOUTH KENNER ROAD
AVONDALE, LOUISIANA
LDEQ A.I. NO. 32219

PREPARED FOR

RIVER BIRCH, INC.
GRETNA, LOUISIANA

ENGINEERING ASSOCIATES, INC.
CONSULTING ENGINEERS
1415 Delplaza Dr., Ste. B
Baton Rouge, LA. 70815
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