LCIDN41-BPermit David H. Griffin
1990-1992

Pinecroft-Sedgefield Fire Department

RECEIVED OCT 16 1991

October 14, 1991

D.H. Griffin
P.O. Box 7657
Greensboro, NC 27407

To Whom It May Concern,

This letter is to indicate that we shall respond and provide firefighting services to the site to the extent of our capabilities. While we will provide a response, our capabilities at landfill fires are limited. Earth moving equipment and dirt, which we do not possess, will be required to control most landfill fires. We suggest that the demolition landfill owner provide us a contingency plan for obtaining these resources on a 24 hour basis.

Vernon Ward
Vernon Ward, Chief

2239 Bishop Road • Greensboro, North Carolina 27406 • Telephone 299-4421

AQUATERRA

Environmental Consultants

May 20, 1991

D. H. Griffin Wrecking Company, Inc.
Post Office Box 7657
Greensboro, North Carolina 27407

Attention: Mr. David H. Griffin, Sr.

Reference: Laboratory Analytical Results of April 24, 1991 Sampling
Wiley Davis Landfill
Greensboro, North Carolina
Aquaterra Job No. 417A

Dear Mr. Griffin:

Enclosed are the results for the April 24, 1991 ground water sampling at the Wiley Davis Landfill facility. The sampling and analysis were conducted to verify total metal concentrations of all existing monitoring wells and to verify the organic composition of ground water by resampling and analyzing well WD-2s. Results of the analysis are summarized in Table 1 (organic composition) and Table 2 (total metals with a historical summary of past analyses). A photocopy of the recent analytical report is attached.

Organic analytical results again confirm the presence of chlorobenzene, and 1,2- and 1,4- dichlorobenzene in the ground water. Vinyl chloride (16 µg/L) was detected for the first time. Vinyl chloride at 16 µg/L is above its respective state standard of 0.015 µg/L as defined in North Carolina Administrative Code Title 15, Subchapter 2C, Section .0200. Methylene chloride (16 µg/L) was detected above its respective standard of 5 µg/L; 1,1-Dichloroethane, detected at 20 µg/L, has no assigned standard other than its quantitation limit. Semivolatile organic compounds 4-methylphenol (47 µg/L) and naphthalene (10 µg/L) were also detected for the first time.

Total metals concentrations have remained essentially the same for barium and chromium. Barium was detected in all monitoring wells ranging from 0.12 mg/L in background well WD-7 to 4.8 mg/L at WD-6d. The state water quality standard for barium is 1.0 mg/L. Chromium was detected in six of the eight monitoring wells at concentrations ranging from 0.03 to 0.74 mg/L, the state standard for this metal (0.05 mg/L) was exceeded at four of the monitoring wells.

Aquaterra anticipates that remediation of the organic constituents will be required. Based on the concentrations of total barium and chromium as well as the proximity of drinking water wells to the site, remediation of these metals may also be warranted.

Corporate Office:
P O Box 30328
Raleigh, NC 27650
(919) 859-9987
FAX (919) 859-9930

Charlotte Office:
P O Box 668107
Charlotte, NC 28266-8107
(704) 525-8680
FAX (704) 527-2792

Greensboro Office:
P O Box 16241
Greensboro, NC 27416-0241
(919) 273-5033
FAX (919) 271-8138

In March 1991, Four Seasons Industrial Services, Inc. conducted a brief pilot study that involved running extracted ground water through a bag filter. The study did result in dropping the levels of metals below cleanup standard. Aquaterra recommends that a larger scale test involving the pumping of ground water through a series of bag filters be conducted at a later date.

Please submit a copy of the analytical results to the following address:

North Carolina Department of Environment,
[illegible]
Division of Environmental Management
Groundwater Section
8025 North Point Boulevard

Attention: Mr. Larry Lucas

If you have any questions, please call me at (919) 859-9987.

Sincerely,

AQUATERRA, INC.

Steve J. Czekalski

Steve J. Czekalski
Project Manager

Bryson D. Trexler, Jr. by KSP

Bryson D. Trexler, Jr., Ph.D., P.G.
Program Manager

SJC/BDT/cbb

GUILFORD COUNTY
DEPARTMENT OF PUBLIC HEALTH

August 15, 1991

Mr. Jeff Rodgers
Waste Management Specialist
Solid Waste Section
Department of Environment, Health, and Natural Resources
N. Central Regional Office
310 East Third Street
Winston-Salem, N. C. 27101

Dear Mr. Rodgers:

On July 22, the Guilford County Board of Health voted to rescind the Delegated Solid Waste Management Program with the former N. C. Department of Human Resources. It is my understanding that Guilford County's responsibilities under this agreement will end 30 days after the N. C. Division of Solid Waste Management receives this notification.

We have enjoyed working with the state on the problems of solid waste, and I believe that progress has been made in Guilford County toward better control of demolition landfills and other solid waste problems. We will continue to do what we can to assist the state in handling solid waste problems, given our manpower limitations, even though we will not have the responsibilities we did under the delegation agreement.

Sincerely,

Brian H. Greene

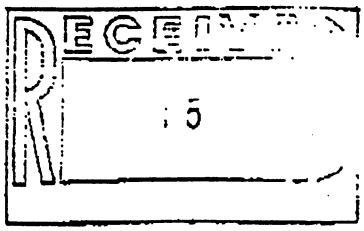
Brian H. Greene
Interim Health Director

BG/cb

CC: Earl Tysinger

301 North Eugene Street
P.O. Box 3508
Greensboro, N. C. 27401

501 E. Green Dr.
High Point, N. C. 27260



State of North Carolina
Department of Environment, Health, and Natural Resources
North Central Regional Office

James G. Martin, Governor
William W. Cobey, Jr., Secretary

August 13, 1991

Margaret Foster
Regional Director

Mr. Brian Greene, Interim Health Director
Guilford County Department of Public Health
P.O. Box 3508
Greensboro, N.C. 27401

RE: Termination of Delegated Solid Waste Management Program in Guilford County

Dear Mr. Greene:

It has been brought to my attention that the Guilford County Board of Health has determined to officially rescind the Delegated Solid Waste Management Program granted by Ronald H. Levine, M.D., M.P.H., State Health Director, through the former North Carolina Department of Human Resources on May 1, 1987 (copy enclosed).

Pursuant to the terms of the Delegation Agreement, the Guilford County Health Department shall provide written notice at least thirty (30) days before termination of the Delegation Agreement.

As a matter of record, please submit to me a letter with the date of this determination to officially rescind or terminate the Delegated Solid Waste Program.

If there are any questions, please contact me at (919)761-2390.

Sincerely,

N.C. DIVISION OF SOLID WASTE MANAGEMENT

Jeff Rodgers
KA

Jeff Rodgers
Waste Management Specialist
Solid Waste Section

JDR:ka
Enclosure
cc: Julian Foscue
Dexter Matthews
Central Files, Raleigh

File
Guil. Co.
Griffin Dem. Ldf

ATE 8/5/91

DOCUMENTATION FORM

___ OFFICE CORRESPONDENCE	___ COMPLAINT INVESTIGATION
___ TELEPHONE LOG/CONVERSATION	___ INVESTIGATION FOLLOW-UP
✓ CONFERENCE NOTES	✓ SITE VISIT/ASSESSMENT
___ MEMORANDUM	___ PERSONAL MEETING
	___ OTHER ___

TO: Files FROM: J. Rodgers, Waste Mgmt. Specialist

SUBJECT: D.H. Griffin - Wiley Davis Rd.
Demo. Landfill

Re: Current status re: operations, expected closure, etc.

Met with D.H. Griffin, Sr., Juan Carroll, Lawrence Griffin at site to assess current operations and discussed plans re: closure of existing demolition landfill.

Closure operations appear to be moving along satisfactorily at site.

They estimate that the site will be closed out completely in approx. 1 year (filling, capping and seeding).

I advised that they pay particular attention to side slopes to ensure 3:1 slopes.

Received 7/26/91

D. H. GRIFFIN WRECKING CO., Inc.

"If It's Wrecking – Call Us"

4700 HILL TOP ROAD
PHONE: (919) 855-7030

P. O. BOX 7657
GREENSBORO, N. C. 27417-0657

22 July 1991

Mr. Jeff Rodgers
Waste Management Specialist
Solid Waste Section
N. C. Division of Solid Waste Management
310 East Third Street, Suite 200
Winston Salem, North Carolina 27101

Reference: Your Letter Dated July 12, 1991

Dear Mr. Rodgers:

In response to your above referenced letter, which was received this date, I would like to schedule our meeting at the Wiley Davis Road Landfill for:

Monday 5 August 1991 9:30 a.m.

Please advise if the above date and time will be satisfactory for you.

Sincerely,

D. H. GRIFFIN WRECKING COMPANY, INC.

D. H. Griffin, Sr.
President

DHG,Sr/mg

File

D.H. Griffin Co.

FOUR SEASONS

Four Seasons Industrial Services, Inc.
3107 South Elm-Eugene Street • P.O. Box 16590
Greensboro, North Carolina 27416-0590
(919) 273-2718 • Fax Number (919) 274-5798

7/19/91

N.C. Division Solid Waste Management
310 E. Third Street
Suite # 200
Winston Salem, North Carolina 27101

Attention: Jeff Rodgers

Four Seasons Industrial Services loaded fiberglass tank pieces onto a dump truck and transported materials to the City of Greensboro landfill on White Road, Greensboro, North Carolina.

If there any questions regardarding this matter, please do not hesitate to call.

Eric D. McManus
Manager-Industrial Services

Eric D McManus

EDM/kem

attachment

Recycled Paper

CITY OF GREENSBORO
WHITE STREET LANDFILL
GREENSBORO, NC

PERMIT NO. 41-03

GREENSBORO

7-19-1991 / TIME IN / OUT 14:49/15:02

TICKET NUMBER	:	403624	
VEHICLE	:	FS0000000	
VEHICLE CAPACITY	:	0	
ACCOUNT	:	001900	
		FOUR SEASONS IND SERVICES INC	

COUNTY	MUNICIPALITY	PERCENT
00	0	100

LH 6201

GROSS WEIGHT Lb.:	28260	scale 1	
TARE WEIGHT Lb. :	21320	scale 1	
NET WEIGHT Lb. :	6940	3.47 tons	

WASTE TYPE	:	03 INDUSTRIAL
RATE ($/TON)	:	19.50
MINIMUM CHARGE	:	5.00

COUNTY	MUNICIPALITY	PERCENT

COMPUTED NET

Charge	CHARGE	: 67.67
SurCharge	SURCHARGE	: 0.00
Credit	TOTAL PRICE	: 67.67

NO HAZARDOUS OR LIQUID WASTES ACCEPTED

FILE - GUIL. CO.
FACILITY - DGMS. L/F

State of North Carolina
Department of Environment, Health, and Natural Resources
Division of Solid Waste Management
P.O. Box 27687 · Raleigh, North Carolina 27611-7687

James G. Martin, Governor
William W. Cobey, Jr., Secretary

William L. Meyer
Director

July 12, 1991

D.H. Griffin, Sr.
4500 Hilltop Road
Greensboro, NC 27407

Dear Mr. Griffin:

Due to recent changes within Guilford County and within the Guilford County Department of Public Health, Environmental Health Division, the state-delegated Solid Waste Program in Guilford County has technically reverted back to the N.C. Division of Solid Waste Management.

The scope of the program as it was handled by the Guilford County Department of Public Health, dealt with the permitting, inspection, and regulation enforcement of demolition waste disposal sites within Guilford County ultimately under the control of the N.C. Division of Solid Waste Management.

Please be advised that the N.C. Division of Solid Waste Management will re-assume directly all the above mentioned activities and your contact is:

Jeff Rodgers
Waste Management Specialist
Solid Waste Section
N.C. Division of Solid Waste Management
310 East Third Street, Suite 200
Winston-Salem, NC 27101
Telephone: 919/761-2390

Enclosed you will find an attached page that indicates violations and/or conditions that need to be addressed, discussed, and a plan of action developed on your part with the operation of your demolition landfill.

You are instructed to contact me to set up an appointment to meet to evaluate and discuss these items within the next 2 weeks.

Sincerely,

Jeff Rodgers
Waste Management Specialist
Solid Waste Section

ADDENDUM

Based upon a review of the records pertaining to the operation of your demolition landfill in Guilford County, the following item(s) must be addressed, discussed, and a plan of action developed:

LANDFILL: D.H. Griffin Demolition Landfill, Wiley Davis Road

PERMIT NUMBER: 41-B

ITEM(S)

A. Proper closure of this demolition landfill

B. Cover Requirements

C. Erosion Control Requirements

D. Drainage Control Requirements

cc: Julian Foscue, Solid Waste Section Western Area Supervisor
Dexter Matthews, Solid Waste Section Chief
Raleigh-Central Files
File

State of North Carolina
Department of Environment, Health, and Natural Resources
Winston-Salem Regional Office

James G. Martin, Governor
William W. Cobey, Jr., Secretary

Margaret Plemmons Foster
Regional Manager

DIVISION OF ENVIRONMENTAL MANAGEMENT
GROUNDWATER SECTION

February 27, 1991

D.H. Griffith, Sr.
c/o D.H. Griffith Wrecking Co., Inc.
P.O. Box 4657
Greensboro, NC 27407

SUBJECT: MONITOR WELL CONSTRUCTION
PERMIT NO. 30-0887-WM-0325
GUILFORD COUNTY

Dear Mr. Griffith:

In accordance with your application received February 25, 1991, we are forwarding herewith Monitor Well Construction Permit No. 30-0887-WM-0325 for the construction of three monitor wells in the Carolina Slate Belt Hydrogeologic Unit.

Henceforth, correspondence and data relating to these wells shall be designated Wiley Davis Landfill, including incident number or water quality number, if appropriate.

This Permit will be effective from the date of its issuance and shall be subject to the conditions and limitations as specified therein.

Sincerely,

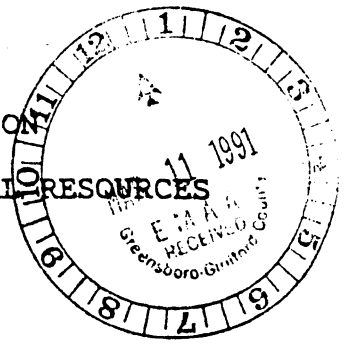
Larry K. Lucas

Larry K. Lucas
Hydrogeological Regional
Supervisor

LKL/LDC/ahl
Enclosure
cc: Groundwater Section - Central Office
Guilford County Division of Emergency Management
Aquaterra Environmental Consultants
WSRO

8025 North Point Boulevard, Suite 100, Winston-Salem, N.C. 27106-3203 • Telephone 919-761-2351

1368-A



NORTH CAROLINA

ENVIRONMENTAL MANAGEMENT COMMISSION

DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES

PERMIT FOR THE CONSTRUCTION OF

A MONITOR WELL OR WELL SYSTEM

In accordance with the provisions of Article 7, Chapter 87, North Carolina General Statutes, and other applicable Laws, Rules, and Regulations.

PERMISSION IS HEREBY GRANTED TO

D.H. Griffith Wrecking Co., Inc.

FOR THE CONSTRUCTION OF THREE MONITOR WELLS in the Carolina Slate Belt Hydrogeologic unit located at Wiley Davis Landfill, Greensboro, North Carolina in Guilford County in accordance with the application dated February 19, 1991, and in conformity with the specifications and supporting data, all of which are filed with the Department of Environment, Health and Natural Resources and are considered a part of this Permit.

This Permit is for well construction only, and does not waive any provisions or requirements or any other applicable laws or regulations.

Construction of a well under this Permit shall be in compliance with the North Carolina Well Construction Regulations and Standards, and any other laws and regulations pertaining to well construction.

This Permit will be effective from the date of its issuance until August 26, 1991, and shall be subject to other specified conditions, limitations or exceptions as follows:

1. A permanent identification plate with the date of construction, depth of well, screen interval, depth of grout, drilling contractor, and his registration number shall be attached to the well head or the outer protective steel casing.

2. The well construction completion form and all water quality data are to be submitted to the Central Office of the Groundwater Section P. O. Box 27687, Raleigh, North Carolina 27611.

3. All laboratory analysis of Groundwater samples collected from the permitted monitor wells are to be submitted to North Carolina Department of Environment, Health, and Natural Resources, Groundwater Section, P. O. Box 27687, Raleigh, N. C. 27611 with a copy to the North Carolina Department of Environment, Health and Natural Resources, Groundwater Section, 8025 North Point Boulevard, Suite 100, Winston-Salem, N. C. 27106 within 60 days of well completion, and quarterly thereafter.

4. All additional investigative findings in relation to the pollution sources being monitored, as indicated in item J of permit application, are to be submitted to North Carolina Department of Environment, Health and Natural Resources, Groundwater Section, P. O. Box 27687, Raleigh, N. C. 27611 with a copy to North Carolina Department of Environment, Health, and Natural Resources, Groundwater Section, 8025 North Point Boulevard, Suite 100, Winston-Salem, N. C. 27106 within 60 days of well completion, and quarterly thereafter.

5. The well shall be afforded a means of protection against vandalism, damage, or unauthorized use.

6. When any monitor well is no longer useful for its intended purpose, it shall be abandoned in compliance with North Carolina Administrative Code 15. 2C.0113 and a well abandonment form sent to the North Carolina Department of Environment, Health, and Natural Resources, Groundwater Section, P. O. Box 27687, Raleigh, N. C. 27611 with a copy to North Carolina Department of Environment, Health and Natural Resources, Groundwater Section, 8025 North Point Boulevard, Suite 100, Winston-Salem, N. C. 27106.

7. The monitor well shall be constructed in accordance with the Groundwater Section's recommended construction details as outlined in attachment #1.

Permit issued this the 27th day of February 1991

FOR THE NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

Larry D. Coble

Larry D. Coble, Regional Supervisor
Division of Environmental Management

By Authority of the Environmental Management Commission

Permit No. 30-0887-WM-0325

AQUATERRA
Environmental Consultants

February 27, 1991

North Carolina Department of Environment, Health
and Natural Resources
Division of Environmental Management
8025 North Point Boulevard
Winston-Salem, North Carolina 27106

Attention: Mr. Steve Weiss

Reference: Request for Extension to Submit
Corrective Action Plan
Wiley Davis Landfill
Wiley Davis Road
Greensboro, North Carolina
Aquaterra Job No. 417A

Dear Mr. Weiss:

Aquaterra appreciates your February 25, 1991, verbal approval of a 30 day extension to submit a corrective action plan (CAP) of the Wiley Davis Landfill, Inc. facility located in Greensboro, North Carolina. With this extension, the CAP will be submitted to your office no later than April 29, 1991.

Please call me at (919) 859-9987 if you have any questions.

Sincerely,

AQUATERRA, INC.

Steve J. Czekalski

Steve J. Czekalski
Project Geologist

cc: Mr. D. H. Griffin, Sr.

SJC/mdy

L1745-91

Corporate Office:
P O Box 50328
Raleigh, NC 27650
(919) 859-9987
FAX (919) 859-9930

Charlotte Office:
P O Box 668107
Charlotte, NC 28266-8107
(704) 525-8680
FAX (704) 527-2792

Greensboro Office:
P O Box 16241
Greensboro, NC 27416-0241
(919) 273-5003
FAX (919) 271-8138

AQUATERRA
Environmental Consultants

February 19, 1991

North Carolina Department of Environment, Health
and Natural Resources
Division of Environmental Management
8025 North Point Boulevard
Winston-Salem, North Carolina 27106

Attention: Mr. Steve Weiss

Reference: Request to Construct Ground Water Monitoring Wells
Wiley Davis Landfill
Wiley Davis Road
Greensboro, North Carolina
Aquaterra Job No. 417A

Dear Mr. Weiss:

At the request of Mr. D.H. Griffin Sr. president of the D.H. Griffin Wrecking Company, Inc. of Greensboro, North Carolina, Aquaterra, Inc. (Aquaterra) is submitting this request to construct monitoring wells at the referenced property (see Figure 1). The wells are to be used to determine the ground water quality surrounding the landfill and also to obtain data needed to provide a proper corrective action plan for ground water remediation along the landfill.

Aquaterra proposes to install three ground water monitoring wells with locations as shown in Figure 2. Two of the wells will be used to monitor the water table conditions and one well (located 100 feet southeast of existing monitoring well WD-2d) will be screened in the shallow bedrock at the site. All wells will be constructed as specified in 15 NCAC 2C.0108. A well schematic showing the planned construction is included in Figures 3 and 4 of this application. Upon completion, Aquaterra will submit to the D. H. Griffin Wrecking Company, Inc., for their submittal to the Division of Environmental Management, Well Completion Form GW-1 for each well as required by North Carolina law along with analytical results of the ground water sampling.

In addition, Aquaterra is requesting a 30-day extension to submit a corrective action plan (CAP) for a ground water remediation system to be constructed at the landfill. The CAP was requested by your office in a Notice of Violation sent to the president of the D.H. Griffin Wrecking Company on January 31, 1991. A deadline to submit the CAP to your office was set at March 30, 1991. Aquaterra is requesting a 30-day extension to complete ground water assessment activities and the CAP. If the extension is granted, the CAP will be submitted to you by 5 p.m. on April 29, 1991.

Corporate Office:
P O Box 50328
Raleigh, NC 27650
(919) 859-9987
FAX (919) 859-9930

Charlotte Office:
P O Box 668107
Charlotte, NC 28266-8107
(704) 525-8680
FAX (704) 527-2792

Greensboro Office:
P O Box 16241
Greensboro, NC 27416-0241
(919) 273-5003
FAX (919) 271-8138

Wiley David Landfill
L1714-91
February 19, 1991

Please call if you have any questions.

Sincerely,

AQUATERRA, INC.

Steve Czekalski

Steve J. Czekalski
Project Geologist

cc: Mr. D. H. Griffin, Sr.

SJC/mdy

POLLUTION INCIDENT/U.S.T. LEAK REPORTING FORM

POTENTIAL SOURCE OWNER-OPERATOR

Potential Source Owner-Operator: D.H. Griffin, SR.			Telephone:
Company: D.H. Griffin Wrecking Co.		Street Address: P.O. Box 4657	
City: Greensboro	County: Guilford	State: NC	Zip Code: 27407

U.S.T. REGISTERED 1. YES 2. NO	SOURCE/U.S.T. IN USE 1. N/A 2. YES 3. NO	PERMIT TYPE	OWNERSHIP	OPERATION TYPE
FACILITY ID#	SOURCE PERMITTED 1. Yes 2.No	0. N/A	0. N/A	0. N/A
FEDERAL U.S.T. DESIGNATION 1. Regulated 2. Non-Regulated	PERMIT NUMBER	1. Non-discharge	1. Municipal	1. Public Service
STATE U.S.T. DESIGNATION 1. Commercial 2. Non-Commercial	SOURCE ON ERRIS LIST 1. Yes 2. No	2. Oil terminal	2. Military	2. Agricultural
	ERRIS NUMBER	(3) Landfill	3. Unknown	3. Residential
		4. Mining	(4) Private	4. Educational/Religious
		5. NPDES	5. Federal	5. Industrial
		6. RCRA	6. County	6. Commercial
			7. State	7. Mining

U.S.T. LEAK PREVENTION MEASURES
Was tank retrofitted with overfill protection?
1. Yes
2. No
When and by whom? _____
Was tank retrofitted with interior lining?
1. Yes
2. No
When and by whom? _____
Was tank retrofitted with cathodic protection?
1.Yes
2.No
When and by whom? _____

REASON FOR INCIDENT
1. Transportation
2. Mechanical failure
3. Facility
4. Inventory only
(5) Human error
6. Vandalism
7. Unknown

ACTIONS TAKEN

Investigation, Containment, Cleanup, etc. PRELIMINARY.

Notice of Violation was sent. Aquaterra has submitted a Ground Water Site Assessment. A remedial action plan is due to be submitted before march 30, 1991

UPDATE: THree more MONITORING wells to Be PUT IN BEFORE FINAL EXTENT DETERMINATION.

REMEDIAL PLAN DUE APRIL 30, 1991 BY GRANT OF EXTENSION

Circle Appropriate Responses
Lab Samples Taken By: 1. D.E.M. 2. D.H.S. (3) Responsible Party 4. None

Samples Taken Include (1) Groundwater (2) Soil (3) Surface Water

POLLUTION INCIDENT/U.S.T. LEAK REPORTING FORM

1. Incident #_____
2. Tabulate only _____

Division of Environmental Management
GROUNDWATER SECTION

TYPE OF ACTION

A

1. Emergency Response
2. Compliance Investigation
(3) Complaint Investigation
4. Routine Inventory
5. U.S.T. Leak
6. Other:_____

POTENTIAL HAZARDS: (1) Toxic Chemicals 2. Radioactivity 3. Air Emmissions 4. Explosives 5. Fire

INCIDENT DESCRIPTION

B

Incident Location/Name: Wiley Davis Landfill

Address: Wiley Davis Road

City/Town: Greensboro | County: Guilford | Region: Winston Salem

Briefly Describe Incident

Facility in question is a privately-owned, long-lived, demolition debris landfill. On-site contamination has apparently been caused by what has been dumped there over the years.

Date Incident Occurred or Leak Detected: ?

If L.U.S.T., How Leak Was Detected:
1. Tank Gauging
2. Vapor Monitoring
3. GW Monitoring
4. Contractor who tightness tested, removed tank, or installed leak detection system. _____
5. Interstitial Monitoring
6. Tank Removal
7. Tightness Test
8. Other_____

PERSON REPORTING INCIDENT

C

Name: Art Hagstrum | Date: | Time:

Company/Agency: DEM Water Quality Section | Telephone: 919 761-2351

REPORTED BY: 1. Tank owner/operator (2) Government agency 3. Private (3rd) party
4. Facility owner (Non-LUST) 5. Other:_____

RECOMMENDED ACTION

D

(MULTIPLE CHOICES POSSIBLE)
1. Investigation complete
(2) Continue investigation
3. Initiate/complete cleanup
4. Long-term remedial action
5. Drilling support
6. Issue NOV
7. Confirm leak
8. Monitoring plan

Comments: Remedial Action Plan is due by 3-30-91. 4-30-91

CLEANUP LEAD: (1) Responsible Party 2. State | Site Priority Ranking:

D.E.M. Regional Contact: Steve Weiss | Signature: Steve Wein | Date: Feb. 11, 1991

POLLUTION INCIDENT/U.S.T. LEAK REPORTING FORM

POLLUTANTS INVOLVED

E

MATERIALS INVOLVED	AMOUNT STORED OR TANK CAPACITY	AMOUNT LOST	AMOUNT RECOVERED
Chlorobenzene	N/A		
lead	N/A		
Chromium	N/A		

IMPACT ON SURFACE WATERS

F

WATERS AFFECTED 1. Yes 2. No (3.) Potentially — Distance to Stream(ft): (0-25)'

Fish Kill 1. Yes 2. No: Unknown — Name of Stream: Unnamed trib. — Stream Class:

IMPACT ON DRINKING WATER SUPPLIES

G

WELLS AFFECTED 1. Yes (2.) No 3. Potentially: Wells in vicinity are still being evaluated — No. of Wells Affected — No. of Wells Potentially Affected

Population Served By Affected Wells — Estimated Population Served By Potentially Affected Wells — Aquifer(s) Being Used 1. Water Table 2. Confined 3. Bedrock

POTENTIAL SOURCE OF POLLUTION

H

PRIMARY SOURCE OF POTENTIAL POLLUTION (Select one)	PRIMARY POLLUTANT TYPE (Select one)	LOCATION	SETTING
(1.) Intentional dump	1. Pesticide/herbicide	1. Facility	(1.) Residential
2. Pit, pond, lagoon	2. Radioactive waste	2. Railroad	2. Industrial
3. Leak-underground	3. Gasoline/diesel	3. Waterway	3. Urban
4. Spray irrigation	4. Heating oil	4. Pipeline	4. Rural
5. Land application	5. Other petroleum prod.	(5.) Dumpsite	
6. Animal feedlot	6. Sewage/septage	6. Highway	
7. Source unknown	7. Fertilizers	7. Residence	
8. Septic tank	8. Sludge	8. Other	
9. Sewer line	(9.) Solid waste leachate		
10. Stockpile	10. Metals		
11. Landfill	11. Other inorganics		
12. Spill-surface	12. Other organics		
13. Well			
14. Dredge spoil			
15. Nonpoint source			

If other sources, list corresponding No's.

If multiple pollutant types, list corresponding No's.

If PIRF previously submitted for Nonprimary Sources, list incident No's.

Confirmed Violation of:

1. 15 NCAC 2L: X Yes ____ No
2. Article 21A Part I: ____ Yes ____ No
3. Article 21A Part II: ____ Yes ____ No
4. Federal/State U.S.T. rules: ____ Yes ____ No

POLLUTI I INCIDENT/U.S.T. LEAK REPORTIN

LOCATION OF INCIDENT

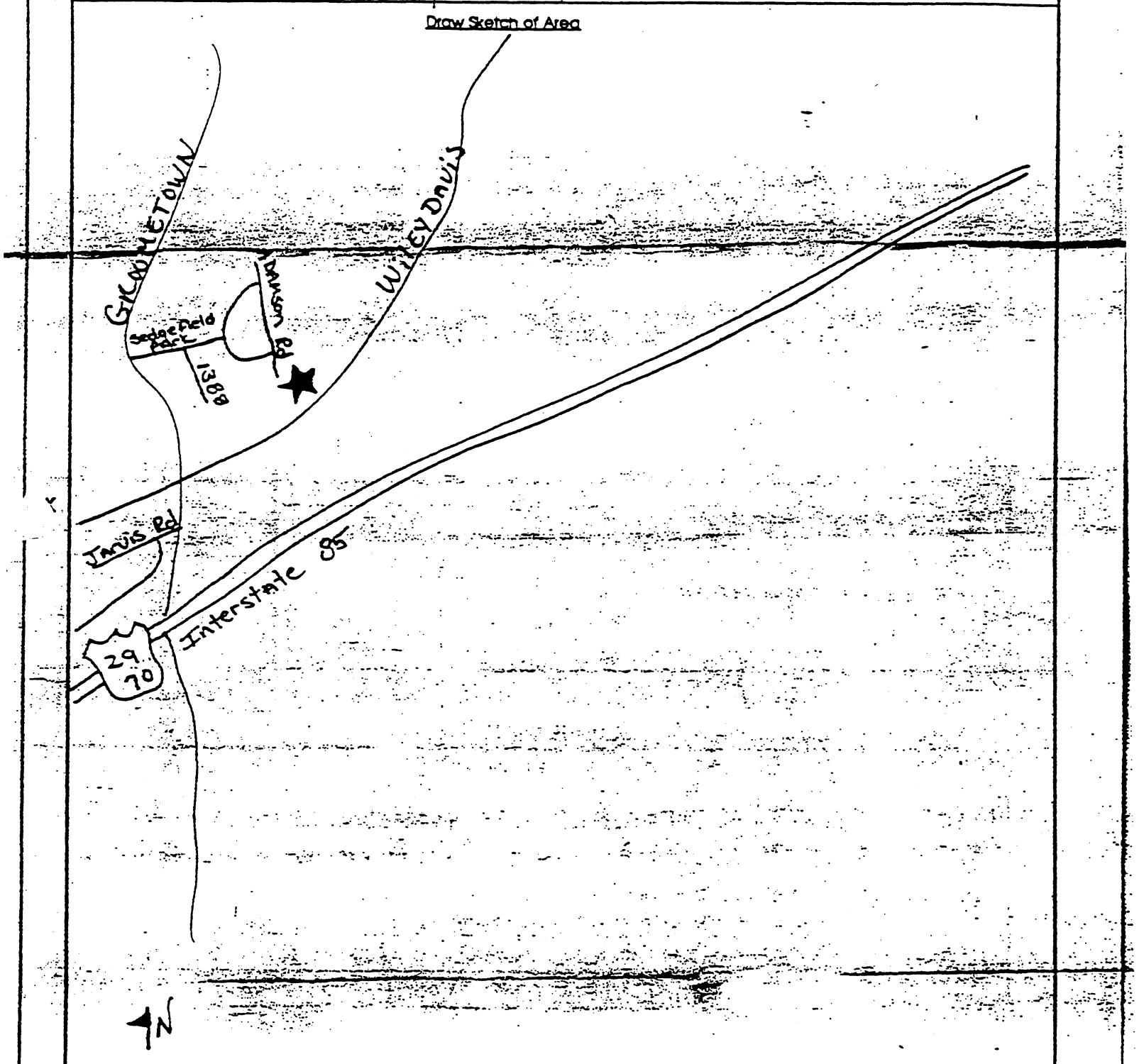
7 1/2 Min. Quad Name: Greensboro, NC

Five Min. Quad Number: M 54

Lat. : Deg : Min : Sec : 79° 51' 40"

Long. : Deg : Min : Sec : 36° 00' 03"

Draw Sketch of Area



Sketch Should Identify The Following:

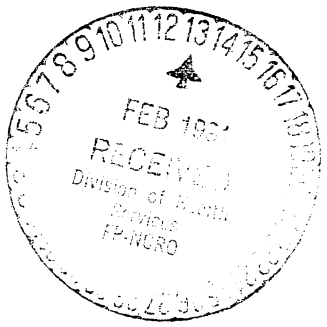
1. Pollutant Source(s)
2. Impacted and Threatened Water Supplies
3. Direction of Overland Flow
4. Significant Recharge and Discharge Features
5. Relative Physical Structures (roads, buildings, etc.)
6. North Arrow
7. Scale

BORUM & ASSOCIATES, INC.
ENGINEERS — PLANNERS — SURVEYORS
405-D PARKWAY
GREENSBORO, N. C. 27401

MAILING ADDRESS:
P. O. BOX 14215
GREENSBORO, N. C. 27415-4215

TELEPHONE 919-275-0471
919-272-3115
FAX 919-275-3719

February 8, 1991



Dept. of Environment, Health
& Natural Resources
Solid Waster Management Division
Post Office Box 27687
Raleigh, North Carolina 27611-7687

Attn: Mr. Jim Coffey

Re: D.H. Griffin Class II Landfill
Wiley Davis Road - Guilford County, N.C.

Dear Mr. Coffey:

Attached herewith is the application for the above mentioned project. We have submitted all items we feel are necessary for evaluation of this site as a possible "Class II" landfill. Please review this for submission compliance with N.C. Solid Waste Management Rules (amended through March 1, 1989) and notify us if additional information is necessary. If this is sufficient, please review and evaluate the site and this plan for approval.

Thank you for your cooperation concerning this matter. Should you have any questions, please call.

Very truly yours,

BORUM & ASSOCIATES, INC.

Homer S. Wade, P.E.

HSW/cc

Enclosure

cc: Mr. David H. Griffin
Mr. Julian Foscue

1271

FEB 4 1991
EMAA
RECEIVED
Greensboro Guilford County

State of North Carolina
Department of Environment, Health, and Natural Resources
Winston-Salem Regional Office

James G. Martin, Governor
William W. Cobey, Jr., Secretary

Margaret Plemmons Foster
Regional Manager

DIVISION OF ENVIRONMENTAL MANAGEMENT
GROUNDWATER SECTION

NOTICE OF VIOLATION OF N.C.A.C. TITLE 15A SUBCHAPTER 2L
CLASSIFICATIONS AND WATER QUALITY STANDARDS
APPLICABLE TO THE GROUNDWATERS OF NORTH CAROLINA

January 31, 1991

CERTIFIED MAIL NUMBER P-614 922 859
RETURN RECEIPT REQUESTED

FEB 2 0 1991

Mr. D.H. Griffin, Sr.
D.H. Griffin Wrecking Co., Inc.
P.O. Box 4657
Greensboro, NC 27407

Subject: Groundwater Contamination At Wiley Davis Landfill, Wiley Davis Road, Greensboro, Guilford County

Dear Mr. Griffin:

Chapter 143, North Carolina General Statues, authorizes and directs the Environmental Management Commission of the Department of Environment, Health, and Natural Resources to protect and preserve the water and air resources of the State. The Division of Environmental Management has the delegated authority to enforce adopted pollution control rules and regulations.

The purpose of N.C.A.C. Title 15A Subchapter 2L is to maintain and preserve the quality of the groundwaters, prevent and abate pollution and contamination of the waters of the State, protect public health, and permit management of the groundwaters for their best usage by the citizens of North Carolina.

Wiley Davis Landfill has presented the Winston-Salem Regional Office with results of laboratory analyses of groundwater samples collected from monitoring wells installed at the above-referenced site. These analyses revealed chlorobenzene at 350 parts per billion (ppb) and 1,4-dichlorobenzene at monitor well (MW) 2s; lead at 440 ppb in MW-2d; and chromium at 160 ppb in MW-1.

These contaminate concentrations exceed the maximum allowable concentrations for such substances as specified in N.C.A.C. Title 15A 2L .0202. Therefore, they are in violation of the water quality standards for the groundwaters of the State. Please reference the following excerpt from Subchapter 2L which specifies corrective action as follows:

N.C.A.C. Title 15A 2L .0106 Corrective Action

(a) The goal of actions taken to restore groundwater quality shall be restoration to the level of the standards, or as close thereto as is economically and technologically feasible.

(b) Any person conducting or controlling an activity which results in the discharge of a waste or hazardous substance or oil to the groundwaters of the state or in proximity thereto, shall take immediate action to terminate and control the discharge, mitigate any hazards resulting from exposure to the pollutants and notify the Department of the discharge.

(c) Any person conducting or controlling an activity which results in an increase in the concentration of a substance in excess of the groundwater standard:

(1) as the result of activities, other than agricultural operations, not permitted by the state, shall assess the cause, significance and extent of the violation; submit a plan for eliminating the source of contamination and for restoration of groundwater quality; and implement the plan in accordance with a Special Order by Consent or a Special Order of the Commission.

It is our understanding that you and/or your firm are responsible for the aforementioned violations. Subsequently, you are considered as the party responsible for eliminating the source of contamination and restoring groundwater quality.

An adequate report describing the horizontal and vertical extent was received by this office on October 31, 1990. This office understands that Aquaterra, Inc., has done further work to define the contaminated area. A corrective action plan (remedial action plan) should be submitted to this office by March 30, 1991. The plan must be implemented in accordance with a Special Order by Consent (SOC) or a Special Order of the Commission.

Should you dispute our assessment of responsibility, please include documentation of your position in your response.

Failure to submit the report required or failure to expeditiously eliminate the contaminate source and restore groundwater quality in the affected area may result in the recommendation of enforcement action including: (1) the issuance of a special order against you under the authority of G.S. 143-215.2, (2) a request to the Attorney General to institute an action for injunctive relief, and (3) a civil penalty of up to $10,000 per day in accordance with G.S. 143-215.6.

Please do not hesitate to contact Steve Weiss or Larry K. Lucas regarding any questions you may have about this matter.

Sincerely,

Larry D. Coble

Larry D. Coble
Regional Supervisor

LDC/ahl

Enclosure

cc: Office of General Counsel
Incident Management Unit
WSRO Files
~~County Health Department~~

AQUATERRA
Environmental Consultants

January 30, 1991

D.H. Griffin Wrecking Company, Inc.
Post Office Box 4657
Greensboro, North Carolina 27407

Attention: Mr. David H. Griffin, Sr.

Reference: Laboratory Analytical Results of
Off-site Potable Wells and
Stream Samples
Wiley Davis Landfill, Inc. Site
Greensboro, North Carolina
Aquaterra Job No. 417A

Dear Mr. Griffin:

Enclosed are the analytical results for ground water samples associated with the Wiley Davis Landfill, Inc. The samples were obtained from potable water wells located on the following properties: Carolina Freight (Carolina Well), Roger Rentals (Rental Well), George and Martha Watson residence (Watson Well), and the David and Effie Lundsford residence (Lundsford Well). These potable wells are located hydraulically downgradient of the site.

Before a sample was collected from each well, the well tap was opened for approximately five minutes to purge stagnant water from the well. The sampler wore clean disposable vinyl gloves during sampling activities. In accordance with EPA protocols, all samples were placed in laboratory provided bottles, labeled, and stored in an ice filled cooler for preservation.

Two stream samples (LF-US, upstream sample) and (LF-DS, downstream sample) were collected by partially submerging the sample bottles into the stream. Stream sample locations are shown in the attached figure.

Based upon the analytical results of the August 1990 ground water assessment, samples were analyzed for the possible presence of volatile and semivolatile compounds as well as analysis of total metal concentrations of barium, chromium, and lead. Samples were analyzed for volatile organic compounds (VOCs) in accordance with SW-846 Method 8010 analysis and semivolatile compounds in accordance with SW-846 Method 8270 (Base/Neutral extractable compounds plus library search).

Corporate Office:
P O Box 50328
Raleigh, NC 27650
(919) 859-9987
FAX (919) 859-9930

Charlotte Office:
P O Box 668107
Charlotte, NC 28266-8107
(704) 525-8680
FAX (704) 527-2792

Greensboro Office:
P O Box 16241
Greensboro, NC 27416-0241
(919) 273-5003
FAX (919) 271-8138

The analytical results did not indicate any contaminants found during the leachate collection pond water and sludge characterizations or the ground water assessment. One volatile organic compound (tetrachloroethene) was found in the Carolina Freight well at a concentration of one μg/L (1 μg/L equals one part per billion, ppb). The North Carolina Groundwater Standard for tetrachloroethene is 0.7 ppb.

Although tetrachloroethene was not indicated in the characterization and assessment of the Wiley Davis landfill site, Aquaterra recommends that you notify Mr. Brent Kaiser of Carolina Freight for his information.

Two possible explanations for the presence of this contaminant exist. First, the compound detected at this relatively low quantity may be attributed to laboratory contamination. Secondly, tetrachloroethane is commonly used as a degreaser of metal parts. It seems possible that this may have been used on-site. Our sampling technician stated that he saw no obvious indication of a chemical spill near the well head. Aquaterra recommends resampling the well and analyzing for SW-846 Method 8010 compounds.

Aquaterra recommends that you forward a copy of this letter to Carolina Freight and the other well owners soon after receipt. The letter and analytical results should also be forwarded to the North Carolina Department of the Environment, Health, and Natural Resources (DEHNR), Division of Environmental Management (DEM) Groundwater Section; DEHNR Solid Waste Section; and the Guilford County Health Department.

Sincerely,

AQUATERRA, INC.

Steve J. Czekalski

Steve J. Czekalski
Project Geologist

Senior Peer Review By:

Phillip L. Rahn, P.G.
President

SJC/cbb

cc: Mr. Terry Cole - Guilford County Health
Mr. Jeff Rodgers - DEHNR, Solid Waste Section
Mr. Steve Weiss - DEHNR, Groundwater Section

AQUATERRA
Environmental Consultants

January 29, 1991

D.H. Griffin Wrecking Company, Inc.
Post Office Box 4657
Greensboro, North Carolina 27407

Attention: Mr. David H. Griffin, Sr.

Reference: Laboratory Analytical Results of
Off-site Potable Wells and
Stream Samples
Wiley Davis Landfill, Inc. Site
Greensboro, North Carolina
Aquaterra Job No. 417A

Holding Pond water analysis results

Dear Mr. Griffin:

Enclosed are the analytical results for ground water samples associated with the Wiley Davis Landfill, Inc. The samples were obtained from potable water wells located on the following properties: Carolina Freight (Carolina Well), Roger Rentals (Rental Well), George and Martha Watson residence (Watson Well), and the David and Effie Lundsford residence (Lundsford Well). These potable wells are located hydraulically downgradient of the site.

Before a sample was collected from each well, the well tap was opened for approximately five minutes to purge stagnant water from the well. The sampler wore clean disposable vinyl gloves during sampling activities. In accordance with EPA protocols, all samples were placed in laboratory provided bottles, labeled, and stored in an ice filled cooler for preservation.

Two stream samples (LF-US, upstream sample) and (LF-DS, downstream sample) were collected by partially submerging the sample bottles into the stream. Stream sample locations are shown in the attached figure.

Based upon the analytical results of the August 1990 ground water assessment, samples were analyzed for the possible presence of volatile and semivolatile compounds as well as analysis of total metal concentrations of barium, chromium, and lead. Samples were analyzed for volatile organic compounds (VOCs) in accordance with SW-846 Method 8010 analysis and semivolatile compounds in accordance with SW-846 Method 8270 (Base/Neutral extractable compounds plus library search).

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FAX (704) 527-2792

Greensboro Office:
P O Box 16241
Greensboro, NC 27416-0241
(919) 273-5003
FAX (919) 271-8138

The analytical results did not indicate any contaminants found during the leachate collection pond water and sludge characterizations or the ground water assessment. One volatile organic compound (tetrachloroethene) was found in the Carolina Freight well at a concentration of one $\mu g/L$ (1 $\mu g/L$ equals one part per billion, ppb). The North Carolina Groundwater Standard for tetrachloroethene is 0.7 ppb.

Although tetrachloroethene was not indicated in the characterization and assessment of the Wiley Davis landfill site, Aquaterra recommends that you notify Mr. Brent Kaiser of Carolina Freight for his information.

Two possible explanations for the presence of this contaminant exist. First, the compound detected at this relatively low quantity may be attributed to laboratory contamination. Secondly, tetrachloroethane is commonly used as a degreaser of metal parts. It seems possible that this may have been used on-site. Our sampling technician stated that he saw no obvious indication of a chemical spill near the well head. Aquaterra recommends resampling the well and analyzing for SW-846 Method 8010 compounds.

Aquaterra recommends that you forward a copy of this letter to Carolina Freight and the other well owners soon after receipt. The letter and analytical results should also be forwarded to the North Carolina Department of the Environment, Health, and Natural Resources (DEHNR), Division of Environmental Management (DEM) Groundwater Section; DEHNR Solid Waste Section; and the Guilford County Health Department.

Sincerely,

AQUATERRA, INC.

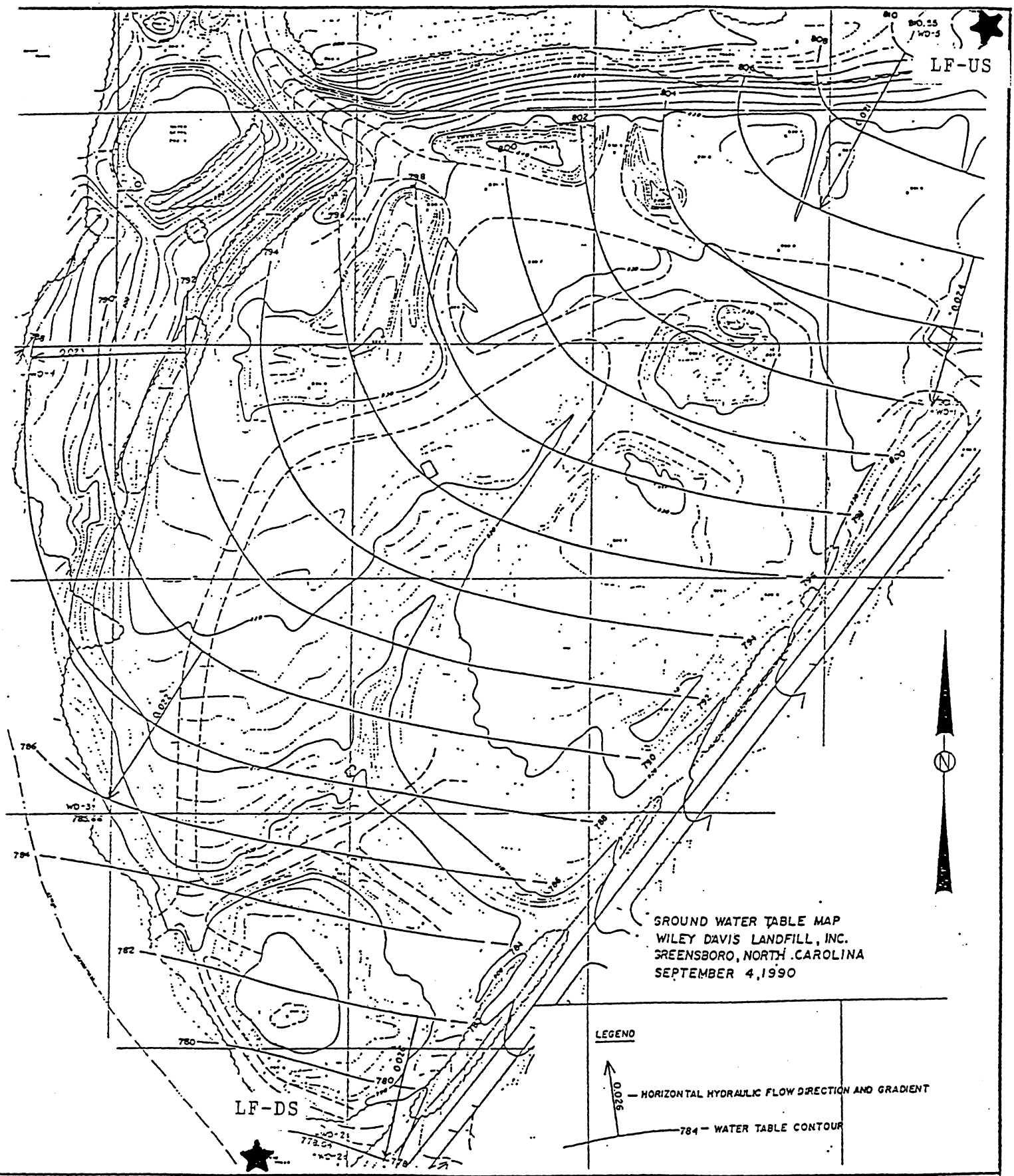
Steve J. Czekalski

Steve J. Czekalski
Project Geologist

Senior Peer Review By:

Phillip L. Rahn, P.G.
President

SJC/cbb



PROJECT: Wiley Davis Landfill Guilford Co., NC	Stream Sample Locations				AQUATERRA, INC. RALEIGH, GREENSBORO, CHARLOTTE NORTH CAROLINA
	JOB: 417A	DRAWING:	FIGURE:	SCALE: 1"=150	

Industrial & Environmental Analysts, Inc.
P.O. Box 12846
Research Triangle Park, North Carolina 27709
(919) 677-0090
FAX (919) 677-0427

January 24, 1991

Steve Czekalski
Aquaterra, Inc.
P.O. Box 50328
Raleigh, NC 27650

Reference IEA Report No.: 196182
Project I.D.: 417A

Dear Mr. Czekalski,

Transmitted herewith are the results of analyses on six samples submitted to our laboratory.

Please see the enclosed reports for your results.

Very truly yours,

INDUSTRIAL & ENVIRONMENTAL ANALYSTS, INC.

Linda F. Mitchell
Director, Technical Support Services

State Certification:

Alabama - #40210	New Jersey - #67719	South Carolina - #99021
Georgia - #816	Tennessee - #00296	North Carolina - #37720
Kansas - #E-158	Virginia - #00179	#84

IEA LABORATORY RESULTS

IEA Project #: 196-182
Client Name: Aquaterra, Inc.

Sample #	Client ID	Parameter	Results		Date Analyzed
		TOTAL METALS:			
1	Carolina Well	Barium	<0.10	mg/L	01/18/91
2	Rental Well	Barium	<0.10	mg/L	01/18/91
3	Watson Well	Barium	<0.10	mg/L	01/16/91
4	Lundsford Well	Barium	<0.10	mg/L	01/16/91
5	LF-US	Barium	<0.10	mg/L	01/16/91
6	LF-DS	Barium	<0.10	mg/L	01/16/91
1	Carolina Well	Chromium	<0.03	mg/L	01/18/91
2	Rental Well	Chromium	<0.03	mg/L	01/18/91
3	Watson Well	Chromium	<0.03	mg/L	01/18/91
4	Lundsford Well	Chromium	<0.03	mg/L	01/18/91
5	LF-US	Chromium	<0.03	mg/L	01/18/91
6	LF-DS	Chromium	<0.03	mg/L	01/18/91
1	Carolina Well	Lead	<0.005	mg/L	01/14/91
2	Rental Well	Lead	<0.005	mg/L	01/14/91
3	Watson Well	Lead	<0.005	mg/L	01/15/91
4	Lundsford Well	Lead	<0.005	mg/L	01/15/91
5	LF-US	Lead	<0.005	mg/L	01/15/91
6	LF-DS	Lead	<0.005	mg/L	01/15/91

PURGEABLE HALOCARBONS
SW-846 METHOD 8010 COMPOUNDS

IEA Sample Number: 196-182-2
Sample Identification: Rental Well
Date Analyzed: 01/12/91 By: Averill

Number	Compound	Quantitation Limit (ug/L)	Results Concentration (ug/L)
1	Bromodichloromethane	1.0	BQL
2	Bromoform	1.0	BQL
3	Bromomethane	1.0	BQL
4	Carbon tetrachloride	1.0	BQL
5	Chlorobenzene	1.0	BQL
6	Chloroethane	1.0	BQL
7	2-Chloroethylvinyl ether	1.0	BQL
8	Chloroform	1.0	BQL
9	Chloromethane	1.0	BQL
10	Dibromochloromethane	1.0	BQL
11	1,2-Dichlorobenzene	1.0	BQL
12	1,3-Dichlorobenzene	1.0	BQL
13	1,4-Dichlorobenzene	1.0	BQL
14	1,1-Dichloroethane	1.0	BQL
15	1,2-Dichloroethane	1.0	BQL
16	1,1-Dichloroethene	1.0	BQL
17	total 1,2-Dichloroethene	1.0	BQL
18	1,2-Dichloropropane	1.0	BQL
19	cis-1,3-Dichloropropene	1.0	BQL
20	trans-1,3-Dichloropropene	1.0	BQL
21	Methylene chloride	1.0	BQL
22	1,1,2,2-Tetrachloroethane	1.0	BQL
23	Tetrachloroethene	1.0	BQL
24	1,1,1-Trichloroethane	1.0	BQL
25	1,1,2-Trichloroethane	1.0	BQL
26	Trichloroethene	1.0	BQL
27	Trichlorofluoromethane	1.0	BQL
28	Vinyl Chloride	1.0	BQL

Comments:

BQL = Below Quantitation Limit

PURGEABLE HALOCARBONS
SW-846 METHOD 8010 COMPOUNDS

IEA Sample Number: 196-182-3
Sample Identification: Watson Well
Date Analyzed: 01/12/91 By: Averill

Number	Compound	Quantitation Limit (ug/L)	Results Concentration (ug/L)
1	Bromodichloromethane	1.0	BQL
2	Bromoform	1.0	BQL
3	Bromomethane	1.0	BQL
4	Carbon tetrachloride	1.0	BQL
5	Chlorobenzene	1.0	BQL
6	Chloroethane	1.0	BQL
7	2-Chloroethylvinyl ether	1.0	BQL
8	Chloroform	1.0	BQL
9	Chloromethane	1.0	BQL
10	Dibromochloromethane	1.0	BQL
11	1,2-Dichlorobenzene	1.0	BQL
12	1,3-Dichlorobenzene	1.0	BQL
13	1,4-Dichlorobenzene	1.0	BQL
14	1,1-Dichloroethane	1.0	BQL
15	1,2-Dichloroethane	1.0	BQL
16	1,1-Dichloroethene	1.0	BQL
17	total 1,2-Dichloroethene	1.0	BQL
18	1,2-Dichloropropane	1.0	BQL
19	cis-1,3-Dichloropropene	1.0	BQL
20	trans-1,3-Dichloropropene	1.0	BQL
21	Methylene chloride	1.0	BQL
22	1,1,2,2-Tetrachloroethane	1.0	BQL
23	Tetrachloroethene	1.0	BQL
24	1,1,1-Trichloroethane	1.0	BQL
25	1,1,2-Trichloroethane	1.0	BQL
26	Trichloroethene	1.0	BQL
27	Trichlorofluoromethane	1.0	BQL
28	Vinyl Chloride	1.0	BQL

Comments:

BQL = Below Quantitation Limit

FORM 8010 Rev. 062089

PURGEABLE HALOCARBONS
SW-846 METHOD 8010 COMPOUNDS

IEA Sample Number: 196-182-4
Sample Identification: Lundsford Well
Date Analyzed: 01/12/91 By: Averill

Number	Compound	Quantitation Limit (ug/L)	Results Concentration (ug/L)
1	Bromodichloromethane	1.0	BQL
2	Bromoform	1.0	BQL
3	Bromomethane	1.0	BQL
4	Carbon tetrachloride	1.0	BQL
5	Chlorobenzene	1.0	BQL
6	Chloroethane	1.0	BQL
7	2-Chloroethylvinyl ether	1.0	BQL
8	Chloroform	1.0	BQL
9	Chloromethane	1.0	BQL
10	Dibromochloromethane	1.0	BQL
11	1,2-Dichlorobenzene	1.0	BQL
12	1,3-Dichlorobenzene	1.0	BQL
13	1,4-Dichlorobenzene	1.0	BQL
14	1,1-Dichloroethane	1.0	BQL
15	1,2-Dichloroethane	1.0	BQL
16	1,1-Dichloroethene	1.0	BQL
17	total 1,2-Dichloroethene	1.0	BQL
18	1,2-Dichloropropane	1.0	BQL
19	cis-1,3-Dichloropropene	1.0	BQL
20	trans-1,3-Dichloropropene	1.0	BQL
21	Methylene chloride	1.0	BQL
22	1,1,2,2-Tetrachloroethane	1.0	BQL
23	Tetrachloroethene	1.0	BQL
24	1,1,1-Trichloroethane	1.0	BQL
25	1,1,2-Trichloroethane	1.0	BQL
26	Trichloroethene	1.0	BQL
27	Trichlorofluoromethane	1.0	BQL
28	Vinyl Chloride	1.0	BQL

Comments:

BQL = Below Quantitation Limit

PURGEABLE HALOCARBONS
SW-846 METHOD 8010 COMPOUNDS

IEA Sample Number: 196-182-5
Sample Identification: LF-US
Date Analyzed: 01/12/91 By: Averill

Number	Compound	Quantitation Limit (ug/L)	Results Concentration (ug/L)
1	Bromodichloromethane	1.0	BQL
2	Bromoform	1.0	BQL
3	Bromomethane	1.0	BQL
4	Carbon tetrachloride	1.0	BQL
5	Chlorobenzene	1.0	BQL
6	Chloroethane	1.0	BQL
7	2-Chloroethylvinyl ether	1.0	BQL
8	Chloroform	1.0	BQL
9	Chloromethane	1.0	BQL
10	Dibromochloromethane	1.0	BQL
11	1,2-Dichlorobenzene	1.0	BQL
12	1,3-Dichlorobenzene	1.0	BQL
13	1,4-Dichlorobenzene	1.0	BQL
14	1,1-Dichloroethane	1.0	BQL
15	1,2-Dichloroethane	1.0	BQL
16	1,1-Dichloroethene	1.0	BQL
17	total 1,2-Dichloroethene	1.0	BQL
18	1,2-Dichloropropane	1.0	BQL
19	cis-1,3-Dichloropropene	1.0	BQL
20	trans-1,3-Dichloropropene	1.0	BQL
21	Methylene chloride	1.0	BQL
22	1,1,2,2-Tetrachloroethane	1.0	BQL
23	Tetrachloroethene	1.0	BQL
24	1,1,1-Trichloroethane	1.0	BQL
25	1,1,2-Trichloroethane	1.0	BQL
26	Trichloroethene	1.0	BQL
27	Trichlorofluoromethane	1.0	BQL
28	Vinyl Chloride	1.0	BQL

Comments:

BQL = Below Quantitation Limit

PURGEABLE HALOCARBONS
SW-846 METHOD 8010 COMPOUNDS

IEA Sample Number: 196-182-6
Sample Identification: LF-DS
Date Analyzed: 01/12/91 By: Averill

Number	Compound	Quantitation Limit (ug/L)	Results Concentration (ug/L)
1	Bromodichloromethane	1.0	BQL
2	Bromoform	1.0	BQL
3	Bromomethane	1.0	BQL
4	Carbon tetrachloride	1.0	BQL
5	Chlorobenzene	1.0	BQL
6	Chloroethane	1.0	BQL
7	2-Chloroethylvinyl ether	1.0	BQL
8	Chloroform	1.0	BQL
9	Chloromethane	1.0	BQL
10	Dibromochloromethane	1.0	BQL
11	1,2-Dichlorobenzene	1.0	BQL
12	1,3-Dichlorobenzene	1.0	BQL
13	1,4-Dichlorobenzene	1.0	BQL
14	1,1-Dichloroethane	1.0	BQL
15	1,2-Dichloroethane	1.0	BQL
16	1,1-Dichloroethene	1.0	BQL
17	total 1,2-Dichloroethene	1.0	BQL
18	1,2-Dichloropropane	1.0	BQL
19	cis-1,3-Dichloropropene	1.0	BQL
20	trans-1,3-Dichloropropene	1.0	BQL
21	Methylene chloride	1.0	BQL
22	1,1,2,2-Tetrachloroethane	1.0	BQL
23	Tetrachloroethene	1.0	BQL
24	1,1,1-Trichloroethane	1.0	BQL
25	1,1,2-Trichloroethane	1.0	BQL
26	Trichloroethene	1.0	BQL
27	Trichlorofluoromethane	1.0	BQL
28	Vinyl Chloride	1.0	BQL

Comments:

BQL = Below Quantitation Limit

BASE/NEUTRAL EXTRACTABLES
SW-846 METHOD 8270

IEA Sample Number: 196-182-1
Sample Identification: Carolina Well
Date Extracted: 01/14/91
Date Analyzed: 01/18/91 By: Mace

Number	Compound	Quantitation Limit (ug/L)	Results Concentration (ug/L)
1	Acenaphthene	5	BQL
2	Acenaphthylene	5	BQL
3	Anthracene	5	BQL
4	Benzo(a)anthracene	5	BQL
5	Benzo(b)fluoranthene	5	BQL
6	Benzo(k)fluoranthene	5	BQL
7	Benzo(g,h,i)perylene	5	BQL
8	Benzo(a)pyrene	5	BQL
9	Benzyl alcohol	10	BQL
10	bis(2-Chloroethoxy)methane	5	BQL
11	bis(2-Chloroethyl)ether	5	BQL
12	bis(2-Chloroisopropyl)ether	5	BQL
13	bis(2-Ethylhexyl)phthalate	5	BQL
14	4-Bromophenyl phenyl ether	5	BQL
15	Benzyl butyl phthalate	5	BQL
16	4-Chloroaniline	10	BQL
17	2-Chloronaphthalene	5	BQL
18	4-Chlorophenyl phenyl ether	5	BQL
19	Chrysene	5	BQL
20	Dibenzo(a,h)anthracene	5	BQL
21	Dibenzofuran	5	BQL
22	Di-n-butylphthalate	5	BQL
23	1,3-Dichlorobenzene	5	BQL
24	1,4-Dichlorobenzene	5	BQL
25	1,2-Dichlorobenzene	5	BQL
26	3,3'-Dichlorobenzidine	10	BQL
27	Diethyl phthalate	5	BQL
28	Dimethyl phthalate	5	BQL
29	2,4-Dinitrotoluene	5	BQL
30	2,6-Dinitrotoluene	5	BQL
31	Di-n-octylphthalate	5	BQL
32	Fluoranthene	5	BQL
33	Fluorene	5	BQL
34	Hexachlorobenzene	5	BQL
35	Hexachlorobutadiene	5	BQL
36	Hexachlorocyclopentadiene	5	BQL
37	Hexachloroethane	5	BQL
38	Indeno(1,2,3-cd)pyrene	5	BQL
39	Isophorone	5	BQL

BASE/NEUTRAL EXTRACTABLES
SW-846 METHOD 8270

IEA Sample Number: 196-182-1
Sample Identification: Carolina Well
Date Extracted: 01/14/91
Date Analyzed: 01/18/91 By: Mace

Number	Compound	Quantitation Limit (ug/L)	Results Concentration (ug/L)
40	2-Methylnaphthalene	5	BQL
41	Naphthalene	5	BQL
42	2-Nitroaniline	25	BQL
43	3-Nitroaniline	25	BQL
44	4-Nitroaniline	25	BQL
45	Nitrobenzene	5	BQL
46	N-Nitroso-di-n-propylamine	5	BQL
47	N-Nitrosodiphenylamine	5	BQL
48	Phenanthrene	5	BQL
49	Pyrene	5	BQL
50	1,2,4-Trichlorobenzene	5	BQL

Comments:

BQL = Below Quantitation Limit

TENTATIVELY IDENTIFIED COMPOUNDS

IEA Sample Number: 196-182-1
Sample Identification: Carolina Well
Applicable Fraction: Volatile _____ Base/Neutral _X_ Acid ___ Other ___

Tentatively Identified Compound (TIC) refers to substances which are not present in the list of target compounds. Therefore, not all TIC's are identified and quantitated using individual standards. TIC listings are prepared utilizing a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist.

Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TIC's are identified and quantitated only if the peak height is equal to or greater than 10% of that of the nearest internal standard.

TIC Compound Name	Concentration (ug/L)
None per above criteria	<5

BASE/NEUTRAL EXTRACTABLES
SW-846 METHOD 8270

IEA Sample Number: 196-182-2
Sample Identification: Rental Well
Date Extracted: 01/14/91
Date Analyzed: 01/18/91 By: Mace

Number	Compound	Quantitation Limit (ug/L)	Results Concentration (ug/L)
1	Acenaphthene	5	BQL
2	Acenaphthylene	5	BQL
3	Anthracene	5	BQL
4	Benzo(a)anthracene	5	BQL
5	Benzo(b)fluoranthene	5	BQL
6	Benzo(k)fluoranthene	5	BQL
7	Benzo(g,h,i)perylene	5	BQL
8	Benzo(a)pyrene	5	BQL
9	Benzyl alcohol	10	BQL
10	bis(2-Chloroethoxy)methane	5	BQL
11	bis(2-Chloroethyl)ether	5	BQL
12	bis(2-Chloroisopropyl)ether	5	BQL
13	bis(2-Ethylhexyl)phthalate	5	BQL
14	4-Bromophenyl phenyl ether	5	BQL
15	Benzyl butyl phthalate	5	BQL
16	4-Chloroaniline	10	BQL
17	2-Chloronaphthalene	5	BQL
18	4-Chlorophenyl phenyl ether	5	BQL
19	Chrysene	5	BQL
20	Dibenzo(a,h)anthracene	5	BQL
21	Dibenzofuran	5	BQL
22	Di-n-butylphthalate	5	BQL
23	1,3-Dichlorobenzene	5	BQL
24	1,4-Dichlorobenzene	5	BQL
25	1,2-Dichlorobenzene	5	BQL
26	3,3'-Dichlorobenzidine	10	BQL
27	Diethyl phthalate	5	BQL
28	Dimethyl phthalate	5	BQL
29	2,4-Dinitrotoluene	5	BQL
30	2,6-Dinitrotoluene	5	BQL
31	Di-n-octylphthalate	5	BQL
32	Fluoranthene	5	BQL
33	Fluorene	5	BQL
34	Hexachlorobenzene	5	BQL
35	Hexachlorobutadiene	5	BQL
36	Hexachlorocyclopentadiene	5	BQL
37	Hexachloroethane	5	BQL
38	Indeno(1,2,3-cd)pyrene	5	BQL
39	Isophorone	5	BQL

BASE/NEUTRAL EXTRACTABLES
SW-846 METHOD 8270

IEA Sample Number: 196-182-2
Sample Identification: Rental Well
Date Extracted: 01/14/91
Date Analyzed: 01/18/91 By: Mace

Number	Compound	Quantitation Limit (ug/L)	Results Concentration (ug/L)
40	2-Methylnaphthalene	5	BQL
41	Naphthalene	5	BQL
42	2-Nitroaniline	25	BQL
43	3-Nitroaniline	25	BQL
44	4-Nitroaniline	25	BQL
45	Nitrobenzene	5	BQL
46	N-Nitroso-di-n-propylamine	5	BQL
47	N-Nitrosodiphenylamine	5	BQL
48	Phenanthrene	5	BQL
49	Pyrene	5	BQL
50	1,2,4-Trichlorobenzene	5	BQL

Comments:

BQL = Below Quantitation Limit

TENTATIVELY IDENTIFIED COMPOUNDS

IEA Sample Number: 196-182-2
Sample Identification: Rental Well
Applicable Fraction: Volatile _____ Base/Neutral _X_ Acid ___ Other ___

Tentatively Identified Compound (TIC) refers to substances which are not present in the list of target compounds. Therefore, not all TIC's are identified and quantitated using individual standards. TIC listings are prepared utilizing a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist.

Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TIC's are identified and quantitated only if the peak height is equal to or greater than 10% of that of the nearest internal standard.

TIC Compound Name	Concentration (ug/L)
None per above criteria	<5

iea

BASE/NEUTRAL EXTRACTABLES
SW-846 METHOD 8270

IEA Sample Number: 196-182-3
Sample Identification: Watson Well
Date Extracted: 01/14/91
Date Analyzed: 01/18/91 By: Mace

Number	Compound	Quantitation Limit (ug/L)	Results Concentration (ug/L)
1	Acenaphthene	5	BQL
2	Acenaphthylene	5	BQL
3	Anthracene	5	BQL
4	Benzo(a)anthracene	5	BQL
5	Benzo(b)fluoranthene	5	BQL
6	Benzo(k)fluoranthene	5	BQL
7	Benzo(g,h,i)perylene	5	BQL
8	Benzo(a)pyrene	5	BQL
9	Benzyl alcohol	10	BQL
10	bis(2-Chloroethoxy)methane	5	BQL
11	bis(2-Chloroethyl)ether	5	BQL
12	bis(2-Chloroisopropyl)ether	5	BQL
13	bis(2-Ethylhexyl)phthalate	5	BQL
14	4-Bromophenyl phenyl ether	5	BQL
15	Benzyl butyl phthalate	5	BQL
16	4-Chloroaniline	10	BQL
17	2-Chloronaphthalene	5	BQL
18	4-Chlorophenyl phenyl ether	5	BQL
19	Chrysene	5	BQL
20	Dibenzo(a,h)anthracene	5	BQL
21	Dibenzofuran	5	BQL
22	Di-n-butylphthalate	5	BQL
23	1,3-Dichlorobenzene	5	BQL
24	1,4-Dichlorobenzene	5	BQL
25	1,2-Dichlorobenzene	5	BQL
26	3,3'-Dichlorobenzidine	10	BQL
27	Diethyl phthalate	5	BQL
28	Dimethyl phthalate	5	BQL
29	2,4-Dinitrotoluene	5	BQL
30	2,6-Dinitrotoluene	5	BQL
31	Di-n-octylphthalate	5	BQL
32	Fluoranthene	5	BQL
33	Fluorene	5	BQL
34	Hexachlorobenzene	5	BQL
35	Hexachlorobutadiene	5	BQL
36	Hexachlorocyclopentadiene	5	BQL
37	Hexachloroethane	5	BQL
38	Indeno(1,2,3-cd)pyrene	5	BQL
39	Isophorone	5	BQL

BASE/NEUTRAL EXTRACTABLES
SW-846 METHOD 8270

IEA Sample Number: 196-182-3
Sample Identification: Watson Well
Date Extracted: 01/14/91
Date Analyzed: 01/18/91 By: Mace

Number	Compound	Quantitation Limit (ug/L)	Results Concentration (ug/L)
40	2-Methylnaphthalene	5	BQL
41	Naphthalene	5	BQL
42	2-Nitroaniline	25	BQL
43	3-Nitroaniline	25	BQL
44	4-Nitroaniline	25	BQL
45	Nitrobenzene	5	BQL
46	N-Nitroso-di-n-propylamine	5	BQL
47	N-Nitrosodiphenylamine	5	BQL
48	Phenanthrene	5	BQL
49	Pyrene	5	BQL
50	1,2,4-Trichlorobenzene	5	BQL

Comments:

BQL = Below Quantitation Limit

TENTATIVELY IDENTIFIED COMPOUNDS

IEA Sample Number: 196-182-3
Sample Identification: Watson Well
Applicable Fraction: Volatile _____ Base/Neutral _X_ Acid ___ Other ___

Tentatively Identified Compound (TIC) refers to substances which are not present in the list of target compounds. Therefore, not all TIC's are identified and quantitated using individual standards. TIC listings are prepared utilizing a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist.

Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TIC's are identified and quantitated only if the peak height is equal to or greater than 10% of that of the nearest internal standard.

TIC Compound Name	Concentration (ug/L)
None per above criteria	<5

BASE/NEUTRAL EXTRACTABLES
SW-846 METHOD 8270

IEA Sample Number: 196-182-4
Sample Identification: Lundsford Well
Date Extracted: 01/14/91
Date Analyzed: 01/17/91 By: Mace

Number	Compound	Quantitation Limit (ug/L)	Results Concentration (ug/L)
1	Acenaphthene	5	BQL
2	Acenaphthylene	5	BQL
3	Anthracene	5	BQL
4	Benzo(a)anthracene	5	BQL
5	Benzo(b)fluoranthene	5	BQL
6	Benzo(k)fluoranthene	5	BQL
7	Benzo(g,h,i)perylene	5	BQL
8	Benzo(a)pyrene	5	BQL
9	Benzyl alcohol	10	BQL
10	bis(2-Chloroethoxy)methane	5	BQL
11	bis(2-Chloroethyl)ether	5	BQL
12	bis(2-Chloroisopropyl)ether	5	BQL
13	bis(2-Ethylhexyl)phthalate	5	BQL
14	4-Bromophenyl phenyl ether	5	BQL
15	Benzyl butyl phthalate	5	BQL
16	4-Chloroaniline	10	BQL
17	2-Chloronaphthalene	5	BQL
18	4-Chlorophenyl phenyl ether	5	BQL
19	Chrysene	5	BQL
20	Dibenzo(a,h)anthracene	5	BQL
21	Dibenzofuran	5	BQL
22	Di-n-butylphthalate	5	BQL
23	1,3-Dichlorobenzene	5	BQL
24	1,4-Dichlorobenzene	5	BQL
25	1,2-Dichlorobenzene	5	BQL
26	3,3'-Dichlorobenzidine	10	BQL
27	Diethyl phthalate	5	BQL
28	Dimethyl phthalate	5	BQL
29	2,4-Dinitrotoluene	5	BQL
30	2,6-Dinitrotoluene	5	BQL
31	Di-n-octylphthalate	5	BQL
32	Fluoranthene	5	BQL
33	Fluorene	5	BQL
34	Hexachlorobenzene	5	BQL
35	Hexachlorobutadiene	5	BQL
36	Hexachlorocyclopentadiene	5	BQL
37	Hexachloroethane	5	BQL
38	Indeno(1,2,3-cd)pyrene	5	BQL
39	Isophorone	5	BQL

BASE/NEUTRAL EXTRACTABLES
SW-846 METHOD 8270

IEA Sample Number: 196-182-4
Sample Identification: Lundsford Well
Date Extracted: 01/14/91
Date Analyzed: 01/17/91 By: Mace

Number	Compound	Quantitation Limit (ug/L)	Results Concentration (ug/L)
40	2-Methylnaphthalene	5	BQL
41	Naphthalene	5	BQL
42	2-Nitroaniline	25	BQL
43	3-Nitroaniline	25	BQL
44	4-Nitroaniline	25	BQL
45	Nitrobenzene	5	BQL
46	N-Nitroso-di-n-propylamine	5	BQL
47	N-Nitrosodiphenylamine	5	BQL
48	Phenanthrene	5	BQL
49	Pyrene	5	BQL
50	1,2,4-Trichlorobenzene	5	BQL

Comments:

BQL = Below Quantitation Limit

PURGEABLE HALOCARBONS
SW-846 METHOD 8010 COMPOUNDS

IEA Sample Number: 196-182-1
Sample Identification: Carolina Well
Date Analyzed: 01/12/91 By: Averill

Number	Compound	Quantitation Limit (ug/L)	Results Concentration (ug/L)	
1	Bromodichloromethane	1.0	BQL	
2	Bromoform	1.0	BQL	
3	Bromomethane	1.0	BQL	
4	Carbon tetrachloride	1.0	BQL	
5	Chlorobenzene	1.0	BQL	
6	Chloroethane	1.0	BQL	
7	2-Chloroethylvinyl ether	1.0	BQL	
8	Chloroform	1.0	BQL	
9	Chloromethane	1.0	BQL	
10	Dibromochloromethane	1.0	BQL	
11	1,2-Dichlorobenzene	1.0	BQL	
12	1,3-Dichlorobenzene	1.0	BQL	
13	1,4-Dichlorobenzene	1.0	BQL	
14	1,1-Dichloroethane	1.0	BQL	
15	1,2-Dichloroethane	1.0	BQL	
16	1,1-Dichloroethene	1.0	BQL	
17	total 1,2-Dichloroethene	1.0	BQL	
18	1,2-Dichloropropane	1.0	BQL	
19	cis-1,3-Dichloropropene	1.0	BQL	
20	trans-1,3-Dichloropropene	1.0	BQL	
21	Methylene chloride	1.0	BQL	
22	1,1,2,2-Tetrachloroethane	1.0	BQL	
23	Tetrachloroethene	1.0		1
24	1,1,1-Trichloroethane	1.0	BQL	
25	1,1,2-Trichloroethane	1.0	BQL	
26	Trichloroethene	1.0	BQL	
27	Trichlorofluoromethane	1.0	BQL	
28	Vinyl Chloride	1.0	BQL	

Comments:

BQL = Below Quantitation Limit

TENTATIVELY IDENTIFIED COMPOUNDS

IEA Sample Number: 196-182-4
Sample Identification: Lundsford Well
Applicable Fraction: Volatile _____ Base/Neutral _X_ Acid ___ Other ___

Tentatively Identified Compound (TIC) refers to substances which are not present in the list of target compounds. Therefore, not all TIC's are identified and quantitated using individual standards. TIC listings are prepared utilizing a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist.

Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TIC's are identified and quantitated only if the peak height is equal to or greater than 10% of that of the nearest internal standard.

TIC Compound Name	Concentration (ug/L)
None per above criteria	<5

BASE/NEUTRAL EXTRACTABLES
SW-846 METHOD 8270

IEA Sample Number: 196-182-5
Sample Identification: LF-US
Date Extracted: 01/14/91
Date Analyzed: 01/17/91 By: Mace

Number	Compound	Quantitation Limit (ug/L)	Results Concentration (ug/L)
1	Acenaphthene	5	BQL
2	Acenaphthylene	5	BQL
3	Anthracene	5	BQL
4	Benzo(a)anthracene	5	BQL
5	Benzo(b)fluoranthene	5	BQL
6	Benzo(k)fluoranthene	5	BQL
7	Benzo(g,h,i)perylene	5	BQL
8	Benzo(a)pyrene	5	BQL
9	Benzyl alcohol	10	BQL
10	bis(2-Chloroethoxy)methane	5	BQL
11	bis(2-Chloroethyl)ether	5	BQL
12	bis(2-Chloroisopropyl)ether	5	BQL
13	bis(2-Ethylhexyl)phthalate	5	BQL
14	4-Bromophenyl phenyl ether	5	BQL
15	Benzyl butyl phthalate	5	BQL
16	4-Chloroaniline	10	BQL
17	2-Chloronaphthalene	5	BQL
18	4-Chlorophenyl phenyl ether	5	BQL
19	Chrysene	5	BQL
20	Dibenzo(a,h)anthracene	5	BQL
21	Dibenzofuran	5	BQL
22	Di-n-butylphthalate	5	BQL
23	1,3-Dichlorobenzene	5	BQL
24	1,4-Dichlorobenzene	5	BQL
25	1,2-Dichlorobenzene	5	BQL
26	3,3'-Dichlorobenzidine	10	BQL
27	Diethyl phthalate	5	BQL
28	Dimethyl phthalate	5	BQL
29	2,4-Dinitrotoluene	5	BQL
30	2,6-Dinitrotoluene	5	BQL
31	Di-n-octylphthalate	5	BQL
32	Fluoranthene	5	BQL
33	Fluorene	5	BQL
34	Hexachlorobenzene	5	BQL
35	Hexachlorobutadiene	5	BQL
36	Hexachlorocyclopentadiene	5	BQL
37	Hexachloroethane	5	BQL
38	Indeno(1,2,3-cd)pyrene	5	BQL
39	Isophorone	5	BQL

BASE/NEUTRAL EXTRACTABLES
SW-846 METHOD 8270

IEA Sample Number: 196-182-5
Sample Identification: LF-US
Date Extracted: 01/14/91
Date Analyzed: 01/17/91 By: Mace

Number	Compound	Quantitation Limit (ug/L)	Results Concentration (ug/L)
40	2-Methylnaphthalene	5	BQL
41	Naphthalene	5	BQL
42	2-Nitroaniline	25	BQL
43	3-Nitroaniline	25	BQL
44	4-Nitroaniline	25	BQL
45	Nitrobenzene	5	BQL
46	N-Nitroso-di-n-propylamine	5	BQL
47	N-Nitrosodiphenylamine	5	BQL
48	Phenanthrene	5	BQL
49	Pyrene	5	BQL
50	1,2,4-Trichlorobenzene	5	BQL

Comments:

BQL = Below Quantitation Limit

TENTATIVELY IDENTIFIED COMPOUNDS

IEA Sample Number: 196-182-5
Sample Identification: LF-US
Applicable Fraction: Volatile _____ Base/Neutral _X_ Acid ___ Other ___

Tentatively Identified Compound (TIC) refers to substances which are not present in the list of target compounds. Therefore, not all TIC's are identified and quantitated using individual standards. TIC listings are prepared utilizing a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist.

Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TIC's are identified and quantitated only if the peak height is equal to or greater than 10% of that of the nearest internal standard.

TIC Compound Name	Concentration (ug/L)
None per above criteria	<5

BASE/NEUTRAL EXTRACTABLES
SW-846 METHOD 8270

IEA Sample Number: 196-182-6
Sample Identification: LF-DS
Date Extracted: 01/14/91
Date Analyzed: 01/17/91 By: Mace

Number	Compound	Quantitation Limit (ug/L)	Results Concentration (ug/L)
1	Acenaphthene	5	BQL
2	Acenaphthylene	5	BQL
3	Anthracene	5	BQL
4	Benzo(a)anthracene	5	BQL
5	Benzo(b)fluoranthene	5	BQL
6	Benzo(k)fluoranthene	5	BQL
7	Benzo(g,h,i)perylene	5	BQL
8	Benzo(a)pyrene	5	BQL
9	Benzyl alcohol	10	BQL
10	bis(2-Chloroethoxy)methane	5	BQL
11	bis(2-Chloroethyl)ether	5	BQL
12	bis(2-Chloroisopropyl)ether	5	BQL
13	bis(2-Ethylhexyl)phthalate	5	BQL
14	4-Bromophenyl phenyl ether	5	BQL
15	Benzyl butyl phthalate	5	BQL
16	4-Chloroaniline	10	BQL
17	2-Chloronaphthalene	5	BQL
18	4-Chlorophenyl phenyl ether	5	BQL
19	Chrysene	5	BQL
20	Dibenzo(a,h)anthracene	5	BQL
21	Dibenzofuran	5	BQL
22	Di-n-butylphthalate	5	BQL
23	1,3-Dichlorobenzene	5	BQL
24	1,4-Dichlorobenzene	5	BQL
25	1,2-Dichlorobenzene	5	BQL
26	3,3'-Dichlorobenzidine	10	BQL
27	Diethyl phthalate	5	BQL
28	Dimethyl phthalate	5	BQL
29	2,4-Dinitrotoluene	5	BQL
30	2,6-Dinitrotoluene	5	BQL
31	Di-n-octylphthalate	5	BQL
32	Fluoranthene	5	BQL
33	Fluorene	5	BQL
34	Hexachlorobenzene	5	BQL
35	Hexachlorobutadiene	5	BQL
36	Hexachlorocyclopentadiene	5	BQL
37	Hexachloroethane	5	BQL
38	Indeno(1,2,3-cd)pyrene	5	BQL
39	Isophorone	5	BQL

BASE/NEUTRAL EXTRACTABLES
SW-846 METHOD 8270

IEA Sample Number: 196-182-6
Sample Identification: LF-DS
Date Extracted: 01/14/91
Date Analyzed: 01/17/91 By: Mace

Number	Compound	Quantitation Limit (ug/L)	Results Concentration (ug/L)
40	2-Methylnaphthalene	5	BQL
41	Naphthalene	5	BQL
42	2-Nitroaniline	25	BQL
43	3-Nitroaniline	25	BQL
44	4-Nitroaniline	25	BQL
45	Nitrobenzene	5	BQL
46	N-Nitroso-di-n-propylamine	5	BQL
47	N-Nitrosodiphenylamine	5	BQL
48	Phenanthrene	5	BQL
49	Pyrene	5	BQL
50	1,2,4-Trichlorobenzene	5	BQL

Comments:

BQL = Below Quantitation Limit

TENTATIVELY IDENTIFIED COMPOUNDS

IEA Sample Number: 196-182-6
Sample Identification: LF-DS
Applicable Fraction: Volatile _____ Base/Neutral _X_ Acid ___ Other ___

Tentatively Identified Compound (TIC) refers to substances which are not present in the list of target compounds. Therefore, not all TIC's are identified and quantitated using individual standards. TIC listings are prepared utilizing a computerized library search of electron impact mass spectral data and evaluation of the relevant data by a mass spectral data specialist.

Quantitation is accomplished by relative peak height of the compound compared to that of the nearest internal standard from the total ion chromatogram. TIC's are identified and quantitated only if the peak height is equal to or greater than 10% of that of the nearest internal standard.

TIC Compound Name	Concentration (ug/L)
None per above criteria	<5

CHAIN OF CUSTODY RECORD

PROJ. NO.: 417A

PROJECT NAME: Wiley Davis

SAMPLERS: (Signature) Thomas F. Haynes

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	6010	8270 BN+ Lib Search	Total Barium, Chromium & Lead				REMARKS
Carolina Well	1/9			✓	Carolina Freight Carriers	7	✓	✓	✓				Normal Turnaround. Send
Rental Well	"			✓	Roger Rental Company	7	✓	✓	✓				Results to Steve Czekalski,
Watson Well	"			✓	George Watson Residence	7	✓	✓	✓				Raleigh Office.
Lunsford Well	"			✓	David Lunsford Residence	7	✓	✓	✓				
LF-US	"			✓	Land Fill - Up Stream	7	✓	✓	✓				
LF-DS	"			✓	Land Fill - Down Stream	7	✓	✓	✓				
													Only 6 bottles received for all samples
													IEA # 196-182

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Thomas Haynes	1/9/91 15:10	[signature]			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		Elizabeth D. Gray	1/10/91 12:00n	P.O. # R 3701	

DISTRIBUTION: Original and Pink copies accompany sample shipment to laboratory: Pink copy retained by laboratory: Yellow copy retained by samplers.

ATLANTIC COAST ENGINEERING AND TESTING, INC.

123 MANLEY AVENUE GREENSBORO, N.C. 27407

PHONE: 919-292-8230

Report on Subsurface Exploration
and Engineer's Evaluation

D. H. Griffin Landfill
Guilford County, NC

Our Project AC-1729

ATLANTIC COAST ENGINEERING AND TESTING, INC.

123 MANLEY AVENUE **GREENSBORO, N.C. 27407**

PHONE: 919-292-8230

January 16, 1991

Borum & Associates, Inc.
Engineers, Planners, & Surveyors
405-D Parkway
Greensboro, NC 27401

Re: Report of Subsurface Exploration and Engineer's Evaluation
D. H. Griffin Landfill, Guilford County, NC
Our Project AC-1729

Gentlemen:

The authorized subsurface exploration and geotechnical engineering evaluation of areas anticipated to be used in the expansion of the D. H. Griffin Landfill in Guilford County, NC, have been completed. The attached report defines the purpose, outlines the scope, and provides the results of the exploration and evaluation. Further, it draws conclusions from the results and presents recommendations based on the conclusions.

In summary, the areas investigated are suitable for the expansion of the landfill. The suitability of the soils which will provide the bulk of the material for landfilling operations is good. These silt (ML) soils can be graded, worked, and compacted at their in-situ (natural) moisture contents and will provide an acceptable impermeable zone for landfill cover and bottom layer when compacted properly. The depth of the landfill will be restricted by the hard layer at the majority of site locations in Phase I and by the water table at locations in Phase II. The site generally appears to have a condition conducive to the construction of a landfill with a sloping but nearly uniform and regular bottom. In previously graded areas (Phase I) provisions should be made to maintain a required zone above restrictive barriers.

Thank you for the opportunity to provide professional services on this project. Please contact us if we can be of further service or if you have questions concerning this report.

Sincerely,

ATLANTIC COAST ENGINEERING
AND TESTING, INC.

C. B. Higgins, Jr., Manager

Roy L. Harris, P.E.

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ATLANTIC COAST ENGINEERING AND TESTING, INC.

123 MANLEY AVENUE **GREENSBORO, N.C. 27407**

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SECTION 1

GENERAL INFORMATION

A. Authorization

The subsurface exploration and geotechnical engineering evaluation of the existing borrow area and areas that are targeted for use in the expansion of the borrow area and proposed landfill were performed as requested and authorized by Borum & Associates, Inc.

B. Purpose and Scope

The basic purpose of this exploration and evaluation is to:

1. Determine whether the soils encountered in the areas proposed for the landfill are acceptable, and

2. Establish the limiting depth and elevation of the landfill bottom as dictated by the depth and elevation of the stabilized ground water table and/or rock surface.

The scope of this report includes a field inspection, the field sampling of soils, the localized in-situ field testing of soils, the laboratory testing of selected soil samples, the preparation of a topographic map showing the limiting subsurface strata defined by the stabilized groundwater table and/or rock surface, and the preparation of stratagraphic subsurface cross-sections identifying subsurface zones and soil types.

SECTION 2

SITE DESCRIPTION

A. General

The elevations shown in this report are based on the topographic plan of the site and elevations for each boring location supplied by Borum & Associates, Inc.

B. Location

The site is located in Guilford County, NC at coordinates 36 00'15" latitude and 79 58'55" longitude (see Figure 1, Appendix 1). The nearly rectangular-shaped property is bounded on the east by Wiley Davis Road and on the west by property of William C. and E. W. Nuckles.

C. General Site Features

The area designated for the landfill consists of Phase I (west section) and Phase II (east section). Phase I is presently a working borrow area, while Phase II was relatively undisturbed and partially wooded at the time of field studies (see Figures 1 and 2, Appendix 1).

D. Topography

From the southwest corner of Phase I (elevation 796), the Phase I section slopes upward 150' north (to elevation 809), 400' east (to elevation 809), and 250' northeast (to elevation 803). From the center of the Phase I section (elevation 803), the groundsurface slopes gently upward to the north (elevation 805 to 807).

A knoll (elevation 823) in the northwest corner of Phase I slopes steeply downward 100' south and east (to elevation 809 and 805, respectively). The knoll exists due to difficult excavation of very hard (100+ blow) material.

From the southwest corner of the Phase II section (elevation 815), the groundsurface slopes upward 300' north (elevation 824), 400' east (elevation 823), and 500' northeast (elevation 831).

E. Surface Water

A small tributary stream is situated along the south side of the property. In addition, a number of minor, dry swales which carry storm runoff to the creek also cross locations of both sections designated for landfill.

F. Soil Survey Data

The Guilford County Soil Survey published by the Soil Conservation Service and issued December 1977 indicates there are two basic soil groups that are located within the boundaries.

The primary soil group mapped over most of the site is the ENON series. These soils are primarily silts and sandy silts (SM and SF) with no plasticity. The permeability of these sandy silt soils is described as slow. They developed from the products of mixed acidic and basic rocks or diorite, gabbro, hornblade schist formed in residuum.

G. Rock Outcrops

Outcrops of rock were observed in the northwest corner of Phase I and several highly fractured and isolated rocks were observed. Some boulders and fractured rocks were noted in the Phase I section and apparently had been encountered during excavation operations.

SECTION 3

EXPLORATION AND TESTING PROGRAM

A. Field Exploration

The following activities were conducted in the field at the landfill site:

1. A reconnaissance visit to the site was completed;

2. Eighteen (18) soil test borings were drilled, nine in Phase I and nine in Phase II (see Appendix 3 for Test Boring Records);

3. Slotted pipe was placed in boreholes B-5, B-7, B-12, and B-17 to monitor ground water tables (see Table 5, Appendix 2 for results);

4. In-situ permeability tests were performed at boring locations B-5 and B-12 (see Table 5, Appendix 2 for results).

Boring locations were selected and surveyed by Borum & Associates, Inc. The elevations used in this report are referenced to the topography shown on Figure 2, Appendix 1.

To obtain bulk and undistributed soil samples for laboratory testing, auger borings were drilled within five to ten feet of test boring locations selected for sampling based on an inspection of split-spoon samples and a review of standard penetration resistances.

Detailed descriptions of the field exploration procedures are presented in Appendix 5.

B. Laboratory Testing

The following tests were conducted in the laboratory:

1. Four grain size distribution tests, including wash 200 and hydrometer analyses (see Appendix 4 for results);

2. Four Atterberg Limits tests (see Table 3, Appendix 2 for results);

3. Four moisture content tests (see Table 2, Appendix 2 for results);

4. Four standard proctor compaction tests (see Appendix 4 for results);

5. Two constant head permeability tests on "undisturbed" shelby tube samples; (see Table 4, Appendix 2 for results);

6. One constant head permeability test on a remolded sample (see Table 4, Appendix 2 for results).

Detailed descriptions of the laboratory testing procedures are presented in Appendix 5.

to its high porosity. Its ability to transmit water is generally low, however, due to the small size of the pores and high absorption capacity of the clays and silts. The unweathered bedrock essentially has no primary (intergranular) porosity. Stresses through geologic time have fractured the rocks, however, and groundwater is transmitted through these fractures. In general, the storage capacity of bedrock is lower than that of an equal volume of saprolite, but its permeability (ability to transmit water) is greater. Rock fractures become smaller and less numerous with increasing depth, and are normally insignificant for water supply at depths greater than 300 feet.

Groundwater is currently used in Guilford County for domestic, agricultural, industrial, and municipal water supplies. These supplies are normally obtained through drilled wells which draw water from the fractured bedrock. Many domestic and small-volume agricultural supplies historically were obtained from the saprolite zone through shallow, large-diameter hand-excavated or bored wells. This practice is becoming less common because a bedrock well will generally provide a more reliable water supply with a lower potential for pollution than a shallow well. By using deeper wells which are isolated from the saprolite by casing, the saprolite serves as a storage reservoir and natural filter for water slowly infiltrating from the surface into the fractured bedrock.

The water table varies from near the groundsurface in valleys to more than 100 feet below the groundsurface on sharply rising hills. In general and under natural conditions, the water table is nearly parallel to the groundsurface at lower elevations but diverges as the groundsurface rises from creeks or valleys. The quantities of water available are generally small, with typical yields of less than 10 gpm for domestic wells. The zone of influence of such wells is typically less than 300 feet.

There is some degree of variation in the quality of groundwater in Guilford County due to local variations in rock type, but water quality normally meets primary and secondary drinking water standards.

SECTION 5

SITE GEOHYDROLOGY

A. General

Eighteen (18) soil test borings were drilled at the approximate locations shown on Figure 2, Appendix 1. Details of the subsurface strata, soil types, and soil consistencies encountered at each boring are shown on the Test Boring Records provided in Appendix 3. Generalized subsurface profiles constructed from this information are included in Appendix 1 (see Figures 3, 4, 5, 6, 7, 8). Table 1 (Appendix 2) provides a summary of the elevations for seven-day ("stabilized") groundwater tables, partially weathered rock, and auger refusal materials measured at the boring locations.

B. Soil, Partially Weathered Rock, and Auger Refusal Materials

Beneath a 4" to 6" thick surface topsoil zone (Phase II), the soils encountered in the borings were primarily residual silty sands (ML-MH). Clayey silts (MH) and low plastic clays were also identified, but these soils were localized.

The partially weathered rock surface (Phase I) generally slopes in a configuration similar to the ground surface, generally north to south (see Figures 2 and 3 through 8, Appendix 1).

Auger refusal materials (materials that could not be penetrated with soil drilling equipment) were encountered at Phase I borings (see Table 1, Appendix 2, and Figures 3 through 8, Appendix 1). Some general trends are evident from a review of the profiles, showing a configuration similar to the groundsurface. Phase II borings encountered partially weathered rock at one location (B-10). No auger refusal was encountered. See Appendix 1, Figures 6, 7, 8.

C. Groundwater

In general, the water table is shallow at site areas lower in elevation (Phase I--previously graded) and deep at site locations with higher elevations (Phase II--undisturbed) (see Figures 3 through 8, Appendix 1). The water surface in Phase II follows the same general trend as the topography, but appears to be smoother and have a lower and more uniform slope. The primary

groundwater flow direction appears to be toward the south with little apparent interaction with site drainage features.

Groundwater levels may fluctuate several feet with seasonal and rainfall variations and with changes in the water level in adjacent drainage features. Normally, the highest groundwater levels occur in late winter and spring and the lowest levels occur in late summer and fall. The borings completed for this project were drilled during an unusually wet fall. Therefore, the measured groundwater table elevations likely reflect a seasonally and annually high level, and the seven-day water table readings should represent a reasonable water table for landfill design.

SECTION 6

GEOTECHNICAL AND GEOHYDROLOGICAL EVALUATIONS, CONCLUSIONS, AND RECOMMENDATIONS

A. Allowable Excavation Depths

It is generally desirable to excavate as much soil from within a landfill area as possible to create maximum volume for the storage of waste. Two major factors will limit the extent of excavation: the groundwater table and partially weathered rock or rock surface. Regulatory agencies generally require that a minimum of four feet of soil be maintained between the waste material and groundwater or rock because fractures in rock can form a direct path to the groundwater.

Based on the data from the soil test borings drilled at this site, the landfill bottom elevation will be restricted by partially weathered rock at five (5) boring locations and by the water table at thirteen (13) locations (see Table 6, Appendix 2, and Figures 3 through 8, Appendix 1). The allowable depths of excavation at site boring locations are shown on Table 6, Appendix 1. These depths assume that a four-foot thick layer of soil is maintained above the restricting barrier and that the landfill volume is fully developed.

Conventional earth moving equipment can excavate the soils encountered in the borings above the allowable excavation depths shown on Table 6, Appendix 2, providing the auger refusal material encountered at boring location B-1 is isolated and not massive. Ripping equipment would be required to remove hard ridges and peaks if the partially weathered rock or rock surface is highly irregular and erratic, which is not generally indicated by the borings.

B. Suitability of Site Soils for Landfill Development

1. Site Soils Available for Landfilling

The two types of soils available for use in the development of the landfill at this site are sandy silts (ML) and silty sand (SF); however, only the ML soils were tested in detail to determine their suitability for landfilling operations.

2. Moisture Content of Site Soils

Based on the standard proctor compaction test conducted on a sample of ML soils mixed from

various depths (see Appendix 4), the moisture contents of the site ML soils would need to be between 12% and 20% to achieve 95% compaction. The natural moisture contents of all ML soils tested from the site (see Table 2, Appendix 2) vary between 18.8 to 22.5%. These samples are representative of a wide range of depth and site location conditions. Based on the coverage with the sampling and the test results, it appears that the majority of ML soils at the site could be suitably graded, worked, and compacted in their natural moisture conditions.

In summary, the suitability of the ML soils for landfilling operations appears good in terms of moisture content, since they can be worked and compacted in their natural moisture condition.

3. Permeability Coefficients of Site Soils

Tables 4 and 5, Appendix 2, present the results of laboratory and field permeability tests, respectively. The permeability coefficient of the remolded (compacted) sample (Table 4) is on the order of 10^{-6} cm/sec. Soils with permeability coefficients in this range are considered acceptable for use as landfill bottom and final landfill cover material.

The results of the laboratory tests conducted on the "undisturbed" samples (Table 4) indicate that permeability coefficients are in the range of 10^{-5} to 10^{-6} cm/sec. for those samples. The results of the field permeability tests (Table 5) indicate that permeability coefficients are in the range of 10^{-5} for the site locations tested. These data clearly indicate that a minimum one foot thickness of the soils presently at the anticipated bottom elevation of the landfill should be scarified and compacted to 95% of the standard proctor maximum dry density before filling operations begin to raise the permeability coefficient of this soil zone from 10^{-5} cm/sec to 10^{-6} - 10^{-7} cm/sec.

In summary, regarding permeability coefficients, the suitability of the ML soils for use in landfilling operations is acceptable since they will compact into a relatively impervious landfill cover or bottom layer with permeability coefficients in the range of 10^{-7} to 10^{-6} cm/sec.

4. Erodability of Site Soils

The potential of the ML soils to erode easily will require that mitigative measures to protect against erosion be provided in areas where these

soils are exposed. To reduce erosion from rainfall and run-off, it is recommended that completed slopes, especially those utilizing the ML soils, be grassed immediately to establish a protective cover. Temporary erosion protection and sedimentation control (gravel-lined ditches, siltation ponds, silt fences, etc.) will be required at the lower reaches of the active landfilling areas and perhaps on previously landfilled areas until an adequate stand of grass is developed.

5. Stability of Cut Slopes in Site Soils

Stability of cut slopes in ML soils may be influenced more by soil structure than by characteristics of the soil particles. The deeper soils typically retain the relic structure of the parent rock from which they are weathered. Unfavorable orientations of planes of weakness (joints, fractures, and/or tabular bodies) can result in movement of blocks or wedges of soil in cut slopes when triggered by disturbance or excess moisture. We recommend that all cut slopes in the ML soils be no steeper than 2 horizontal to 1 vertical for slopes less than 25 feet high unless engineering evaluations are performed. If planes of weakness are identified during construction, the slopes may have to be flattened.

6. Partially Weathered Rock

Partially weathered rock generally requires special equipment or procedures for effective excavation. Quite often the partially weathered rock is excavated in "chunks" which are broken apart during placement and compaction. If the partially weathered rock is completely broken apart it has properties similar to the ML soils. However, because landfill soil covers, especially the intermediate covers, are relatively thin and placed over soft and compressible waste material, only minimum compaction can be achieved; thus, it will be difficult to break up all of the partially weathered rock "chunks." If the cover contains zones of partially weathered rock fragments with void space between the fragments, permeability will be anomalously high. For these reasons, it is recommended that the landfill bottom not be extended below the general partially weathered rock layer (above bedrock, not lenses within the soil mantle).

7. Alluvium

Alluvial soils generally should not be utilized in landfill development or operation. Evaluation of a specific group of alluvial soils may determine that they are suitable for a specific purpose,

such as for landscaping. In any event, it is doubtful that there are alluvial soils present on this site.

C. Potential for Groundwater Contamination

1. Groundwater Movement

Any landfill has the potential for generating some leachate. Groundwater contamination from a landfill is caused by migration of leachate from the waste material into the saturated zone. Infiltrating water from either subsurface or surface sources is responsible for most of the leachate developed in a landfill. Infiltration of water cannot be totally excluded, but can be minimized with proper design and operation.

The greatest potential source of subsurface infiltration occurs if the excavation is carried too deep or if unusual climatic conditions lead to an anomalously high water table. Sources of surface infiltration include surface water run-on from adjacent areas and precipitation. Water flowing onto the landfill from adjacent areas should not be permitted. This is typically accomplished with interceptor ditches.

The final landfill cover should be sloped about one percent or more to provide positive drainage and reduce the potential for surface ponding. However, to reduce the potential for cover erosion from high-velocity run-off, the cover slope should be not steeper than about ten percent. Final cover slopes below one percent or above ten percent likely will require extra maintenance to preserve the integrity of the final cover until a stand of grass develops. Cover slopes greater than ten percent should be terraced. Infiltration through the landfill cover is influenced by the permeability of the cover material.

Based on typical conditions the movement of groundwater through the substrata outside the flood plain in the site soils will vary with the permeability coefficient of the soil approximately as follows:

Permeability Coefficient of Soil	Groundwater Movement Through Soil
10^{-4} cm/sec	105 ft/year
10^{-5} cm/sec	10 ft/year
10^{-6} cm/sec	1 ft/year
10^{-7} cm/sec	0.1 ft/year

From the above table, it is evident that compacting the site soils into layers with permeability coefficients of 10^{-6} cm/sec or less will greatly reduce the potential for leachate contamination of groundwater. Unsaturated permeability is normally lower than saturated permeability. Also, it has been our experience that Piedmont saprolites have higher horizontal than vertical permeability. Movement through the unsaturated zone could be expected to alter the leachate, if any, by chemical and physical interactions with the saprolite (barring a direct connection to the groundwater such as along a joint or seam; potential direct connections found during construction should be repaired by excavation and recompaction).

The site substrata generally exhibits uniform conditions. The borings indicate that the weathered soil zone is similar throughout most of the site with respect to depth, consistency, and properties.

Any wells within the landfill expansion area used to monitor groundwater for this testing program should not be permitted to remain, as they will provide conduits to the groundwater if not removed. It is recommended that wells in areas to be used for landfill be sealed to their full depth. Any casing should be removed prior to or during placement of the seal (grout or concrete could be used).

2. Groundwater Quality

Measurements of site groundwater characteristics (parameters such as temperature, PH, specific conductance, oxidation-reduction potential, metals, dissolved solids, etc.) should be made prior to landfilling operations. This information is useful as background data and would be compared with measurements of similar parameters made during (and after) operation of the landfill.

3. Groundwater Monitoring

A system of groundwater monitoring wells and surface water monitoring stations should be established to detect changes in the groundwater regime that may be from landfill operations and evaluate groundwater and surface water for potential contamination.

During landfilling operations, groundwater quality in the monitoring wells and at the surface water monitoring stations should be checked routinely. Appropriate indicator tests, such as those

described above and others that may be required by the state, should be performed to identify potential contamination. The results of those tests would be correlated to background information developed for each sampling location prior to the start of landfilling operations.

APPENDICES

APPENDIX 1 - Figures

APPENDIX 2 - Tables

APPENDIX 3 - Test Boring Records

APPENDIX 4 - Laboratory Proctor and Grain Size Test Results

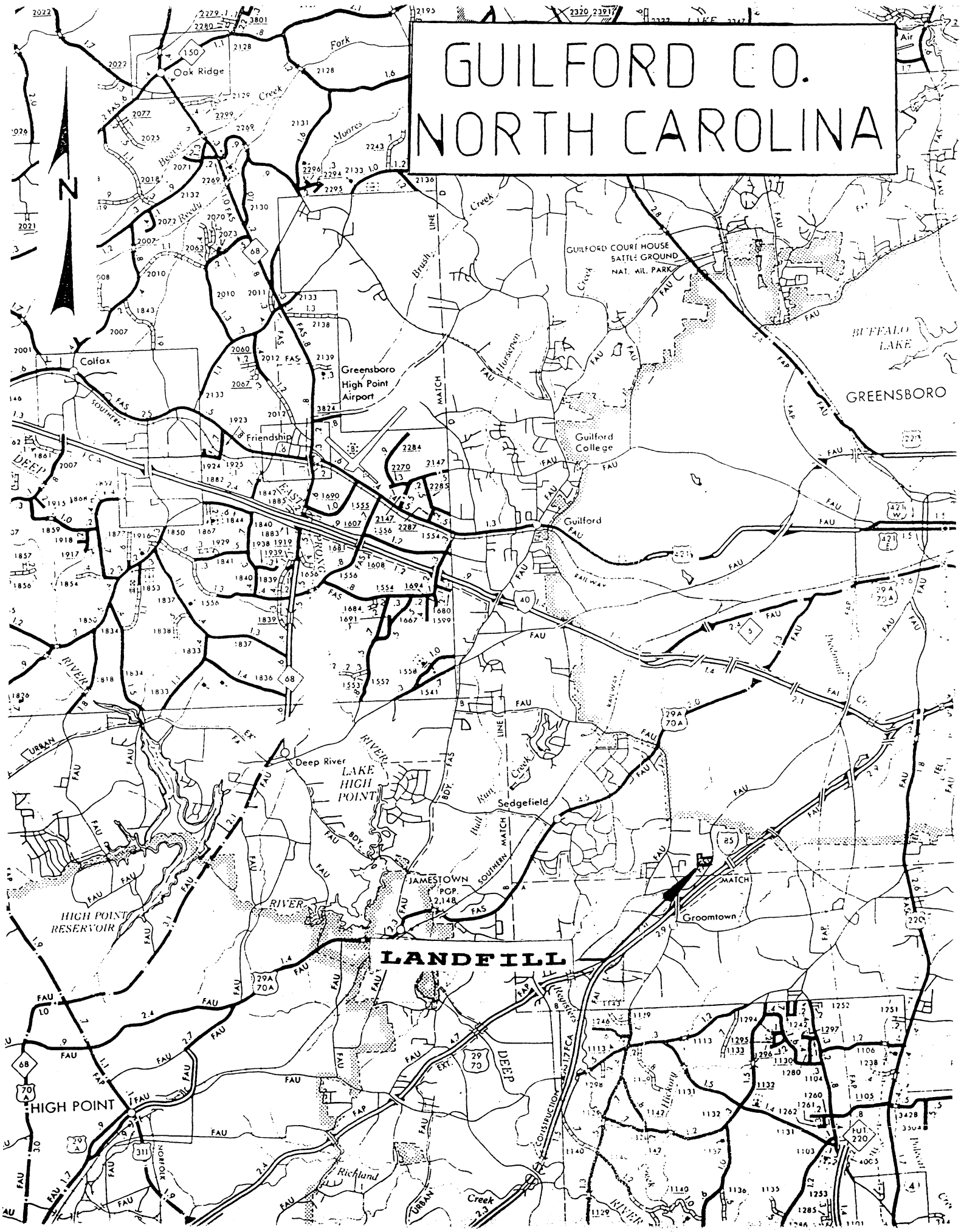
APPENDIX 5 - Field Testing Procedures

APPENDIX 6 - Laboratory Testing Procedures

APPENDIX 1

FIGURES

Figure 1	Vicinity Map
Figure 2	Topographic Map with Boring Locations
Figures 3 through 8	Subsurface Profiles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POINT
Sedgefield
JAMESTOWN
POP.
2,148
Groomtown
HIGH POINT
RESERVOIR
HIGH POINT
Richland
Creek
Brush
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Moores
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Reedy
Fork
Creek
Hickory
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Horsepen
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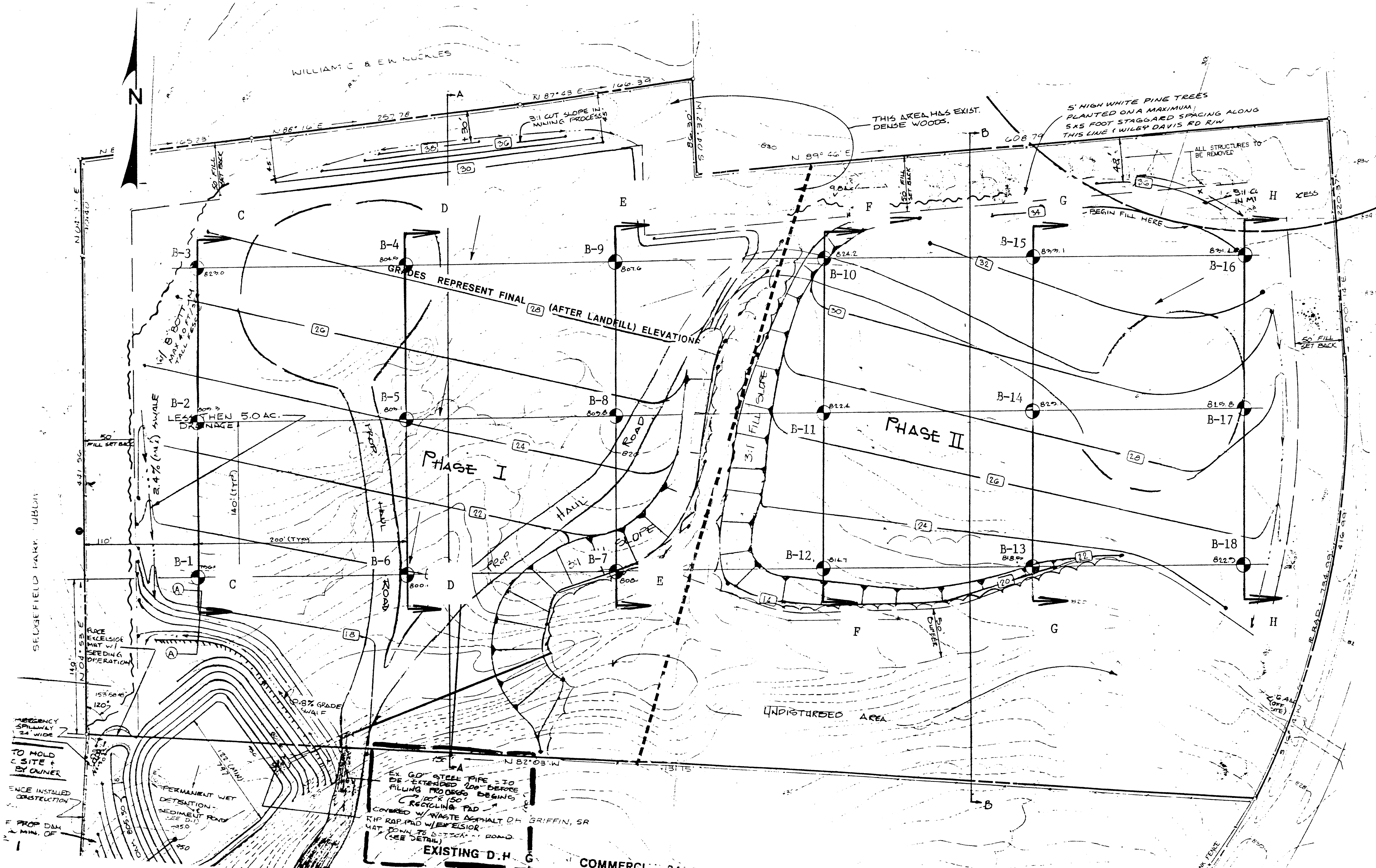
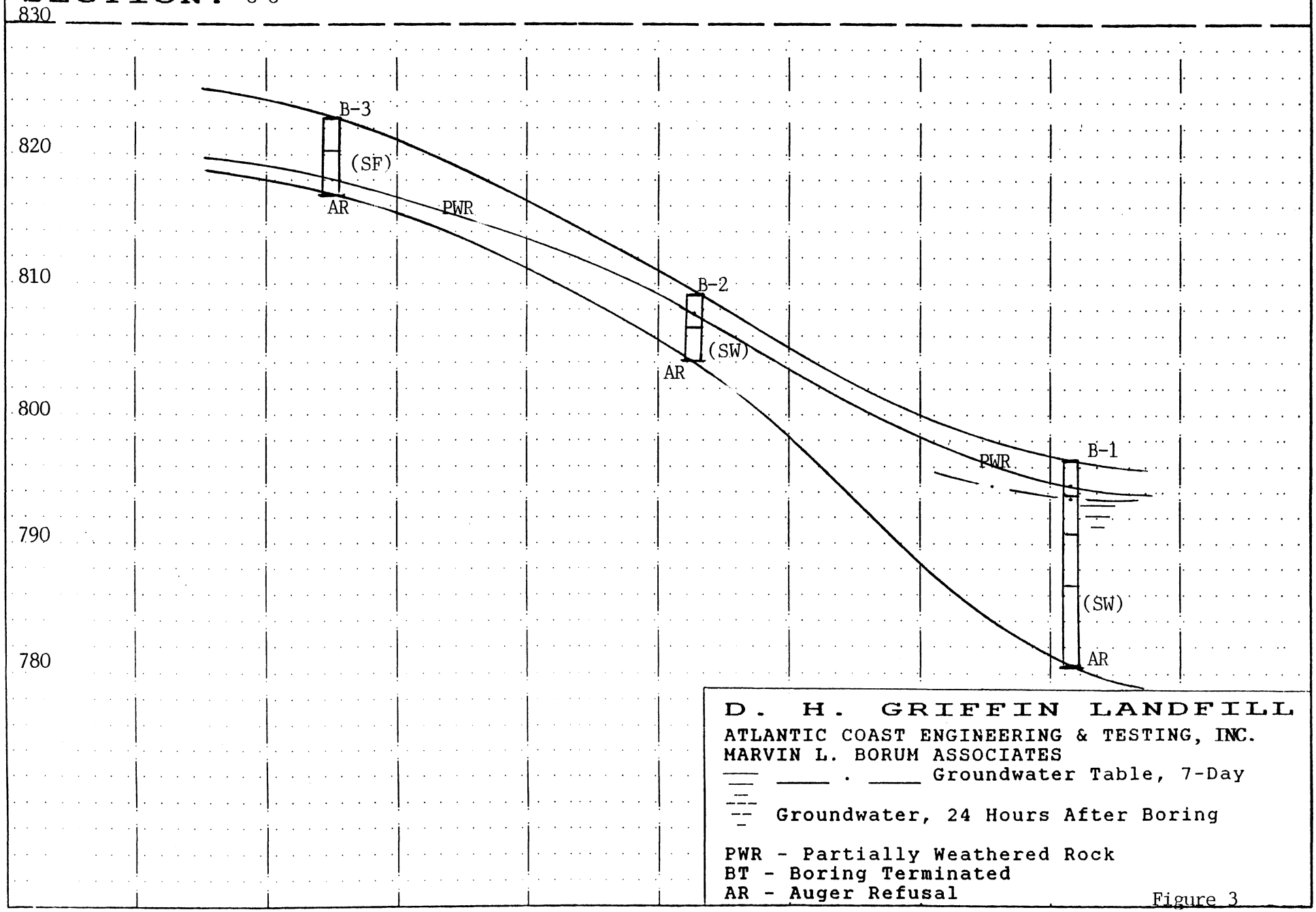
Figure 1



COMMERCI SA DROCK PIT & DEMOLITION LANDFILL
Figure 2

BORING PROFILE
SECTION: C-C



D. H. GRIFFIN LANDFILL
ATLANTIC COAST ENGINEERING & TESTING, INC.
MARVIN L. BORUM ASSOCIATES

____ . ____ Groundwater Table, 7-Day

Groundwater, 24 Hours After Boring

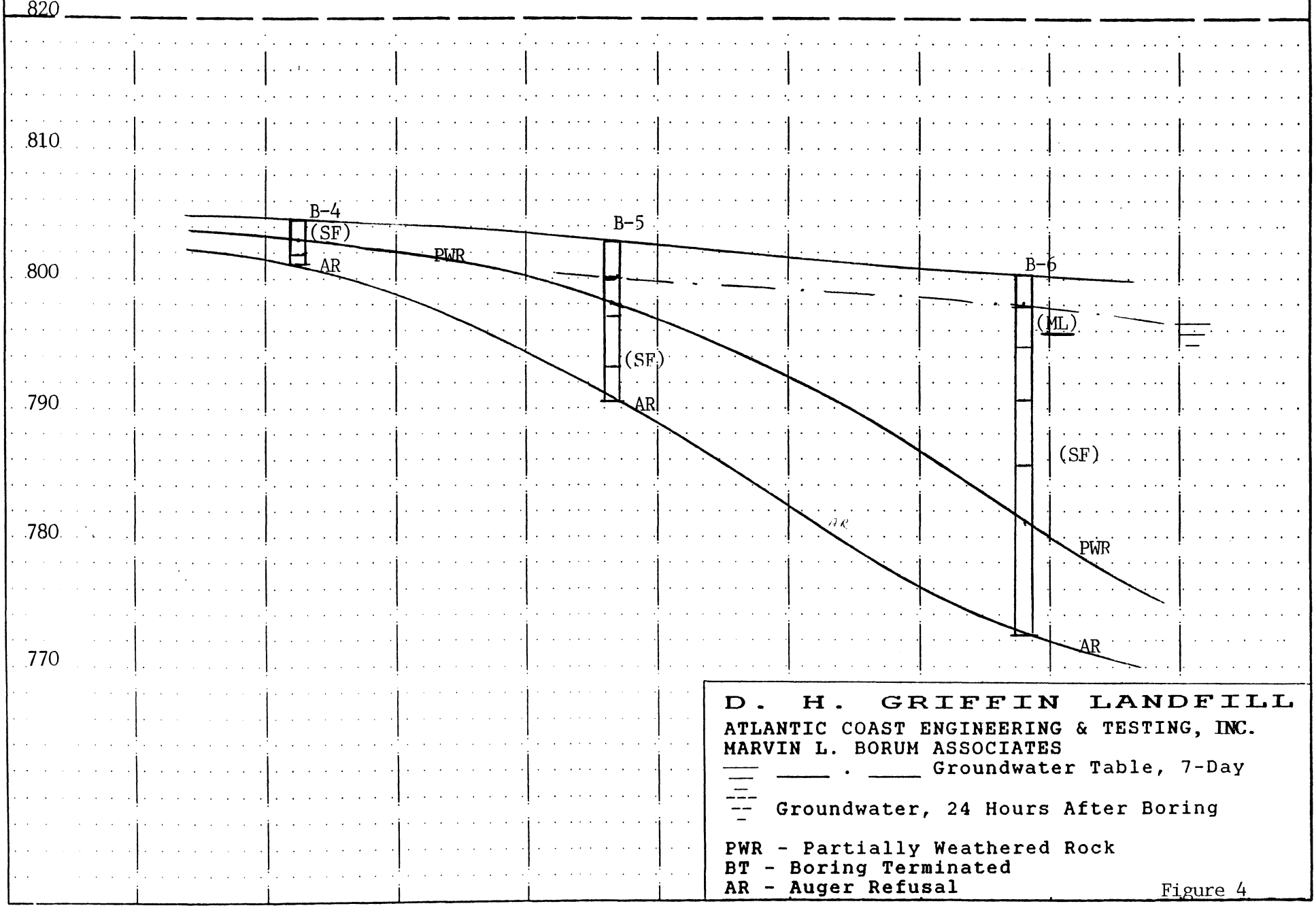
PWR - Partially Weathered Rock
BT - Boring Terminated
AR - Auger Refusal

Figure 3

HORIZONTAL DISTANCE: 1" = 50'

AC-1729

BORING PROFILE
SECTION: D-D



D. H. GRIFFIN LANDFILL

ATLANTIC COAST ENGINEERING & TESTING, INC.
MARVIN L. BORUM ASSOCIATES

____ . ____ Groundwater Table, 7-Day

Groundwater, 24 Hours After Boring

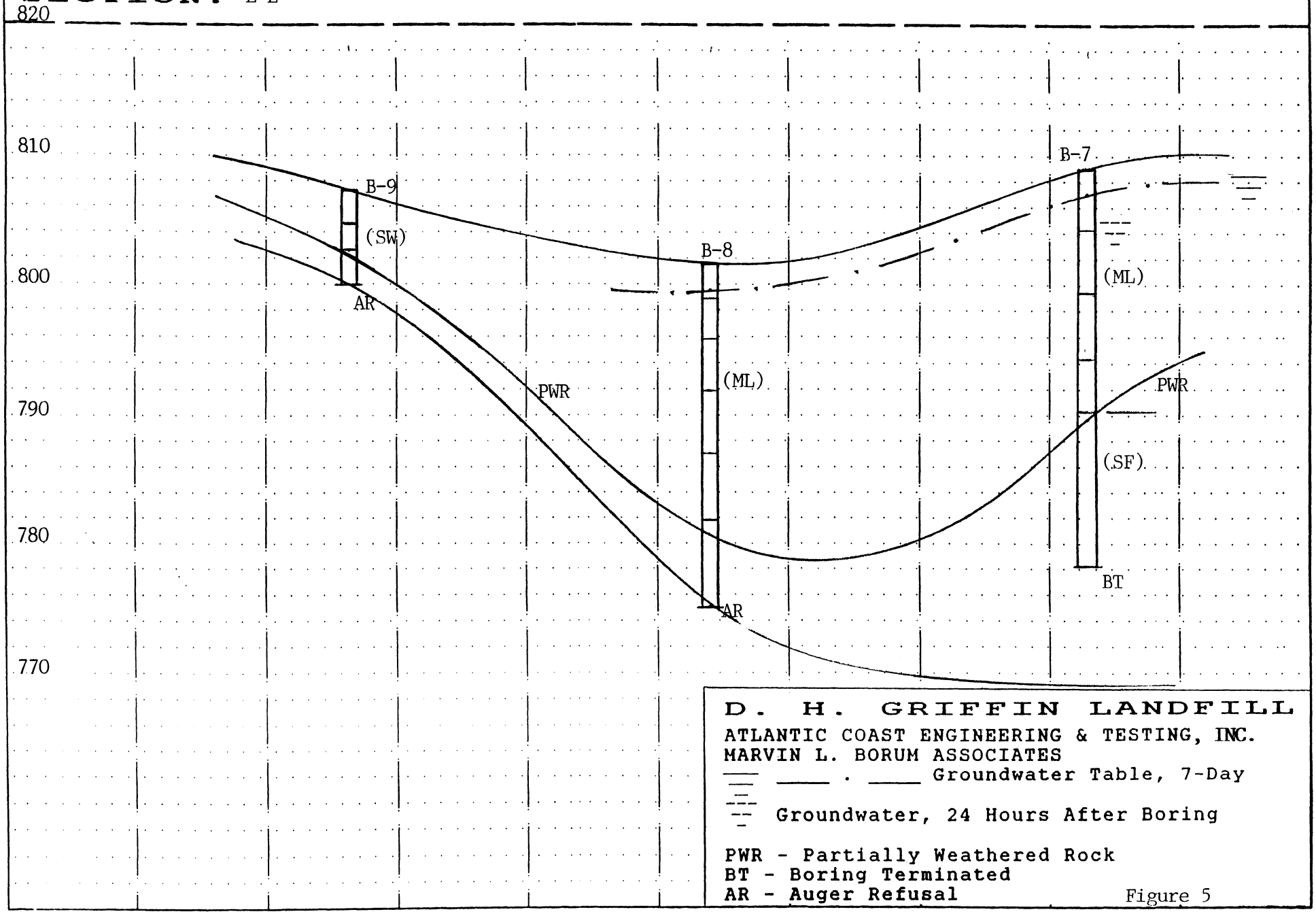
PWR - Partially Weathered Rock
BT - Boring Terminated
AR - Auger Refusal

Figure 4

HORIZONTAL DISTANCE: 1" = 50'

AC-1729

BORING PROFILE
SECTION: E-E



D. H. GRIFFIN LANDFILL

ATLANTIC COAST ENGINEERING & TESTING, INC.
MARVIN L. BORUM ASSOCIATES

____ . ____ Groundwater Table, 7-Day

Groundwater, 24 Hours After Boring

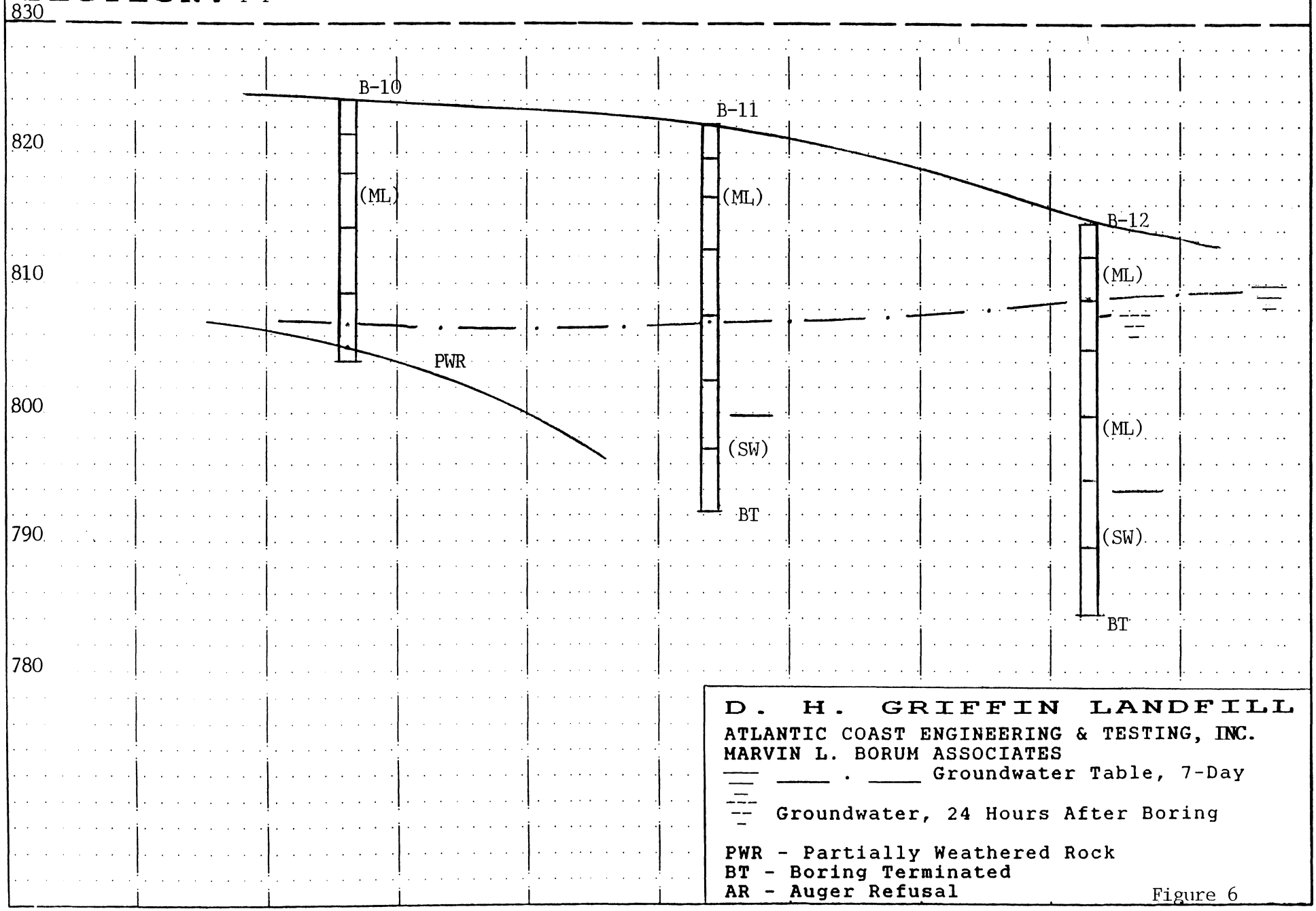
PWR - Partially Weathered Rock
BT - Boring Terminated
AR - Auger Refusal

Figure 5

HORIZONTAL DISTANCE: 1" = 50'

AC-1729

BORING PROFILE
SECTION: F-F



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ATLANTIC COAST ENGINEERING & TESTING, INC.
MARVIN L. BORUM ASSOCIATES

Groundwater Table, 7-Day

Groundwater, 24 Hours After Boring

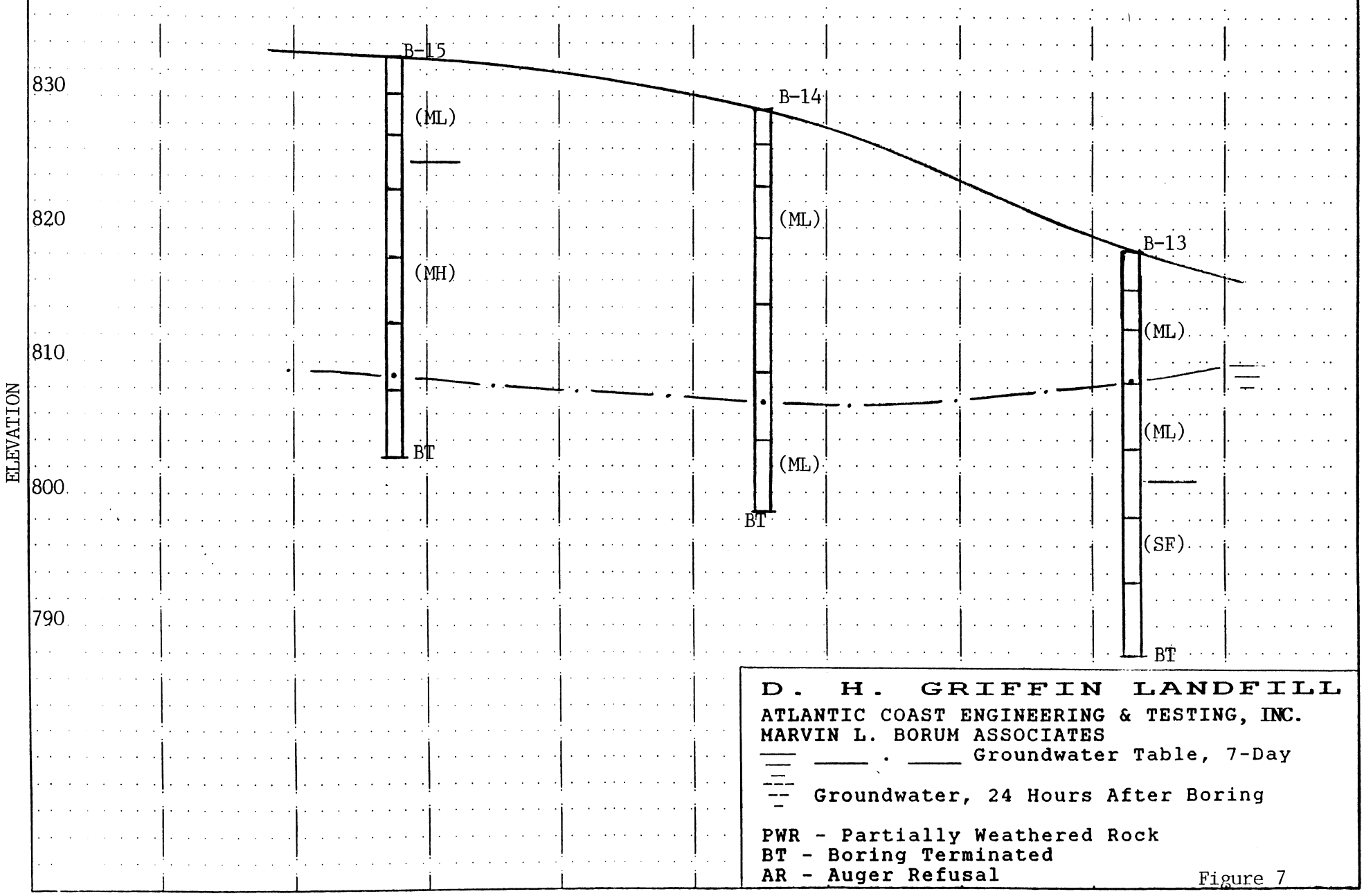
PWR - Partially Weathered Rock
BT - Boring Terminated
AR - Auger Refusal

Figure 6

HORIZONTAL DISTANCE: 1" = 50'

AC-1729

BORING PROFILE
SECTION: G-G



D. H. GRIFFIN LANDFILL

ATLANTIC COAST ENGINEERING & TESTING, INC.
MARVIN L. BORUM ASSOCIATES

____ . ____ Groundwater Table, 7-Day

Groundwater, 24 Hours After Boring

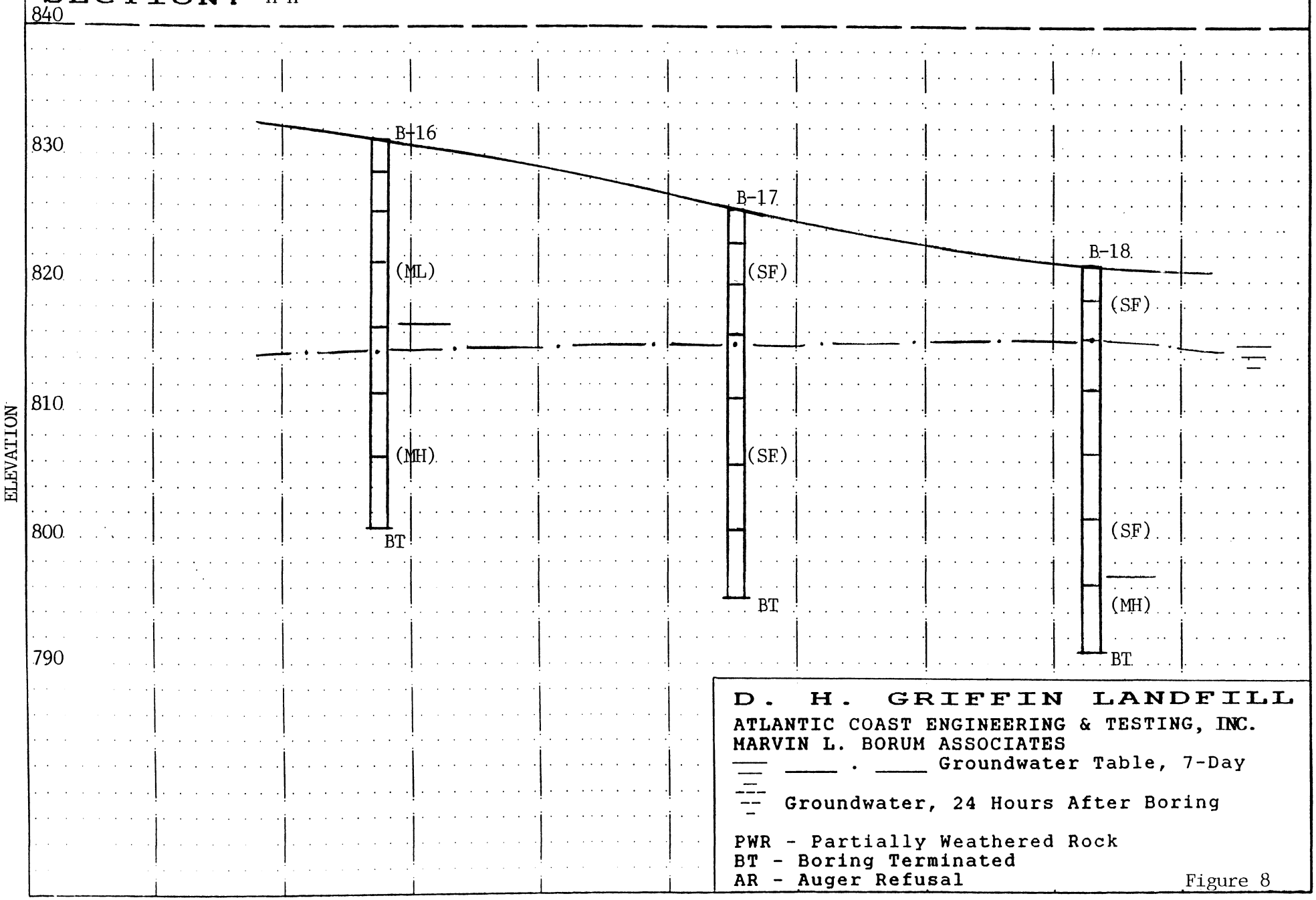
PWR - Partially Weathered Rock
BT - Boring Terminated
AR - Auger Refusal

Figure 7

HORIZONTAL DISTANCE: 1" = 50'

AC-1729

BORING PROFILE
SECTION: H-H



D. H. GRIFFIN LANDFILL
ATLANTIC COAST ENGINEERING & TESTING, INC.
MARVIN L. BORUM ASSOCIATES

Groundwater Table, 7-Day

Groundwater, 24 Hours After Boring

PWR - Partially Weathered Rock
BT - Boring Terminated
AR - Auger Refusal

Figure 8

HORIZONTAL DISTANCE: 1" = 50'

AC-1729

APPENDIX 2

TABLES

D. H. Griffin Landfill

Table 1

Summary of Groundwater, Partially Weathered Rock, and Auger Refusal Elevations

Boring Location	Ground Surface Elevation	Depth to Ground-Water (1)	Ground-Water Elevation (1)	Depth to Partially Weathered Rock	Partially Weathered Rock Elevation	Depth to Auger Refusal	Auger Refusal Elevation
B-1	796.5	2.0'	794.5	2.0'	794.5	16.0'	780.5
B-2	809.3	---	---	1.5'	807.8	5.0'	804.3
B-3	823.0	---	---	5.0'	818.0	6.0'	817.0
B-4	804.5	---	---	2.0'	802.5	3.0'	801.5
B-5	803.1	3.0'	800.1	5.0'	798.1	10.5'	792.6
B-6	800.4	2.3'	798.1	19.0'	781.4	28.0'	772.4
B-7	808.8	1.5'	807.3	19.0'	789.8	---	---
B-8	803.8	2.3'	801.5	23.0'	780.8	28.0'	775.8
B-9	807.6	---	---	5.0'	802.6	7.5'	800.1
B-10	824.2	17.0'	807.2	19.0'	805.2	20.0'	804.2
B-11	822.4	15.5'	806.9	---	---	---	---
B-12	814.7	5.5'	809.2	---	---	---	---
B-13	818.5	10.0'	808.5	---	---	---	---
B-14	829.1	22.0'	807.1	---	---	---	---
B-15	833.1	24.0'	809.1	---	---	---	---
B-16	831.4	17.0'	814.4	---	---	---	---
B-17	825.8	11.0'	814.8	---	---	---	---
B-18	822.9	7.5'	815.4	---	---	---	---

Note: (1) Seven-day groundwater tables--assumed to be "stabilized" water table.

D. H. Griffin Landfill

Table 2

Natural Moisture Content of Selected Samples

Boring Location	Ground Surface Elevation	Sample Depth	Sample Elevation	Sample Moisture Content (1)	Soil Classification
B-1	796.5	4'	792.5	8.7%	SW
B-11	822.4	10'	812.4	22.5%	ML
B-14	829.1	20'	809.1	20.5%	ML
B-16	831.4	13'	818.4	18.8%	ML

Note: (1) Tests conducted in accordance with ASTM Procedure D-2216.

D. H. Griffin Landfill

Table 3

Atterberg Limits Test Results

Boring Location	Ground Surface Elevation	Sample Depth	Sample Elevation	Liquid Limit (1)	Plastic Limit (2)	Plasticity Index	Unified Classification	Soil Description
B-1	796.5	4' - 8'	790.5	21	21	NP	SW	Brown and Gray Silty Sand
B-11	822.4	10' - 15'	809.9	32	28	6	ML	Tan to Brown Sandy Silt
B-14	829.1	20' - 28'	805.1	NP	NP	NP	ML	Gray to Black and White Sandy Silt
B-16	831.4	13' - 18'	815.4	37	17	20	ML	Tan Sandy Silt

Notes: Tests conducted in accordance with: (1) ASTM Procedure D-423
(2) ASTM Procedure D-424

D. H. Griffin Landfill

Table 4

Laboratory Permeability Test Results

Boring Location	Ground Surface Elevation	Sample Depth	Sample Elevation	Sample Type (1)	Permeability Coefficient (K) (3)	Sample Classification
B-11	822.4	10' - 15'	807.4 to 812.4	"Remolded" (2)	1.58×10^{-6} cm/sec	ML
B-12	814.7	5' - 7'	807.7 to 809.7	"Undisturbed"	1.66×10^{-5} cm/sec	ML
B-16	831.4	7' - 9'	822.4 to 824.4	"Undisturbed"	9.9×10^{-6} cm/sec	ML

Notes: (1) All samples tested were trimmed to the following dimensions:

Length = l = 1.5 in.
Diameter = d = 1.5 in.

(2) Sample remolded to at least 95% of the standard proctor maximum dry density at optimum moisture content (107.5 lbs/cu.ft. at 16.6% moisture content--compare with proctor curve).

(3) Permeability = $K = \frac{ai}{Q}$ (constant head test; ASTM Procedure D-2434), where:

Sample Area = a = 1.77 sq.in.
Water Head on Sample = h = 39 in.
Hydraulic Gradient - $i = \frac{h}{l} = 26$

D. H. Griffin Landfill

Table 5

Field Permeability Test Results

Boring Location	Ground Surface Elevation	Ground-Water Depth (1)	Ground-Water Elevation (1)	Depth of Test (2)	Test Elevation	Flow into Ground (Q)	Permeability Coefficient (K) (3)	Soil Classification at Test Elevation
B-5	803.1	3'	800.1	1.5'	801.6	1.9×10^{-3} gpm	1.5×10^{-5} cm/sec	SF
B-12	814.7	7'	807.7	9.0'	805.7	2.27×10^{-3} gpm	3.7×10^{-5} cm/sec	ML

Notes: (1) Seven-day groundwater tables--assumed to be "stabilized" water table because of the relatively wet weather.

(2) A two-inch inside diameter pvc pipe was installed in the bottom of the borehole at the indicated depth (H in permeability calculation).

(3) An open-end borehold field permeability test was conducted (Test Procedure BuRec E-18; Reference: U.S. Dept. of Interior, BuRec, Earth Manual, First Edition, Denver, CO, 1960, p. 543). The pipe was filled with water to the groundsurface and the rate at which the water fell in the pipe was measured.

Permeability = $K = \frac{Q}{5.5rH}$, where:

Water Head = Depth of Test = H
Radius of Pipe = r = 1 in. = 0.0833 ft.

D. H. Griffin Landfill

Table 6

Allowable Landfill Excavation Depths

Boring Location	Ground Surface Elevation	Subsurface Barrier Restricting Landfill Bottom	Approximate Subsurface Barrier Depth	Approximate Subsurface Barrier Elevation	Approximate Landfill Bottom Elevation	Approximate Allowable Excavation Depth
B-1	796.5	PWR(2)	2.0'	794.5	798.5	---
B-2	809.3	PWR(2)	1.5'	807.8	811.8	---
B-3	823.0	PWR(2)	5.0'	818.0	822.0	1.0'
B-4	804.5	PWR(2)	2.0'	802.5	806.5	---
B-5	803.1	WT(1)	3.0'	800.1	804.1	---
B-6	800.4	WT(1)	2.3'	798.1	802.1	---
B-7	808.8	WT(1)	1.5'	807.3	811.3	---
B-8	803.8	WT(1)	2.3'	801.5	805.5	---
B-9	807.6	PWR(2)	5.0'	802.6	806.6	1.0'
B-10	824.2	WT(1)	17.0'	807.2	811.2	13.0'
B-11	822.4	WT(1)	15.5'	806.9	810.9	11.5'
B-12	814.7	WT(1)	5.5'	809.2	813.2	1.5'
B-13	818.5	WT(1)	10.0'	808.5	812.5	6.0'
B-14	829.1	WT(1)	22.0'	807.1	811.1	18.0'
B-15	833.1	WT(1)	24.0'	809.1	813.1	20.0'
B-16	831.4	WT(1)	17.0'	814.4	817.4	14.0'
B-17	825.8	WT(1)	11.0'	814.8	818.8	7.0'
B-18	822.9	WT(1)	7.5'	815.4	819.4	3.5'

(1) Water Table
(2) Partially Weathered Rock

APPENDIX 3

TEST BORING RECORDS

NOMENCLATURE AND SYMBOLS

SYMBOLS

▮	UNDISTURBED SAMPLE (UD) RECOVERED
▯	UNDISTURBED SAMPLE (UD) NOT RECOVERED
●	STANDARD PENETRATION RESISTANCE (ASTM D1586-67)
( )	Unified Soil Classification (by visual inspection)
100/2"	NUMBER OF BLOWS (100) TO DRIVE THE SPOON A NUMBER OF INCHES(2)
AX,BX,NX	CORE BARREL SIZES WHICH OBTAIN CORES 1-1/8,1-5/8 and 2-1/8 INCHES IN DIAMETER, RESPECTIVELY
65%	PERCENTAGE OF ROCK CORE RECOVERED
RQD	ROCK QUALITY DESIGNATION-% OF CORE SEGMENTS 4 OR MORE INCHES LONG
▽	WATER TABLE AT LEAST 24 HOURS AFTER DRILLING
▽	WATER TABLE ONE HOUR OR LESS AFTER DRILLING

PENETRATION RESISTANCE RESULTS

	NO. OF BLOWS, N	APPROXIMATE RELATIVE DENSITY
SANDS	0 - 4	VERY LOOSE
	5 - 10	LOOSE
	11 - 20	FIRM
	21 - 30	VERY FIRM
	31 - 50	DENSE
	OVER 50	VERY DENSE
		APPROXIMATE CONSISTENCY
SILTS AND CLAYS	0 - 1	VERY SOFT
	2 - 4	SOFT
	5 - 8	FIRM
	9 - 15	STIFF
	16 - 30	VERY STIFF
	31 - 50	HARD
	OVER 50	VERY HARD

DRILLING PROCEDURES

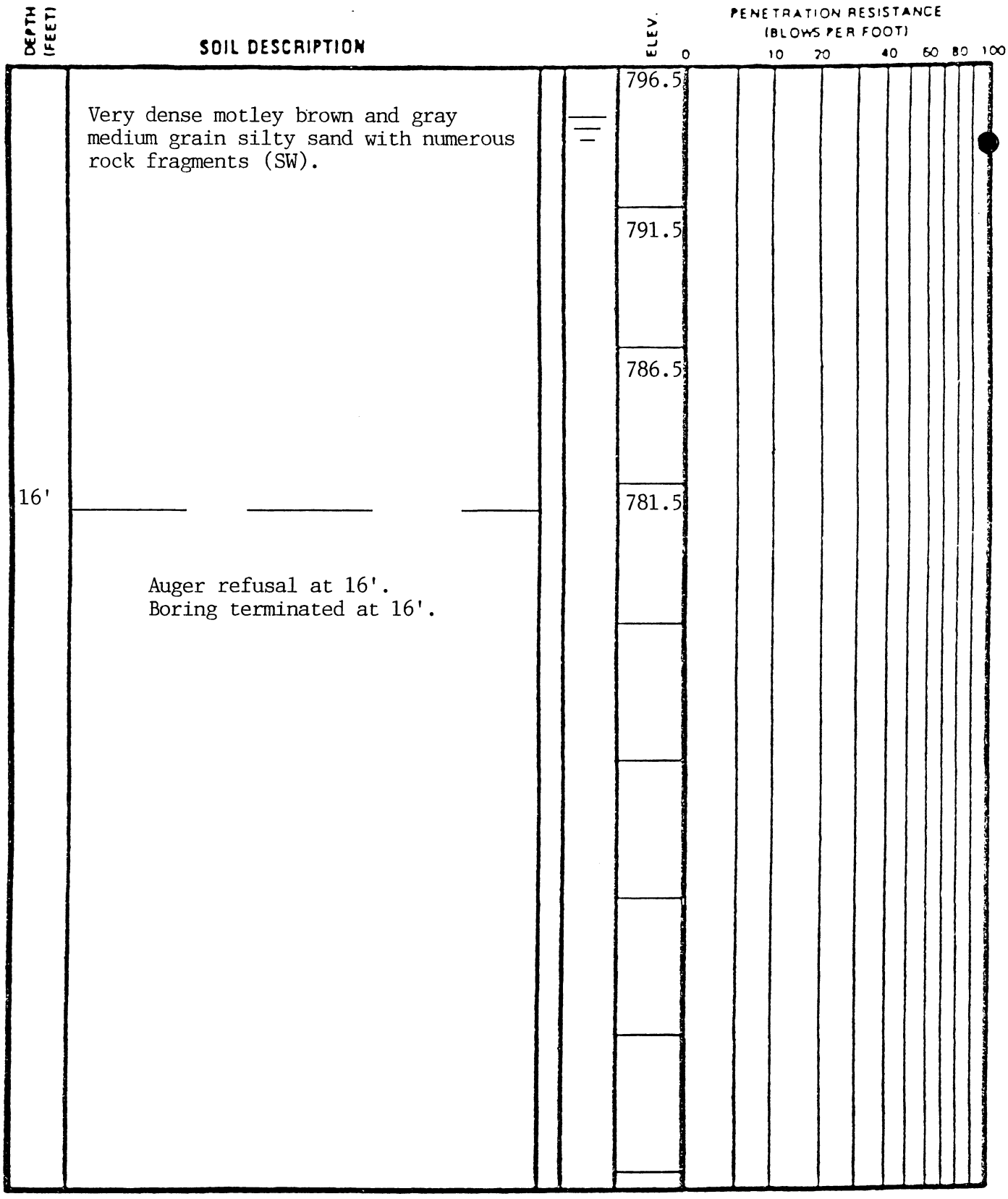
SOIL SAMPLING AND STANDARD PENETRATION TESTING PERFORMED IN ACCORDANCE WITH ASTM D 1586-67. THE STANDARD PENETRATION RESISTANCE IS THE NUMBER OF BLOWS OF A 140 POUND HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D., 1.4 INCH I.D. SPLIT SPOON SAMPLER ONE FOOT. CORE DRILLING IN ACCORDANCE WITH ASTM DESIGNATION D 2113-62T. THE UNDISTURBED SAMPLING PROCEDURE IS DESCRIBED BY ASTM SPECIFICATION D 1587-67.

PROJECT: D. H. Griffin AC-1729

BORING NO: B-1

WATER ENCOUNTERED: At 24 hours - 2'
At 7 days - 2'

BORING TERMINATED 16'



TEST BORING RECORD

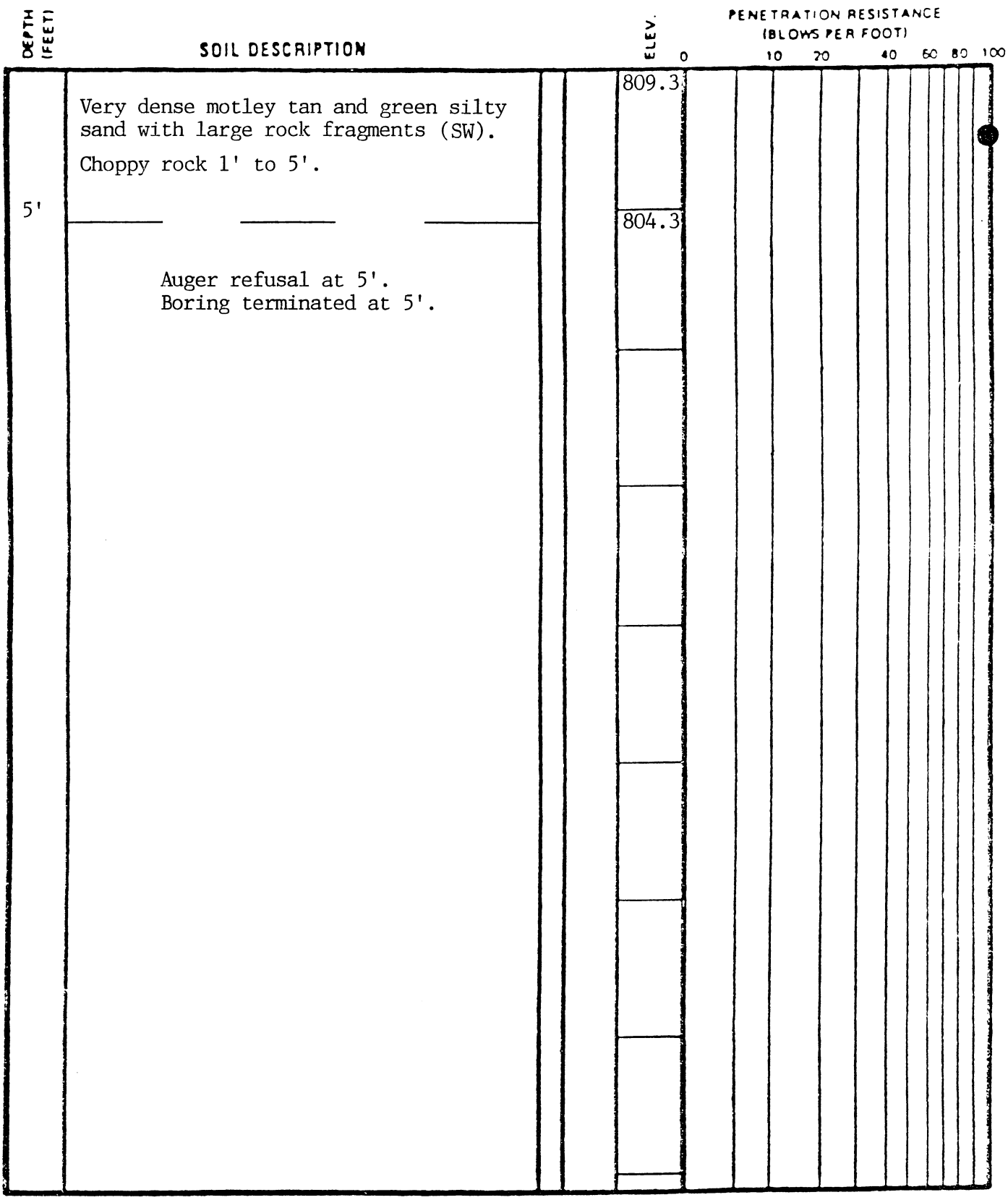
ATLANTIC COAST ENGINEERING AND TESTING, INC.

PROJECT: D. H. Griffin AC-1729

BORING NO: B-2

WATER ENCOUNTERED: None

BORING TERMINATED 5'



TEST BORING RECORD

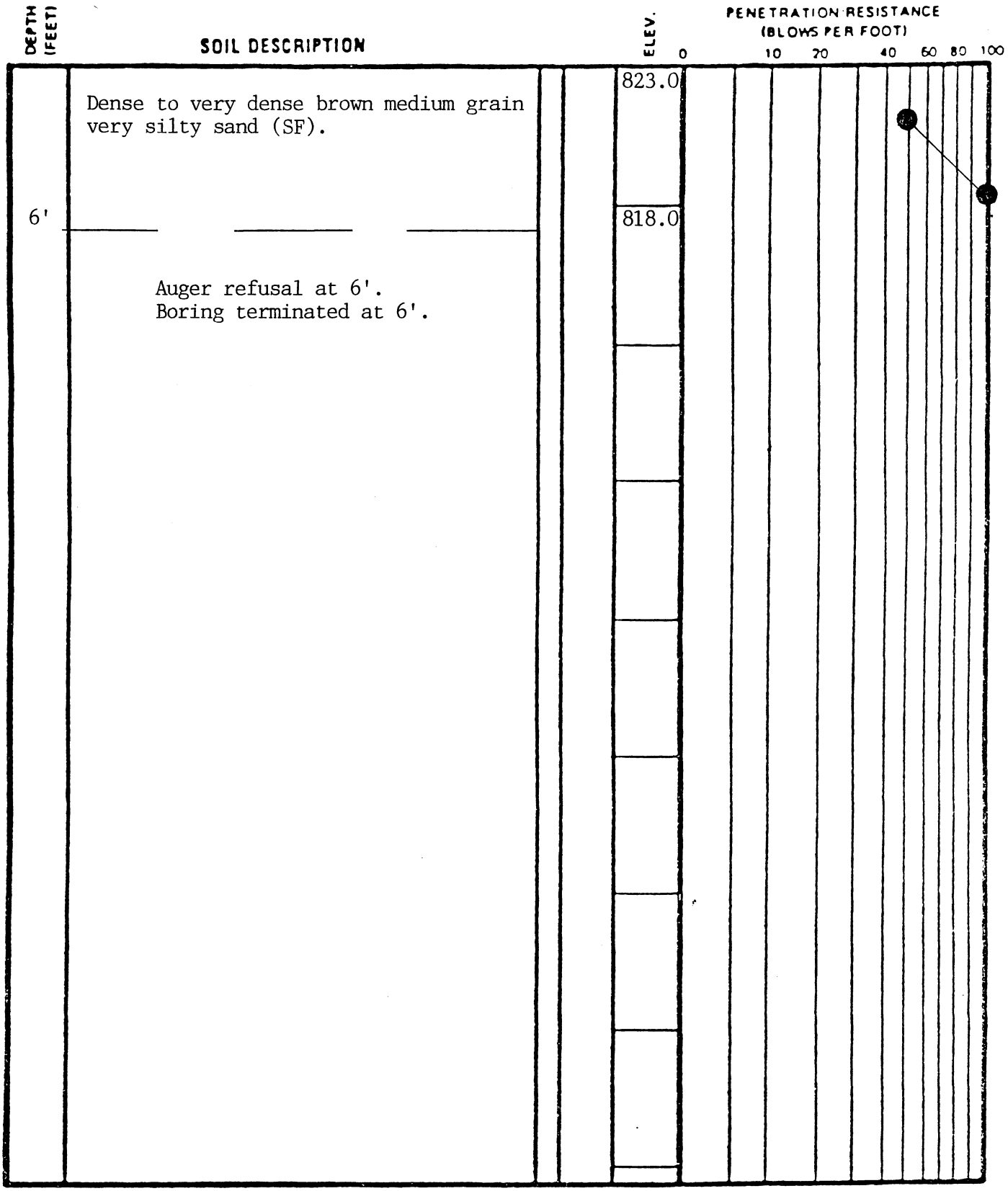
ATLANTIC COAST ENGINEERING AND TESTING, INC.

PROJECT: D. H. Griffin AC-1729

BORING NO: B-3

WATER ENCOUNTERED: None

BORING TERMINATED 6'



TEST BORING RECORD

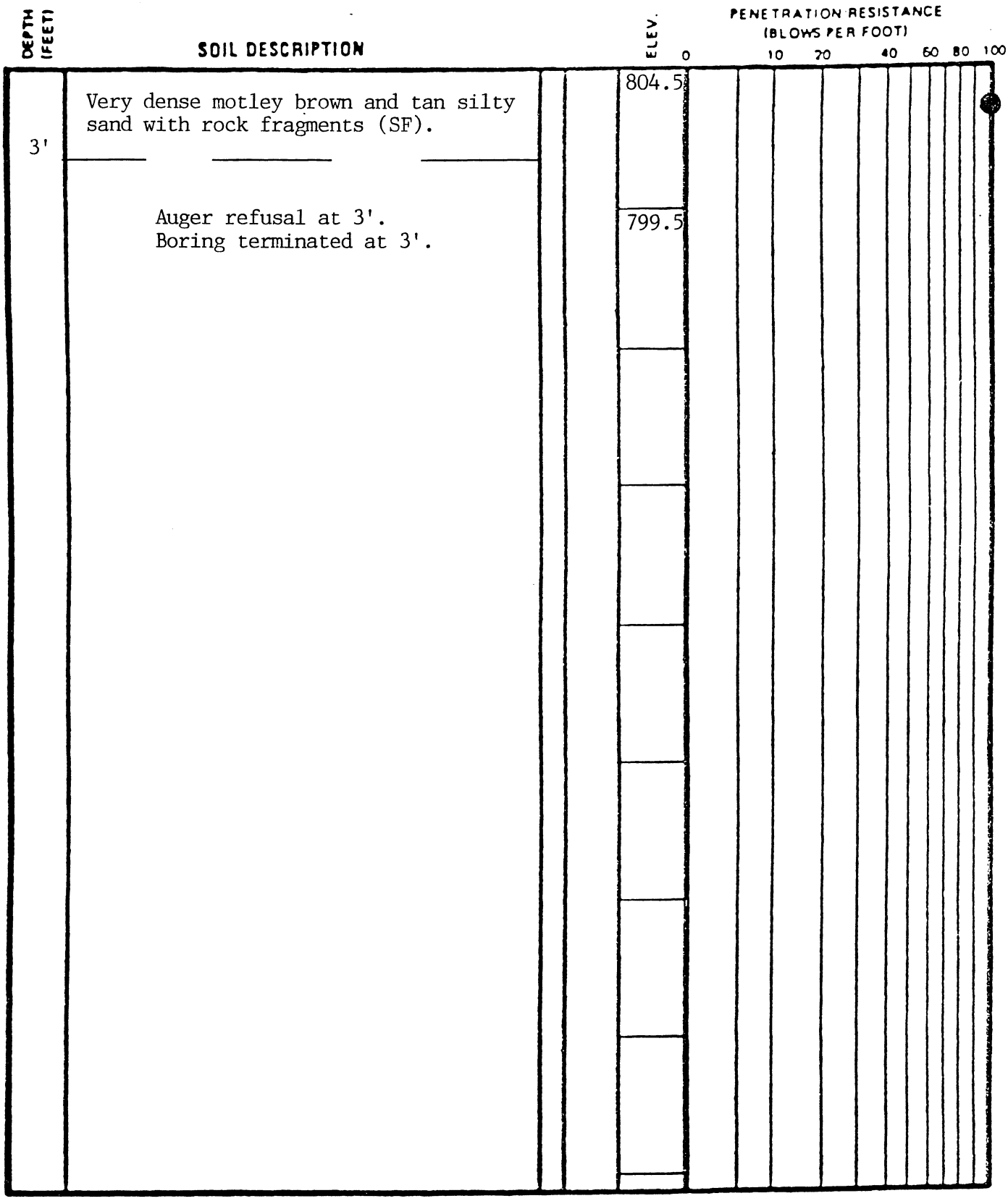
ATLANTIC COAST ENGINEERING AND TESTING, INC.

PROJECT: D. H. Griffin AC-1729

BORING NO: B-4

WATER ENCOUNTERED: None

BORING TERMINATED 3'



TEST BORING RECORD

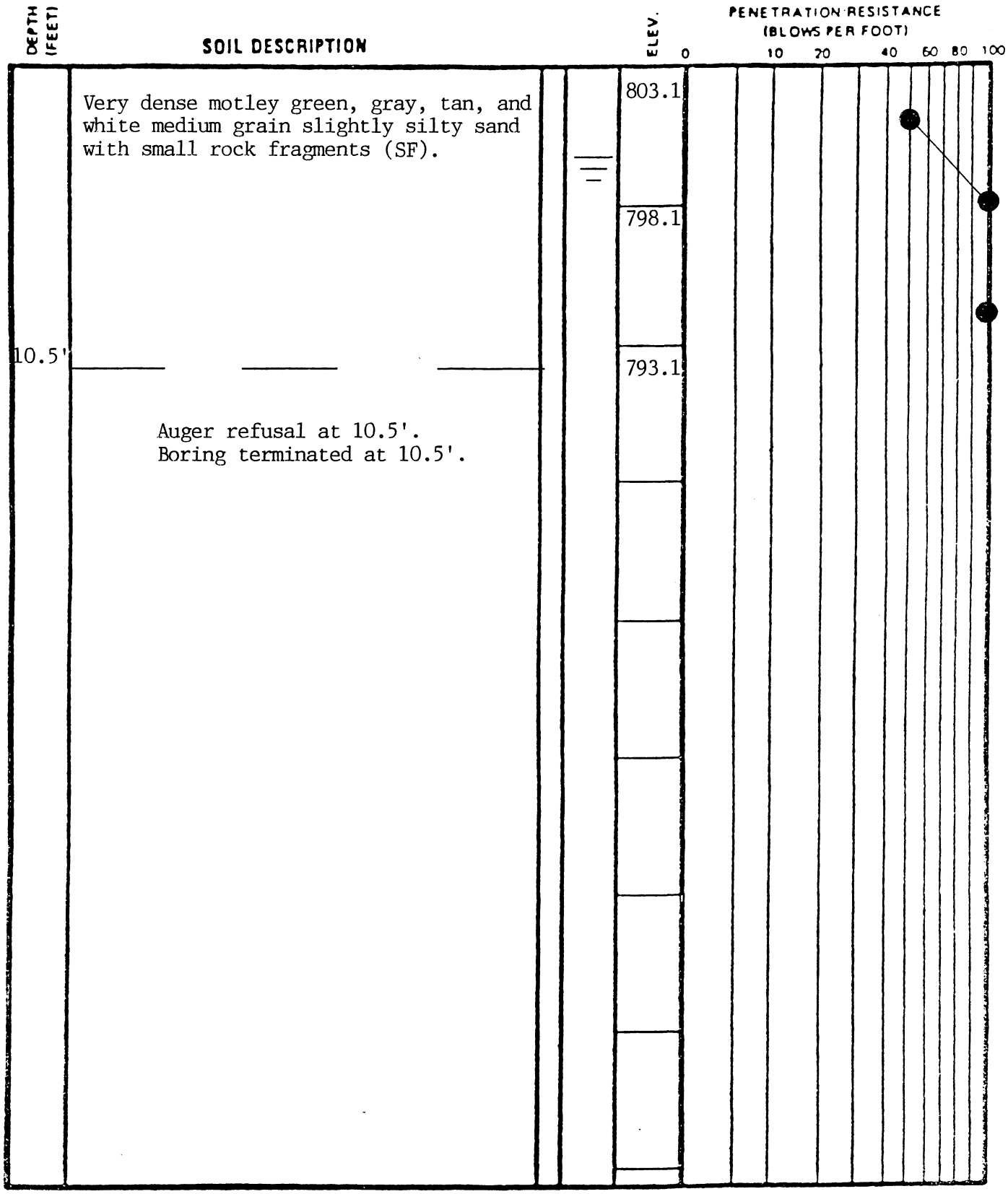
ATLANTIC COAST ENGINEERING AND TESTING, INC.

PROJECT: D. H. Griffin AC-1729

BORING NO: B-5

WATER ENCOUNTERED: At 24 hours - 3'
At 7 days - 3'

BORING TERMINATED 10.5'



TEST BORING RECORD

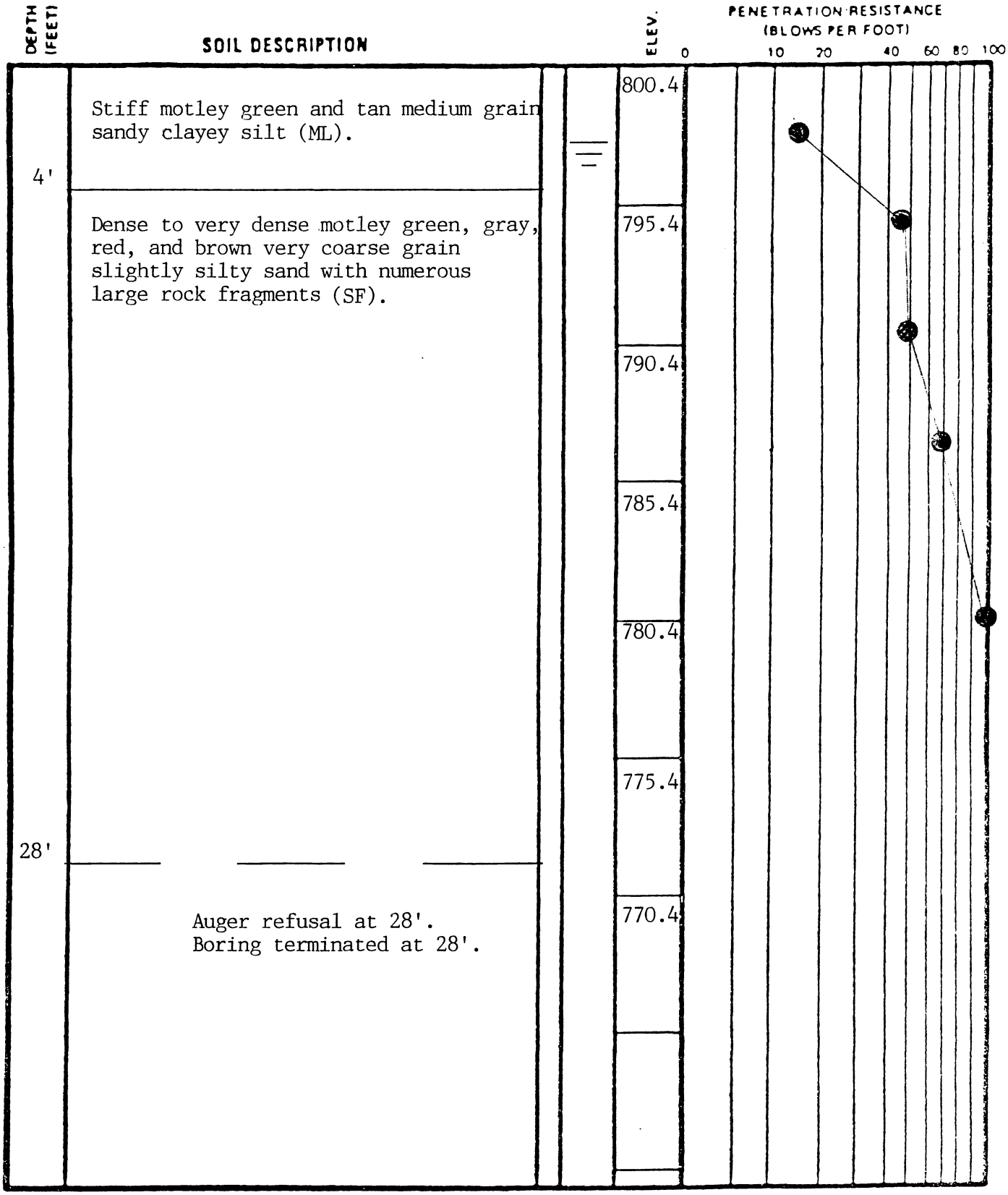
ATLANTIC COAST ENGINEERING AND TESTING, INC.

PROJECT: D. H. Griffin AC-1729

BORING NO: B-6

WATER ENCOUNTERED: At 24 hours - 2.5'
At 7 days - 2.3'

BORING TERMINATED 28'



TEST BORING RECORD

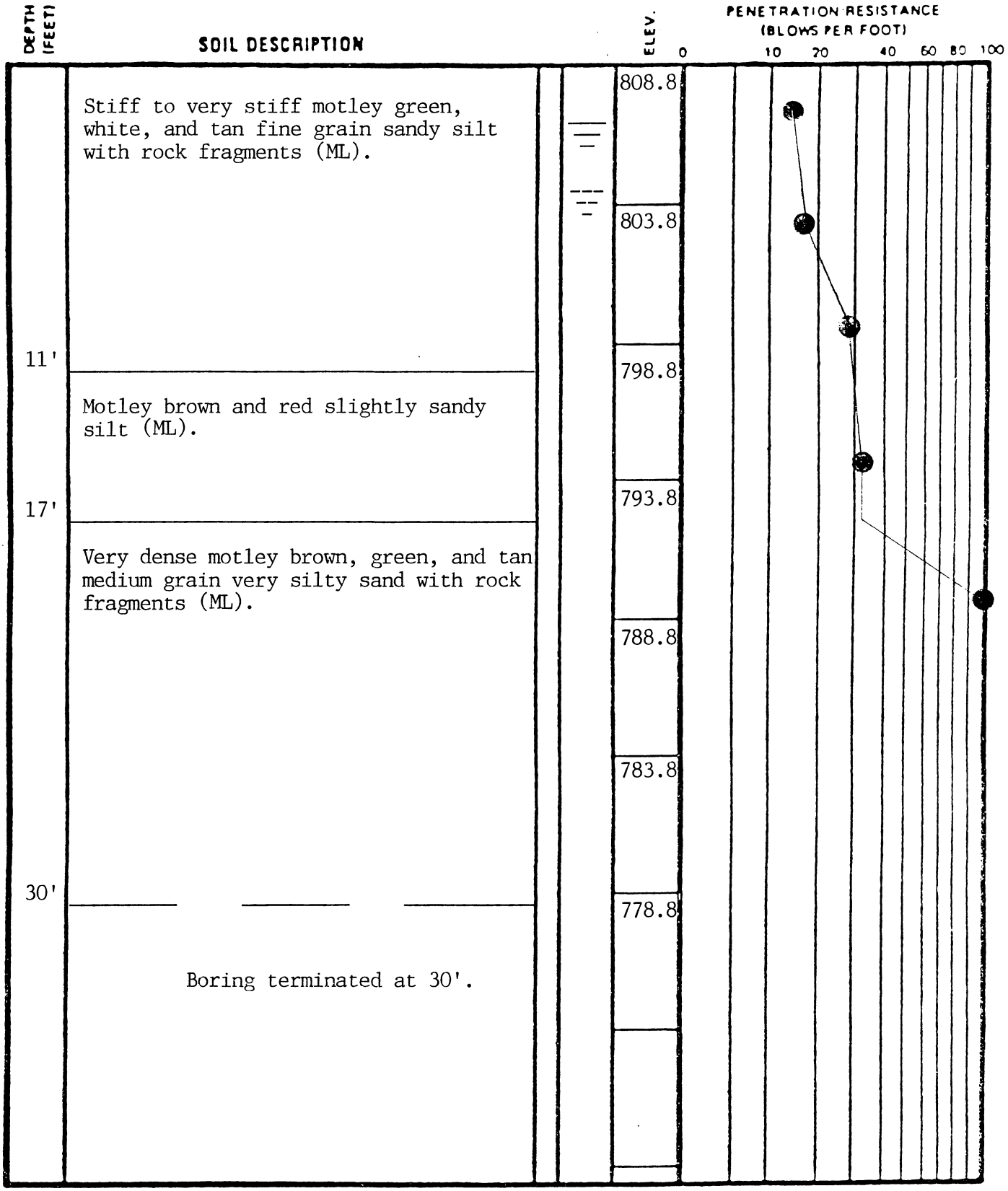
ATLANTIC COAST ENGINEERING AND TESTING, INC.

PROJECT: D. H. Griffin AC-1729

BORING NO: B-7

WATER ENCOUNTERED: At 24 hours - 4'
At 7 days - 1.5'

BORING TERMINATED 30'



TEST BORING RECORD

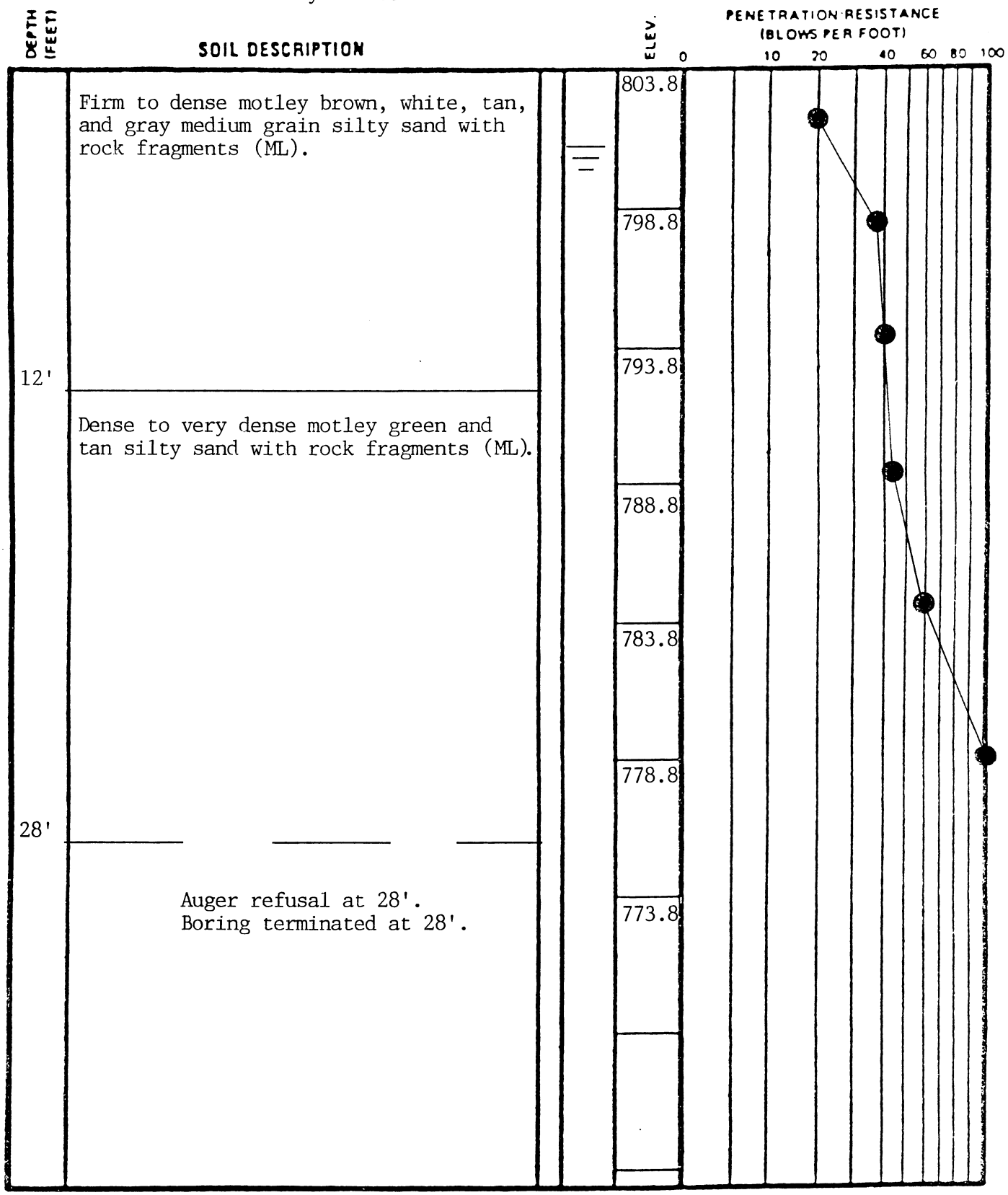
ATLANTIC COAST ENGINEERING AND TESTING, INC.

PROJECT: D. H. Griffin AC-1729

BORING NO: B-8

WATER ENCOUNTERED: At 24 hours - 2.5'
At 7 days - 2.3'

BORING TERMINATED 28'



TEST BORING RECORD

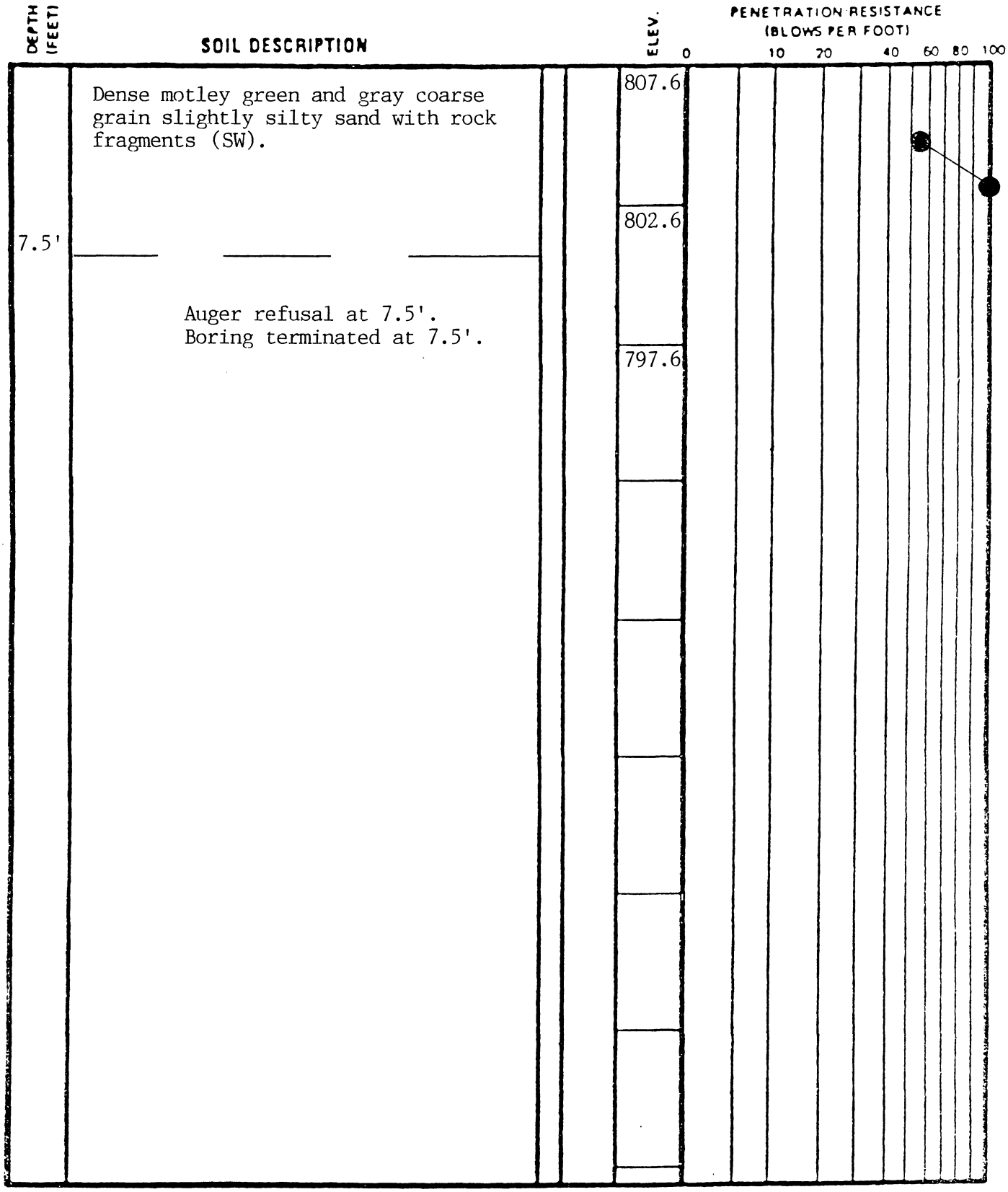
ATLANTIC COAST ENGINEERING AND TESTING, INC.

PROJECT: D. H. Griffin AC-1729

BORING NO: B-9

WATER ENCOUNTERED: None

BORING TERMINATED 7.5'



TEST BORING RECORD

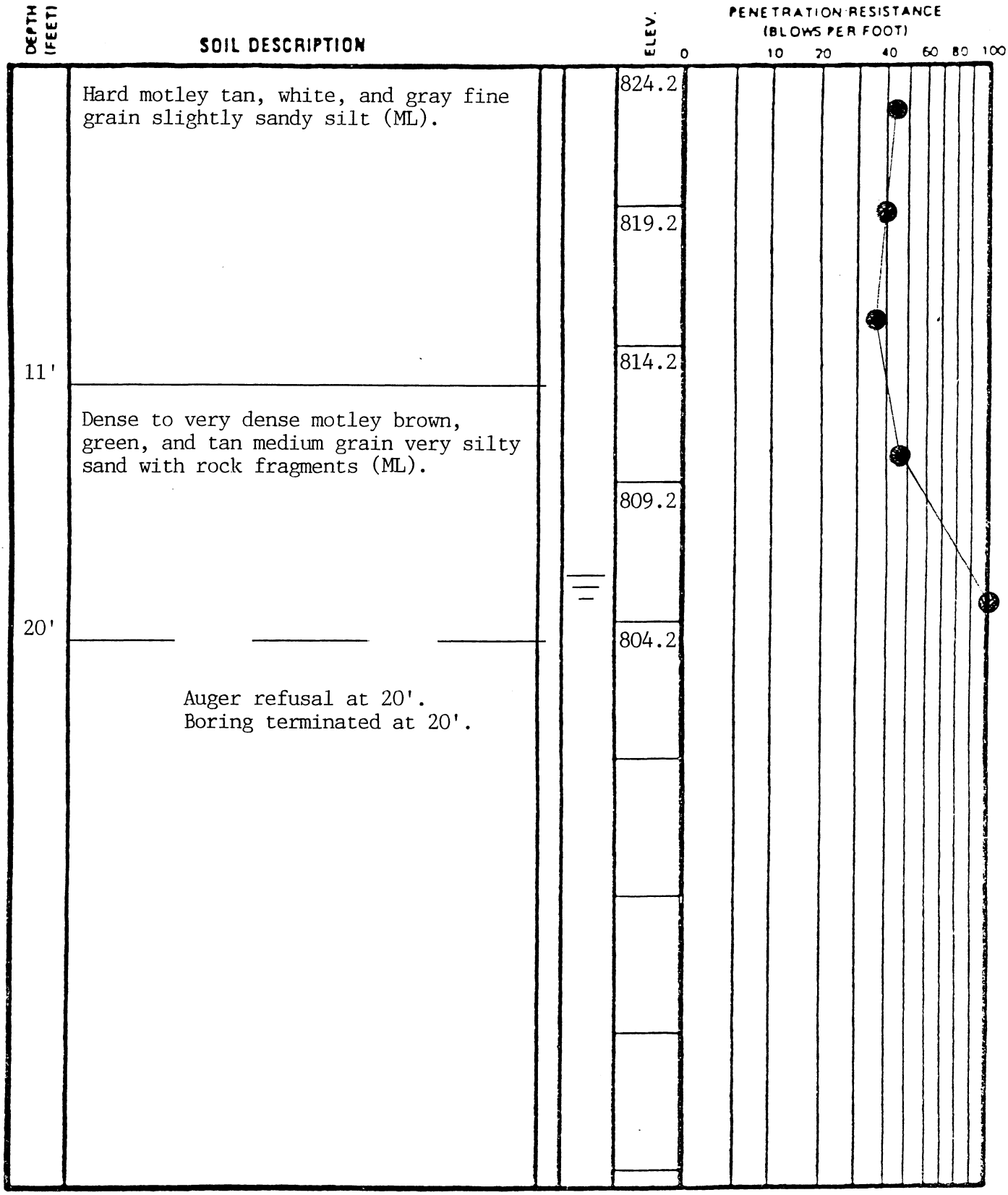
ATLANTIC COAST ENGINEERING AND TESTING, INC.

PROJECT: D. H. Griffin AC-1729

BORING NO: B-10

WATER ENCOUNTERED: At 24 hours - 17'
At 7 days - 17'

BORING TERMINATED 20'



TEST BORING RECORD

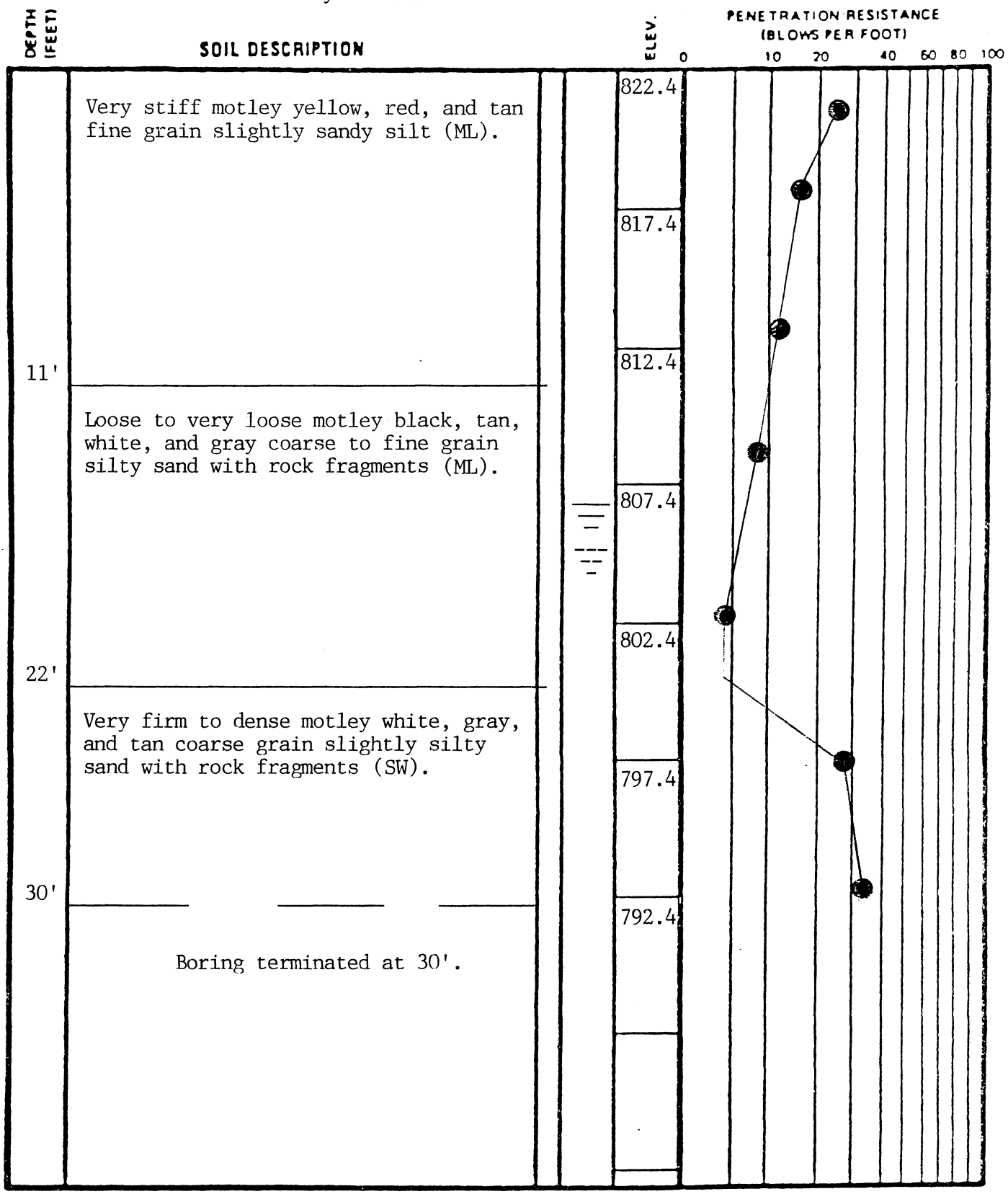
ATLANTIC COAST ENGINEERING AND TESTING, INC.

PROJECT: D. H. Griffin AC-1729

BORING NO: B-11

WATER ENCOUNTERED: At 24 hours - 17'
At 7 days - 15.5'

BORING TERMINATED 30'



TEST BORING RECORD

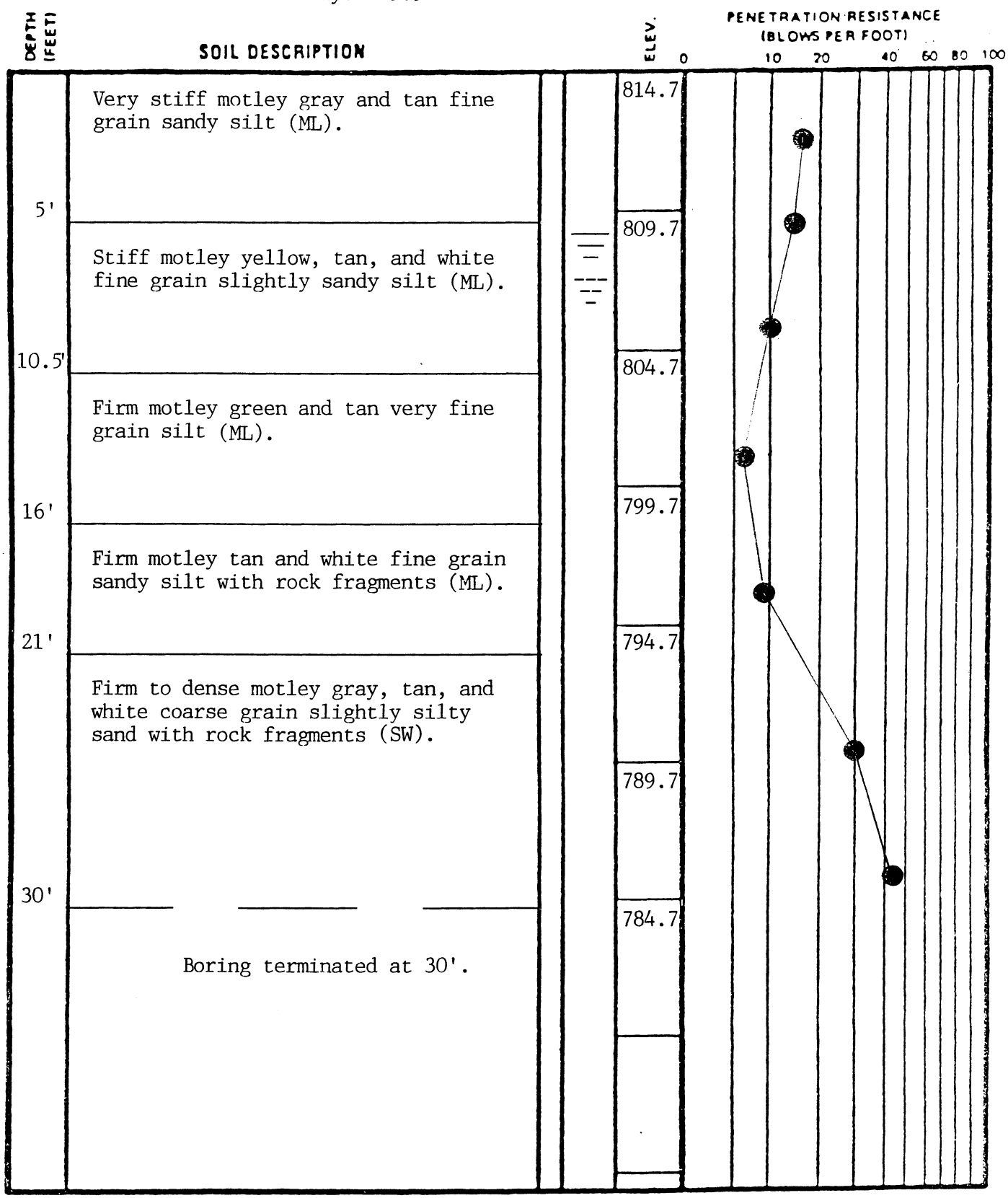
ATLANTIC COAST ENGINEERING AND TESTING, INC.

PROJECT: D. H. Griffin AC-1729

BORING NO: B-12

WATER ENCOUNTERED: At 24 hours - 7'
At 7 days - 5.5'

BORING TERMINATED 30'



TEST BORING RECORD

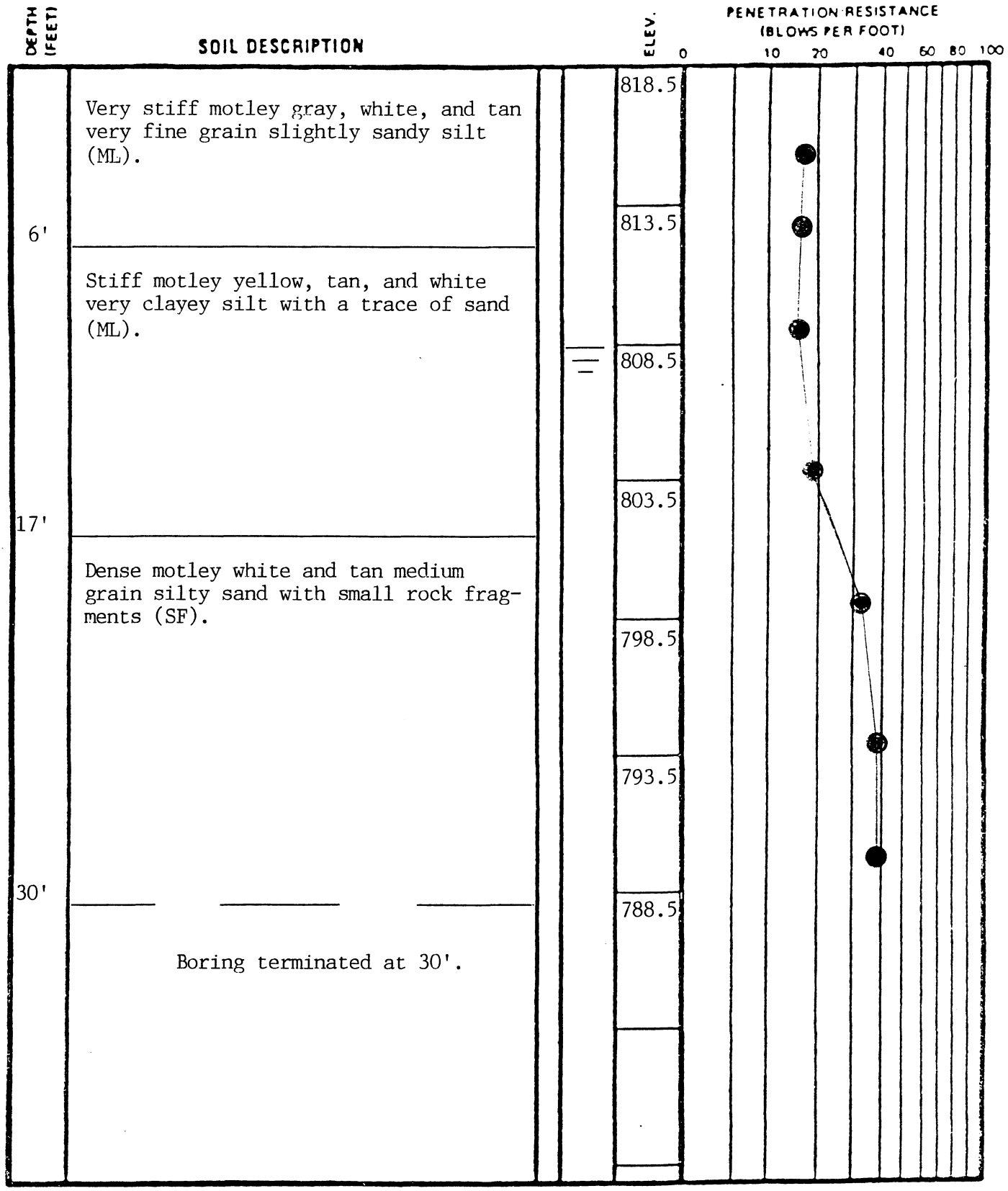
ATLANTIC COAST ENGINEERING AND TESTING, INC.

PROJECT: D. H. Griffin AC-1729

BORING NO: B-13

WATER ENCOUNTERED: At 24 hours - 10'
At 7 days - 10'

BORING TERMINATED 30'



TEST BORING RECORD

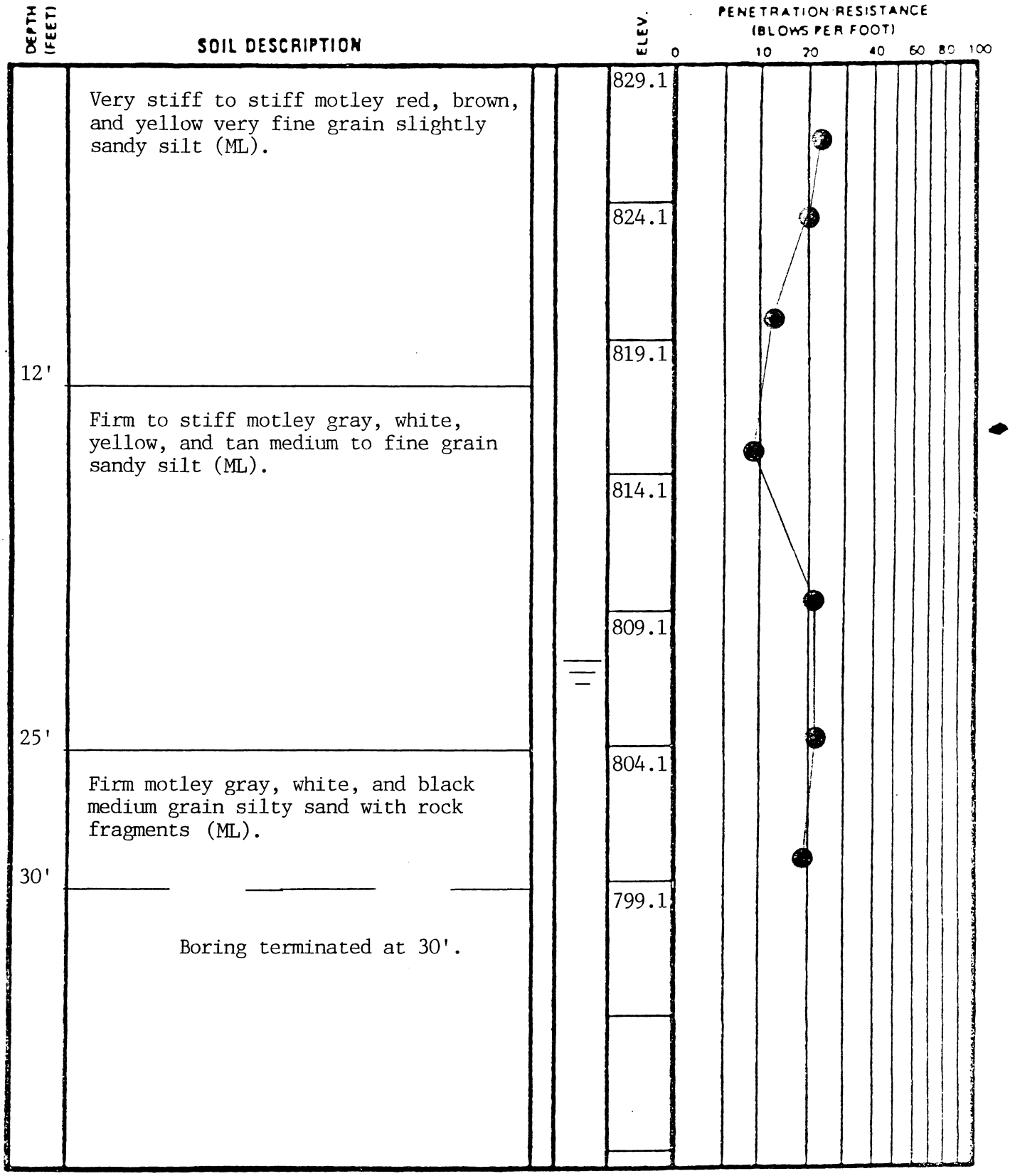
ATLANTIC COAST ENGINEERING AND TESTING, INC.

PROJECT: D. H. Griffin AC-1729

BORING NO: B-14

WATER ENCOUNTERED: At 24 hours - 22'
At 7 days - 22'

BORING TERMINATED 30'



TEST BORING RECORD

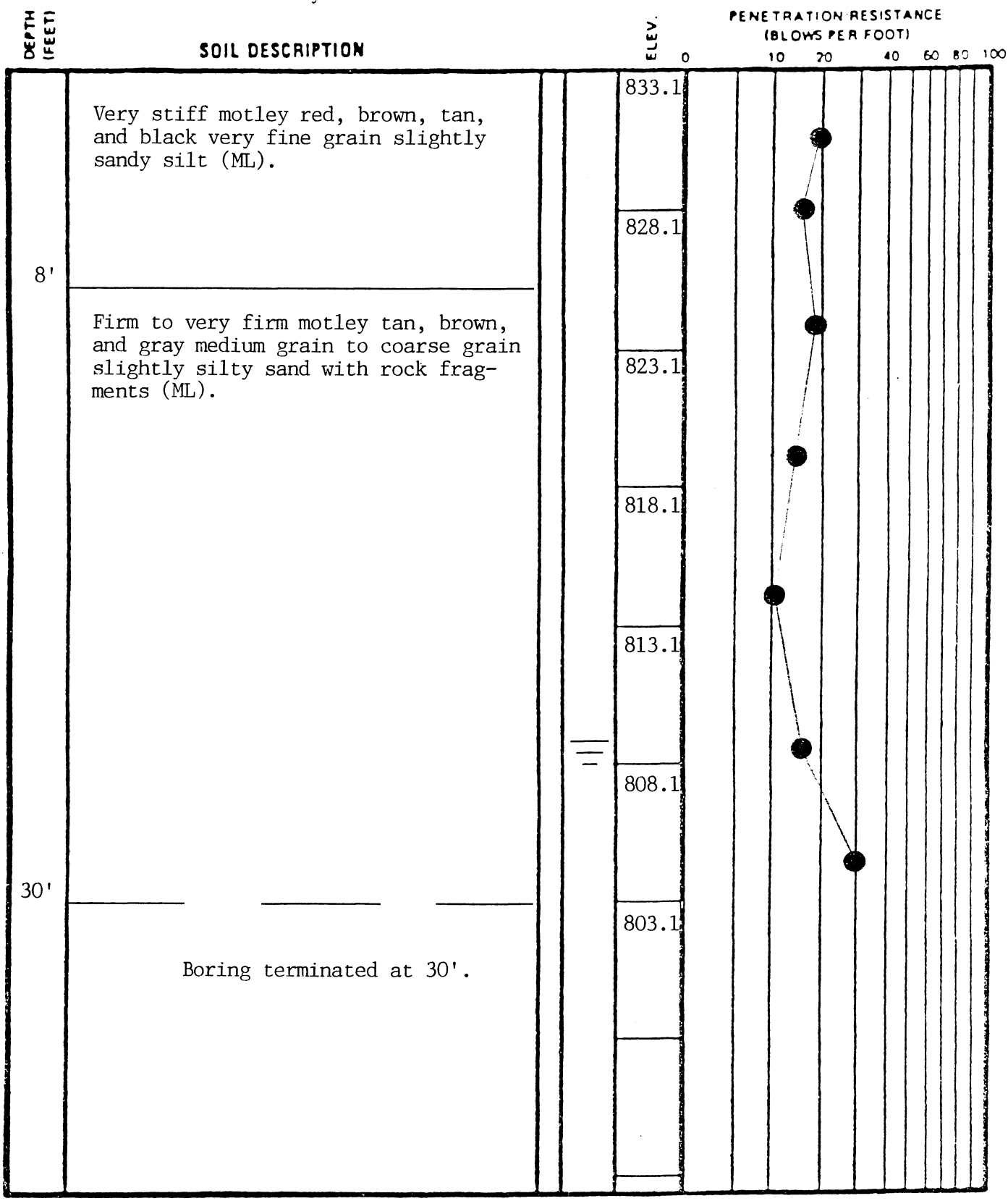
ATLANTIC COAST ENGINEERING AND TESTING, INC.

PROJECT: D. H. Griffin AC-1729

BORING NO: B-15

WATER ENCOUNTERED: At 24 hours - 24'
At 7 days - 24'

BORING TERMINATED 30'



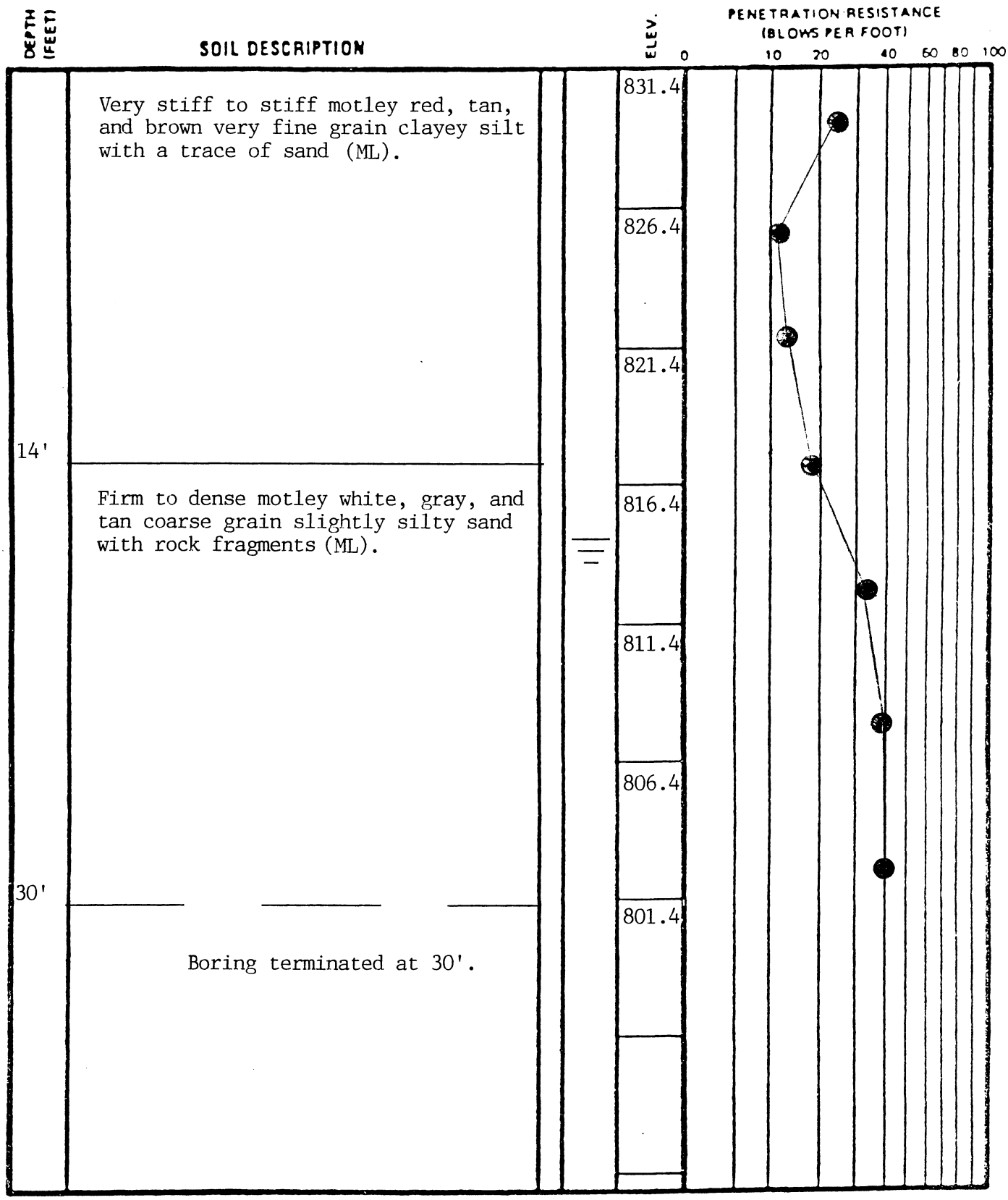
TEST BORING RECORD

ATLANTIC COAST ENGINEERING AND TESTING, INC.

PROJECT: D. H. Griffin AC-1729 **BORING NO:** B-16

WATER ENCOUNTERED: At 24 hours - 17'
At 7 days - 17'

BORING TERMINATED 30'



TEST BORING RECORD

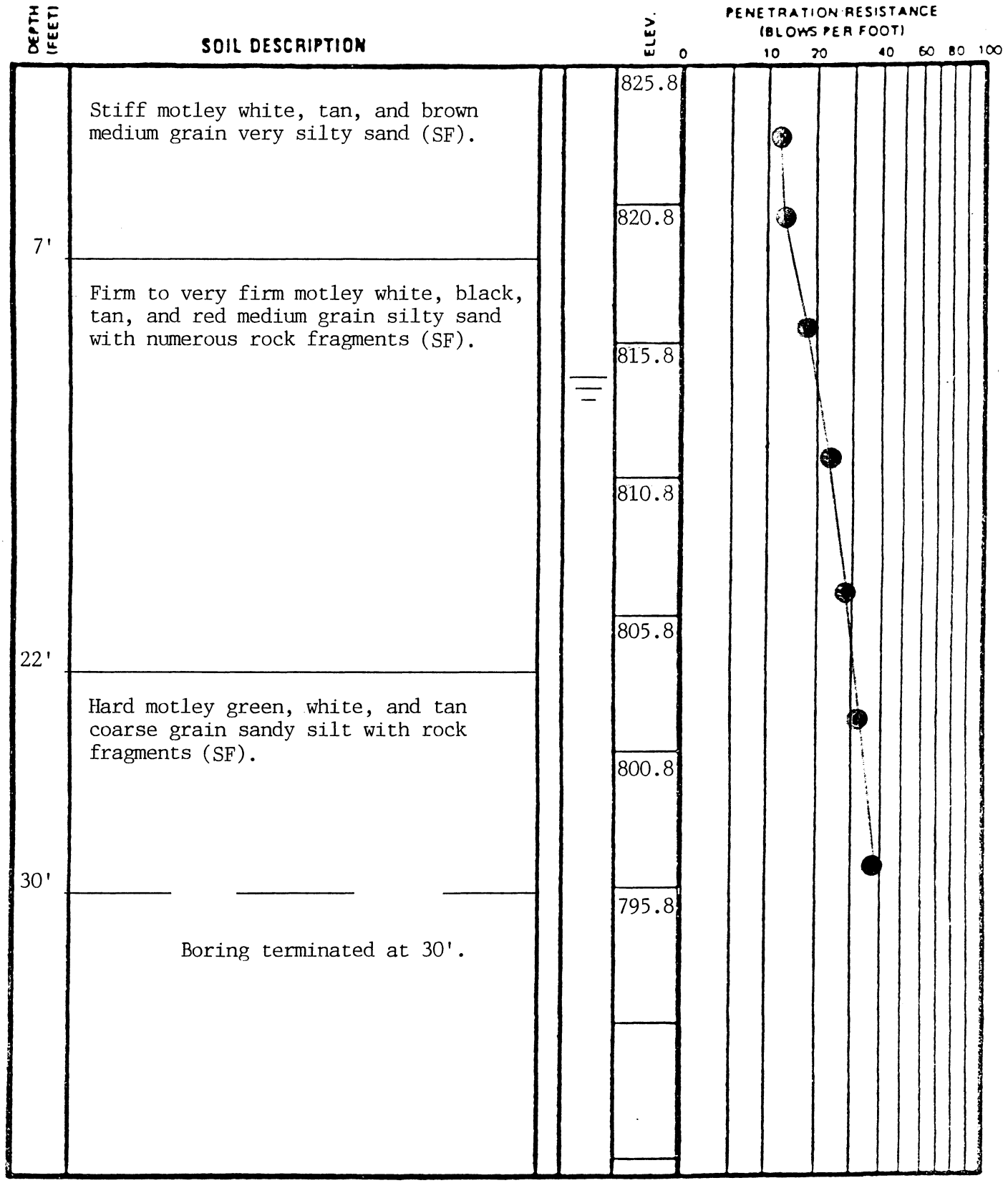
ATLANTIC COAST ENGINEERING AND TESTING, INC.

PROJECT: D. H. Griffin AC-1729

BORING NO: B-17

WATER ENCOUNTERED: At 24 hours - 11'
At 7 days - 11'

BORING TERMINATED 30'



TEST BORING RECORD

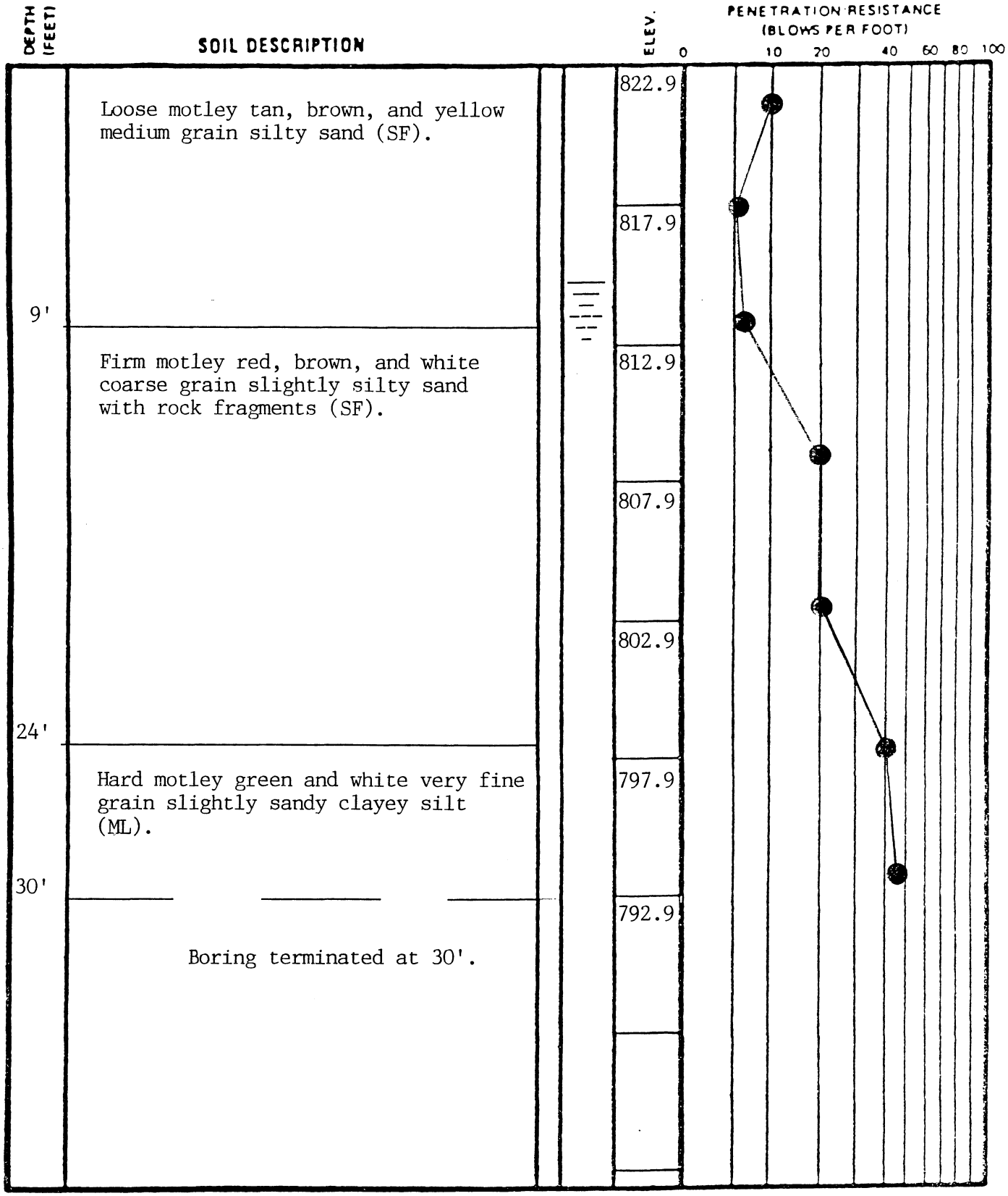
ATLANTIC COAST ENGINEERING AND TESTING, INC.

PROJECT: D. H. Griffin AC-1729

BORING NO: B-18

WATER ENCOUNTERED: At 24 hours - 8'
At 7 days - 7.5'

BORING TERMINATED 30'



TEST BORING RECORD

ATLANTIC COAST ENGINEERING AND TESTING, INC.

APPENDIX 4

LABORATORY PROCTORS AND GRAIN SIZE TESTS

ATLANTIC COAST ENGINEERING AND TESTING, INC.

123 MANLEY AVENUE GREENSBORO, N.C. 27407

PHONE: 919-292-8230

Client: D. H. Griffin Client's No. _____

Report of: MOISTURE-DENSITY (PROCTOR) RELATIONSHIP OF SOIL

Laboratory No. 6411 Report No. MD-1

Job No. AC-1729

A. ORIGIN AND DESCRIPTION OF SAMPLE

Project: D. H. Griffin Commercial Sandrock Pit and Demolition Landfill

Specific Location of Sample: B-1 4' to 8'

Soils Technician Sampling: J. Higgins Date 11-30-90

Est. Vol. of Soil Represented by Sample _____ Cu. Yds. Number of Samplings to Form Composite of Sample _____; Weigh of Total Sample: _____ lbs; **Description of Soil** (Visual-Manual Procedure): Silty sand with numerous rock frag

Color: Brown and gray Odor: _____ Natural Field Density: Loose ☐; Dense ☒; Consistency: Soft ☐ Firm ☐; Stiff ☐; Very Stiff ☐; Hard ☐.

B. PHYSICAL CHARACTERISTICS

Sample Moisture Content: _____%

Plasticity (By Visual-Manual Procedure ☐: Non-Plastic ☐; Low Plastic ☐; Medium Plastic ☐; High Plastic ☐;

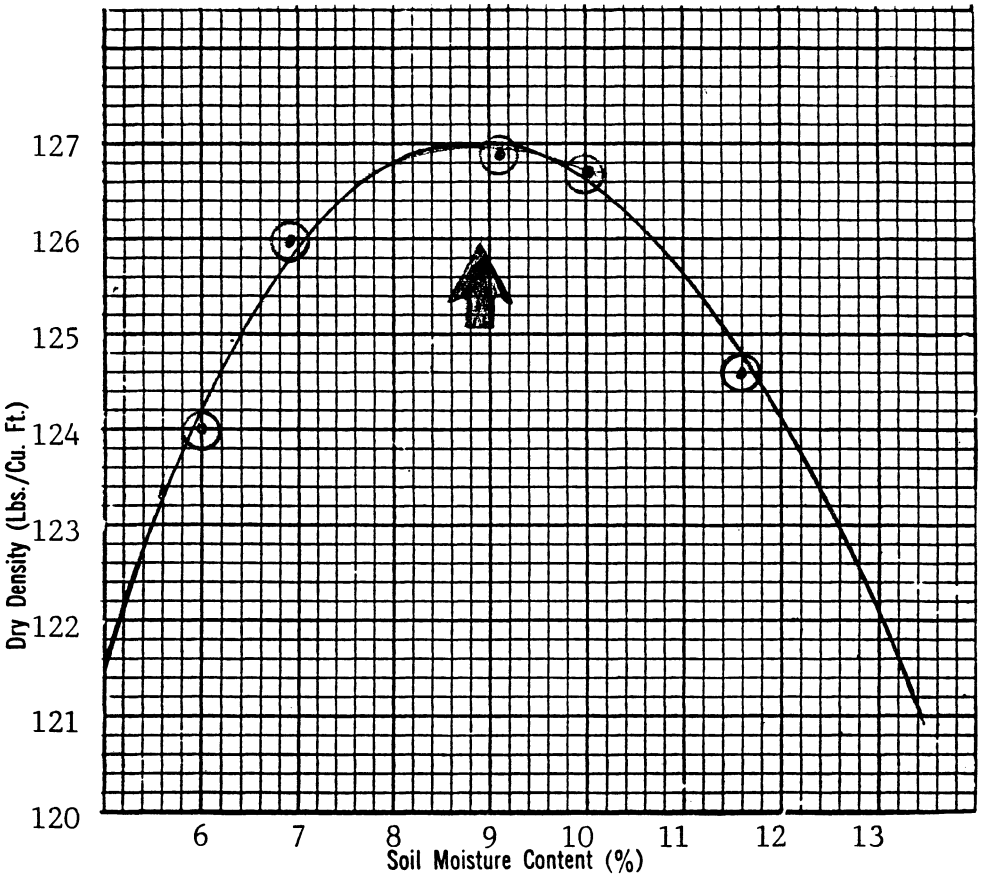
Soil Classification: _____

Classification System: _____

Grainsize Distribution

Sieve Size	% Passing

C. MOISTURE-DENSITY TEST



Method of Test: ☒ ASTM D698, Method A

☐ ASTM D1557, Method _____;

☐ Other (Define) _____

OPTIMUM MOISTURE CONTENT = 8.9 %

MAXIMUM DRY DENSITY = 127.0 Lbs./Cu. Ft.

SUGGESTED OPERATING MOISTURE RANGE TO OBTAIN MAXIMUM DRY DENSITY = _____ % to _____ %

Lab. Technician S. Ross

Remarks:

Distribution: _____

C. R. Higgins, Jr., Manager

ATLANTIC COAST ENGINEERING AND TESTING, INC.

123 MANLEY AVENUE GREENSBORO, N.C. 27407

PHONE: 919-292-8230

Client: D. H. Griffin Client's No. _____

Report of: MOISTURE-DENSITY (PROCTOR) RELATIONSHIP OF SOIL

Report No. MD-2

Laboratory No. 6412 Job No. AC-1729

A. ORIGIN AND DESCRIPTION OF SAMPLE

Project: D. H. Griffin Commercial Sandrock Pit and Demolition Landfill

Specific Location of Sample: B-11 10' to 15'

Soils Technician Sampling: J. Higgins Date 11-30-90

Est. Vol. of Soil Represented by Sample _____ Cu. Yds. Number of Samplings to Form Composite of Sample _____; Weigt of Total Sample: _____ lbs; **Description of Soil** (Visual-Manual Procedure): coarse to fine grain silty sand with rock fragments

Color: tan-brown Odor: None Natural Field Density: Loose ☒; Dense ☐; Consistency: Soft ☐ Firm ☐; Stiff ☐; very Stiff ☐; Hard ☐.

B. PHYSICAL CHARACTERISTICS

Sample Moisture Content: _____%

Plasticity (By Visual-Manual Procedure ☐: Non-Plastic ☐; Low Plastic ☐; Medium Plastic ☐; High Plastic ☐;

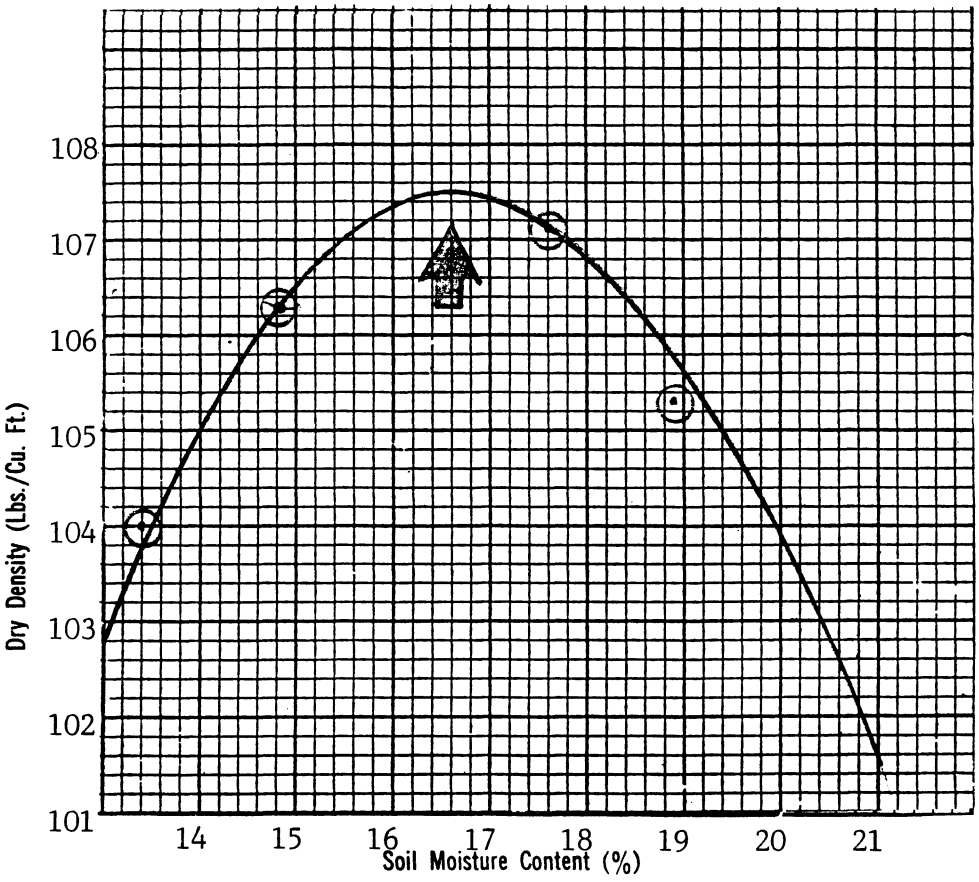
Soil Classification: _____

Classification System: _____

Grainsize Distribution

Sieve Size	% Passing

C. MOISTURE-DENSITY TEST



Method of Test: ☒ ASTM D698, Method A

☐ ASTM D1557, Method _____;

☐ Other (Define) _____

OPTIMUM MOISTURE CONTENT = 16.6 %

MAXIMUM DRY DENSITY = 107.5 Lbs./Cu. Ft.

SUGGESTED OPERATING MOISTURE RANGE TO OBTAIN MAXIMUM DRY DENSITY = _____ % to _____ %

Lab Technician S. Ross

Remarks:

Distribution: _____

_____

ATLANTIC COAST ENGINEERING AND TESTING, INC.

123 MANLEY AVENUE GREENSBORO, N.C. 27407

PHONE: 919-292-8230

Client: D. H. Griffin Client's No. _____

Report of: MOISTURE-DENSITY (PROCTOR) RELATIONSHIP OF SOIL

Report No. MD-3

Laboratory No. 6415 Job No. AC-1729

A. ORIGIN AND DESCRIPTION OF SAMPLE

Project: D. H. Griffin Commercial Sandrock Pit and Demolition Landfill

Specific Location of Sample: B-14 20' to 28'

Soils Technician Sampling: J. Higgins Date 12-5-90

Est. Vol. of Soil Represented by Sample _____ Cu. Yds. Number of Samplings to Form Composite of Sample _____; Weight of Total Sample: _____ lbs; **Description of Soil** (Visual-Manual Procedure): Med. grain silty sand with rock frag

Color: gray/white/black Odor: _____ Natural Field Density: Loose ☐; Dense ☐; Consistency: Soft ☐ Firm ☒; Stiff ☐; very Stiff ☐; Hard ☐.

B. PHYSICAL CHARACTERISTICS

Sample Moisture Content: _____%

Plasticity (By Visual-Manual Procedure ☐: Non-Plastic ☐; Low Plastic ☐; Medium Plastic ☐; High Plastic ☐;

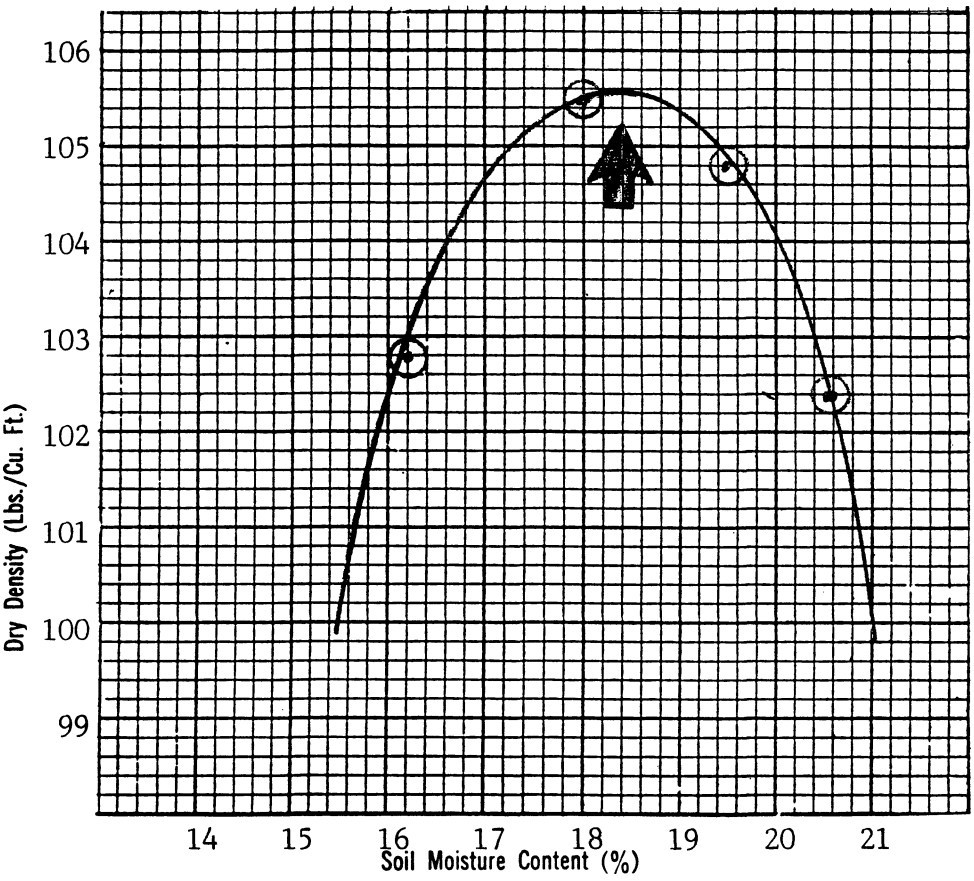
Soil Classification: _____

Classification System: _____

Grainsize Distribution

Sieve Size	% Passing

C. MOISTURE-DENSITY TEST



Method of Test: ☒ ASTM D698, Method A

☐ ASTM D1557, Method _____;

☐ Other (Define) _____

OPTIMUM MOISTURE CONTENT = 18.4 %

MAXIMUM DRY DENSITY = 105.6 Lbs./Cu. Ft.

SUGGESTED OPERATING MOISTURE RANGE TO OBTAIN MAXIMUM DRY DENSITY = _____ % to _____ %

Lab. Technician S. Tuttle

Remarks:

Distribution: _____

C. R. Higgins, Jr., Manager

ATLANTIC COAST ENGINEERING AND TESTING, INC.

123 MANLEY AVENUE GREENSBORO, N.C. 27407

PHONE: 919-292-8230

Client: D. H. Griffin Client's No. _____

Report of: MOISTURE-DENSITY (PROCTOR) RELATIONSHIP OF SOIL

Report No. MD-4

Laboratory No. 6416 Job No. AC-1729

A. ORIGIN AND DESCRIPTION OF SAMPLE

Project: D. H. Griffin Commercial Sandrock Pit and Demolition Landfill

Specific Location of Sample: B-16 13' to 18'

Soils Technician Sampling: J. Higgins Date 12-5-90

Est. Vol. of Soil Represented by Sample _____ Cu. Yds. Number of Samplings to Form Composite of Sample _____; Weigh of Total Sample: _____ lbs; **Description of Soil** (Visual-Manual Procedure): coarse grain slightly silty sand with rock fragments

Color: white/gray/tan Odor: _____ Natural Field Density: Loose ☐; Dense ☒; Consistency: Soft ☐ Firm ☐; Stiff ☐; Very Stiff ☐; Hard ☐.

B. PHYSICAL CHARACTERISTICS

Sample Moisture Content: _____%

Plasticity (By Visual-Manual Procedure ☐: Non-Plastic ☐; Low Plastic ☐; Medium Plastic ☐; High Plastic ☐;

Soil Classification: _____

Classification System: _____

Grainsize Distribution

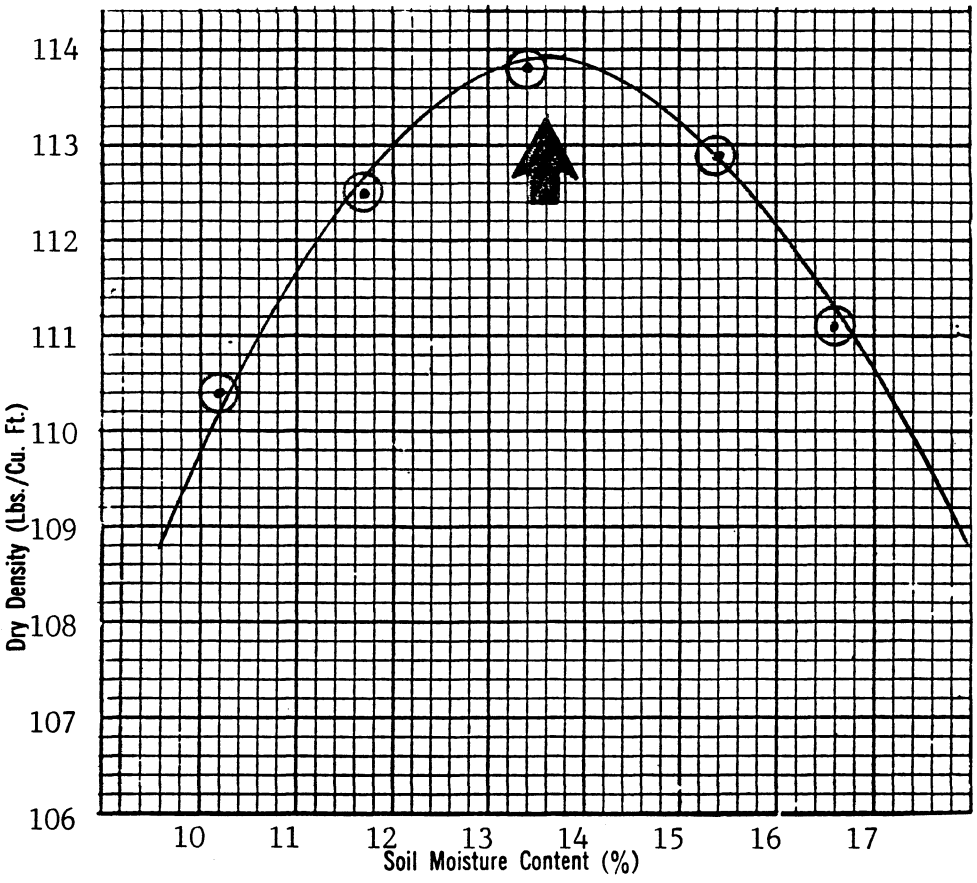
Sieve Size	% Passing

Method of Test: ☒ ASTM D698, Method A

☐ ASTM D1557, Method _____;

☐ Other (Define) _____

C. MOISTURE-DENSITY TEST



OPTIMUM MOISTURE CONTENT = 13.6 %

MAXIMUM DRY DENSITY = 113.9 Lbs./Cu. Ft.

SUGGESTED OPERATING MOISTURE RANGE TO OBTAIN MAXIMUM DRY DENSITY = _____ % to _____ %

Lab. Technician S. Ross

Remarks:

Distribution: _____

D. H. Griffin Landfill

Table 1

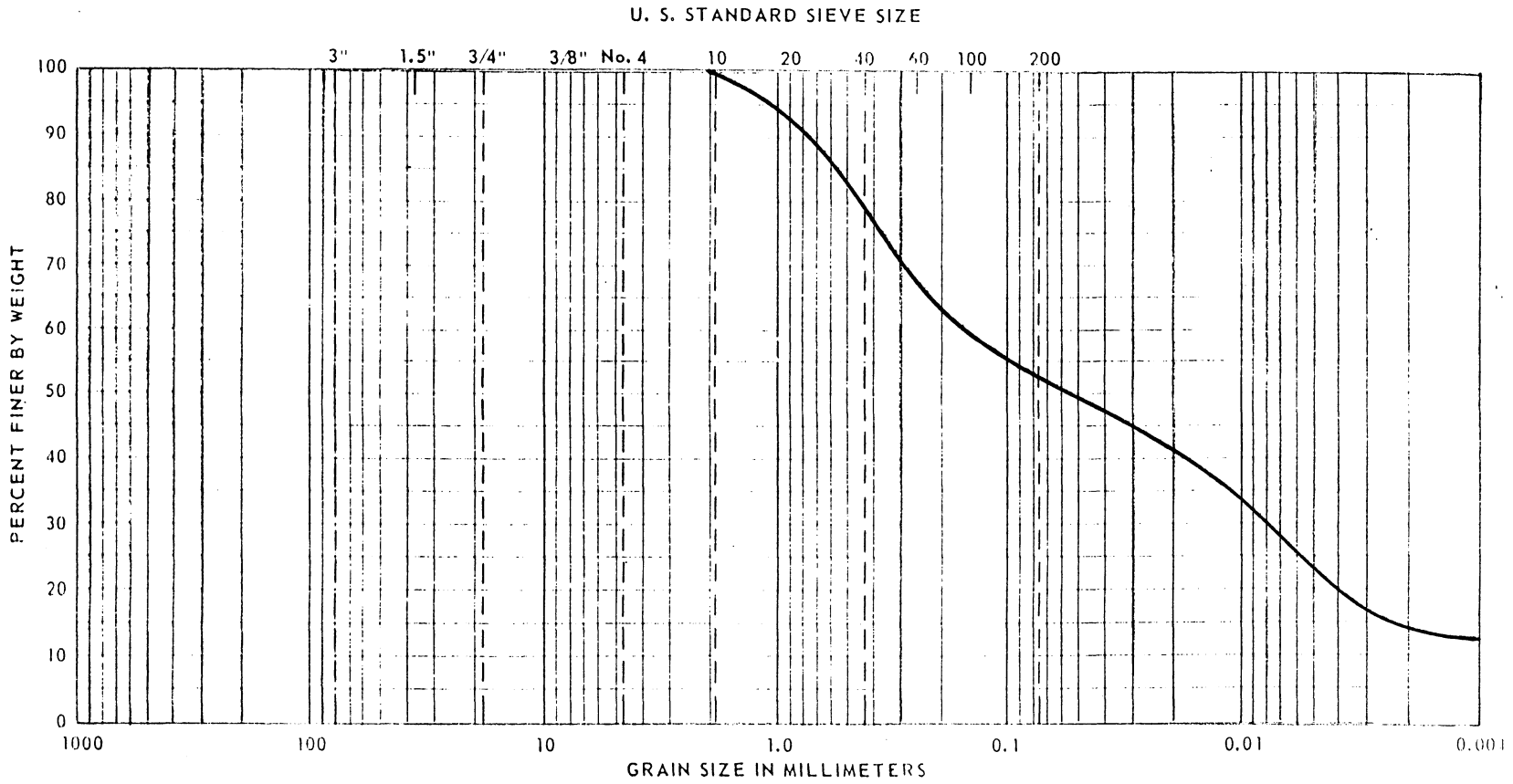
Soil Identification

Boring Location	% Passing No. 10	% Passing No. 40	% Passing No. 200	Liquid Limit	Plastic Limit	Plasticity Index	Soil Classification
B-1	87.5	50.0	21.0	21	21	NP	SW
B-11	99.0	73.2	44.0	32	28	6	ML
B-14	99.9	85.0	57.7	NP	NP	NP	ML
B-16	99.7	82.2	48.4	37	17	20	ML

ATLANTIC COAST ENGINEERING AND TESTING, INC.

PROJECT: D. H. Griffin Landfill AC-1729

GRAIN SIZE DISTRIBUTION CURVE



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SAMPLE NO.	BORING	DEPTH	LINE	CLASSIFICATION	NAT. WC	LL	PL	PI	REMARKS	PLOTTED BY
6416	B-16	13'	——	ML		37	17	20		
			— —							
			—·—							
			—··—							

APPENDIX 5

FIELD TESTING PROCEDURES

Site Reconnaissance

The surface conditions at the site of the proposed landfill expansion were inspected. The purpose of the site reconnaissance is to observe the general site topography and to note any outstanding surface features that might affect the proposed project. A more accurate evaluation of the subsurface conditions and possible construction problems and an increased awareness of the overall site conditions are obtained when visual site reconnaissance data are used in conjunction with the field and laboratory test results.

Soil Test Borings

Eighteen (18) soil test borings and four (4) offset auger borings to obtain undisturbed and bulk samples were made at the site. The approximate boring locations are shown on the Topographic Map (Figure 2, Appendix 1). The borings were surveyed in the field and groundsurface elevation determined by representatives of Borum & Associates, Inc.

The borings were made by mechanically twisting a continuous flight steel auger into the soil. Soil sampling and penetration testing were performed in general accordance with ASTM D 1586. At regular intervals, soil samples were obtained with a standard 1.4-inch I.D., 2-inch O.D., split-tube sampler. The sampler was first seated 6 inches to penetrate any loose cuttings, and then driven an additional 12 inches with blows of a 140-pound hammer falling 30 inches. The number of hammer blows required to drive the sampler the final 12 inches was recorded and is designated the "penetration resistance." The penetration resistance, when properly evaluated, is an index to the soil's strength and load supporting capability.

Representative portions of the soil samples, thus obtained, were placed in plastic containers and transported to the laboratory. In the laboratory, the samples were examined by a consulting engineer to verify the driller's field classifications. Test Boring Records, Appendix 3, show the soil descriptions and penetration resistances.

Undisturbed Sampling

Split-barrel samples are suitable for visual examination and classification tests but are not sufficiently intact for quantitative laboratory tests. Therefore, relatively undisturbed samples were obtained in selected borings by drilling to the desired depth and forcing a section of 3-inch O.D., 16-gauge steel tubing into the soil. The sampling procedure is described by ASTM D 1587. Each tube, together with the encased soil, was carefully removed from the ground, made airtight, and transported to the laboratory. The depths of undisturbed samples are shown on the appropriate Test Boring Records.

Bag Samples

Loose bulk samples were obtained from Borings B-1, B-11, B-14, and B-16 at 4'-8', 10'-15', 20'-28', and 13'-18' below existing grade, respectively. These bulk samples were collected from auger cuttings. The soil was placed in a cloth sack and returned to the laboratory with a sample in a plastic container.

Groundwater Level Readings

Groundwater level readings were recorded at 24 hours after boring. These readings indicated the approximate location of the hydrostatic water table at the time of our field investigation. To insure access to the groundwater level at the borings, a 2-inch diameter pvc pipe with the bottom section slotted was placed in selected boreholes. The annular space around the pipe was filled in at the ground-surface to exclude surface runoff. At most of the boring locations, water table readings were taken again about 7 days after the borings were completed to permit stabilization of the groundwater table which had been locally disrupted by the drilling operations. Groundwater measurements are presented in Table 1, Appendix 2, and graphically on the Test Boring Records (Appendix 3) and Subsurface Profiles (Figures 3 through 8, Appendix 1).

Open End Borehole Field Permeability Test

United States Department of the Interior Bureau of Reclamation Test Procedure Designation E-18*.

Tests are made in an open pipe inserted in an open borehole. Clean water is added to the pipe and the flow (rate of fluid drop in the pipe) is allowed to stabilize for about five minutes and is then measured. The permeability is then obtained from the following relationship:

$$K = \frac{Q}{5.5rH}$$, where:

K = permeability,
Q = constant rate of flow into borehole,
r = inside radius of pipe, and
H = differential head of water.

* Reference: Earth Manual, U.S. Dept. of the Interior, BuRec, Denver, CO, First Edition, July 1960, p. 543.

APPENDIX 6

LABORATORY TESTING PROCEDURES

Natural Moisture Content

The natural moisture content of selected samples was determined in accordance with ASTM D 2216. The moisture content of the soil is the ratio, expressed as a percentage, of the weight of water in a given mass of soil to the weight of the soil particles. The results are presented on Table 2 in Appendix 2.

Grain Size Distribution

Grain size tests were performed on selected soil samples to determine the particle size distribution of these materials. After initial drying, the samples were washed over a U.S. standard No. 200 sieve to remove the fines (particles finer than a No. 200 mesh sieve). The samples were then dried and sieved through a standard set of nested sieves. This test was performed in a manner similar to that described by ASTM D 422. The results are presented as percent finer by weight versus particle size. The results are presented in Appendix 4.

Hydrometer Test

The distribution of fine-grained (silt and clay size) particles present in selected samples was determined by passing the samples through a No. 200 mesh sieve and performing a hydrometer test (also ASTM D 422). The results are shown in Appendix 4 on the silt and clay portion of the grain size distribution curves.

Soil Plasticity

Several soil samples were selected for Atterberg Limits testing to determine their soil plasticity characteristics. The soil's Plasticity Index (PI) is representative of this characteristic and is determined from the Liquid Limit (LL) and the Plastic Limit (PL). The LL is the moisture content at which the soil will flow as a heavy viscous fluid and is determined in accordance with ASTM D 423. The PL is the moisture content at which the soil begins to lose its plasticity and is determined in accordance with ASTM D 424. The results are presented on Table 3 in Appendix 2.

Compaction Test

Four bulk samples of typical site soils were collected, placed in a cloth sack, and returned to the laboratory for compaction testing. Four standard proctor compaction tests (ASTM D 698) were performed on these samples to determine their compaction characteristics, including maximum dry density and optimum moisture content. Test results are presented in Appendix 4.

Permeability Tests

Permeability tests were conducted on selected undisturbed and remolded samples to determine the coefficient of permeability, k. The coefficient of permeability is a constant of proportionality relating to the ease with which a fluid passes through a porous medium. The two laboratory methods (ASTM D 2434) available for this test are constant water head or pressure and falling head. For this project, constant head tests were conducted.

The sample is placed in the permeability apparatus and saturated to remove all air. Then, water is passed through the sample at a known (measured) head, and the rate of flow through the sample is measured. The permeability is calculated using Darcy's Law, $Q=kiA$, where "Q" is the measured flow through the sample, "i" is the hydraulic gradient (water head/sample length) and "A" is the cross-sectional area of the soil sample. The test results are presented in Table 4, Appendix 2, as the coefficient of permeability expressed in units of cm/sec.

GUILFORD COUNTY
DEPARTMENT OF PUBLIC HEALTH

January 11, 1991

Mr. Jeff Rodgers
NCSWM
4714 Cricklewood Road
Greensboro, NC 27407

Dear Jeff:

This letter is to document our telephone conversation on January 7, 1991 concerning the D. H. Griffin application for a type "two" landfill. As you recall, you stated that it was your understanding that the DEHNR-Solid Waste Management Section would permit and inspect the type "two" landfill(s) since Guilford County had not been delegated that authority. Therefore, our office will refer to your section any future calls concerning this site.

If the situation with this case should change, our office would greatly appreciate being notified by the NC DEHNR of the changes.

Sincerely,

Terry B. Cole

Terry B. Cole
Toxic and Health Hazard Unit Specialist

/hn
cc: Julian Foscue
Larry Leach
File
Tracking

301 North Eugene Street
P.O. Box 3508
Greensboro, N. C. 27401

501 E. Green Dr.
High Point, N. C. 27260

FILE
DH GRIFFIN
GUILFORD CO.

State of North Carolina
Department of Environment, Health, and Natural Resources
Division of Solid Waste Management
P.O. Box 27687 · Raleigh, North Carolina 27611-7687

James G. Martin, Governor
William W. Cobey, Jr., Secretary

William L. Meyer
Director

December 18, 1990

Mr. Homer S. Wade
Borum & Associates, Inc.
405-D Parkway
Greensboro, North Carolina 27401

RE: Hazel R. Sizemore Landfill, Guilford County

Dear Mr. Wade:

Thank you for requesting clarification of North Carolina's policy on construction landfills. I am sorry for the delay in responding to you letter of October 15, 1990.

In regard to your request for information concerning a permit for the continued disposal of construction/demolition debris as outlined in your letter, the Solid Waste Section does not have regulations governing this type of facility at this point in time. We will be developing policy and regulations in the future.

At this point in time, an applicant can apply for a permit to operate such a facility; however, the permit application would have to meet the existing requirements for a sanitary landfill. Enclosed please find a copy of the Solid Waste Management Rules which address siting and permit requirements for a sanitary landfill.

If you have any questions, please contact our office at (919)733-0692.

Sincerely,

James C Coffey

James C. Coffey
Acting Chief
Solid Waste Section

ENCLOSURE

cc: Bill Morris
Julian Foscue

AQUATERRA
Environmental Consultants

October 31, 1990

D.H. Griffin Wrecking Company, Inc.
Post Office Box 4657
Greensboro, North Carolina 27407

Attention: Mr. D.H. Griffin, Sr.
President

Reference: Ground Water Site Assessment
Wiley Davis Landfill, Inc.
Wiley Davis Road
Guilford County, North Carolina
Aquaterra Job No. 417A

Dear Mr. Griffin:

Aquaterra, Inc. (Aquaterra) has completed a ground water assessment of the Wiley Davis Landfill, Inc. facility. The results of the ground water analyses indicated organic and metal contaminants in varying degrees in all installed monitoring wells. Levels of several contaminants exceed North Carolina State ground water standards. Remediation of these contaminants is recommended to reduce their concentrations to either below state standards or to demonstrate that these contaminants do not pose potential negative impacts to the environment and human health.

After you review this report, Aquaterra recommends that you forward the three additional copies to the following state and county agencies:

Guilford County Department of Public Health
P.O. Box 3508
Greensboro, NC 27401
Attn: Mr. Todd Davidson

Corporate Office
P O Box 30328
Raleigh, NC 27650
(919) 859-9987
FAX (919) 859-9930

Charlotte Office
P O Box 668107
Charlotte, NC 28266-8107
(704) 525-8880
FAX (704) 527-2792

Greensboro Office
P O Box 16241
Greensboro, NC 27416-0241
(919) 273-5003
FAX (919) 271-8138