Site Exploration
Proposed Slurry Wall Leachate Control System
Lena Road Landfill, Stage II
Manatee County, Florida

Oct. 31, 1988



Ardaman & Associates, Inc.



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## 💟 Ardaman & Associates, Inc.

October 31, 1988 File Number 87-7326

Consultants in Soils, Hydrogeology, Foundations and Materials Testing

Manatee County Department of Public Works 4501 - 66th Street West Bradenton, Florida 34210

Attention:

Mr. Terry J. Ried

Solid Waste Division Manager

Subject:

Site Exploration for the Proposed Slurry Wall Leachate Control

System, Lena Road Landfill, Stage II, Manatee County, Florida

#### Gentlemen:

As requested and authorized by Manatee County Department of Public Works, we have completed a field exploratory and laboratory program at the Lena Road Landfill site (Stage II) in accordance with our original proposal dated February 24, 1988 and our modified proposal dated October 21, 1988. Please note that the Site Exploration Study for the Gun Club site (Stage III), as included in our proposals, was covered in our previous report dated October 17, 1988.

This report has been prepared for the exclusive use of Manatee County for specific application to the construction of the slurry wall/leachate control system for the Lena Road Landfill area in accordance with generally accepted geotechnical and hydrogeological engineering practice. No other warranty, expressed or implied, is made.

We appreciate the opportunity to be of service to you on this phase of the project. If you have any questions or need further assistance, please do not hesitate to contact the undersigned or Mr. Herb Stangland, P.E.

Very truly yours, ARDAMAN & ASSOCIATES, INC.

Lakshmi U. Reddi

Lakshmi N. Reddi Project Engineer

John E. Garlanger, Ph.D., P.E.

**Principal** 

Florida Registration No. 19782

LNR:cc

cc: Bob Hall

Gary Schmidt

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#### 1.0 INTRODUCTION

#### 1.1 Project Description

The objective of this report is to provide soil boring data and laboratory test results for the construction of the proposed slurry wall/leachate control system for the Stage II Lena Road Landfill in Manatee County, Florida.

The landfill site, consisting of approximately 200 acres, is located north of and adjacent to the existing landfill in Section 6, T35S, R19E and Section 31, T34S, R19E. A location map is presented in Figure 1. A 1982 aerial photograph of the site is provided in Figure 2. The Stage II landfill is an expansion of the existing landfill. Hydrogeological conditions at and near the site were discussed in detail in the following reports submitted by Ardaman & Associates, Inc. (A&A):

- "Compilation of Hydrogeological and Groundwater Data for Lena Road Landfill, Stage I and Stage II Areas, Volumes I and II", dated April 16, 1987.
- "Site Exploration for Proposed Slurry Wall Leachate Control System at Gun Club Landfill", October 17, 1988.

Based upon the information gathered in these studies and the data from this exploration, a slurry wall/leachate control system will provide a viable alternative to isolate the groundwater within the landfill area from adjacent properties.

#### 1.2 Scope of Work

The following tasks were completed by A&A for the subject study:

- Reviewed the data collected from our previous studies.
- Conducted site visits by Messrs. Bill Ryan, P.E., and Lakshmi Reddi, Ph.D., of A&A.
- Planned and conducted a field exploratory program consisting of 30 Standard Penetration Test (SPT) borings and 10 helical power auger borings to assess the subsurface conditions along the proposed route of the slurry wall and to recover soil samples for laboratory testing.
- Planned and conducted a laboratory testing program to characterize the engineering properties of representative soil samples retrieved from the site.
- Prepared this report to document the results of our field and laboratory studies, and to provide information on the required depths for the proposed slurry wall.

The analyses and recommendations submitted in this report are based upon the data obtained from the soil borings performed at the locations indicated. The

information contained in this report does not reflect any variations which may occur at other locations where borings are not available. The nature and extent of such variations between the borings may not become evident until construction. If variations then appear evident, it will be necessary for a reevaluation of the recommendations presented herein after performing on-site observations during the construction period and noting the characteristics of the variations.

#### 2.0 FIELD EXPLORATORY PROGRAM

#### 2.1 Test Borings

A field program was conducted by A&A at the site between June 1, 1988 and October 21, 1988. The field exploratory program consisted of performing 30 Standard Penetration Test (SPT) borings and 10 helical power auger borings at the approximate locations illustrated on the boring location plan shown in Figure 3. The locations of these borings were selected along the proposed route of the slurry wall. The borings were spaced approximately 200 feet apart along the north, east and west walls of the site. Even-numbered stations were staked; and the ground surface elevations at these stations were provided by Manatee County. Odd-numbered stations were located using tape measurements from the adjacent stations; and the ground surface elevations were estimated from a topographic map provided by Manatee County. Therefore, the locations and elevations of the borings at odd-numbered stations should be considered only approximate, as implied by the methods of measurement used. The SPT borings were advanced using procedures similar to those outlined in ASTM D-1586. A summary of this field procedure is included in Appendix 1. All the test borings were grouted upon completion of drilling with neat cement using the tremie pipe grouting method. The SPT boring logs are provided in Appendix 2.

#### 2.2 Sampling Program

Split-spoon soil samples were recovered during performance of the SPT. Typically, continuous samples at 1.5-foot intervals were recovered for the top 10 feet of the borings and the bottom 15 feet of the borings. In between, split-spoon soil samples were obtained at 5-foot intervals, or whenever there was a major change in soil strata. These samples were visually classified in the field and representative portions of the soil samples were sealed in airtight jars and later transported to our laboratory for additional classification and testing.

Soil samples were also recovered from auger borings conducted at the site. Auger borings were conducted using a 4-inch diameter, continuous flight, helical auger with a cutting head at its end. The auger was screwed into the ground in 5-foot sections. It was powered by the rotating action of the kelly bar of a rotary drill rig. Samples were recovered by withdrawing the auger out of the ground without rotating it. The soil samples so obtained, were classified and representative samples put in jars and brought back to the laboratory for classification and testing.

#### 3.0 LABORATORY TESTING PROGRAM

#### 3.1 General

All recovered split-spoon samples were returned to our laboratory for visual examination and for determination of engineering properties. The laboratory testing program was performed to better define the subsurface soil stratification, and to determine the index properties and engineering characteristics of the subsurface soils with respect to the proposed construction. All tests, where applicable, were performed in accordance with current ASTM standards.

#### 3.2 Classification Tests

The split-spoon jar samples were visually classified in the laboratory using the procedures outlined in the Unified Soil Classification System (USCS). Tests were performed on representative samples and included natural moisture content determinations, Atterberg limits, grain size analysis, and percent fines determinations, i.e., percent by dry weight of materials passing the U.S. No. 200 standard sieve. The results of these tests, which are presented on the boring logs in Appendix 2, were used to aid in classifying and stratifying the soils. The full grain size sieve analyses are presented in Appendix 3.

#### 4.0 GENERAL SUBSURFACE CONDITIONS

#### 4.1 Soil Boring Profiles

The results of the field exploratory and laboratory testing programs are documented in the boring logs in Appendix 2. Generalized subsurface profiles at the SPT boring locations are presented in Figures 4 and 5.

The stratification shown on the boring logs and profiles represent our interpretation of the field logs and the results of laboratory examinations on recovered samples from the borings. The stratification lines represent the approximate boundary between soil types and the transitions may be more gradual than shown.

The soil boring profiles are representative of subsurface conditions only at their respective locations and for their vertical reaches. Local variations of the subsurface materials in the area are anticipated and may be encountered. The relative density of cohesionless soils and the consistency of cohesive soils may be inferred from the engineering classification table presented with the boring logs based on empirical correlations with the SPT blow count values (N values).

#### 4.2 Hydrogeology

Hydrogeological conditions at the site were discussed in detail elsewhere (Ardaman, 1987) and therefore will not be repeated herein. To summarize, a surficial unconfined aquifer system is found in the beds of sand and slightly silty to silty sand found on site at depths between the surface and 10 to 15 feet. This zone is recharged directly by local rainfall. Water levels encountered in this system for the most part range between 0.5-5.0 feet below ground surface. These

levels can fluctuate widely with variations in rainfall and evapotranspiration. Movement of the shallow groundwater is very limited due to the lack of topographic relief but some radial movement away from the landfill occurs. Vertical movement of water downward is restricted due to the presence of clays and clayey sands first encountered at depths of 15 to 20 feet. Recharge through the approximately 100-foot thick confining beds above the underlying aquifer systems has been estimated at less than 2 inches/year by Stewart (1980). Wells for domestic supply are from the deeper artesian aquifers and not from the surficial aquifer.

#### 4.3 Stratigraphy

Based upon a review of the test borings performed along the perimeter of the proposed landfill, the shallow subsurface profile generally consists of two main strata, a surficial fine sand to clayey fine sand layer overlying a stratum of sandy clays and clays.

The surficial soils (0 to 20 feet) generally consist of a brown fine sand to slightly silty fine sand with increasing clay contents at greater depths. Traces of phosphate were frequently encountered below depths of 15 to 20 feet. The typical SPT blow count value in this relatively pervious surficial sandy stratum is between 2 and 23 blows per foot, indicative of very loose to medium dense sand.

The top of the sandy clay to clay stratum, which underlies the surficial sandy soils, is typically encountered at depths of 25 to 30 feet below ground surface. The soils that make up this stratum (Stratum 4) are primarily gray to brown clay and sandy clay. In many boreholes, Stratum 4 is underlain and/or overlain by a gray to green clayey fine sand stratum (Stratum 5). Boreholes along the west wall, however, encountered a gray clayey silt stratum (Stratum 6) underlying Stratum 4. The clayey silt stratum was found to be very dense with blow count values close to 50. Table 1 shows the variations in fines content of various strata encountered at the site. With average fines contents of 68 and 72, Strata 4 and 6 can generally be considered impervious relative to the surficial sandy soils.

According to the Unified Soil Classification System (USCS) based on the plasticity of the soils, the soils in Stratum 4 are primarily composed of low to medium plasticity sandy clay with a USCS designation of CL, and clays of high plasticity, with a USCS designation of CH. The clayey materials within the explored depths can generally be described as medium stiff to hard with a typical blow count value of 5 to over 50. We recommend that the slurry cut-off wall be keyed a minimum of 3 feet into the top of this clayey stratum.

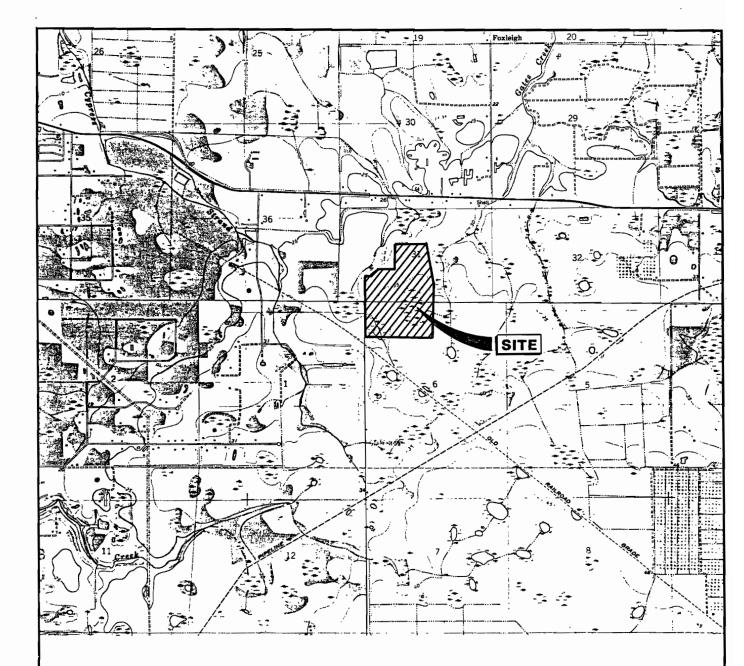
The depths to the top of the natural clayey liner at the boring locations, based upon our interpretation of the field and laboratory data (which include visual examination of soil samples, fines content determinations, and Atterberg limits) are included on the generalized boring profiles presented in Figures 4 and 5. The slurry cut-off wall should be keyed a minimum of 3 feet into the top of the confining unit identified on Figures 4 and 5. In general, the SPT borings did not encounter significant difficulty in drilling requiring boring relocation. However, the blow count values at some locations in Strata 4 and 5 are significantly greater

than 50. Slurry trenching activities may encounter difficulty at these locations. We recommend that the top of the clay layer be verified by a qualified geotechnical engineer or his representative during construction so that the slurry wall will be keyed into the proper layer.

Table 1
PERCENT FINES OF VARIOUS STRATA

	No. of Measurements	Range of Variation	Average	Standard Deviation
Light gray to brown medium to fine sand to slightly silty fine sand (Strata 1 and 3)	3	3-11	7.7	4.2*
Gray to brown slightly silty to silty fine sand (Stratum 2)	6	6-31	14	10.0
Gray to green clay and sandy clay (Stratum 4)	10	49-79	68	11.4
Gray and green slightly clayey to clayey fine sand (Stratum 5)	23	5–57	27	13.2
Gray silt (Stratum 6)	2	68-75	72	4.9*

<sup>\*</sup>Standard deviation may not be a true representation since the number of measurements is too small.



## SITE LOCATION

TOWNSHIPS 34 AND 35, SOUTH RANGE 19, EAST **SECTIONS 6 AND 31** 

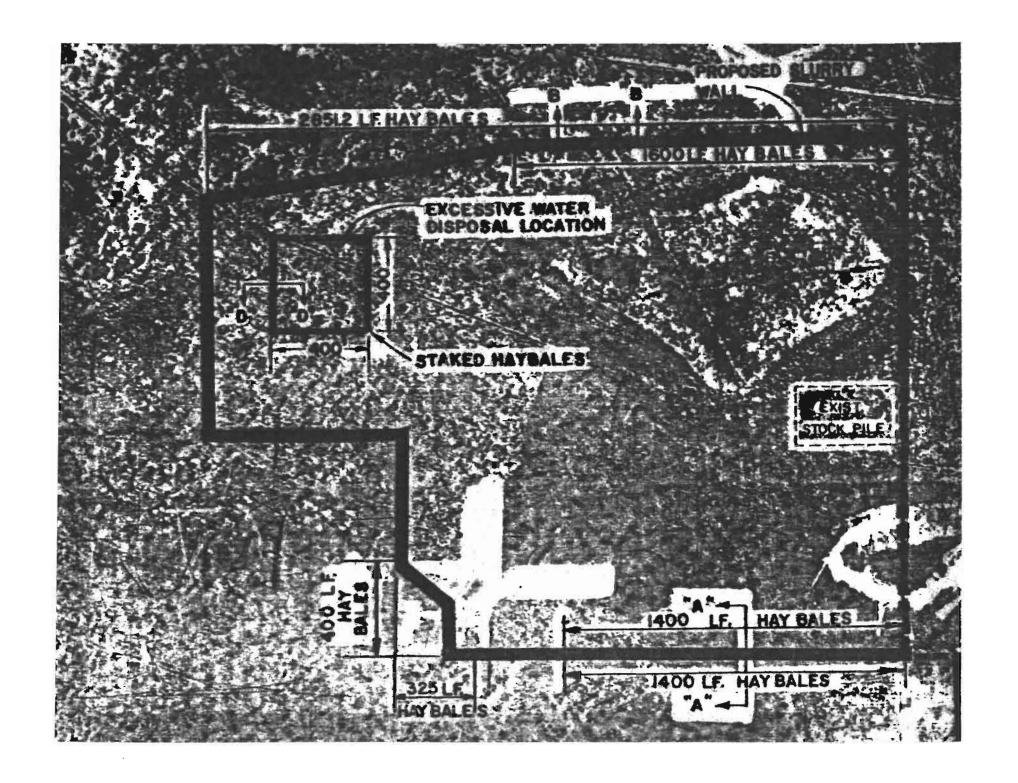


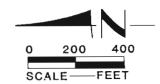


Ardaman & Associates, Inc. Consulting Engineers in Soil Mechanics, Foundations, and Materials Testing

SITE EXPLORATION
PROPOSED SLURRY WALL LEACHATE CONTROL SYSTEM
LENA ROAD LANDFILL, STAGE II
MANATEE COUNTY, FLORIDA

CHECKED BY: KLN DATE: 10/28/88 87-7326





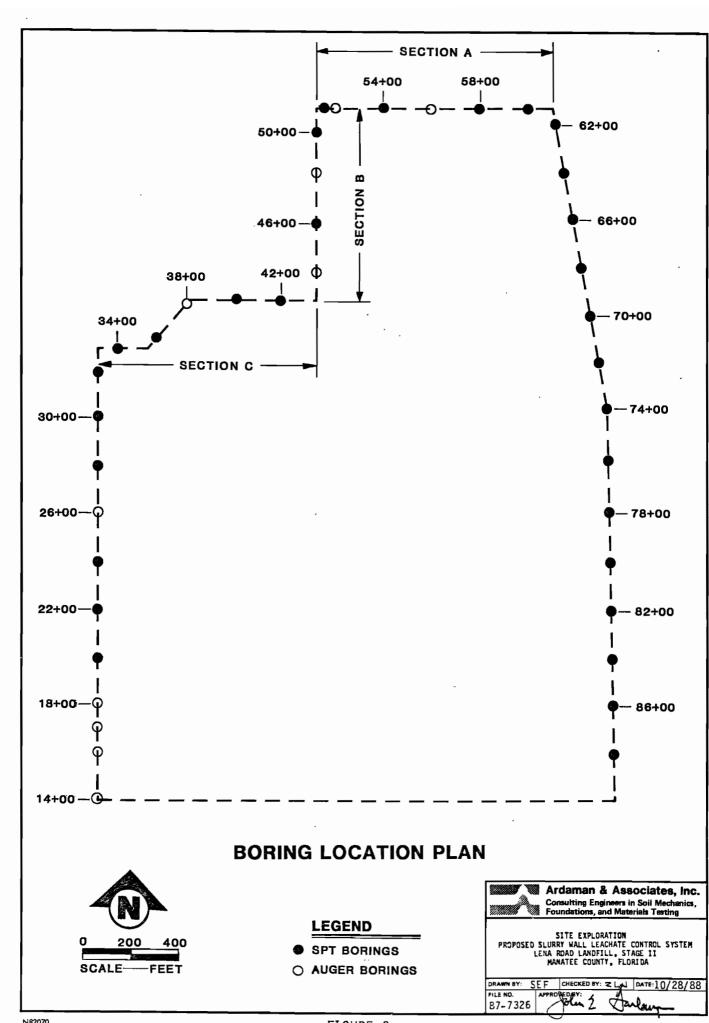
# **AERIAL MAP OF THE SITE**

Ardaman & Associates, Inc.
Consulting Engineers in Soils, Hydrogeology,
Foundations, and Materials Testing

SITE EXPLORATION
PROPOSED SLURRY WALL LEACHATE CONTROL SYSTEM
LENA ROAD LANOFILL, STAGE II
MANATEE COUNTY, FLORIDA

DRAWN BY SEF CHECKED BY RLN DATE 10/28/88
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IMAGE IS OF POOR QUALITY



# Appendix 1

### STANDARD PENETRATION TEST PROCEDURES

#### STANDARD PENETRATION TEST

The standard penetration test is a widely accepted method of *in situ* testing of foundation soils (ASTM D-1586). A 2-foot long, 2-inch O.D. split-barrel sampler attached to the end of a string of drilling rods is driven 18 inches into the ground by successive blows of a 140-pound hammer freely dropping 30 inches. The number of blows needed for each 6 inches of penetration is recorded. The sum of the blows required for penetration of the second and third 6-inch increments of penetration constitutes the test result or N-value. After the test, the sampler is extracted from the ground and opened to allow visual examination and classification of the retained soil sample. The N-value has been empirically correlated with various soil properties allowing a conservative estimate of the behavior of soils under load.

The tests are usually performed at 5-foot intervals. However, more frequent or continuous testing is done by our firm through depths where a more accurate definition of the soils is required. The test holes are advanced to the test elevations by rotary drilling with a cutting bit, using circulating fluid to remove the cuttings and hold the fine grains in suspension. The circulating fluid, which is a bentonitic drilling mud, is also used to keep the hole open below the water table by maintaining an excess hydrostatic pressure inside the hole. In some soil deposits, particularly highly pervious ones, NX-size flush-coupled casing must be driven to just above the testing depth to keep the hole open and/or to prevent the loss of circulating fluid.

Representative split-spoon samples from soils at every 5 feet of drilled depth and from every different stratum are brought to our laboratory in air-tight jars for further evaluation and testing, if necessary. Samples not used in testing are stored for at least six months prior to being discarded. After completion of a test boring, the hole is kept open until a steady state groundwater level is recorded. The hole is then sealed, if necessary, and backfilled.

Appendix 2

BORING LOGS

# BORING LOG ARDAMAN & ASSOCIATES, INC.

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# BORING LOG ARDAMAN & ASSOCIATES, INC.

BORING NO. STA 18+00
TOTAL DEPTH 40.0 ft
SHEET 1 OF 1

PROJECT Lena Road Landfill, Phas	е П				FILE NO.	87-7326
CLIENT Manatee County Departm	nent of Public Works				_ rms	01-1320
BORING LOCATION See Figure 3.						
COUNTY Manatee	STATE Florida		ELEVATION	34.57 ft	NGVD	
DATE STARTED 7-5-1988	DATE COMPLETED	7-5-1988	BORING TYPE	SPT	NG VD	
DRILLER/RIG Fisher/Nick		1-0-1000	LENGTH/TYPE		Tland duillant	
WATER TABLE DEPTH: 1st 2.75'	DATE	7-5-1988	TIME	CASING _	Used driller's	s mud.
2nd	DATE -	7-9-1988				
REMARKS	DAIR _		TIME			
REMARKS						

De	pth		rd Penetratio		_	Lab 1	Data			
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbed Samples
				1					Gray fine sand with roots (SP)	<del>                                     </del>
	-			2					Brown fine sand (SP)	[]
1	-								-	<b>-</b>
	5			3						
2	-								Grayish brown slightly silty fine sand (SP-SM)	<u> </u>
									<del>-</del>	<u>L</u> l
3	_ _ 10								_	[]
	-10-									<u> - </u>
	-			4					Gray clayey fine sand with phosphate (SM)	
4	-			5						<del> </del>
	15	J							- Grayish yellow clayey fine sand, trace phosphate (SC)	
5	-								-	<b>-</b>
									-	<u> </u>
6	20			6					_	Fl
										<b> </b> -
7	-									[]
广		ĺ		7					- Gray silty fine sand, trace phosphate (SM)	<b> -</b>
	25								<del>-</del>	
8_	-								-	-
		ľ							<del>-</del> -	
9				8	29	31			_	[-]
	30								<del>-</del>	<u> - </u>
10	_									
Ť	-								-	-
	35			9					- Gray sandy clay (CL)	
11	-									}
									-	
12	40			10	33	75	43	16	Gray silt, trace rock (ML)	-

									DG TES, INC.  BORING NO. TOTAL DEPTH SHEET 1 0	31.5 ft
PR	OJE(	Lena Mened	Road Land	fill, Phas	se II	e Push	14 - Yez		FILE NO. 87-	7326
BO	RINC	LOCATIO	N See F	igure 3.	OT A	DI Pub	ile w	OFKS		
DA	TE S	TARTED	ee 10-19-198	8	DAT	E COI	Floric MPLE	TED _	ELEVATION 34.53 ft NGVD (approxima 10-19-1988 BORING TYPE SPT	
$\nu_{\rm M}$	411111	n/niG	ופנו/ הועפוו	717					LENGTH/TYPE CASING Used driller's muc	d.
RE	MAR	KS	2nd				DA'	TE _	10-19-1988 TIME TIME	
	pth	Standa	ard Penetrati			7-1-				· ·
	<u> </u>		ASTM D-158			Lab			Soil Description and Remarks	Undisturbed
Meters	Feet	Blows/6"	N Value	Sample No.	(%)		(%)	PI (%)	(Unified Classification)	Samples
_								_	Gray fine sand (SP)	
	_	] .		1					Brown fine sand (SP)	<u> </u>
1	_	ļ		2						_[
		ł		3					Gray clayey fine sand (SC)	-
	_ 5		[	4						<b> -</b>
2	-	İ	}	_					Gray fine sand (SP)	<b>-</b>
	_		ľ	5					Ĺ	
	_		[	6				1	-	[]
3	10_		Ì	_					-	
	-			7					<del> </del>	<b> </b> -
4	_		ł		İ				<u> </u>	
	_		ĺ						Dark brown fine sand (SP)	1
	15		ŀ	8						1
5	-	2-4-4	8	9					Brown clayey fine sand (SC)	<b> -</b>
	_	4-7-2	9	10	l				<u> </u>	-
					[					-[
6	20	2-12-17	29	11					Gray slightly silty fine sand with phosphate (SP-SM)	
	_	12-17-21	38	12	19	9		l		41
7	-	12-15-14	29	13					Gray clayey fine sand with phosphate (SC)	-
	_	9-10-10	20	14				}		<b> </b>
	25									
8	-	8-9-9	18	15					-	-
	-	11 <b>-9</b> -8	17	16					-	-
	-	8-8-11	19	17	20	23				_}
9	30	8-12-21	33	18					Gray sandy clay with phosphate (CL)	
	_	21-19-21	40	19					-	
10	-									7-1
~~	-								Termination of boring at 31.5 feet.	-
	35								<u> </u>	-
11	_									

ARDAMAN & ASSOCIATES, INC.

BORING NO. STA 22+00
TOTAL DEPTH 34.5 ft
SHEET 1 OF 1

PROJECT Lena Road Landfill, Phase II	FILE NO. 87-7326
CLIENT Manatee County Department of Public Works	
BORING LOCATION See Figure 3.	
COUNTY Manatee STATE Florida	ELEVATION 34.50 ft NGVD
DATE STARTED 9-19-1988 DATE COMPLETED 9-19-19	88 BORING TYPE SPT
DRILLER/RIG Fisher/Nick	LENGTH/TYPE CASING Used driller's mud.
WATER TABLE DEPTH: 1st 0.75' DATE 9-19-19	88 TIME
2nd DATE	TIME
REMARKS	

De	pth		rd Penetratio			Lab I	Data			
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbed Samples
	-			· ·					Brown slightly silty fine sand (SP-SM)  - Brown silty fine sand (SM)	-
2	5	-4-7 7	11	1 2					- - -	- - -
3		7 <b>-9</b> -10	19	3					- Brown fine sand (SP)	- - -
4	-	( <del>-a-</del> 10	Та	3	-				- - - -	<del>-</del>    -  -  -
5	15 	4-2-2	4	4					-  - -	- - - -
6_	20	4~6~7	13	5					Gray silty fine sand, trace phosphate (SM)	- - - -
7	25	5-5-7 6-6-7	12 13	6 7					Gray to green clayey fine sand (SC)	-  -  -  -
8	-	6-11-9 10-17-17	20 34	8					Gray silty fine sand with lenses of green clay (SM-CH)	    
9	30	13-17-21 17-50/4	38 50/4	10 11					- Light gray clay, trace rock (CL)	-  -  -
10	35	24-50/3 37-17-21	50/3 38	12	54		86	39	Light gray silt (MH)	<u> </u>
11	-								Termination of boring at 34.5 feet.	- - - -

									DG BORING NO. TOTAL DEPTH SHEET 1 OF		
PROJECT Lena Road Landfill, Phase II FILE NO. 27-7326											
CLIENT Manatee County Department of Public Works BORING LOCATION See Figure 3.											
CC	UNT	Y Manat	tee		STA	re —	Florid	la .	ELEVATION 34.33 ft NGVD (approximate	oles\	
DA	TES	TARTED _	10-20-198	88	DAT	E CO	MPLE'	TED .	10-20-1988 BORING TYPE SPT		
WA	TER	TABLE DE	David/Dav PTH: 1st	4.0'	_		DÀ	TE	LENGTH/TYPE CASING Used driller's mud.		
		KS	2nd				DA'	TE _	10-20-1988 TIME TIME		
T.E.	WAR										
De	pth		ard Penetrati ASTM D-158			Lab :	Data				
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)		LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbed Samples	
Г					1			<del> </del>	Gray fine sand (SP)	<del>                                     </del>	
	_	1		1					Brown fine sand (SP)	<b>Ť</b>	
١.	-	1		) *				ł		╁╽	
1	_	1							Gray silty fine sand (SM)	<b> </b>	
	5			2 3	ĺ				T i	<b> </b>	
			[		l		}	ł	F	-	
2	-		Ì		l			ļ	T	<b> </b>	
			ĺ	4					<u> </u>	<u>                                     </u>	
			ļ	_				)	Ţ	<b> </b>	
3	10		}	5	l		ļ			-	
1		Ì		6					Grayish brown fine sand (SP)	1-	
				1	ŀ					<b> </b>	
4			]	7	l	ĺ		ĺ	Ţ	<b> </b>	
<u> </u>		1		}						╁╎	
1	15		[	8	ļ				Gray clayey fine sand with phosphate and rock fragments (SC)	<b> </b>	
١.			]	-	ļ						
_5_		5-1-1	2	9	29	15	ŀ	]	Γ	[ ]	
1		0-3-4	7	10					Light brown clayey fine sand with phosphate (SC)	<b>f</b> .	
			[	1						-	
-6_	20	3-2-4	6	11				ĺ	Gray clayey fine sand with phosphate (SC)	[	
1		3-3-7	10	12							
									Crow ollaw fine read to the back (Carl)		
7	_	7-6-6	12	13	29	8	}		Gray silty fine sand, trace phosphate (SM)		
	_	6-12-17	29	14				ŀ			
	25		ļ						Grow clover fine good with the track of (CC)	T	
_8_	_	6-12-12	24	15		}			Gray clayey fine sand with phosphate (SC)		
	_	20-12-17	29	16					- Dark green sandy clay with phosphate (CL)	F	
		10-50/6-	50/6	17						-	
9_	30	50/4	50/4	18						<b> </b>	
		i	l	l					Light gray clayeysilt with rock fragments (ML)	†-	
	_	50/8	50/3	19	ļ					<b> </b>	
10									Termination of boring at 31.5 foot.		
	35									<b> </b>	
11											
									Ţ.	-	
<b>L</b> .	_	1								1	

									DG BORING NO. TOTAL DEPT SHEET 1	STA 26+00 TH 40.0 ft OF 1
CL	JENT	7.5	Road Land tee County N See F	- D 4		of Pul	olic W	orks	FILE NO.	
TAT A	mnn	m = = = =				_			ELEVATION	·
⊢	pth		ard Penetration	on Test						
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)			Soil Description and Remarks (Unified Classification)	Undisturbed Samples
Г	_								Gray fine sand (SP)	
1	-			1					Brown clayey fine sand (SC)	-
2	5_			2					Gray slightly silty fine sand (SP-SM)	
3	-								- -	
3	10_							ľ		-
4_	-			3					-	
5_	<u>15</u>			4					Brown slightly silty fine sand (SP-SM)	
6				5			ľ		Grayish yellow clayey fine sand with phosphate (SC)	-  -
_0_	20								<u> </u>	
7	_			7					- 	
8	25			8					Gray clayey fine sand (SC)	-
9	-								- - -	
	30_			9	29	77	40	13	Gray clay, trace rock (CL)	-
10	_			10					Gray sandy clay, trace rock (CL)	
11	35								- James Cary, Hace fock (CII)	
12	40			11	43	68			Gray silt (ML)	-  -  -

								DG TOTAL DEPTH SHEET 1 0	34.5 ft
PRO.	IECT Lena	Road Land	ifill, Pha	se II	65.	** ***		FILE NO 87-	7326
30RI	NG LOCATIO	N Soo t	Tioning 2						<del></del>
COU. DATI	NTY <u>Mana</u> ESTARTED	tee 9-20-1988		STAT DAT	LE COI	Florid MPLE	da TED	ELEVATION 33.99 ft NGVD (approxima 9-20-1988 BORING TYPE SPT	tely)
111111	LER/RIG ER TABLE DE	Fisher/Nic	ck					LENGTH/TYPE CASING Used driller's much	I
						- DA'	TE —	TIME Used drifters indo	
EEM.	ARKS								
Dept	h Stand	ard Penetration			Lab	Data			T -
Meters	Blows/6"	N	Sample	N <sub>M</sub>	· -		PI	Soil Description and Remarks	Undisturbe
ו מבי	Blows/6"	Value	No.	(%)				(Unified Classification)	Samples
+	<del>                                     </del>		<del></del>	-	-		╁		+
	7	ł					ĺ	Light brown fine sand (SP)	<b> - </b>
1	7	1				ł	ĺ	-	<b> -</b>
4	7			1	ł		l	<u></u>	<b> - </b>
	5 2-2-4	6	1	ł	ļ			<u> </u>	<b> -</b>
	7	1	1	ł	ļ		ĺ	<u> </u>	
4	7	1		l		ĺ	1	_	<b>F</b> 1
	7	}	1		ĺ	l	l		<b>-</b> ∤}
	7	1		]		1	)	Grayish brown slightly silty fine sand (SP-SM)	<b> </b>
ر ل <u>ـ</u>	.0 5-5-5	10	2			l		Citay is in brown suggestly sirty time saile (37-314)	<u>                                     </u>
		]	] -	ĺ	l		1		
	7				ŀ			ļ	<b> </b>
	7	1		ĺ	]		1	<u></u>	<b> </b>
7	7.	İ		l			)	Ť.	<b> </b>
	3-2-3	5	3		ĺ				<b> </b>
	7	1			ĺ	]	l	Γ	
+	3		ļ		l				
		1		]	}		1		<b>-</b> []
.		1	ł					Gray clayey fine sand with phosphate and thin lenses of	
<u> </u>	6-8-11	19	4	l	ĺ			gray fine sand (SC)	
		ĺ		l	ł	[			
	_								
4			_						1
	5-10-13	23	5					_ Gray clayey fine sand (SC)	
2	14-16-15	31	6					_	
	11-10-8	18	7						1_
	_	1						Gray to green clayey fine sand with rock fragments (SC)	-
	10-12-50/3	73/9	8					-	-
	38-29-25	54	9					-	
۲.	10								1
	19-12-9	21	10					Construction (CV)	
	8-9-11	20	11					Gray sandy clay (CL)	
2	_							-	_
	19-30-50	80	12					-	-
<u>با</u>	35	1			1	1	1	The maintain and the state of t	
1	-					1		Termination of boring at 34.5 feet.	-
	_							-	-
	-							-	-
2	1			1				_	

ARDAMAN & ASSOCIATES, INC.

BORING NO. STA 30+00 TOTAL DEPTH 34.5 ft SHEET 1 OF 1

PROJECT Lena Road Landfill, Pha	ase II				FILE NO. 87-7326
CLIENT Manatee County Depart	tment of Public Works				
BORING LOCATION See Figure 3.					
COUNTY Manatee	STATE Florida		ELEVATION	33.82 ft	NGVD
DATE STARTED 9-20-1988	DATE COMPLETED	9-20-1988	BORING TYPE	SPT	I.G / B
DRILLER/RIG Fisher/Nick		0 00 10,00	LENGTH/TYPE		Used driller's mud.
WATER TABLE DEPTH: 1st 1.0'	DATE	9-20-1988	TIME		0000 0111101 0111111
2nd	DATE		TIME		-
REMARKS					

De	pth		rd Penetratio			Lab 3	Doto			
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbed Samples
2	5	4-7-8	15	1					Brown fine sand (SP)	-
3	10	4-6-6	12	2	19	7			Gray slightly silty fine sand (SP-SM)	-   -   -
5	- 15	3-4-2	6	3					Gray slightly silty fine sand with phosphate (SP-SM)	-
6	20	3–5–6	11	4					Gray clayey fine sand with phosphate (SC)	- - -
7	- - 25	3-5-7 6-7-7	12 14	5 6	37	75			Gray sandy clay, trace phosphate (CL)	
8	_	6-7-6 12-31-50	13 81	7 8					Gray sandy silt with rock fragments (ML)	
9	30	37-50/2	50/2	9						-
10		28-17-14 13-18-21	31 39	10 11					- Light gray silt (ML) -	_
11	35	24-30-21	51	12					Termination of boring at 34.5 feet.	_
12	40									-

ARDAMAN & ASSOCIATES, INC.

BORING NO. STA 32-TOTAL DEPTH 30.0 ft SHEET 1 OF 1 STA 32+00

PROJECT Lena Road Landfill, Phase II CLIENT Manatee County Department of Public Works	FILE NO. 87-7326
BORING LOCATION See Figure 3.	
COUNTY Manatee STATE Florida ELEVATION	34.20 ft NGVD (approximately)
DATE STARTED 6-2-1988 DATE COMPLETED 6-2-1988 BORING TYPE S	SPT
DRILLER/RIG Fisher/Nick LENGTH/TYPE CA WATER TABLE DEPTH: 1st 3.5' DATE 6-2-1988 TIME	ASING Used driller's mud.
2nd DATE TIME	
REMARKS	

L_	pth		rd Penetratio	on Test	_					
			ASTM D-1586			Lab ]	Data		Soil Depositation and Remarks	
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbed Samples
	_	1-1-2	3	1 2					Gray fine sand with roots (SP)	_
1	-	1-2-2	4	3					Light brown fine sand (SP)	
	- 5	1-2-3	5							<b>-</b>
		<b>2-5</b> -6	11							_[_
2	-	4-7-7	14	4					Brown slightly silty fine sand (SP-SM)	[-]
48 - 100		5-7-7	14						<b>-</b>	[
_3_	10	4-5-6	11						_	<b> -</b>
	-								<del>-</del>	-
4	-								Gray fine sand, trace phosphate (SP)	
	15	3-3-2	5	5					-	
5_	-								-	-
		2-2-3	5	6		14			Light brown clayey fine sand with phosphate (SC)	-[-]
6	20	4-6-7	13	7		17			Light brown clayey line sand with phosphate (SC)	
	_	4-6-7	13	8		28			Gray clayey fine sand (SC)	<b>-</b>
7	-	5-7-7	14	9		62			Gray sandy clay (CL)	1
	- 25	4-5-7	12	10					F	<b> -</b>
8	-	6-50/6	50/6	11						
	-	50/4	50/4	12	21		22	5	Light gray silt with rock fragments (ML)	7-1
9	_ 30	50/5	50/5	13					-	
	_50								Termination of boring at 30.0 feet.	
10	-									-
									<del>-</del> -	
11	35								-	$\vdash$
									<del> -</del>  -	
	-								-	-
12	40								<u> </u>	<u> </u>

	B	O	R	IN	G	L	OG	i
ARD	ΑM	ΑN	&	AS	SO	CIA	TES.	INC

BORING NO. STA 34+00 TOTAL DEPTH 31.5 ft SHEET 1 OF 1

PROJECT _ Lena Road Landfill, Phase II	FILE NO. 87-7326
CLIENT Manatee County Department of Public Works	
BORING LOCATION See Figure 3.	· · · · · · · · · · · · · · · · · · ·
COUNTY Manatee STATE Florida	ELEVATION 34.0 ft NGVD (approximately)
DATE STARTED 10-20-1988 DATE COMPLETED 10-20-1988	BORING TYPE SPT
DRILLER/RIG David/David	LENGTH/TYPE CASING Used driller's mud.
WATER TABLE DEPTH: 1st 4.5' DATE 10-20-1988	TIME
2nd DATE	TIME
REMARKS	

L.	MARI										
	pth		rd Penetratio ASTM D-1586			Lab J	Data				
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)		Undistur Sample	
				1					Gray fine sand (SP)	_	
1				2					- Brown fine sand (SP)		
	5			3					Gray silty fine sand (SM)	F	
2				4					Brown silty fine sand (SM)		
	-			5					Gray silty fine sand (SM)		
3	10								<u>-</u>		
4										-	
	15_								Light brown fine sand (SP)		
5_	]	3-4-7	11	6							
		3-4-3	7	7					Light brown fine sand with phosphate (SP)	-	
6	20	1-1-5	6	. 8					Grayish brown clayey fine sand with phosphate (SC)	-  -	
	-	5-5-5	10	9	26	23			- Gray sandy clay with phosphate (CL)		
7	} -	4-6-10	16	10					Gray clay with phosphate (CH)	<b>.</b>	
	25	6-8-9	17	11					Gray clayey fine sand (SC)	<del> </del>	
8		6–1–5	6	12							
	-	6-50/6	50/6	13					Light brown clayey fine sand with phosphate (SC)	-	
9	] ]	50/6 ~ -	50/6	14					Light brown clay with cemented sand and phosphate (CH)	[]	
	_30_	50/6	50/6	15					Bight brown day with demented sand and phosphate (CH)	$\vdash$	
10	-	50/6	50/6	16						-	
									Termination of boring at 31.5 feet.		
11	35										
									F		
12	-								-	-	
	40		Associates								

									OG BORING NO. TOTAL DEPTH SHEET 1 OF	30.5 ft	
PROJECT Lena Road Landfill, Phase II											
BORING LOCATION See Figure 3											
COUNTY Manatee STATE Florida ELEVATION 33.8 ft NGVD (approximately)  DATE STARTED 10-21-1988 DATE COMPLETED 10-21-1988 BORING TYPE SPT  DRILLER/RIG David/David LENGTH/TYPE CASING Used driller's mud.											
		R/RIG TABLE DE							LENGTH/TYPE CASING Used driller's mud.		
		KS	2nd				DA'	LE _	10-21-1988 TIME TIME		
ㄴ			rd Penetration								
	epth		ASTM D-158			Lab :	Data		Sell Description of D		
Meters	Feet	Blows/6*	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbed Samples	
۱	-								-	-	
	-			,				,	_	<u> - </u>	
1	-								-	-	
ı	5							1	<b>-</b> L	<b> </b>	
2	_										
_	-								Washed	_	
	-								-	-	
3	10								-	FI 1	
ĺ	_										
.4	-			ĺ.,					-	<u> </u>	
l	_ 15								_	<u>-                                    </u>	
5	10	6-5-5	10	1					Day 1 (00)	<u> </u>	
۲		Ì							Brown clayey fine sand (SC)	[]	
ĺ	-	1-1-1	2	2					Gray slightly silty fine sand with traces of phosphate		
6	20	110							(SP-SM)	-	
l	20	1-1-3 3-4-6	4 10	3 4						+	
									Gray clayey fine sand with phosphate (SC)	<b> </b>	
7		6-12-14	26	5							
		6-8-7	15	6					Light gray clayey fine sand with phosphate and cemented	-	
8	25	8-8-13	21	7					sand (SC)	-	
r		50		8							
		40							Light gray sandy clay (CL)		
9	_	10-18-50	68	9					-	-	
	30	15-50-		10 11						]_	
									Termination of boring at 30.5 feet	-	
10	]										
	-								_		
	35								-	-	
11	-								-	-	
	-								-	-	
12									<u>-</u>		

ARDAMAN & ASSOCIATES, INC.

BORING NO. STA 38+00
TOTAL DEPTH 30.0 ft
SHEET 1 OF 1

PROJECT Lena Road Landfill, Pha CLIENT Manatee County Depart				FILE NO. 87-7326
BORING LOCATION See Figure 3.				
COUNTY Manatee	STATE Florida		ELEVATION	33.70 ft NGVD (approximately)
DATE STARTED 10-7-1988	DATE COMPLETED	10-7-1988	BORING TYPE	Auger
DRILLER/RIG David/David	<u> </u>		LENGTH/TYPE	
WATER TABLE DEPTH: 1st 3.5'	DATE	10-7-1988	TIME	
2nd	DATE		TIME	
REMARKS				

<u> </u>		Standa	rd Penetratio	man Man						
	pth		ASTM D-1586	in rest		Lab I	Data			
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	<b>-2</b> 00 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbed Samples
	-			1					Brown slightly silty fine sand (SP-SM)	-
1_	1			2					Brown silty fine sand (SM)	T-
	5			3						
2				4					Light brown slightly silty fine sand (SP-SM)	F
3	_ 10			5						E
	-			6					- - -	
4_	-			7					-	
5_	15			8					Gray slightly silty fine sand with phosphate (SP-SM)	
	-			9						
6_	20			10 11					Gray clayey fine sand with phosphate and shell (SC)	
7				12					- Gray sandy clay with phosphate (CL)	
	2 <u>5</u>			13						
8	-			14					Gray sandy clay with rock (CL)	-
9	_ _ _30			15					<del> -</del>  -	-  -
									- Termination of boring at 30.0 feet.	
10									_	E
11	35								-  -	-
	-								- -	-
12	40									

# BORING LOG ARDAMAN & ASSOCIATES, INC.

BORING NO. STA 40+00
TOTAL DEPTH 29.0 ft
SHEET 1 OF 1

PROJECT Lena Road Landfill, Phase II	FILE NO. 87-7326
CLIENT Manatee County Department of Public Works	
BORING LOCATION See Figure 3.	
COTINE	
COUNTY Manatee STATE Florida ELEVATION	33.5 ft NGVD (approximately)
DAME ON A DATE	
DATE STARTED 10-22-1988 DATE COMPLETED 10-22-1988 BORING TYPE	SPT
	CASING Used driller's mud.
WATER MARY WEREN	one osed driner's mud.
WATER TABLE DEPTH: 1st 4.0' DATE 10-22-1988 TIME	
DATE TIME	
DEM A DVG	
REMARKS	

	WAR									
	epth	Standa	rd Penetratio ASTM D-1586	on Test	Lab Data					
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbed Samples
	-	2-3-3	6	1 2					- Brown fine sand with roots (SP)	
1	-	4-5-5	10						-	-
	5	7-5-6	11	3						
2	-	8-10-12	22	4					- Light brown slightly silty fine sand with roots (SP-SM)	-
		4-5-6	11	5						
,		7-10-9	19	6					Light brown slightly silty fine sand (SP-SM)	-
۲	10	6-6-6	12	7 8					<b>├-</b> -	
ı	-	3-1-3	4	9					_	-
4_	_	3-4-5	9	10					_	
l	15	3-6-5	11	11						
5	-	5-20-20	40	12					Gray clayey fine sand with phosphate and traces of shell fragments (SC)	_
l		3-5-7	12						-	-1
_6	20	2-2-5	7	13					-	
ı	_	2-2-2	4	14					-	
7	-	2-2-7		15 16					-	-
		3-3-6	9	17						<b>†</b> [
	25	7-6-9	15	18					- Gray sandy clay with seams of gray clay (CL)	
8		5-5-11		10						-
		10-50/3 50/6	16 50/3 50/6	19 20 21					- Gray clayey fine sand with phosphate (SC)	
9	30	55/0	55/5	21					Termination of boring at 29.0 feet.	
	-								- Termination of boring at 25.0 feet.	-
10	-								-	-
	_								_	
	35								_	
11									-	-
									_	-
12										
	40									

									DG TES, INC.  BORING NO. TOTAL DEPTH SHEET 1 0	
PR( CL)	OJEC IENT	Lena Manat	Road Lane ee Count	fill, Pha	se II	of Dub	lie To	anlas	FILE NO	7 3 2 6
BO)	RING	Manat LOCATION Y Manat	See I	Figure 3.	OT A	OI Put	one w	OFKS		
			0-4-1300		DAT	E COI	Florid MPLE	TED _	ELEVATION 33.35 ft NGVD 6-2-1988 BORING TYPE SPT	
WA'	TER	R/RIG TABLE DEF	Fisher/NieTH: 1st	<u>3.5</u> '			DA'	TE	LENGTH/TYPE CASING Used driller's muse 6-2-1988 TIME	1.
	MARI		2nd					TE _	11ME	
De	pth		rd Penetrati ASTM D-158		Γ	Lab	Data			<del></del>
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	T	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbed Samples
		1-1-2	3	1					Gray fine sand with fine roots (SP)	
	-	1-2-2	4	2	`				Dark brown slightly silty fine sand (SP-SM)	<b>T</b>
1		1-2-3	5	3					-	-
	5	2-4-5	9							1
2	-	3-5-8	13						Gray silty fine sand (SM)	-
	1	7-9-7	16	ļ						<del>-</del> [
3									Gray slightly silty fine sand (SP-SM)	
Ť	10	5–7–6	13						-	$\vdash$
	]								_	
4	_						 		-	
	15	2-2-3	5	6					-	-
5				}						
Ť	_									
	4	1-1-1	2	7					Gray clayey fine sand with shell and phosphate (SC)	<b>7</b> -∤
6	20	1-1-2	3	8						
	-	4-6-5	11	9		23				
7	]	3-7-5	12	10						+1
	4	3-2-4	6	11					Gray clayey fine sand (SC)	
8	25	2-50/3	50/3	12						-{-
•		2 55,5	00,0						Light gray sandy clay with rock fragments (CL)	
	4					l			-	
9	30	27-50/4	50/4	13					-	$\vdash$
									Tormination of boning at 20.0 feet	
	-								Termination of boring at 30.0 feet.	
10	-								-	-
	35								<u> </u>	-
r	~~			ļ					<u> </u>	

									OG TES, INC.  BORING NO. TOTAL DEPTH SHEET 1 OF	STA 44+0 30.0 ft
	OJEC ENT		Road Land ee County	fill, Pha	se II	of Dub	lia W	anlea	FILE NO. 87-73	126
BOI CO	RING	LOCATION	See F	igure 3.		re			TI DIA TION	
DA'	TE ST	TARTED	10-7-1988		DAT	E CO	APLE'	red [	ELEVATION 33.30 ft NGVD (approximate Auger	
WA	TER	TABLE DEF	David/Dav PTH: 1st	3-0'	_			re	LENGTH/TYPE CASING 10-7-1988 TIME	
		ks	2nd				DA'	re _	10-7-1988 TIME TIME	
	pth	Standa	rd Penetrati			Tab 1				<del></del>
	-		ASTM D-158			Lab		Ī	Soil Description and Remarks	Undisturbe
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	(%)	(%)	(Unified Classification)	Samples
	-			1					- Brown slightly silty fine sand (SP-SM)	
1	4	[		2					Light brown slightly silty fine sand (SP-SM)	
	5								-	<b> -</b>
_ [				3		}			-	<b> </b> -
2	4	1		4						Ėł
	4	}							-	L I
3	10			5	20	6		ĺ	-	-
7	1								-	<del>[-</del> ]
	]	}		6						<b> </b>
4	4	j		7					Grayish brown slightly silty fine sand with phosphate	
									and rock fragments	-
╶┟	15			8					-	
5	]			9					<u> </u>	<b> - </b>
-	4					<b>'</b>				
,				10					Gray clayey fine sand with phosphate and rock fragments	
7	20								(SC)	_
				11					Gray slightly clayey fine sand with phosphate and trace     of rock fragments (SC)	<b>-</b>
7				12						
	-								-	
	25			13		]				<u>L</u> 1
8	-								Gray sandy clay with phosphate (CL)	<b> -</b>
	]			14	41		52	22	Craw alaw (CV)	<b> </b>
9	4			15					Gray clay (CH)	
7	30									_
	+								Termination of boring at 30.0 feet.	-
0	1									
	1									-
-	35									
1								1	L	

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# BORING LOG ARDAMAN & ASSOCIATES, INC.

BORING NO. STA 46+00 TOTAL DEPTH 30.0 ft SHEET 1 OF 1

PROJECT Lena Road Landfill, Phase II FILE NO. 87-7326	
BORING LOCATION See Figure 3.	
COTIVING	
Florida SZ.Z II NGVD (approximately)	
DDII 1 ED /DYG	
WATELER/RIG David/David LENGTH/TYPE CASING Used driller's mud.	
WATED TADE P. DEDUCE. 1.4	
10 44 1000	
2nd DATE TIME	
REMARKS	

	pth		Standard Penetration Test ASTM D-1586							
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbed Samples
	_	1-2-5	7	1					Gray fine sand with traces of roots (SP)	
1	_	4-4-4	8	2					Brown fine sand (SP)	-  -
	5	3-1-2	3	3						
2	-	2-4-6	10	4					Light brown slightly silty fine sand (SP-SM)	-
		5-5-5	10	5						
3	_ 	5-6-6	12	6					-	_
į.	_	8-7-8	15	7					[	
	-	3-3-6	9	8					-	-
4		7-8-9	17	9						-
	15	5-5-11	16	10					<u>-</u>	_
_5_		8-8-11	19	11					-	<u>                                     </u>
	-	6-8-10	18	12					Brown fine sand with traces of phosphate (SP)	-
6	20	5-5-4	9	13						
		2-1-1	2	14					Gray clayey fine sand with shell fragments and traces of phosphate (SC)	F
7_	_	1-1-2	3	15						
	- 25	7-10-50/3	50/3	16					_	-
8	_	50/3	50/3	17					Gray clayey fine sand with phosphate and cemented sand (SC)	-
	-	50-50-50/3	50/3	18						
9	-	50/3	50/3	19					Gray slightly sandy clay with phosphate (CL)	-
	30	50/3	50/3	20						-
10	-								Termination of boring at 30.0 feet.	
10	-								-	-
	35								Ĺ	
11	-								-	
	-								-	-
12										
	40									

				ARDAN	IAN	& A	sso	CIA	DG TES, INC.  BORING NO. TOTAL DEPTH SHEET 1 OF	1
	OJEC IENT	T Lena 1	Road Land	fill, Pha	se II	of Duk	lin Viv		FILE NO	326
во		20011101	· <u>see r</u>	igure 3.						
DA	TE ST	TARTED	10-7-1988		STAT	E CO	Florid IPLE	a FED	10-7-1988 BORING TYPE Apper	
DR	ILLE	R/RIG TABLE DEF	David/Day	rid				ΓE	LENGTH/TYPE CASING	
			2nd	2.5			DAT	re _	10-7-1988 TIME TIME	
RE.	WAKI	KS						_		
	pth		rd Penetration ASTM D-158			Lab	Data			
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbed Samples
	_	,		1					- Light brown slightly silty fine sand (SP-SM)	-
1	-			2	ł			1		
OLAN COLOR	-			}					-	-
	5_			3				ľ	<u> </u>	
2	-			ł	ĺ	1			<u> </u>	-
	-			4	[			}	<del> -</del>	<b>F</b>
	1	·			1	ĺ			-	-
3	10			5	ĺ			[		<b>F</b>
					ŀ			}		
ł				6		İ				
4				7		1		[		[]
	4			·	Ī	ł			Brown silty fine sand (SM)	
	15			8	1	1	}	}	<u>'</u>	
5	-			ł	ł	1		[	<u>-</u>	-
	-			9	1					<del> </del>
6	-			10	}				- Gray silty fine sand with phosphate (SM)	<u> </u>
	20			l		}			Gray silty fine sand with phosphate, trace of rock (SM)	]-
7	-			11	17	20			Gray clayey fine sand with phosphate and rock fragments (SC)	<u> </u>
	-			12						<b> </b> -
8	25			13					Gray sandy clay with phosphate and traces of rock (CL)	
				14						
9_	30			15					- Gray clay with phosphate (CH)	F
	-								Termination of boring at 30.0 feet.	
1,,	-								- The state of the	_
10	-								-	-
									-	-
	35								-	
11	-								-	-
	-								-	<b> -</b>
	4					}			<u> -</u>	H

ARDAMAN & ASSOCIATES, INC.

BORING NO. STA 50+00 TOTAL DEPTH 30.0 ft SHEET 1 OF 1

PROJECT Lena Road Landfill, Phase II	FILE NO. 87-7326
CLIENT Manatee County Department of Public Works	FIRE NO
BORING LOCATION See Figure 3.	
COLLYDY	ELEVATION 31.3 ft NGVD (approximately)
DATE COLA DIMENSIONAL PROPERTY OF THE PROPERTY	Olio It ROYD (approximately)
DD# 10-40-1000	BORING TYPE SPT
WATER MARY PROPERTY	LENGTH/TYPE CASING Used driller's mud.
WATER TABLE DEPTH: 1st 5.5' DATE 10-25-1988	TIME
2nd DATE	TIME
REMARKS	

	pth		rd Penetratio ASTM D-1586			Lab 1	Data				· · ·
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Und Se	listurbed amples
	-	1-3-3	6	1					- Brown fine sand with roots (SP)		
1	-	4-4-5	9	2						-	
	5	6-4-4	8	3					Light brown fine sand (SP)	-	
2	-	3-2-2	4	4					-		
1	-	2-1-3	4	5					-	-	
		3-4-5	9	6							
3	10			7							
1	-	6-7-9	16						-	ŀί	
4		6-6-8	14	8					-	-	
广		4-4-5	9								
ł	15	6-6-8	14	9							
5	-	7-7-9	16	10					Gray slightly silty fine sand with phosphate (SP-SM)	-	
		6-6-9	15	11							
6	20	6-11-18	29	12	:				-	$ \cdot $	
		6-6-7	13	13							
7		7-9-11	20	14					Gray clayey fine sand with phosphate (SC)	-	
	ا _ ا	9-11-15	26	15							
8	<u>25</u>	10-50/6	50/6	16					Light brown sandy clay with phosphate (CL)		
ı	-	50	50/6	17					-	-	
		50	50/6	18							
9	30	35-50/6	50/6					_			
									Termination of boring at 30.0 feet	-	
10	]									_	
1	25								-	H	
11	35								-	-	
	-								-		
12	40								-	$ \cdot $	
	40								the state of the s		

#### BORING LOG ARDAMAN & ASSOCIATES, INC.

BORING NO. STA 51+50
TOTAL DEPTH 31.0 ft
SHEET 1 OF 1

PROJECT Lena Road Landfill, Phase II	FILE NO. 87-7326
	FIDE NO
BORING LOCATION See Figure 3.	
COTTAMA	
	TION 31.17 ft NGVD
DATE STARTED 6-3-1988 DATE COMPLETED 6-3-1988 BORING	
DDITT TO TOO	
DRILLER/RIG Fisher/Nick LENGT	H/TYPE CASING Used driller's mud.
WATED MADY E DEDMEY	Used driners indd.
WATER TABLE DEPTH: 1st 4.5' DATE 6-3-1988 TIME	
REMARKS	

F	_,, ¬	Standa	rd Penetratio	n Toot						· · ·
	pth		ASTM D-1586			Lab I	Data		Soil Provide and P	
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbed Samples
	_	1-2-4	6	1 2					Light gray fine sand with roots (SP)	-
1	-	4-5-5	10	3					Light brown slightly silty fine sand with roots (SP-SM)	
	5	4-2-2	4	4					Gray silty fine sand (SM)	<del> </del>
		1-1-1	2				j		Gray sirty fine said (511)	
2		1-1-0	1							F
		1-1-2	3						-	<u></u>
3_	10	3-3-4	7	5					Gray slightly silty fine sand (SP-SM)	-
									-	
4_	-								Drown alousy fire good (SC)	7-1
	15	1-2-1	3	6					Brown clayey fine sand (SC)	<b>†</b>
5	-								-	F
										<u>-</u> -
6		4-5-6	11	7					Dark gray slightly silty fine sand (SP-SM)	
	20	4-2-1	3	8						<u>}-</u>
		1-1-2	3	9		10			Dark gray slightly clayey fine sand (SM-SC)	<u>                                     </u>
7	-	3-5-5	10	10					Gray silty fine sand with rock fragments, trace of phosphate (SM)	]
	_25	11-21-27	48	11					Light brown to gray clayey fine sand with a trace of	<b> </b>
8_	-	28-17-42	59	12					phosphatic rock (SC)	F
		18-6-9	15	13	61	64	64	27	Gray clay, trace silt (CH)	<u> </u>
9		10-16-21	37	14					- Gray sandy clay with rock fragments (CL)	-
	-30	24-50/5	50/5	15						<u> </u>
10	-								Termination of boring at 31.0 feet.	-
11	35_								-	-
***										-
12	40								-	-
			, r		,					

BORING NO. STA 52+00 TOTAL DEPTH 30.0 ft

ARD	AMAN & ASSOCIATES, INC.	SHEET 1 OF 1
BORING LOCATION See Figure COUNTY Manatee  DATE STARTED 10-7-1988  DRILLER/RIG David/David	artment of Public Works	FILE NO. 87-7326  31.50 ft NGVD (approximately) Auger CASING
WATER TABLE DEPTH: 1st 3.5		
REMARKS	DATE TIME	
Depth Standard Penetration Test ASTM D-1586	Lab Data	
10		

De	epth	Standa	rd Penetratio	on Test		Tab 1	D-4-			· ·
Meters	Feet :	Blows/6"	N Value	Sample No.	NM (%)	Lab ) -200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbe Samples
1 2 3 4 5 6	10 15 20 25		VALUE	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	19	11			- Light brown silty fine sand (SM)  Gray silty fine sand (SM)  Brown slightly silty fine sand with traces of phosphate (SP-SM)  Gray silty fine sand with phosphate, trace rock fragments (SM)  Gray clayey fine sand with phosphate (SC)  Gray clay (CH)	
10 11 12	35								Termination of boring at 30.0 feet.	

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#### BORING LOG ARDAMAN & ASSOCIATES, INC.

BORING NO. STA 54+00 TOTAL DEPTH 31.5 ft SHEET 1 OF 1

PROJECT Lena Road Landfill, Pha	se II			FILE NO. 87-7326
CLIENT Manatee County Depart	mont of Dublic Worles			1100 1100
	ment of Fublic works			
BORING LOCATION See Figure 3.				
COUNTY Manatee	STATE Florida		ELEVATION 32.09 ft 1	NGVD (approximately)
			BULVATION 32.09 It	AGAD (abbloximater)
DATE STARTED 10-25-1988	DATE COMPLETED	10-25-1988	BORING TYPE SPT	
	Duin comi nnimb.	10-20-1500	DOMING LIFE SPI	
DRILLER/RIG David/David			LENGTH/TYPE CASING	Timed delliante man 3
		_	LENGIN/IIPE CASING	Used driller's mud.
WATER TABLE DEPTH: 1st 5.0'	DATE	10 0F 1000	TIME	
WILL THE THE DATE IN THE OWN	םואם	10-25-1988	TIME	
2nd	DATE		miles.	
	DATE		TIME	
REMARKS				

	pth	Standa	rd Penetratio	on Test		Lab 1	Data			· ·
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbed Samples
	1	1-1-2	3	1					- Brown fine sand with roots (SP)	-
1	_	2-2-2	4	2						
	_ 5	3-3-5	8	3					Brown slightly silty fine sand with roots (SP-SM)	-
2	-	6-5-5	10	<b>4</b> 5					Light brown slightly silty fine sand (SP-SM)	-
	-	5-5-6	11	6					-	-
	-	6-6-6	12	7				Ì	-	-
3	10	6-6-8	14	8					_	_
	_	1-2-2	4	9						-
4	_	5-6-8	14	10					-	-
	15	5-6-5	11	11						
5_	_	2-1-2	3	12					_	
		6-6-7	13	13				 	Brown slightly silty fine sand with phosphate (SP-SM)	-
6	20	6-6-4	10	14						
	-	5-6-10	16	15					Gray clayey fine sand with cemented sand (SC)	_
7		7-6-7	13	16					Light gray sandy clay with phosphate (CL)	-
	_	10-9-11	20	17				[		
8	25	15-17-33	50	18					_	-
		23-50/3	50/3	19						
	-	30-41-50/3	50/3	20					-	-
9	30	50/3	50/3	21						-
	1	50/3	50/3	22						_
10	_								Termination of boring at 31.5 feet.	-
	35								_	_
11	-								-	-
										-
12	40								-	-
	40			Cara te Control						

									OG TES, INC.  BORING NO. TOTAL DEPTH SHEET 1 OF	STA 56+00 30.0 ft
C D D W	ATE S RILLE	Mana G LOCATIO Y Mana TARTED R/RIG TABLE DE	tee 10-7-1988 David/Da PTH: 1st 2nd	y Depart Figure 3. B yid 4.0'	STA' DAT	re e con	Floric MPLE	ia TED	ELEVATION 32.5 ft NGVD (approximate)  10-7-1988 BORING TYPE Auger LENGTH/TYPE CASING  10-7-1988 TIME TIME	y)
II control	Feet	Stands Blows/67	ASTM D-158  N  Value	Sample	NM (%)	Lab 1	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbed Samples
	-			2					- Brown slightly silty fine sand (SP-SM) - Light brown silty fine sand (SM)	-
	5			3					- - -	- -
_3	10			5					-    -	-
4	15			8	:				- - -	-
ľ	-			9	20	21			Gray clayey fine sand with phosphate, traces of rock	_

ARDAMAN & ASSOCIATES, INC.

BORING NO. STA 58+00
TOTAL DEPTH 35.0 ft
SHEET 1 OF 1

	OJEC IENT		Road Land ee County	fill, Phas	se II	& Deals	lin M.	1	FILE NOFILE NO	26
BO		LOCATION	See F	igure 3.						
DA	TE ST	CARTED _	ee 10-10-198	8	STAT	E CON	Florid MPLE	a FED	ELEVATION 33.0 ft NGVD (approximately BORING TYPE SPT	)
W A	TER	R/RIG TABLE DEI	David/Dav TH: 1st	'id 3.0'			DA'		LENGTH/TYPE CASING Used driller's mud.	
	MAR		2nd				DA'		10-10-1988 TIME	
	pth		rd Penetration			Lab 1	Data			
Meters	Feet	Blows/6"	N	Sample		-200	LL	PI	Soil Description and Remarks (Unified Classification)	Undisturbed Samples
Me	F		Value	No.	(%)	(%)	(%)	(%)		
	_								-	-
	-								-	-
1_	-								<u> </u>	-
	5								<u>}</u>	-
	_							[	<del>-</del>	-(
2	_								Washed	- [
									- Mashed	-
						ĺ				-
3	10							ĺ		_(
	_									_]
	_					[			-	_
4	-								-	-
		2-4-6	10	1 2					<del></del>	-
	15_	4-3-2	_	3		ĺ		ĺ	- Brown fine sand with traces of rock and phosphate (SP)	-
5	-	4-3-2	5	4		]			<u>-</u>	-
		1-1-4	5	5 6				ĺ	<u> </u>	-
	_	17-59-13	72	7		ĺ	}			-
6	20			8		12		]		-
	_	50-20-20	40	9		ł	ł		Light brown clayey fine sand with phosphate (SC)	_
		28-29-50	79	10				ł	-	_
7_	-	50-18-18	36	11					<u> </u>	-
	-			12		ļ	ĺ			_
	25	10-5-8	13	13					Gray sandy clay with traces of phosphate (CL)	-
8	-	16-20-27	47						<u>-</u>	-
	~	50-16-9	25	14					<u> -</u>	-
		30-10-9	23	15						-
9	<u>3</u> 0	8-6-6	12	16					Gray clay with phosphate, traces of rock fragments (CH)	-
		15-8-8	16							_
i				17		42				
10		14-5-6	11	18					_	_
	_	30-50-17	67	19					- Brown clayey fine sand (SC)	_
	35	50/8	50/8	20						_
11	_								Termination of boring at 35.0 feet.	-
	-								-	~
	-								-	-
12	40								<u>-</u>	-

ARDAMAN & ASSOCIATES, INC.

BORING NO. STA 60+00 TOTAL DEPTH 31.0 ft SHEET 1 OF 1

PROJECT Lena Road Landfill, Pha CLIENT Manatee County Depart			FILE NO. 87-7326
BORING LOCATION See Figure 3.	ment of I dolle works		
COUNTY Manatee	STATE Florida		ELEVATION 33.13 ft NGVD (approximately)
DATE STARTED 6-3-1988	DATE COMPLETED	6-3-1988	BORING TYPE SPT
DRILLER/RIG Fisher/Nick	<u> </u>		LENGTH/TYPE CASING Used driller's mud.
WATER TABLE DEPTH: 1st 4.75'	DATE	6-3-1988	TIME
2nd	DATE		TIME
REMARKS			

<u> </u>	-41	Standa	rd Penetratio	n Test				_		
	pth		ASTM D-1586			Lab I	Data		Sall Description and Description	l
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbed Samples
		1-2-2	4	1 2					Gray slightly silty fine sand (SP-SM)	
	4								Dark brown slightly silty fine sand (SP-SM)	<u>[</u> ]
1	-	1-1-2	3	3					Light brown slightly silty fine sand (SP-SM)	
		1-1-1	2						-	<b> - </b>
	5	1-1-3	4	4					Violation and Corp.	+-
2		4-6-7	13	_					Light brown silty fine sand (SM)	┸╽
	]			5					Light gray fine sand (SP)	
	_	5–7–7	14						Light gray line said (SP)	
3	10	6-5-4	9						<u> </u>	<u> - </u>
	-								-	-
4	1									+1
1									Dark brown silty fine sand (SM)	<b>†</b>
	15	1-1-2	3	6						
5	_								-	<b>L</b>
	4								-	<b> </b> -
	-									<u>-</u> -
6	20	6-9-9	18	7					Light gray clayey fine sand with rock fragments, trace	<b>T</b> -1
] [	1								phosphate (SC)	
	4	37-24-31	55	8						1
7	_	18-4-10	14	9		79			Gray sandy clay (CL)	
	- 25	21-13-27	40	10	35	74			Gray Sarry Clay (CL)	$\vdash$
8	20	21-28-19	47	11					-	H
H	-								<u> </u>	
		8-4-6	10	12		77				
9	_	7-9-7	16	13					-	-
	30	6-6-5	11	14					Gray clay (CH)	4-
	-									+1
10	-								Termination of boring at 31.0 feet.	-
	35								_	
11	-								-	-
	_								-	-
	~								<u> </u>	-
12	40									-

									OG TES, INC.  BORING NO. TOTAL DEPTH SHEET 1 0	STA 62+0 _30.0 ft F _1
	OJE		Road Land	ifill. Pha	se II				FILE NO. 97-7	
	IENT RINC	Mana LOCATIO	tee Count N See F	y Depart			olic W	orks		
CU	UNT	Y Mana	tee		STA	re F CO	Florid	la	ELEVATION 33.2 ft NGVD (approximate 10-12-1988 BORING TYPE SPT	ly)
I DK	ֈրրբ	R/RIG	Dourid /Dou	rid					LENGTH/TYPE CASING Used driller's mud	
		TABLE DE	PTH: 1st 2nd	3,5'			– DA' DA'	TE TE	10-12-1988 TIME	
RE	MAR	KS								
	pth	Standa	ard Penetration			Lab	Data			T
Meters	eet	Blows/6"	N	Sample	NM	-200	LL	PI	Soil Description and Remarks	Undisturbed Samples
Me	Fe	DIOWS/6	Value	No.	(%)	(%)	(%)	(%)	(Unified Classification)	Samples
									Light brown slightly silty fine sand (SP-SM)	<del>                                     </del>
	_	<b>!</b>						ł		
1	_	ł								
	_	{	ĺ	1					+	<u> </u>
	5_	}				1			<u> </u>	
2	_				ŀ				-	-   ·
	-		ļ.	ĺ					<u></u>	<b>F</b> 1
				ł			l			<b> </b>
3	10				l		ļ			<u> </u>
	_			ł		ĺ				
П	_		l		ĺ		l		_	
4	-		]		ł				-	1
		3-3-4	7	1		l	l	1	Brown slightly silty fine sand (SP-SM)	<b>1</b>
П	15	3-6-4		2	ĺ				Brown slightly silty fine sand with traces of phosphate	<del>[-</del> -}
5	_	3-0-4	10	3			İ	ł	(SP-SM)	┟│
		7-21-38	59	4 5		1	]	ļ	<ul> <li>Gray clayey fine sand with phosphate and traces of rock fragments (SC)</li> </ul>	}
		27-50-29	79	6	1					<b>†</b>
6_	20			ĺ	1			}	Light brown clayey fine sand with phosphate (SC)	
	_	70-25-29	54	7	39	56				$\Gamma$
	-	16-20-50/3	70	8 9	ĺ	) `			Gray sandy clay (CL) Gray sandy clay with phosphate (CL)	1
7	-	10-21-29	50	10					Gray sandy clay with phosphate (CL)	<b>1</b> -
	25	26-30-34					ĺ			<del> </del> -
8	טע	20-30-34	64	11					Gray sandy clay (CL)	<u></u>
ľ	~	25-31-35	66	12					Gray sandy clay with phosphate (CL)	-
		16-9-25	34	13					Character with the translate (CW)	<b>†</b>
9	_	00 00							Gray clay with phosphate (CH)	
٦	30	20-28-31	59	14						$\perp$
	٦								Termination of boring at 30.0 feet.	-
10	-								-	-
	-								-	-
	35								<u> </u>	-
11	5.0								<u></u>	
12									L	Γ

									OG TES, INC.  BORING NO. TOTAL DEPTH SHEET 1 0	STA 64+0 31.5 ft F 1
PR	OJE(		Road Land						FILE NO. 87-7	326
BO	RINC	LOCATION	tee Count N See I	igure 3.						
DA	UNT TE S	TARTED	ee 10-13-198	18	STA' DAT	TE E CO	Florid	la TED	ELEVATION 33.3 ft NGVD (approximate 10-13-1988 BORING TYPE SPT	ly)
יוע	パルバロ	R/RIG TABLE DE	Fietoh/De	wid			DA'		LENGTH/TYPE CASING Used driller's mud	
	MAR		2nd	_ 3.5		_	DA'	TE _	10-13-1988 TIME TIME	
	pth	Standa	ard Penetrati	on Test		Tob :	Data			
	<del>-</del>		ASTM D-158	Sample	NM	-200	LL	DY	Soil Description and Remarks	Undisturbe
Meters	Feet	Blows/6"	Value	No.	(%)		(%)	(%)	(Unified Classification)	Samples
	_			1					Gray fine sand (SP)	1
	-	ļ				ĺ			Brown fine sand (SP)	
1_	_	1		2						<u> </u>
	_ _ 5		[			l			Dark gray slightly silty fine sand (SP-SM)	<b>7-</b>
2	_			3						
_4_	_							[	_	
	-			4					-	<b> -</b>
3	10								<u> </u>	<b>H</b>
						}				
	_			5						
4	-								-	<b> </b> -
	 15	3-3-3	6	6					-	<b>F</b>
5		2-3-5	8	7						
	_	5-5-5	10	8						<u> </u>
	-	2-4-6	10	9					Brown slightly silty fine sand (SP-SM)	<b> </b> -
6	20		10						Gray silty fine sand with phosphate and trace of rock fragments (SM)	+
	_	4-3-8	11	10					Gray slightly silty fine sand with phosphate and traces	
7	-	8-8-8	16	11					of rock fragments (SP-SM)	<b> </b> -
Ė	_	5-8-12	20	12	30	57			Gray clayey fine sand with phosphate (SC)	<del> </del> -
	25	8-12-28	40	13	ĺ					
8	_	50-50-50	50 50	14 15						-[]
	-		50	16					Gray sandy clay with phosphate (CL)	<u> - </u>
	-	10-16-17	33	17					<u> </u>	<u> - </u>
9_	30	10-26-34	60	18						
	-	18-22-26	48	19					-	
10	-									1-1
	-								Termination of boring at 31.5 feet.	-
	35									-
11										

									TOTA	NG NO. L DEPTH [ <u>1</u> OF	STA 66+00 35.0 ft
	OJEC	- rena	Road Land							NO87-73	
BO	IENT RING					of Pub	lic W	orks			
Co	UNT	Manat LOCATION Manat TARTED	ee Bee F	igure 3.	STAT	CE	Florid	la	ELEVATION 33.5 ft NGVD (a)	pproximatel	<del>v)</del>
DA DR	TE S. ILLE		10-13-198 Fletch/Da		DAT	E CO	MPLE'	TED _			
WA	TER	TABLE DE	PTH: 1st	3.51			DA'	ΓE	LENGTH/TYPE CASING Used dr TIME		
		Ks	2nd				DA'	TE	TIME		
	pth		ASTM D-1586			Lab :	Data				<u>-</u>
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)		Undisturbed Samples
				1					Gray fine sand (SP)		
	_					l			Brown fine sand (SP)		
1	_			2			[				
	_						İ				
	5			3		[	ľ		Dark gray slightly silty fine sand (SP-SM)		
2	4		ĺ		ĺ	ĺ		ļ			<u> </u>
Ť	_		}			İ	١.		  -		L
	-		ļ	4	ŀ	ł		ł	<u>_</u>		L
۱ , ا	-				ļ			1	_		- [
3	_10_		,	5			[	ļ	_		<u>-</u>
	-		1			ļ	İ	]	-		- 1
	-						ŀ		-		<b>-</b> (
4	-			6		ł			-		-
				_				l	-		-
	15		}	7					-		<b>-</b>
5	٦						l	]	-		<del>-</del>
	4	4-4-5	9	8			ĺ				-
	-	5-8-12	20	9				ĺ	Gray silty fine sand with traces of phosphate an	nd rock	-
6	20	J-0-12	20	10		[			fragments (SM)		- (
		9-6-3	9	11		ŀ		l	<u> </u>		<u>-</u>
	-	4-4-8	12	12		ŀ		l	<u> </u>		-
7	٦						ĺ	l			<u> </u>
	٦	8-18-29	47	13	19	15	l	1	Gray clayey fine sand with phosphate (SC)		-
	25	50	50	14	[						
8		28-20-47	67	15	ŀ	l	l				
	_	15-21-37	58	16					_		
	_	9-12-16	28	17					<del></del>		-
9	30	12-16-21	37	18					Gray sandy clay with phosphate (CL)		-
	_	8-9-24	33	19							-
10		9-12-22	34	20							
	25	11-12-24	36	21							-
	35					-	-	_	<del></del>		-
11	-					1			Termination of boring at 35.0 feet.		- [
	-								<u> </u>		- [
									<u> </u>		-
12	40							}	-		-

ARDAMAN & ASSOCIATES, INC.

BORING NO. STA 68+00
TOTAL DEPTH 31.0 ft
SHEET 1 OF 1

					<del></del>	
PROJECT _ Lena Road Landfill, Pha	co TI				T17 T 170	
Or There					FILE NO.	87-7326
CLIENT Manatee County Depart	ment of Public Works					
COUNTY Manatee	STATE Florida		ELEVATION	33.79 ft N	JCVD	
D 4 MD 6 m 4 =				00.10 IL I	TG V D	
	DATE COMPLETED	6-6-1988	BORING TYPE	SPT		
DRILLER/RIG Fisher/Nick	•		LENGTH/TYPE C		11	
			LENGIN/IIFE (	DNIANC	Used driller's	mua.
WATER TABLE DEPTH: 1st 3.75'	DATE	6-6-1988	TIME			
2nd	DATE					
211U	DAIE		TIME			
REMARKS				_		

	epth		ard Penetration			Lab 1	Data			_	-
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)		isturbed imples
	_	2-1-3	4	1					Gray fine sand (SP)		
1	-	3-3-4	7	2					Dark brown silty fine sand (SM)	-	
广		3-4-4	8	3					Brown fine sand (SP)		
	_5_	4-7-6	13						Diown file said (SF)	-	
2	-	5-5-8	13	4							
		9-12-11	23						- Gray fine sand (SP)	-	
3	10	7-8-7	15						_		
4	-							l	Gray slightly silty fine sand with phosphate (SP-SM)		
l	15	2-2-2	4	5							
5_	-								<u> </u>	-	
									-		
6	20	3-4-9	13	6	21	65				-	
	-	4-3-4	7	7	35	76		ĺ	-	-	
7		3-5-7	12	8					_ Gray sandy clay with phosphate (CL)	-	
	25	5-6-9	15	9					-		
8	25	14-18-19	37	10							
	-	11-15-16	31	11					Gray clayey fine sand with thin lenses of fine sand and phosphate	-	
9		12-16-14	30	12						-	
	30	10-10-12	22	13	30	42			-	Н	
10	]								Termination of boring at 31.0 feet.		
1	-								-	-	
	35										
11									_	$  \cdot  $	
12	40								<u></u>	-	

								_	DOG BORING NO. TOTAL DEPTH SHEET 1 OF	STA 70- 31.5 ft
	OJEC IENT		Road Land	fill, Pha	se II	- 6 T	11 - 10		FILE NO. 87-7	326
30	RING	LOCATION	tee Count See I	y Departi Figure 3.			one w	orks		
	UNT: TE SI	Y <u>Manat</u> FARTED	tee	10	STA	re e cor	Florid	la	ELEVATION 33.5 ft NGVD (approximate 10-14-1988 BORING TYPE SPT	ly)
JК	ILLE	R/RIG	David/Day	rid					LENGTH/TYPE CASING Used driller's mud	•
N A	TER	TABLE DE	PTH: 1st 2nd				DA'		10-14-1988 TIME	
RE	MARI	KS					- DA		TIME	
De	pth		rd Penetrati		_	Lab	Doto			
	_		ASTM D-158	<del></del> _		T		T	Soil Description and Remarks	Undisturb
Meters	Feet	Blows/6"	N Value	Sample No.	(%)	-200 (%)	(%)	PI (%)	(Unified Classification)	Samples
				1			-		Gray fine sand (SP)	<del>                  -</del>
						1		l	Brown fine sand (SP)	7
				2	ĺ		l			<b>[</b> ]
٦				3				ł		
	5_		]	4			ĺ			T.I
2				1	ĺ			[	Dark gray slightly silty fine sand (SP-SM)	
۲	4		}		]					
	4			5		1	ĺ		_	
	-				1			]	_	
_	10				l	1			L	
	_			6			l	l	-	
	4			1	ĺ		l		-	<b>L</b>
1	-				ĺ				-	<b> </b>
				7	ļ	ļ	l	ł	-	-1
	15		_	_	]			]		<del> </del> -
5_	$\vdash$	3-1-0	1	8		ł			- Brown slightly silty fine sand (SP-SM)	-
	-	0-2-1	3	9	ľ	l	l	ĺ		╂╎
	-			10	ĺ			ł	Gray silty fine sand with phosphate (SM)	<b>[</b> -]
3_	20		1	10				]		+ $ $
		4-5-4	9	11		1	ł		Gray clayey fine sand with phosphate and rock fragments (SC)	<b> -</b>
		5-9-11	20	12	İ		,	İ	_ (50)	<b> </b> -
,	7			1		1			<u> </u>	<b> </b> -
	٦	9-8-6	14	13	ĺ		ĺ			<del> </del>
	25	5-5-8	13	14	40	ĺ	59	38	Green clay with thin seams of fine sand, trace phosphate (CH)	<b>F</b>
8										
		7-11-14	<b>2</b> 5	15			}			
	_	9-9-11	20	16						
9_		15-18-21	39	17					- Gray clayey fine sand with phosphate (SC)	-
	30_								F	
	-	15-20-28	48	18					<u> </u>	-
0	-								Tormination of horizon at 21 E fact	7-1
	-				ĺ				Termination of boring at 31.5 feet.	-
	35								<u></u>	-
1	33								-	
-	7				ĺ				-	-

ARDAMAN & ASSOCIATES, INC.

BORING NO. STA 72+00
TOTAL DEPTH 31.5 ft
SHEET 1 OF 1

PROJECT Lena Road Landfill, Phase II	FILE NO 87-7326
BORING LOCATION See Figure 3	
COUNTY Manatee STATE Florida	ELEVATION 33.75 ft NGVD (approximately)
DATE STARTED 10-14-1988 DATE COMPLETED 10-14-1988 DRILLER/RIG Fletch/David	BORING TYPE SPT
WATER TARE PERMIT	LENGTH/TYPE CASING Used driller's mud.
2nd DATE	TIME
REMARKS	

De	pth	Stands	rd Penetratio	on Test		Lob I	)oto			<del></del>
	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbed Samples
De 1 2 3 4 5 6 7 9 10	5 10 15 20 25 30 30 30 30 30 30 30 30 30 30 30 30 30		ASTM D-1586 N	Sample			LL	PI (%)	Soil Description and Remarks (Unified Classification)  Dark gray fine sand (SP)  Gray clayey fine sand (SC)  Gray slightly silty fine sand (SP-SM)  Brown fine sand (SP)  Gray silty fine sand with phosphate and rock fragments (SM)  Green clay with thin seams of fine sand, trace phosphate (CH)  Green clay with clayey fine sand, trace phosphate (CL)  Gray very clayey fine sand, trace phosphate (CL)  Termination of boring at 31.5 feet.	
11	35								Termination of boring at 31.5 feet.	-

ARDAMAN & ASSOCIATES, INC.

BORING NO. STA 74+00 TOTAL DEPTH 31.5 ft SHEET 1 OF 1

PROJECT Lena Road Landfill, Pha	on II				**** T \***	
<del> </del>					FILE NO.	87-7326
CLIENT Manatee County Depart	ment of Public Works			_		
	one or rabile morns					
	_					
COUNTY Manatee	STATE Florida		ELEVATION	34.0 ft N	IGVD (approxim	notely)
DATE STARTED 10-17-1988		10 15 1000			TOTO (approate	nately)
	DATE COMPLETED	10-17-1988	BORING TYPE	SPT		
DRILLER/RIG David/David	•		LENGTH/TYPE	CASING	Used driller's	
				CHOING	Used ormers	mua.
WATER TABLE DEPTH: 1st 3.5'	DATE	10-17-1988	TIME			
2nd	DATE -					
	DATE		TIME			
REMARKS						
				_		

De	epth		rd Penetratio			Lab 1	Data			<del>_</del>	
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturb Samples	xed s
	-			1					Gray fine sand (SP)  Brown fine sand (SP)		
1_	- 5			2					- Dark gray slightly silty fine sand (SP-SM)	-	
2	-			3					- - -	- -	
3	10			4					-	-	
4	-			5						-	
5	15	5-2-3	5	6 7					- Brown fine sand (SP)		
3	-	4-4-4	8	8							
6		1-1-1	2	9					Gray slightly silty fine sand (SP-SM)		
۲	20	3-7-6 6-7-7	13 14	10 11					Grayish green clay with seams of clayey fine sand (CH)	  -	
7	-   -   -	6-5-7	12	12					Gray clayey fine sand with phosphate (SC)		
8	25_	6-9-9 8-9-11	18 20	13 14	54	50			Grayish green clay with lenses of fine sand, trace phosphate (CH)	_  -	
		3-6-8	14	15							
9	30	8-9-7	16	16					- Gray clay with lenses of clayey fine sand (CH)	_	
	-	9-9-9	18	17					Gray clayey fine sand with phosphate (SC)	-	
10	-								Termination of boring at 31.5 feet.	-  -	
11	35								-  	-	
	-								-	  -  -	
12	40_								_	-	

ARDAMAN & ASSOCIATES, INC.

BORING NO. STA 76+00 TOTAL DEPTH 31.5 ft SHEET 1 OF 1

PROJECT Lena Road Landfill, Phase II	FILE NO. 87-7326
CLIENT Manatee County Department of Public Works	122 101 01-1020
DODDER - Manated County Department of Fubile Works	
COUNTY Manatee STATE Florida	ELEVATION 34.40 ft NGVD (approximately)
DAME COMA DONNE	Table 10 10 10 (approximately)
	19-1988 BORING TYPE SPT
DRILLER/RIG David/David	LENGTH/TYPE CASING Used driller's mud.
WATER TABLE DEPTH: 1st 3.0' DATE 10-	19-1988 TIME
Znd DATE	TIME
REMARKS	

	pth	Standa	rd Penetration	on Test		Lab l	Data			· ·
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbed Samples
				1					Gray fine sand (SP)	
	-								Brown fine sand (SP)	
1	-			2						-
1	5			3					Dark gray slightly silty fine sand (SP-SM)	-
2				4					_	_
۴	-								-	-
1	-			5					-	-
3_	10									-
1				6					-	-
1.	-								-	
4										-
ł	15			7						
5	-	5-7-6	13	8					- Brown slightly silty fine sand, trace phosphate (SP-SM)	-
1		4-4-4	8	9						-
6_	20	4-8-9	17	10					Gray clayey fine sand with rock, phosphate and shell (SC)	
		28-16-13	29	11					Brown clayey fine sand with phosphate (SC)	-
		12-10-9	19	12						
7	-	9-7-7	14	13					Gray clayey fine sand with phosphate (SC)	-
	25	7-7-7	14	14	26		39	21	Grayish green clay with lenses of fine sand, trace phosphate (CL)	
8	-	6-8-6	14	15					- phosphate (OZ)	-
		6-6-5	11	16					-	
9	30	1-6-5	11	17					-	-
	-{	5-5-4	9	18	42	35			Clayey fine sand layer at bottom	
10									Termination of boring at 31.5 feet.	-
									-	-
11	35								-	-
	-								-	
12	40								-	-
_										

ARDAMAN & ASSOCIATES, INC.

BORING NO. STA 78+00
TOTAL DEPTH 31.0 ft
SHEET 1 OF 1

PROJECT Lena Road Landfill, Phase	. 77			
	<u> </u>			FILE NO. 87-7326
CLIENT Manatee County Department	ent of Public Works			
BORING LOCATION See Figure 3.	CHE OF LUDITO HOLKS			
BURING LOCATION See Figure 3.				
COUNTY Manatee S	STATE Florida		ELEVATION 34.34 f	1 170100 (
DAGE COLORS	1 101 100			t NGVD (approximately)
	DATE COMPLETED	6-6-1988	BORING TYPE SPT	
DRILLER/RIG Fisher/Nick				
WATER MARK PERSON			LENGTH/TYPE CASING	Used driller's mud.
WATER TABLE DEPTH: 1st 3.5'	DATE	6-6-1988	TIME	
		0 0 1000		
2nd	DATE		TIME	
REMARKS			··	

	epth		ard Penetration		Ι -	Lab 1	Data			
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbed Samples
	_	1-2-4	6	1					Gray fine sand (SP)	
	_	3-5-4	9	2					Dark brown slightly silty fine sand (SP-SM)	[]
1	-			3					Brown fine sand (SP)	<b> -</b>
	5	4-5-6	11							+
١.		4-7-9	16	4					Light brown fine sand (SP)	
2_	-	7-8-7	15						_	
	-	6-5-6	11						Gray fine sand, trace clay (SP)	1-1
3_	10	5-5-5	10							<b> </b> -
	_								_	
	-									<b>L</b>
4_	-								Gray slightly silty fine sand, trace phosphate (SP-SM)	<u>-</u>
	15	2-2-4	6	5						<b> </b> -
_5	_								_	
	-								_	<b> </b> -
										<b>}</b> -
6	20	4-17-10	27	6	17	38			Light brown clayey fine sand, traces of rock and phosphate (SC)	<u> </u>
	-	6-18-12	30	7					phosphate (SC)	
7	-	14-7-9	16	8						<b> </b> -
	]								Grayish green clayey fine sand (SC)	<u> - </u>
	25	4-5-5	10	9		33				
8_	-	4-5-6	11	10					-	
	-	4-7-8	15	11					Grayish green sandy clay with thin lenses of gray fine	-
		5-3-3	6	12					- sand (CL)	<b> </b> -
9	30	2-2-3	5	13					L	
	-			13		_				-
10	-								Termination of boring at 31.0 feet.	-
	35								-	
11	-								-	-
	-								r	<u> - </u>
12										
	40									

	_								OG BORING TOTAL SHEET	DEPTH 31.5 ft
PR	OJE	CT Long	Road Land	Ifill Dho	- II				THE DAY	2
CL	IENT	Mana	too County	Donasti	mant.	of Pub	lic W	orks	FILE N	O87-7326
BO	RINC	LOCATIO	N _ See F	igure 3.				OT ICO		
	IMU	I Manot	100		STAT	re	Florid	la	ELEVATION 34.50 ft NGVD (a	pproximately)
DR	ILLE	TARTED R/RIG	10-19-198	8	DAT	E CO	MPLE	red _	10-19-1988 BORING TYPE SPT	
WA	TER	TABLE DE	David/Day	2 OI			DA	TE	LENGTH/TYPE CASING <u>Used dri</u> 10-19-1988 TIME	
			2nd				DA'	TE —	TIME TIME	
RE	MAR	KS					-			
⊢		Stonde	ard Penetratio	M						
_	pth		ASTM D-158			Lab :	Data			
Meters	يد		N	Sample	NYM	000	7.7	77	Soil Description and Remarks	Undisturbed
et	Feet	Blows/6"	Value	No.	(%)	-200 (%)	LL (%)	PI (%)	(Unified Classification)	Samples
⅀			74140	110.	(70)	(70)	(70)	(70)		
				1					Gray fine sand (SP)	
			}	,		ł	ł			
	_			2					Brown fine sand (SP)	<b>-</b>
1	-			3						
	_			4	ľ				_ Dark gray silty fine sand (SM)	
	5		ł				ľ			ΓΙ
									<del> -</del>	
_ 2	-		ľ	5					-	1-1
	_			[ "					-	L.I
	_		ĺ			ĺ		l		
			}	6					F	<b>F</b> (
3	10			"				ĺ	<u>-</u>	<b>F</b> }
	10		[				[		<b>⊢</b>	<b>⊢</b>
	_		ľ	7			ŀ	ĺ	L	Lí
	_			ľ						Γ
4				8			ł		Г	
	_							l	<b>F</b>	-
	_						l		-	<b> -</b>
	15			9					L	
_5	_						ĺ			
		3-5-6	11	10			ļ	1		
									Brown slightly silty fine sand (SP-SM)	-
1 1	_	4-4-7	11	11		]		l	Brown saightly safey thie said (SF-SM)	<del></del>
6	_								Crow clayers fire and with wheelth (SC)	
┡	20	4-3-2	5	12	39	5			Gray clayey fine sand with phosphate (SC)	Γ
									Γ	
	-	2-1-2	3	13		,	ł			
I _	-	7 01 05	40						Gray sandy clay, trace rock and phosphate (CL)	<b> </b> -
7	-	7-21-25	46	14			1		Land only a accirculate (OD)	
		14-17-27	44	15						Γ
	25						ľ		Γ	
		13-25-14	39	16					<u> </u>	-
8	-						l		ļ-	_
	_	16-20-33	53	17				1	,	
li							ľ			
	7	10-12-9	21	18		ĺ		1	Gray clayey fine sand with phosphate (SC)	F)
9	~					]			<b>F</b>	<b> -</b>
	30_	11-12-13	25	19					<b>-</b>	
ł		11-17-18	35	20					L	] [
		11 11-10	30	20	-			-		
10							}			-
	-								Termination of boring at 31.5 feet.	-
	-						1		-	
	35									
11										
										<u> - </u>
	-								F	-
	-								l-	-
12	_								-	L

									OG BORING NO. TOTAL DEPTH SHEET 1 OF	STA 82+00 40.0 ft
	OJE		Road Land	ifill. Pha	se II				FILE NO 97.7	
во	IENT RINC	LOCATIO	tee Count	y Departi igure 3.			lic W	orks		
DA	TE S	Y <u>Manat</u> TARTED	tee		STA	re e coi	Florid MPLE	la TED	ELEVATION 34.60 ft NGVD (approximate 7-15-1988 BORING TYPE SPT	ely)
מען	71111111	R/RIG TABLE DE	Fisher/Nic	nlr				TE	LENGTH/TYPE CASING Used driller's mud.	
		KS	· 2nd				DA'		7-15-1988 TIME TIME	
╙					_		_			
	pth		ASTM D-158			Lab	Data			
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbed Samples
	_								- Brown slightly silty fine sand (SP-SM)	-
1	_	1				l			†	<b>-</b>
┢	_		ĺ		ļ				į.	
ı	5	4-4-6	10	1						
2	-	1	J						-	-
l	-								<u>}</u>	<u> </u>
l	_	]	ł							<b> </b>
3	10	4-5-7	12	2					Dark grayish brown fine sand (SP)	
L	-		ľ						-	-
4	-		<u> </u>						<u>}</u>	<b>-</b>
+		4-3-6	9	١.					†	<b>-</b>
	15	4-3-0	]	3						
_5_									-	
	-								<u>-</u>	-
	-		ł						Gray clayey fine sand with shell fragments and phosphate	}
6_	20	2-1-1	2	4					(SC)	<u>                                     </u>
	_								_	
7	_								-	<u>L</u> l
广	-									+
'	25	12-14-19	33	5					Gray clayey fine sand (SC)	<b> </b> -
8	_	14.17.10		_						
	-	14-17-13	30	6					-	_
	-	7-13-13	26	7	19	31			-	<b> </b> -
9	30	15-16-15	31	8					-	-
		16-18-19	37	9					- Gray slightly clayey fine sand (SM-SC)	
1,0	_								Gray Sugarry Caryey mae Sand (SM-SC)	
10	-								-	-
	- 35	9-4-6	10	10					Gray sandy clay with thin lenses of gray fine sand (CL)	-
11		5-5-8	]	l						
			13	11	28		30	6		
	_	4-6-7	13	12					-	
12	_	4-7-8	15	13	1				-	

									OG BORING NO. TOTAL DEPTH SHEET 1 C	
PR	OJE		Road Land	ifill, Pha	se II				DIVE NO. OF	
BC	IENT	Mana LOCATIO	tee County	Dengrt	mont	of Pul	olic W	orks	FILE NO. 87-	1020
CC	UNT	Y Manat	tee		STA'		Florid	ia	ELEVATION 34.51 ft NGVD (approxima	itely)
DR	TE S	TARTED R/RIG	7-15-1988 Fisher/Nic	ale	DAT	E CO	MPLE	TED	7-15-1988 BORING TYPE SPT	
WA	TER	TABLE DE	PTH: 1st	2.251			DA'		7-15-1988 LENGTH/TYPE CASING Used driller's mu	d
RE	MAR	KS	2nd				DA'	TE _	TIME	
	epth		ard Penetration			Lab	Data			
Meters	et	D1 ton	N	Sample	NM	-200	LL	PI	Soil Description and Remarks	Undisturbed
Met	Feet	Blows/6"	Value	No.	(%)		(%)	(%)	(Unified Classification)	Samples
	-			<del> </del>	<del> </del>	+-	-	<del>                                     </del>		<del>- </del>
ı	[ -	i			l	1	ĺ		<ul> <li>Brown slightly silty fine sand (SP-SM)</li> </ul>	<b>F</b> [
1	-	1		}					-	<b>-</b>
1	-	1	ļ		ľ			ĺ	-	<b>F</b>
l		1		ĺ	l	l	ĺ		-	<u> </u>
ı	5	4-6-7	13	1 1	l		ł	ĺ		
2	-		10	] ^					-	
	] -	ł				ĺ			-	<u> </u>
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۱	-		ļ				l		L	
3_	10_	4-5-6	11	2	[					
l	-	1	ĺ	ĺ			l			
1	_			}				[		
4	_					ĺ		l		_[
	_	}		ł	1	ļ	ļ	]	Gray slightly silty fine sand (SP-SM)	Γ
	15	2-3-5	8	3						
5	_					ł	l	ĺ		
۲				ĺ	ĺ	1	ļ	l		
l				}	1					41
	_			}	l	İ	ĺ		Gray silty fine sand with shell and phosphate (SM)	<b>[</b> ]
6	20	2-1-3	4	4	ł	ł	l	[		<b> </b>
Ι.						ļ				
l									<u> </u>	<b> </b>
7	]					ĺ			-	
	~				i	]				<del> </del>
ı	25	6-6-8	14	5	22	20			Gray clayey fine sand with phosphate, trace rock (SC)	
8					~~	40		ĺ	-	-
l °	1						ĺ		<u> </u>	-
	-	23-50/4	73/10	_					-	-
	-		73/10	6	[			ĺ		+
9		21-56/6	56/6	7	31	49			Gray sandy clay (CL)	
	30_	5.4.0						ĺ		$\vdash$
	-	5-4-9	13	8			[		-	-
10	-								-	-
٣	-				}				-	-
	_						ľ		-	
	35_								<u> </u>	
11	-	5-6-8	14	9	ĺ				-	
	-	5-5-6	11	10	l				-	
	4				}				-	
12		5-6-7	13	11						

Termination of boring at 39.5 feet.

									DG TES, INC.  BORING NO. TOTAL DEPTH SHEET 1 OF	
	OJE		Road Land	ifill, Pha	se II				FILE NO 87-73	226
	RINC	Mana 1	tee Count	v Departi	ment	of Pub	lie W	orks	11111101101101101	
CC	UNT	Y Manat	tee		STA		Florid		ELEVATION 35.0 ft NGVD (approximate)	<u>v)</u>
DA	TE S	TARTED _ R/RIG	7-14-1988 Fisher/Nic	-1-	DAT	E CO	MPLE'	TED _	7-14-1988 BORING TYPE SPT	
WA	TER	TABLE DE	PTH: 1st	2.5'			DA'	TE	7-14-1988 TIME LENGTH/TYPE CASING Used driller's mud.	_
		KS	2nd				DA'		TIME	
n.	MAR.									
De	pth		ard Penetration ASTM D-158			Lab	Data			
Meters	at .		N	Sample	NM	-200	LL	PI	Soil Description and Remarks	Undisturbed
<i>l</i> et	Feet	Blows/6"	Value	No.	(%)	(%)	(%)	(%)	(Unified Classification)	Samples
_			<del>                                     </del>		-		-			<del> </del>
	-	1	ļ		ļ	ł	1		- Brown slightly silty fine sand (SP-SM)	<b> -</b>
	-	1		]		l			<u> </u>	<b>-</b>
1_		1	[			1	]		-	<b>L</b> (
		1	ĺ			ļ			ŀ	- 1
	_ 5	2-1-5	6	1	ĺ			l	-	<u> - </u>
2	-	ł				1		l	-	<b>-</b> 1
	-	ł			ł	l	ł		-	-
	-	-			]				-	<b>-</b>
3									-	-
<u> </u>	10	3-6-8	14	2	18	6	[		_	_
	-	}	ĺ		l		ĺ		-	<b>L</b>
	-	ł	1	}	l		ł		-	-
4	-	ł	ł						-	<u> </u>
	~		ļ		ļ		[		Brown fine sand (SP)	<b>L</b>
	15	8-9-5	14	3		J	ĺ		<u>_</u>	Ll
_5	-	ł	[				ĺ		_	-
	_	-	ĺ		ļ		ĺ		_	<u> </u>
	_	1	1				l		_	-
6	_	}	}	1					_	_
	_20_	1 <b>-</b> 1-1	2	4		ĺ			Constant of the second state of the second sta	<u> </u> _
	_		1	1					Gray clayey fine sand with phosphate and shell fragments - (SC)	<u> </u>
_	_			1	ĺ	ļ				<u> </u>
7	_		ľ	1	ĺ				Dense fragmentary material	<b>L</b>
	-			}	l		ĺ		-	_
	25	7-6-6	12	5	1		ĺ		Gray clayey fine sand with phosphate (SC)	Ll
8	-		ĺ		ŀ	1			_	Lł
	_		ļ		l		1		_	
	_		}		l				_	L
9		1	l			ļ				<u>L</u>
-	30	8-6-19	25	6	l		ĺ		Gray sandy clay with streaks of gray fine sand (CL)	
	_									LÌ
	_	10-18-15	33	7						
10	_	8-7-10	17	8						
	_					1				
	35	8-12-11	33	9						Γ
11	_	8-9-9	18	10	37	33				
									L	Γ
		5-7-10	17	11	25	20			Gray clayey fine sand (SC)	
12		8~8-9	17	12						
	40								Termination of boring at 39.5 feet.	Γ

#### **BORING LOG** ARDAMAN & ASSOCIATES, INC.

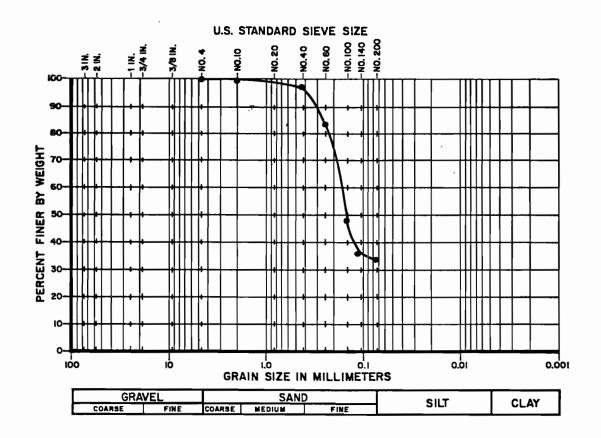
BORING NO. STA 88+00 TOTAL DEPTH 30.5 ft SHEET 1 OF 1

						·- <u>-</u>
PROJECTLena Road Landfill, Pha					FILE NO. 87	-7326
CLIENT Manatee County Depart	ment of Public Works					
BORING LOCATION See Figure 3.	The second of th					
COUNTY Manatee	STATE Florida		ELEVATION	36.0 ft N	GVD (approxima	telv)
DATE STARTED 6-7-1988	DATE COMPLETED	6-7-1988	BORING TYPE	SPT	····	
DRILLER/RIG Fisher/Nick	•		LENGTH/TYPE	CASING	Used driller's mu	ıd.
WATER TABLE DEPTH: 1st 4.0'	DATE	6-7-1988	TIME			
··· 2nd	DATE		TIME			
REMARKS						

De	pth	Stands	ard Penetration	on Test		Lab I	Data			<del></del>
Meters	Feet	Blows/6"	N Value	Sample No.	NM (%)	-200 (%)	LL (%)	PI (%)	Soil Description and Remarks (Unified Classification)	Undisturbed Samples
	1	1-2-4	6	1 2					Dark grayish brown fine sand with roots (SP)	_
1	_	5-5-5	10						Light brown fine sand (SP)	<u> </u>
Ė		4-5-4	9	3					<u> </u>	
	5	4-9-13	22						G	+
2	7	9-11-11	22	4					- Gray fine sand (SP)	
		6-6-7	13						-	-
3	_10	5-7-8	15						F-	
									Dark gray fine sand (SP)	<u> </u>
4	-								_	
	15	4-3-5	8	5	18	3			L	
5_	-								-	-
									(	-
6	20	1-0-1	1	6					Gray clayey fine sand with phosphate and shell	<del>-</del>
	_	1-1-3	4	7					fragments (SC)	-  -
7		50/3							}-	-
		2-3-5	8	8		24			<u></u>	_
8	25	3-4-6	10	9					Gray clay with lenses of fine sand (CH)	1-1
Ť		4-7-9	16	10						
	-	5-3-5	8	11					Gray sandy clay (CL)	+
9	30	4-7-9	16	12						<u> </u>
									Termination of boring at 30.5 feet.	7-1
10									_	Fl
	35								_	-
11	-								-	-
12									-	F
<u></u>	40			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				T T DI AME	The second state of the se	75-31-51

#### Appendix 3

#### GRAIN SIZE DISTRIBUTION CURVES

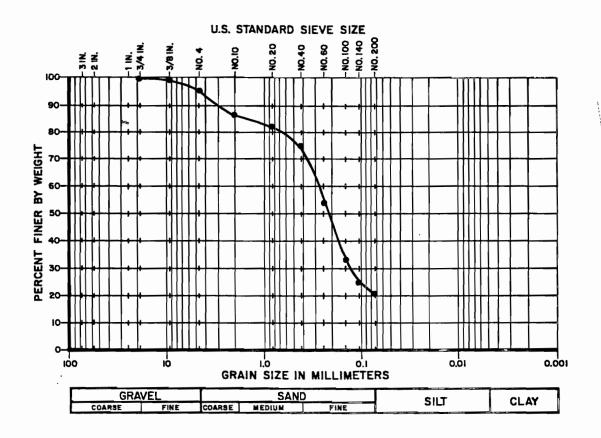


TEST HOLE NO.	SAMPLE NO.	DEPTH	SYMBOL	SAMPLE DESCRIPTION	UNIFIED CLASS.
86+00	9	34.01	•	GRAY CLAYEY FINE SAND	SC



SITE EXPLORATION
PROPOSED SLURRY WALL LEACHATE CONTROL SYSTEM
LENA ROAD LANOFILL, STAGE II
MANATEE COUNTY, FLORIDA

DRAWN BY: SEF CHECKED BY: KLN DATE: 10/28/88
FILE NO. APPROVE BY: 2



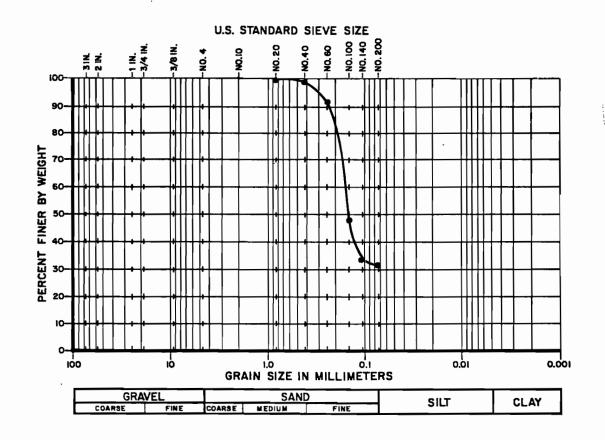
MPLE NO.	DEPTH	SYMBOL	SAMPLE DESCRIPTION	UNIFIED CLASS.
5	25.0'	•	GRAY CLAYEY FINE SAND	sc
<del> </del> -				
<del></del>				
	5			10.



SITE EXPLORATION
PROPOSED SLURRY WALL LEACHATE CONTROL SYSTEM
LENA ROAD LANDFILL, STAGE II
MANATEE COUNTY, FLORIDA

DRAWN BY: SEF CHECKED BY: KLNI DATE: 10/28/88
FILE NO.
87-7326

N82070



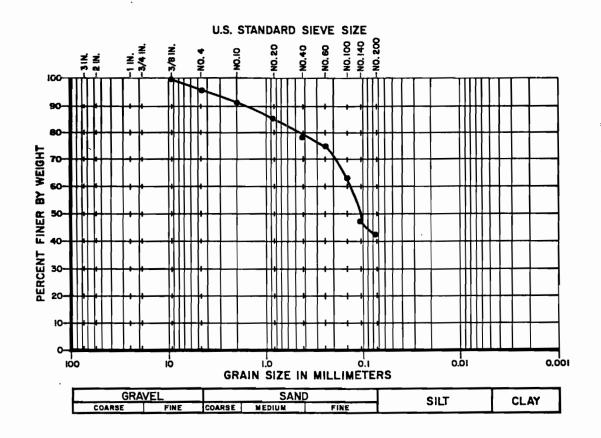
TEST HOLE NO.	SAMPLE NO.	DEPTH	SYMBOL	SAMPLE DESCRIPTION	UNIFIED CLASS.
82+00	7	28.01	•	GRAY CLAYEY FINE SAND	SC



SITE EXPLORATION
PROPOSED SLURRY WALL LEACHATE CONTROL SYSTEM
LENA ROAD LANDFILL, STAGE II
MANATEE COUNTY, FLORIDA

CHECKED BY: 15 LN DATE: 10/28/88 DRAWN BY: SEF

FILE NO. 87-7326



SAMPLE NO.	DEPTH	SYMBOL	SAMPLE DESCRIPTION	UNIFIED CLASS.
13	30.5*	•	GRAY CLAYEY FINE SAND	SC
		<del>                                      </del>		
	NO.	NO.	NO. DEFIN STMBOL	NO. DEFTH STMBOL SAMPLE DESCRIPTION



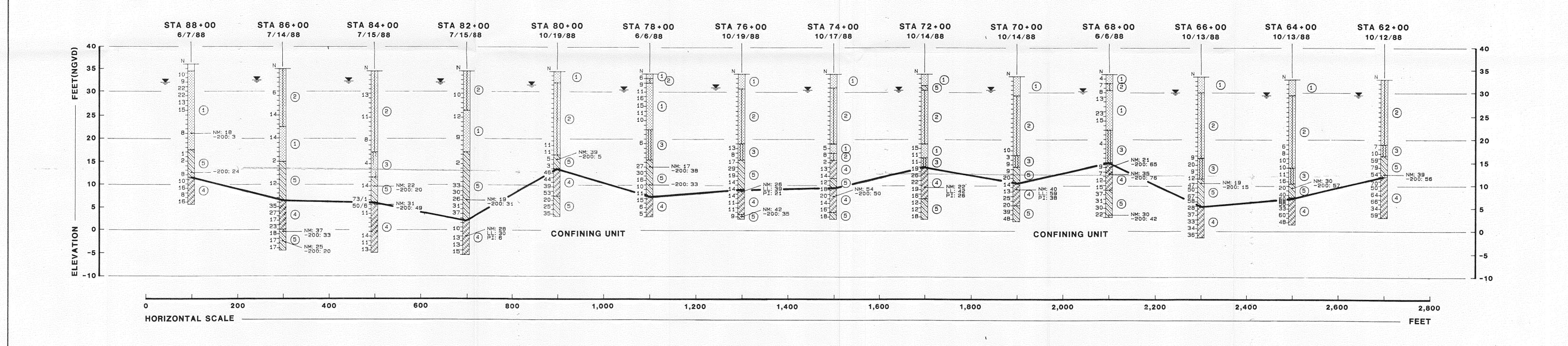
SITE EXPLORATION
PROPOSED SLURRY WALL LEACHATE CONTROL SYSTEM
LENA ROAD LANDFILL, STAGE II
MANATEE COUNTY, FLORIDA

FILE NO.

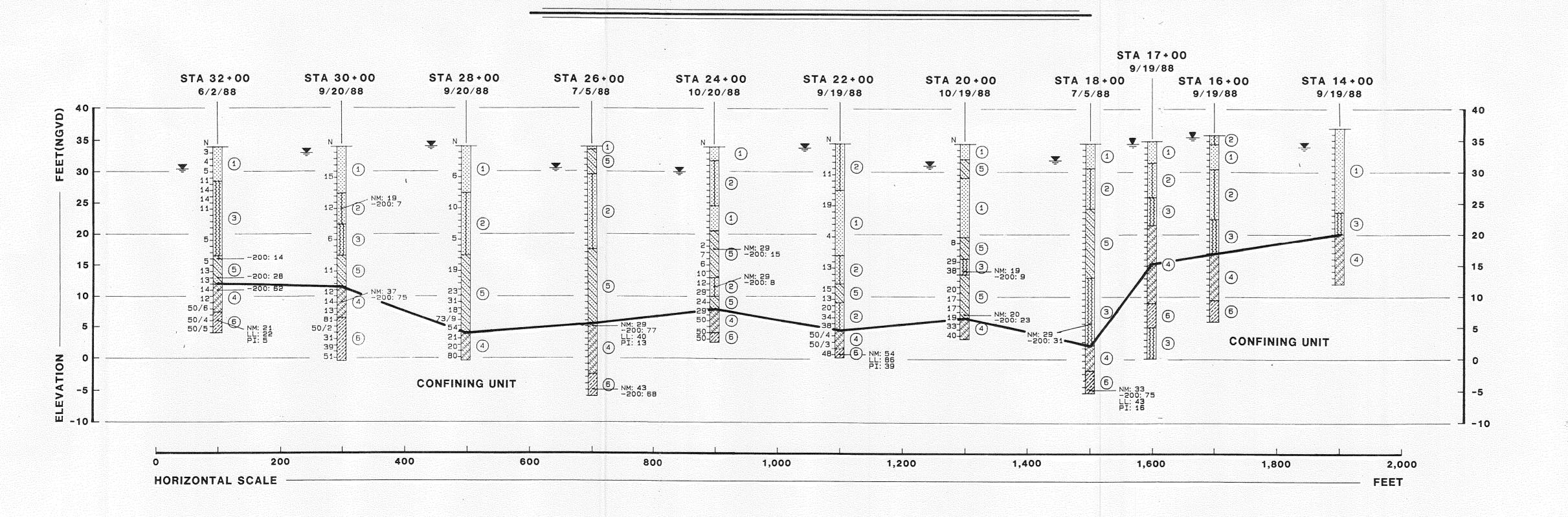
87-7326

DATE: 10/28/88

## EAST WALL SOIL BORING PROFILES







LEGEND

LIGHT GRAY TO GRAY AND LIGHT BROWN TO YELLOWISH BROWN FINE SAND

GRAY OR LIGHT BROWN TO YELLOWISH BROWN SLIGHTLY SILTY TO SILTY FINE SAND

GRAY AND BROWN MEDIUM TO FINE SAND TO SLIGHTLY SILTY FINE SAND WITH PHOSPHATES

GRAY AND GREEN OR BROWN TO LIGHT YELLOWISH BROWN CLAY
AND SANDY CLAY WITH OCCASIONAL TRACES OF PHOSPHATES
AND SEAMS OF FINE SAND

GRAY AND GREEN SLIGHTLY CLAYEY TO CLAYEY FINE SAND WITH OCCASIONAL TRACES OF PHOSPHATES, SHELL OR CEMENTED SAND

6 GRAY CLAYEY SILT AND SILT WITH OCCASIONAL TRACES OF

STA STATION WHERE STANDARD PENETRATION TEST (SPT) BORING OR AUGER BORING WAS CONDUCTED IN 1988

N STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT

50/3" 50 BLOWS FOR 3 INCHES PENETRATION INTO SOIL

GROUNDWATER LEVEL MEASURED ON DATE DRILLED

NM NATURAL MOISTURE CONTENT IN PERCENT

-200 PERCENT PASSING NO. 200 SIEVE SIZE (PERCENT FINES)

LL LIQUID LIMIT IN PERCENT

PL PLASTIC LIMIT IN PERCENT PI PLASTICITY INDEX IN PERCENT

k COEFFICIENT OF PERMEABILITY IN cm/sec

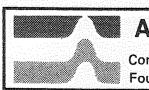
ENGINEERING CLASSIFICATION I COHESIONLESS SOILS DESCRIPTION BLOW COUNT "N" VERY LOOSE LOOSE
MEDIUM DENSE
DENSE
VERY DENSE 10 TO 30 30 TO 50 50

VERY SOPT 0 TO 2 2 TO 4 4 TO 8 1/4 TO 1/2 1/2 TO 1 1 TO 2 2 TO 4 SOFT MEDIUM STIFF STIFF VERY STIFF 8 TO 15 15 TO 30

II COHESIVE SOILS

HARD WHILE THE BORINGS ARE REPRESENTATIVE OF SUISURPACE CONDITIONS AT THEIR RESPECTIVE LOCATIONS AND FOR THEIR RESPECTIVE VERTICAL REACHES, LOCAL VARIATIONS CHARACTERISTIC OF THE SUISURFACE MATERIALS OF THE REGION ARE ANTICIPATED AND MAY BE ENCOUNTERED. THE BORING LOGS AND RELATED INFORMATION ARE BASED ON THE DRILLERS LOGS AND VISUAL EXAMINATION OF SELECTED SAMPLES IN THE LABORATORY. THE DELINEATION BUTWEEK SOIL TYPES SHOWN ON THE LOGS IS APPROXIMATE AND THE DESCRIPTION REPRESENTS OUR INTERPRETATION OF SUBSURFACE CONDITIONS AT THE DESIGNATED BORING LOCATIONS ON THE PARTICULAR DATE DRILLED.

GROUNDWATER ELEVATIONS SHOWN ON THE BORING LOGS REPRESENT GROUNDWATER SURFACES ENCOUNTERED ON THE DATES SHOWN. FLUCTUATIONS IN WATER TABLE LEVELS SHOULD BE ANTICIPATED THROUGHOUT THE YEAR. AISENCE OF WATER SURFACE DATA ON CERTAIN BORINUS IMPLIES THAT NO GROUNDWATER DATA & AVAILABLE, BUT DOES NOT NECESSARDLY MUAN THAT GROUNDWATER WILL NOT BE ENCOUNTERED AT THESE LOCATIONS OR WITHIN THE VERTICAL REACHES OF THESE BORINGS IN THE PUTURE.



Ardaman & Associates, Inc.

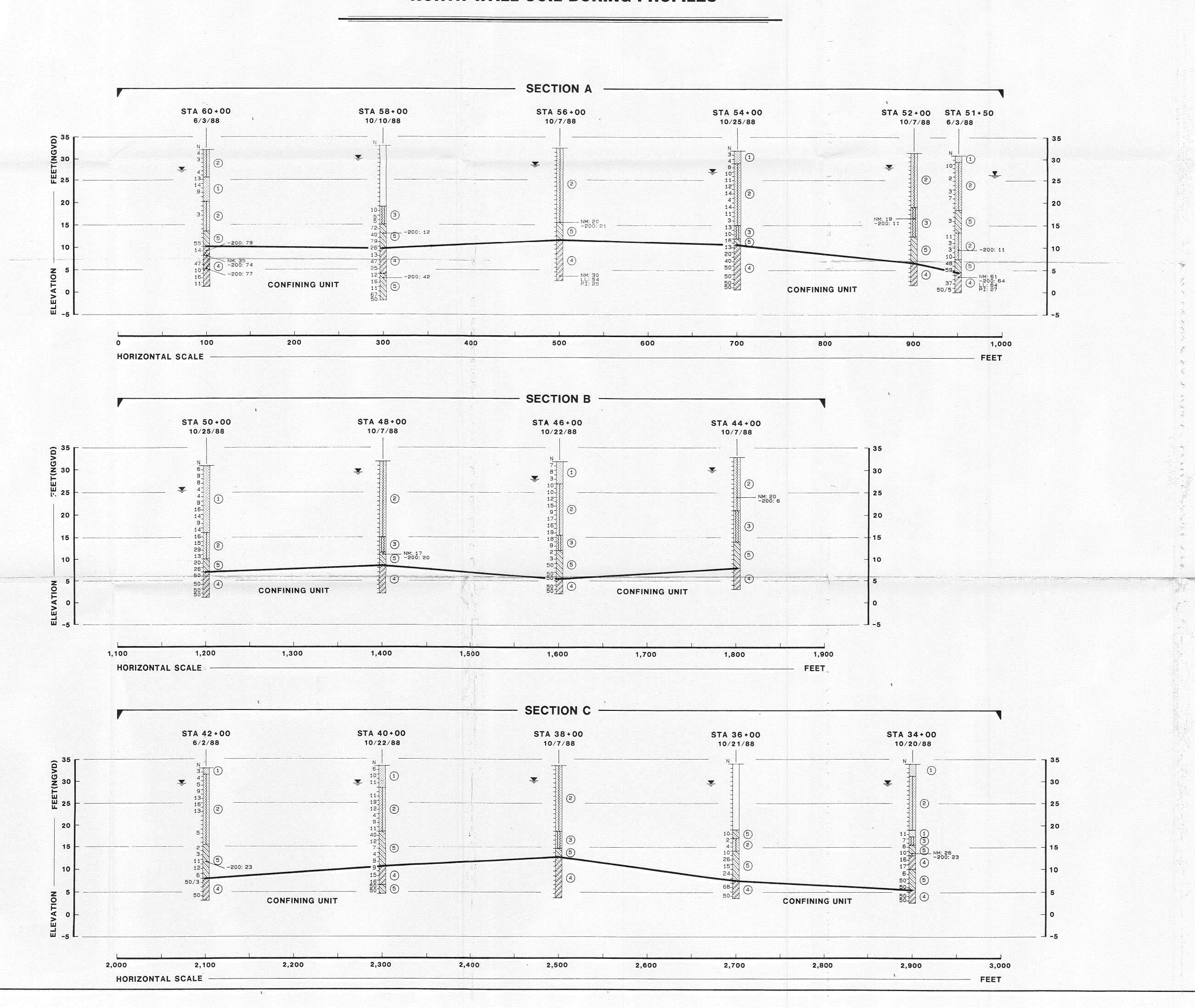
Consulting Engineers in Soils, Hydrogeology, Foundations, and Materials Testing

SITE EXPLORATION PROPOSED SLURRY WALL LEACHATE CONTROL SYSTEM LENA ROAD LANDFILL, STAGE II MANATEE COUNTY, FLORIDA

DRAWN BY: R.B.E. CHECKED BY: RLN DATE: 10/28/88

John & Harley 87-7326

# NORTH WALL SOIL BORING PROFILES



LEGEND

LIGHT GRAY TO GRAY AND LIGHT BROWN TO YELLOWISH BROWN FINE SAND

(2) GRAY OR LIGHT BROWN TO YELLOWISH BROWN SLIGHTLY SILTY TO SILTY FINE SAND

GRAY AND BROWN MEDIUM TO FINE SAND TO SLIGHTLY SILTY FINE SAND WITH PHOSPHATES

GRAY AND GREEN OR BROWN TO LIGHT YELLOWISH BROWN CLAY
AND SANDY CLAY WITH OCCASIONAL TRACES OF PHOSPHATES
AND SEAMS OF FINE SAND

(5) GRAY AND GREEN SLIGHTLY CLAYEY TO CLAYEY FINE SAND WITH OCCASIONAL TRACES OF PHOSPHATES, SHELL OR CEMENTED SAND

G GRAY CLAYEY SILT AND SILT WITH OCCASIONAL TRACES OF PHOSPHATES

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LL LIQUID LIMIT IN PERCENT

PL PLASTIC LIMIT IN PERCENT

PI PLASTICITY INDEX IN PERCENT

k COEFFICIENT OF PERMEABILITY IN cm/sec

ENGINEERING CLASSIFICATION

I COMESIONLESS SOILS

DESCRIPTION YERY LOOSE

MEDIUM DENSE

DENSE VERY DENSE

II COHESIVE SOILS

MEDIUM STIFF STIFF VERY STIFF HARD

WHILE THE BORINGS ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT THEIR RESPECTIVE LOCATIONS AND FOR THEIR RESPECTIVE VERTICAL REACHES, LOCAL VARIATIONS CHARACTERISTIC OF THE SUBSURFACE MATERIALS OF THE REGION ARE ANTICIPATED AND MAY BE ENCOUNTERED. THE BORING LOCS AND RELATED INFORMATION ARE BASED ON THE DRILLERS LOGS AND VISUAL EXAMINATION OF SELECTED SAMPLES IN THE LABORATORY. THE DELIMEATION BETWEEN SOIL, TYPES SHOWN ON THE LOGS IS APPROXIMATE AND THE DESCRIPTION REPRESENTS OUR INTERPRETATION OF SUBSURFACE CONDITIONS AT THE DESIGNATED BORING LOCATIONS ON THE PARTICULAR DATE DRILLED.

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SITE EXPLORATION PROPOSED SLURRY WALL LEACHATE CONTROL SYSTEM LENA ROAD LANDFILL, STAGE II

MANATEE COUNTY, FLORIDA

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FIGURE 5