

SUBSOIL INVESTIGATION
ISLE DERNIERES RESTORATION
EASTERN ISLE DERNIERE & TRINITY ISLAND
TERREBONNE PARISH, LOUISIANA

PROJECT NO. 5449

FOR
STATE OF LOUISIANA
DEPT. OF NATURAL RESOURCES

T. BAKER SMITH & SON, INC.
CONSULTING ENGINEERS
HOUMA, LOUISIANA

GORE ENGINEERING, INC.
SOIL AND FOUNDATION INVESTIGATIONS
METAIRIE, LOUISIANA

GORE ENGINEERING, INC.
SOIL AND FOUNDATION INVESTIGATIONS

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BORINGS
ANALYSES

TESTING
REPORTS

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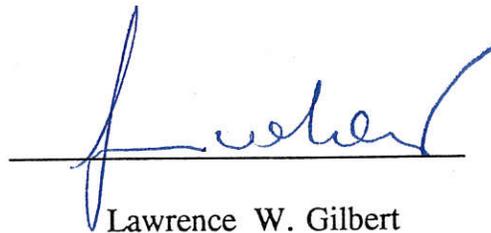
Subsoil Investigation
Isle Dernieres Restoration
Eastern Isle Derniere & Trinity
Island
Terrebonne Parish, Louisiana

Gentlemen:

Herein is our report on the results of a subsoil foundation investigation made for the subject project.

Yours very truly,

GORE ENGINEERING, INC.



Lawrence W. Gilbert

LWG:laq

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**SUBSOIL INVESTIGATION
ISLE DERNIERES RESTORATION
EASTERN ISLE DERNIERE & TRINITY ISLAND
TERREBONNE PARISH, LOUISIANA**

INTRODUCTION

1. This report contains the results of a subsoil foundation investigation made at the subject site. Instructions to proceed with the investigation were received by Letter Agreement for Professional Services dated October 5, 1993 with T. Baker Smith & Son, Inc. Consulting Engineers for the project. The study was made for the Department of Natural Resources of the State of Louisiana.

2. The study included the drilling of soil test borings to determine subsurface conditions and stratification and the performance of soil mechanics laboratory tests on samples obtained from the borings to evaluate their physical characteristics. Engineering analyses were made, based on the borings and test data to develop criteria to be used in the restoration of Isle Dernieres.

SOIL BORINGS AND SUBSOIL CONDITIONS

Field Exploration

3. Sixteen (16) undisturbed sample type soil test borings (B-1, B-2, B-6 thru B-9 and B-11 thru B-20) were drilled to depths of 28 to 30 ft. below water surface during the period of October 18-27, 1993. The borings were made with a drill rig mounted

to the deck of a spud barge and at designated locations approximately as shown in a plan on Figure 1. Undisturbed sampling was performed continuously in all cohesive or semi-cohesive materials with a three inch diameter thin wall tube sampler. Representative samples were cut from the cores and placed in moisture proof containers for preservation until laboratory testing could be performed.

4. When cohesionless material was encountered, which could not be sampled by undisturbed methods, the Standard Penetration test was performed. This test consists of driving a two inch diameter splitspoon sample 1 ft. (after first seating it 6 inches) with a 140 lb. hammer falling 30 inches. The number of blows required to drive the sampler gives an indication of the density of the material.

5. In addition, ten (10) hand auger sample soil test borings (A-1 thru A-6 and T-1 thru T-4) were drilled to the 3 ft. depth at designed locations on land and approximately as shown in plan on Figures 19 thru 21. These borings were terminated when the borehole began to cave during drilling as free water was encountered. Disturbed samples were taken of representative materials and placed in moisture proof containers for preservation until further laboratory visual classification and testing could be performed.

6. Subsoil profiles developed from the deep undisturbed borings showing the general stratification and character of the soils are given on Figures 1 and 2. Logs of

all the individual borings showing the detailed stratification and sample depths are given on Figures 3 thru 21.

Subsoil Description

7. Trinity Island (B-1 thru B-9) Reference to the subsoil profile on Figure 1 and logs of borings B-1 thru B-9 shows that the borings were drilled in from 3 to 4 ft. of water. Beginning at the mud bottom in borings B-1 thru B-7, there is generally very soft gray sandy clay or clay with sand layers and shell which extends to the 6½ to 12 ft. depth. This is underlain in boring B-2 by 4 ft. of soft brown humus with much wood. Beginning at the mud bottom in boring B-9, there is very soft gray organic clay with humus to the 9½ ft. depth and then very soft gray sandy clay with humus and wood to the 12 ft. depth. Underlying these near surface more cohesive soils and beginning at the mud bottom in boring B-8, loose to dense gray fine sand with wood, shell or a trace of organic was encountered and extends to the 14 to 18 ft. depth. As can be seen on the subsoil profile, this sand stratum is thickest on the eastern side of the island.

8. Beginning at the 14 to 18 ft. depth in all borings there is very soft to soft gray clay or sandy clay with shell or shell fragments. Borings B-1, B-2 and B-8 were all terminated in this stratum at the 28 to 28½ ft. depth, however it extends to the 18½ to 27 ft. depth in borings B-6, B-7 and B-9. Beginning at the 18½ to 27 ft. depth in borings B-6,

B-7 and B-9 there is soft to medium stiff gray clay or sandy clay which extends to at least the 28 to 29 ft. depth, the maximum depth explored by these borings.

9. Eastern Isle Derniere (B-11 thru B-20) Reference to the subsoil profile on Figure 2 and logs of borings B-11 thru B-20 shows that these borings were drilled in from 3 to 5 ft. of water. The subsoils encountered in borings B-11 thru B-14 primarily consist of medium dense to dense gray fine sand with shell or shell fragments to the maximum depth explored of 28 to 28½ ft. However, 2 to 4½ ft. of very soft clay or sandy clay was interbedded within this sand stratum in borings B-11 thru B-13 beginning at the 6 to 6½ ft. depth.

10. The subsoils below mud bottom in borings B-15 thru B-20 are more heterogeneous in character. These soils generally consist of very soft to soft clay, silty clay or organic clay and loose to medium dense clayey sand or sandy silt to the 11 to 15½ ft. depth. Beginning at this depth in borings B-15 thru B-17 and B-19 and B-20 there is medium dense to dense gray fine sand with shell or shell fragments which extends to the 21 to 26 ft. depth. Beneath this sand in borings B-15 and B-17 and beginning at the 12 ft. depth in boring B-18 there is very soft to soft clay or sandy clay which extends to the 25½ and 27 ft. depth in borings B-18 and B-15, respectively, and to at least the 28 ft. depth in boring B-17 where this boring was terminated. Beginning at the 21½ to 27 ft. depth in the remaining borings, loose gray clayey sand or sand was encountered. Borings B-15, B-16 and

B-18 were terminated in this stratum at depths ranging from 28 to 30 ft., however it extends to the 26 and 27 ft. depths in borings B-20 and B-19, respectively. The clayey sands are underlain in these two borings by soft gray clay to at least the 28½ ft. depth, the maximum depth explored by these borings.

11. Hand Auger Borings (A-1 thru A-6 and T-1 thru T-4) As previously indicated, hand auger borings were drilled on both islands to determine the character of the near surface soils. Borings A-1 thru A-6, made on Eastern Isle Derniere, indicate that the subsoils to the maximum depth explored of 3 ft. consist of medium dense to dense tan and gray, brownish gray or gray fine sand with shell. The borings made on Trinity Island (T-1 thru T-4) indicate that the subsoils to the 1 to 2½ ft. depth consist of gray, tan and gray or black fine sand with specks of shell, root fibers and some organic. This surface sand is underlain in all borings by very soft gray or brown organic clay or clay with organic. Borings T-2 thru T-4 were terminated in these clays at the 3 ft. depth, however it extends to the 2½ ft. depth in boring T-1. Beginning at the 2½ ft. depth in boring T-1 there is loose gray clayey fine sand with organic to at least the 3 ft. depth where this boring was terminated.

LABORATORY TESTS

12. In order to develop the physical properties of the soils, soil mechanics laboratory test were performed on samples obtained from the borings. This testing consisted primarily of Natural Moisture Content, Unit Weight and Unconfined Compression. Grain

Size and Triaxial Shear Tests were performed on some of the more granular materials and Atterberg Limits were performed on selected samples. The results of all the laboratory tests except Grain Size are tabulated along side the boring logs at the appropriate sample and depth on Figures 3 thru 21. Grain Size Test results are given on Figures 22 thru 33.

13. The unconfined compressive strength is used in analyses to determine undrained shear strength of cohesive soils for slope stability analyses. The Atterberg Limits along with the Natural Moisture Content give an indication of the compressibility of the soils and are used empirically to estimate settlements.

FOUNDATION ANALYSIS

General

14. It is understood that the proposed construction consists of restoration of Isle Dernieres. This includes both East Isle Derniere and Trinity Island. The general restoration procedures will consist of building up the existing dune along the Gulf of Mexico to Elev. +8 using overwash sands where available and supplemented with hydraulic sand fill. A back dike will also be constructed and will be about 500 ft. landward of and parallel to the dune. This back dike will have a crown at Elev. +4 and will be constructed in from 1 to 2 ft. of water. Construction of this back dike will be from insitu material taken from a borrow pit on the Gulf of Mexico side of the back dike. Upon completion of the dune

and back dike, the area between them will be raised with hydraulic fill. Subsequent to this, the restored islands will be planted with dune and marsh vegetation.

15. Slope stability analyses were made to develop a cross-section of the back dike as well as the limits of equipment flotation and borrow excavation. In addition, settlement analyses were made to allow for an estimation of the long term settlements of the restored islands. Discussion is also given with regard to estimated shrinkage of the hydraulic fill material.

Back Dike

16. Slope Stability Analyses Analyses were made based on the Wedge Method or Method of Planes to estimate the stability of the proposed back dike. This includes determining the dike side slopes based on an 8 ft. wide crown at Elev. +4. The analyses assume this dike will be constructed in a maximum of 2 ft. of water and are based on a low water level at Elev. 0. The analyses were also made to develop the limits of flotation and borrow excavation on the Gulf of Mexico side of the proposed back dike. It was assumed that the dike will be constructed using bucket dredge operations. The analyses were based on subsoils consisting of very soft clays as encountered in some of the soil borings.

17. Results of Analyses The results of slope stability analyses made with regard to the proposed back dike are given on Figure 34. As can be seen, dike side slopes of 1 vertical on 8 horizontal are recommended for design. A 25 ft. wide berm should be maintained from the Gulf of Mexico side toe of dike. The flotation and borrow excavation could then extend on a 1 vertical on 1 horizontal side slope to Elev. -8 and then on a 1 vertical on 7 horizontal side slope to Elev. -25. Based on this configuration, a minimum factor of safety of 1.30 was calculated for the stability of the dike and a factor of safety of 1.34 was calculated for a potential failure of the dike into the flotation and borrow excavation. These factors of safety are believed adequate considering the temporary nature of the back dike and that some gain in shear strength will occur during staged construction, as will be discussed.

18. The slope stability analyses were made assuming the subsoils beneath the dike are primarily very soft clays. As can be seen by the logs of borings, areas exist where the subsoils are more granular in character and consist of loose to dense sands. Where primarily sands exist beneath the proposed back dike, increased stability exists. However placement of sands by bucket dredging will result in relatively flat side slopes below water. Also, these type soils are highly susceptible to erosion. Consequently, the side slopes indicated above are also recommended for the case where sands exist below mud bottom. This average side slope may be composed of a flatter underwater slope and a

steeper above water slope. This may be needed since it cannot be assured that the underwater placement of sand will stand on a 1 vertical or 8 horizontal slope.

19. Construction Considerations Some discussion with regard to construction of the back dike is warranted. While it is believed that the factors of safety given above are adequate, the stability of the back dike and flotation and borrow excavation is highly dependent on the methods, means and sequence of construction. It is believed that best results would be achieved by staged construction. For this case, small increases in the dike grade are placed over a relatively wide base. Time should be allowed between successive lifts in order to permit for some consolidation and strength gain of the subsoils and some "crusting" of the exposed surface when the material is placed above water. The adjacent borrow material should be carefully placed into the dike section and in relatively small quantities to minimize disturbance of the very soft subgrade. While not included in the stability analyses, geotextile fabric should be considered by the contractor as a means of increasing base stability. If used, the fabric should extend from toe to toe of the dike section in continuous or adequately sewn pieces.

20. It is understood that the construction period allowed for the back dike will be about 6 months and that the dike will have to last for about 1 year. It should be recognized that this dike will be highly susceptible to erosion, particularly where the borrow material consists of sand. Long term maintenance will be needed to rebuild any sections

of the dike which erode and also to compensate for long term settlements, as will be discussed. Visqueen, sand bags or other means of controlling erosion should be considered by the contractor, as needed, to minimize erosion of the dike side slopes.

21. In view of the above, it is recommended that all potential contractors be clearly advised of the risks associated with the dike construction and maintenance difficulties in a pre bid conference. This will allow them an opportunity to realistically assess their costs associated with this project.

22. Estimated Settlements Analyses were made to estimate the settlements that should be expected due to the fill placed on the subsoils as a result of the restoration project. These will be the result of a combination of long term consolidation settlements due to the fill load as well as shrinkage of the fill material, itself. In general, long term consolidation settlements will be greatest where the subsoils are cohesive in character and particularly where organic materials exist. Lesser consolidation settlements would be expected where subsoils are primarily granular in character. With regard to shrinkage of the fill material, these will also be greatest where the dredged material is more cohesive in character and will be small where the dredged materials consist primarily of sands.

23. Consolidation Settlements Analyses were made based on various representative soil borings to estimate the long term consolidation settlements that should be expected. The analyses were made based on a large loaded area and were based on uniform unit loads ranging from 400 to 1,000 lbs. per sq. ft. Results of these settlement analyses are given in the following table.

UNIFORM UNIT LOAD (LBS/SQ.FT.)	<u>ESTIMATED CONSOLIDATION SETTLEMENT (INCHES)</u>			
	<u>B-2 & B-9</u>	<u>B-6</u>	<u>B-12</u>	<u>B-16 & B-18</u>
400	10 to 15	6 to 10	3 to 6	10 to 15
600	15 to 20	8 to 13	4 to 7	12 to 17
800	17 to 22	10 to 15	5 to 8	14 to 19
1000	20 to 25	12 to 17	6 to 10	17 to 22

In determining the magnitude of settlements, the uniform unit load due to the fill material can be calculated using an average unit weight of fill of 40 lbs. per cu. ft. below water and 100 lbs. per cu. ft. above water.

24. As can be seen, the largest settlements were calculated at borings where the subsoils to the maximum depth explored are primarily cohesive in character. The magnitude of settlements generally decreases as the percentage of sands within the soil borings increases. The settlement estimates given above are based on calculations for the maximum depth of these soil borings (approximately 30 ft.). Additional settlements should be expected due to consolidation of the subsoils beneath the maximum depth explored.

While no detailed analyses were made, it is estimated that this may increase the settlements by about 25 percent.

25. No detailed time/rate of settlement analyses were made, but it is believed that approximately 30 to 50 percent of the estimated settlements may occur within the first year after fill placement. The remaining settlements will take a long period of time and on the order of 10 to 15 years to completely occur. Consideration should be given to these estimated settlements in selecting the grades at which the fill material will be placed.

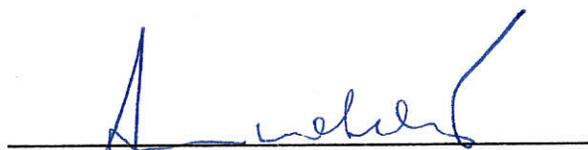
26. Shrinkage Factors In addition to the long term consolidation settlements given above, some additional settlements due to shrinkage of the fill material, itself, should be considered. While no detailed analyses were made, the following estimated ranges of shrinkage factors are given based on the type of material placed.

<u>TYPE MATERIAL</u>	<u>SHRINKAGE FACTOR (PERCENT)</u>
Fine Sand (SM,SP)	5 to 10
Sandy Silt (ML)	10 to 15
Silty Clay (CL)	20 to 30

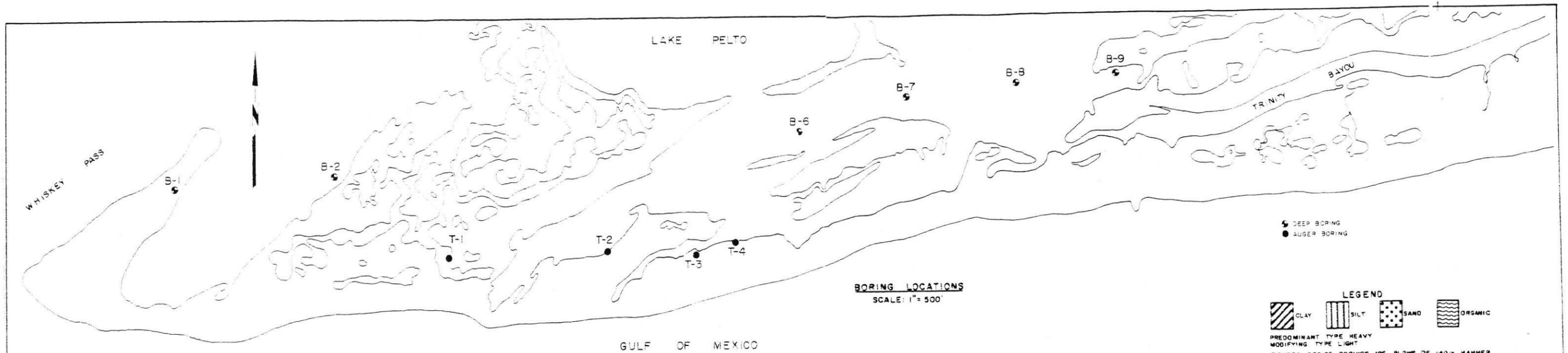
As can be seen from the above table, the least amount of shrinkage would be expected to occur where sands are used as fill material. In order to calculate the amount of settlement due to shrinkage, the total height of fill placement should be multiplied by the shrinkage

factors given above. These settlements due to shrinkage would be additive to those due to consolidation settlements, as given above.

GORE ENGINEERING, INC.



Lawrence W. Gilbert

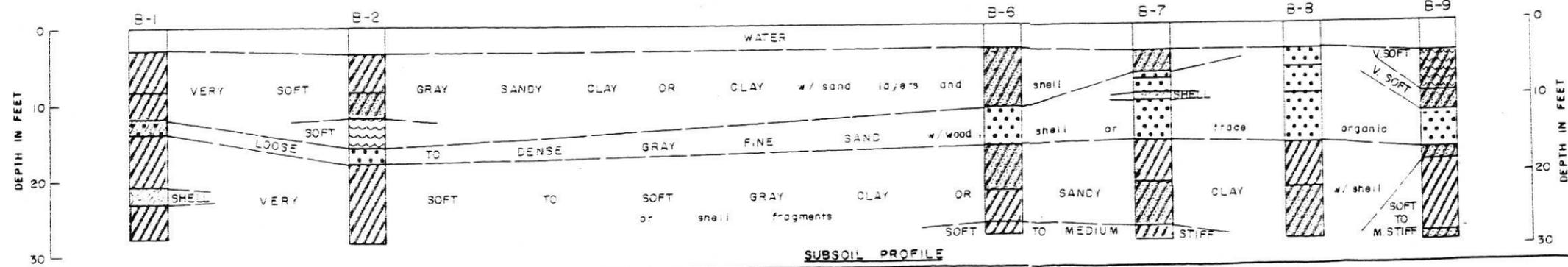


LEGEND

CLAY
 SILT
 SAND
 ORGANIC

PREDOMINANT TYPE HEAVY
 MODIFYING TYPE LIGHT

FIGURES BESIDE BORINGS ARE BLOWS OF 140 lb. HAMMER FALLING 30 in. TO DRIVE A 2 in. DIA. SAMPLER ONE FOOT.



SUBSOIL INVESTIGATION
ISLE DERNIERES RESTORATION
EASTERN ISLE DERNIERE & TRINITY ISLAND
TERREBONNE PARISH, LOUISIANA

BORING LOCATIONS AND SUBSOIL PROFILE

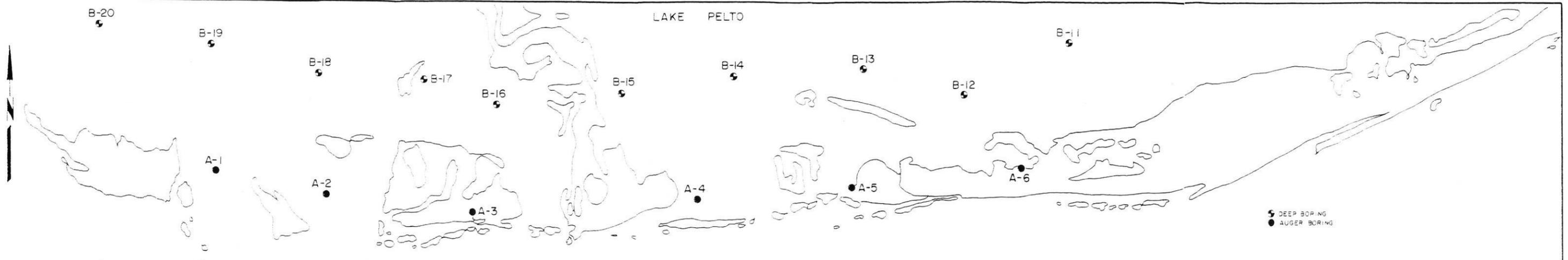
FOR
STATE OF LOUISIANA
DEPT. OF NATURAL RESOURCES

T. BAKER SMITH & SON, INC.
CONSULTING ENGINEERS
HOUMA, LOUISIANA

NOVEMBER, 1993

SORE ENGINEERING, INC.

FIG.



GULF OF MEXICO

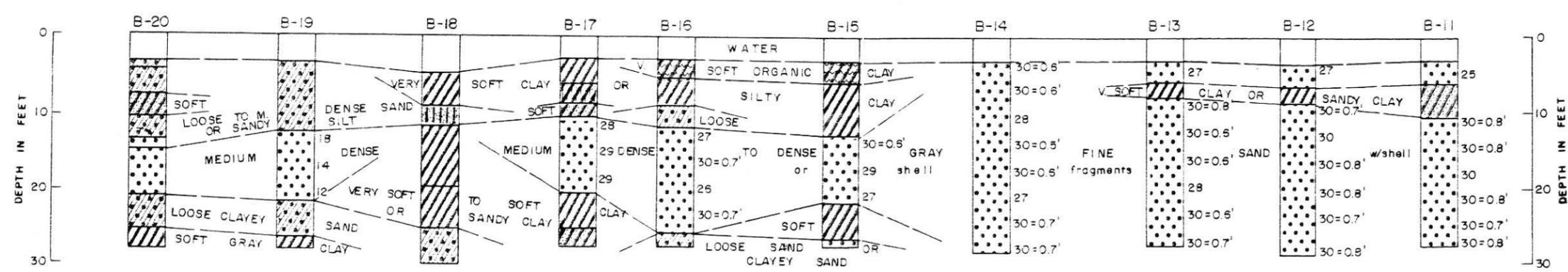
BORING LOCATIONS
SCALE: 1" = 500'

LEGEND

CLAY
 SILT
 SAND
 ORGANIC

PREDOMINANT TYPE HEAVY
MODIFYING TYPE LIGHT

FIGURES BESIDE BORINGS ARE BLOWS OF 140 lb. HAMMER
FALLING 30 in. TO DRIVE A 2 in. DIA. SAMPLER ONE FOOT.



SUBSOIL PROFILE

SUBSOIL INVESTIGATION
ISLE DERNIERES RESTORATION
EASTERN ISLE DERNIERE & TRINITY ISLAND
TERREBONNE PARISH, LOUISIANA

BORING LOCATIONS AND SUBSOIL PROFILE

FOR
STATE OF LOUISIANA
DEPT. OF NATURAL RESOURCES

T. BAKER SMITH & SON, INC.
CONSULTING ENGINEERS
HOUMA, LOUISIANA

NOVEMBER, 1993

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J-5449

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J*5449

Soil and Foundation Investigations
Metairie, Louisiana

Boring No. B-1

LOG OF BORING AND TEST RESULTS

Date of Boring: 18 Oct 1993

Project: ISLE DERNIERES RESTORATION - EASTERN ISLE DERNIERE & TRINITY ISLAND - TERREBONNE PARISH, LOUISIANA
FOR: STATE OF LOUISIANA - DEPT. OF NATURAL RESOURCES
T. BAKER SMITH & SON, INC. - CONSULTING ENGINEERS - HOUMA, LOUISIANA

Recorded By: Daren Dupepe

Sample No.	SAMPLE Depth in Feet		STRATUM Depth in feet	VISUAL CLASSIFICATION	*Blows per Foot	Symbol Log	Scale (ft)	UNCONFINED COMP. (qu) (lbs/sq.ft)	WATER CONTENT (percent)	UNIT WEIGHT (lbs./cu.ft.)		ATTERBERG LIMITS		
	From	To								DRY	WET	L.L.	P.L.	P.I.
			0	WATER										
1	3.5	4.0	3.0	VERY SOFT GRAY CLAY W/SAND LENSES & LAYERS & SHELL			5	94.6						
2	6.5	7.0	8.5		245		82.1	49.5	90.1	83	46	37		
3	9.5	10.0	8.5	VERY SOFT GRAY CLAY W/MUCH SHELL			10	47.9						
4	12.5	13.0	12.0	LOOSE GRAY CLAYEY FINE SAND W/MUCH SHELL				660*	29.3	84.5	109.3		(24)	
5	17.5	18.0	14.0	VERY SOFT GRAY CLAY W/SPECKS SHELL & TRACE ORGANIC			15	205	98.4	44.4	88.0			
			21.0	SHELL W/SOME CLAY				20	23.0					
6	22.5	23.0	23.5	SOFT GRAY CLAY W/SAND LENSES & LAYERS & SOME ORGANIC			25	710	125.5	44.0	99.2			
7	27.5	28.0	28.0											

VALUES IN PARENTHESIS () INDICATE PERCENT PASSING NO. 200 SIEVE.

 CLAY  SILT  SAND  ORGANIC
Predominant type bold. Modifying type light.

*140 lb. hammer dropped 30 in. on 2 in. splitspoon sampler after first being seated 6 in.

REMARKS: *equivalent Qu from 1-point triaxial test

GORE ENGINEERING, INC.

J*5449

Soil and Foundation Investigations
Metairie, Louisiana

Boring No. B-2

LOG OF BORING AND TEST RESULTS

Date of Boring: 18 Oct 1993

Project: ISLE DERNIERES RESTORATION - EASTERN ISLE DERNIERES & TRINITY ISLAND - TERREBONNE, LOUISIANA
FOR: STATE OF LOUISIANA - DEPT. OF NATURAL RESOURCES
T. BAKER SMITH & SON, INC. - CONSULTING ENGINEERS - HOUMA, LOUISIANA

Recorded By: Daren Dupepe

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	From	To								DRY	WET	L.L.	P.L.	P.I.	
			.0	WATER											
1	6.0	6.5	3.5	VERY SOFT GRAY CLAY W/SAND LAYERS & SAND			5	225	67.6	56.9	95.3	61	14	47	
2	9.0	9.5	8.5	VERY SOFT GRAY SANDY CLAY W/SAND LAYERS & SPECKS SHELL			10	235	28.4	85.0	109.1	40	24	16	
3	12.0	12.5	12.0	SOFT BROWN HUMUS W/MUCH WOOD			15		199.3						
4	17.0	17.5	16.0	LOOSE GRAY FINE SAND W/WOOD & CLAY LAYERS					35.5						(12)
5	22.0	22.5	18.0	VERY SOFT GRAY CLAY W/SAND LENSES & LAYERS & SHELL FRAGMENTS			20	310	62.6	59.2	96.3				(90)
6	28.0	28.5	28.5				25	180	51.3	67.0	101.4				
VALUES IN PARENTHESIS () INDICATE PERCENT PASSING NO. 200 SIEVE															

CLAY SILT SAND ORGANIC
Predominant type bold. Modifying type light.

*140 lb. hammer dropped 30 in. on 2 in. splitspoon sampler after first being seated 6 in. REMARKS:

GORE ENGINEERING, INC.

J*5449

Soil and Foundation Investigations
Metairie, Louisiana

Boring No. B-6

LOG OF BORING AND TEST RESULTS

Date of Boring: 18 Oct 1993

Project: ISLE DERNIERES RESTORATION - EASTERN ISLE DERNIERE & TRINITY ISLAND - TERREBONNE, LOUISIANA
FOR: STATE OF LOUISIANA - DEPT. OF NATURAL RESOURCES
T. BAKER SMITH & SON, INC. - CONSULTING ENGINEERS - HOUMA, LOUISIANA

Recorded By: Daren Dupepe

Sample No.	SAMPLE Depth in Feet		STRATUM Depth in feet	VISUAL CLASSIFICATION	*Blows per Foot	Symbol Log	Scale (ft)	UNCONFINED COMP. (qu) (lbs./sq. ft)	WATER CONTENT (percent)	UNIT WEIGHT (lbs./cu. ft.)		ATTERBERG LIMITS			
	From	To								DRY	WET	L.L.	P.L.	P.I.	
			0.0	WATER											
1	3.5	4.0	3.0	VERY SOFT GRAY SANDY CLAY W/CLAY & SAND LAYERS (W/SPECKS WOOD @ 8.5 - 12.0')			5	180	17.2	89.4	104.8	42	14	28	
2	6.5	7.0					10	200	35.4	80.2	108.6	31	18	13	
3	9.5	10.0					11.0	120	30.3	80.5	104.9				
4	12.5	13.0	16.0	LOOSE GRAY FINE SAND W/SHELL & CLAY			15		27.9						
5	17.5	18.0	22.0	VERY SOFT GRAY SANDY CLAY W/SAND LENSES & LAYERS & WOOD				20	325	48.0	69.3	102.6			
6	22.5	23.0	26.5	VERY SOFT CLAY W/MUCH SHELL				25		24.8					
7	27.5	28.0	28.0	SOFT TO MEDIUM STIFF GRAY CLAY W/SAND LENSES & SHELL FRAGMENTS					990	63.8	59.6	97.6			

CLAY SILT SAND ORGANIC
Predominant type bold. Modifying type light.

*140 lb. hammer dropped 30 in. on 2 in. splitspoon sampler after first being seated 6 in.

REMARKS:

GORE ENGINEERING, INC.

J*5449

Soil and Foundation Investigations
Metairie, Louisiana

Boring No. B-7

LOG OF BORING AND TEST RESULTS

Date of Boring: 19 Oct 1993

Project: ISLE DERNIERES RESTORATION - EASTERN ISLE DERNIERE & TRINITY ISLAND - TERREBONNE PARISH, LOUISIANA
FOR: STATE OF LOUISIANA - DEPT. OF NATURAL RESOURCES
T. BAKER SMITH & SON, INC. - CONSULTING ENGINEERS - HOUMA, LOUISIANA

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Sample No.	SAMPLE Depth in Feet		STRATUM Depth in feet	VISUAL CLASSIFICATION	*Blows per Foot	Symbol Log	Scale (ft)	UNCONFINED COMP. (qu) (lbs/sq.ft)	WATER CONTENT (percent)	UNIT WEIGHT (lbs./cu.ft.)		ATTERBERG LIMITS			
	From	To								DRY	WET	L.L.	P.L.	P.I.	
			0.0												
				WATER											
1	3.5	4.0	3.5	VERY SOFT GRAY SANDY CLAY W/HUMUS & SHELL			5		39.9			34	27	7	
2	6.5	7.0	6.5	LOOSE GRAY FINE SAND W/TRACE OF HUMUS					25.0						
3	8.0	8.5	7.0	DENSE GRAY FINE SAND W/SPECKS SHELL					21.5						
4	8.5	9.0	8.5	SHELL W/SOME SAND			10		16.0						
5	11.0	11.5	9.5	MEDIUM DENSE TO DENSE GRAY FINE SAND W/MUCH SHELL					18.7						
6	13.5	14.0	10.0				15		20.6						
7	17.5	18.0	15.5	VERY SOFT GRAY CLAY W/SAND LENSES & SHELL FRAGMENTS			20	455	76.8	52.1	92.1				
8	22.5	23.0	21.0	VERY SOFT GRAY SANDY CLAY W/SHELL			25	360	42.4	72.9	103.8				
9	28.0	28.5	27.0	SOFT TO MEDIUM STIFF GRAY CLAY W/SAND LENSES & LAYERS & SHELL FRAGMENTS				915	54.3	64.6	99.7				

CLAY SILT SAND ORGANIC
Predominant type bold. Modifying type light.

*140 lb. hammer dropped 30 in. on 2 in. splitspoon sampler after first being seated 6 in.

REMARKS:

GORE ENGINEERING, INC.

J*5449

Soil and Foundation Investigations
Metairie, Louisiana

Boring No. B-8

LOG OF BORING AND TEST RESULTS

Date of Boring: 19 Oct 1993

Project: ISLE DERNIERES RESTORATION - EASTERN ISLE DERNIERE & TRINITY ISLAND - TERREBONNE PARISH, LOUISIANA
FOR: STATE OF LOUISIANA - DEPT. OF NATURAL RESOURCES
T. BAKER SMITH & SON, INC. - CONSULTING ENGINEERS - HOUMA, LOUISIANA

Recorded By: Daren Dupepe

Sample No.	SAMPLE Depth in Feet		STRATUM Depth in feet	VISUAL CLASSIFICATION	*Blows per Foot	Symbol Log	Scale (ft)	UNCONFINED COMP. (qu) (lbs/sq.ft)	WATER CONTENT (percent)	UNIT WEIGHT (lbs./cu.ft.)		ATTERBERG LIMITS			
	From	To								DRY	WET	L.L.	P.L.	P.I.	
			0.0												
				WATER											
1	3.5	4.0	3.5	LOOSE GRAY FINE SAND W/TRACE OF HUMUS & SHELL FRAGMENTS			5	770*	31.8	85.1	112.1	34	30	4	
2	6.5	7.0	6.0	LOOSE GRAY FINE SAND W/CLAY, TRACE OF HUMUS & MUCH SHELL					21.9			28	--	NP	
3	9.5	11.0	9.5	MEDIUM DENSE GRAY FINE SAND W/SHELL	25		10		25.8						
4	12.0	13.5			22		15		27.5						
5	17.5	18.0	16.0	VERY SOFT GRAY CLAY W/SAND LENSES				470	72.3	54.9	94.6				
6	22.5	23.0	22.0	VERY SOFT GRAY SANDY CLAY W/SHELL FRAGMENTS			25								
7	28.0	28.5	28.5					420	45.0	69.7	101.0				

CLAY SILT SAND ORGANIC
Predominant type bold. Modifying type light.

*140 lb. hammer dropped 30 in. on 2 in. splitspoon sampler after first being seated 6 in.

REMARKS: *equivalent Qu from 1-point triaxial test

GORE ENGINEERING, INC.

J*5449

Soil and Foundation Investigations
Metairie, Louisiana

Boring No. B-9

LOG OF BORING AND TEST RESULTS

Date of Boring: 20 Oct 1993

Project: ISLE DERNIERES RESTORATION - EASTERN ISLE DERNIERE & TRINITY ISLAND - TERREBONNE PARISH, LOUISIANA
FOR: STATE OF LOUISIANA - DEPT. OF NATURAL RESOURCES
T. BAKER SMITH & SON, INC. - CONSULTING ENGINEERS - HOUMA, LOUISIANA

Recorded By: Daren Dupepe

Sample No.	SAMPLE Depth in Feet		STRATUM Depth in feet	VISUAL CLASSIFICATION	*Blows per Foot	Symbol Log	Scale (ft)	UNCONFINED COMP. (qu) (lbs/sq.ft)	WATER CONTENT (percent)	UNIT WEIGHT (lbs./cu.ft.)		ATTERBERG LIMITS		
	From	To								DRY	WET	L.L.	P.L.	P.I.
			0.0											
				WATER										
1	6.5	7.0	4.0	VERY SOFT GRAY ORGANIC CLAY W/HUMUS			5	80	183.8	26.7	75.7	122	24	98
2	9.5	10.0	9.5	VERY SOFT GRAY SANDY CLAY W/HUMUS & WOOD			10	495	35.0	80.2	108.3	31	25	6
3	12.0	13.5	12.0	MEDIUM DENSE GRAY FINE SAND W/SPECKS SHELL	26		15		22.1					
4	17.5	18.0	17.0	VERY SOFT GRAY SANDY CLAY W/PLENTY SHELL				325	45.5	68.8	100.1			
			18.5				20							
5	22.5	23.0		MEDIUM STIFF GRAY CLAY W/SAND LENSES			25	1050	60.0	62.3	99.6			
6	28.5	29.0	28.0	SOFT GRAY SANDY CLAY W/SHELL FRAGMENTS				600	44.8	71.5	103.6			
			29.0				30							

CLAY SILT SAND ORGANIC
Predominant type bold. Modifying type light.

*140 lb. hammer dropped 30 in. on 2 in. splitspoon sampler after first being seated 6 in.

REMARKS:

GORE ENGINEERING, INC.

J*5449

Soil and Foundation Investigations
Metairie, Louisiana

Boring No. B-11

LOG OF BORING AND TEST RESULTS

Date of Boring: 27 Oct 1993

Project: ISLE DERNIERES RESTORATION - EASTERN ISLE DERNIERE & TRINITY ISLAND - TERREBONNE PARISH, LOUISIANA
FOR: STATE OF LOUISIANA - DEPT. OF NATURAL RESOURCES
T. BAKER SMITH & SON, INC. - CONSULTING ENGINEERS - HOUMA, LOUISIANA

Recorded By: Daren Dupepe

Sample No.	SAMPLE Depth in Feet		STRATUM Depth in feet	VISUAL CLASSIFICATION	*Blows per Foot	Symbol Log	Scale (ft)	UNCONFINED COMP. (qu) (lbs/sq.ft)	WATER CONTENT (percent)	UNIT WEIGHT (lbs./cu.ft.)		ATTERBERG LIMITS			
	From	To								DRY	WET	L.L.	P.L.	P.I.	
			0	WATER											
1	3.5	5.0	3.0	DENSE GRAY FINE SAND	25		5		28.3						
2	6.5	7.0	6.0	SOFT GRAY SANDY CLAY				620	29.4	90.3	116.8				
3	9.5	10.0	10.5				10	665	34.7	83.4	112.3				
4	10.5	11.5			30 = .8'				27.2						
5	13.5	15.0			30 = .8'		15		25.9						
6	17.0	18.5		DENSE GRAY FINE SAND W/SHELL FRAGMENTS	30				26.0						
7	20.5	22.0			30 = .8'				22.1						
8	24.0	25.5			30 = .7'		25		26.7						
9	26.5	28.0	28.0		30 = .8'				23.8						

CLAY SILT SAND ORGANIC
Predominant type bold. Modifying type light.

*140 lb. hammer dropped 30 in. on 2 in. splitspoon sampler after first being seated 6 in.

REMARKS:

GORE ENGINEERING, INC.

J#5449

Soil and Foundation Investigations
Metairie, Louisiana

Boring No. B-12

LOG OF BORING AND TEST RESULTS

Date of Boring: 27 Oct 1993

Project: ISLE DERNIERES RESTORATION - EASTERN ISLE DERNIERE & TRINITY ISLAND - TERREBONNE PARISH, LOUISIANA
FOR: STATE OF LOUISIANA - DEPT. OF NATURAL RESOURCES
T. BAKER SMITH & SON, INC. - CONSULTING ENGINEERS - HOUMA, LOUISIANA

Recorded By: Daren Dupepe

Sample No.	SAMPLE Depth in Feet		STRATUM Depth in feet	VISUAL CLASSIFICATION	*Blows per Foot	Symbol Log	Scale (ft)	UNCONFINED COMP. (qu) (lbs/sq.ft)	WATER CONTENT (percent)	UNIT WEIGHT (lbs./cu.ft.)		ATTERBERG LIMITS				
	From	To								DRY	WET	L.L.	P.L.	P.I.		
			0	WATER												
1	3.5	4.0	3.5	DENSE GRAY FINE SAND	27		5		27.4							
2	6.5	7.0	6.5	VERY SOFT BROWNISH GRAY CLAY W/HUMUS & SAND LENSES				.170	141.6	33.2	80.3	98	38	60		
3	8.5	10.0	8.5	DENSE GRAY FINE SAND W/SPECKS SHELL	30 = .7'		10		23.4							
4	12.0	13.5			30			23.8								
5	15.5	17.0			30 = .8'			28.7								
6	19.0	20.5			30 = .8'			26.1								
7	22.5	24.0			30 = .7'			22.6								
8	27.0	28.5			30 = .8'			24.1								

CLAY SILT SAND ORGANIC
Predominant type bold. Modifying type light.

*140 lb. hammer dropped 30 in. on 2 in. splitspoon sampler after first being seated 6 in. **REMARKS:**

GORE ENGINEERING, INC.

J#5449

Soil and Foundation Investigations
Metairie, Louisiana

Boring No. B-13

LOG OF BORING AND TEST RESULTS.

Date of Boring: 27 Oct 1993

Project: ISLE DERNIERES RESTORATION - EASTERN ISLE DERNIERE & TRINITY ISLAND - TERREBONNE PARISH, LOUISIANA
FOR: STATE OF LOUISIANA - DEPT. OF NATURAL RESOURCES
T. BAKER SMITH & SON, INC. - CONSULTING ENGINEERS - HOUMA, LOUISIANA

Recorded By: Daren Dupepe

Sample No.	SAMPLE Depth in Feet		STRATUM Depth in feet	VISUAL CLASSIFICATION	*Blows per Foot	Symbol Log	Scale (ft)	UNCONFINED COMP. (qu) (lbs/sq.ft)	WATER CONTENT (percent)	UNIT WEIGHT (lbs./cu.ft.)		ATTERBERG LIMITS				
	From	To								DRY	WET	L.L.	P.L.	P.I.		
			.0	WATER												
1	3.5	5.0	3.0	DENSE GRAY FINE SAND	27		5		24.0							
2	6.5	7.0	6.0	VERY SOFT BROWNISH GRAY CLAY W/HUMUS & SAND LAYERS				195	116.6	37.9	82.0	98	20	78		
3	8.0	9.5	8.0	DENSE GRAY FINE SAND W/SPECKS SHELL	30 = .8'		10		21.1							
4	11.5	13.0			30 = .6'			15		22.0						
5	15.0	16.5			30 = .6'			20		19.7						
6	18.5	20.0			28			25		20.9						
7	22.0	23.5			30 = .6'					23.5						
8	26.5	28.0	28.0		30 = .7'					25.6						

CLAY SILT SAND ORGANIC
Predominant type bold. Modifying type light.

*140 lb. hammer dropped 30 in. on 2 in. splitspoon sampler after first being seated 6 in.

REMARKS:

GORE ENGINEERING, INC.

J#5449

Soil and Foundation Investigations
Metairie, Louisiana

Boring No. B-14

LOG OF BORING AND TEST RESULTS

Date of Boring: 26 Oct 1993

Project: ISLE DERNIERES RESTORATION - EASTERN ISLE DERNIERE & TRINITY ISLAND - TERREBONNE PARISH, LOUISIANA
FOR: STATE OF LOUISIANA - DEPT. OF NATURAL RESOURCES
T. BAKER SMITH & SON, INC. - CONSULTING ENGINEERS - HOUMA, LOUISIANA

Recorded By: Daren Dupepe

Sample No.	SAMPLE Depth in Feet		STRATUM Depth in feet	VISUAL CLASSIFICATION	*Blows per Foot	Symbol Log	Scale (ft)	UNCONFINED COMP. (qu) (lbs/sq.ft)	WATER CONTENT (percent)	UNIT WEIGHT (lbs./cu.ft.)		ATTERBERG LIMITS			
	From	To								DRY	WET	L.L.	P.L.	P.I.	
			.0	WATER											
1	3.0	4.0	3.0		30 = .6'		5		22.7						
2	6.0	7.5			30 = .6'		10		21.8						
3	9.5	11.0		DENSE GRAY FINE SAND W/SPECKS SHELL	28		15		21.5						
4	13.0	14.5			30 = .5'		20		22.6						
5	16.5	18.0			30 = .6'		25		24.6						
6	20.0	21.5			27				22.3						
7	23.5	25.0			30 = .7'				29.9						
8	27.0	28.5	28.5		30 = .7'				30.2						

CLAY SILT SAND ORGANIC
Predominant type bold. Modifying type light.

*140 lb. hammer dropped 30 in. on 2 in. splitspoon sampler after first being seated 6 in.

REMARKS:

GORE ENGINEERING, INC.

J*5449

Soil and Foundation Investigations
Metairie, Louisiana

Boring No. B-15

LOG OF BORING AND TEST RESULTS

Date of Boring: 26 Oct 1993

Project: ISLE DERNIERES TESTORATION - EASTERN ISLE DERNIERE & TRINITY ISLAND - TERREBONNE PARISH, LOUISIANA
FOR: STATE OF LOUISIANA - DEPT. OF NATURAL RESOURCES
T. BAKER SMITH & SON, INC. - CONSULTING ENGINEERS - HOUMA, LOUISIANA

Recorded By: Daren Dupepe

Sample No.	SAMPLE Depth in Feet		STRATUM Depth in feet	VISUAL CLASSIFICATION	*Blows per Foot	Symbol Log	Scale (ft)	UNCONFINED COMP. (qu) (lbs/sq.ft)	WATER CONTENT (percent)	UNIT WEIGHT (lbs./cu.ft.)		ATTERBERG LIMITS			
	From	To								DRY	WET	L.L.	P.L.	P.I.	
			.0	WATER											
1	3.5	4.0	3.0	VERY SOFT BROWN & GRAY ORGANIC CLAY			5		146.6			146	39	107	
2	6.5	7.0	6.0	VERY SOFT GRAY CLAY W/ORGANIC & SAND LENSES				180	117.0	37.3	80.9				
3	9.5	10.0					10	165	87.3	46.9	87.8	90	26	64	
4	12.5	13.0	13.0					135	108.2	39.9	83.0				
5	13.0	14.5		MEDIUM DENSE TO DENSE GRAY FINE SAND W/SPECKS SHELL	30 = .6"		15		25.0						
6	16.5	18.0			29		20		23.6						
7	20.0	21.5			27				22.6						
8	22.5	23.0	22.0	VERY SOFT GRAY CLAY W/SAND LENSES & LAYERS			25	490	46.1	72.1	105.4				
9	27.5	28.0	27.0 28.0	MEDIUM DENSE GRAY FINE SAND W/CLAY LENSES					28.4						

CLAY SILT SAND ORGANIC
Predominant type bold. Modifying type light.

*140 lb. hammer dropped 30 in. on 2 in. splitspoon sampler after first being seated 6 in.

REMARKS:

GORE ENGINEERING, INC.

J*5449

Soil and Foundation Investigations
Metairie, Louisiana

Boring No. B-16

LOG OF BORING AND TEST RESULTS

Date of Boring: 26 Oct 1993

Project: ISLE DERNIERES RESTORATION - EASTERN ISLE DERNIERE & TRINITY ISLAND - TERREBONNE PARISH, LOUISIANA
FOR: STATE OF LOUISIANA - DEPT. OF NATURAL RESOURCES
T. BAKER SMITH & SON, INC. - CONSULTING ENGINEERS - HOUMA, LOUISIANA

Recorded By: Daren Dupepe

Sample No.	SAMPLE Depth in Feet		STRATON Depth in feet	VISUAL CLASSIFICATION	*Blows per Foot	Symbol Log	Scale (ft)	UNCONFINED COMP. (qu) (lbs/sq.ft)	WATER CONTENT (percent)	UNIT WEIGHT (lbs./cu.ft.)		ATTERBERG LIMITS			
	From	To								DRY	WET	L.L.	P.L.	P.I.	
			.0	WATER											
1	3.5	4.0	3.0	VERY SOFT BROWNISH GRAY ORGANIC CLAY			5	80	142.3	32.0	77.5	109	36	73	
2	6.5	7.0	5.5	VERY SOFT GRAY CLAY W/SOME ORGANIC				75	94.7	43.1	84.0	94	30	64	
3	9.5	10.0	9.0	LOOSE GRAY CLAYEY FINE SAND W/CLAY LAYERS			10	750*	29.0	89.4	115.3	25	22	3	
4	12.0	13.5	12.0	MEDIUM DENSE TO DENSE GRAY FINE SAND W/SHELL FRAGMENTS	27		15		25.9						
5	15.5	17.0	30 = .7'												
6	19.0	20.5	26		20					26.3					
7	22.5	24.0	30 = .7'		25					23.6					
8	27.5	28.0	26.0	LOOSE GRAY CLAYEY FINE SAND				540	28.9	88.3	113.8				
			28.0												

CLAY SILT SAND ORGANIC
Predominant type bold. Modifying type light.

*140 lb. hammer dropped 30 in. on 2 in. splitspoon sampler after first being seated 6 in.

REMARKS: *equivalent Qu from 1-point triaxial test

GORE ENGINEERING, INC.

J*5449

Soil and Foundation Investigations
Metairie, Louisiana

Boring No. B-17

LOG OF BORING AND TEST RESULTS

Date of Boring: 25 Oct 1993

Project: ISLE DERNIERES RESTORATION - EASTERN ISLE DERNIERE & TRINITY ISLAND - TERREBONNE PARISH, LOUISIANA
FOR: STATE OF LOUISIANA - DEPT. OF NATURAL RESOURCES
T. BAKER SMITH & SON, INC. - CONSULTING ENGINEERS - HOUMA, LOUISIANA

Recorded By: Daren Dupepe

Sample No.	SAMPLE Depth in Feet		STRATUM Depth in feet	VISUAL CLASSIFICATION	*Blows per Foot	Symbol Log	Scale (ft)	UNCONFINED COMP. (qu) (lbs./sq.ft)	WATER CONTENT (percent)	UNIT WEIGHT (lbs./cu.ft.)		ATTERBERG LIMITS				
	From	To								DRY	WET	L.L.	P.L.	P.I.		
			0.0													
				WATER												
1	3.5	4.0	3.0	VERY SOFT GRAY CLAY W/TRACE OF ORGANIC & SPECKS WOOD			5	45	117.2	38.4	83.3	96	28	68		
2	6.5	7.0	6.5	VERY SOFT GRAY SILTY CLAY W/TRACE OF ORGANIC & SPECKS WOOD				140	46.9	71.3	104.8	45	19	26		
3	9.5	10.0	9.0	VERY SOFT GRAY SANDY CLAY			10	180	43.2	74.2	106.2	38	22	16		
4	11.0	12.5	11.0	MEDIUM DENSE TO DENSE GRAY FINE SAND W/SHELL	28				20.6							
5	14.5	16.0	14.5		29		15		23.6							
6	18.0	19.5	18.0		29		20		22.4							
7	22.5	23.0	21.0	SOFT GRAY CLAY W/SAND LENSES & LAYERS				775	68.9	56.6	95.6					
			25.5				25									
8	27.5	28.0	28.0	VERY SOFT GRAY SANDY CLAY W/SPECKS SHELL					29.6							

CLAY SILT SAND ORGANIC
Predominant type bold. Modifying type light.

*140 lb. hammer dropped 30 in. on 2 in. splitspoon sampler after first being seated 6 in.

REMARKS:

GORE ENGINEERING, INC.

J*5449

Soil and Foundation Investigations
Metairie, Louisiana

Boring No. B-18

LOG OF BORING AND TEST RESULTS

Date of Boring: 20 Oct 1993

Project: ISLE DERNIERES RESTORATION - EASTERN ISLE DERNIERE & TRINITY ISLAND - TERREBONNE PARISH, LOUISIANA
FOR: STATE OF LOUISIANA - DEPT. OF NATURAL RESOURCES
T. BAKER SMITH & SON, INC. - CONSULTING ENGINEERS - HOUMA, LOUISIANA

Recorded By: Daren Dupepe

Sample No.	SAMPLE Depth in Feet		STRATUM Depth in feet	VISUAL CLASSIFICATION	*Blows per Foot	Symbol Log	Scale (ft)	UNCONFINED COMP. (qu) (lbs/sq.ft)	WATER CONTENT (percent)	UNIT WEIGHT (lbs./cu.ft.)		ATTERBERG LIMITS			
	From	To								DRY	WET	L.L.	P.L.	P.I.	
			0.0												
				WATER											
			5.0				5								
1	6.5	7.0		VERY SOFT GRAY CLAY W/HUMUS, SAND LENSES & SHELL FRAGMENTS				165	59.3	60.7	96.7	55	26	29	
2	9.5	10.0	9.5	LOOSE GRAY SANDY SILT W/SOME CLAY			10	155	37.4	79.8	109.7	37	--	NP	
3	12.5	13.0	12.0					165	82.8	50.5	92.3				
				VERY SOFT GRAY CLAY W/SANDY SILT LENSES & SHELL FRAGMENTS			15								
4	17.5	18.0						645	60.7	61.7	99.1	53	22	31	
			20.0				20								
5	22.5	23.0		SOFT GRAY CLAY W/SAND LENSES				420	50.6	68.6	103.3				
			25.5				25								
6	29.5	30.0		LOOSE GRAY CLAYEY FINE SAND W/TRACE HUMUS				840*	32.2	83.2	110.0				
			30.0				30								

CLAY SILT SAND ORGANIC
Predominant type bold. Modifying type light.

*140 lb. hammer dropped 30 in. on 2 in. splitspoon sampler after first being seated 6 in.

REMARKS: *equivalent Qu from 1-point triaxial test

GORE ENGINEERING, INC.

J*5449

Soil and Foundation Investigations
Metairie, Louisiana

Boring No. B-19

LOG OF BORING AND TEST RESULTS

Date of Boring: 20 Oct 1993

Project: ISLE DERNIERES RESTORATION - EASTERN ISLE DERNIERE & TRINITY ISLAND - TERREBONNE PARISH, LOUISIANA
FOR: STATE OF LOUISIANA - DEPT. OF NATURAL RESOURCES
T. BAKER SMITH & SON, INC. - CONSULTING ENGINEERS - HOUMA, LOUISIANA

Recorded By: Daren Dupepe

Sample No.	SAMPLE Depth in Feet		STRATUM Depth in feet	VISUAL CLASSIFICATION	*Blows per Foot	Symbol Log	Scale (ft)	UNCONFINED COMP. (qu) (lbs/sq.ft)	WATER CONTENT (percent)	UNIT WEIGHT (lbs./cu.ft.)		ATTERBERG LIMITS			
	From	To								DRY	WET	L.L.	P.L.	P.I.	
			0.0												
				WATER											
1	3.5	4.0	3.5				5	1100*	25.6	90.8	114.0	24	--	NP	
2	6.5	7.0						860	29.8	85.7	111.2				
3	9.5	10.0		LOOSE TO MEDIUM DENSE GRAY CLAYEY FINE SAND W/SHELL FRAGMENTS & CLAY LAYERS (MUCH SHELL @ 11.5 - 12.0')			10		29.8						
4	13.0	14.5	13.0		18		15		24.6						
5	16.5	18.0		MEDIUM DENSE GRAY FINE SAND W/SHELL FRAGMENTS	14		20		23.8						
6	20.0	21.5			12				25.7						
7	22.5	23.0	22.0	LOOSE GRAY CLAYEY FINE SAND			25		27.0						
8	28.0	28.5	27.0	SOFT GRAY CLAY W/SAND LENSES & LAYERS				620	64.7	59.0	97.1				
			28.5												

CLAY
 SILT
 SAND
 ORGANIC
 Predominant type bold. Modifying type light.

*140 lb. hammer dropped 30 in. on 2 in. split spoon sampler after first being seated 6 in.

REMARKS: *equivalent Qu from 1-point triaxial test

GORE ENGINEERING, INC.

J*5449

Soil and Foundation Investigations
Metairie, Louisiana

Boring No. B-20

LOG OF BORING AND TEST RESULTS

Date of Boring: 20 Oct 1993

Project: ISLE DERNIERES RESTORATION - EASTERN ISLE DERNIERE & TRINITY ISLAND - TERREBONNE PARISH, LOUISIANA
FOR: STATE OF LOUISIANA - DEPT. OF NATURAL RESOURCES
T. BAKER SMITH & SON, INC. - CONSULTING ENGINEERS - HOUMA, LOUISIANA

Recorded By: Daren Dupepe

Sample No.	SAMPLE Depth in Feet		STRATUM Depth in feet	VISUAL CLASSIFICATION	*Blows per Foot	Symbol Log	Scale (ft)	UNCONFINED COMP. (qu) (lbs/sq.ft)	WATER CONTENT (percent)	UNIT WEIGHT (lbs./cu.ft.)		ATTERBERG LIMITS			
	From	To								DRY	WET	L.L.	P.L.	P.I.	
			0.0	WATER		///									
1	3.5	4.0	3.5	LOOSE GRAY CLAYEY FINE SAND W/SHELL FRAG.			5	450	29.9	87.8	114.1				
2	6.5	7.0	4.5	LOOSE GRAY CLAYEY FINE SAND					29.4						
3	9.5	10.0	8.0	SOFT GRAY SANDY CLAY W/SHELL			10		31.1			35	21	14	
4	12.5	13.0	11.0	LOOSE GRAY FINE CLAYEY SAND W/SHELL				180	39.6	77.7	108.4	26	--	NP	
5	15.0	15.5	14.0	LOOSE GRAY FINE SAND W/SPECKS SHELL			15	410*	28.5	90.1	115.8				
6	17.5	18.0	15.5	MEDIUM DENSE GRAY FINE SAND W/SPECKS SHELL			20		25.7						
7	22.5	23.0	21.5	LOOSE GRAY CLAYEY FINE SAND			25		22.8						
8	28.0	28.5	26.0	SOFT GRAY CLAY W/SHELL FRAGMENTS & SAND LAYERS				590	53.7	65.6	100.8				

CLAY SILT SAND ORGANIC
Predominant type bold. Modifying type light.

*140 lb. hammer dropped 30 in. on 2 in. splitspoon sampler after first being seated 6 in.

REMARKS: *equivalent Qu from 1-point triaxial test

GORE ENGINEERING, INC.

J*5449

Soil and Foundation Investigations
Metairie, Louisiana

Boring No. A-1

LOG OF BORING AND TEST RESULTS

Date of Boring: 28 Oct 1993

Project: ISLE DERNIERES RESTORATION - EASTERN ISLE DERNIERE & TRINITY ISLAND - TERREBONNE PARISH, LOUISIANA
FOR: STATE OF LOUISIANA - DEPT. OF NATURAL RESOURCES
T. BAKER SMITH & SON, INC. - CONSULTING ENGINEERS - HOUMA, LOUISIANA

Recorded By: Daren Dupepe

Sample No.	SAMPLE Depth in Feet		STRATUM Depth in feet	VISUAL CLASSIFICATION	*Blows per Foot	Symbol Log	Scale (ft)	UNCONFINED COMP. (qu) (lbs/sq.ft)	WATER CONTENT (percent)	UNIT WEIGHT (lbs./cu.ft.)		ATTERBERG LIMITS		
	From	To								DRY	WET	L.L.	P.L.	P.I.
1	.5	1.0	.0	MEDIUM DENSE TAN & GRAY FINE SAND W/SPECKS SHELL					15.9			17	--	NP
2	1.5	2.0							17.1					
3	2.5	3.0	2.5 3.0	DENSE BROWNISH GRAY CLAYEY FINE SAND W/SHELL & CLAY LAYERS					24.4					
Boring Number A-2														
1	.5	1.0	.0	MEDIUM DENSE BROWNISH GRAY FINE SAND W/SHELL					23.0			20	--	NP
2	1.5	2.0	1.0						22.8					
3	2.5	3.0	3.0	DENSE GRAY FINE SAND W/SHELL					22.5					
Boring Number A-3														
1	.5	1.0	.0	MEDIUM DENSE BROWN & GRAY FINE SAND W/SPECKS SHELL					20.4					
2	1.5	2.0							17.5			24	--	NP
3	2.5	3.0	2.5 3.0	DENSE GRAY FINE SAND W/SHELL					23.3					

CLAY SILT SAND ORGANIC
Predominant type bold. Modifying type light.

*140 lb. hammer dropped 30 in. on 2 in. splitspoon sampler after first being seated 6 in.

REMARKS:

GORE ENGINEERING, INC.

J*5449

Soil and Foundation Investigations
Metairie, Louisiana

Boring No. A-4

LOG OF BORING AND TEST RESULTS

Date of Boring: 28 Oct 1993

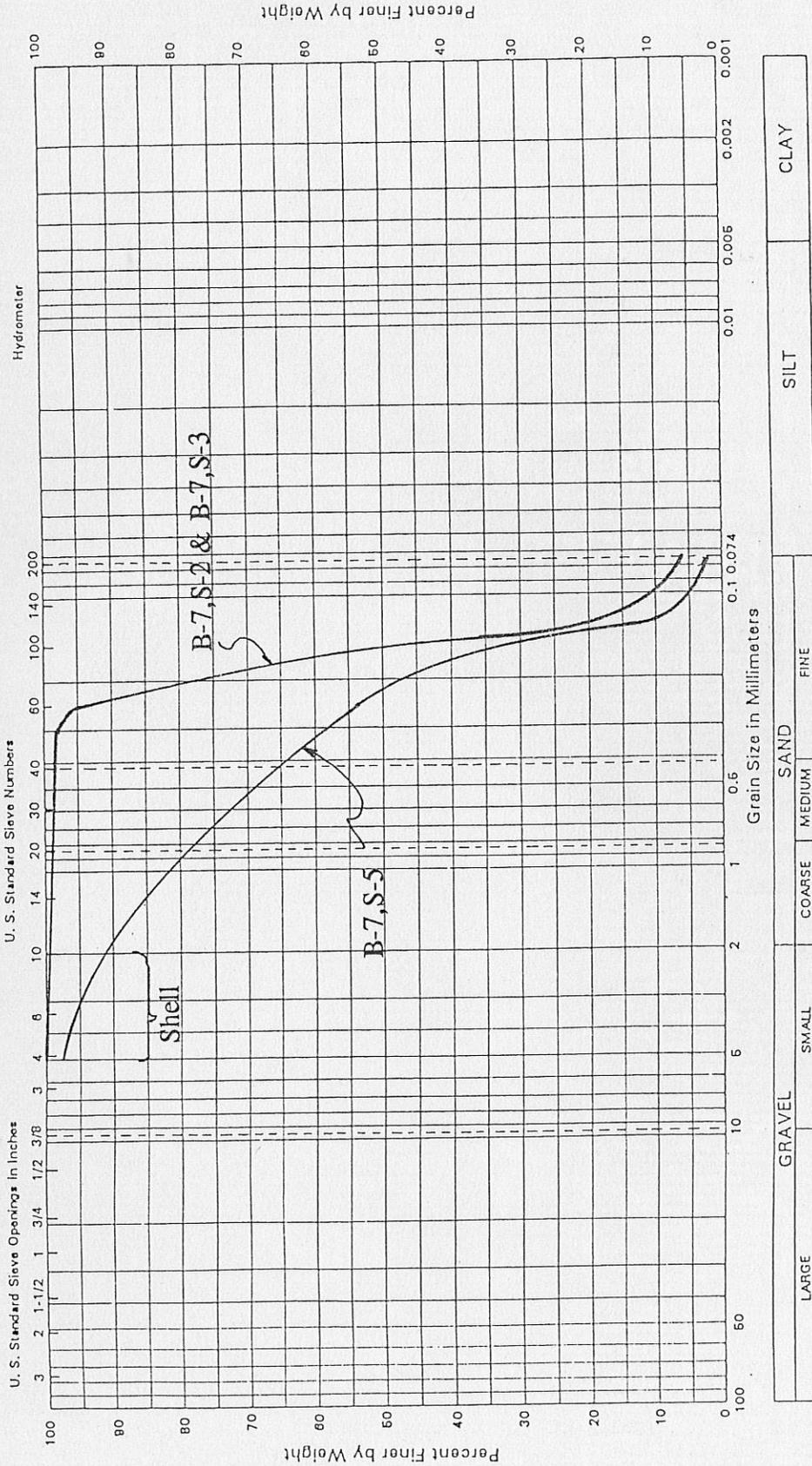
Project: ISLE DERNIERES RESTORATION - EASTERN ISLE DERNIERE & TRINITY ISLAND - TERREBONNE PARISH, LOUISIANA
FOR: STATE OF LOUISIANA - DEPT. OF NATURAL RESOURCES
T. BAKER SMITH & SON, INC. - CONSULTING ENGINEERS - HOUMA, LOUISIANA

Recorded By: Daren Dupepe

Sample No.	SAMPLE Depth in Feet		STRATON Depth in feet	VISUAL CLASSIFICATION	*Blows per Foot	Symbol Log	Scale (ft)	UNCONFINED COMP. (qu) (lbs/sq.ft)	WATER CONTENT (percent)	UNIT WEIGHT (lbs./cu.ft.)		ATTERBERG LIMITS			
	From	To								DRY	WET	L.L.	P.L.	P.I.	
1	.5	1.0	.0	MEDIUM DENSE BROWNISH GRAY FINE SAND W/SHELL		••••			23.1						
2	1.5	2.0	1.0	DENSE GRAY FINE SAND W/SHELL (W/MUCH SHELL @ 2.5 - 3.0')		••••			32.4						
3	2.5	3.0	3.0			••••			29.7			17	--	NP	
Boring Number A-5															
1	.5	1.0	.0	MEDIUM DENSE BROWNISH GRAY SAND W/SPECKS SHELL		••••			22.4			20	--	NP	
2	1.5	2.0	1.0	DENSE GRAY FINE SAND W/FEW SHELL FRAGMENTS		••••			25.6						
3	2.5	3.0	2.5	DENSE GRAY FINE SAND W/SHELL		••••			23.5						
Boring Number A-6															
1	.5	1.0	.0	MEDIUM DENSE BROWNISH GRAY SAND W/SPECKS SHELL		••••			24.3						
2	1.5	2.0	1.0	DENSE GRAY FINE SAND W/FEW SHELL FRAGMENTS		••••			21.2			20	--	NP	
3	2.5	3.0	2.5	DENSE GRAY & BLACK CLAYEY FINE SAND W/ORGANIC & CLAY		••••			21.1						
Boring Number A-7															

CLAY
 SILT
 SAND
 ORGANIC
 *140 lb. hammer dropped 30 in. on 2 in. splitspoon sampler after first being seated 6 in.

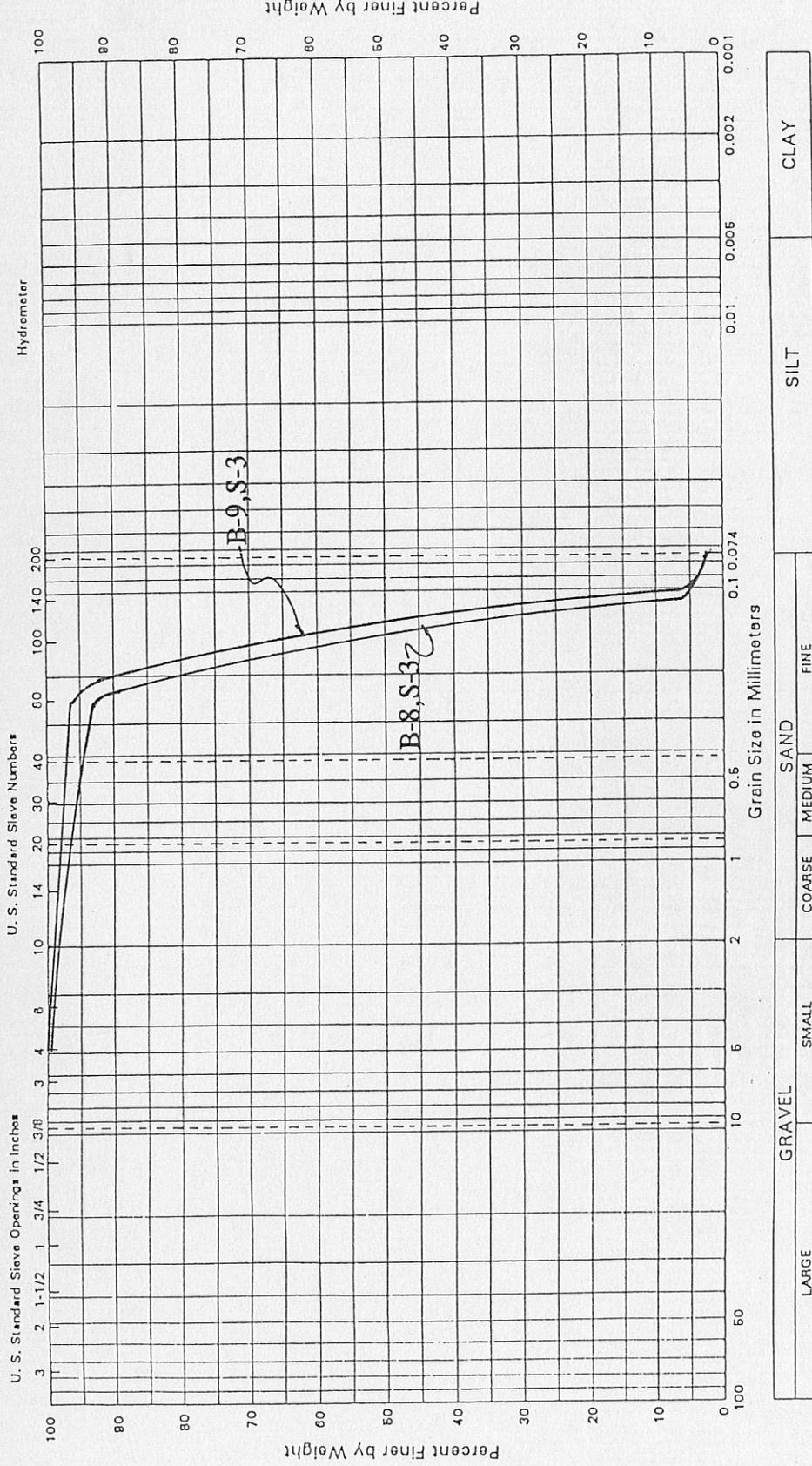
REMARKS: FIG. 20



GRAIN SIZE DETERMINATIONS

SUBSOIL INVESTIGATION
 ISLE DERNIERES RESTORATION
 EASTERN ISLE DERNIERE & TRINITY ISLAND
 TERREBONNE PARISH, LOUISIANA

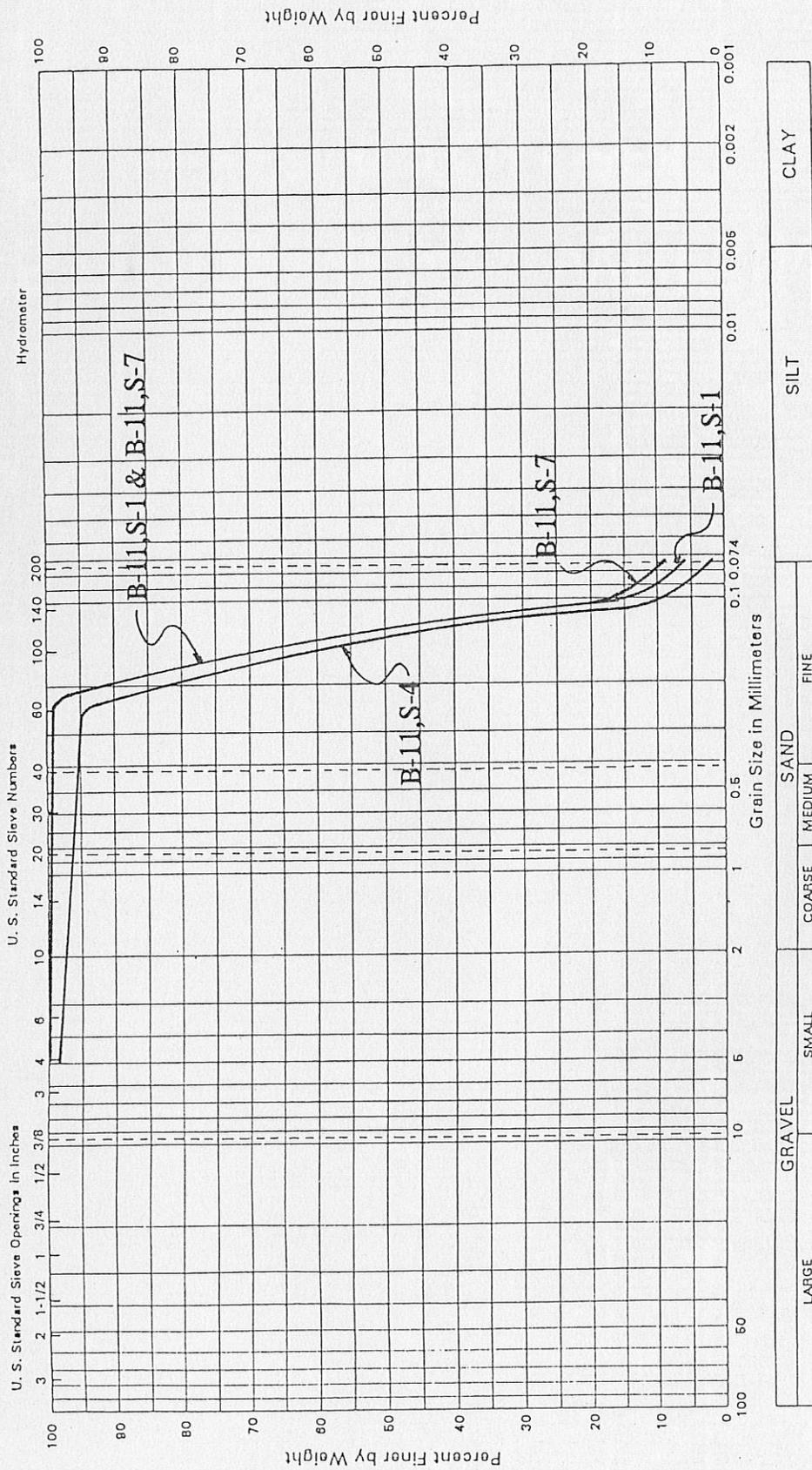
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GRAIN SIZE DETERMINATIONS

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 ISLE DERNIERES RESTORATION
 EASTERN ISLE DERNIERE & TRINITY ISLAND
 TERREBONNE PARISH, LOUISIANA

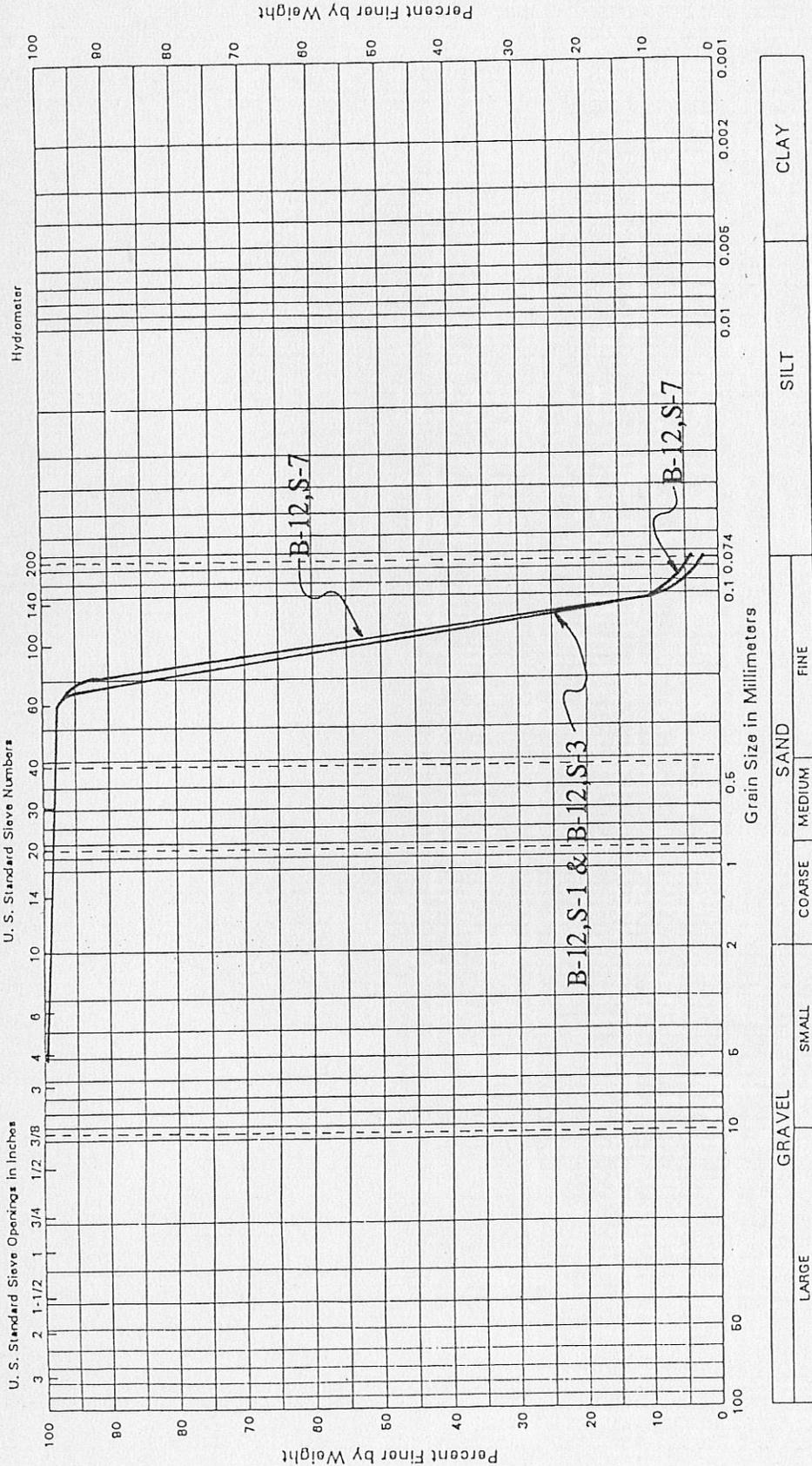
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GRAIN SIZE DETERMINATIONS

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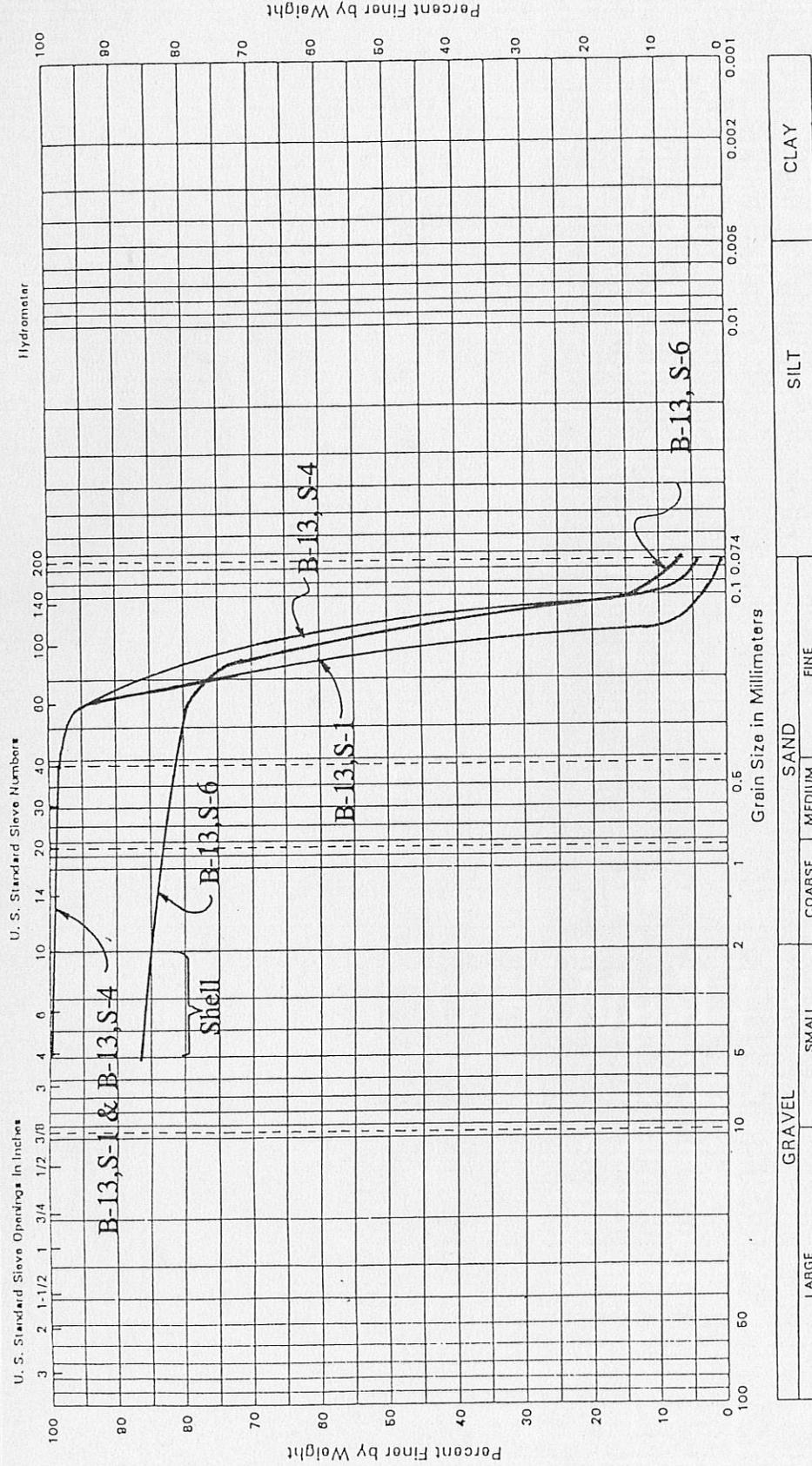
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GRAIN SIZE DETERMINATIONS

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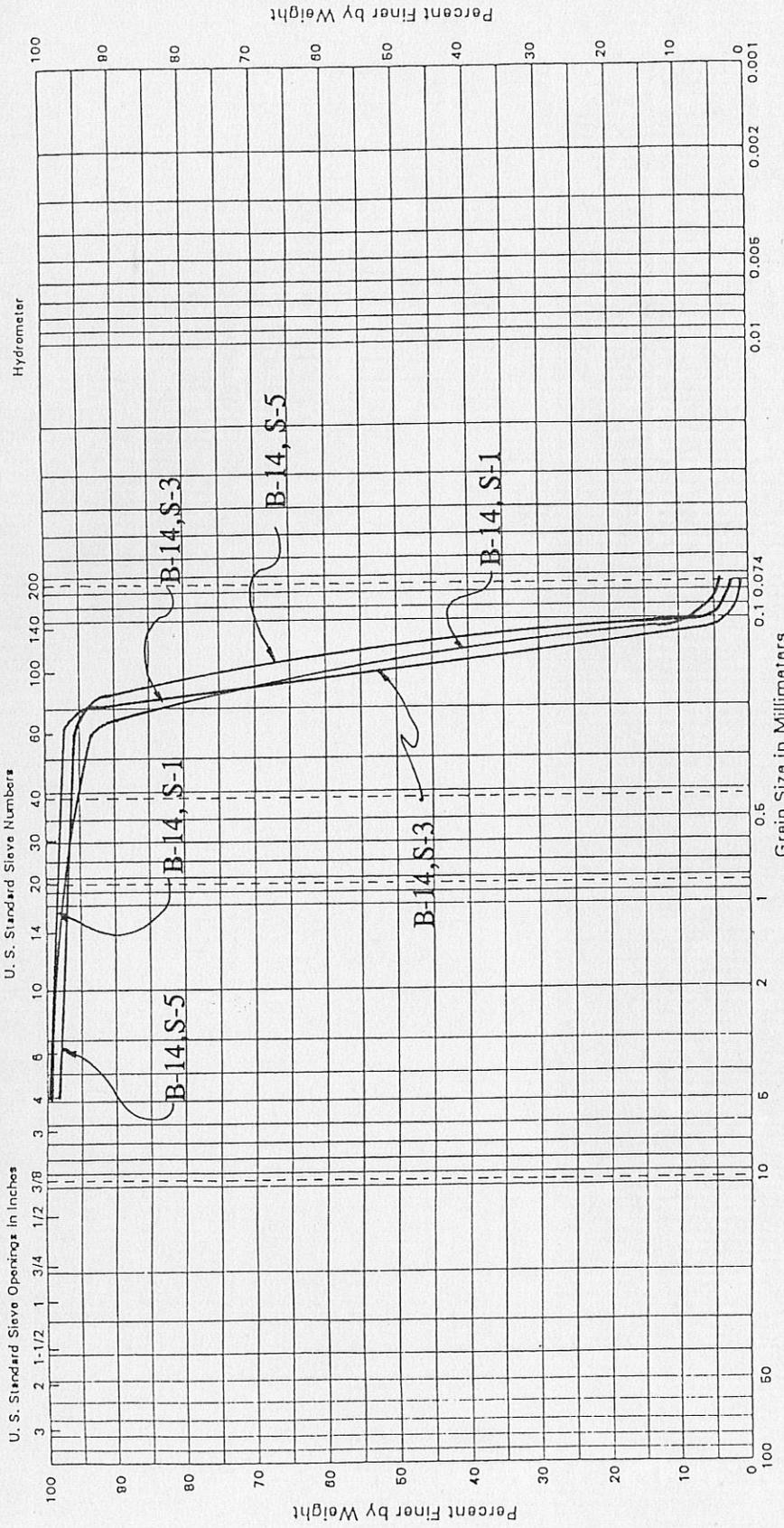
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GRAIN SIZE DETERMINATIONS

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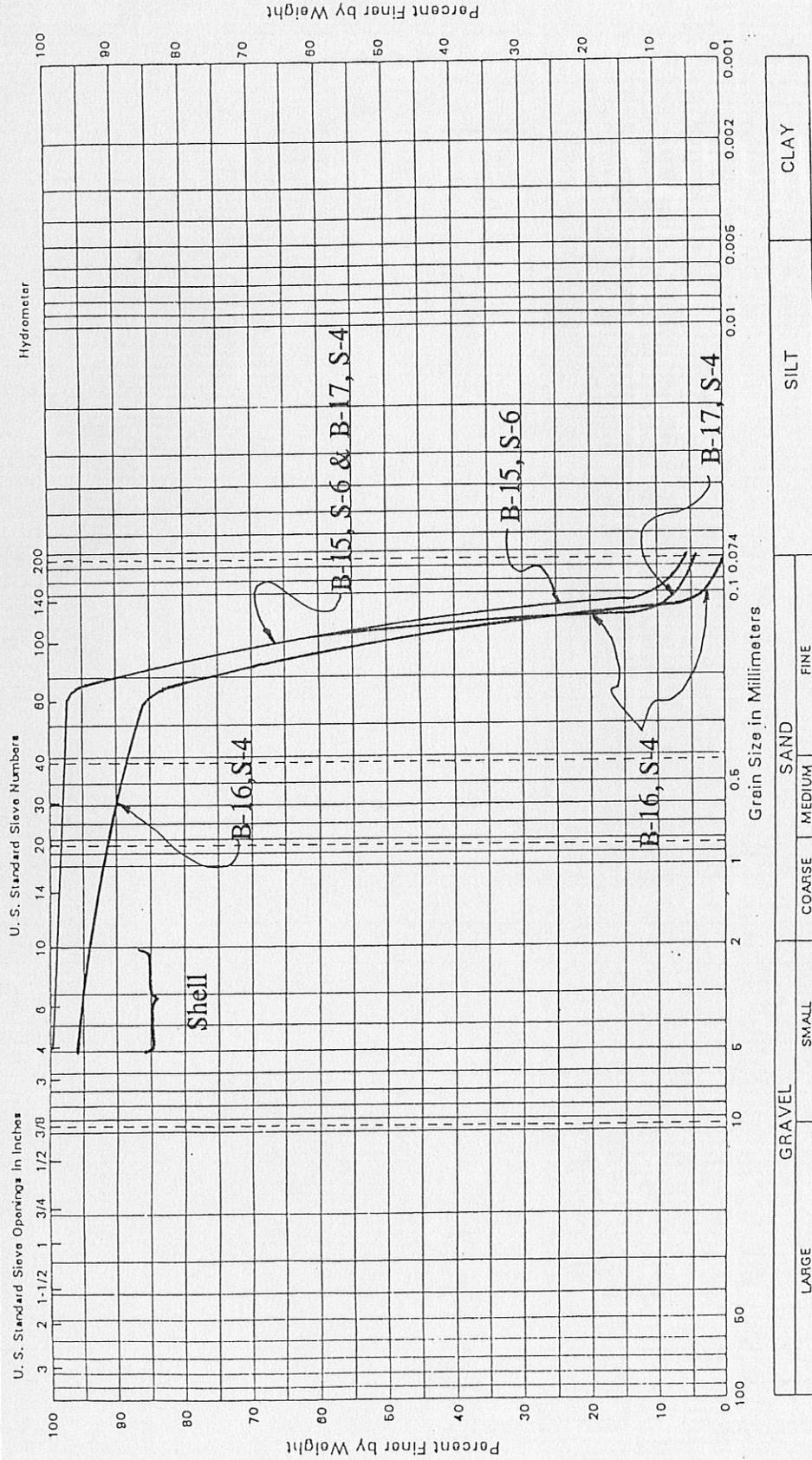
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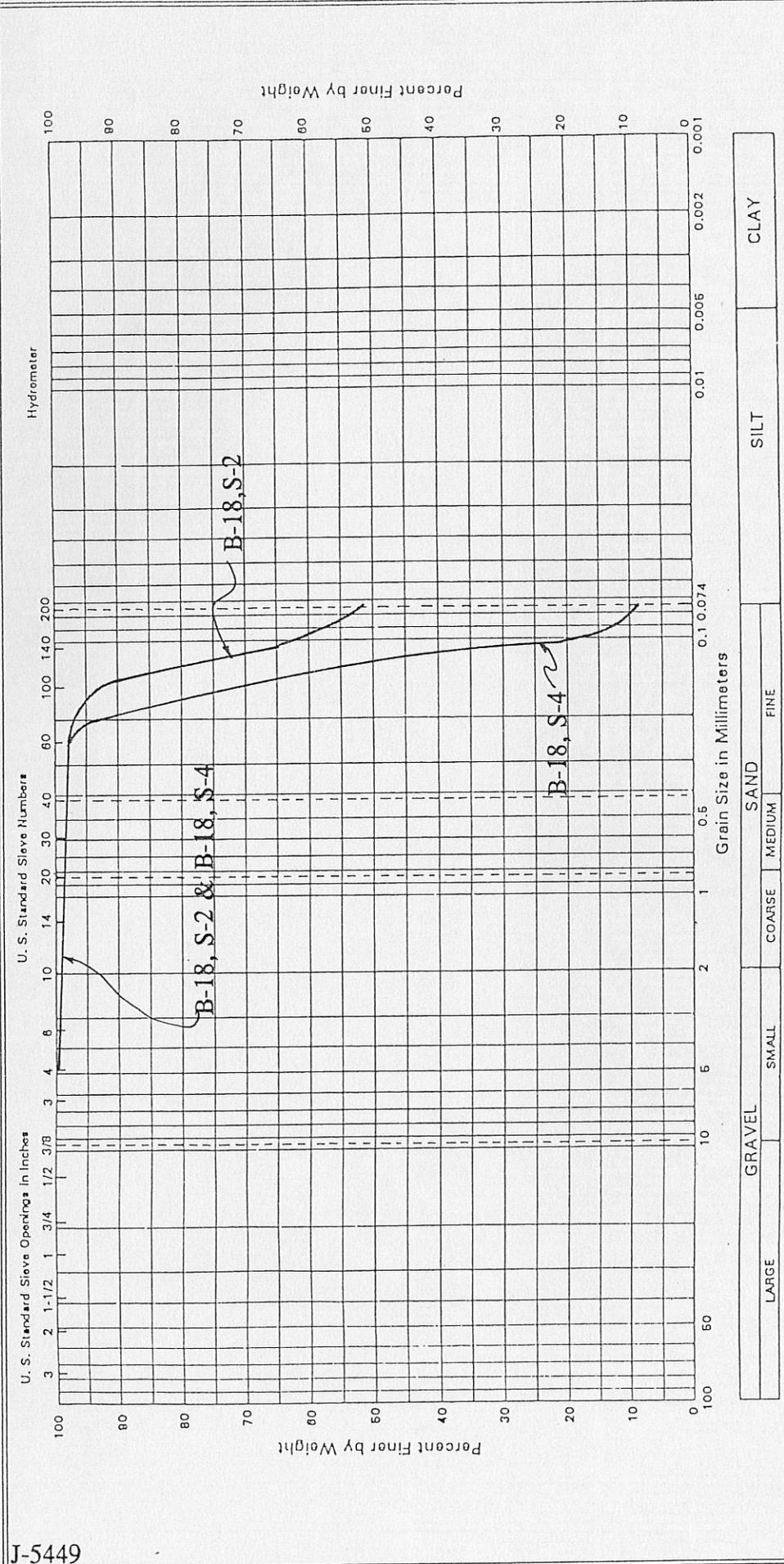


GRAIN SIZE DETERMINATIONS

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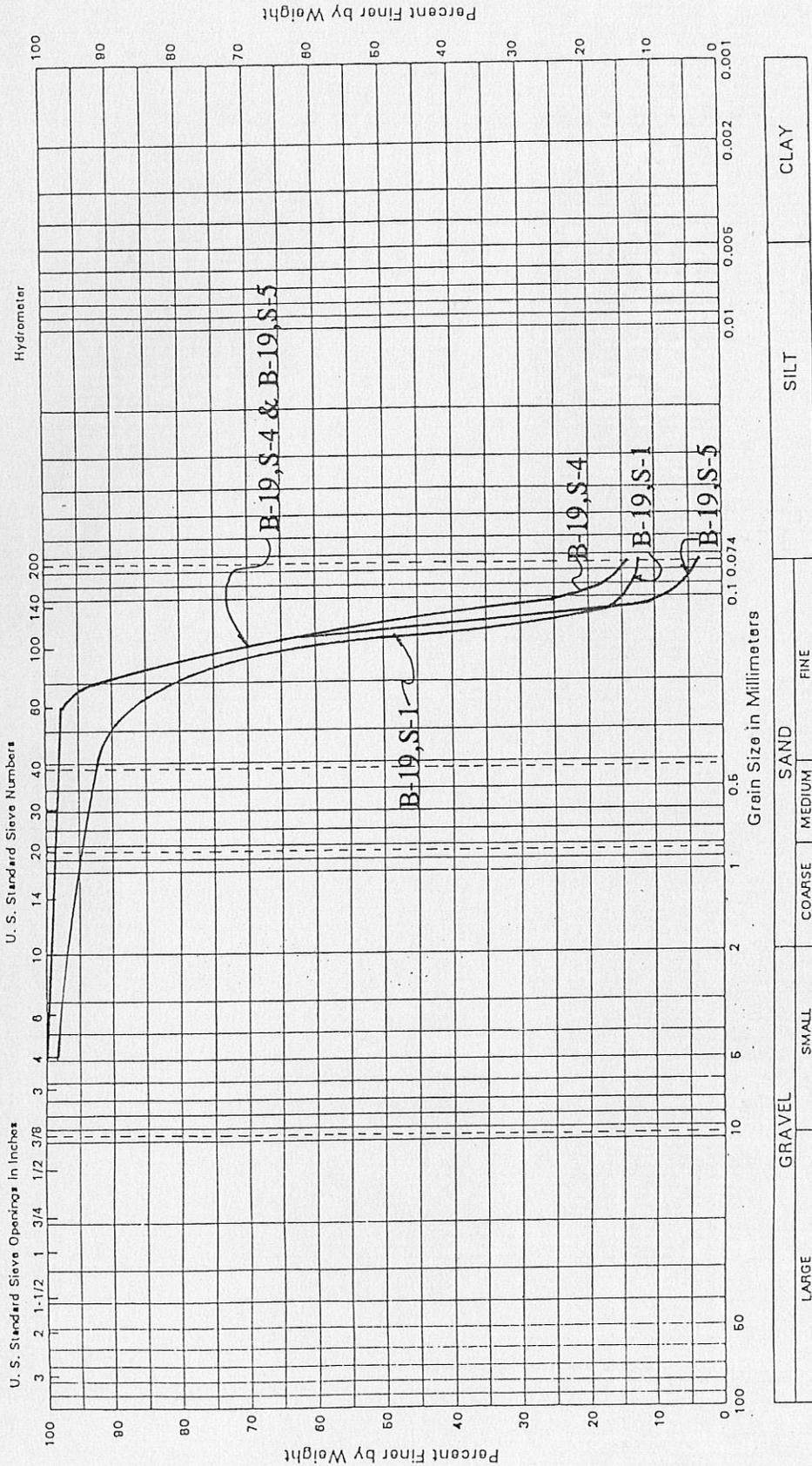




GRAIN SIZE DETERMINATIONS

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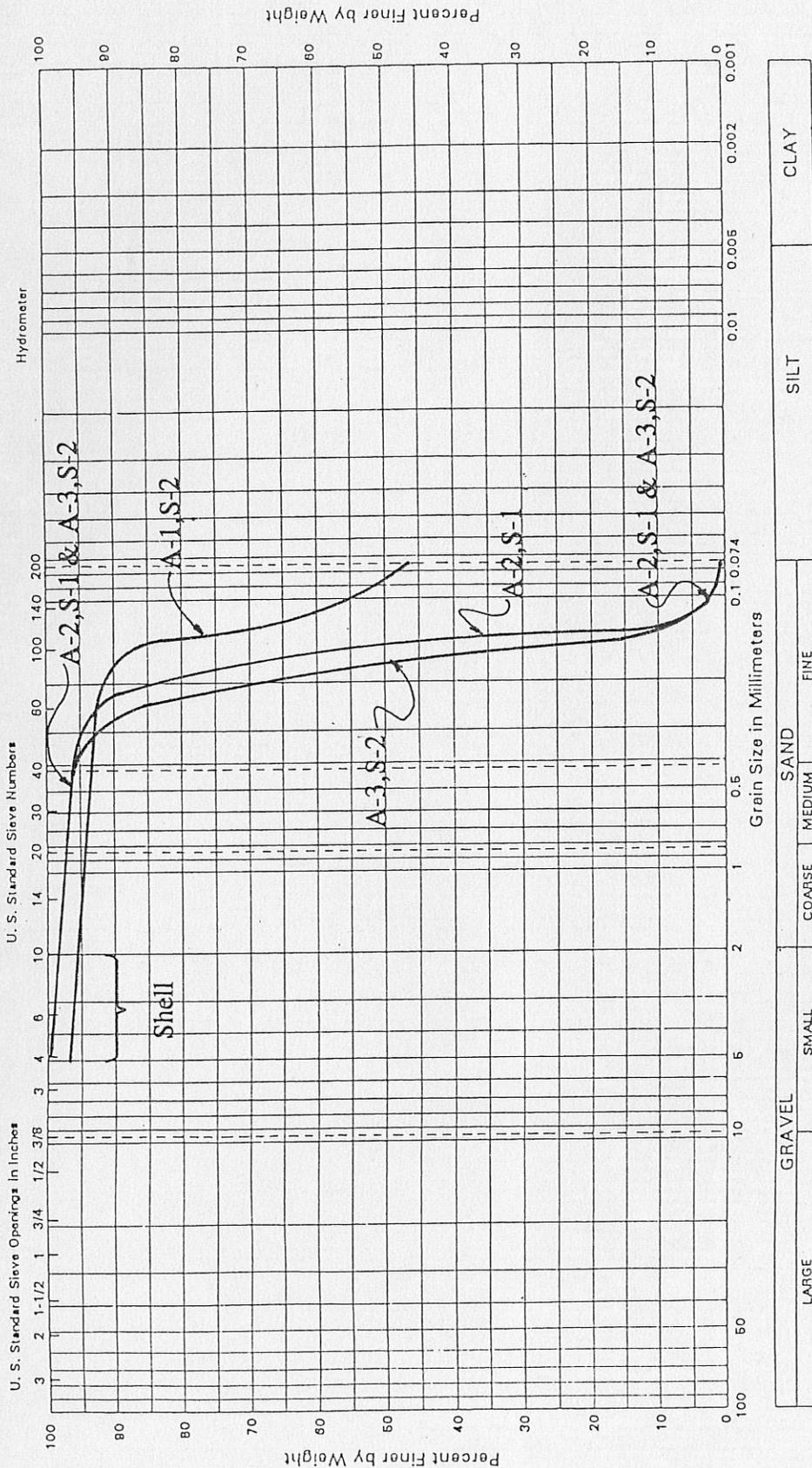
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GRAIN SIZE DETERMINATIONS

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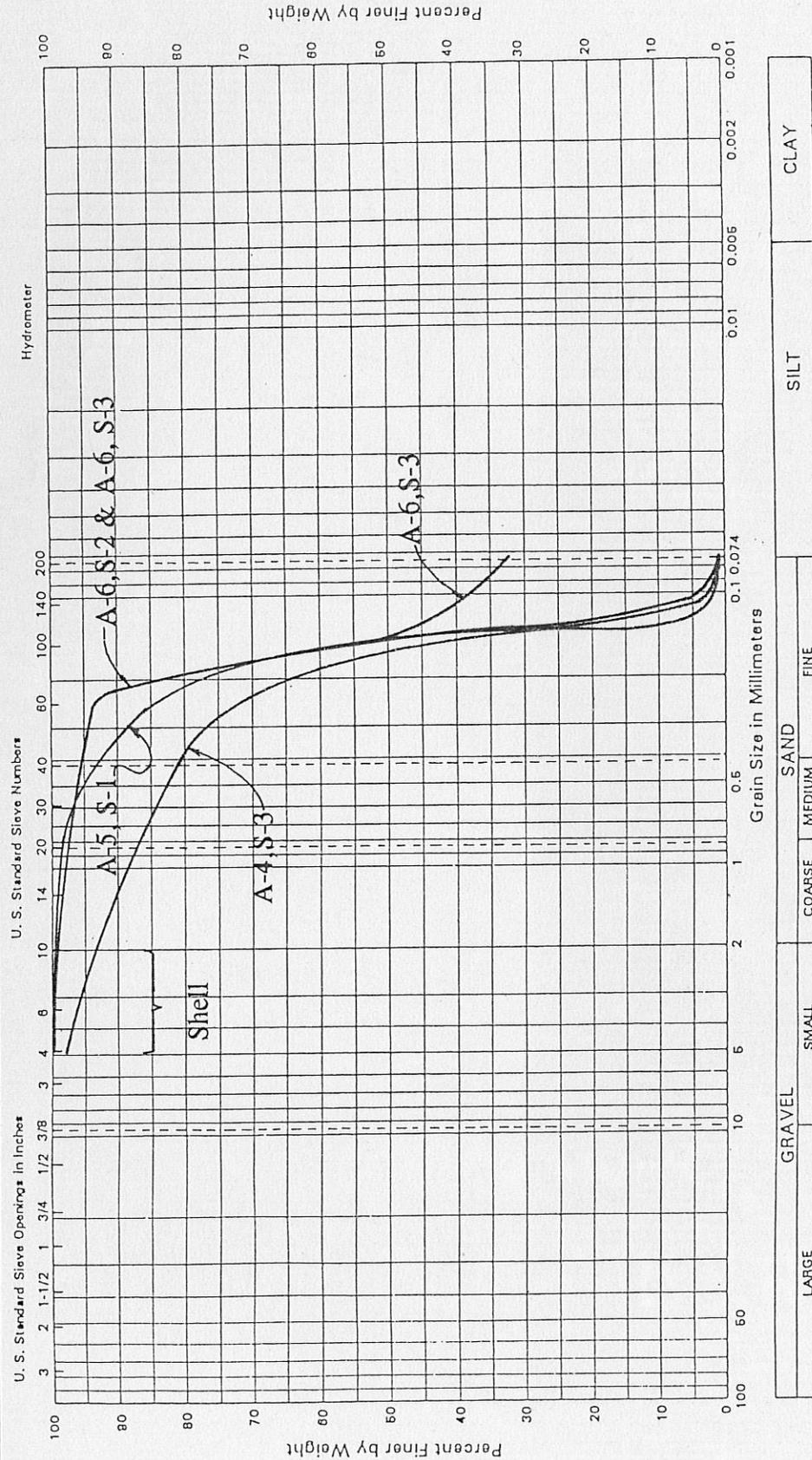
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GRAIN SIZE DETERMINATIONS

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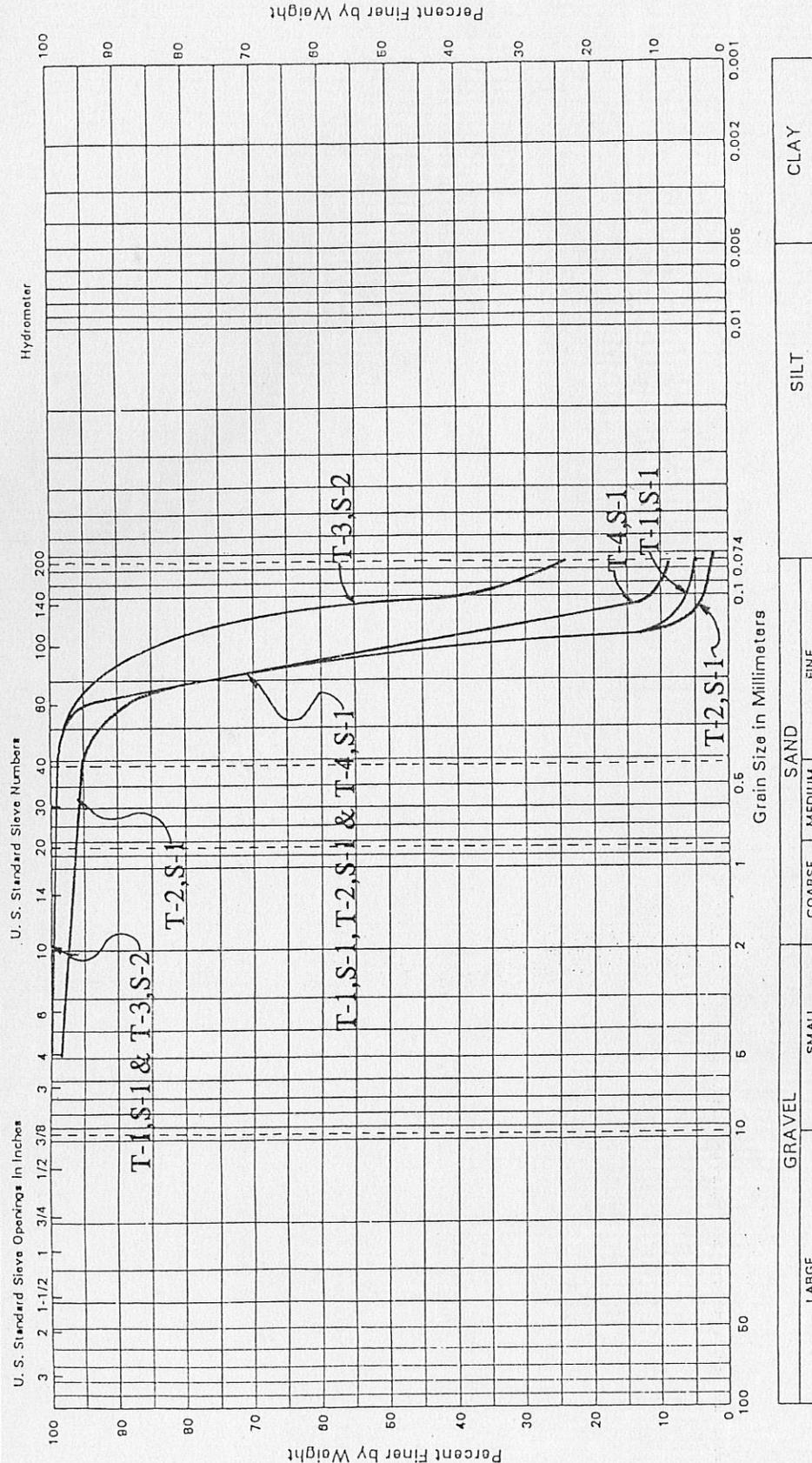
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GRAIN SIZE DETERMINATIONS

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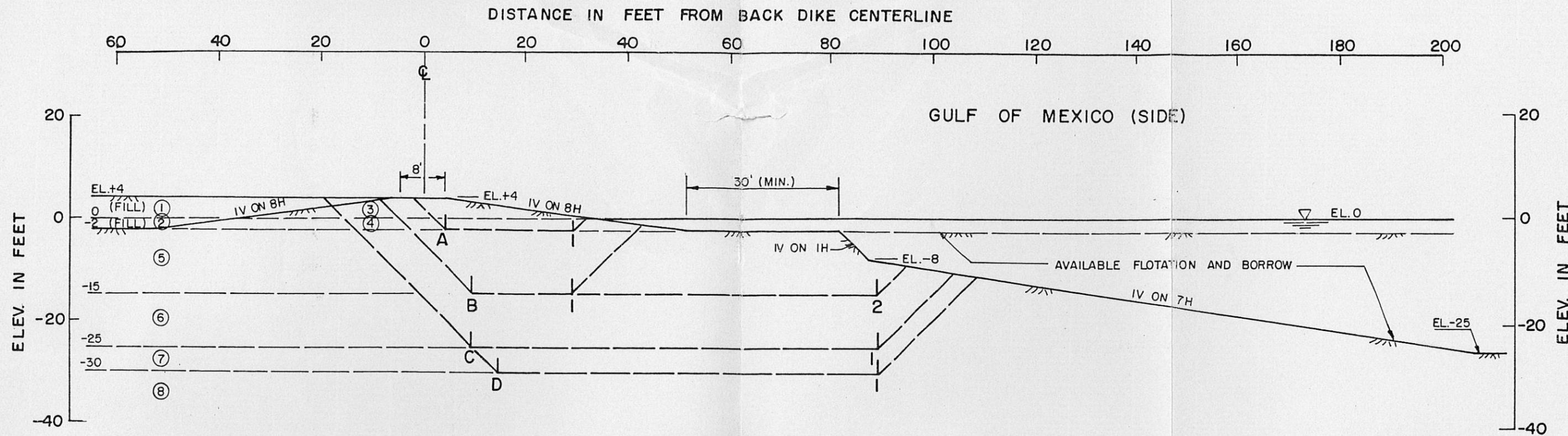
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**SLOPE STABILITY ANALYSIS
BACK DIKE STABILITY**

STRATUM NO.	ANGLE OF FRICTION (DEGREES)	EFFECTIVE UNIT WEIGHT (LBS./CU.FT.)	UNIT COHESION (LBS./SQ.FT.)	
			Center of Stratum	Bottom of Stratum
①	0	90	0	0
②	0	28	0	0
③	0	90	50	50
④	0	28	50	50
⑤	0	40	90	90
⑥	0	40	200	200
⑦	0	40	300	300
⑧	0	40	300	300

ASSUMED FAILURE PLANE	FACTOR OF SAFETY
A 1	1.91
B 1	1.30
B 2	1.34
C 1	1.73
D 1	2.06

RESULTS OF ANALYSES

$$F.S. = \frac{R_a + R_b + R_p}{D_a - D_p}$$

$$F.S._{B1} = \frac{2660+1800+2127}{8293-3215} = 1.30$$

SUBSOIL INVESTIGATION
ISLE DERNIERES RESTORATION
EASTERN ISLE DERNIERE & TRINITY ISLAND
TERREBONNE PARISH, LOUISIANA

STABILITY ANALYSES

FOR
STATE OF LOUISIANA
DEPT. OF NATURAL RESOURCES

T. BAKER SMITH & SON, INC.
CONSULTING ENGINEERS
HOUMA, LOUISIANA