SUBSOIL INVESTIGATION

PROPOSED HONDA DEALERSHIP
LAKESHORE ESTATES

I-10 SERVICE ROAD

ST. TAMMANY PARISH, LOUISIANA

PROJECT NO. 8102

FOR

SHAW LOUISIANA INVESTMENTS, L.L.C.

THOMAS PARTNERSHIP
ARCHITECTURE-PLANNING
DENVER, COLORADO

KREBS, LaSALLE, LeMIEUX CONSULTANTS, INC.
CIVIL ENGINEERS
METAIRIE, LOUISIANA

JEFFREY-THOMAS-AVEGNO, INC.
STRUCTURAL ENGINEERS
NEW ORLEANS, LOUISIANA

TEAL CONSTRUCTION COMPANY
GENERAL CONTRACTORS
HOUSTON, TEXAS

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

GORE ENGINEERING, INC.

SOIL AND FOUNDATION INVESTIGATIONS

AWRENCE W. GILBERT, D. ENGR.
REG. C.E.

BORINGS
ANALYSES

TESTING
REPORTS

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22 November, 2002

Shaw Louisiana Investments, L.L.C.
1080 S. Colorado Boulevard
Denver, Colorado 80246

Subsoil Investigation
Proposed Honda Dealership
Lakeshore Estates
I-10 Service Road
St. Tammany 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:sd

TABLE OF CONTENTS

SUBSOIL INVESTIGATION
PROPOSED HONDA DEALERSHIP
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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 on September 23, 2002 from Jeff Barlow of Shaw Louisiana Investments, LLC. Thomas Partnership Architecture-Planning are the Architects for the project. Krebs, LaSalle, LeMieux Consultants, Inc. are the Consulting Civil Engineers for the project and Jeffery-Thomas-Avegno, Inc. are the Consulting Structural Engineers. Teal Construction Company are the General Contractors for the project.

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 foundation design.

SOIL BORINGS

Field Exploration

3. Two (2) undisturbed sample type soil test borings (B-1 and B-2) were drilled to depths of 60 ft. on October 8, 2002. The borings were made with a truck mounted

drill rig at designated locations approximately as shown in 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 sampler 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, five (5) auger type soil test borings (A-1 thru A-5) were made to the 6 ft. depth on October 9, 2002. These borings were also made with a truck mounted drill rig at designated locations within the area of pavement improvement and approximately as shown in plan on Figure 1. Samples were taken of representative materials and placed in moisture proof containers for preservation until further laboratory visual classification and testing could be performed.

LABORATORY TESTS

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

Shear and Grain Size (percent passing the No. 200 Sieve) tests were performed on some of the more granular materials and Atterberg Limits tests were performed on selected cohesive samples. The results of all the laboratory tests are tabulated along side the boring logs at the appropriate sample and depth on Figures 2 thru 4.

7. The Unconfined Compression and Triaxial Shear strength tests are used in analyses to give a measure of "skin friction" values used to estimate pile load capacities. The Atterberg Limits along with the Natural Moisture Content tests give an indication of the compressibility of the soils and are used empirically to estimate settlements. The Grain Size tests are used to classify the more granular soils.

SUBSOIL CONDITIONS

8. A subsoil profile developed from the deeper borings showing the general stratification and character of the soils is given on Figure 1. Logs of all of the individual borings showing the detailed stratification and sample depths are given on Figures 2 thru 4.

Subsoil Description

9. **Borings B-1 and B-2** Reference to the subsoil profile and logs of borings B-1 and B-2 shows that beginning at the ground surface in both borings there is 1½ ft. of loose to medium dense gray and reddish tan or brown and gray clayey fine sand. This is underlain by soft gray and reddish tan or reddish tan and light gray sandy clay to the 5½ to 8 ft. depth and then in boring B-2 by stiff to very stiff light gray and reddish tan clay that extends to the 12 ft. depth. Beginning at the 5½ to 12 ft. depth in both borings there is

medium stiff reddish tan and light gray, light gray and reddish tan or light gray clay or sandy clay to the 17 to 23 ft. depth. Below this there is generally stiff reddish tan and light gray, reddish tan and greenish gray or greenish gray and reddish tan clay that extends to the 26 to 35 ft. depth and then medium stiff gray clay or sandy with sand or a trace of wood and shell fragments to the 42 to 42½ ft. depth.

10. Beginning at the 42 to 42½ ft. depth in both borings there is medium dense gray clayey fine sand or fine sand to the 45 and 48 ft. depth. This is underlain in boring B-1 by very dense gray fine sand to the 50½ ft. depth and in boring B-2 by loose gray silty fine sand to the 50 ft. depth. The remainder of the explored depth of 60 ft. in boring B-1 consists of medium stiff to stiff tan or gray clay. Beginning at the 50 ft. depth in boring B-2 there is very soft brown clay with much wood to the 58 ft. depth and then medium dense gray fine sand that continues to at least the 60 ft. depth, the maximum depth explored.

11. <u>Borings A-1 thru A-5</u> Reference to the logs of borings A-1 thru A-5 shows that beginning at the ground surface in borings A-2 thru A-5 there is 1 to 2½ ft. of loose gray and reddish tan or dark gray fine sand. Below this in borings A-2 and A-5 and beginning at the ground surface in boring A-1 there is loose gray and reddish tan or dark gray clayey fine sand to the 2½ ft. depth. Beginning at the 1 to 2½ ft. depth in all of these borings there is soft gray and reddish tan or reddish tan and light gray sandy clay. Boring A-3 was terminated in this stratum at the 6 ft. depth, but it only continues to the 4½ to 5 ft. depth in the remaining borings. The remainder of the explored depth of 6 ft. in borings A-1, A-2, A-4 and

A-5 consists of medium stiff to stiff light gray and reddish tan or reddish tan and light gray sandy clay.

12. **Groundwater** At the time of making the borings, groundwater was measured at depths of 7.6 and 7.7 ft. below the existing ground surface elevation in borings B-2 and B-1, respectively. Groundwater was measured shortly after making the borings and may not have become fully static at the time of measurement. In any event, groundwater could fluctuate due to seasonal precipitation, drainage, prolonged drought, etc. If groundwater is important to construction, it should be measured at that particular time.

FOUNDATION ANALYSES

13. It is understood that the proposed construction will consist of an Automobile Dealership at the subject site. This will include a single story building, nominally 18,400 sq. ft. in plan, in the general area of borings B-1 and B-2 and approximately as shown in plan on Figure 1. Design structural loads are not known at this time, but are anticipated to be nominal and not unusual for this type construction. In addition, the area surrounding the proposed building where borings A-1 thru A-5 were made will be improved with rigid (concrete) pavement to allow for vehicular traffic. Furnished information indicates that up to about 12 ft. of fill will be needed to raise the site grade in the area of the proposed building and about 10 to 12 ft. of fill will be needed to raise the grade in the remaining area of the site.

14. The near surface soils that were encountered to the 5½ to 8 ft. depth in borings B-1 and B-2 are only fair in bearing quality and are somewhat compressible, even

under nominal loading. In view of this and considering the thickness of fill needed to raise the site grade, piles are recommended for support of all structural loads that cannot tolerate settlements including the ground floor slab. Analyses were made in this regard and the results are given in the following section.

Pile Foundations

15. It is understood that 60 ft. long Class "B" treated timber piles (ASTM D-25) are being considered for support of the proposed building. Therefore, analyses were made based on borings B-1 and B-2 to estimate the load carrying capacities of this type pile. The piles will generally receive their support through "skin friction" along their embedded length. Some additional "point" support would also develop for piles with tips driven to firm embedment into the medium dense to dense sands that were encountered at the 42 and 42½ ft. depths in borings B-1 and B-2, respectively.

16. **Estimated Pile Load Capacities** The results of the analysis of borings B-1 and B-2 indicates that a single pile load capacity of 25 tons in compression could be used for design of a 60 ft. long Class "B" treated timber pile (ASTM D-25) driven to firm embedment into sand. The analysis assumes 12 ft. of fill will be placed to raise the site grade in the area of the proposed building and the pile length is measured from the top of fill. The foregoing estimated pile load capacity contains a factor of safety of 2.0 against failure in compression which is recommended for design. It does not consider drag load, group effect or settlements, as will be discussed.

17. **Drag Load** When fill is placed on the site, the underlying compressible soils consolidate, resulting in surface settlement. As the compressible soils consolidate, "negative skin friction" or downdrag may be imparted on piles. This could result in an extraneous load, additive to any structural load, on the piles and could increase settlements of the structure. It is our opinion that drag load is dependent on the thickness of fill, compressibility of the soils, time-rate of consolidation and pile length. It is understood that about 12 ft. of fill will be needed to raise the site grade in the area of the proposed building and about 10 to 12 ft. of fill will be needed to raise the grade in the remaining area of the site.

18. In order to minimize the effects of drag load, a minimum pile length of 60 ft. (below the fill surface), driven to firm embedment into sand, is believed adequate for design. While this pile length would not totally eliminate long term settlements due to drag load, it should limit them to on the order of 1 to 2 inches. It is also recommended that the fill needed to raise the site grade be placed as soon as practical. It is also recommended that the structure foundation be strengthened above normal design to increase its rigidity and ability to withstand the estimated settlements. While this would not reduce settlements with regard to drag load, it should minimize any detrimental effects due to differential settlements.

19. In general, limiting the total amount of fill needed to raise the site grade would also minimize drag load effects on piles. Other measures that could be considered include a preload surcharge program that includes "wick drains". The surcharge preload program should be designed to induce most of the anticipated long term consolidation

settlements prior to construction of the proposed building. Alternatively, a lightweight expanded clay aggregate fill, geofoam blocks, etc. could be used in lieu of clay fill. These lightweight materials would result in lesser load imposed at the ground surface within the structure footprint and, consequently, reduce the settlement of pile foundations due to drag load. Additional analyses could be made in this regard should these construction procedures be considered for design.

20. **Group Effect** The effect of pile grouping on the single pile load capacities is dependent on pile spacing, pile length and soil characteristics throughout the pile length and below the pile tips. Assuming a minimum center to center spacing of 3 ft., group effect should be unimportant for pile clusters of less than 6 piles. Group effect could become important for larger clusters and should be evaluated when actual pile layout is known as outlined in the criteria given in Appendix "A" following the text.

21. **Estimated Settlements** No detailed settlement analyses were made since the design structural loads, pile layout, etc. are not known at the present time. However, notwithstanding settlements related to drag load as discussed above, settlement of pile supported footings using the recommended pile load capacities in single widely spaced rows or in clusters of up to 4 to 6 piles are estimated to be on order of ¾ to 1 inch. Settlements would increase with the size for the pile cluster and, if larger clusters of closely spaced piles are needed for support, detailed settlement analyses should be made.

22. **Pile Driving** Some discussion with regard to pile driving appears warranted. In general, driving of Class "B" timber piles should be limited to the rate of 25 blows per foot using a Vulcan No. 1 hammer or equivalent. These recommendations are given in order to minimize possible damage to the piles.

23. As previously indicated, about 12 ft. of fill will be needed to raise the site grade in the area of the proposed building. In order to facilitate pile driving and minimize drag load effects, it is recommended that the fill within the footprint of the proposed building be a cohesive or clay type fill or other material that will not develop high driving resistance when piles are driven through it. If a sand fill were to be used within the building footprint, high driving resistance would be expected as the piles penetrate the 12 ft. of sand fill. This could preclude driving the piles to the desired tip depth.

24. Notwithstanding driving resistance through the 12 ft. of fill, as was discussed, piles with tips above the medium dense to very dense sands (42 and 42½ ft. depth in borings B-1 and B-2) should be able to be driven with normal effort not exceeding the above limitations. Driving of timber piles into the underlying sand could be erratic. In view of this, it is recommended that probe type piles be driven throughout the site to establish driving characteristics and pile lengths. While it is believed the piles could be driven several feet into the sand without severe damage, the piles should be closely observed and, if "refusal" or little or no penetration under several successive blows occurs, driving should be ceased.

Areal Settlements

25. Analyses were made to estimate long term consolidation settlements that should be expected to occur due to fill load over a large filled area. Assuming a fill thickness of 12 ft., long term settlements due to consolidation of the subsoils are estimated to be on the order of 4 to 7 inches. Some additional settlement could occur due to shrinkage of the fill material, itself. This should be small and unimportant if sand fill is used outside of the building footprint, but could become important (on the order of about 6 inches) if good quality cohesive material is used for fill. The estimated settlements would occur over most of the filled area, while settlements at the perimeter or edge of the fill would be approximately one-half (1/2) of the center settlements and would occur only over a limited range near the perimeter.

26. The estimated settlements given above are based on a uniform fill thickness over a large filled area and a unit weight of fill of about 110 lbs. per cubic ft. These estimates are <u>ultimate</u> values due to fill loads. Additional settlements could occur due to lowering of groundwater with improved drainage or shrinkage of cohesive fill.

27. The estimated areal settlements are total consolidation settlements and will take a long time to completely occur. Detailed soil properties to determine time-rate of settlement were not developed. However, it is estimated that about 30 to 40 percent may occur within the first 1 to 2 years after fill placement. The remaining 60 to 70 percent would take a long time to completely occur and on the order of 20 to 30 years. As previously discussed, some of these settlements could be induced with a preload surcharge program prior

to construction of the proposed building. The rate of settlement due to the preload surcharge could be accelerated with the use of "wick drains".

28. Areal settlement should be considered in design, particularly where unsupported appurtenances (driveway, walkways, planters, etc.) adjoin pile supported structures. At these vulnerable locations, it may be desirable to structurally tie such unsupported elements into the pile supported structure to minimize the effects of differential settlement. Also, the effect of areal settlement should be considered where utility lines connect to and underlie pile supported structures. Flexibility should be incorporated into the lines to allow for settlement and "pulling" of the lines.

Pavement Improvement

29. It is understood that the area surrounding the proposed building will be improved with rigid (concrete) pavement to allow for vehicular traffic that consists primarily of automobiles and light trucks. However, it will also be subjected to occasional heavier traffic (garbage trucks, delivery trucks, standard highway trucks (HS-20), etc.).

30. Based on the visual classification and laboratory tests performed on the soil samples, the naturally occurring near surface soils that were encountered to the 6 ft. depth in borings A-1 thru A-5 are predominantly granular in character. They would classify as either SP, SC or CL according to the Unified Soil Classification System (USCS/ASTM) and A-1-b, A-2-6, A-3 or A-6 according to AASHTO.

31. Based on the soil borings and laboratory test data, it is believed that the near surface soils could be assigned a Westergaard Coefficient of Subgrade Reaction ("K" value) of 125 psi per inch for use in rigid pavement design. This value could also be used for design if good quality compacted clay is used for fill. A Westergaard Coefficient of Subgrade Reaction ("K" value) of 200 psi per inch could be assumed if controlled-compacted granular (sand) fill is used. This assumes that the existing ground surface is stripped of all vegetation, very soft or loose surface soil, deleterious materials, etc. and is well drained prior to construction of the new pavement.

32. It should be noted that when the near surface soils become saturated, they are susceptible to a decrease in strength and loss in stability and could become unsuitable as subgrade support. Therefore, pavement construction should only be attempted when this subgrade is dry and stable and after good drainage has been established in the area of pavement improvement.

33. Consideration should be given to the areal settlements previously discussed when designing the pavement improvement. In view of the thickness of fill needed to raise the pavement grade, relatively large areal settlements should be expected. These areal settlement would be larger if clay is used to raise the site grade outside the footprint of the building, since this type material would be more susceptible to shrinkage related settlements. These settlements may result in a decrease in the life of the pavement improvement or an increase in the frequency of pavement rehabilitation. This would be more important if clay fill is used under the pavement improvement.

Fill Material

34. With regard to fill placement in pavement areas our office normally recommends that the base material for concrete pavement consists of a locally available "sugar" sand or "pumped" sand having less than 10 percent fines passing the No. 200 Sieve. It is also recommended that this base material be compacted to at least 95 percent of Maximum Dry Density at Optimum Moisture Content according to ASTM D- 698. Ideally, any sand fill placed in pavement areas should also be compacted to this standard.

35. A lower degree of compaction within the building footprint area, should be considered, since the proposed building will be pile supported. As previously discussed, the fill within the building footprint should be selected and placed so that it does not present high resistance to pile driving. The fill within the building footprint could consist of good quality cohesive material, free from organic, wood, roots, deleterious materials, etc. This should be compacted to a density of about that of the natural subsoils in order to minimize long term areal settlements and the effect of drag load. However, controlled-compaction of this portion of the fill is believed to be unwarrented.

GORE ENGINEERING, INC.

Lawrence W. Gilbert

(Reda Bakeer)

Minimum Pile Spacing

SPAC $= 0.05\,L_1 + 0.025\,L_2 + 0.0125\,L_3$ (Min.3.0 ft.)

SPAC = Center to center spacing of piles (ft.)

L_1 = Pile penetration in ft. up to 100 ft.

L_2 = Pile penetration in ft. from 101 to 200 ft.

L_3 = Pile penetration in ft. from 200 to 300 ft.

Allowable Group Capacity*

$$Q_a = \frac{P \times L \times c}{FSF} + \frac{2.6q_u\,(1 + 0.2\,\frac{w}{b})\,A}{FSB}$$

P = Perimeter distance of pile group (ft.)

L = Length of pile (ft.)

c = Average (weighted) shear strength ($\frac{1}{2}q_u$) of soil throughout pile length (lbs./sq.ft.)

q_u = Unconfined compressive strength of soils below pile tips (lbs./sq.ft.)

w = Width of base of pile group (ft.)

b = Length of base of pile group (ft.)

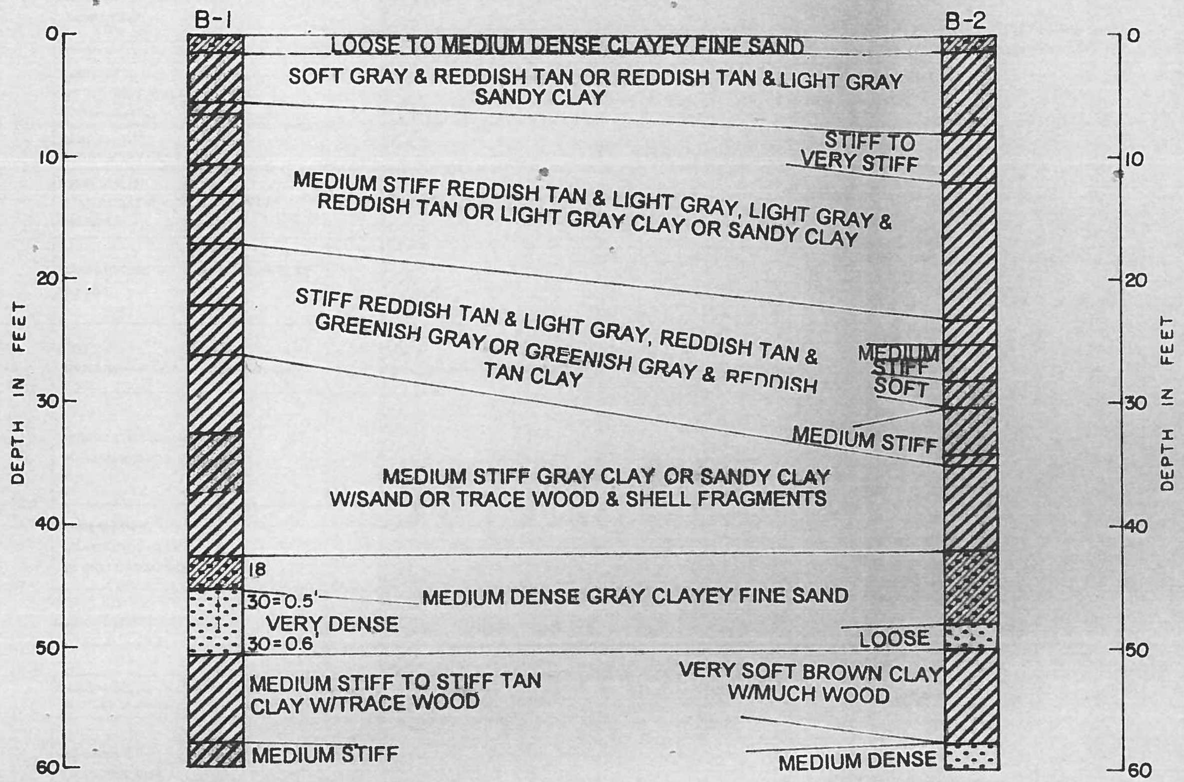
A = Base area of pile group (sq. ft.)

FSF = Factor of safety for friction area = 2

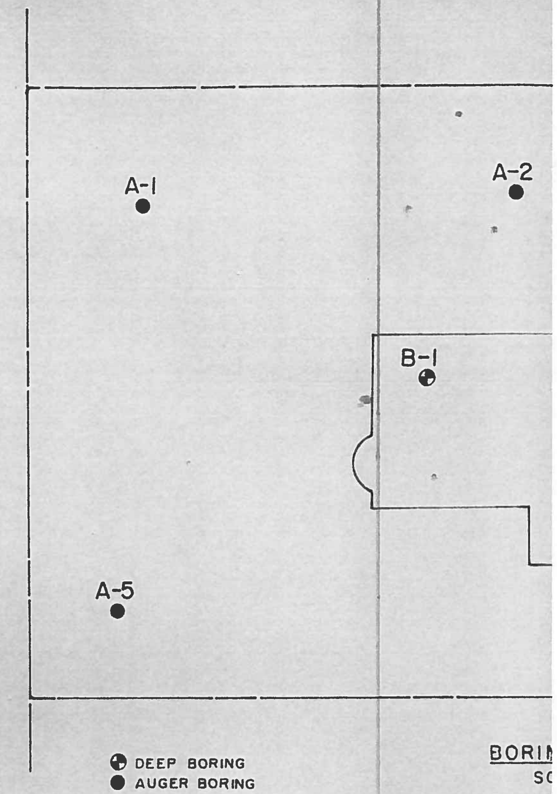
FSB = Factor of safety for base area = 3

*In no case should the recommended single pile load capacity be exceeded.

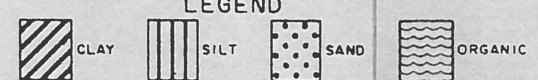
Appendix "A"



SUBSOIL PROFILE
SCALE: 1" = 30'



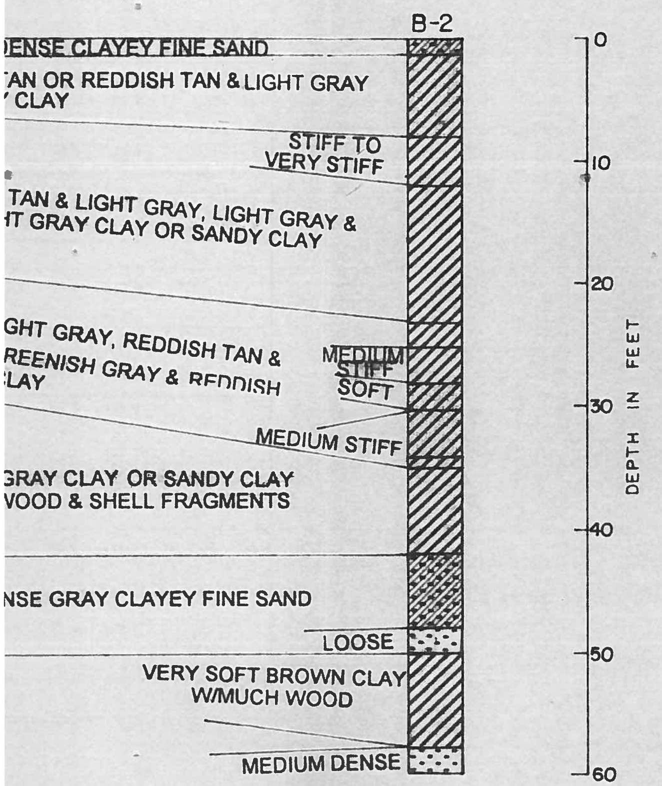
LEGEND



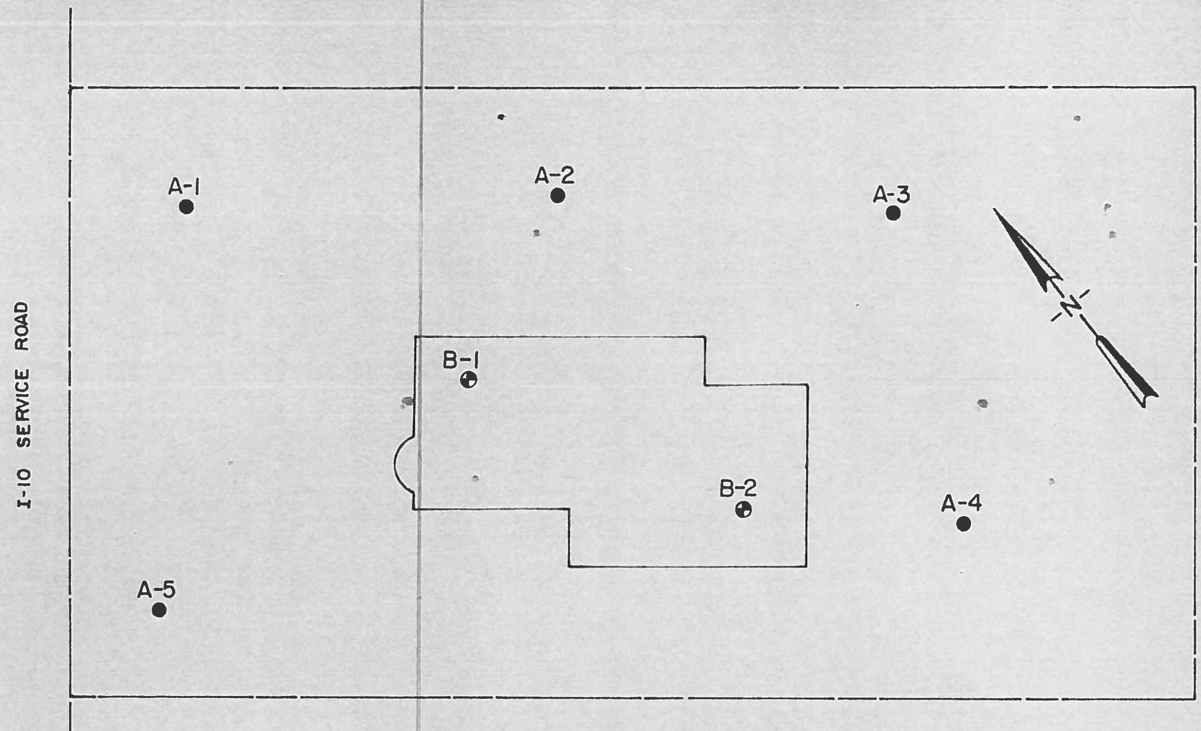
PREDOMINANT TYPE HEAVY
MODIFYING TYPE LIGHT

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

T.J.M.
J-8102



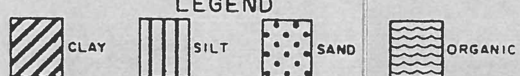
OIL PROFILE
ALE: 1"= 30'



● DEEP BORING
● AUGER BORING

BORING LOCATIONS
SCALE: 1"= 100'

LEGEND



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

PROPOSED HONDA DEALERSHIP

LAKESHORE ESTATES
I-10 SERVICE ROAD
ST. TAMMANY PARISH, LOUISIANA

BORING LOCATIONS AND SUBSOIL PROFILE

FOR
SHAW LOUISIANA INVESTMENTS, L.L.C.

OCTOBER , 2002 GORE ENGINEERING , INC

FIG. 1

Match

GORE ENGINEERING, INC.

Job No. 8102

Soil and Foundation Investigations
Metairie, Louisiana

Boring No. B-1

LOG OF BORING AND TEST RESULTS

Date Boring Drilled: 8 October 2002

Project: **PROPOSED HONDA DEALERSHIP - LAKESHORE ESTATES - I-10 SERVICE RD. - ST. TAMMANY PARISH, LA.**
FOR: SHAW LOUISIANA INVESTMENTS, L.L.C.

Recorded By: **Don Tusa**

Sample No.	SAMPLE Depth in Feet From	SAMPLE Depth in Feet To	STRATUM Depth in Feet	VISUAL CLASSIFICATION	*Blows per Foot	Symbol Log	Scale (feet)	UNCONFINED COMPRESSION (Qu) (lbs./sq.ft.)	WATER CONTENT (percent)	UNIT WEIGHT (lbs./cu.ft.) DRY	UNIT WEIGHT (lbs./cu.ft.) WET	ATTERBERG LIMITS L.L.	ATTERBERG LIMITS P.L.	ATTERBERG LIMITS P.I.
			.0				0							
1	.5	1.0		LOOSE BROWN & GRAY CLAYEY FINE SAND				560	17.8	95.5	112.5			
			1.5											
2	2.5	3.0		SOFT GRAY & REDDISH TAN SANDY CLAY			5	775	19.0	100.6	119.7			
			5.5											
3	5.5	6.0		MEDIUM STIFF REDDISH TAN & LIGHT GRAY CLAY W/ SAND				1285	20.2	103.2	124.0			
			6.5											
4	8.5	9.0		MEDIUM STIFF LIGHT GRAY & REDDISH TAN SANDY CLAY			10	1225	19.9	101.7	121.9	31	15	16
			10.5											
5	11.5	12.0		MEDIUM STIFF LIGHT GRAY CLAY				1810	30.5	88.9	116.0			
			13.0											
6	14.5	15.0		MEDIUM STIFF LIGHT GRAY & REDDISH TAN CLAY W/ SILT			15	1370	31.5	84.3	110.9	54	27	27
			17.0											
7	19.5	20.0		STIFF REDDISH TAN & LIGHT GRAY CLAY W/ SILT			20	2570	37.9	80.4	110.9			
			22.0											
8	24.5	25.0		STIFF GREENISH GRAY & REDDISH TAN CLAY			25	2765	42.5	77.7	110.7			
			26.0											
9	26.5	27.0		MEDIUM STIFF GRAY CLAY W/ SAND & SHELL FRAGMENTS				1530	55.7	66.7	103.8			
10	29.5	30.0					30	1000	53.6	66.0	101.3			
			32.5											
11	34.5	35.0		MEDIUM STIFF GRAY SANDY CLAY W/ SHELL FRAGMENTS			35	1685	34.7	82.4	111.0	34	14	20
			37.5											
12	39.5	40.0		MEDIUM STIFF GRAY CLAY W/ SAND POCKETS			40	1500	55.4	67.6	105.1			
			42.5											
13	42.5	44.0		MEDIUM DENSE GRAY FINE SAND W/ CLAY & SHELL	18		45		22.5				(8)	
			45.0											
14	45.0	46.5		VERY DENSE GRAY FINE SAND	30 = .5'									
15	48.5	50.0			30 = .6'		50		18.8				(3)	
			50.5											
16	51.0	51.5		MEDIUM STIFF TO STIFF TAN CLAY W/ TRACE WOOD				1260	33.1	86.1	114.6			
17	54.5	55.0					55	2655	39.9	80.6	112.7	53	19	34
			58.0											
18	59.5	60.0		MEDIUM STIFF GRAY SANDY CLAY			60	1325	22.7	99.2	121.7			
			60.0											

NOTE: VALUES IN PARENTHESES ( ) INDICATE PERCENT PASSING NO. 200 SIEVE.

CLAY SILT SAND ORGANIC

Predominant Type Bold. Modifying Type Light.

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

REMARKS: Water Table Depth = 7.7 ft (See Text)

Fig. 2

GORE ENGINEERING, INC.

Job No. 8102

Soil and Foundation Investigations
Metairie, Louisiana

Boring No. B-2

LOG OF BORING AND TEST RESULTS

Date Boring Drilled: 8 October 2002

Project: PROPOSED HONDA DEALERSHIP - LAKESHORE ESTATES - I-10 SERVICE RD. - ST. TAMMANY PARISH, LA.
FOR: SHAW LOUISIANA INVESTMENTS, L.L.C.

Recorded By: **Don Tusa**

Sample No.	SAMPLE Depth in Feet From	SAMPLE Depth in Feet To	STRATUM Depth in Feet	VISUAL CLASSIFICATION	*Blows per Foot	Symbol Log	Scale (feet)	UNCONFINED COMPRESSION (Qu) (lbs./sq.ft.)	WATER CONTENT (percent)	UNIT WEIGHT (lbs./cu.ft.) DRY	UNIT WEIGHT WET	ATTERBERG LIMITS L.L.	P.L.	P.I.
1	.5	1.0	.0	MEDIUM DENSE GRAY & REDDISH TAN CLAYEY FINE SAND			0	1115	17.5	100.2	117.7			
2	2.5	3.0	1.5	SOFT REDDISH TAN & LIGHT GRAY SANDY CLAY				960	20.4	100.2	120.6	27	14	13
3	5.5	6.0					5	575	20.7	101.7	122.8			
4	8.5	9.0	8.0	STIFF TO VERY STIFF LIGHT GRAY & REDDISH TAN CLAY W/ SILT			10	3720	20.8	100.1	120.9			
5	11.5	12.0						4115	27.0	94.0	119.4			
6	14.5	15.0	12.0	MEDIUM STIFF TO STIFF REDDISH TAN & LIGHT GRAY SILTY CLAY			15	1715	31.7	82.7	108.9	37	26	11
7	19.5	20.0					20	3010	40.8	79.2	111.5			
8	24.5	25.0	23.0	STIFF REDDISH TAN & GREENISH GRAY CLAY W/ SILT			25	2380	42.8	73.9	105.5			
9	26.0	26.5	25.0	MEDIUM STIFF GRAY CLAY W/ SAND				1270	55.2	65.7	101.9	73	21	52
10	29.5	30.0	28.0	SOFT GRAY SANDY CLAY W/ SHELL FRAGMENTS			30	920	31.1	86.7	113.6			
11	31.5	32.0	30.0	MEDIUM STIFF GREENISH GRAY SANDY CLAY				1540	24.0	92.7	114.9			
12	34.5	35.0	34.0	MEDIUM STIFF GREENISH GRAY CLAY W/ SAND			35	1710	35.3	79.5	107.5			
13	36.0	36.5	35.0	MEDIUM STIFF GRAY CLAY W/ TRACE WOOD & SHELL FRAGMENTS				1745	42.9	76.3	109.0			
14	39.5	40.0					40	1200	65.6	61.1	101.1			
15	44.5	45.0	42.0	MEDIUM DENSE GRAY CLAYEY FINE SAND			45	1130+	25.7	92.7	116.5		(28)	
16	49.5	50.0	48.0	LOOSE GRAY SILTY FINE SAND			50		24.5				(27)	
17	54.5	55.0	50.0	VERY SOFT BROWN CLAY W/ MUCH WOOD			55		54.6					
18	59.5	60.0	58.0	MEDIUM DENSE GRAY FINE SAND			60	1280+	16.9	96.6	112.9			
			60.0											

NOTE: VALUES IN PARENTHESES ( ) INDICATE PERCENT PASSING NO. 200 SIEVE.

CLAY SILT SAND ORGANIC

Predominant Type Bold. Modifying Type Light.

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

REMARKS: Water Table Depth = 7.6 ft (See Text)

+equivalent Qu from 1-point triaxial test

Fig. 3

GORE ENGINEERING, INC.

Job No. 8102

Soil and Foundation Investigations
Metairie, Louisiana

LOG OF BORING AND TEST RESULTS

Boring No. A-1

Date Boring Drilled: 9 October 2002

Project: PROPOSED HONDA DEALERSHIP - LAKESHORE ESTATES - I-10 SERVICE RD. - ST. TAMMANY PARISH, LA.
FOR: SHAW LOUISIANA INVESTMENTS, L.L.C.

Recorded By: Don Tusa

Sample No.	SAMPLE Depth in Feet From	SAMPLE Depth in Feet To	STRATUM Depth in Feet	VISUAL CLASSIFICATION	*Blows per Foot	Symbol Log	Scale (feet)	UNCONFINED COMPRESSION (Qu) (lbs./sq.ft.)	WATER CONTENT (percent)	UNIT WEIGHT (lbs./cu.ft.) DRY	UNIT WEIGHT (lbs./cu.ft.) WET	ATTERBERG LIMITS L.L.	ATTERBERG LIMITS P.L.	ATTERBERG LIMITS P.I.
			.0				0							
1	.5	1.0		LOOSE DARK GRAY CLAYEY FINE SAND					20.5					
			1.0											
2	1.5	2.0		LOOSE GRAY & REDDISH TAN CLAYEY FINE SAND			2		18.6					
			2.5											
3	3.5	4.0		SOFT GRAY & REDDISH TAN SANDY CLAY			4		19.8					
			4.5											
4	5.5	6.0		MEDIUM STIFF REDDISH TAN & LIGHT GRAY SANDY CLAY			6		20.4					
			6.0											

Boring No. A-2

Recorded By: Don Tusa

Sample No.	From	To	Stratum Depth	Visual Classification	Blows per Foot	Symbol Log	Scale (feet)	Qu	Water Content	Dry	Wet	L.L.	P.L.	P.I.
			.0				0							
1	.5	1.0		LOOSE GRAY & REDDISH TAN FINE SAND					16.3					
			1.0											
2	1.5	2.0		LOOSE GRAY & REDDISH TAN CLAYEY FINE SAND			2		18.1					
			2.5											
3	3.5	4.0		SOFT GRAY & REDDISH TAN SANDY CLAY			4		20.1					
			4.5											
4	5.5	6.0		STIFF REDDISH TAN & LIGHT GRAY SANDY CLAY			6		18.3					
			6.0											

Boring No. A-3

Recorded By: Don Tusa

Sample No.	From	To	Stratum Depth	Visual Classification	Blows per Foot	Symbol Log	Scale (feet)	Qu	Water Content	Dry	Wet	L.L.	P.L.	P.I.
			.0				0							
1	.5	1.0		LOOSE GRAY & REDDISH TAN FINE SAND					16.6					
2	1.5	2.0					2		21.0					
			2.5											
3	3.5	4.0		SOFT REDDISH TAN & LIGHT GRAY SANDY CLAY			4		20.2					
4	5.5	6.0					6		23.1					
			6.0											

Boring No. A-4

Recorded By: Don Tusa

Sample No.	From	To	Stratum Depth	Visual Classification	Blows per Foot	Symbol Log	Scale (feet)	Qu	Water Content	Dry	Wet	L.L.	P.L.	P.I.
			.0				0							
1	.5	1.0		LOOSE GRAY & REDDISH TAN FINE SAND					16.2					
			1.0											
2	1.5	2.0		SOFT REDDISH TAN & LIGHT GRAY SANDY CLAY			2		19.0					
3	3.5	4.0					4		21.2					
			4.5											
4	5.5	6.0		STIFF LIGHT GRAY & REDDISH TAN SANDY CLAY			6		18.2					
			6.0											

Boring No. A-5

Recorded By: Don Tusa

Sample No.	From	To	Stratum Depth	Visual Classification	Blows per Foot	Symbol Log	Scale (feet)	Qu	Water Content	Dry	Wet	L.L.	P.L.	P.I.
			.0				0							
1	.5	1.0		LOOSE DARK GRAY FINE SAND					17.9					
			1.0											
2	1.5	2.0		LOOSE GRAY & REDDISH TAN CLAYEY FINE SAND			2		19.2					
			2.5											
3	3.5	4.0		SOFT REDDISH TAN & LIGHT GRAY SANDY CLAY			4		21.6					
			5.0											
4	5.5	6.0		STIFF LIGHT GRAY & REDDISH TAN SANDY CLAY			6		19.9					
			6.0											

CLAY SILT SAND ORGANIC
Predominant Type Bold. Modifying Type Light.

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

REMARKS: