Geotechnical Group Inc.
Geotechnical Consulting Engineers

Report on the Geotechnical Investigation at the proposed New La Aventura Development Gurabo, Puerto Rico

Job No. P-785

January 2008

Prepared for:

Eng. Al Risek
Owner

Prepared by:

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Geotechnical Group Inc.

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Report on the Geotechnical Investigation at the New La Aventura Development Gurabo, Puerto Rico

Job No. P-785

January 2008

Prepared by:
Carlos R. Sierra, P.E., Lic. 9007
Geotechnical Engineer

Date: January 28, 2008

This report consists of 30 pages

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1. INTRODUCTION:

The present soil report covers the results of the subsurface exploration made at the construction site of the proposed New La Aventura Development, Gurabo, Puerto Rico.

The exploration was directed to obtain preliminary information, regarding the site subsoil conditions at each test boring drilled. The engineering soil data thus obtained will be used in the formulation of the pertinent preliminary general foundation recommendations, which shall be followed by the structure foundation design.

The exploration was made following the instructions of Eng. Al Risek, as owner. This report has been prepared for the exclusive use of the owner, his architects, and others involved in the preparation of the plans and specifications of the project.

This office assures that our recommendations are in line with the generally accepted practice in the field of Soil Mechanics and Foundation Engineering, no other warranty, expressed or implied is made.

1.1 Soil Sampling Procedure

In acquiring the soil samples necessary for this evaluation, drilling procedures were performed. The drilling and sampling procedures were performed using a

CME 55LC Drill Rig, which performed the test holes. The hammer used for the Standard Penetration Testing was a 140-lb. safety hammer. The Standard Penetration Test (SPT) as described in ASTM D 1586-99 was used to determine the "N_{SPT}" value for disturbed soil sampling. Soil samples were described using the visual-manual description method. In this sampling method, a standard configuration, 2-in OD split barrel (sample) was used as a testing probe and for sample recuperation. The sample attached at the end of the solid string of the drill rods is advanced to an 18-in. or 24-in. interval, depending on the sample length, using a 140-lb hammer dropped through a 30-in. free fall.

The sample used during this investigation was 18-in. in length. The blows required to advance the hole were each 6-in. and were recorded in a field-boring log. The standard penetration resistance, or "N_{SPT}" value, is the sum of the blows required for the second and third 6-in. drives. The hole is then cleaned to the top of the next interval to be sampled and the procedure is repeated.

The samples and field logs were collected, secured and transported to Sierra Geotechnical Group facilities, for routine laboratory testing procedures.

1.2 Laboratory Testing

Laboratory testings of soil samples from the borings were performed at Sierra Geotechnical Group facilities. This testings consisted of natural water content determination, unconfined compression testing, and manual visual description.

The water content tests were performed in accordance with ASTM D 2216-98 *Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass*. An engineer described all samples collected from the

test holes, the descriptions were performed and when possible unconfined compression tests were performed on cohesive samples using either the spring tester method or the pocket penetrometer.

2. SITE DESCRIPTION

2.1 Location

The project is located in the Municipality of Gurabo; the access to the project is obtained through PR# 941 and interception with PR# 942, PR. This location lies in the Gurabo Quadrangle 7.5 Minutes Series Topographic Quadrangle.

2.2 Topography

The proximity of the studied area can be noted on Appendix A using reference approximation; the site elevation is in the varied from order of 70 to 250 meters above mean sea level. Specific topography of the site has not been obtained; therefore reference approximation was made using the above referenced publication. Topography of the lot was considered a natural deposit and it shows to be sloping south. The leading surface runoff of the lots area flows to stream corresponding to the lot limits.

2.3 Geologic Setting

The general geologic setting of the project site was obtained from information gathered from the Geologic Map from the Gurabo Quadrangle (Map I-657); prepared by Victor M. Seiders (1971) which was published by the U.S Geologic

Survey (USGS). The general geologic descriptions obtained from this map place the studied area at different geologic setting with were described as follow:

Hydrothermal altered rock (TKa) from the Cretaceous and Tertiary Era was classified as a metamorphic rock formation. This formation was described as hard light gray and grayish green altered, metamorphosed and sheared volcanic and plutonic rocks. Primary texture largely absent or obscure.

This Celda Formation (Kcl) from the Cretaceous Era was described Basaltic pillow lava and volcanic breccia relatively rich in clinopyroxene and fragments of scoria. In parts sheared and contact metamorphosed in parts hydro thermally altered.

This Inferno Formation (Kiv) from the Cretaceous Era was described as Volcaniclastic rock members, andesitic volcanic sandstone and breccia with less abundant mudstone. In parts rich in fragments of altered pumice and perlite.

A segment of the aforementioned map is included as Geologic Location in Appendix A, with an approximate location of the project. If additional information is required please refer to Geologic Map I-657.

3. SUBSOIL CONDITIONS:

The general soil profile of the site as disclosed by the ten (10) test borings drilled show the following general description. The area evaluated show the presence of natural formations. These formations correspond to residual deposits and weathered rock formations. Consequently test boring disclose basically hard to

very hard consistencies on the upper topography. These materials were generally described as yellowish brown, brown or grayish brown silty clay. Also showing weathered rock patterns. Nevertheless, on the lower land no substantial amount of organic material was detected at samples obtained but soft consistency and compressible materials were encountered. These materials were described as dark brown and grayish clays. The consistency of these materials was considered soft. These deposits were found covering the natural formation of the area. No land slide or faults were detected at the evaluated areas northe vicinities.

Please refer to the enclosed boring logs and boring location for more detailed information regarding the soil profile, water level, and laboratory tests results.

3.1 Ground Water Table

The Ground Water Table (GWT) in an open excavation or test-boring hole is measure after completion of drilling procedure. The observation is then recorded and informed on test boring log as part of this report. Nevertheless, it may be possible that permeability of soil drill don't show the presence of a stable water level.

Consequently, if this condition is extremely important to the safe development it is recommended establishing a permanent observation well and periodic measurements are taken. Nevertheless, at the site the Ground Water Level (GWT) was not detected at the depth drilled. For more details please refer to the enclosed boring logs.

It should be noted that the Ground Water Table is always being affected by natural factors such as the distance from water sources, the permeability of the subsoil, the topography of the area, and the amount of precipitation. Moreover, it should be taken into account that whenever changes in the topography of a site are made, changes in the Ground Water Table characteristics of the region frequently occur.

Such conditions are difficult to detect within the normal scope of time of the exploration. Usually, springs are detected during the construction period, when excavations or ground surface stripping are made. If this or any related problems arise please notify the subscriber to provide more detailed solutions or recommendations of who could deal with ground water mitigation.

4. PRELIMINARY FOUNDATION RECOMMENDATIONS:

Based on the results of the test borings drilled, we have concluded that the proposed New La Aventura Development may be constructed at the area tested. Nevertheless, some precautions should be taken into consideration. Test borings drilled were performed to establish a general soil behavior. Nevertheless, no abnormal conditions were detected visually or physically. The following table can be used for preliminary foundation system design.

General Subsoil Condition	Expected Allowable Soil Pressure (psf)
Controlled Earthwork	2,000 psf
Low land controlled earthwork	2,000 psf
Cut area Weathered rock formation	4,000 psf
Cut area Unweathered rock Formations	5,000 psf

Further evaluation once the final structure location is provided shall be performed. This evaluation shall be directed to ensure that loading characteristic of any structure may be applied. As part of the development of the property earthwork will be required. Consequently, all new fill placement procedures should be performed in accordance with Site Preparation Procedures submitted in this report.

Taking these factors into consideration, we understand that normal structure may be placed over conventional spread or mat foundation system. Soil capacities shall be established during future geotechnical explorations to be performed on specific developments.

For general design purposes the following information may be used.

Soil Profile Type	Soil Profile Name/Generic Description	Average Soil Properties for top 100 feet (30 480mm) of Soil Profile		
		Shear Wave Velocity Vs feet/second (mts)	Standard Penetration Test N (or Ncr for Cohesionless Soil Layers)	Undrained Shear Strength S psf (kfa)
Sc	Very Dense Soil & Soft Rock	1,200 to 2,500 (360 to 760)	<50	>2,000 (100)
Sp	Stiff Soil Profile	600 to 1,200	15 to 50	1,000 to 2,000 (50 to 100)
Se	Soft Soil Profile	<600 (180)	<15	<1,000 (50)
Sf	Soil Requiring Site-Specific Evaluation. See Section 1629.3.1			

1 Soil Profile Type SE also includes any soil profile with more than 10 feet (3048mm) of soft clay defined as soil with a plasticity index, PI>20,W_<40 percent and S_<500psf(24kPa). The Plasticity Index PI, and the moisture content,W_shall be determined in accordance with approved national standards.

According to the Uniformed Building Code (UBC) the area is classified as Sp seismic characterization zone type.

4.1 Dewatering Requirements

At the time of our evaluation no condition, which we understand, will required the use of dewatering to produce a stable excavation. Also, no dewatering was anticipated during any phase of the foundation excavation. Consequently, any water entering the excavation area as a result from the surface run-off water can be pumped out directly from a sump located adjacent to the excavation area.

5. SITE PREPARATION:

All fill or soft soil deposits should be removed from the site. Depth of removal should vary in accordance with required excavation depth or soft soil deposits encountered. Depth of removal will be established during earthwork procedures. Any artesian (water seepage) condition detected during this procedure shall be controlled and evaluated on site. It is advisable and extremely important that during all the development of the lot a resident geotechnical technician should be available to inspect at all times the earthwork procedure. Once all cuts are finalized and tested a proof rolling of the exposed sub grade should be performed.

It is expected that heavy excavation or drilling and blasting may be required based on amount of cut required. This fact shall be taken into consideration on bidding and also unit prices shall established for this purposes. Please refer to enclosed boring logs.

If the proof rolling operation fails, a series of test pits or remedial solutions should be required at the questionable behavior site. Consequently, a detailed evaluation of the field earthwork should be performed.

The extent of any unstable deposits should be determined at the field or during the process of fill control procedures. It is advisable to make sure that the foundation area contains no beds of unsuitable materials.

The above report anticipates contingencies that can be effectively covered by establishing in the contract documents special provisions to cover unstable excavation areas, and corresponding replacements at a pre-established unit price, to be actually paid by field volume measurements upon completed work. Any fill material required to reach the desired final grade has to be placed in successive layers not exceeding eight (8) inches, uncompacted and each lift be imparted with a minimum compaction of 95% of the fill material maximum dry density as obtained from laboratory compaction tests made according to ASTM Designation D-1557 and meeting the requirements of an A-2-4 classification or better material in accordance with AASHTO classification.
Any required slope should comply with the following table.

Material Type	Permanent Slope (Horizontal : Vertical)
Silt, Clay & Sand (Compacted)	2.5:1
Weathered Rock	1.5:1
Unweathered Rock	1:1

All exposed cut soil materials should be properly protected against erosion. Slopes have more than 6 mts in the vertical should be provided with a terrace of at least 2 mts in the horizontal plane.

No slope toe should be left closed to any structure with out a buffer zone or equivalent protection. Seeding or similar procedures should be provided to minimize erosion of exposed face. No water should be allowed to run thru the

face of any slope at any time. The base of any slope to be constructed should be compacted to it maximum dry density (∂ dry). Specific recommendations and control should be applied on these zones. Cut performed on rock outcrops should be inspected and evaluated to establish long-term stability.

5.1 Parking and Access Areas:

The results of the geotechnical exploration show that the subsoil conditions of the explored tract of land at its upper horizon consist of silty clay deposits.

These sub grade materials (when saturated) are affected by reducing their loading bearing resistance, which can drop to an equivalent CBR value of about 4 or less. Consequently, reduction of pavement thickness and reduction in long term pavement maintenance costs may be cut down by providing a sub base course of an A-1 type material over improved resulting sub grade ground.
The sub base of an A-1 type material compacted to 95% may yield a CBR value about 18 to 20, which will serve as a parameter for the design of a flexible pavement section.

For more precise CBR values it would be necessary to perform a laboratory test of the material to be used for field tests after the fill is placed and the section is prepared for said purposes.
Areas to be paved should be superficially removed from construction debris and any superficial unsuitable material to a minimum depth of 1 ft. The resulting exposed grade should be downgraded to the required cross sections or sub grade elevation. The exposed sub grade has to be proof rolled to detect weak spots or unstable material, which has to be excavated and replaced with selected fill material, backfill as previously discussed.

Concluded, the excavation of unsuitable material a strong permeable geotextile membrane should be placed at the exposed grade. Then backfill the excavated area with selected fill, the resulted sub grade be brought to an unyielding surface by recompaction (95%) and then proceed with the construction of sub base material of A-1 type of soil. The sub base fill material has to be placed in successive layers of 8 inches thick, and each lift compacted to obtain a minimum density of 95% of the maximum dry density as obtained on typical compaction tests made according to ASTM D-1557 and meeting the requirements of an A-1 classification. All construction required in parking areas should be made following a controlled fill construction procedure in the manner specified previously on site preparation except that the minimum compaction requirements for sub base and base should be 95% of its respective maximum dry density in accordance with ASTM D- 1557 later edition.

6. LIMITATIONS OF THIS REPORT:

The above recommendations are given based on the interpretation of the arbitrary selected, limited number of soil samples rather than precise knowledge of actual conditions. Should subsoil between borings vary and different conditions than those described be encountered, the owner or contractor is urged to contact the writer for a field inspection, as the recommendations may have to vary to accommodate undisclosed conditions.

Furthermore, the writer or his approved representative shall make the monitoring and inspection of earthwork, related construction procedures, as well as the supervision of the implementation of the given recommendations. Otherwise, the inspecting engineer should study this report, perform additional tests, as he

deems necessary, submit his own recommendations or assume full responsibility of the herein given recommendations in their entirety.

6.1 Uncertainties And Limitations

Only a very small portion of the subsurface conditions at the site have been observed and/or tested. The possibility of subsurface conditions differing from those assumed and developed in this investigation cannot be discarded. Information presented in this report is based upon our understanding of the subsoil conditions depicted by the performed borings drilled and the assumption that the subsurface conditions do not deviate from those disclosed by the field exploration.

7. FIELD WORK:

The fieldwork consists of drilling ten (10) test borings by the hollow stem auger method.

The depths of the test borings were in the order of 10.5 to 15.0 ft. with a total footage of 132.0 ln. ft. of borings drilled at the subject site.

Respectfully submitted,

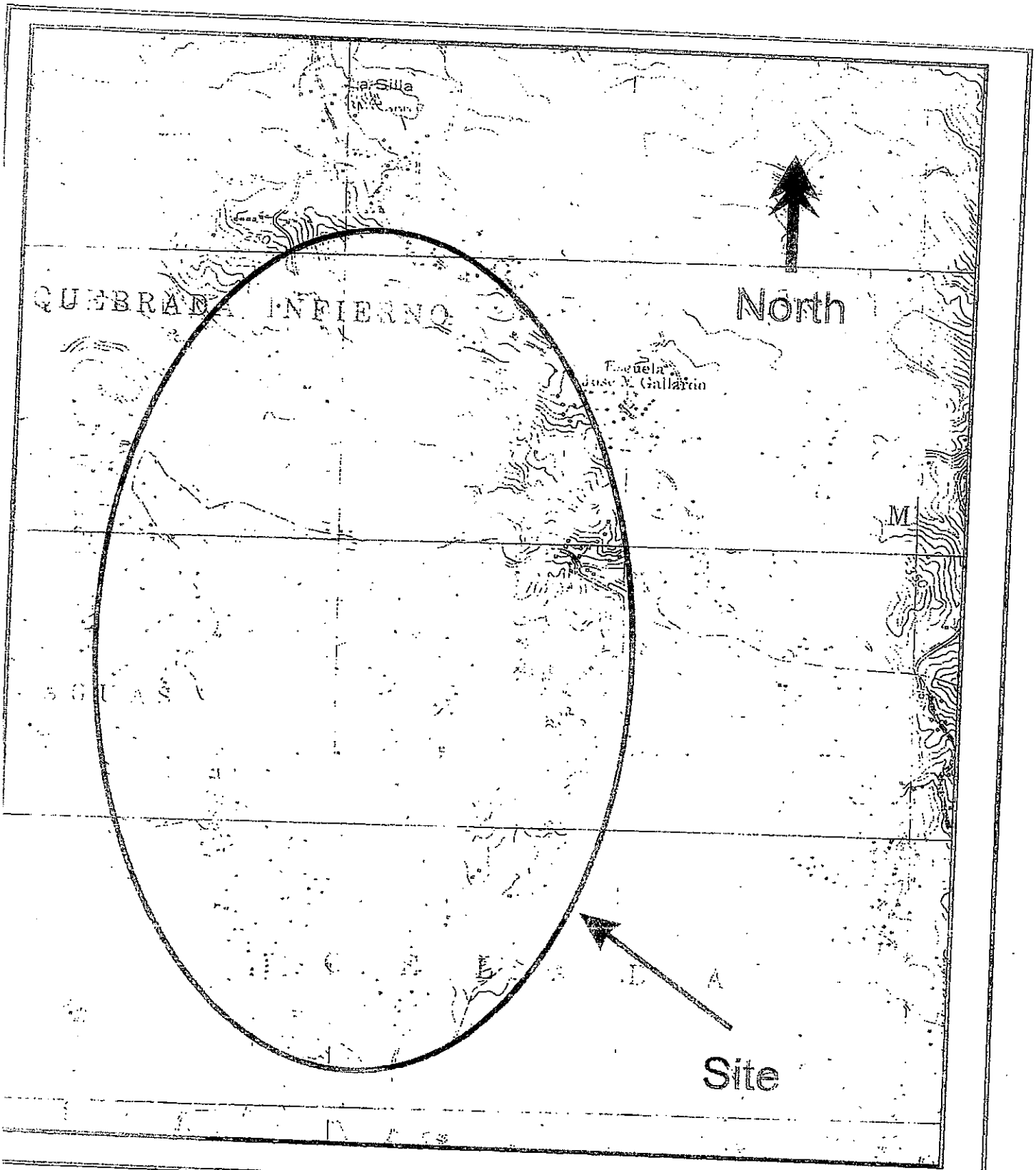
Geotechnical Group Inc.

CARLOS R. SIERRA PEREZ
INGENIERO
LICENCIADO
PUERTO RICO

Carlos R. Sierra P. E
January 28, 2007
Job P-79[illegible]

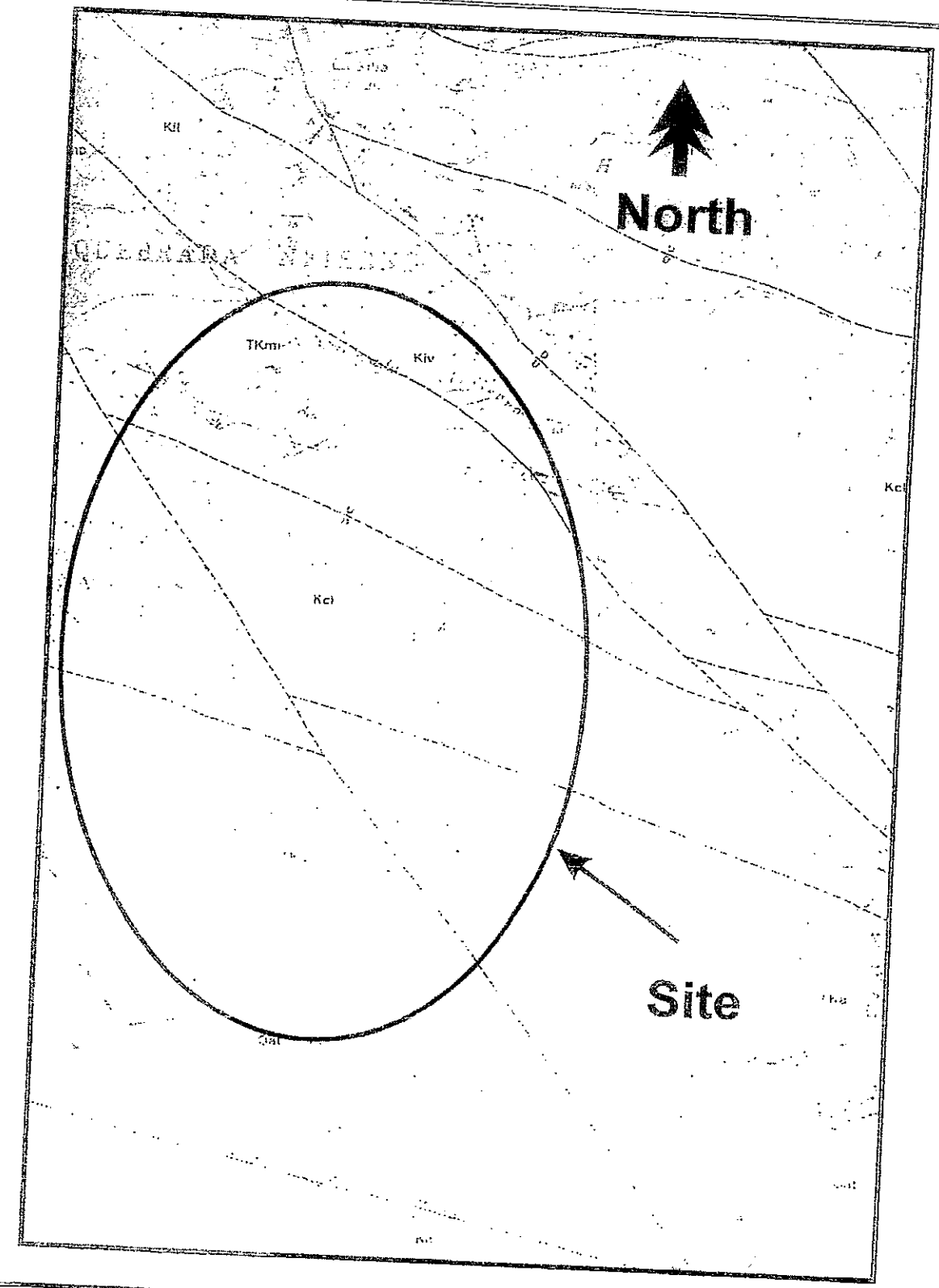
APPENDIX A

Site Location
&
Geologic Location



Site Location

eotechnical Group Inc. P.O. Box 2439, Guaynabo P.R.00970-2439	Scale: Not To Scale	Project: La Aventura Dev. Gurabo, PR Job # P-785



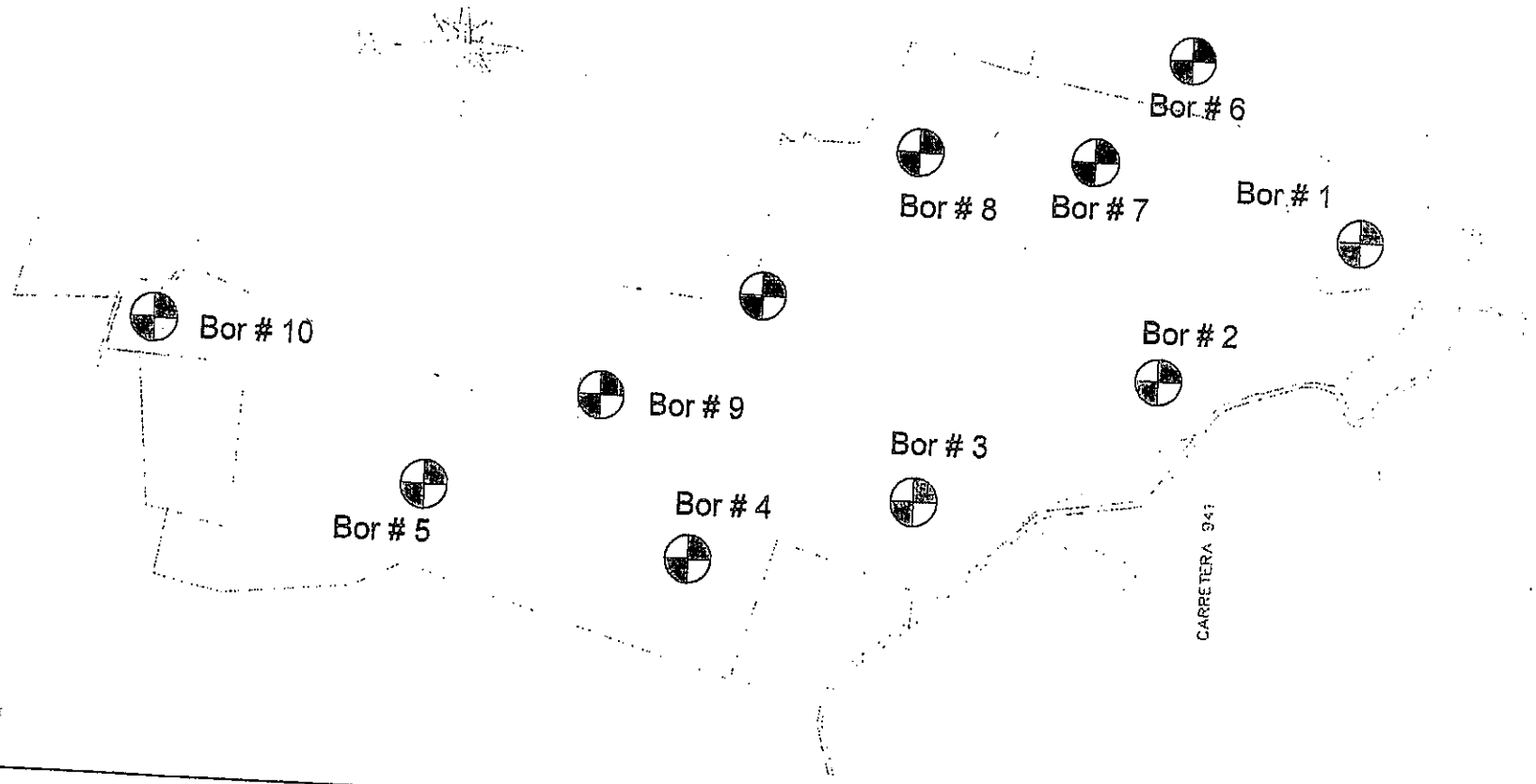
Geologic Location

Geotechnical Group Inc. P.O. Box 2439, Guaynabo P.R.00970-2439	Scale: Not To Scale	Project: La Aventura Dev. Gurabos, P.R. Job # P-785

APPENDIX B

Boring Location
&
Boring Logs

Test Boring Locations



Boring Location

Sierra
Geotechnical Group Inc.
P.O. Box 2439, Guaynabo P.R. 00970-2439
Tel. (787) 789-7981 Fax (787)731-7731

Scale: No a Escala (Esquematico)

Project: La Aventura Development
Gurabo, P.R.

Sierra Geotechnical Group

BORING NO. 1
PAGE 1 OF 1
JOB NO. P-785

PROJECT: La Aventura
LOCATION: Gurabo, PR
DESCRIPTION: J. Garcia APPROVED: C. Sierra
STATION:
HAMMER WT(lb): 140 DROP(in): 30 SIZE:
DEPTH OF WATER DRY ft. AFTER COMPLETION
____ ft. ____ HOURS AFTER COMPLETION

Boring Log

DATE STARTED: 01/09/08
DATE COMPLETED: 01/09/08
DRILL MACHINE: CME 45
DRILLER: P. Andino
GROUND ELEV.:
DEPTH OF HOLE(ft): 10.5

DEPTH (ft)	Blow 1 (0 - 6")	Blow 2 (6 - 12")	Blow 3 (12" - 18")	Blow 4 (18" - 24")	SPT N VALUE	Material Description	Symbol	RQD %	Wn	PL	LL	PI	qU (TSF)
0	3	7	11		18	Brown silty clay.			25.3				
2	16	18	21		39	Brown silty clay, some weathered rock fragments.			12.2				
4	27	30	40		70	Grayish brown silty clay, some weathered rock fragments.			8.4				
6	25	37	42		79	Same as above.			10.1				
8	17	38	40		78	Same as above.			9.9				
10	24	40	50		90	Same as above.			9.6				
10.5	24	50/3			50/3	Same as above.			8.3				
						End of boring.							

PROPERTIES VS. DEPTH

PI ◇ Plasticity Index
LL ◎ Liquid Limit
PL ▣ Plastic Limit
Wn ▲ Natural Water

10 20 30 40 50 60 70 80 90

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BORING NO. 2
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JOB NO. P-785

PROJECT: La Aventura
LOCATION: Gurabo, PR
DESCRIPTION: J. Garcia APPROVED: C. Sierra
STATION:
HAMMER WT(lb): 140 DROP(in): 30 SIZE:
DEPTH OF WATER DRY ft. AFTER COMPLETION
____ ft. ____ HOURS AFTER COMPLETION

Boring Log

DATE STARTED: 01/09/08
DATE COMPLETED: 01/09/08
DRILL MACHINE: CME 45
DRILLER: P. Andino
GROUND ELEV.:
DEPTH OF HOLE(ft): 15

Blow 1 (0 - 6")	Blow 2 (6 - 12")	Blow 3 (12" - 18")	Blow 4 (18" - 24")	SPT N VALUE	Material Description	Symbol	RQD %	Wn	PL	LL	PI	qU (TSF)
3	4	6		10	Brown silty clay.			39.2				
6	7	7		14	Same as above.			23.6				
7	8	9		17	Same as above.			32.5				
4	4	3		7	Same as above.			42.2				
5	5	6		11	Same as above.			40.0				
6	7	8		15	Same as above.			36.6				
7	7	8		15	Same as above.			36.4				
5	7	8		15	Brown silty clay some weathered rock formation.			40.8				
					End of boring.							

PROPERTIES VS. DEPTH

PI ◇ Plasticity Index
LL ● Liquid Limit
PL ■ Plastic Limit
Wn ▲ Natural Water

10 20 30 40 50 60 70 80 90

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Sierra Geotechnical Group

BORING NO. 3
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JOB NO. P-785

PROJECT: La Aventura
LOCATION: Gurabo, PR
DESCRIPTION: J. Garcia APPROVED: C. Sierra
STATION:
HAMMER WT(lb): 140 DROP(in): 30 SIZE:
DEPTH OF WATER DRY ft. AFTER COMPLETION
____ ft. ____ HOURS AFTER COMPLETION

Boring Log

DATE STARTED: 01/10/08
DATE COMPLETED: 01/10/08
DRILL MACHINE: CME 45
DRILLER: P. Andino
GROUND ELEV.:
DEPTH OF HOLE(ft): 9

DEPTH (ft)	Blow 1 (0 - 6")	Blow 2 (6 - 12")	Blow 3 (12" - 18")	Blow 4 (18" - 24")	SPT N VALUE	Material Description	Symbol	RQD %	Wn	PL	LL	PI	qU (TSF)
0	5	11	13		24	Brown silty clay.			27.8				
2	10	10	12		22	Same as above.			30.1				
4	10	10	10		20	Same as above.			30.5				
6	6	10	14		24	Same as above.			25.2				
8	20	25	25		50	Brown silty clay, some weathered rock formation.			27.4				
9	20	31	40		71	Same as above.			28.8				
						End of boring.							

PROPERTIES VS. DEPTH

PI ◇ Plasticity Index
LL ⊕ Liquid Limit
PL ▣ Plastic Limit
Wn ▲ Natural Water

10 20 30 40 50 60 70 80 90

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BORING NO. 4
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JOB NO. P-785

PROJECT: La Aventura
LOCATION: Gurabo, PR
DESCRIPTION: J. Garcia APPROVED: C. Sierra
STATION:
HAMMER WT(lb): 140 DROP(in): 30 SIZE:
DEPTH OF WATER DRY ft. AFTER COMPLETION
____ ft. ____ HOURS AFTER COMPLETION

Boring Log

DATE STARTED: 01/10/08
DATE COMPLETED: 01/10/08
DRILL MACHINE: CME 45
DRILLER: P. Andino
GROUND ELEV.:
DEPTH OF HOLE(ft): 7.5

Blow 1 (0 - 6")	Blow 2 (6 - 12")	Blow 3 (12" - 18")	Blow 4 (18" - 24")	SPT N VALUE	Material Description	Symbol	RQD %	Wn	PL	LL	PI	qU (TSF)
7	7	15		22	Grayish brown silty clay, some rock fragments.			18.3				
7	7	9		16	Same as above.			39.5				
7	10	9		19	Same as above.			15.7				
3	7	5		12	Same as above.			17.9				
3	5	17		22	Same as above.			19.3				
					End of boring.							

PROPERTIES VS. DEPTH

PI ◇ Plasticity Index
LL ● Liquid Limit
PL ■ Plastic Limit
Wn ▲ Natural Water

10 20 30 40 50 60 70 80 90

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Sierra Geotechnical Group

BORING NO. 5
PAGE 1 OF 1
JOB NO. P-785

PROJECT: La Aventura
LOCATION: Gurabo, PR
DESCRIPTION: J. Garcia APPROVED: C. Sierra
STATION:
HAMMER WT(lb): 140 DROP(in): 30 SIZE:
DEPTH OF WATER DRY ft. AFTER COMPLETION
____ ft. ____ HOURS AFTER COMPLETION

Boring Log

DATE STARTED: 01/09/08
DATE COMPLETED: 01/09/08
DRILL MACHINE: CME 45
DRILLER: P. Andino
GROUND ELEV.:
DEPTH OF HOLE(ft): 15

Blow 1 (0 - 6")	Blow 2 (6 - 12")	Blow 3 (12" - 18")	Blow 4 (18" - 24")	SPT N VALUE	Material Description	Symbol	RQD %	Wn	PL	LL	PI	qU (TSF)
3	5	5		10	Brown silty clay.			37.1				
6	6	7		13	Same as above.			28.9				
6	7	8		15	Same as above.			28.8				
3	4	5		9	Brown silty clay, some weathered rock fragments.			30.5				
4	4	4		8	Same as above.			28.2				
5	5	5		10	Same as above.			31.6				
5	5	6		11	Same as above.			28.0				
5	8	10		18	Same as above.			29.4				
					End of boring.							

PROPERTIES VS. DEPTH
PI ◇ Plasticity Index
LL ● Liquid Limit
PL ■ Plastic Limit
Wn ▲ Natural Water
10 20 30 40 50 60 70 80 90

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BORING NO. 6
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JOB NO. P-785

PROJECT: La Aventura
LOCATION: Gurabo, PR
DESCRIPTION: J. Garcia APPROVED: C. Sierra
STATION:
HAMMER WT(lb): 140 DROP(in): 30 SIZE:
DEPTH OF WATER DRY ft. AFTER COMPLETION
____ ft. ____ HOURS AFTER COMPLETION

Boring Log

DATE STARTED: 01/17/08
DATE COMPLETED: 01/17/08
DRILL MACHINE: CME 55
DRILLER: P. Andino
GROUND ELEV.:
DEPTH OF HOLE(ft): 15

Blow 1 (0 - 6")	Blow 2 (6 - 12")	Blow 3 (12" - 18")	Blow 4 (18" - 24")	SPT N VALUE	Material Description	Symbol	RQD %	Wn	PL	LL	PI	qU (TSF)
4	6	8		14	Yellowish brown silty clay.			23.3				
4	5	6		11	Yellowish brown silty clay, some weathered rock fragments.			25.7				
4	5	7		12	Same as above.			28.7				
5	7	10		17	Same as above.			25.6				
6	10	10		20	Same as above.			23.4				
6	10	17		27	Same as above.			25.9				
10	13	21		34	Same as above.			18.4				
30	28	30		58	Same as above.			20.3				
					End of boring.							

PROPERTIES VS. DEPTH

PI ◇ Plasticity Index
LL ● Liquid Limit
PL ▣ Plastic Limit
Wn ▲ Natural Water

10 20 30 40 50 60 70 80 90

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BORING NO. 7
PAGE 1 OF 1
JOB NO. P-785

PROJECT: La Aventura
LOCATION: Gurabo, PR
DESCRIPTION: J. Garcia APPROVED: C. Sierra
STATION:
HAMMER WT(lb): 140 DROP(in): 30 SIZE:
DEPTH OF WATER DRY ft. AFTER COMPLETION
_____ ft. _____ HOURS AFTER COMPLETION

Boring Log

DATE STARTED: 01/17/08
DATE COMPLETED: 01/17/08
DRILL MACHINE: CME 55
DRILLER: P. Andino
GROUND ELEV.:
DEPTH OF HOLE(ft): 15

Blow 1 (0 - 6")	Blow 2 (6 - 12")	Blow 3 (12" - 18")	Blow 4 (18" - 24")	SPT N VALUE	Material Description	Symbol	RQD %	Wn	PL	LL	PI	qU (TSF)
3	7	8		15	Brown silty clay.			18.8				
9	15	20		35	Brown silty clay, some weathered rock fragments.			17.2				
8	12	18		30	Same as above.			16.4				
9	13	33		46	Same as above.			24.2				
21	30	38		68	Same as above.			17.0				
30	30	38		68	Same as above.			14.0				
10	13	21		34	Same as above.			9.5				
38	50/6			50/6	Same as above.			14.4				
					End of boring.							

PROPERTIES VS. DEPTH

PI ◇ Plasticity Index
LL ◉ Liquid Limit
PL ▣ Plastic Limit
Wn ▲ Natural Water

10 20 30 40 50 60 70 80 90

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Sierra Geotechnical Group

BORING NO. 8
PAGE 1 OF 1
JOB NO. P-785

PROJECT: La Aventura
LOCATION: Gurabo, PR
DESCRIPTION: J. Garcia
STATION: APPROVED: C. Sierra
HAMMER WT(lb): 140 DROP(in): 30 SIZE:
DEPTH OF WATER DRY ft. AFTER COMPLETION
ft. HOURS AFTER COMPLETION

Boring Log

DATE STARTED: 01/17/08
DATE COMPLETED: 01/17/08
DRILL MACHINE: CME 55
DRILLER: P. Andino
GROUND ELEV.:
DEPTH OF HOLE(ft): 15

DEPTH (ft)	Blow 1 (0 - 6")	Blow 2 (6 - 12")	Blow 3 (12" - 18")	Blow 4 (18" - 24")	SPT N VALUE	Material Description	Symbol	RQD %	Wn	PL	LL	PI	qU (TSF)
	2	3	3		6	Brown silty clay.			36.1				
	5	6	10		16	Same as above.			29.4				
	7	10	17		27	Same as above.			22.9				
	10	10	14		24	Same as above.			14.9				
	10	15	30		45	Same as above.			13.2				
	10	18	30		48	Same as above.			17.1				
	10	18	28		46	Same as above.			19.7				
	16	18	28		46	Same as above.			12.8				
						End of boring.							

PROPERTIES VS. DEPTH
PI ◇ Plasticity Index
LL ● Liquid Limit
PL ▩ Plastic Limit
Wn ▲ Natural Water
10 20 30 40 50 60 70 80 90

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BORING NO. 9
PAGE 1 OF 1
JOB NO. P-785

PROJECT: La Aventura
LOCATION: Gurabo, PR
DESCRIPTION: J. Garcia APPROVED: C. Sierra
STATION:
HAMMER WT(lb): 140 DROP(in): 30 SIZE:
DEPTH OF WATER DRY ft. AFTER COMPLETION
____ ft. ____ HOURS AFTER COMPLETION

Boring Log

DATE STARTED: 01/18/08
DATE COMPLETED: 01/18/08
DRILL MACHINE: CME 45
DRILLER: P. Andino
GROUND ELEV.:
DEPTH OF HOLE(ft): 15

DEPTH (ft)	Blow 1 (0 - 6")	Blow 2 (6 - 12")	Blow 3 (12" - 18")	Blow 4 (18" - 24")	SPT N VALUE	Material Description	Symbol	RQD %	Wn	PL	LL	PI	qU (TSF)
1	3	3	4		7	Brown silty clay.			28.2				
3	4	5	6		11	Same as above.			25.7				
5	7	9	9		18	Brown silty clay and weathered rock fragments.			25.2				
7	6	6	10		16	Same as above.			31.9				
9	5	7	12		19	Same as above.			26.2				
11	7	9	14		23	Same as above.			27.6				
13	7	8	13		21	Same as above.			27.3				
15	6	12	14		26	Same as above.			20.1				
						End of boring.							

PROPERTIES VS. DEPTH
PI ◇ Plasticity Index
LL ◉ Liquid Limit
PL ◙ Plastic Limit
Wn ▲ Natural Water
10 20 30 40 50 60 70 80 90

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Sierra Geotechnical Group

BORING NO. 10
PAGE 1 OF 1
JOB.NO. P-785

PROJECT: La Aventura
LOCATION: Gurabo, PR
DESCRIPTION: J. Garcia APPROVED: C. Sierra
STATION:
HAMMER WT(lb): 140 DROP(in): 30 SIZE:
DEPTH OF WATER DRY ft. AFTER COMPLETION
____ ft. ____ HOURS AFTER COMPLETION

Boring Log

DATE STARTED: 01/18/08
DATE COMPLETED: 01/18/08
DRILL MACHINE: CME 45
DRILLER: P. Andino
GROUND ELEV.:
DEPTH OF HOLE(ft): 15

DEPTH (ft)	Blow 1 (0 - 6")	Blow 2 (6 - 12")	Blow 3 (12" - 18")	Blow 4 (18" - 24")	SPT N VALUE	Material Description	Symbol	RQD %	Wn	PL	LL	PI	qU (TSF)
5	5	10		15	Brown silty clay.			23.3					
10	6	8	10		18	Same as above.			27.2				
15	8	11	13		24	Same as above.			24.3				
	7	15	22		37	Brown silty clay, some weathered rock fragments.			15.2				
	18	30	30		60	Same as above.			18.8				
	16	32	50		82	Same as above.			7.4				
	15	28	30		58	Same as above.			6.2				
	21	30	50		80	Same as above.			9.3				
						End of boring.							

PROPERTIES VS. DEPTH
PI ◇ Plasticity Index
LL ● Liquid Limit
PL ■ Plastic Limit
Wn ▲ Natural Water
10 20 30 40 50 60 70 80 90

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Geotechnical Group Inc.

P.O. Box 2439, Guaynabo, P.R. 00970-2439

Ing Carlos R Sierra P.E.

Colegio de Ingenieros y
Agrimensores de Puerto Rico

Ingeniero Licenciado
Miembro en Propiedad
9007 P.E.

Ing. Carlos R Sierra Perez

Colegiación expira 31/08/2008

Lic # 9007

Feha Expiracion 08/31/2008

Departamento Del Estado

Estado Libre Asociado de Puerto Rico
Departamento de Estado
Secretaría Auxiliar de Juntas Examinadoras

certificamos que
Carlos R. Sierra Pérez
está autorizado a ejercer como
Ingeniero Licenciado
en Puerto Rico

Licencia Núm. 9007
Expedición: 6 octubre 2003
Expiración: 11 octubre 2008

Secretario Auxiliar

Presidente de la Junta

Fecha Expiracion 11 Octubre 2008