ADVANCED SOIL ENGINEERING

P.O. BOX 1313
ISABELA, P.R. 00662
TEL & FAX: 830 - 0366

FILE NO.	BORING NO.
410	7

CLIENT: AHV & ASSOCIATES
PROJECT: CORDECO DISCOVERY BAY & MARINA
LOCATION: ESPINAL WARD, AGUADA
GROUND LEVEL:
DATE STARTED: 02/15/02
DATE FINISH: 02/15/02
BORING TYPE: HOLLOW STEM AUGER
GROUND WATER DEPTH : **3.0 FT.**

DESCRIPTION	DEPTH FT.	WATER DEPTH	N VALUE	W	Qu	Qp	γ	ϕ	LL	PI
Gray sand some clayey silt										
			13	29						
	95									
			26	25						
	100									
END OF BORING										
	105									
	110									
	115									
	120									

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
LL = LIQUID LIMIT
PI = PLASTICITY INDEX

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
WH = WEIGHT OF HAMMER

ADVANCED SOIL ENGINEERING

P.O. BOX 1313
ISABELA, P.R. 00662
TEL & FAX: 830 - 0366

FILE NO.	BORING NO.
410	8

CLIENT: AHV & ASSOCIATES
PROJECT: CORDECO DISCOVERY BAY & MARINA
LOCATION: ESPINAL WARD, AGUADA
GROUND LEVEL:
DATE STARTED: 02/15/02
DATE FINISH: 02/15/02
BORING TYPE: HOLLOW STEM AUGER
GROUND WATER DEPTH : **2.0 FT.**

DESCRIPTION	DEPTH FT.	WATER DEPTH	N VALUE	W	Qu	Qp	γ	ϕ	LL	PI
Brown silty clay			2	25						
		▼								
Brownish gray silty clay trace sand			2	42						
	5		2	68						
			1	56						
			3	18						
	10									
Gray sand trace silt			30	20						
	15									
			52	21						
	20									
			39	18						
	25									
			45	20						
continue	30									

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
WH = WEIGHT OF HAMMER

ADVANCED SOIL ENGINEERING

P.O. BOX 1313
ISABELA, P.R. 00662
TEL & FAX: 830 - 0366

FILE NO.	BORING NO.
410	8

CLIENT: AHV & ASSOCIATES
PROJECT: CORDECO DISCOVERY BAY & MARINA
LOCATION: ESPINAL WARD, AGUADA
GROUND LEVEL:
DATE STARTED: 02/15/02
DATE FINISH: 02/15/02
BORING TYPE: HOLLOW STEM AUGER
GROUND WATER DEPTH : **2.0 FT.**

DESCRIPTION	DEPTH FT.	WATER DEPTH	N VALUE	W	Qu	Qp	γ	ϕ	LL	PI
Brownish gray sand trace silt										
			42	30						
	35									
			38	28						
	40									
END OF BORING										
	45									
	50									
	55									
	60									

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
WH = WEIGHT OF HAMMER

APPENDIX NO. 3

FIELD AND LABORATORY TESTING PROCEDURES

ADVANCED SOIL ENGINEERING
GEOTECHNICAL CONSULTING ENGINEERS
P.O. BOX 1313, ISABELA, PUERTO RICO 00662

APPENDIX NO. 3

FIELD AND LABORATORY TESTING PROCEDURES

FIELD TESTING

DRILLING

Auger Borings (ASTM D 1452). These are performed by turning a hollow-stem auger into the ground a short distance. As the auger advances into the ground, the cutting rise to the surface on the auger spirals, although the depth from which the material comes cannot be accurately determined. By using hollow-stem augers, samples can be recovered from the bottom of the auger, thus eliminating the need for driving casings.

Wash Borings. The wash boring process consist of driving a section of 2.5 inches casing into the ground by a drop-hammer operation, as in pile driving. After each length of casing has been driven the earth material inside the casing is cleaned out by a chopping and washing similar to jetting. This is accomplished by flowing water under pressure through rods or pipes which are operated inside the casing. A chisel shaped chopping bit is attached to the end of the rods, and the whole string alternatively is raised and chopped so that the resultant chopping and jetting action loosens the soil. The return flow of water bring the cuttings to the surface.

STANDARD PENETRATION TEST

Standard Penetration Test (SPT) and Split Barrel Sampling (ASTM D 1452). The samples are secured from the bottom of the cleaned hole by a 1.375 inches ID x 24 inches long split spoon samples. With the sampler in, resting on the bottom of the hole, it is driven with the drop of a 140 pounds hammer from a 30 inches height. The number of blows for every 6 inches of sampler penetration is recorded, and the number of blows between 6 and 18 inches of penetration is reported as the N-value. The N-value gives an indication of the consistency of cohesive soils and relative density of granular soils.

Undisturbed Sampling. Undisturbed samples are obtained with thin wall Shelby tube samplers, 3 inches OD by 30 inches long. The sampler is forced into the soil by static force or downward pressure and is pulled out also statically. These samplers are sealed in the field with wax and shipped to the laboratory. Samples are then extruded at the time of testing by pushing in the same direction that the samples penetrated the sampler. Special care is taken in handling these samples to minimize disturbance.

COHESIVE SOILS

N-Values Blows / ft.	Consistency	Unconfined Compressive Strength (tsf)
Less than 2	Very Soft	Less than 0.25
2 - 4	Soft	0.25 - 0.50
4 - 8	Medium	0.50 - 1.00
8 - 15	Stiff	1.00 - 2.00
15 - 30	Very Stiff	2.00 - 4.00
Over 30	Hard	Over 4.00

GRANULAR SOILS

N-Values Blows / ft.	Relative Density
0 - 5	Very Loose
5 - 10	Loose
10 - 30	Medium
30 - 50	Dense
Over 50	Very Dense

LABORATORY TESTING

Natural Moisture (Water) Content (ASTM D 2216). The natural moisture (water) content is determined by finding the quantity of water present in the natural condition and expressing it as a percentage of the dry weight of the solid soil particles of the sample. The water present in the sample is determined by subtracting the weight of the wet soil from the weight of the specimen after been oven dried in an oven at 110 °C for a minimum period of 16 hours.

Atterberg Limits (ASTM D 4318). These limits and related indices are commonly used in geotechnical engineering for soil identification and classification purposes. However, these are also empirically correlated to various parameters which are used for preliminary analyses. The procedure used to determine liquid and plastic limits are described in the referenced ASTM Standard.

Unconfined Compression Test (ASTM D 2166). The cohesive soil specimens obtained from split spoon samples can not be considered as undisturbed samples, nevertheless, the approximate unconfined compressive strength can be easily determined. Unconfined compressive strength tests were performed by subjecting suitable soil samples to axial loads until failure. The compressive strength is defined as the ratio of maximum axial load required to failure to the corrected area and is expressed in units of tons per square feet.

Description and Identification of Soils (ASTM D 2488). The description of soils include the color, type (gravel, sand, silt, clay, organic), consistency (if soil is fine-grained), size and roundness (if soil is coarse-grained) and some other special characteristics which can assist in the identification and classification of the soil. The latter are those recommended for field classification (dilatancy, dry strength, shine and toughness). To approximate the consistency of fine-grained soils (soft, medium, stiff, hard) a simple test is performed with the thumb. The description of coarse-grained soils (sands and gravels) include size (fine, medium, coarse) and roundness (angular, sub-angular, sub-round, round). The relative amount of coarse fractions in fine-grained soils is estimated by placing a representative sample of some 50 grams in a graduated cylinder filled with water. The mix is shaken and allowed to settle. Particles of a size larger than fine sand are visible to the naked eye, while silts and clays are not. In this manner, estimates of the relative amount of the coarse fractions are made and reported as:

Trace	*1 - 10%*
Some	*10 - 20%*
Gravelly, sandy	*20 - 35%*
And	*35 - 50%*

APPENDIX NO. 4

LABORATORY RESULTS

ADVANCED SOIL ENGINEERING
GEOTECHNICAL CONSULTING ENGINEERS
P.O. BOX 1213, ISABELA, PUERTO RICO 00662

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O BOX 1313
ISABELA, P.R. 00662

TEL: (787) 830-0366
CEL: (787) 376-8636

GRAIN SIZE DISTRIBUTION TEST DATA

Date : February 16, 2002
Client : AHV & Associates
Project : Cordeco Discovery Bay & Marina, Espinal Ward, Aguada

SAMPLE DATA

Location of sample : Boring No.1 (4'-8'), No.5 (8'-13') and No.6 (2'-6')
Sample description : Brownish gray and gray silty clay trace sand
Fineness Modulus : 0.1
USCS Class : MH Liquid limit : 50.7
AASHTO Class : A-7-6(26) Plasticity index : 23.3

NOTES

Remarks : Tested by : Eduardo Rodriguez

Checked by: Nelson Muñoz, P. E.

Fig. No. : 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	126.00	6.31
Tare	=	0.00	0.00
Dry sample weight	=	126.00	6.31
Minus # 200 from wash	=	94.99 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
1"	0.00	0.00	0.00	100.00
3/4"	0.00	0.00	0.00	100.00
1/2"	0.00	0.00	0.00	100.00
3/8"	0.00	0.00	0.00	100.00
No. 4	0.00	0.00	0.00	100.00
No. 8	0.04	0.03	0.03	99.97
No. 16	0.18	0.14	0.17	99.83
No. 30	1.16	0.92	1.10	98.90
No. 50	1.09	0.87	1.96	98.04
No. 100	1.58	1.25	3.21	96.79
No. 200	2.26	1.79	5.01	94.99

FRACTIONAL COMPONENTS

% + 75 mm = 0.00 % Gravel = 0.00 % Sand = 5.01 % Finer = 94.99

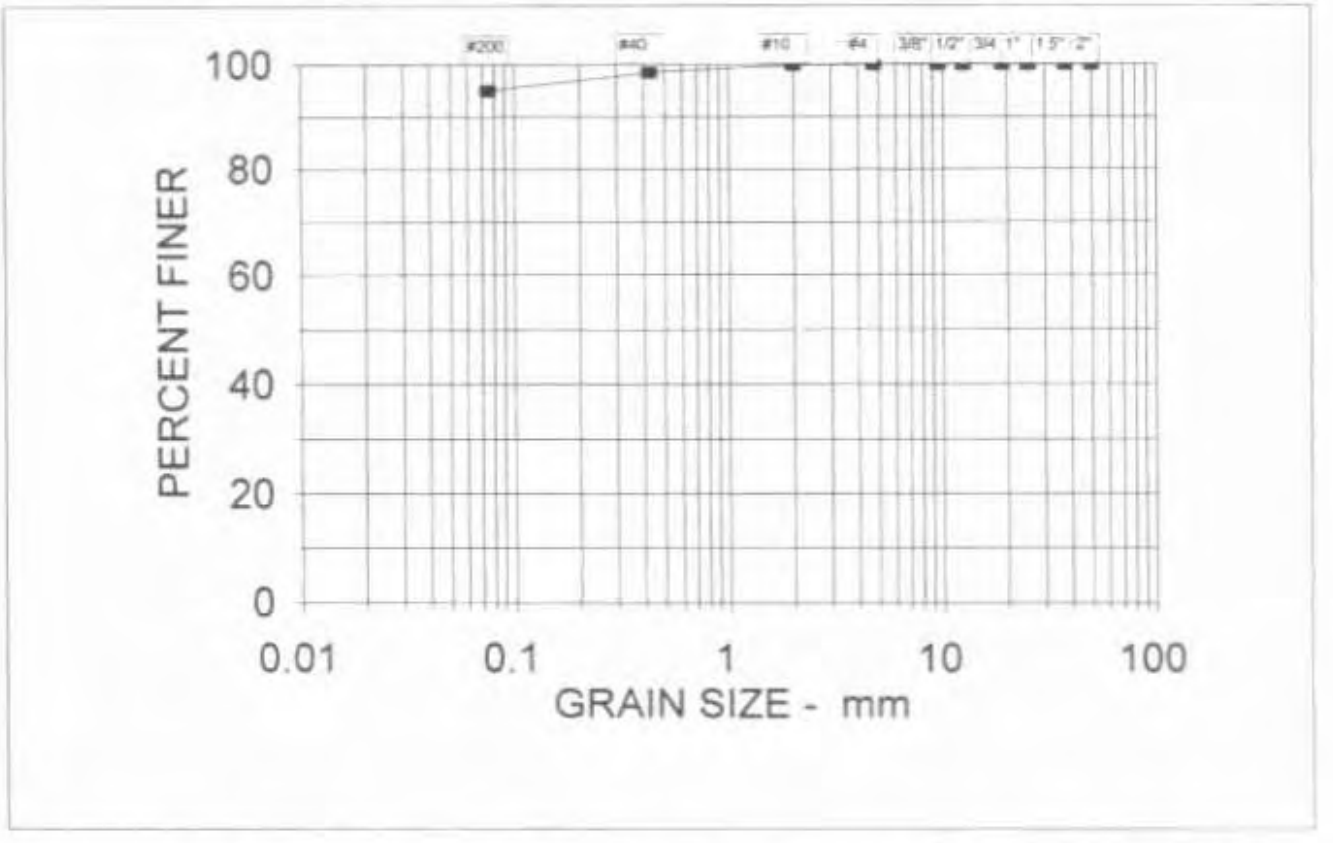
ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O BOX 1313
ISABELA, P.R. 00662

TEL: (787) 830-0366
CEL: (787) 376-8636

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 75 mm	% GRAVEL	% SAND	% SILT	% CLAY
0.00	0.00	5.01	94.99	

LL	PI	D85	D60	D50	D30	D15	D10	Cc	Cu
50.7	23.3								

MATERIAL DESCRIPTION	USCS	AASHTO
Brownish gray and gray silty clay trace sand	MH	A-7-6(26)

Client : AHV & Associates

Project : Cordeco Discovery Bay Resort & Marina, Espinal Ward, Aguada

Location : Boring No.1 (4'-8'), No.5 (8'-13') and No.6 (2'-6')

Remarks:

Tested by : Eduardo Rodriguez

Checked by : Nelson Muñoz, P.E.

Figure No. : 1

Date : February 16, 2002

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O BOX 1313
ISABELA, P.R. 00662

TEL: (787) 830-0366
CEL: (787) 376-8636

GRAIN SIZE DISTRIBUTION TEST DATA

Date : February 16, 2002
Client : AHV & Associates
Project : Cordeco Discovery Bay & Marina, Espinal Ward, Aguada

SAMPLE DATA

Location of sample : Boring No.1 (13'-28'), No.2 and No.5 (13'-23')
Sample description : Gray sand trace silt
Fineness Modulus : 2.8
USCS Class : SW Liquid limit : N/L
AASHTO Class : A-1-b Plasticity index : N/P

NOTES

Remarks Tested by : Eduardo Rodriguez

Checked by : Nelson Muñoz, P. E.

Fig. No. : 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	129.46	124.72
Tare	=	0.00	0.00
Dry sample weight	=	129.46	124.72
Minus # 200 from wash	=	3.66 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
1"	0.00	0.00	0.00	100.00
3/4"	0.00	0.00	0.00	100.00
1/2"	0.00	0.00	0.00	100.00
3/8"	0.00	0.00	0.00	100.00
No. 4	0.82	0.63	0.63	99.37
No. 8	10.27	7.93	8.57	91.43
No. 16	39.17	30.26	38.82	61.18
No. 30	28.89	22.32	61.14	38.86
No. 50	24.22	18.71	79.85	20.15
No. 100	13.25	10.23	90.08	9.92
No. 200	8.10	6.26	96.34	3.66

FRACTIONAL COMPONENTS

% + 75 mm = 0.00 % Gravel = 0.63 % Sand = 95.71 % Finer = 3.66

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O BOX 1313
ISABELA, P.R. 00662

TEL. (787) 830-0366
CEL. (787) 376-8636

GRAIN SIZE DISTRIBUTION TEST DATA

Date : February 16, 2002
Client : AHV & Associates
Project : Cordeco Discovery Bay & Marina, Espinal Ward, Aguada

SAMPLE DATA

Location of sample : Boring No.1 ('28-'40), No.2 (23'-40'), No.4 (23'-40') and No.6 (38'-60')
Sample description : Brownish gray sand trace silt
Fineness Modulus : 1.5
USCS Class : SP Liquid limit N/L
AASHTO Class : A-3 Plasticity inde: N/P

NOTES

Remarks Tested by : Eduardo Rodríguez

Checked by: Nelson Muñoz, P. E.

Fig. No. 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	774.46	743.29
Tare	=	0.00	0.00
Dry sample weight	=	774.46	743.29
Minus # 200 from wash	=	4.02 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
1"	0.00	0.00	0.00	100.00
3/4"	0.00	0.00	0.00	100.00
1/2"	0.00	0.00	0.00	100.00
3/8"	0.00	0.00	0.00	100.00
No. 4	0.51	0.07	0.07	99.93
No. 8	2.16	0.28	0.34	99.66
No. 16	9.18	1.19	1.53	98.47
No. 30	64.13	8.28	9.81	90.19
No. 50	264.89	34.20	44.01	55.99
No. 100	364.46	47.06	91.07	8.93
No. 200	37.96	4.90	95.98	4.02

FRACTIONAL COMPONENTS

% + 75 mm = 0.00 % Gravel = 0.07 % Sand = 95.91 % Finer = 4.02

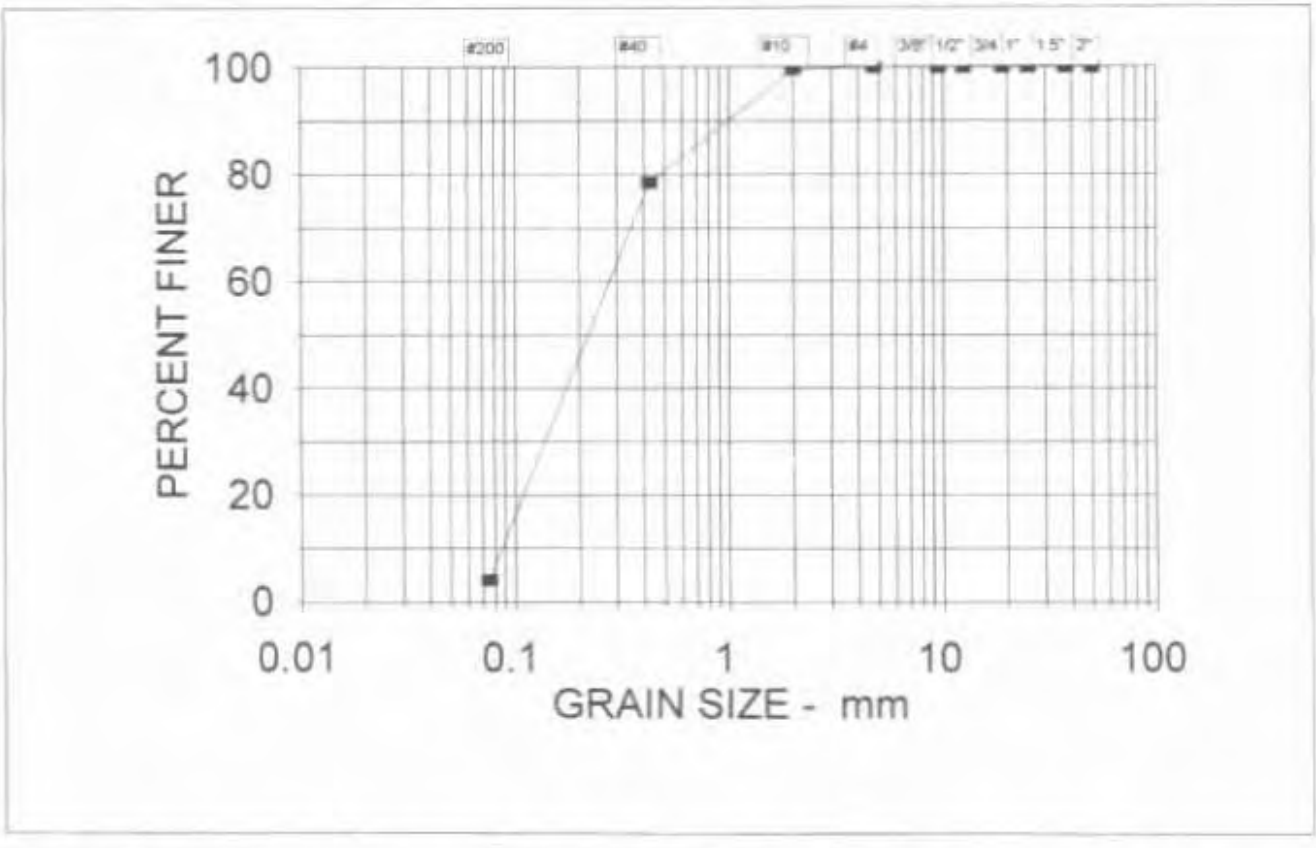
ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O BOX 1313
ISABELA, P.R. 00662

TEL. (787) 830-0366
CEL. (787) 376-8636

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 75 mm	% GRAVEL	% SAND	% SILT	% CLAY
0.00	0.07	95.91	4.02	

LL	PI	D85	D60	D50	D30	D15	D10	Cc	Cu
N/L	N/P	0.69	0.28	0.22	0.14	0.10	0.09	0.79	3.20

MATERIAL DESCRIPTION	USCS	AASHTO
Brownish gray sand trace silt	SP	A -3

Client : AHV & Associates

Project : Cordeco Discovery Bay Resort & Marina, Espinal Ward, Aguada

Location : Boring No.1 ('28-'40), No.2 (23'-40'), No.4 (23'-40') and No.6 (38'-60')

Remarks:

Tested by : Eduardo Rodriguez

Checked by : Nelson Muñoz, P.E.

Figure No. : 1

Date : February 16, 2002

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O BOX 1313
ISABELA, P.R. 00662

TEL: (787) 830-0366
CEL: (787) 376-8636

GRAIN SIZE DISTRIBUTION TEST DATA

Date : February 16, 2002
Client : AHV & Associates
Project : Cordeco Discovery Bay & Marina, Espinal Ward, Aguada

SAMPLE DATA

Location of sample : Boring No 3 (13'-40')
Sample description : Gray sand trace silt
Fineness Modulus : 2.0
USCS Class : SW Liquid limit : N/L
AASHTO Class : A-1-b Plasticity index : N/P

NOTES

Remarks : Tested by : Eduardo Rodríguez

Checked by: Nelson Muñoz, P. E.

Fig. No. 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	388.40	374.36
Tare	=	0.00	0.00
Dry sample weight	=	388.40	374.36
Minus # 200 from wash	=	3.61 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
1"	0.00	0.00	0.00	100.00
3/4"	0.00	0.00	0.00	100.00
1/2"	0.00	0.00	0.00	100.00
3/8"	0.00	0.00	0.00	100.00
No. 4	0.00	0.00	0.00	100.00
No. 8	0.67	0.17	0.17	99.83
No. 16	7.14	1.84	2.01	97.99
No. 30	95.40	24.56	26.57	73.43
No. 50	202.29	52.08	78.66	21.34
No. 100	57.00	14.68	93.33	6.67
No. 200	11.86	3.05	96.39	3.61

FRACTIONAL COMPONENTS

% + 75 mm = 0.00 % Gravel = 0.00 % Sand = 96.39 % Finer = 3.61

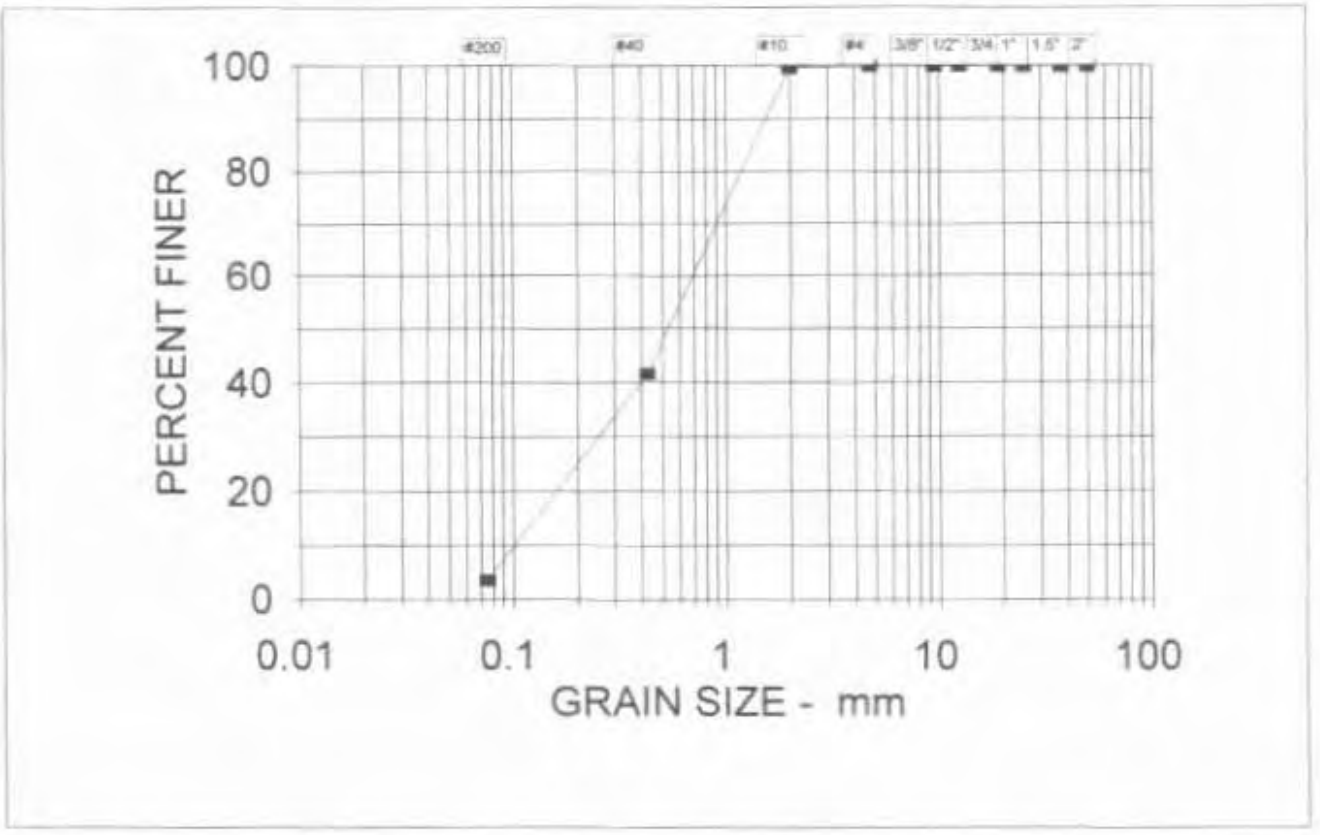
ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O BOX 1313
ISABELA, P.R. 00662

TEL: (787) 830-0366
CEL: (787) 376-8636

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 75 mm	% GRAVEL	% SAND	% SILT	% CLAY
0.00	0.00	96.39	3.61	

LL	PI	D85	D60	D50	D30	D15	D10	Cc	Cu
N/L	N/P	1.35	0.69	0.53	0.25	0.13	0.10	0.90	6.91

MATERIAL DESCRIPTION	USCS	AASHTO
Gray sand trace silt	SW	A -1-b

Client : AHV & Associates

Project : Cordeco Discovery Bay Resort & Marina, Espinal Ward, Aguada

Location : Boring No.3 (13'-40')

Remarks:

Tested by : Eduardo Rodriguez

Checked by : Nelson Muñoz, P.E.

Figure No. : 1

Date : February 16, 2002

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O BOX 1313
ISABELA, P.R. 00662

TEL: (787) 830-0366
CEL: (787) 376-8636

GRAIN SIZE DISTRIBUTION TEST DATA

Date : February 16, 2002
Client : AHV & Associates
Project : Cordeco Discovery Bay & Marina, Espinal Ward, Aguada

SAMPLE DATA

Location of sample : Boring No.6 (6'-35')
Sample description : Light brown sand trace silt
Fineness Modulus : 2.2
USCS Class : SW Liquid limit : N/L
AASHTO Class : A-1-b Plasticity inde: N/P

NOTES

Remarks Tested by : Eduardo Rodriguez

Checked by: Nelson Muñoz, P. E.

Fig. No. : 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	350.97	335.87
Tare	=	0.00	0.00
Dry sample weight	=	350.97	335.87
Minus # 200 from wash	=	4.30 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
1"	0.00	0.00	0.00	100.00
3/4"	0.00	0.00	0.00	100.00
1/2"	0.00	0.00	0.00	100.00
3/8"	0.00	0.00	0.00	100.00
No. 4	1.52	0.43	0.43	99.57
No. 8	3.29	0.94	1.37	98.63
No. 16	16.63	4.74	6.11	93.89
No. 30	115.97	33.04	39.15	60.85
No. 50	132.09	37.64	76.79	23.21
No. 100	58.00	16.53	93.31	6.69
No. 200	8.37	2.38	95.70	4.30

FRACTIONAL COMPONENTS

% + 75 mm = 0.00 % Gravel = 0.43 % Sand = 95.26 % Finer = 4.30

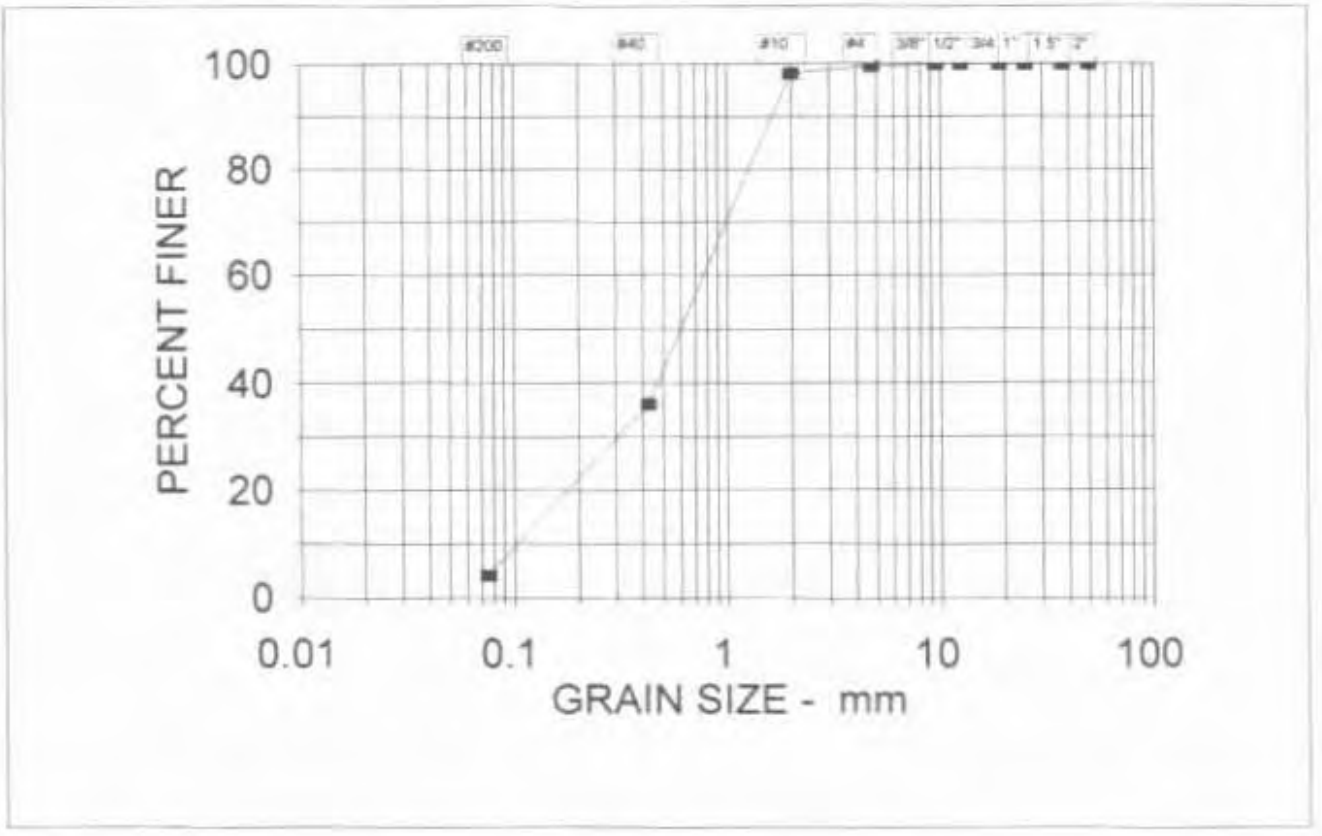
ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O BOX 1313
ISABELA, P.R. 00662

TEL: (787) 830-0366
CEL: (787) 376-8535

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 75 mm	% GRAVEL	% SAND	% SILT	% CLAY
0.00	0.43	95.26	4.30	

LL	PI	D85	D60	D50	D30	D15	D10	Cc	Cu
N/L	N/P	1.44	0.77	0.60	0.31	0.13	0.10	1.18	7.53

MATERIAL DESCRIPTION	USCS	AASHTO
Light brown sand trace silt	SW	A-1-b

Client : AHV & Associates

Project : Cordeco Discovery Bay Resort & Marina, Espinal Ward, Aguada

Location : Boring No.6 (6'-35')

Remarks:

Tested by : Eduardo Rodriguez

Checked by : Nelson Muñoz, P.E.

Figure No. : 1

Date : February 16, 2002

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERING
CONCRETE AND MATERIAL TESTING LABORATORIES

ON THE PRELIMINARY GEOTECHNICAL EXPLORATION PERFORMED AT THE SITE OF THE PROPOSED DISCOVERY BAY RESORT & MARINA, ESPINAR WARD, AGUADA, PUERTO RICO

SUBMITTED TO:

DISCOVERY BAY RESORT & MARINA

BY:

NELSON MUÑOZ, P.E.

ADVANCED SOIL ENGINEERING
GEOTECHNICAL CONSULTING ENGINEERS

JULY 30, 2007
FILE NO. 1061

P.O. BOX 1286 ISABELA, PR 00662 TEL / FAX: (787) 830 - 0366

ON THE PRELIMINARY GEOTECHNICAL EXPLORATION PERFORMED AT THE SITE OF THE PROPOSED DISCOVERY BAY RESORT & MARINA, ESPINAR WARD, AGUADA, PUERTO RICO

1.0 INTRODUCTION:

This report covers the results of a preliminary geotechnical exploration conducted at the site of the proposed Discovery Bay Resort & Marina, Espinar Ward, Aguada, Puerto Rico.

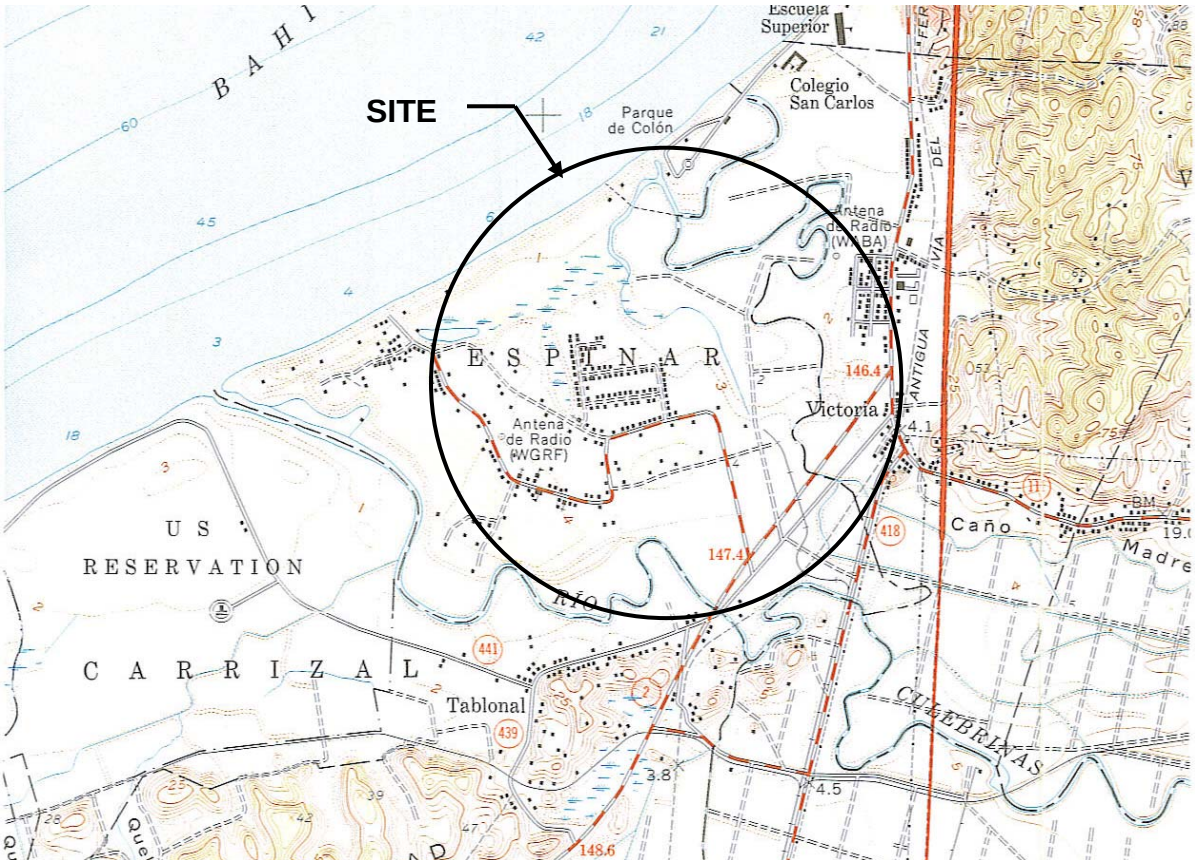
The object of the preliminary investigation was to obtain information regarding the existing geologic subsoil conditions at the site of the proposed development area.

This report has been prepared for the exclusive use of the owner, their designers and others involved in the construction and preparation of the plans and specifications of the project.

2.0 SITE LOCATION AND PROJECT DESCRIPTION:

The site of the proposed project is located at the intersection of PR 115 Km. 27.3 and PR 442, Espinar Ward, Aguada, Puerto Rico.

For a proper site location, see attached site location map.



SITE LOCATION MAP

3.0 SCOPE OF INVESTIGATION:

Field Exploration:

The preliminary field exploration consisted of drilling eleven (11) test borings along the proposed Discovery Bay Resort and Marina site. Test borings were drilled to depths varying from 40.0 to 100.0 ft with a total footage of 760.0 lin. ft.

The borings were performed using the wash boring (dry method) technique in accordance with ASTM D 1452. Samples were obtained using the "Standard Penetration Test (SPT)", as specified in ASTM D 1586.

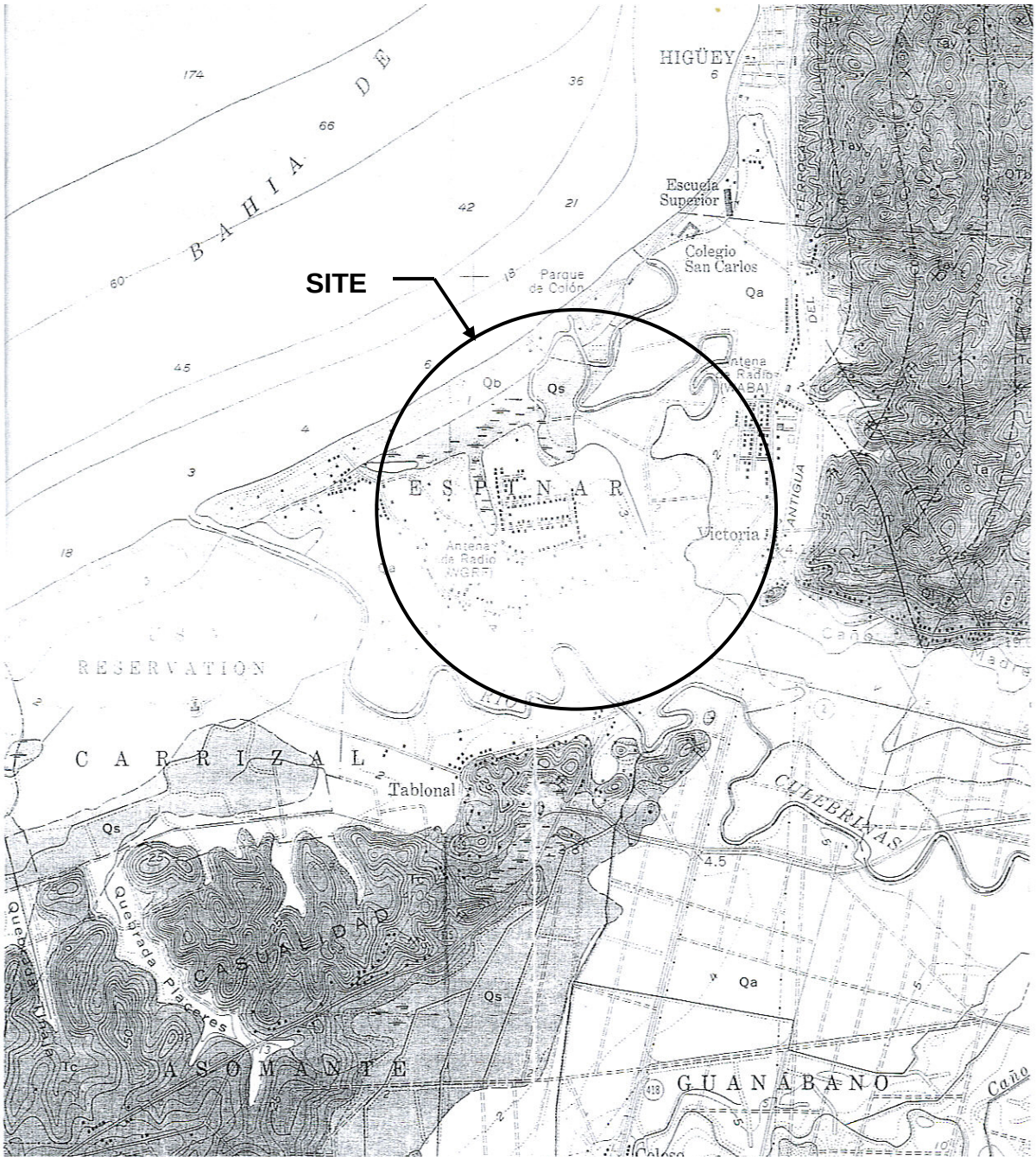
Please refer to ***Appendix No. 1 (Boring Location Map)****, for boring location.*

4.0 U.S. GEOLOGICAL SURVEY MAPS:

The Department of the Interior through its U.S. Geological Survey offices published a Geologic Map No. I-569 of the Aguadilla Quadrangle.

This was surveyed by Watson H. Monroe and published on 1969. The proposed project lies in a formation described as:

Qa – Alluvium: Clayey sand and sandy clay, containing scattered pebbles and cobbles of volcanic rocks in some areas; gently crossbedded and laminated.



U.S. GEOLOGICAL SURVEY MAP

Qb – Beach deposits: Quartz sand, shell fragments and scattered grains of other minerals resistant to weathereing; cementation to beach rock common; deposits inland from present shoreline covered by a thin blanket of sand blown from present beaches and dunes; gently crossbedded, generally dipping toward sea.

Qs – Swamp deposits: Sandy organic muck and peat.

5.0 PRELIMINARY FOUNDATION RECOMMENDATIONS:

Preliminary recommendations for the geotechnical aspects of the project are based on the subsoil study presented in this report. These office warranties that our recommendations are in the line with the generally accepted practice in the field of Soil Mechanics and Foundation Engineering. This is our only warranty, either expressed or implied.

The use of the subsoil information and preliminary recommendations herein detailed for other structures or areas, except when done by specialist, may lead to serious design errors and should not be attempted.

At the time of this report our project general analysis, evaluations and earthwork construction recommendations, have been formulated using preliminary drawings.

5.1 Building Structures Foundation Recommendation:

The preliminary general subsoil conditions as disclosed from the test boring drilled at the subject site consist of brown silty clay trace to some sand, sandy clay

with organic matter in some cases, extending to depths varying from 4.0 to 18.0 ft. below existing ground elevation.

Borings No.5, No.6, No.9, No. 10 and No.11 show a fill material composed of yellowish brown clayey limestone fragments some sand, which extends to depths varying from 8.0 to 28.0 ft. below existing ground elevation.

The above described silty clay and fill layers are resting over light brown and gray sand trace to some silt, sandy clay, sand some clayey silt that extends to depths varying from 40.0 to 58.0 ft.

Underlying the aforementioned stratum and extending to the end of the test holes, the exploratory work shows gray and black organic clay and organic silt trace sand, grayish brown clay some sand.

The ground water level of the explored site was encountered at depths varying from 6.0 to 20.0 ft. below actual ground elevation during the time of our field exploratory work. This ground water level varies in conformity with local variations of rainy and dry seasonal changes.

The above information corresponds to a general description of the subsoil conditions of the area, however, for detailed description regarding the soil profile, field and laboratory test results, please refer to ***Appendix No. 2 (Boring Logs).*** *For detailed description of the procedures followed for the drilling of the test borings and laboratory testing, please refer to* ***Appendix No. 3 (Field and Laboratory Testing Procedures)*** *and* ***Appendix No. 5 (Laboratory Testing Results)****.*

The findings of our preliminary subsoil exploration uncovered a man made fill deposit and a soft to very soft silty clay deposit at the uppermost 4.0 to 18.0 ft. and gray and black organic clay and organic silt trace sand, grayish brown clay some sand that extends to depths varying from 75.0 to 90.0 ft. resulting unfavorable material and the seat of settlements greater than those normally accepted in the standard of foundations design practice when stressed by the transmitted loads of additional fill and/or column footing located over it.

Under the above established site soil conditions, we have found that the existing fill and silty clay deposits are not competent geologic material to carry proposed structure foundations loads on conventional footing system. Therefore, we recommend the use of deep foundation as piles along the proposed buildable area to support the loads of the intended building structures.

5.1.1 Our Piling Recommendations:

A. The pile foundation shall consist of precast concrete sectional piles of circular or square section. Fuentes Concrete Pile as well as John Grazel Concrete Pile may be used for this project.

B. The design is to be based on a compression downward load capacity and uplift load capacity. This is shown on the table below.

Section		Compression (tons)	Tension (tons)
Square	12''	35	15
	10''	25	12
Circular	12''	30	13
	10''	20	10

C. ***The pile driving operations are to be preceded by the driving of at least one (1) test pile.*** *The test pile shall be selected from the pile clusters located nearer the boring location as indicated in the enclosed plan.*

The pile showing the least driving resistance will be selected for the performance of a pile load test. The piles may be stopped at refusal when they have penetrated two (2) consecutive feet into the weathered rock formation meeting a blow count of 100 blows per foot or proportionally for the last consecutive 2.0 ft.

The pile load test is recommended to determine the actual capacity of the piles in compression and the load test shall be made according to A.S.T.M. Designation D-1143.

D. *The piles shall be driven with a hammer size delivering the necessary pile driving energy, which we have estimated in the order of 18,000 ft. to 23,000 lbs/blow for 10 inches piles and 26,000 ft. to 32,000 lbs/blow for 12 inches piles to reach the above pile lengths but also the pile driving capacity used shall avoids any potential damage to the concrete piles as they driven to the specified depths.*

E. *It is advisable that the test piles be selected from the permanent foundation piles, which shall be driven initially as test piles. In no case, these test piles shall be considered as separate item of the pile foundation driven operation and rather as a field aid to detect forehand any possible variations in the subsoil resistance to the driving of the permanent pile foundation.*

F. The inspection personnel as well as the representative of the piles contractor may feel free to call us to assist them in the interpretation and evaluation of the test piles driving records and of the pile load test.

This technical assistance is directed to assure the use of a reliable field pile driving criteria for the project.

In the event that modification to grading is incorporated, we shall be consulted to evaluate the submitted pile lengths and provide recommendations to compensate for negative skin friction if deemed necessary.

5.2 Espinar Levee Recommendations:

The preliminary general subsoil conditions as disclosed from the test boring drilled at the subject site consist of brown silty clay trace to some sand, sandy clay with organic matter in some cases, extending to depths varying from 4.0 to 18.0 ft. below existing ground elevation.

Borings No.5, No.6, No.9 and No.11 show a fill material composed of yellowish brown clayey limestone fragments some sand, which extends to depths varying from 8.0 to 28.0 ft. below existing ground elevation.

The above described silty clay and fill layers are resting over light brown and gray sand trace to some silt, sandy clay, sand some clayey silt that extends to depths varying from 40.0 to 58.0 ft.

Underlying the aforementioned stratum and extending to the end of the test holes, the exploratory work shows gray and black organic clay and organic silt trace sand, grayish brown clay some sand.

The ground water level of the explored site was encountered at depths varying from 6.0 to 20.0 ft. below actual ground elevation during the time of our field exploratory work. This ground water level varies in conformity with local variations of rainy and dry seasonal changes.

The above information corresponds to a general description of the subsoil conditions of the area, however, for detailed description regarding the soil profile, field and laboratory test results, please refer to ***Appendix No. 2 (Boring Logs).*** *For detailed description of the procedures followed for the drilling of the test borings and laboratory testing, please refer to* ***Appendix No. 3 (Field and Laboratory Testing Procedures)*** *and* ***Appendix No. 5 (Laboratory Testing Results).***

5.2.1 Sheet Pile Wall Recommendations:

A sheet pile wall structure is been analyzed to construct the Espinar Levee. Steel sheet pile walls are widely used for that type of waterfront structures.

We recommend a steel sheet pile wall structure because it is the most common type used and have several advantages over other materials. Some of the advantages are relatively lightweight, resistant to high driving stresses, long service life either above or below water, easy to increase the pile length by either welding or bolting and many others.

The wall system at rest is to be acted by lateral pressure and the lateral earth pressure to act in the walls depends primarily in the type of earth material to be used as backfill. Accordingly, we wish to furnish preliminary soil parameter for computing the lateral pressure.

Type of Backfill	***Estimated angle of Internal Friction***	***Estimated Unit Weight lbs. / cu. ft.***	***Cohesion lbs. / sq. ft.***
In-situ soil	*28º - 32º*	*110 - 120*	*200 - 400*
Compacted borrow fill	*34º - 36º*	*120 - 130*	*neglect*

The material to be used as backfill has to be laboratory tested to verify soil parameters.

5.2.2 Retaining Wall Recommendation:

The results of our preliminary investigation show favorable subsoil conditions to erect the proposed retaining wall structure over deep pile foundation.

For detailed description of the recommendations for deep pile design, please follow the recommendation of the section ***5.1.1 Our Piling Recommendations.***

The foundation wall system at rest is to be acted by lateral pressure and the lateral earth pressure to act in the walls depends primarily in the type of earth material to be used as backfill. Accordingly, we wish to furnish the soil parameter for computing the lateral pressure.

Type of Backfill	***Estimated angle of Internal Friction***	***Estimated Unit Weight lbs. / cu. ft.***	***Cohesion lbs. / sq. ft.***
In-situ soil	*28º - 32º*	*110 - 120*	*200 - 400*
Compacted borrow fill	*34º - 36º*	*120 - 130*	*neglect*

The material to be used as backfill has to be laboratory tested to verify soil parameters.

5.3 Aguadilla Levee Recommendations:

The preliminary general subsoil conditions as disclosed from the test boring drilled at the subject site consist of brown and gray silty clay some sand, extending to a depth of 13.0 ft. below existing ground elevation.

The above described silty clay layer is resting over gray sand some silt, sand some clayey silt that extends to a depth of 23.0 ft.

Underlying the aforementioned stratum and extending to the end of the test holes, the exploratory work shows gray silty sand.

The ground water level of the explored site was encountered at a depth of 6.0 ft. below actual ground elevation during the time of our field exploratory work. This ground water level varies in conformity with local variations of rainy and dry seasonal changes.

The above information corresponds to a general description of the subsoil conditions of the area, however, for detailed description regarding the soil profile, field and laboratory test results, please refer to ***Appendix No. 2 (Boring Logs).*** *For detailed description of the procedures followed for the drilling of the test borings and laboratory testing, please refer to* ***Appendix No. 3 (Field and Laboratory Testing Procedure).***

The proposed Aguadilla Levee consists of an access road at the top and a levee embankment. The preliminary dimensions of the embankment are a maximum vertical height of approximately 3.5 meters and slope sides with a ratio of 2.5:1 (H:V).The width of the access road is in the order of 11.5 meters and the length is 1.8 kilometers approximately.

Some preliminary settlements calculations were performed using the estimated dimension of the proposed levee. The results of the settlements calculation indicate that the average settlements were in the order of 7.00 to 11.00 inches along the alignment.

5.3.1 Site Improvements:

The site preparation prior to any filling or construction operation is to consist of stripping the topsoil supporting any existing vegetation, shrubs, grasses, and

unstable material. Depth of topsoil removal should average one (1) feet, except where any other foreign matter exists that could require deeper removal.

Any weak spot uncovered shall be fully excavated and its space replaced in uncompacted layers not exceeding eight (8) inches and each lift be imparted with a minimum percent of compaction of 95% of the fill material maximum dry density as obtained from laboratory compaction test conducted according to ASTM Standard D-1157.

The removal of the topsoil shall be performed under the direct supervision of a geotechnical engineer or his representative. The aerial extent and depth of removal shall be established by the soil inspector at the field.

If any filling is needed to reach final floor elevation follow the recommendation of the section ***FILLING OPERATIONS AND COMPACTION SECTION.***

6.0 ADDITIONAL RECOMMENDATIONS:

Structure footings and/or slabs shall not be cast partly on fill and partly on cut; neither structure footings shall be cast over differential amounts of fill thickness exceeding three (3) feet. Areas presenting such grading conditions will need to be deepened in the order to reduce the difference in fill thickness to a maximum of three (3) feet.

Once the excavation of the footings is made, recompact the exposed footing base and final floor elevation ***following the procedures of FILLING OPERATIONS AND COMPACTION SECTION.***

All fill slopes shall be constructed for a geometry not steeper than 2:1 (H:V) regardless of it height and shall be also protected against gully and laminar erosion by providing proper drainage facilities. Fill slope shall be design with a positive drainage to avoid water running over sloping ground. ***Steeper fill slopes are not recommended.***

7.0 FILLING OPERATIONS AND COMPACTION:

The fill layers required to reach the final floor elevations and the levees construction shall be placed and compacted following the recommendations below:

1) *Remove all topsoil, vegetation existing on the area prior to start any filling operation.*

2) *Place the fill material in layers not exceeding eight (8) inches and each layer shall be imparted with a degree of compaction of 95 percent of the maximum dry density as obtained from the Modified Compaction Curve Test made according to ASTM D 1557.*

3) *The fill material shall consist of a non-expansive and inorganic soil material similar to a classification A-2-6.*

4) The placement and compaction of the fill layers shall be made under the direct supervision of a soils laboratory.

8.0 ADDITIONAL COMMENTS:

This subsoil exploration has been made on a preliminary basis, and should not be used for final design on account of the limited subsoil exploration program made with the purpose of having a general or preliminary information regarding the feasibility of the site for construction and grading purposes.

The deposit encountered as uncovered by the test borings not necessarily represent the most critical conditions. Consequently, we strongly recommend that a detailed subsoil exploration should be performed at each structure location after type of structure, loading conditions and grading have been established, so that the final recommendations can be submitted for design and construction.

At the time of this report our project general analysis, evaluations and earthwork construction recommendations, have been formulated using preliminary drawings.

All recommendations herein given are based on the spot checks which constitute the test borings made within the buildable area of the parcel and were considered as representative subsoil conditions which are/or might be present along the project.

However, the fact does not exclude the disclosures of a different one that those found, once the construction phase alerts.

Any abnormal condition encountered between borings during the over excavation and construction phase, shall be notified to the soils engineer for further evaluation and to make the pertinent recommendations.

9.0 LIMITATIONS OF THIS REPORT:

This is a preliminary report to be used to identify soil conditions and/or potential areas of concern.

Respectfully submitted,
ADVANCED SOIL ENGINEERING

NELSON MUÑOZ, P.E.

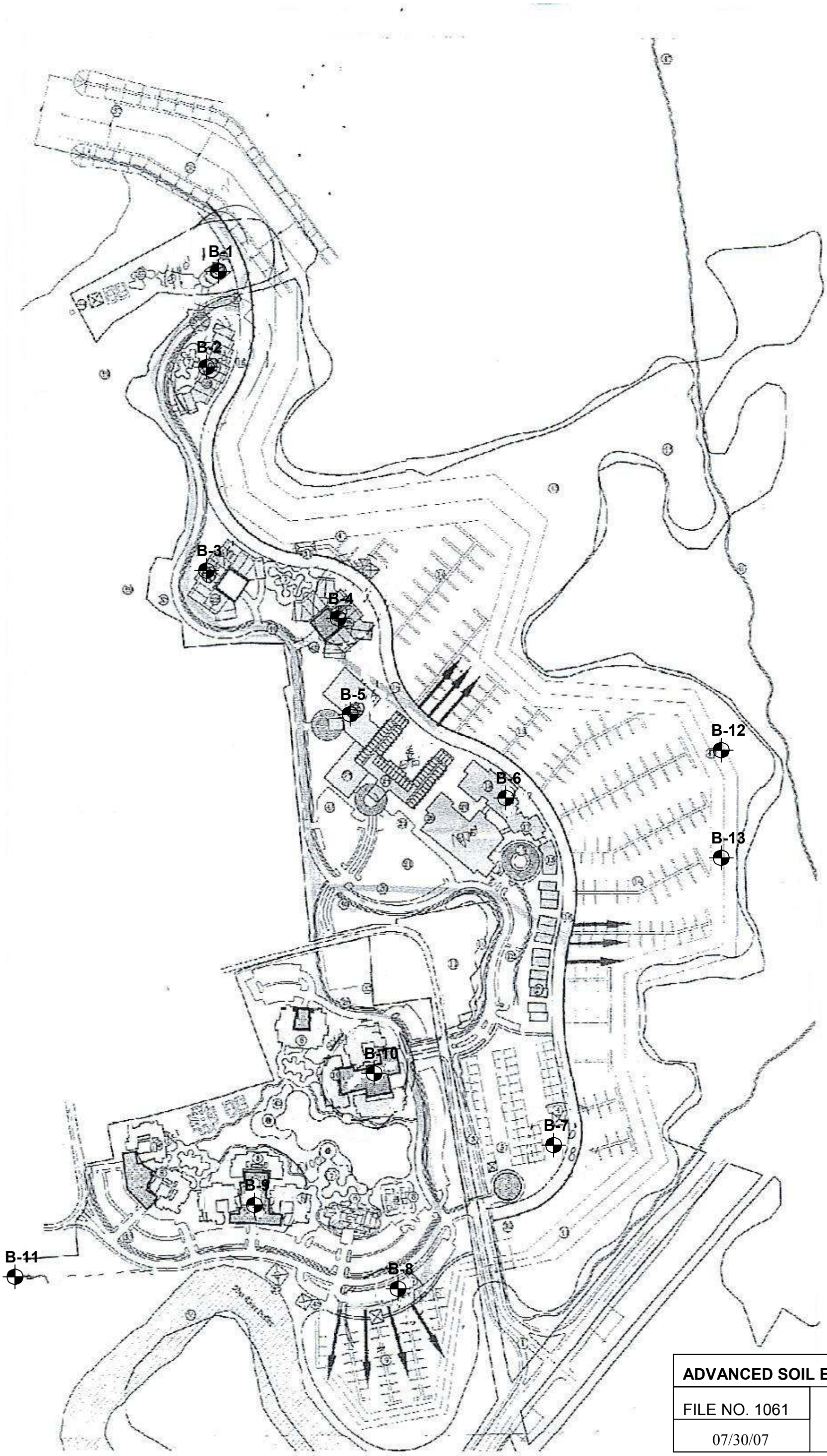
NELSON MUÑOZ GONZALEZ
INGENIERO
LICENCIADO
LIC. 14112
PUERTO RICO

File No. 1061
July 30, 2007

APPENDIX NO. 1

BORING LOCATION MAP

BORING LOCATION MAP



ADVANCED SOIL ENGINEERING	
FILE NO. 1061	
07/30/07	

BORING LOCATION

APPENDIX NO. 2

BORING LOGS

SUBSURFACE EXPLORATION LOG

A S E
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 1

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: -0.537 METERS
DATE STARTED: 06/08/07
DATE FINISH: 06/08/07
GROUND WATER DEPTH: 8.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
	■	SS-1	WH-WH-WH	WH		Brown silty clay trace sand		44						
	■	SS-2	WH-WH-WH	WH		As above.		75						
5	■	SS-3	WH - 1	1		Brown silty clay trace sand, organic matter		46						
	■	SS-4	1 - 2 - 4	6		Gray sand trace rock fragments-silt (traces of sea shell fragments)	SP	45					NL	NP
10	■	SS-5	1 - 1 - 2	3		As above.		25						
15	■	SS-6	3 - 2 - 3	5		As above.		20						
20	■	SS-7	4 - 3 - 5	8		As above.		22			110.0	28		
25	■	SS-8	6 - 7 - 9	16		As above.		20			110.0	30		
30	■	SS-9	8 - 7 - 7	14		As above.		28						
35	■	SS-10	6 - 6 - 6	18		As above, trace silt	SP-SM	24					NL	NP

continue

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 1

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: -0.537 METERS
DATE STARTED: 06/08/07
DATE FINISH: 06/08/07
GROUND WATER DEPTH: 8.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
						Gray sand trace rock fragments-silt (traces of sea shell fragments)								
	■	SS-11	9 - 8 - 9	17		As above.		24						
40						END OF BORING								
45														
50														
55														
60														
65														
70														

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. **1061**
BORING NO. **2**

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 1.115 METERS
DATE STARTED: 06/05/07
DATE FINISH: 06/05/07
GROUND WATER DEPTH: 6.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
	■	SS-1	2 - 3 - 4	7		Brown silty clay		38						
	■	SS-2	2 - 3 - 3	6		As above.		41	1.1	1.0	110.0			
5	■	SS-3	1 - 1 - 3	4		Gray sand trace silt-rock fragments	SW-SM	23					NL	NP
	■	SS-4	3 - 2 - 2	4		As above.		28						
10	■	SS-5	1 - 1 - 1	2		As above.		26						
15	■	SS-6	7 - 5 - 6	11		As above.		11			110.0	30		
20	■	SS-7	3 - 7 - 11	18		As above, trace silt	SP-SM	21					NL	NP
25	■	SS-8	8 - 10 - 13	23		As above.		22			115.0	32		
30	■	SS-9	7 - 9 - 12	21		As above.		25						
35	■	SS-10	10 - 9 - 11	20		As above.		23						

continue

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

A S E
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 3

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 1.155 METERS
DATE STARTED: 06/15/07
DATE FINISH: 06/16/07
GROUND WATER DEPTH: 10.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
						Grayish brown sand some silt trace rock fragments								
40	■	SS-11	6 - 4 - 12	16		As above.		23						
45	■	SS-12	5 - 7 - 8	15		As above.		30						
50	■	SS-13	7 - 6 - 6	12		As above.		26						
55	■	SS-14	5 - 4 - 5	9		Black and gray sandy clayey silt trace rock fragments some organic matter	OL	89			82.2		39.3	11.5
60	■	SS-15	3 - 4 - 5	9		As above.		52	1.2		104.1			
65	■	SS-16	3 - 5 - 6	11		As above.		67			96.1			
70	■	SS-17	4 - 5 - 6	11		Gray silty clay		37						

continue

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 3

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 1.155 METERS
DATE STARTED: 06/15/07
DATE FINISH: 06/16/07
GROUND WATER DEPTH: 10.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
						Gray silty clay								
		SS-18	6 - 8 - 7	15		As above.		35						
75						END OF BORING								
80														
85														
90														
95														
100														
105														

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 4

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 1.093 METERS
DATE STARTED: 05/18/07
DATE FINISH: 05/18/07
GROUND WATER DEPTH: 6.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	φ	LL	PI
	■	SS-1	1 - 1 - 3	4		Brown silty clay trace to some sand trace organiic matter		16						
	■	SS-2	5 - 5 - 3	8		As above.		54						
5	■	SS-3	WH-WH-WH	WH		Brown and gray silty clay trace organic matter		64		0.4				
	■	SS-4	WH-WH-WH	WH		As above.		69						
10	■	SS-5	WH-WH-WH	WH		As above, organic matter (Peat)		297						
15	■	SS-6	8 - 12 - 16	28		Gray sand trace silt	SP-SM	23			115.0	30	NL	NP
20	■	SS-7	5 - 7 - 6	13		As above.		20			110.0			
25	■	SS-8	6 - 8 - 10	18		As above.		22						
30	■	SS-9	14 - 12 - 16	28		As above.		23						
35	■	SS-10	11 - 15 - 20	35		As above.		24			120.0	32		

continue

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
φ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. **1061**
BORING NO. **4**

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 1.093 METERS
DATE STARTED: 05/18/07
DATE FINISH: 05/18/07
GROUND WATER DEPTH: 6.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
						Gray sand trace clay								
40	■	SS-11	12 - 17 - 21	38		As above.		25						
45	■	SS-12	11 - 9 - 11	20		As above.		24						
50	■	SS-13	7 - 8 - 11	19		As above.		25			110.0	32		
55	■	SS-14	6 - 8 - 7	15		As above.		35						
60	■	SS-15	3 - 5 - 7	12		Black and gray organic clay trace sand	OH	61		1.2			53.3	26.6
65	■	SS-16	WH-WH-WH-	WH		As above.		66						
70	■	SS-17	WH-WH-WH-	WH		As above.		63		0.5	97.5			

continue

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

A S E
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. **1061**
BORING NO. **4**

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 1.093 METERS
DATE STARTED: 05/18/07
DATE FINISH: 05/18/07
GROUND WATER DEPTH: 6.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
						Black and gray organic clay trace sand								
75	■	SS-18	3 - 4 - 5	9		As above.		63						
80	■	SS-19	5 -5 - 5	10		As above.		60		1.4	103.8			
85	■	SS-20	5 - 4 - 5	9		As above.		38						
90	■	SS-21	7 - 7 - 8	15		As above.		69		1.2				
95	■	SS-22	6 - 6 - 8	14		As above.		66						
100	■	SS-23	7 - 8 - 7	15		As above.		26						
						END OF BORING								
105														

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

A S E
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 5

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 0.296 METERS
DATE STARTED: 06/17/07
DATE FINISH: 06/18/07
GROUND WATER DEPTH: 20.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
	■	SS-1	3 - 3 - 4	7		Yellowish brown clayey rock fragments some sand	GC	14					36.0	19.5
	■	SS-2	1 - 2 - 1	3		As above.		10						
5	■	SS-3	1 - 1 - 1	2		As above.		12						
	■	SS-4	3 - 5 - 4	9		As above.		23						
10	■	SS-5	1 - 2 - 1	3		As above.		20						
15	■	SS-6	WH - 1 - WH	1		As above. (FILL)		28						
20	■	SS-7	2 - 1 - 1	2		Light brown sand trace silt		25						
25	■	SS-8	5 - 4 - 4	8		As above.		15						
30	■	SS-9	4 - 6 - 7	13		As above.		15						
35	■	SS-10	6 - 5 - 6	11		As above.		17						

continue

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. **1061**
BORING NO. **5**

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 0.296 METERS
DATE STARTED: 06/17/07
DATE FINISH: 06/18/07
GROUND WATER DEPTH: 20.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
						Grayish brown sand trace silt								
40	■	SS-11	5 - 5 - 5	10		As above.		34						
45	■	SS-12	7 - 6 - 5	11		As above.		29						
50	■	SS-13	5 - 8 - 13	21		As above.		29						
55	■	SS-14	8 - 11 - 14	25		As above.		36						
60	■	SS-15	4 - 4 - 6	10		Gray organic clay trace sand	OH	54	1.4	1.3	102.5		70.9	39.5
65	■	SS-16	5 - 4 - 5	9		Brownish gray silty clay		66	1.2	0.8	92.8			
70	■	SS-17	4 - 2 - 3	5		As above.		54	1.2	1.0	98.1			

continue

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 5

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 0.296 METERS
DATE STARTED: 06/17/07
DATE FINISH: 06/18/07
GROUND WATER DEPTH: 20.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
						Brownish gray silty clay								
75		SS-18	2 - 2 - 3	5		As above.		57	1.3	1.0	94.3			
						END OF BORING								
80														
85														
90														
95														
100														
105														

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 6

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 1.019 METERS
DATE STARTED: 06/14/07
DATE FINISH: 06/14/07
GROUND WATER DEPTH: 13.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
	■	SS-1	3- 2 - 3	5		Yellowish brown silty clay		31						
	■	SS-2	3 - 3 - 3	6		As above.		43	0.9	1.0	108.9			
5	■	SS-3	WH - 2 - 2	4		As above.		39		1.5				
	■	SS-4	WH-WH-WH	WH		As above. (FILL)		49	0.4	0.5	102.8			
10	■	SS-5	WH-WH-WH	WH		Brownish gray clayey silt	MH	64	0.4	0.5	102.8		55.3	23.9
15	■	SS-6	2 - 2 - 4	6		As above.		66	0.2		105.3			
20	■	SS-7	2 - 3 - 2	5		Gray sand trace silt		27						
25	■	SS-8	8 - 11 - 15	26		As above.		20						
30	■	SS-9	8 - 11 - 15	26		As above.		21						
35	■	SS-10	10 - 9 - 14	23		As above.		21						

continue

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 6

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 1.019 METERS
DATE STARTED: 06/14/07
DATE FINISH: 06/14/07
GROUND WATER DEPTH: 13.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
						Gray sand trace silt								
40	■	SS-11	6 - 4 - 6	10		As above.		31						
45	■	SS-12	7 - 9 - 7	16		As above.		33						
50	■	SS-13	8 - 10 - 9	19		Gray silty sand trace rock fragments	SM	23					NL	NP
55	■	SS-14	9 - 9 - 8	17		As above.		20		1.0				
60	■	SS-15	5 - 5 - 7	12		Black and gray organic silt trace sand	OH	111		1.8			60.3	28.6
65	■	SS-16	3 - 3 - 4	7		As above.		70	1.1	1.5	89.9			
70	■	SS-17	4 - 4 - 5	9		As above.		65	1.1	1.8	93.8			

continue

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. **1061**
BORING NO. **6**

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 1.019 METERS
DATE STARTED: 06/14/07
DATE FINISH: 06/14/07
GROUND WATER DEPTH: 13.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
						Black and gray orgnic silt trace sand								
	■	SS-18	2 - 2 - 3	5		As above.		70	1.5	1.5	100.4			
75														
	■	SS-19	WH-WH-WH	WH		As above.		62	0.9	1.0	100.4			
80														
						END OF BORING								
85														
90														
95														
100														
105														

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 7

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 2.668 METERS
DATE STARTED: 05/17/07
DATE FINISH: 05/17/07
GROUND WATER DEPTH: 6.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
	■	SS-1	3 - 2 - 3	5		Brown clayey sand		19						
	■	SS-2	2 - 3 - 2	5		As above.		20	1.1		118.0			
5	■	SS-3	10 - 7 - 7	14		Light brown sand trace rock fragments-silt	SM	20					NL	NP
	■	SS-4	3 - 5 - 6	11		As above.		19						
10	■	SS-5	6 - 7 - 8	15		As above.		18						
15	■	SS-6	2 - 4 - 5	9		As above.		19			110.0	28		
20	■	SS-7	5 - 5 - 7	12		As above.		14						
25	■	SS-8	6 - 5 - 7	12		As above.		21			112.0	30		
30	■	SS-9	9 - 11 - 11	22		As above.		19						
35	■	SS-10	8 - 11 - 9	20		As above.		19			120.0	33		

continue

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 7

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 2.668 METERS
DATE STARTED: 05/17/07
DATE FINISH: 05/17/07
GROUND WATER DEPTH: 6.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
						Light brown sand trace rock fragments-silt								
	■	SS-11	13 - 11 - 12	23		As above.		19						
40						END OF BORING								
45														
50														
55														
60														
65														
70														

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 8

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 3.039 METERS
DATE STARTED: 05/17/07
DATE FINISH: 05/17/07
GROUND WATER DEPTH: 20.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
	■	SS-1	2 - 2 - 3	5		Brown sand trace clay, limestone fragments		8						
	■	SS-2	9 - 6 - 6	12		Yellowish brown silty clay some limestone fragments trace sand		11						
5	■	SS-3	4 - 11 - 9	20		Brownish gray sand some limestone fragments		9						
	■	SS-4	3 - 3 - 3	6		Yellowish brown and bluish gray organic clay trace sand	OH	43	1.4		108.4		55.3	30.5
10	■	SS-5	WH-WH-WH	WH		As above.		52		0.5				
15	■	SS-6	WH-WH-WH	WH		As above.		50	0.4		104.6			
20	■	SS-7	8 - 12 - 11	23		Gray sand trace silt	SP-SW	32			115.0	32	NL	NP
25	■	SS-8	7 - 6 - 9	15		As above.		29						
30	■	SS-9	4 - 5 - 6	11		As above.		28			110.0	28		
35	■	SS-10	11 - 9 - 13	22		As above.		19						

continue

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 8

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 3.039 METERS
DATE STARTED: 05/17/07
DATE FINISH: 05/17/07
GROUND WATER DEPTH: 20.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
						Gray sand trace silt								
	■	SS-11	10 - 8 - 15	23		As above.		26						
40						END OF BORING								
45														
50														
55														
60														
65														
70														

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 9

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 3.294 METERS
DATE STARTED: 05/03/07
DATE FINISH: 05/03/07
GROUND WATER DEPTH: 10.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
	■	SS-1	3 - 18 - 18	36		Brown sandy silty clay some limestone fragments		8						
	■	SS-2	22 - 28 - 19	47		Yellowish brown clayey limestone fragments some sand	SC	10		3.5			36.0	19.5
5	■	SS-3	12 - 20 - 19	39		As above.		11		2.8				
	■	SS-4	9 - 12 - 17	29		As above.		10						
10	■	SS-5	4 - 2 - 2	4		As above.		9						
15	■	SS-6	4 - 3 - 3	6		As above.		15						
20	■	SS-7	3 - 2 - 2	4		As above.								
25	■	SS-8	2 - 2 - 3	5		As above. (FILL)		13						
30	■	SS-9	2 - 1 - 2	3		Light brown sand trace silt	SP	29					NL	NP
35	■	SS-10	4 - 4 - 7	11		As above.		20						

continue

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 9

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 3.294 METERS
DATE STARTED: 05/03/07
DATE FINISH: 05/03/07
GROUND WATER DEPTH: 10.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
						Light brown sand trace silt								
40	■	SS-11	6 - 7 - 8	15		As above.		21						
45	■	SS-12	3 - 2 - 4	6		As above.								
50	■	SS-13	3 - 3 - 4	7		Gray and bluish gray organic clay some sand	OL	66		0.8			48.9	23.7
55	■	SS-14	3 - 3 - 7	10		As above.		25						
60	■	SS-15	2 - 2 - 2	4		As above.		67		0.8				
65	■	SS-16	2 - 4 - 3	7		As above.		64		1.0				
70	■	SS-17	WH - 5 - 4	9		As above.		37	1.2	0.8	114.9			

continue

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 9

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 3.294 METERS
DATE STARTED: 05/03/07
DATE FINISH: 05/03/07
GROUND WATER DEPTH: 10.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
						Gray and bluish gray organic clay some sand								
75	■	SS-18	4 - 4 - 6	10		As above.		25	1.3	0.8	115.5			
80	■	SS-19	5 - 6 - 11	17		Yellowish brown and light gray sand with silt	SM	37	3.3	2.0	123.8		NL	NP
85	■	SS-20	7 - 9 - 13	22		As above.		36	2.7	2.3	120.3			
90	■	SS-21	6 - 6 - 9	15		As above.		36	2.6	2.0	119.7			
95	■	SS-22	7 - 7 - 10	17		As above.		32	2.5	1.8	116.9			
100	■	SS-23	8 - 9 - 11	20		As above.		36	2.7		106.3			
						END OF BORING								
105														

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

A S E
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 10

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 3.502 METERS
DATE STARTED: 05/02/07
DATE FINISH: 05/02/07
GROUND WATER DEPTH: 13.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
	■	SS-1	9 - 8 - 5	13		Yellowish brown clayey limestone fragments some sand		10		3.8				
	■	SS-2	19 - 11 - 7	18		As above.		8		4.3				
5	■	SS-3	5 - 4 - 5	9		As above.		24		4.0				
	■	SS-4	7 - 6 - 7	13		As above.		13		1.5				
10	■	SS-5	3 - 1 - 3	4		As above.		15						
15	■	SS-6	2 - 1 - 1	2		As above.		19						
20	■	SS-7	2 - 1 - 1	2		As above.		17						
25	■	SS-8	3 - 2 - 2	4		As above. (FILL)		23						
30	■	SS-9	5 - 4 - 4	8		Light brown sand trace silt	SP	22					NL	NP
35	■	SS-10	5 - 6 - 10	16		As above.		29						

continue

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 10

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 3.502 METERS
DATE STARTED: 05/02/07
DATE FINISH: 05/02/07
GROUND WATER DEPTH: 13.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
						Light brown sand trace silt								
40	■	SS-11	11 - 9 - 14	23		Gray sand trace to some clayey silt		28						
45	■	SS-12	2 - 5 - 8	13		As above.		29						
50	■	SS-13	6 -9 - 11	20		As above.		32						
55	■	SS-14	5 - 4 - 7	11		Grayish brown clay some sand	CL	39		1.5			47.6	23.4
60	■	SS-15	5 - 4 - 8	12		As above.		35	3.8	2.5	114.3			
65	■	SS-16	6 - 6 - 7	13		As above.		33	1.5	1.3	122.0			
70	■	SS-17	5 - 5 - 8	13		As above.		36	1.5	0.8	118.8			

continue

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 10

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION: 3.502 METERS
DATE STARTED: 05/02/07
DATE FINISH: 05/02/07
GROUND WATER DEPTH: 13.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
						Grayish brown clay some sand								
	■	SS-18	8 - 7 - 10	17		As above.		36	1.9	1.0	122.3			
75						END OF BORING								
80														
85														
90														
95														
100														
105														

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 11

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION:
DATE STARTED: 06/19/07
DATE FINISH: 06/19/07
GROUND WATER DEPTH: 12.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
	■	SS-1	1 - 2 - 3	5		Yellowish brown silty clay some limestone fragments trace sand		13						
	■	SS-2	10 - 7 - 8	15		As above.		15						
5	■	SS-3	2 - 6 - 2	8		As above.		20						
	■	SS-4	1 - 1 - 1	2		As above.		19						
10	■	SS-5	WH - 1 - 1	2		As above.		27						
15	■	SS-6	WH - 1 - 2	3		As above. (FILL)		23						
20	■	SS-7	2 - 1 - 2	3		Light brown sand trace silt		20						
25	■	SS-8	2 - 3 - 2	5		As above.		21						
30	■	SS-9	3 - 2 - 2	4		Light brown and gray silty clay trace sand	CH	26					60.5	35.0
35	■	SS-10	2 - 2 - 3	5		As above.		37						

continue

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 11

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION:
DATE STARTED: 06/19/07
DATE FINISH: 06/19/07
GROUND WATER DEPTH: 12.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
						Light brown and gray silty clay trace sand								
	■	SS-11	3 - 3 - 2	5		As above.		33						
40						END OF BORING								
45														
50														
55														
60														
65														
70														

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

A S E
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. **1061**
BORING NO. **12**

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION:
DATE STARTED: 02/13/02
DATE FINISH: 02/13/02
GROUND WATER DEPTH: 6.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
	■	SS-1	3 - 3 - 3	6		Brown silty clay		32						
	■	SS-2	7 - 6 - 6	12		As above.		42						
5	■	SS-3	3 - 2 - 2	4		As above.		50						
	■	SS-4	2 - 1 - 1	2		As above.		57						
	■	SS-5	1 - 2 - 3	5		As above.		49						
10														
	■	SS-6	3 - 2 - 3	5		Gray sand some silt		35						
15														
	■	SS-7	4 - 6 -12	18		As above.		31						
20														
	■	SS-8	7 - 10 - 6	16		Gray silty sand		27						
25														
	■	SS-9	8 - 12 - 26	38		As above.		23						
30														
	■	SS-10	6 - 30 - 33	63		As above.		22						
35														

continue

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

ASE
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. 1061
BORING NO. 12

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION:
DATE STARTED: 02/13/02
DATE FINISH: 02/13/02
GROUND WATER DEPTH: 6.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
						Gray silty sand								
	■	SS-11	15 - 12 - 17	29		As above.		19						
40						END OF BORING								
45														
50														
55														
60														
65														
70														

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

A S E
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. **1061**
BORING NO. **13**
PAGE 1 OF 2

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION:
DATE STARTED: 02/12/02
DATE FINISH: 02/12/02
GROUND WATER DEPTH: 6.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
		SS-1	3 - 4 - 5	9		Brown silty clay some sand		21						
		SS-2	4 - 2 - 2	4		As above.		15						
5		SS-3	1 - 1 - 1	2		As above.		40						
		SS-4	1 - 1 - 1	2		As above.		47						
		SS-5	1 - 1 - 1	2		Gray silty clay		44						
10														
		SS-6	4 - 9 - 10	19		Gray sand some clayey silt		21						
15														
		SS-7	5 - 10 - 9	19		As above.		21						
20														
		SS-8	6 - 2 - 12	2		Gray silty sand		23						
25														
		SS-9	34 - 50 - 6	77		As above.		23						
30														
		SS-10	10 - 9 - 5	14		As above.		23						
35						continue								

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

SUBSURFACE EXPLORATION LOG

A S E
ADVANCED SOIL ENGINEERING
P.O. BOX 1286
ISABELA, P.R. 00662
TEL & FAX: (787) 830 - 0366

FILE NO. **1061**
BORING NO. **13**

CLIENT: CORDECO NORTHWEST, CORP.
PROJECT: DISCOVERY BAY RESORT & MARINA
LOCATION: AGUADA, PUERTO RICO
GROUND ELEVATION:
DATE STARTED: 02/12/02
DATE FINISH: 02/12/02
GROUND WATER DEPTH: 6.0 FT.

DRILLER: M. RASUK
LAB. TECH: E. RODRIGUEZ
BORING TYPE: AUGER
BORING DIAMETER: 4"

DEPTH (FT)	SAMPLER	SAMPLE NO.	BLOWS / 6"	SPT N VALUE	SYMBOL	VISUAL - MANUAL DESCRIPTION	USCS CLASS	W (%)	Qu	Qp	γ	ϕ	LL	PI
						Gray silty sand								
		SS-11	11 - 9 - 4	13		As above.		26						
40						END OF BORING								
45														
50														
55														
60														
65														
70														

N = BLOWS DELIVERED PER FOOT BY A 140 LB. HAMMER FALLING 30 INCHES
W = NATURAL MOISTURE CONTENT - %
Qu = UNCONFINED COMPRESSIVE STRENGTH - T.S.F.
Qp = CALIBRATED PENETROMETER READING - T.S.F.
WH = WEIGHT OF HAMMER
SYMBOL (SEE APPENDIX NO.4 FOR MORE DETAILS)

γ = ESTIMATED UNIT WEIGHT - P.C.F.
ϕ = ANGLE OF INTERNAL FRICTION - DEGREES
LL = LIQUID LIMIT
PI = PLASTICITY INDEX
(*) ELEVATIONS TAKEN FROM PLANS PREPARED BY DESIGNER

APPENDIX NO. 3

FIELD AND LABORATORY TESTING PROCEDURES

APPENDIX NO. 3

FIELD AND LABORATORY TESTING PROCEDURES

FIELD TESTING

DRILLING

Auger Borings (ASTM D 1452). These are performed by turning a hollow-stem auger into the ground a short distance. As the auger advances into the ground, the cutting rise to the surface on the auger spirals, although the depth from which the material comes cannot be accurately determined. By using hollow-stem augers, samples can be recovered from the bottom of the auger, thus eliminating the need for driving casings.

Wash Borings. The wash boring process consist of driving a section of 2.5 inches casing into the ground by a drop-hammer operation, as in pile driving. After each length of casing has been driven the earth material inside the casing is cleaned out by a chopping and washing similar to jetting. This is accomplished by flowing water under pressure through rods or pipes which are operated inside the casing. A chisel shaped chopping bit is attached to the end of the rods, and the whole string alternatively is raised and chopped so that the resultant chopping and jetting action loosens the soil. The return flow of water bring the cuttings to the surface.

STANDARD PENETRATION TEST

Standard Penetration Test (SPT) and Split Barrel Sampling (ASTM D 1452). The samples are secured from the bottom of the cleaned hole by a 1.375 inches ID x 24 inches long split spoon samples. With the sampler in, resting on the bottom of the hole, it is driven with the drop of a 140 pounds hammer from a 30 inches height. The number of blows for every 6 inches of sampler penetration is recorded, and the number of blows between 6 and 18 inches of penetration is reported as the N-value. The N-value gives an indication of the consistency of cohesive soils and relative density of granular soils.

Undisturbed Sampling. Undisturbed samples are obtained with thin wall Shelby tube samplers, 3 inches OD by 30 inches long. The sampler is forced into the soil by static force or downward pressure and is pulled out also statically. These samplers are sealed in the field with wax and shipped to the laboratory. Samples are then extruded at the time of testing by pushing in the same direction that the samples penetrated the sampler. Special care is taken in handling these samples to minimize disturbance.

COHESIVE SOILS

N-Values Blows / ft.	Consistency	Unconfined Compressive Strength (tsf)
Less than 2	Very Soft	Less than 0.25
2 - 4	Soft	0.25 - 0.50
4 - 8	Medium	0.50 - 1.00
8 - 15	Stiff	1.00 - 2.00
15 - 30	Very Stiff	2.00 - 4.00
Over 30	Hard	Over 4.00

GRANULAR SOILS

N-Values Blows / ft.	Relative Density
0 - 5	Very Loose
5 - 10	Loose
10 - 30	Medium
30 - 50	Dense
Over 50	Very Dense

LABORATORY TESTING

Natural Moisture (Water) Content (ASTM D 2216). The natural moisture (water) content is determined by finding the quantity of water present in the natural condition and expressing it as a percentage of the dry weight of the solid soil particles of the sample. The water present in the sample is determined by subtracting the weight of the wet soil from the weight of the specimen after been oven dried in an oven at 110 ºC for a minimum period of 16 hours.

Atterberg Limits (ASTM D 4318). These limits and related indices are commonly used in geotechnical engineering for soil identification and classification purposes. However, these are also empirically correlated to various parameters which are used for preliminary analyses. The procedure used to determine liquid and plastic limits are described in the referenced ASTM Standard.

Unconfined Compression Test (ASTM D 2166). The cohesive soil specimens obtained from split spoon samples can not be considered as undisturbed samples, nevertheless, the approximate unconfined compressive strength can be easily determined. Unconfined compressive strength tests were performed by subjecting suitable soil samples to axial loads until failure. The compressive strength is defined as the ratio of maximum axial load required to failure to the corrected area and is expressed in units of tons per square feet.

Description and Identification of Soils (ASTM D 2488). The description of soils include the color, type (gravel, sand, silt, clay, organic), consistency (if soil is fine-grained), size and roundness (if soil is coarse-grained) and some other special characteristics which can assist in the identification and classification of the soil. The latter are those recommended for field classification (dilatancy, dry strength, shine and toughness). To approximate the consistency of fine-grained soils (soft, medium, stiff, hard) a simple test is performed with the thumb. The description of coarse-grained soils (sands and gravels) include size (fine, medium, coarse) and roundness (angular, sub-angular, sub-round, round). The relative amount of coarse fractions in fine-grained soils is estimated by placing a representative sample of some 50 grams in a graduated cylinder filled with water. The mix is shaken and allowed to settle. Particles of a size larger than fine sand are visible to the naked eye, while silts and clays are not. In this manner, estimates of the relative amount of the coarse fractions are made and reported as:

Trace	*1 - 10%*
Some	*10 - 20%*
Gravelly, sandy	*20 - 35%*
And	*35 - 50%*

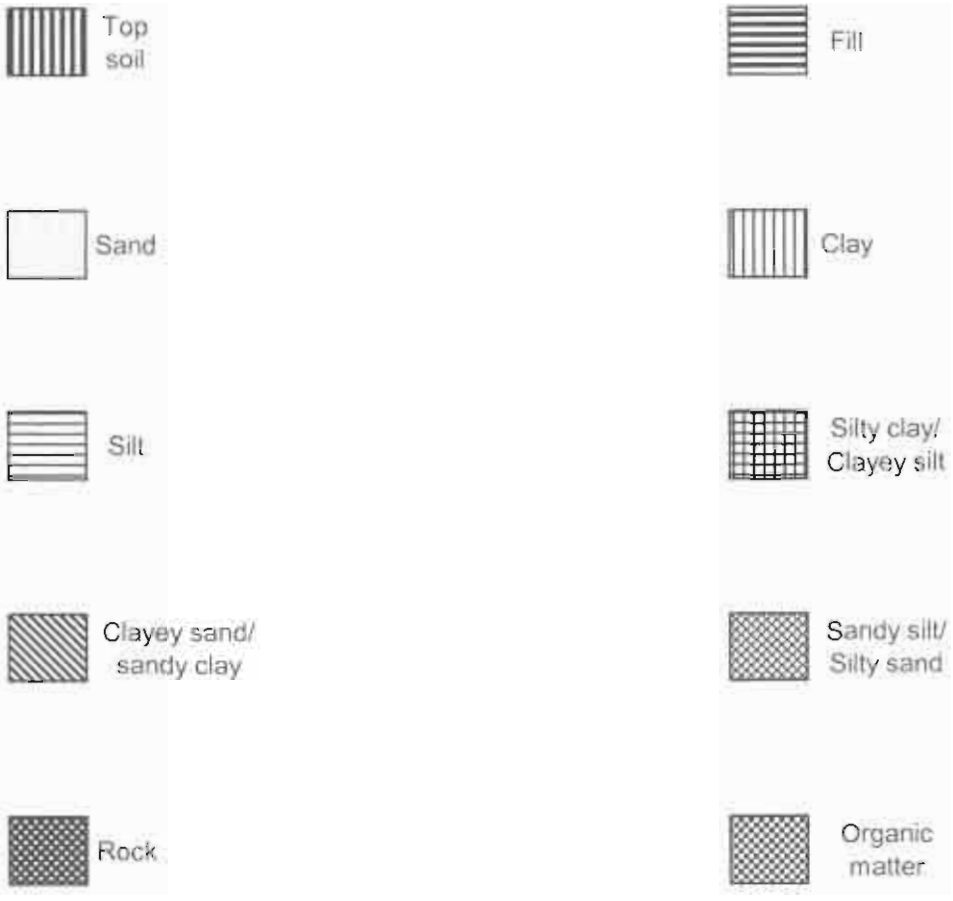
APPENDIX NO. 4

GEOLOGIC LEGEND

APPENDIX NO. 4

GEOLOGIC LEGEND

SYMBOLS



ADVANCED SOIL ENGINEERING
GEOTECHNICAL CONSULTING ENGINEERS
P.O. BOX 1286, ISABELA, PUERTO RICO 00662

APPENDIX NO. 5

LABORTAROY TEST RESULTS

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX : (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST DATA

Date : July 19, 2007
Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR

SAMPLE DATA

Location of sample : Boring No.1 (8' - 33')
Sample description : Gray sand trace rock fragments-silt
USCS Class : SP Liquid Limit : N.L.
AASHTO Class : A-1-b Plasticity Index : N.P.

NOTES

Remaks : Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.
Fig. No. : 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	254.60	243.70
Tare	=	0.00	0.00
Dry sample weight	=	254.60	243.70
Minus # 200 from wash	=	4.28 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
2 1/2"	0.00	0.00	0.00	100.00
2"	0.00	0.00	0.00	100.00
1 1/2"	0.00	0.00	0.00	100.00
1"	0.00	0.00	0.00	100.00
3/4"	0.00	0.00	0.00	100.00
1/2"	0.00	0.00	0.00	100.00
3/8"	2.60	1.02	1.02	98.98
No. 4	20.10	7.89	8.92	91.08
No. 10	58.60	23.02	31.93	68.07
No. 40	156.60	61.51	93.44	6.56
No. 200	5.80	2.28	95.72	4.28

FRACTIONAL COMPONENTS

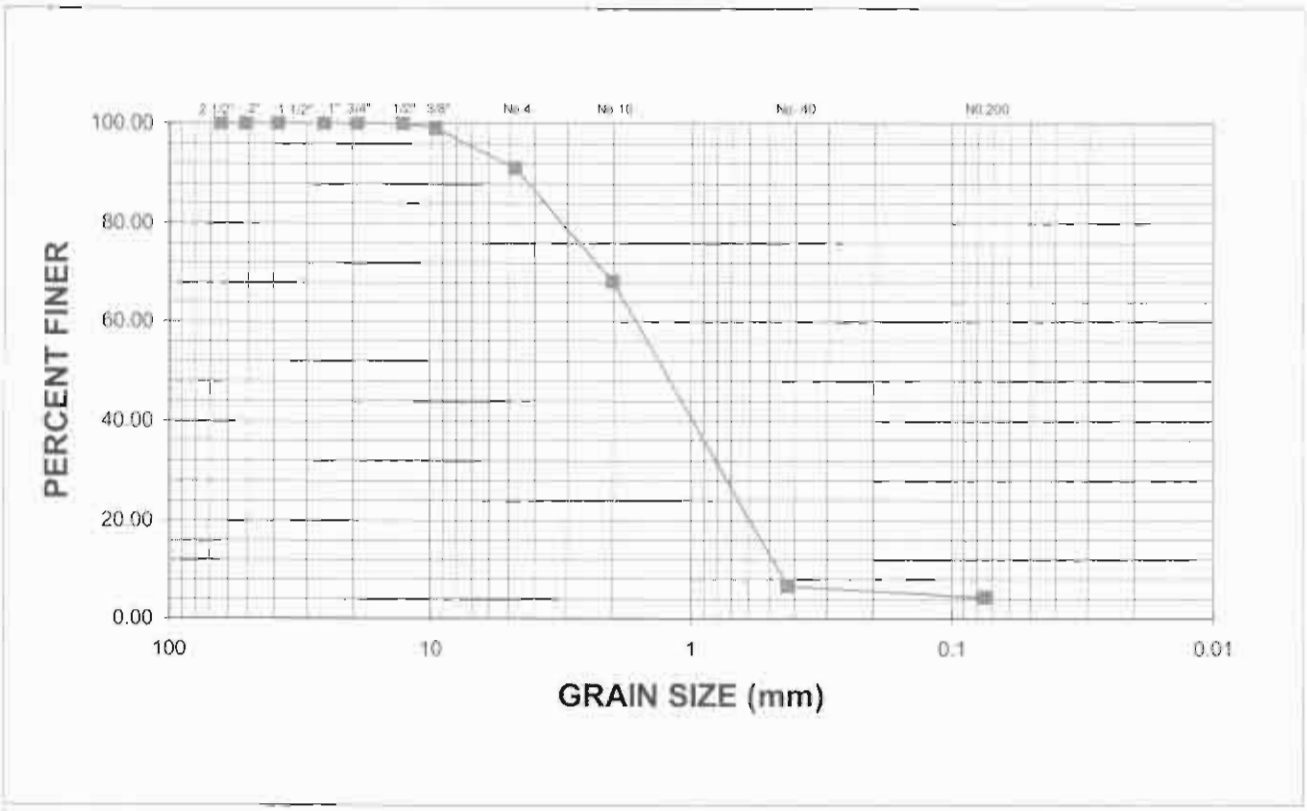
% + 75 mm 0.00 % Gravel = 8.92 % Sand = 86.80 % Finer = 4.28

ADVANCED SOIL ENGINEERING
GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX: (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 75 mm	% GRAVEL	% SAND	% SILT	% CLAY
0.00	8.92	86.80	4.28	

LL	PI	D85	D60	D50	D30	D15	D10	Cc	Cu
N.L.	N.P.	3.78	1.63	1.27	0.77	0.53	0.46	0.78	3.52

MATERIAL DESCRIPTION	USCS	AASHTO
Gray sand trace rock fragments-silt	SP	A-1-b

Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR
Location : Boring No.1 (8' - 33')

Remarks :

Tested by :	Eduardo Rodriguez	Figure No.	:	1
Checked by :	Nelson Muñoz, P.E.	Date	:	July 19, 2007

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX : (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST DATA

Date : July 19, 2007
Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR

SAMPLE DATA

Location of sample : Boring No.1 (33' - 40'), Boring No.2 (18' - 43')
Sample description : Gray sand trace silt
USCS Class : SP-SM Liquid Limit : N.L.
AASHTO Class : A-3 Plasticity Index : N.P.

NOTES

Remaks : Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.
Fig. No. : 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	229.10	216.90
Tare	=	0.00	0.00
Dry sample weight	=	229.10	216.90
Minus # 200 from wash	=	5.33 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
2 1/2"	0.00	0.00	0.00	100.00
2"	0.00	0.00	0.00	100.00
1 1/2"	0.00	0.00	0.00	100.00
1"	0.00	0.00	0.00	100.00
3/4"	0.00	0.00	0.00	100.00
1/2"	0.00	0.00	0.00	100.00
3/8"	0.00	0.00	0.00	100.00
No. 4	0.00	0.00	0.00	100.00
No. 10	1.00	0.44	0.44	99.56
No. 40	25.10	10.96	11.39	88.61
No. 200	190.80	83.28	94.67	5.33

FRACTIONAL COMPONENTS

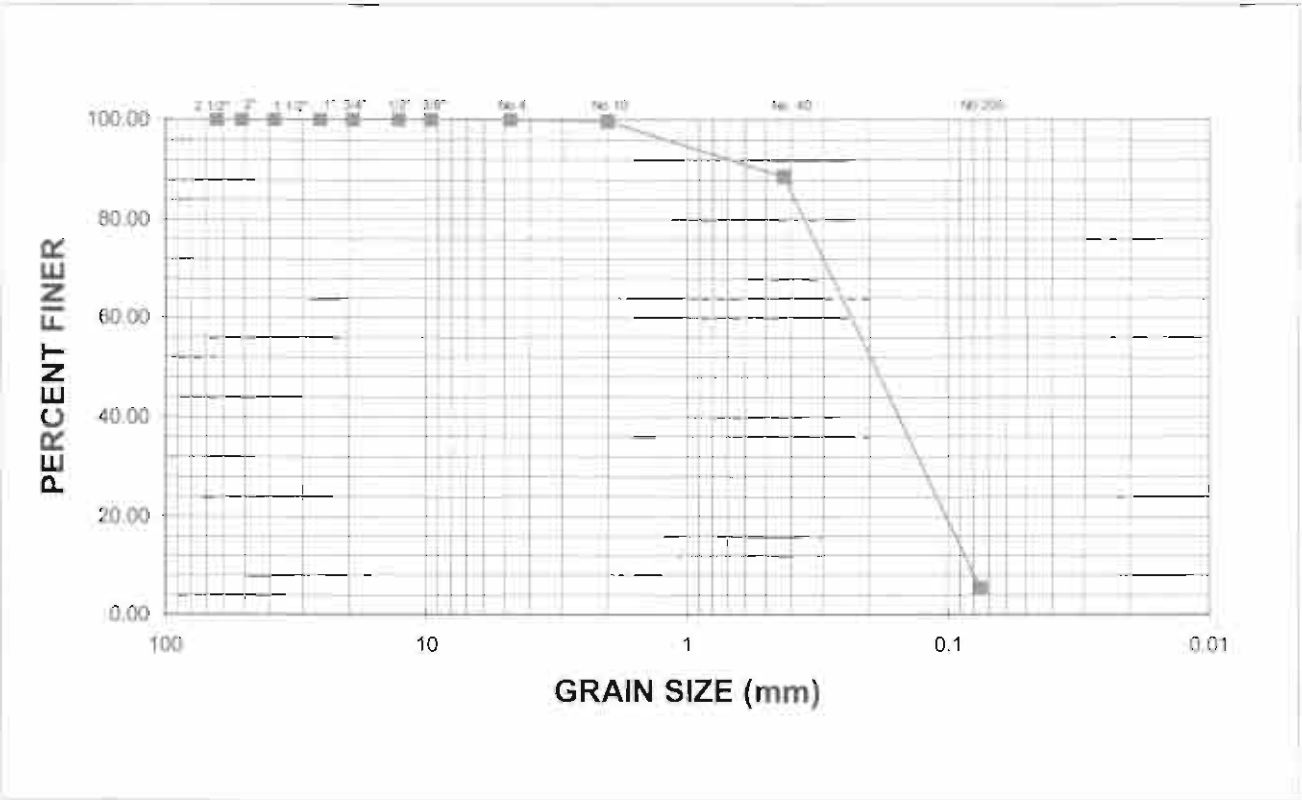
% + 75 mm 0.00 % Gravel = 0.00 % Sand = 94.67 % Finer = 5.33

ADVANCED SOIL ENGINEERING
GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX: (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 75 mm	% GRAVEL	% SAND	% SILT	% CLAY
0.00	0.00	94.67	5.33	

LL	PI	D85	D60	D50	D30	D15	D10	Cc	Cu
N.L.	N.P.	0.39	0.23	0.19	0.13	0.09	0.08	0.81	2.83

MATERIAL DESCRIPTION	USCS	AASHTO
Gray sand trace silt	SP-SM	A-3

Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR
Location : Boring No.1 (33' - 40'), Boring No.2 (18' - 43')

Remarks :

Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.

Figure No. : 1
Date : July 19, 2007

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX : (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST DATA

Date : July 19, 2007
Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR

SAMPLE DATA

Location of sample : Boring No.2 (4' - 18')
Sample description : Gray sand trace silt-rock fragments
USCS Class : SW-SM Liquid Limit : N.L.
AASHTO Class : A-1-b Plasticity Index : N.P.

NOTES

Remaks : Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.
Fig. No. : 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	311.80	284.00
Tare	=	0.00	0.00
Dry sample weight	=	311.80	284.00
Minus # 200 from wash	=	8.92 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
2 1/2"	0.00	0.00	0.00	100.00
2"	0.00	0.00	0.00	100.00
1 1/2"	0.00	0.00	0.00	100.00
1"	0.00	0.00	0.00	100.00
3/4"	0.00	0.00	0.00	100.00
1/2"	0.00	0.00	0.00	100.00
3/8"	0.00	0.00	0.00	100.00
No. 4	25.70	8.24	8.24	91.76
No. 10	45.80	14.69	22.93	77.07
No. 40	167.40	53.69	76.62	23.38
No. 200	45.10	14.46	91.08	8.92

FRACTIONAL COMPONENTS

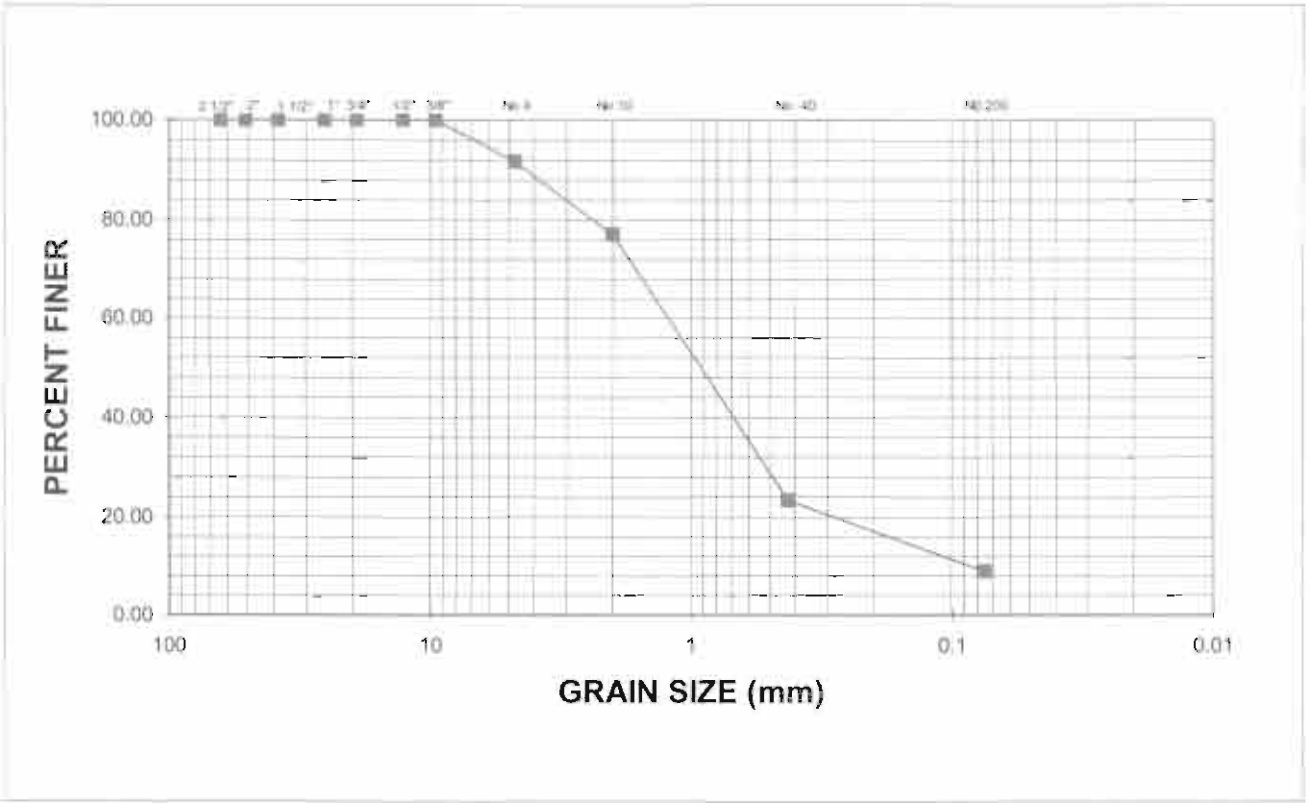
% + 75 mm 0.00 % Gravel = 8.24 % Sand = 82.84 % Finer = 8.92

ADVANCED SOIL ENGINEERING
GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX: (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 75 mm	% GRAVEL	% SAND	% SILT	% CLAY
0.00	8.24	82.84	8.92	

LL	PI	D85	D60	D50	D30	D15	D10	Cc	Cu
N.L.	N.P.	3.19	1.22	0.92	0.51	0.16	0.09	2.53	14.31

MATERIAL DESCRIPTION	USCS	AASHTO
Gray sand trace silt-rock fragments	SW-SM	A-1-b

Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR
Location : Boring No.2 (4' - 18')

Remarks :

Tested by	:	Eduardo Rodriguez	Figure No.	:	1
Checked by	:	Nelson Muñoz, P.E.	Date	:	July 19, 2007

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX : (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST DATA

Date : July 19, 2007
Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR

SAMPLE DATA

Location of sample : Boring No.2 (43' - 58')
Sample description : Yellowish brown sand with clayey silt some rock fragments
USCS Class : SM Liquid Limit : 34.5
AASHTO Class : A-4 Plasticity Index : 10.4

NOTES

Remaks : Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.
Fig. No. : 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	322.70	203.10
Tare	=	0.00	0.00
Dry sample weight	=	322.70	203.10
Minus # 200 from wash	=	37.06 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
2 1/2"	0.00	0.00	0.00	100.00
2"	0.00	0.00	0.00	100.00
1 1/2"	0.00	0.00	0.00	100.00
1"	0.00	0.00	0.00	100.00
3/4"	0.00	0.00	0.00	100.00
1/2"	19.00	5.89	5.89	94.11
3/8"	1.80	0.56	6.45	93.55
No. 4	23.30	7.22	13.67	86.33
No. 10	32.20	9.98	23.64	76.36
No. 40	59.70	18.50	42.14	57.86
No. 200	67.10	20.79	62.94	37.06

FRACTIONAL COMPONENTS

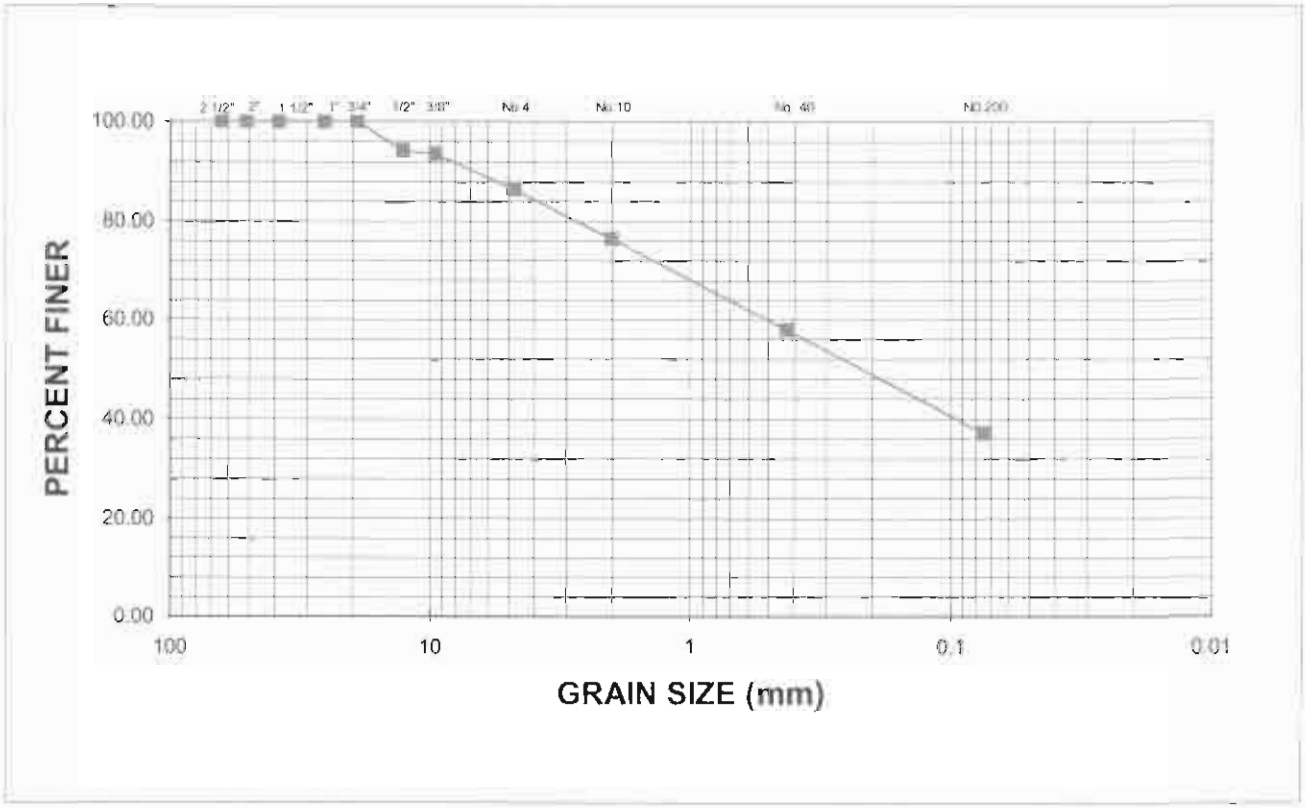
% + 75 mm 0.00 % Gravel = 13.67 % Sand = 49.27 % Finer = 37.06

ADVANCED SOIL ENGINEERING
GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX: (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 75 mm	% GRAVEL	% SAND	% SILT	% CLAY
0.00	13.67	49.27	37.06	

LL	PI	D85	D60	D50	D30	D15	D10	Cc	Cu
34.5	10.4	4.23	0.51	0.22					

MATERIAL DESCRIPTION	USCS	AASHTO
Yellowish brown sand with clayey silt some rock fragments	SM	A-4

Client : Cordeco Northwest, Corp.

Project : Discovery Bay Resort and Marina, Aguada, PR

Location : Boring No.2 (43' - 58')

Remarks :

Tested by : Eduardo Rodriguez

Checked by : Nelson Muñoz, P.E.

Figure No. : 1

Date : July 19, 2007

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX : (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST DATA

Date : July 19, 2007
Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR

SAMPLE DATA

Location of sample : Boring No.2 (58' - 68')
Sample description : Gray clayey silt some sand trace rock fragments
USCS Class : MH Liquid Limit : 50.4
AASHTO Class : A-7-5 (16) Plasticity Index : 19.8

NOTES

Remaks : Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.
Fig. No. : 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	219.30	56.80
Tare	=	0.00	0.00
Dry sample weight	=	219.30	56.80
Minus # 200 from wash	=	74.10 %	
Sieve tare method :			

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
2 1/2"	0.00	0.00	0.00	100.00
2"	0.00	0.00	0.00	100.00
1 1/2"	0.00	0.00	0.00	100.00
1"	0.00	0.00	0.00	100.00
3/4"	0.00	0.00	0.00	100.00
1/2"	0.00	0.00	0.00	100.00
3/8"	0.00	0.00	0.00	100.00
No. 4	7.50	3.42	3.42	96.58
No. 10	15.20	6.93	10.35	89.65
No. 40	28.70	13.09	23.44	76.56
No. 200	5.40	2.46	25.90	74.10

FRACTIONAL COMPONENTS

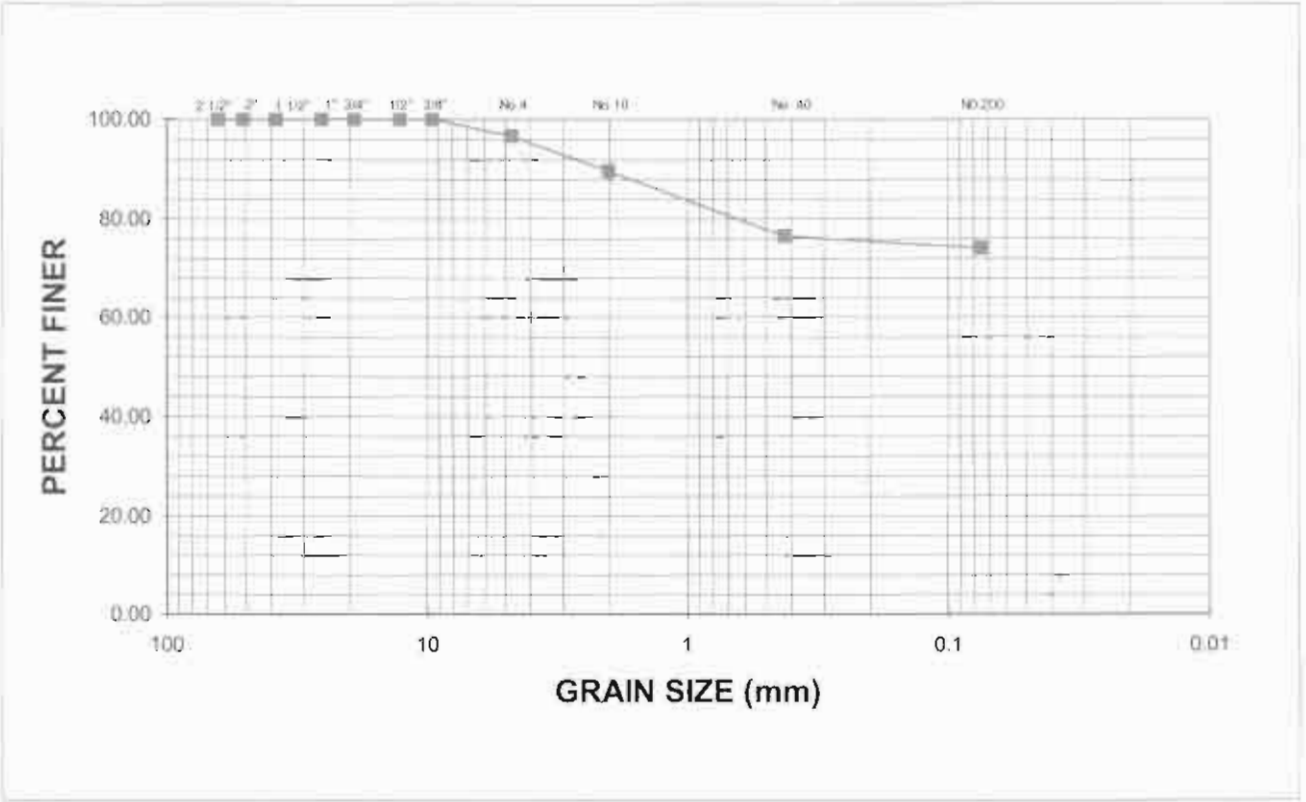
% + 75 mm 0.00 % Gravel = 3.42 % Sand = 22.48 % Finer = 74.10

ADVANCED SOIL ENGINEERING
GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX: (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 75 mm	% GRAVEL	% SAND	% SILT	% CLAY
0.00	3.42	22.48	74.10	

LL	PI	D85	D60	D50	D30	D15	D10	Cc	Cu
50.4	19.8	1.15							

MATERIAL DESCRIPTION	USCS	AASHTO
Gray clayey silt some sand trace rock fragments	MH	A-7-5 (16)

Client : Cordeco Northwest, Corp.

Project : Discovery Bay Resort and Marina, Aguada, PR

Location : Boring No.2 (58' - 68')

Remarks :

Tested by : Eduardo Rodriguez

Checked by : Nelson Muñoz, P.E.

Figure No. : 1

Date : July 19, 2007

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX : (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST DATA

Date : July 19, 2007
Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR

SAMPLE DATA

Location of sample : Boring No.2 (73' - 95')
Sample description : Yellowish brown sand with rock fragments some clayey silt
USCS Class : GM Liquid Limit : 36.7
AASHTO Class : A-2-6 Plasticity Index : 13.3

NOTES

Remaks : Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.
Fig. No. : 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	510.70	444.20
Tare	=	0.00	0.00
Dry sample weight	=	510.70	444.20
Minus # 200 from wash	=	13.02 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
2 1/2"	0.00	0.00	0.00	100.00
2"	0.00	0.00	0.00	100.00
1 1/2"	0.00	0.00	0.00	100.00
1"	62.80	12.30	12.30	87.70
3/4"	17.60	3.45	15.74	84.26
1/2"	19.90	3.90	19.64	80.36
3/8"	40.80	7.99	27.63	72.37
No. 4	82.70	16.19	43.82	56.18
No. 10	94.30	18.46	62.29	37.71
No. 40	101.60	19.89	82.18	17.82
No. 200	24.50	4.80	86.98	13.02

FRACTIONAL COMPONENTS

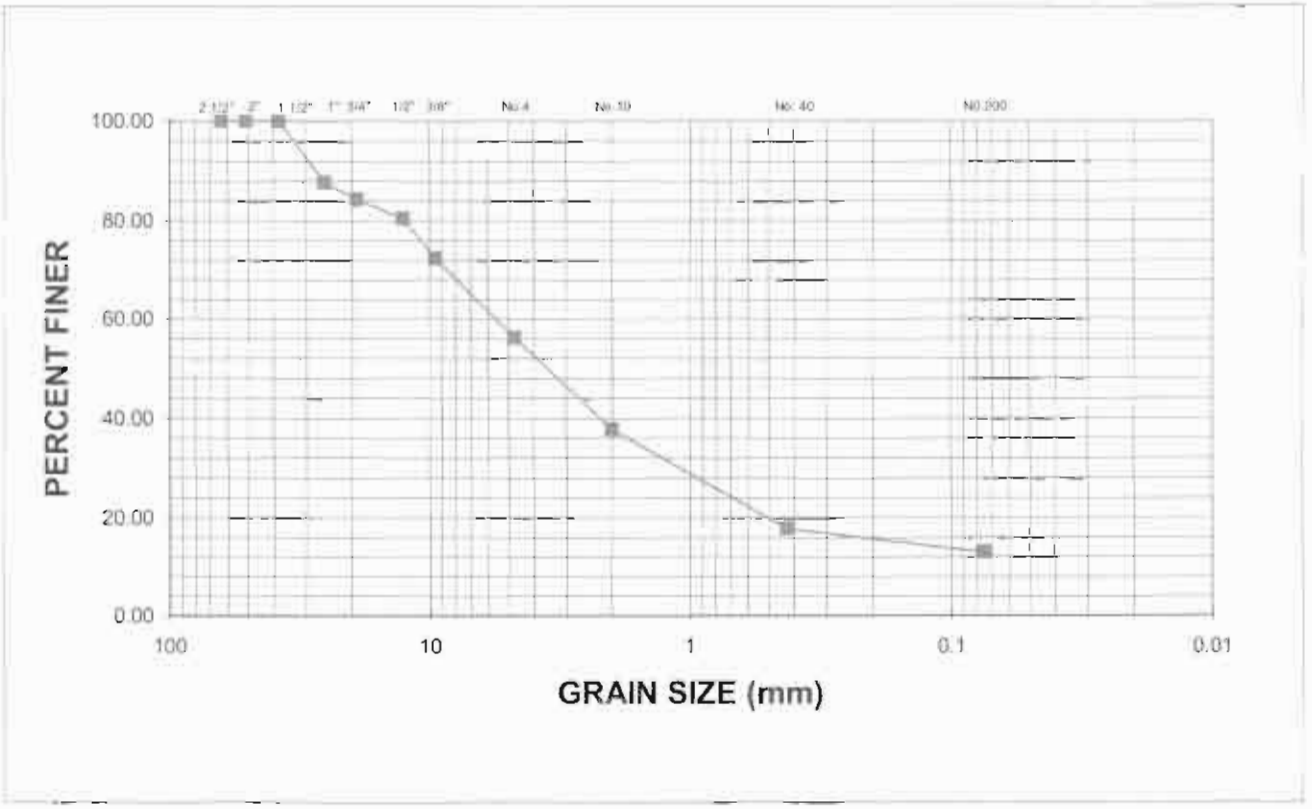
% + 75 mm 0.00 % Gravel = 43.82 % Sand = 43.16 % Finer = 13.02

ADVANCED SOIL ENGINEERING
GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX: (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 75 mm	% GRAVEL	% SAND	% SILT	% CLAY
0.00	43.82	43.16	13.02	

LL	PI	D85	D60	D50	D30	D15	D10	Cc	Cu
36.7	13.3	20.16	5.59	3.56	1.10	0.15			

MATERIAL DESCRIPTION	USCS	AASHTO
Yellowish brown sand with rock fragments some clayey silt	GM	A-2-6

Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR
Location : Boring No.2 (73' - 95')

Remarks :

Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.

Figure No. : 1
Date : July 19, 2007

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX : (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST DATA

Date : July 19, 2007
Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR

SAMPLE DATA

Location of sample : Boring No.3 (28' - 53')
Sample description : Grayish brown sand some silt trace rock fragments
USCS Class : SM Liquid Limit : N.L.
AASHTO Class : A-2-4 Plasticity Index : N.P.

NOTES

Remaks : Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.
Fig. No. : 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	270.30	226.30
Tare	=	0.00	0.00
Dry sample weight	=	270.30	226.30
Minus # 200 from wash	=	16.28 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
2 1/2"	0.00	0.00	0.00	100.00
2"	0.00	0.00	0.00	100.00
1 1/2"	0.00	0.00	0.00	100.00
1"	0.00	0.00	0.00	100.00
3/4"	0.00	0.00	0.00	100.00
1/2"	0.00	0.00	0.00	100.00
3/8"	2.40	0.89	0.89	99.11
No. 4	2.00	0.74	1.63	98.37
No. 10	4.90	1.81	3.44	96.56
No. 40	40.10	14.84	18.28	81.72
No. 200	176.90	65.45	83.72	16.28

FRACTIONAL COMPONENTS

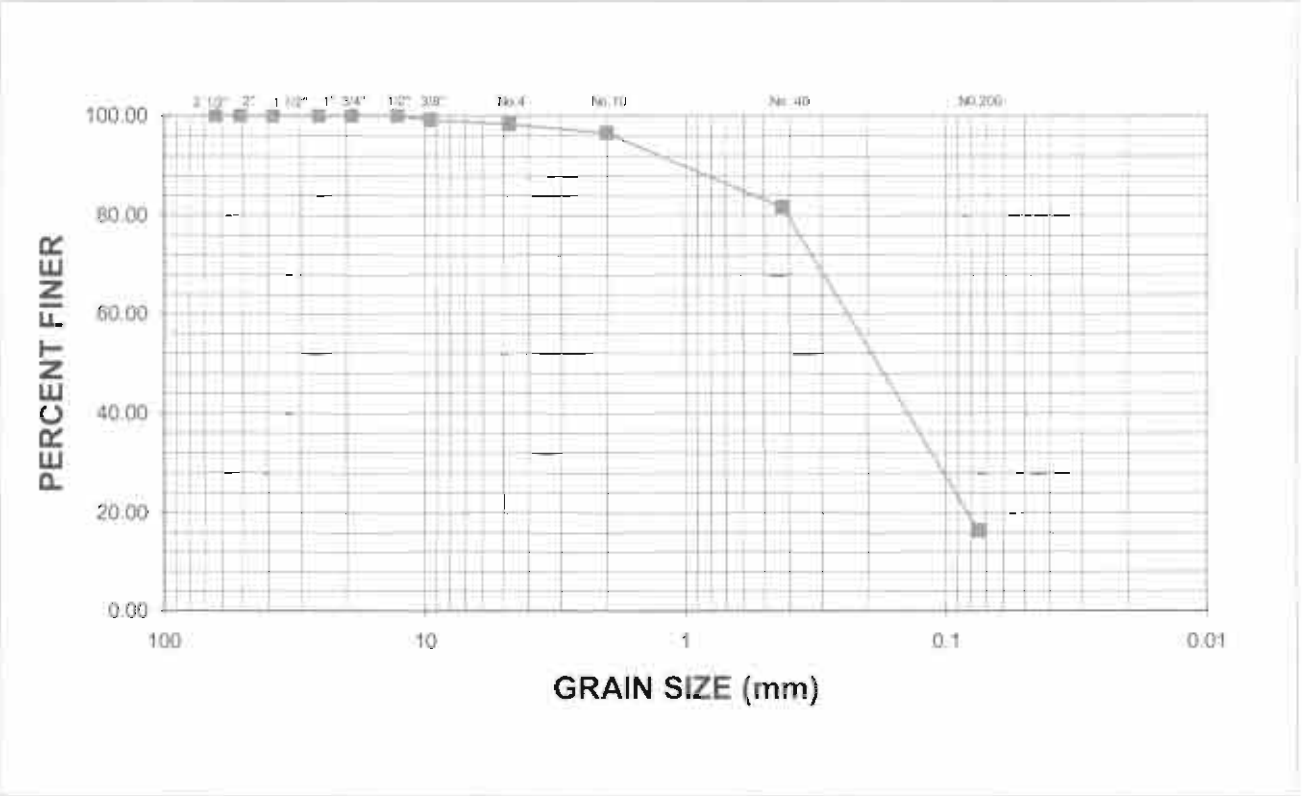
% + 75 mm 0.00 % Gravel = 1.63 % Sand = 82.09 % Finer = 16.28

ADVANCED SOIL ENGINEERING
GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX: (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 75 mm	% GRAVEL	% SAND	% SILT	% CLAY
0.00	1.63	82.09	16.28	

LL	PI	D85	D60	D50	D30	D15	D10	Cc	Cu
N.L.	N.P.	0.60	0.24	0.18	0.11				

MATERIAL DESCRIPTION	USCS	AASHTO
Grayish brown sand some silt trace rock fragments	SM	A-2-4

Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR
Location : Boring No.3 (28' - 53')

Remarks :

Tested by	:	Eduardo Rodriguez	Figure No.	:	1
Checked by	:	Nelson Muñoz, P.E.	Date	:	July 19, 2007

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX : (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST DATA

Date : July 19, 2007
Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR

SAMPLE DATA

Location of sample : Boring No.3 (53' - 75')
Sample description : Black and gray sandy clayey silt trace rock fragments some organic matter
USCS Class : OL Liquid Limit : 39.3
AASHTO Class : A-6 Plasticity Index : 11.5

NOTES

Remaks : Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.
Fig. No. : 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	317.80	80.20
Tare	=	0.00	0.00
Dry sample weight	=	317.80	80.20
Minus # 200 from wash	=	74.76 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
2 1/2"	0.00	0.00	0.00	100.00
2"	0.00	0.00	0.00	100.00
1 1/2"	0.00	0.00	0.00	100.00
1"	0.00	0.00	0.00	100.00
3/4"	0.00	0.00	0.00	100.00
1/2"	0.00	0.00	0.00	100.00
3/8"	2.30	0.72	0.72	99.28
No. 4	10.60	3.34	4.06	95.94
No. 10	19.80	6.23	10.29	89.71
No. 40	33.00	10.38	20.67	79.33
No. 200	14.50	4.56	25.24	74.76

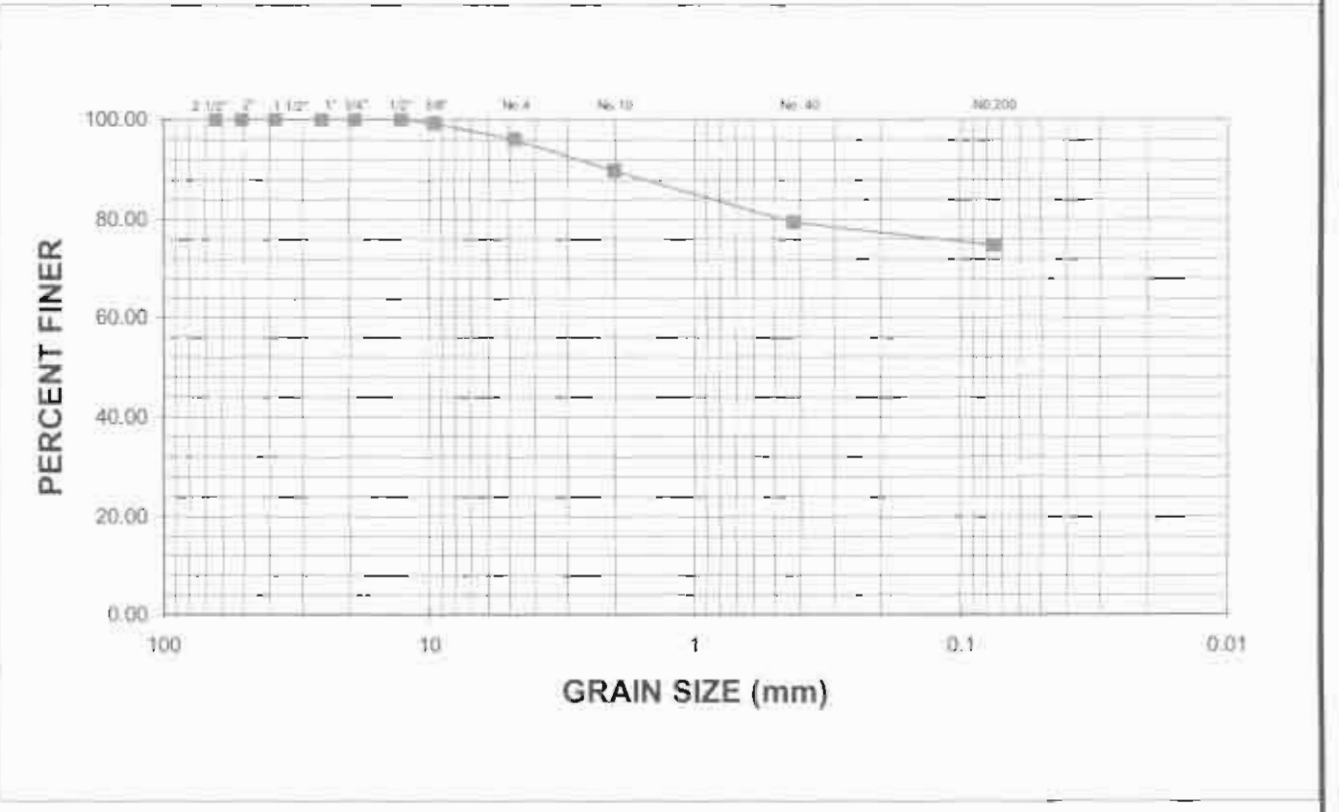
FRACTIONAL COMPONENTS

% + 75 mm 0.00 % Gravel = 4.06 % Sand = 21.18 % Finer = 74.76

ADVANCED SOIL ENGINEERING
GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 75 mm	% GRAVEL	% SAND	% SILT	% CLAY
0.00	4.06	21.18	74.76	

LL	PI	D85	D60	D50	D30	D15	D10	Cc	Cu
39.3	11.5	0.99							

MATERIAL DESCRIPTION	USCS	AASHTO
Black and gray sandy clayey silt trace rock fragments some organic matter	OL	A-6

Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR
Location : Boring No.3 (53' - 75')

Remarks :

Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.

Figure No. : 1
Date : July 19, 2007

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX : (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST DATA

Date : July 19, 2007
Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR

SAMPLE DATA

Location of sample : Boring No.4 (13' - 43')
Sample description : Gray sand trace silt
USCS Class : SP-SM Liquid Limit : N.L.
AASHTO Class : A-3 Plasticity Index : N.P.

NOTES

Remaks : Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.
Fig. No. : 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	342.80	317.30
Tare	=	0.00	0.00
Dry sample weight	=	342.80	317.30
Minus # 200 from wash	=	7.44 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
2 1/2"	0.00	0.00	0.00	100.00
2"	0.00	0.00	0.00	100.00
1 1/2"	0.00	0.00	0.00	100.00
1"	0.00	0.00	0.00	100.00
3/4"	0.00	0.00	0.00	100.00
1/2"	0.00	0.00	0.00	100.00
3/8"	0.00	0.00	0.00	100.00
No. 4	0.00	0.00	0.00	100.00
No. 10	2.90	0.85	0.85	99.15
No. 40	142.30	41.51	42.36	57.64
No. 200	172.10	50.20	92.56	7.44

FRACTIONAL COMPONENTS

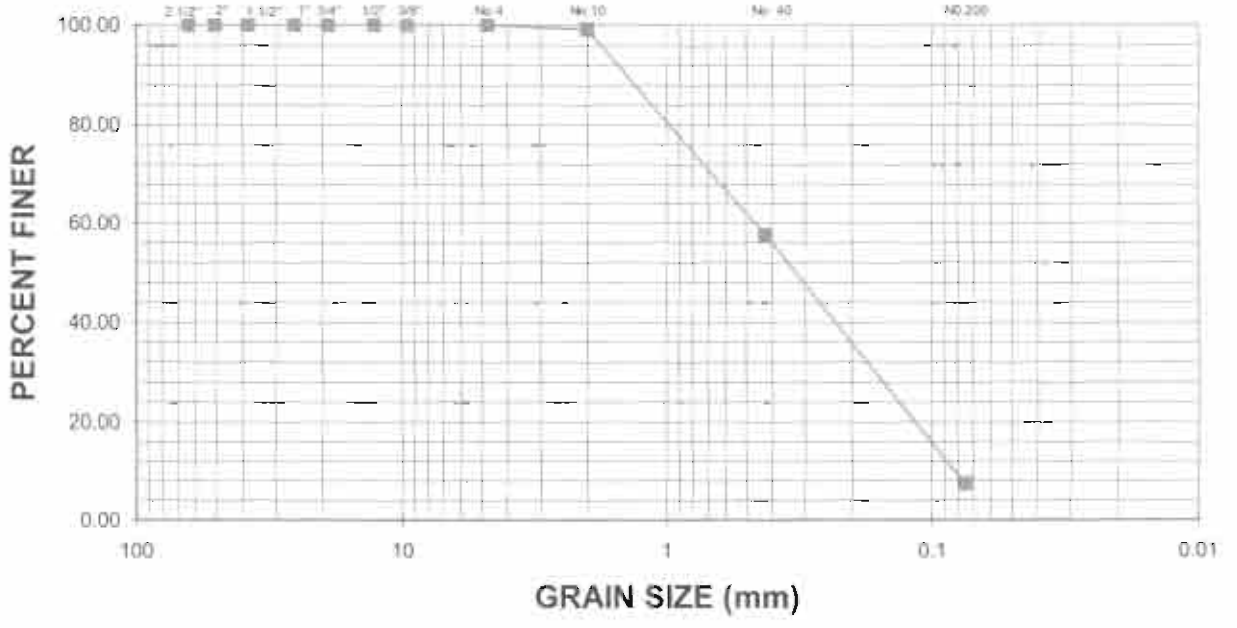
% + 75 mm 0.00 % Gravel = 0.00 % Sand = 92.56 % Finer = 7.44

ADVANCED SOIL ENGINEERING
GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX: (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 75 mm	% GRAVEL	% SAND	% SILT	% CLAY
0.00	0.00	92.56	7.44	

LL	PI	D85	D60	D50	D30	D15	D10	Cc	Cu
N.L.	N.P.	1.18	0.46	0.33	0.16	0.10	0.08	0.70	5.66

MATERIAL DESCRIPTION	USCS	AASHTO
Gray sand trace silt	SP-SM	A-3

Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR
Location : Boring No.4 (13' - 43')

Remarks :

Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.

Figure No. : 1
Date : July 19, 2007

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX : (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST DATA

Date : July 21, 2007
Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR

SAMPLE DATA

Location of sample : Boring No.4 (58' - 93')
Sample description : Black and gray organic clay trace sand
USCS Class : OH Liquid Limit : 53.3
AASHTO Class : A-7-6 (28) Plasticity Index : 26.6

NOTES

Remaks : Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.
Fig. No. : 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	398.30	28.85
Tare	=	0.00	0.00
Dry sample weight	=	398.30	28.85
Minus # 200 from wash	=	92.76 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
2 1/2"	0.00	0.00	0.00	100.00
2"	0.00	0.00	0.00	100.00
1 1/2"	0.00	0.00	0.00	100.00
1"	0.00	0.00	0.00	100.00
3/4"	0.00	0.00	0.00	100.00
1/2"	0.00	0.00	0.00	100.00
3/8"	0.29	0.07	0.07	99.93
No. 4	1.23	0.31	0.38	99.62
No. 10	2.84	0.71	1.09	98.91
No. 40	7.03	1.77	2.86	97.14
No. 200	17.46	4.38	7.24	92.76

FRACTIONAL COMPONENTS

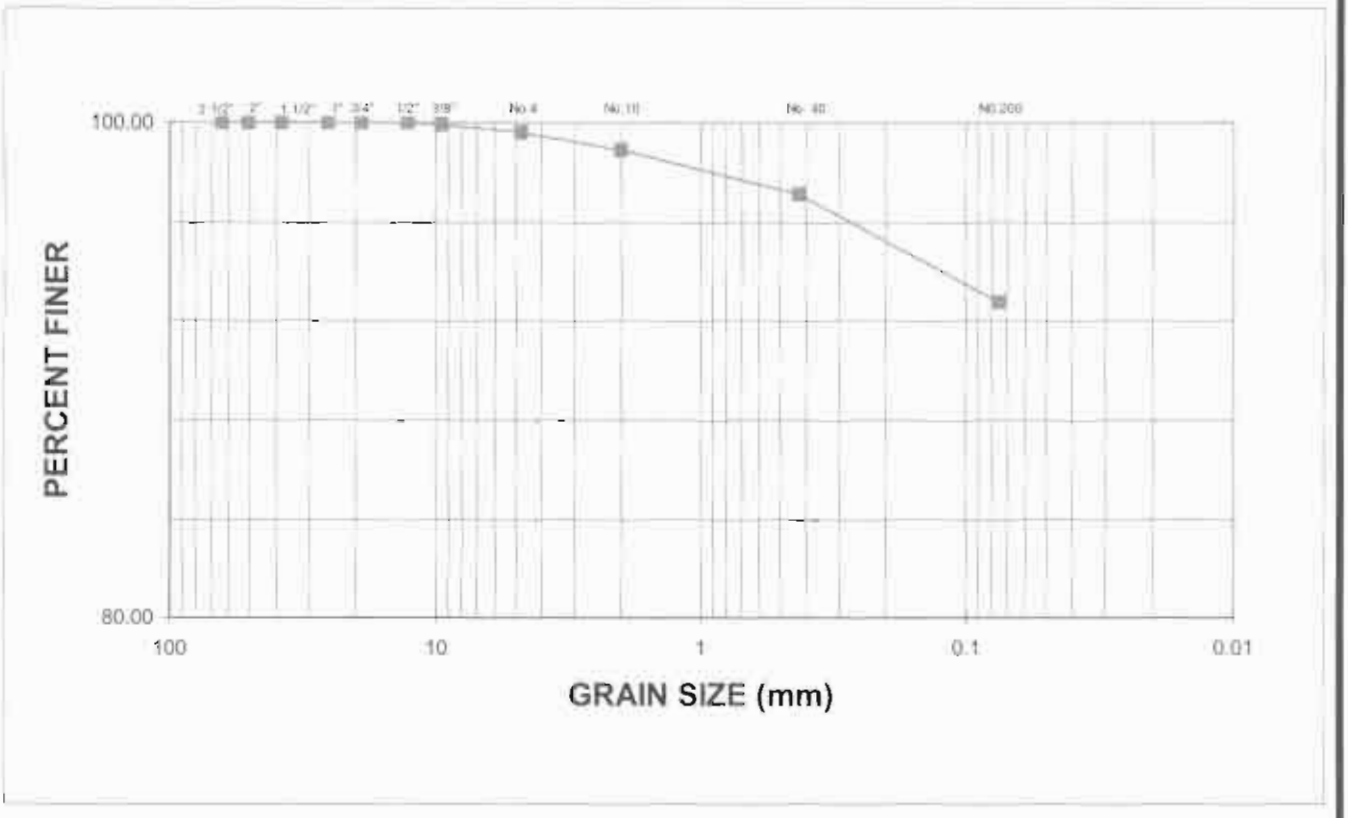
% + 75 mm 0.00 % Gravel = 0.38 % Sand = 6.86 % Finer = 92.76

ADVANCED SOIL ENGINEERING
GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX: (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 75 mm	% GRAVEL	% SAND	% SILT	% CLAY
0.00	0.38	6.86	92.76	

LL	PI	D85	D60	D50	D30	D15	D10	Cc	Cu
53.3	26.6								

MATERIAL DESCRIPTION	USCS	AASHTO
Black and gray organic clay trace sand	OH	A-7-6 (28)

Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR
Location : Boring No.4 (58' - 93')

Remarks :

Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.

Figure No. : 1
Date : July 21, 2007

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX : (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST DATA

Date : July 23, 2007
Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR

SAMPLE DATA

Location of sample : Boring No.5 (0' - 13')
Sample description : Yellowish brown clayey rock fragments some sand
USCS Class : GC Liquid Limit : 36.0
AASHTO Class : A-2-6 Plasticity Index : 19.5

NOTES

Remaks : Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.
Fig. No. : 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	435.70	286.80
Tare	=	0.00	0.00
Dry sample weight	=	435.70	286.80
Minus # 200 from wash	=	34.17 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
2 1/2"	0.00	0.00	0.00	100.00
2"	0.00	0.00	0.00	100.00
1 1/2"	0.00	0.00	0.00	100.00
1"	18.90	4.34	4.34	95.66
3/4"	32.40	7.44	11.77	88.23
1/2"	44.50	10.21	21.99	78.01
3/8"	30.60	7.02	29.01	70.99
No. 4	52.60	12.07	41.08	58.92
No. 10	34.90	8.01	49.09	50.91
No. 40	44.90	10.31	59.40	40.60
No. 200	28.00	6.43	65.83	34.17

FRACTIONAL COMPONENTS

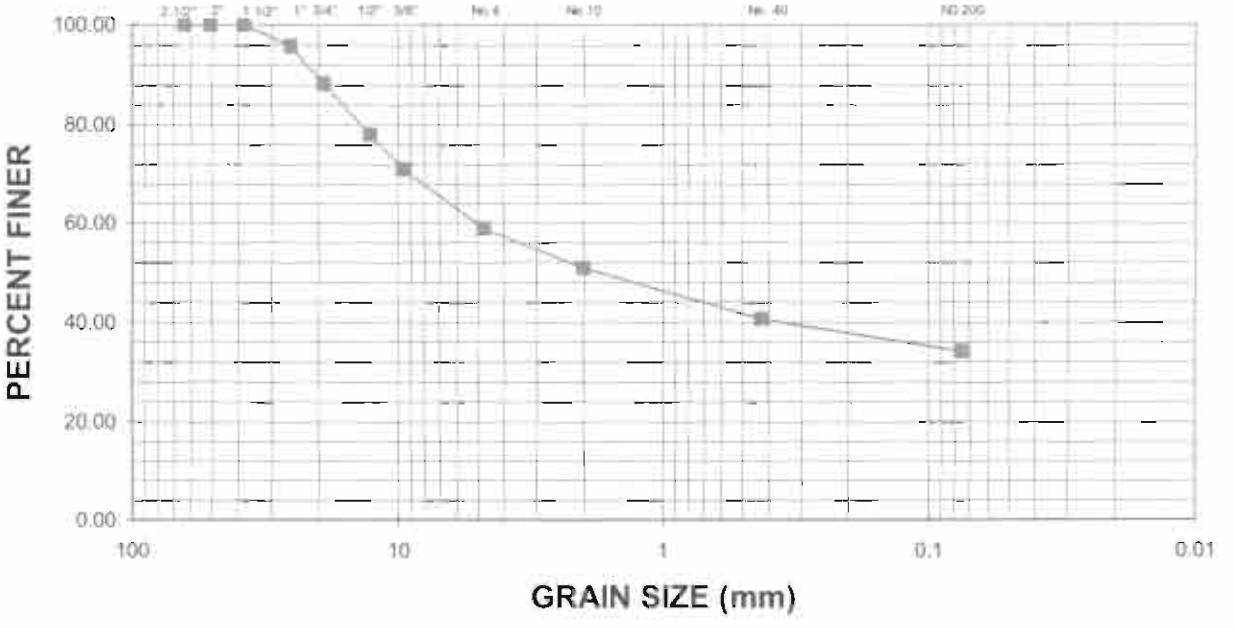
% + 75 mm 0.00 % Gravel = 41.08 % Sand = 24.74 % Finer = 34.17

ADVANCED SOIL ENGINEERING
GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX: (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 75 mm	% GRAVEL	% SAND	% SILT	% CLAY
0.00	41.08	24.74	34.17	

LL	PI	D85	D60	D50	D30	D15	D10	Cc	Cu
36.0	19.5	16.65	5.05	1.75					

MATERIAL DESCRIPTION	USCS	AASHTO
Yellowish brown clayey rock fragments some sand	GC	A-2-6

Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR
Location : Boring No.5 (0' - 13')

Remarks :

Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.

Figure No. : 1
Date : July 23, 2007

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX : (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST DATA

Date : July 19, 2007
Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR

SAMPLE DATA

Location of sample : Boring No.5 (58' - 63')
Sample description : Gray organic clay trace sand
USCS Class : OH Liquid Limit : 70.9
AASHTO Class : A-7-6 (47) Plasticity Index : 39.5

NOTES

Remaks : Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.
Fig. No. : 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	284.90	6.41
Tare	=	0.00	0.00
Dry sample weight	=	284.90	6.41
Minus # 200 from wash	=	97.75 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
2 1/2"	0.00	0.00	0.00	100.00
2"	0.00	0.00	0.00	100.00
1 1/2"	0.00	0.00	0.00	100.00
1"	0.00	0.00	0.00	100.00
3/4"	0.00	0.00	0.00	100.00
1/2"	0.00	0.00	0.00	100.00
3/8"	0.00	0.00	0.00	100.00
No. 4	0.17	0.06	0.06	99.94
No. 10	0.10	0.04	0.09	99.91
No. 40	1.76	0.62	0.71	99.29
No. 200	4.38	1.54	2.25	97.75

FRACTIONAL COMPONENTS

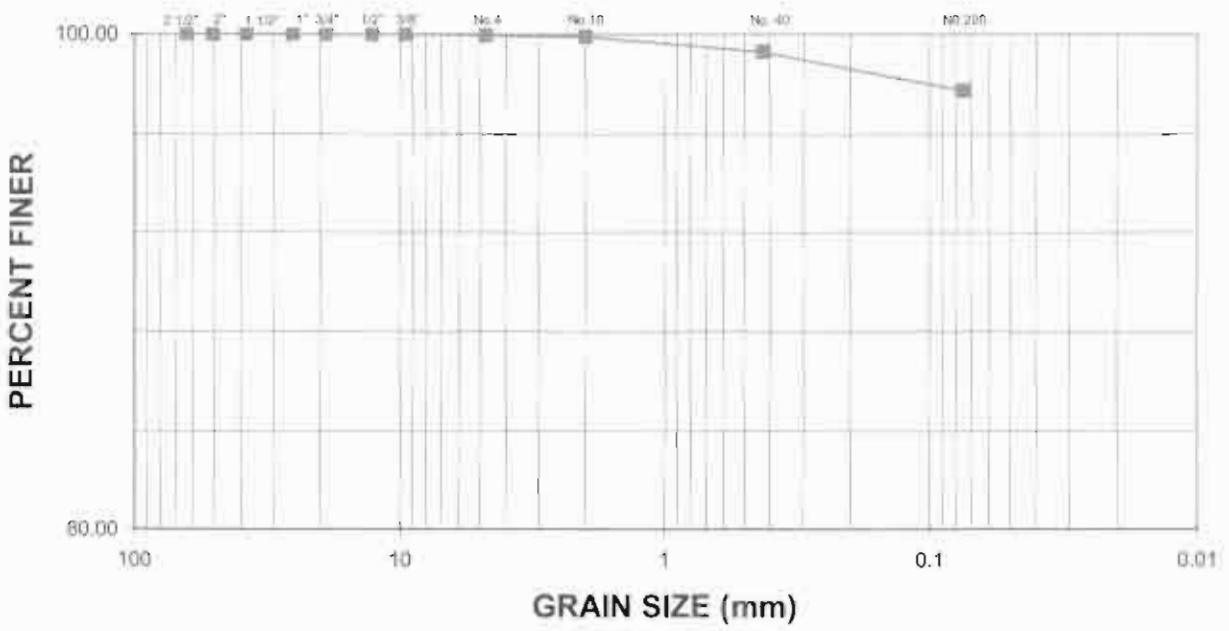
% + 75 mm 0.00 % Gravel = 0.06 % Sand = 2.19 % Finer = 97.75

ADVANCED SOIL ENGINEERING
GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX: (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 75 mm	% GRAVEL	% SAND	% SILT	% CLAY
0.00	0.06	2.19	97.75	

LL	PI	D85	D60	D50	D30	D15	D10	Cc	Cu
70.9	39.5								

MATERIAL DESCRIPTION	USCS	AASHTO
Gray organic clay trace sand	OH	A-7-6 (47)

Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR
Location : Boring No.5 (58' - 63')

Remarks :

Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.

Figure No. : 1
Date : July 19, 2007

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX : (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST DATA

Date : July 21, 2007
Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR

SAMPLE DATA

Location of sample : Boring No.6 (8' - 18')
Sample description : Brownish gray clayey silt
USCS Class : MH Liquid Limit : 55.3
AASHTO Class : A-7-6 (30) Plasticity Index : 23.9

NOTES

Remaks : Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.
Fig. No. : 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	167.50	0.35
Tare	=	0.00	0.00
Dry sample weight	=	167.50	0.35
Minus # 200 from wash	=	99.79 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
2 1/2"	0.00	0.00	0.00	100.00
2"	0.00	0.00	0.00	100.00
1 1/2"	0.00	0.00	0.00	100.00
1"	0.00	0.00	0.00	100.00
3/4"	0.00	0.00	0.00	100.00
1/2"	0.00	0.00	0.00	100.00
3/8"	0.00	0.00	0.00	100.00
No. 4	0.00	0.00	0.00	100.00
No. 10	0.00	0.00	0.00	100.00
No. 40	0.20	0.12	0.12	99.88
No. 200	0.15	0.09	0.21	99.79

FRACTIONAL COMPONENTS

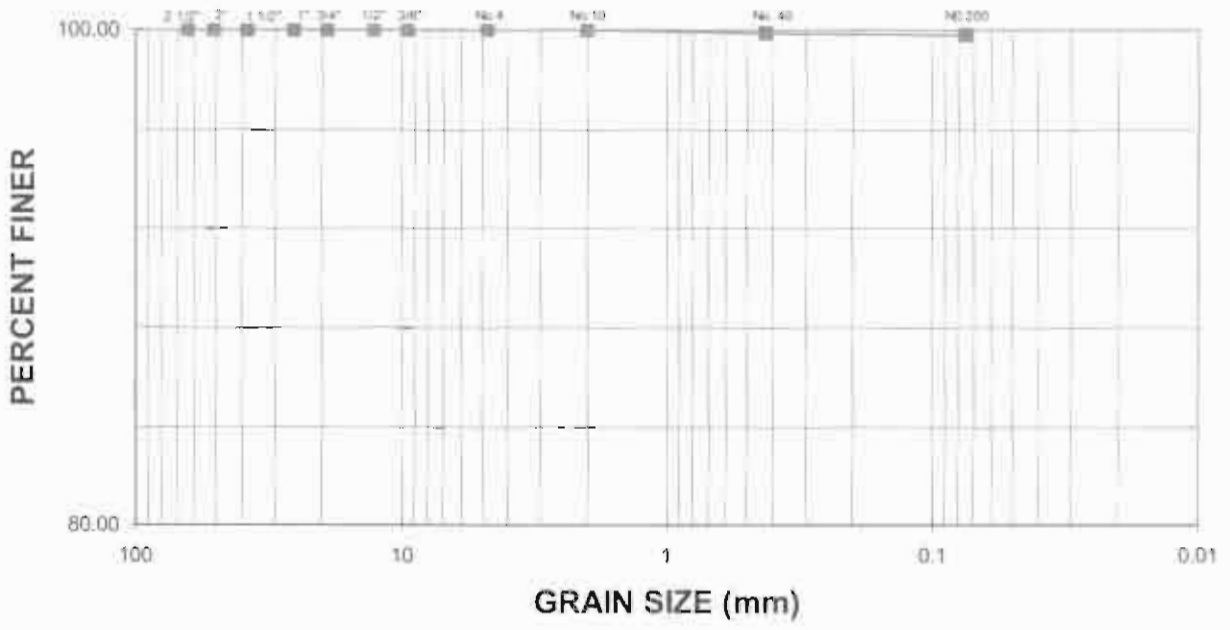
% + 75 mm 0.00 % Gravel = 0.00 % Sand = 0.21 % Finer = 99.79

ADVANCED SOIL ENGINEERING
GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX: (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 75 mm	% GRAVEL	% SAND	% SILT	% CLAY
0.00	0.00	0.21	99.79	

LL	PI	D85	D60	D50	D30	D15	D10	Cc	Cu
55.3	23.9								

MATERIAL DESCRIPTION	USCS	AASHTO
Brownish gray clayey silt	MH	A-7-6 (30)

Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR
Location : Boring No.6 (8' - 18')

Remarks :

Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.

Figure No. : 1
Date : July 21, 2007

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX : (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST DATA

Date : July 19, 2007
Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR

SAMPLE DATA

Location of sample : Boring No.6 (48' - 58')
Sample description : Gray silty sand trace rock fragments
USCS Class : SM Liquid Limit : N.L.
AASHTO Class : A-2-4 Plasticity Index : N.P.

NOTES

Remaks : Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.
Fig. No. : 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	401.80	304.30
Tare	=	0.00	0.00
Dry sample weight	=	401.80	304.30
Minus # 200 from wash	=	24.27 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
2 1/2"	0.00	0.00	0.00	100.00
2"	0.00	0.00	0.00	100.00
1 1/2"	0.00	0.00	0.00	100.00
1"	0.00	0.00	0.00	100.00
3/4"	0.00	0.00	0.00	100.00
1/2"	0.00	0.00	0.00	100.00
3/8"	2.80	0.70	0.70	99.30
No. 4	6.00	1.49	2.19	97.81
No. 10	20.20	5.03	7.22	92.78
No. 40	106.40	26.48	33.70	66.30
No. 200	168.90	42.04	75.73	24.27

FRACTIONAL COMPONENTS

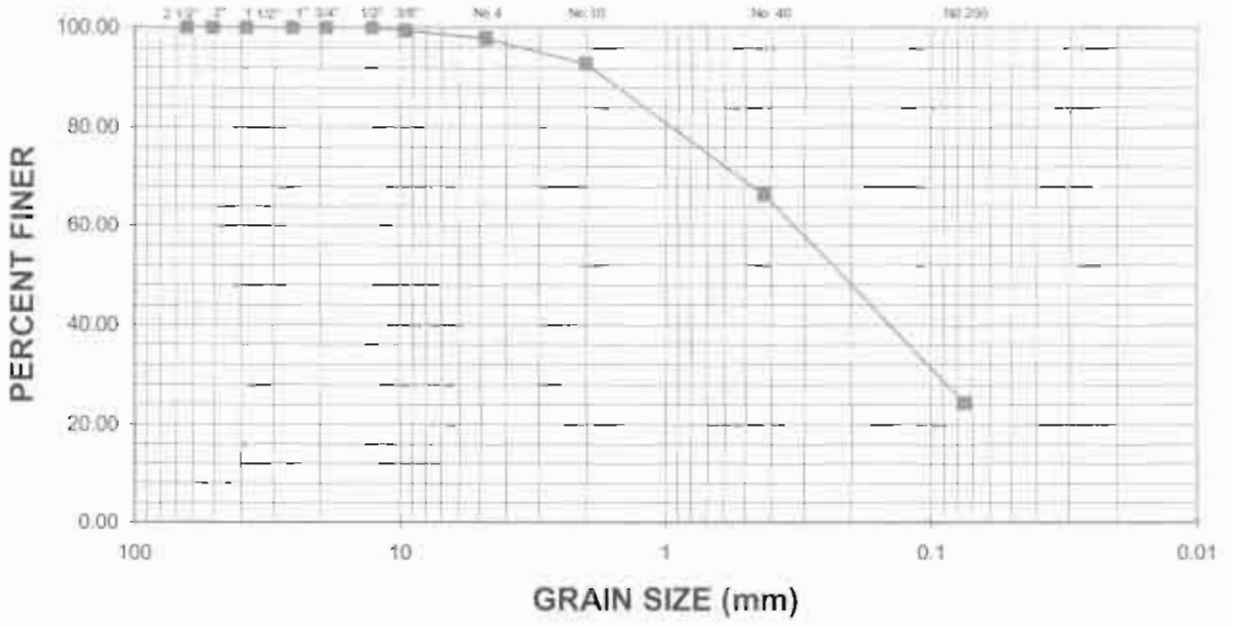
% + 75 mm 0.00 % Gravel = 2.19 % Sand = 73.54 % Finer = 24.27

ADVANCED SOIL ENGINEERING
GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1266
ISABELA, P.R. 00662

TEL / FAX: (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 75 mm	% GRAVEL	% SAND	% SILT	% CLAY
0.00	2.19	73.54	24.27	

LL	PI	D85	D60	D50	D30	D15	D10	Cc	Cu
N.L.	N.P.	1.27	0.33	0.22	0.10				

MATERIAL DESCRIPTION	USCS	AASHTO
Gray silty sand trace rock fragments	SM	A-2-4

Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR
Location : Boring No.6 (48' - 58')

Remarks :

Tested by	:	Eduardo Rodriguez	Figure No.	:	1
Checked by	:	Nelson Muñoz, P.E.	Date	:	July 19, 2007

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX : (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST DATA

Date : July 23, 2007
Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR

SAMPLE DATA

Location of sample : Boring No.6 (58' - 80')
Sample description : Black and gray organic silt trace sand
USCS Class : OH Liquid Limit : 60.3
AASHTO Class : A-7-6 (34) Plasticity Index : 28.6

NOTES

Remaks : Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.
Fig. No. : 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	446.60	17.00
Tare	=	0.00	0.00
Dry sample weight	=	446.60	17.00
Minus # 200 from wash	=	96.19 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
2 1/2"	0.00	0.00	0.00	100.00
2"	0.00	0.00	0.00	100.00
1 1/2"	0.00	0.00	0.00	100.00
1"	0.00	0.00	0.00	100.00
3/4"	0.00	0.00	0.00	100.00
1/2"	0.00	0.00	0.00	100.00
3/8"	0.00	0.00	0.00	100.00
No. 4	0.10	0.02	0.02	99.98
No. 10	3.00	0.67	0.69	99.31
No. 40	7.70	1.72	2.42	97.58
No. 200	6.20	1.39	3.81	96.19

FRACTIONAL COMPONENTS

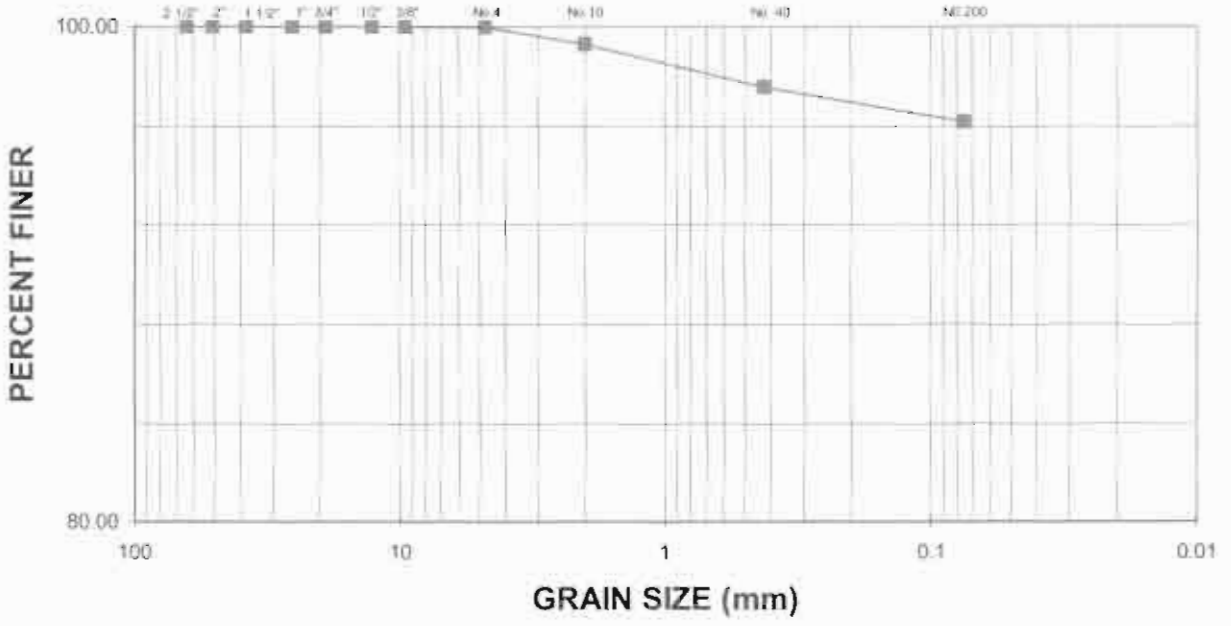
% + 75 mm 0.00 % Gravel = 0.02 % Sand = 3.78 % Finer = 96.19

ADVANCED SOIL ENGINEERING
GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX: (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 75 mm	% GRAVEL	% SAND	% SILT	% CLAY
0.00	0.02	3.78	96.19	

LL	PI	D85	D60	D50	D30	D15	D10	Cc	Cu
60.3	28.6								

MATERIAL DESCRIPTION	USCS	AASHTO
Black and gray organic silt trace sand	OH	A-7-6 (34)

Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR
Location : Boring No.6 (58' - 80')

Remarks :

Tested by	:	Eduardo Rodriguez	Figure No.	:	1
Checked by	:	Nelson Muñoz, P.E.	Date	:	July 23, 2007

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX : (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST DATA

Date : July 23, 2007
Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR

SAMPLE DATA

Location of sample : Boring No.7 (4' - 23')
Sample description : Light brown sand trace rock fragments, silt
USCS Class : SM Liquid Limit : N.L.
AASHTO Class : A-1-b Plasticity Index : N.P.

NOTES

Remaks : Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.
Fig. No. : 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	390.10	381.40
Tare	=	0.00	0.00
Dry sample weight	=	390.10	381.40
Minus # 200 from wash	=	2.23 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
2 1/2"	0.00	0.00	0.00	100.00
2"	0.00	0.00	0.00	100.00
1 1/2"	0.00	0.00	0.00	100.00
1"	0.00	0.00	0.00	100.00
3/4"	10.70	2.74	2.74	97.26
1/2"	12.30	3.15	5.90	94.10
3/8"	2.70	0.69	6.59	93.41
No. 4	3.90	1.00	7.59	92.41
No. 10	8.00	2.05	9.64	90.36
No. 40	309.40	79.31	88.95	11.05
No. 200	34.40	8.82	97.77	2.23

FRACTIONAL COMPONENTS

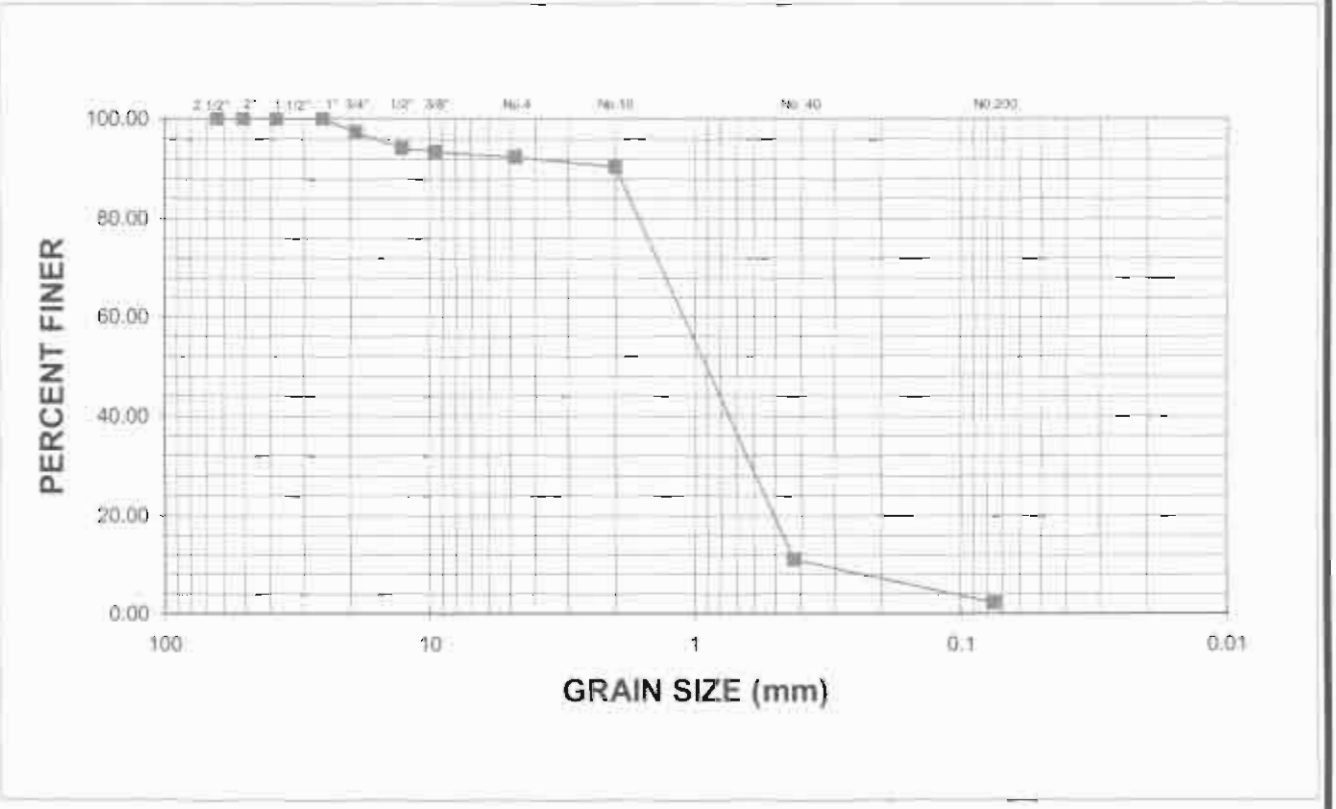
% + 75 mm 0.00 % Gravel = 7.59 % Sand = 90.18 % Finer = 2.23

ADVANCED SOIL ENGINEERING
GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX: (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST REPORT



% + 75 mm	% GRAVEL	% SAND	% SILT	% CLAY
0.00	7.59	90.18	2.23	

LL	PI	D85	D60	D50	D30	D15	D10	Cc	Cu
N.L.	N.P.	1.80	1.11	0.91	0.62	0.46	0.35	0.99	3.20

MATERIAL DESCRIPTION	USCS	AASHTO
Light brown sand trace rock fragments, silt	SM	A-1-b

Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR
Location : Boring No.7 (4' - 23')

Remarks :

Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.

Figure No. : 1
Date : July 23, 2007

ASE

ADVANCED SOIL ENGINEERING

GEOTECHNICAL CONSULTING ENGINEERS
CONCRETE AND MATERIAL TESTING LABORATORIES

P.O. BOX 1286
ISABELA, P.R. 00662

TEL / FAX : (787) 830 - 0366

GRAIN SIZE DISTRIBUTION TEST DATA

Date : July 31, 2007
Client : Cordeco Northwest, Corp.
Project : Discovery Bay Resort and Marina, Aguada, PR

SAMPLE DATA

Location of sample : Boring No.8 (8' - 18')
Sample description : Yellowish brown and bluish gray organic clay trace sand
USCS Class : OH Liquid Limit : 55.3
AASHTO Class : A-7-6 (32) Plasticity Index : 30.5

NOTES

Remaks : Tested by : Eduardo Rodriguez
Checked by : Nelson Muñoz, P.E.
Fig. No. : 1

MECHANICAL ANALYSIS DATA

		Initial	After wash
Dry sample and tare	=	187.60	11.70
Tare	=	0.00	0.00
Dry sample weight	=	187.60	11.70
Minus # 200 from wash	=	93.76 %	

Sieve tare method :

Sieve No.	Weight Soil retained	Percent Retained	Combined % Retained	Percent finer
2 1/2"	0.00	0.00	0.00	100.00
2"	0.00	0.00	0.00	100.00
1 1/2"	0.00	0.00	0.00	100.00
1"	0.00	0.00	0.00	100.00
3/4"	0.00	0.00	0.00	100.00
1/2"	0.00	0.00	0.00	100.00
3/8"	0.00	0.00	0.00	100.00
No. 4	0.00	0.00	0.00	100.00
No. 10	0.60	0.32	0.32	99.68
No. 40	4.80	2.56	2.88	97.12
No. 200	6.30	3.36	6.24	93.76

FRACTIONAL COMPONENTS

% + 75 mm 0.00 % Gravel = 0.00 % Sand = 6.24 % Finer = 93.76