Original Borings

Table 2.2. Laboratory Test Results on Variability Samples For DuPont.

Boring No./ Sample No.	Depth ft	USCS	% Passing No. 200	Liquid Limit	Plastic Limit	Plasticity Index	Specific Gravity
B-1/S-2	5 - 7	SC	60.6	25.4	18.6	6.8	2.67
B-1/S-4	15 - 17	CH	95.8	64.2	28.0	36.2	
B-1/S-5	20 - 22	CH	98.1	50.3	32.6	17.7	2.73
B-1/S-7	28 - 30	CL	96.2	46.4	29.1	17.3	
B-2/S-2	5 - 7	CL	81.1	32.9	20.8	12.1	
B-2/S-3	10 - 12	CH	91.4	52.2	25.2	27.0	
B-2/S-4	15 - 17	CH	98.4	62.6	28.4	34.2	
B-2/S-5	20 - 22	CH	95.5	68.0	30.2	37.8	
B-2/S-6	25 - 27	CH	99.3	62.9	37.8	25.1	
B-3/S-2	5 - 7	CL	33.4	36.5	22.4	14.1	2.74
B-3/S-4	15 - 17	CH	98.5	60.1	30.4	29.7	
B-3/S-5	20 - 22	CH	99.5	69.6	28.5	41.1	2.74
B-3/S-6	25 - 27	CH	99.8	76.9	34.7	42.2	

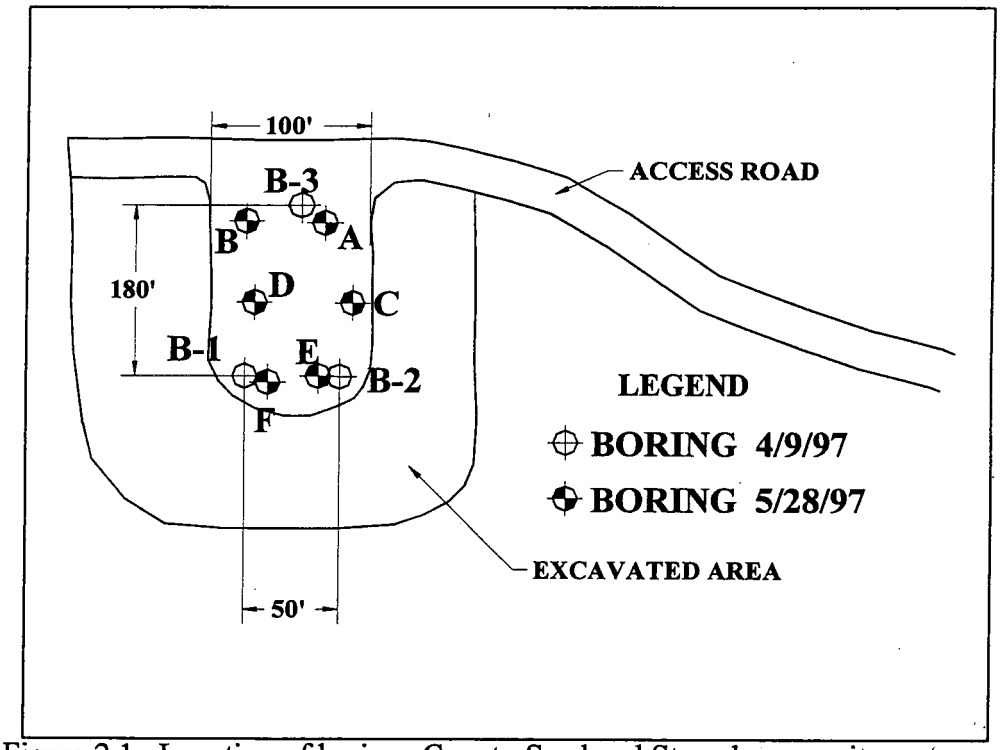


Figure 2.1. Location of borings County Sand and Stone borrow pit.

Table 2.3. Classification Tests for DuPont Clay.

	BORING A				B				C				D				E				F			
Depth ft	LL	PI	- 200	USCS	LL	PI	- 200	USCS	LL	PI	- 200	USCS	LL	PI	- 200	USCS	LL	PI	- 200	USCS	LL	PI	- 200	USCS
2																								
4																								
6																								
8																								
12	63	34	96.9	CH	64	37	99.3	CH	57	29	98.2	CH	57	31	97.1	CH	59	37	99.1	CH	57	29	96.6	CH
14	59	33	99.1	CH	70	41	99.8	CH	93	35	99.8	CH	75	40	99.4	MH	61	36	99.8	CH	54	28	97.0	CH
16	65	34	99.6	CH	70	40	99.6	CH	61	30	99.4	CH	81	43	98.6	MH	72	47	99.4	CH	68	39	99.6	CH
18	65	34	98.1	CH	78	45	99.9	CH	58	35	99.2	CH	89	49	99.8	MH	72	44	99.5	CH	76	46	99.0	CH
20	67	36	99.5	CH	94	60	99.8	CH	76	47	99.7	CH	61	34	98.5	CH	74	46	99.5	CH	67	34	98.2	CH

Notes:

1. Laboratory test results of composite samples (3 sets of tests were performed by 3 different investigators).

	Set #1	Set #2	Set #3
LL	63.0	64.5	67.5
PI	34.7	36.3	35.8
% passing #200	98.6	98.6	98.5
USCS	CH	CH	CH

2. For locations of borings A, B, C, D, E & F, see boring location plan.

3. Soils from 0' - 10' were discarded.

Original Borings

Original Borings

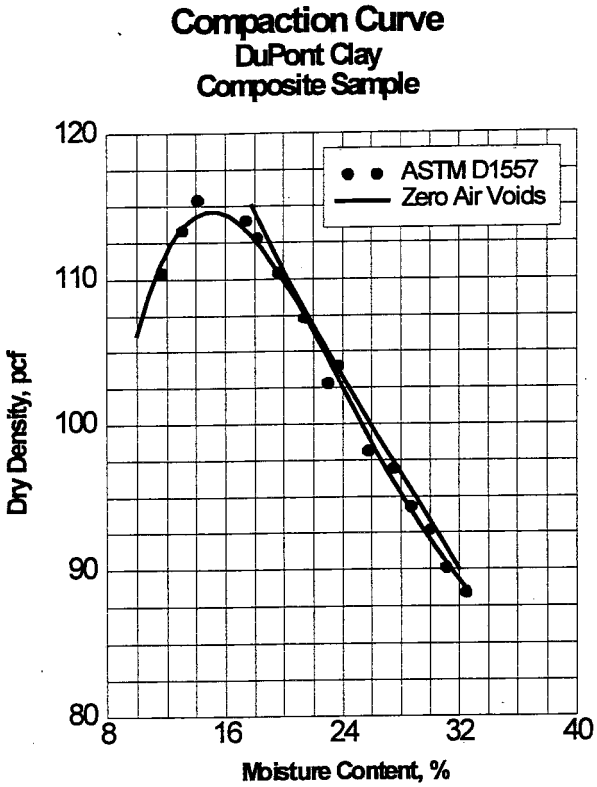


Figure 2.5. ~~CBR~~ Density curve for DuPont clay.

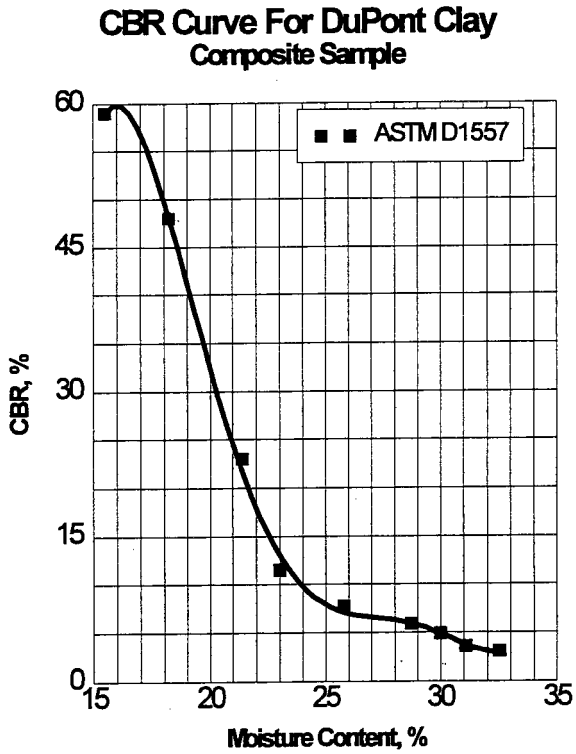
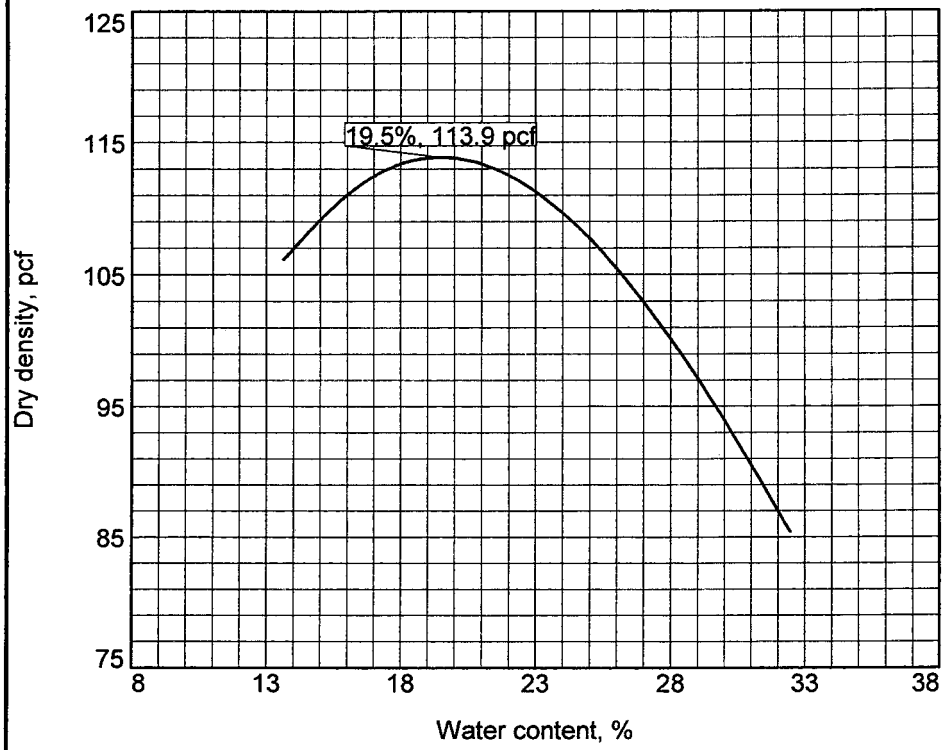


Figure 2.6. ~~Density~~ CBR curve for DuPont clay.

Next 5 Pages – Samples Taken from Stock Pile Used for CC4

COMPACTION TEST REPORT



Curve No.

Test Specification:
ASTM D 1557-02 Method B Modified

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: 0.03333 cu. ft.
Test Performed on Material Passing 3/8 in. **Sieve**

Soil Data

NM _____ **Sp.G.** _____
LL _____ **PI** _____
%>3/8 in. 0.0 **%<#200** 80.9
USCS CL:H\ML:H **AASHTO** _____

TESTING DATA

	1	2	3	4	5	6
WM + WS	8.50	8.80	8.50	8.25		
WM	4.48	4.48	4.48	4.48		
WW + T #1	300.0	300.0	300.0	300.0		
WD + T #1	264.0	258.0	230.0	226.5		
TARE #1	0.0	0.0	0.0	0.0		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	13.6	16.3	30.4	32.5		
DRY DENSITY	106.1	111.5	92.5	85.4		

TEST RESULTS

Maximum dry density = 113.9 pcf

Optimum moisture = 19.5 %

Material Description

Brown SILT\CLAY with sand

Project No. 911031 **Client:** SRA International, Inc.
Project: NAPTF
Pomona, New Jersey
o **Location:** Dupont - 25 Blows **Sample Number:** D-25-B (WGCC-4)

Remarks:
Sampled By: Client
Delivered By: Client

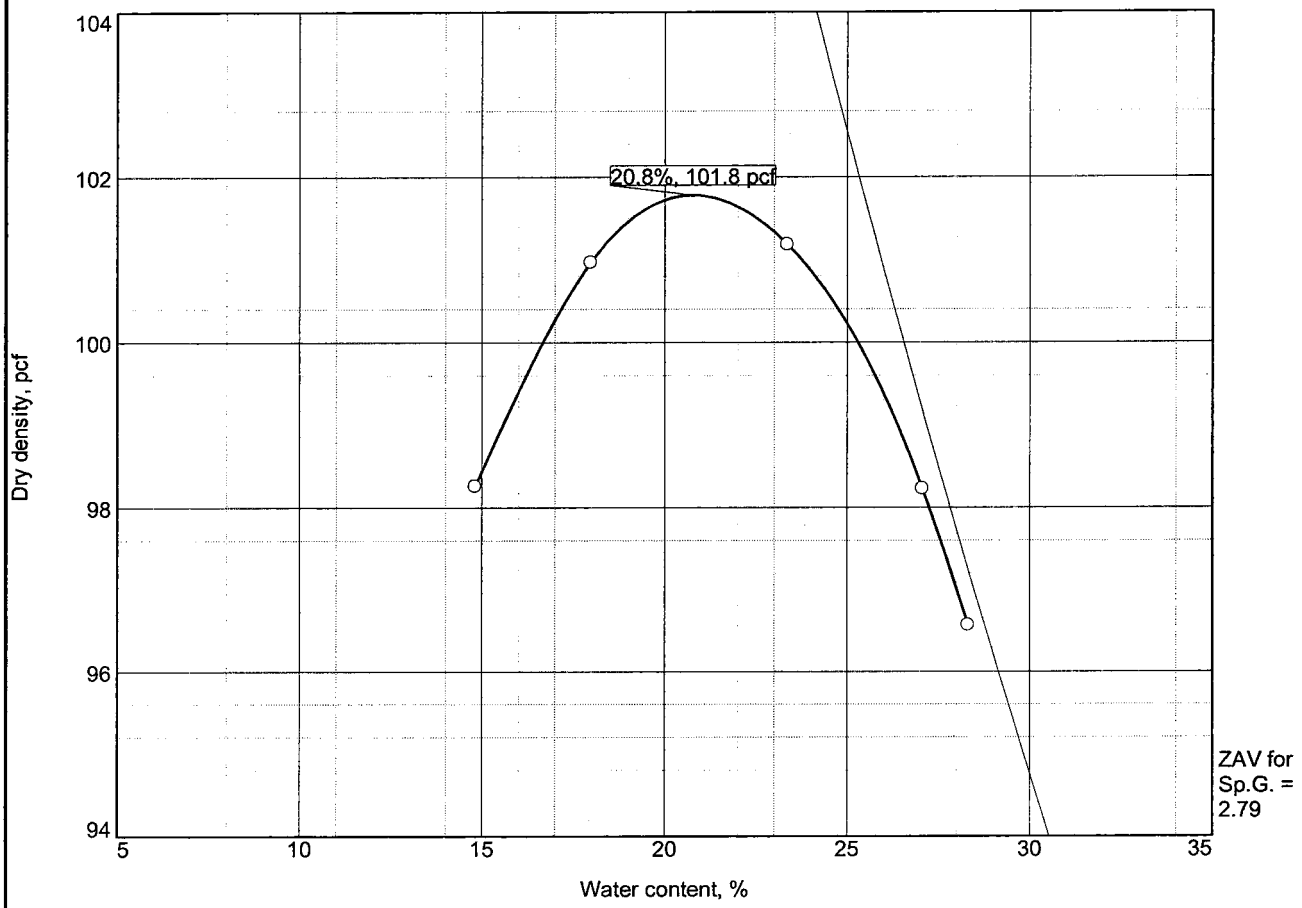
Craig Testing Laboratories, Inc.

Mays Landing, New Jersey

Figure

Tested By: J Landy Jr **Checked By:** R. Norcross

COMPACTION TEST REPORT



Test specification: ASTM D 1557-02 Method A Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > #4	% < No.200
	USCS	AASHTO						
	CL:H\ML:H						0.1	84.0

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 101.8 pcf Optimum moisture = 20.8 %	Brown SILT\CLAY with sand

Project No. 911031 **Client:** SRA International, Inc.
Project: National Airport Pavement Test Facility (NAPTF)
Pomona, New Jersey - CSA # s690000132 - Modification 3
○ **Location:** Dupont Clay **Sample Number:** WGCC-3

Remarks:
Sampled By: Client
Delivered By: CTL

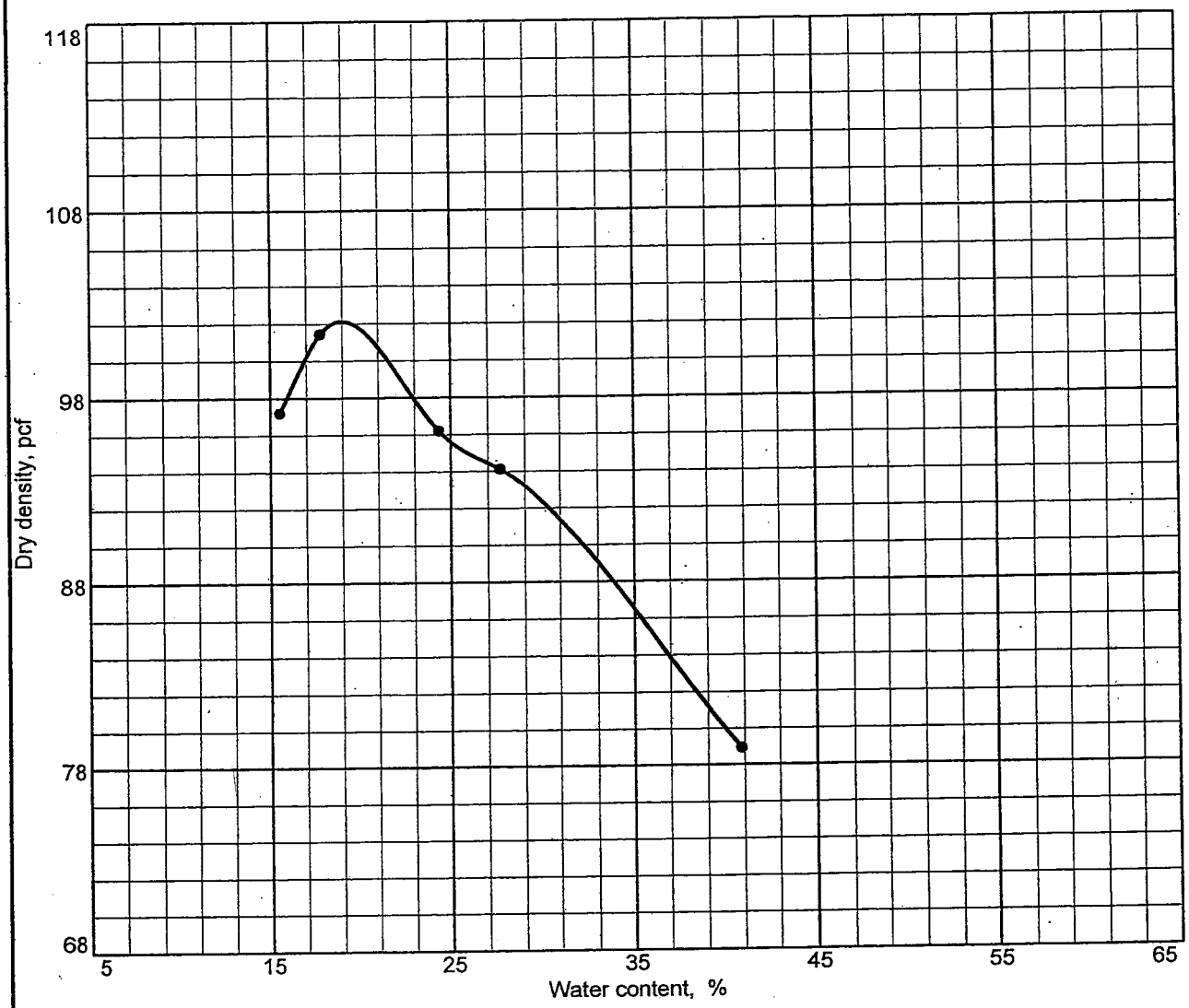
Craig Testing Laboratories, Inc.

Mays Landing, New Jersey

Figure WGCC-3

Tested By: J Landy Jr **Checked By:** R. Norcross

COMPACTION TEST REPORT



Test specification: ASTM D 1557-00 Method C Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
							0.0	58.7

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 102.1 pcf Optimum moisture = 19.0 %	Dark Brown Clay

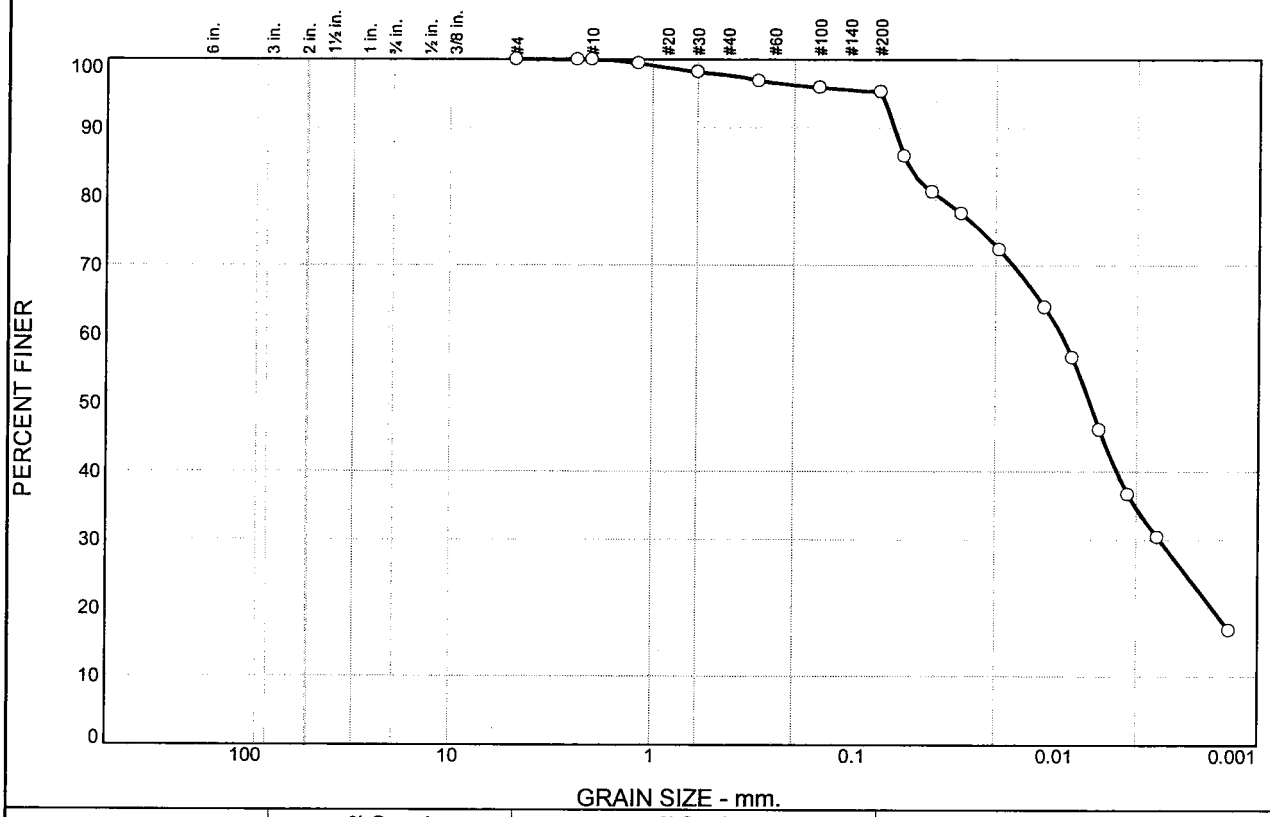
Project No. **Client:** SRA International
Project: National Airport Pavement Facility
Pomona, New Jersey
● **Location:** Dupont Clay

Remarks:

Craig Test Boring Company
Mays Landing, New Jersey

Plate

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	2.3	2.4	55.4	39.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	100.0		
#10	100.0		
#16	99.4		
#30	98.2		
#50	96.9		
#100	95.9		
#200	95.3		

* (no specification provided)

Material Description

Brown-tan fat CLAY

Atterberg Limits

LL= 53 PL= 29 PI= 24

Coefficients

D_{85}= 0.0554 D_{60}= 0.0095 D_{50}= 0.0068
D_{30}= 0.0031 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CH

Remarks

Moisture Content: 46%

Source of Sample: Bulk
Sample Number: Dupont Clay

Date: 2/13/09

Craig Testing Laboratories, Inc.

Mays Landing, New Jersey

Client: SRA International Inc.
Project: National Airport Pavement Test Facility
Pomona, NJ
Project No: 911031-2 **Plate** 1

FALLING -HEAD PERMEABILITY TEST REPORT

CLIENT: SRA International, Inc.

PROJECT: NAPTF Pomona, NJ

Sample No and Source: Dupont Clay

Material Description: Brown SILT/CLAY

Date: 2/11/2009

CGES No.: 911031

Test Method: ASTM 5084, Method C

Type of Sample: Recompacted		Pre-test	Post-test	Specimen Data	Pre-test	Post-test
Water Content (%)	Tare + moist soil	968.13	1407.71	Diameter of specimen, cm	7.31	7.37
	Tare + dry soil	733.22	1151.31	Area of specimen, A, cm^2	42.01	42.71
	Tare	0.00	418.09	Length of specimen, L, cm	12.61	12.61
	Water	234.91	256.40	Vol. of specimen, cc =AL	529.89	538.40
	Dry soil	733.22	733.22	Wet Wt., grams	968.1	990.03
	Water Content	32.0%	35.0%	Bulk density, pcf	114.0	114.7
Physical property:				Water Content	32.0%	35.0%
Liquid Limit:		Specific Gravity	2.54	Dry density, pcf	86.3	85.0
Plastic Limit:		USCS	ML:H/CL:H	Degree of saturation (%)	97.4%	102.8%

Saturation:	Cell Pressure	40 psi	Back Pressure	38 psi	Effective consolidation pressure	2 psi
Permeation	Cell Pressure	41 psi	Head Pressure	39 psi	Tail pressure	38 psi

Permeability Determination (from Last four readings)

Test No		1	2	3	4
Area of pippet, cm^2	a	1.00	1.00	1.00	1.00
Length of specimen, cm	L	12.612	12.612	12.612	12.612
Initial Head, h_1, cm	h_1	50.11	55.0	57.3	62.2
Final Head, h_2, cm	h_2	47.21	50.11	55.01	57.31
Hydraulic gradient	I	3.9	4.2	4.5	4.7
Elapsed time , min	t	56.0	111.0	71.0	137.0
Water temperature, ^0C	T	21.9	21.9	21.9	21.9
Viscosity correction factor	R_T	0.9558	0.9556	0.9556	0.9556
Coefficient of permeability, cm/sec	k_{20}	2.55E-06	2.01E-06	1.38E-06	1.43E-06
Average k_{20}, cm/sec		1.84E-06			

Notes:

(1). Correction factor for viscosity of water at 20 ^0C obtained from table.

(2). $$K_{20} = \frac{a\,L\,R_t}{2\,A\,t}\,\mathrm{Ln}\,(h_1/h_2)$$

Remarks:

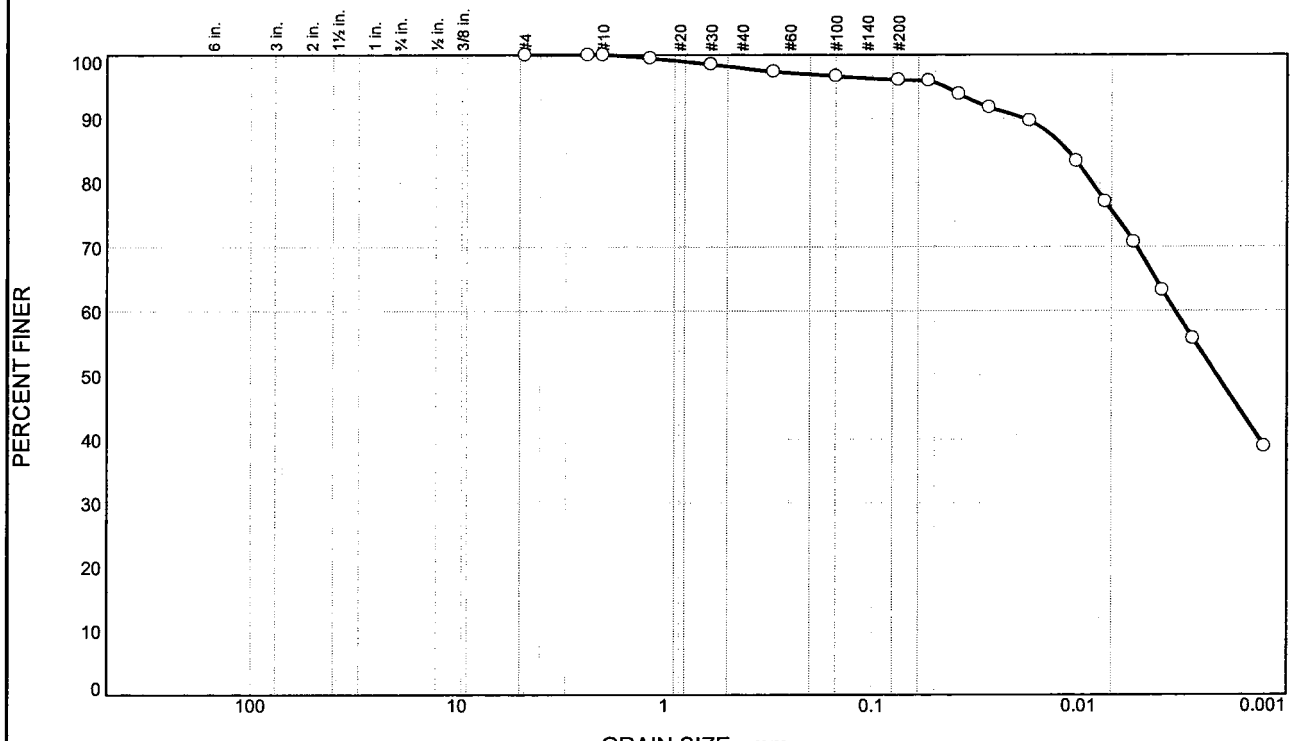
Tested By: RN/JV Computed By: RN/JV Checked By: EF Plate No 1

CRAIG TESTING LABORATORIES, INC.
5434 Harding Highway, Mays Landing, NJ Tel: (609) 625-2730 Fax: (609)625-9133

All reports are the confidential property of clients, and information contained may not be published or reproduced, pending our written approval.

Next 5 Pages - Samples from the Original Pit, Considering restocking from this source.

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	2.1	1.8	27.4	68.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#8	100.0		
#10	100.0		
#16	99.5		
#30	98.5		
#50	97.4		
#100	96.7		
#200	96.1		

* (no specification provided)

Material Description

Tan and gray fat CLAY

Atterberg Limits (ASTM D 4318)

PL= 23 LL= 56 PI= 33

Classification

USCS= CH AASHTO= A-7-6(36)

Coefficients

D_{85}= 0.0115 D_{60}= 0.0035 D_{50}= 0.0022
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Date Tested: 10/13/09 **Tested By:** L. Whiteley

Remarks

Moisture Content (MC): 29%

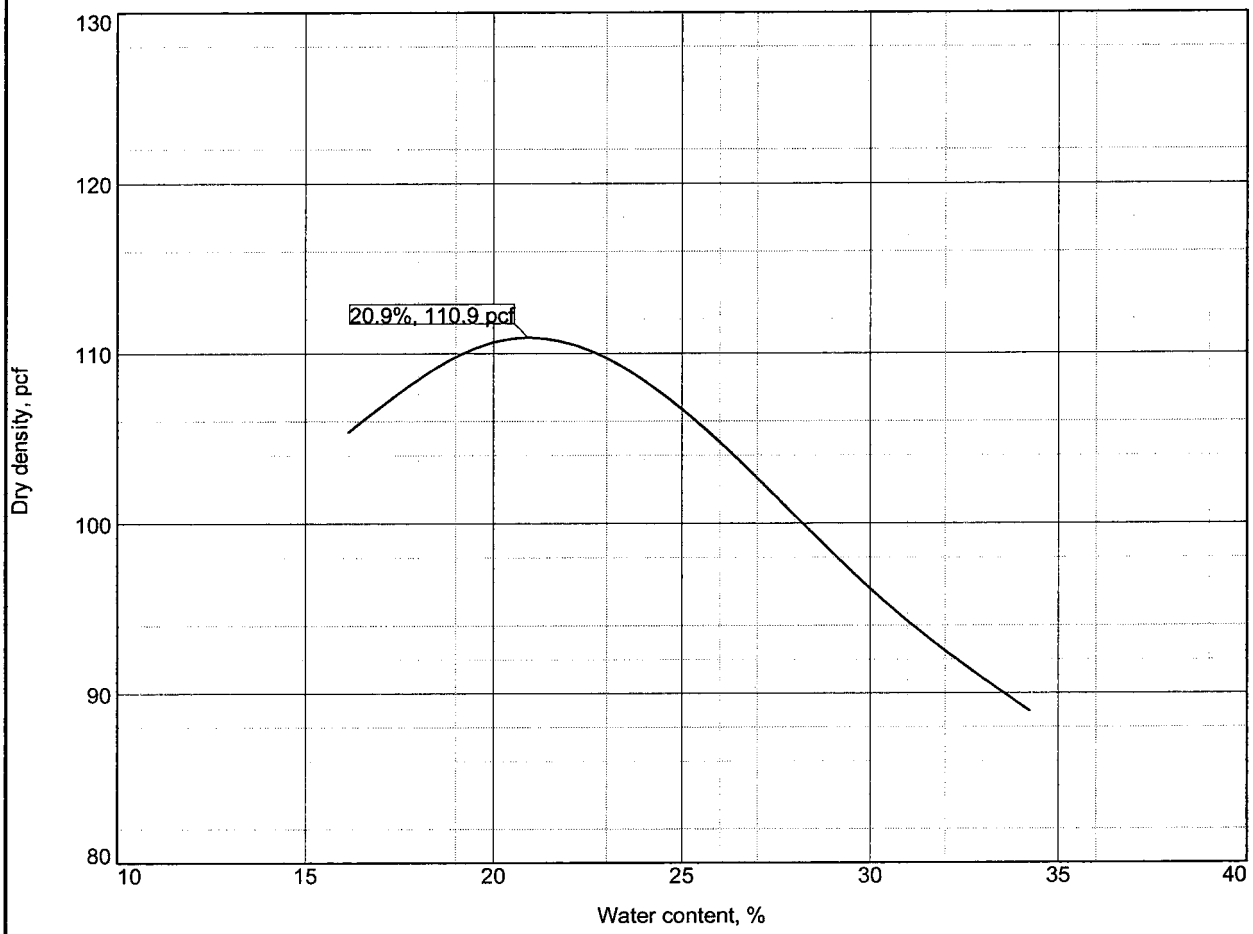
Sample No.: D(2)-25-A **Source of Sample:** Dupont **Date Sampled:** 10/12/09
Location: Dupont Clay (Original) **Elev./Depth:**
Checked By: I. Craig **Title:** VP Const Services

Craig Testing Laboratories, Inc.

Mays Landing, New Jersey

Client: SRA International, Inc.
Project: NAPTF
Pomona, New Jersey
Project No: 911031 **Figure** WGCC-6

COMPACTION TEST REPORT



Test specification: ASTM D 1557-02 Method B Modified

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
	CH	A-7-6(36)		2.589	56	33	0.0	96.1

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 110.9 pcf Optimum moisture = 20.9 %	Tan and gray fat CLAY

Project No. 911031 **Client:** SRA International, Inc.
Project: NAPTF
Pomona, New Jersey
○ **Location:** Dupont Clay (Original) **Sample Number:** D(2)-25-A

Remarks:

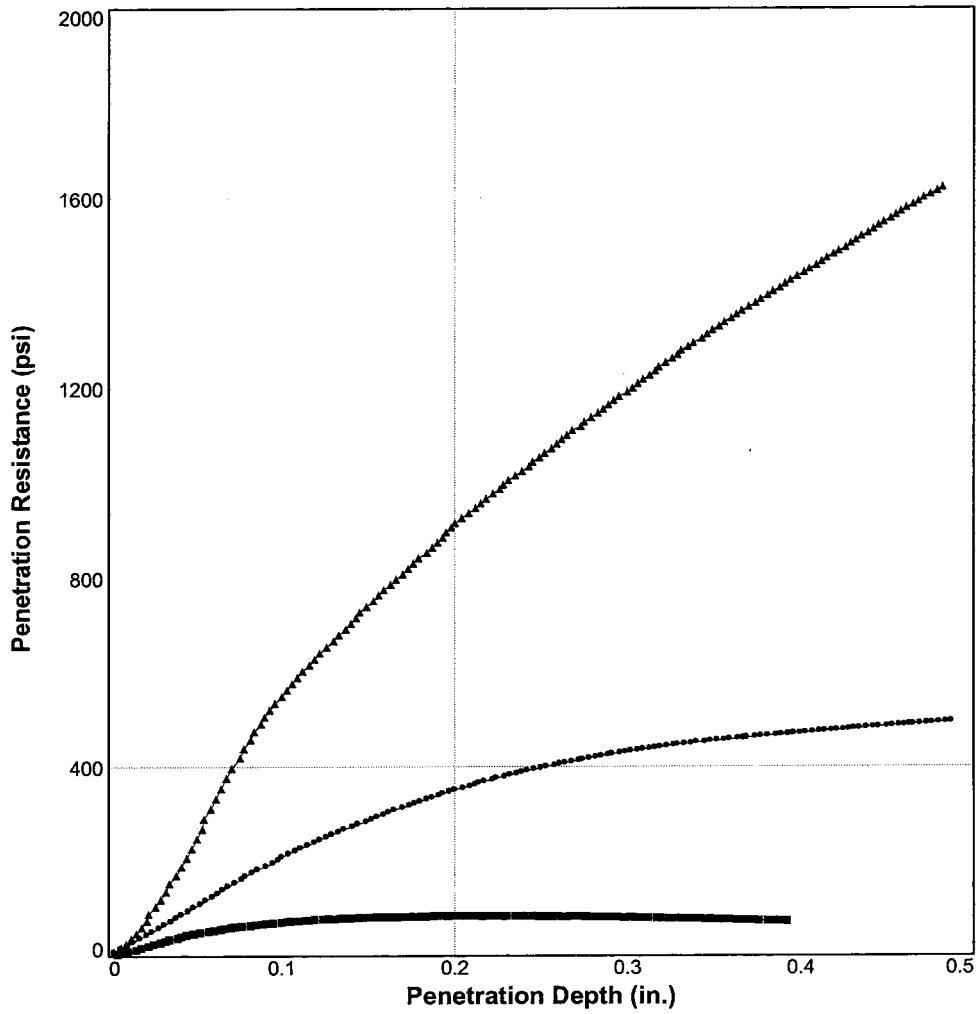
Craig Testing Laboratories, Inc.

Mays Landing, New Jersey

Figure D(2)-25

Tested By: J. Landy Jr. **Checked By:** R. Norcross

BEARING RATIO TEST REPORT
ASTM D 1883-05



	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	110.9	100	20.4				21.0	23.4	0.000	10	
2 △	105.4	95	16.1				59.1	62.7	0.010	10	
3 □	95.5	86.1	30.3				7.1	5.6	0.000	10	

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan and gray fat CLAY	CH	110.9	20.9	56	33

Project No: 911031

Project: NAPTF Pomona, New Jersey

Location: Dupont Clay (Original)

Sample Number: D(2)-25-A

Date: 10/12/09

Test Description/Remarks:

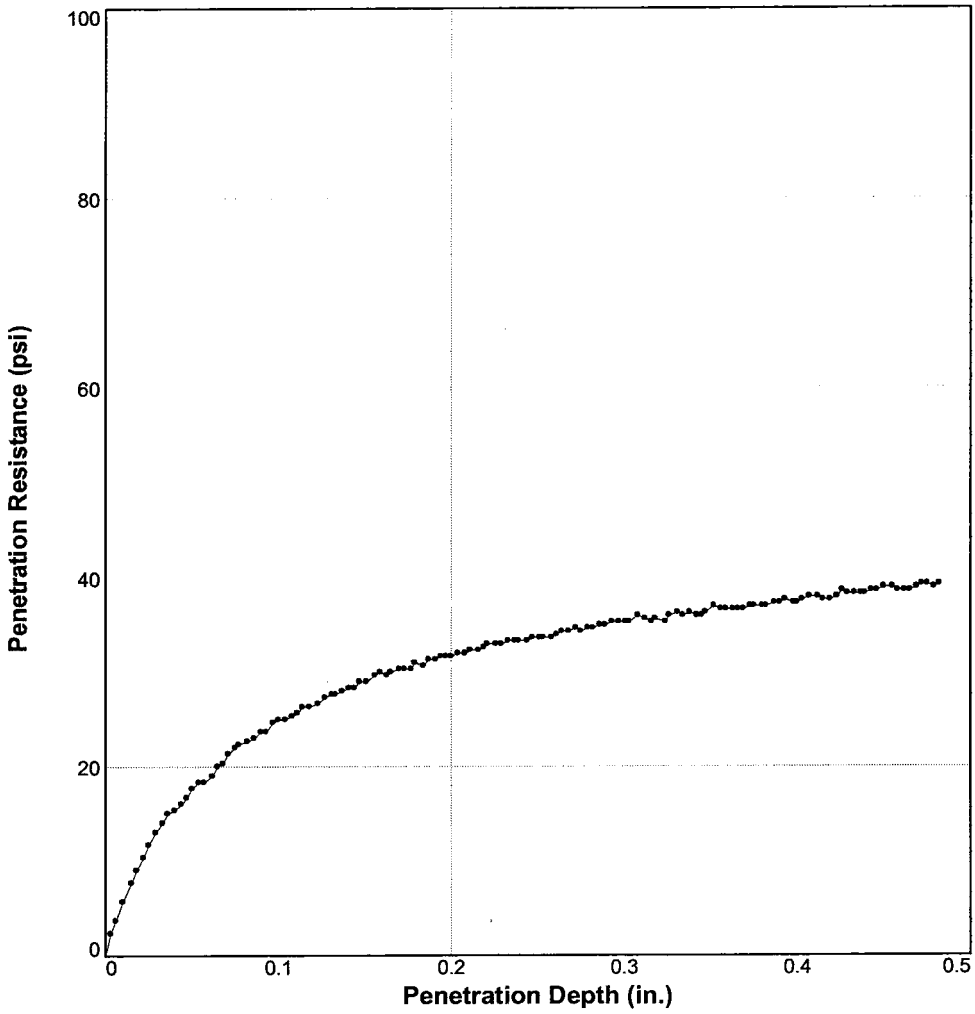
ASTM D-1883 standard not applied per client

BEARING RATIO TEST REPORT

Craig Testing Laboratories, Inc.

Plate D(2)-25-A

BEARING RATIO TEST REPORT
ASTM D 1883-05



	Molded			Soaked			CBR (%)		Linearity Correction (in.)	Surcharge (lbs.)	Max. Swell (%)
	Density (pcf)	Percent of Max. Dens.	Moisture (%)	Density (pcf)	Percent of Max. Dens.	Moisture (%)	0.10 in.	0.20 in.			
1 ○	89.0	80.3	34.2				2.5	2.1	-0.002	10	
2 △											
3 □											

Material Description	USCS	Max. Dens. (pcf)	Optimum Moisture (%)	LL	PI
Tan and gray fat CLAY	CH	110.9	20.9	56	33

Project No: 911031

Project: NAPTF Pomona, New Jersey

Location: Dupont Clay (Original)

Sample Number: D(2)-25-B

Date: 10/12/09

Test Description/Remarks:

ASTM D-1883 standard not applied per client

BEARING RATIO TEST REPORT

Craig Testing Laboratories, Inc.

Plate D(2)-25-B

FALLING-HEAD PERMEABILITY TEST REPORT

CLIENT: SRA International, Inc. DATE: 10/16/2009

PROJECT: NAPTF, Pamona, NJ CGES NO.: 911031

Sample No. and Source: Import - Dupont Clay (Original)

Material Description: Tan and gray fat CLAY Test Method: ASTM 5084, Method C

Type of Sample: Recompacted		Pre-test	Post-test	Specimen Data	Pre-test	Post-test
Water Content (%)	Tare + moist soil, grams	643.73	1112.15	Diameter of specimen, cm	7.29	7.19
	Tare + dry soil, grams	480.61	909.90	Area of specimen, A, cm^2	41.68	40.59
	Tare, grams	0.00	429.29	Length of specimen, L, cm	10.01	9.95
	Water, grams	163.12	202.25	Vol. of specimen, cc =AL	417.15	403.92
	Dry soil, grams	480.61	480.61	Wet Wt., grams	643.7	682.86
	Water Content (%)	33.9%	42.1%	Bulk density, pcf	96.3	105.5
Physical properties:				Water Content (%)	33.9%	42.1%
Liquid Limit: 56	Specific Gravity: 2.59			Dry density, pcf	71.9	74.2
Plastic Limit: 23	USCS: CH			Degree of saturation (%)	70.5%	92.7%

Saturation:	Cell Pressure	40 psi	Back Pressure	38 psi	Effective Consolidation Pressure	2 psi
Permeation:	Cell Pressure	41 psi	Head Pressure	39 psi	Tail Pressure	38 psi

Permeability Determination (from last four readings)

Test No.		1	2	3	4
Area of pippet, cm^2	a	1.00	1.00	1.00	1.00
Length of specimen, cm	L	10.01	10.01	10.01	10.01
Initial Head, h_1, cm	h_1	63.6	72.5	73.5	75.5
Final Head, h_2, cm	h_2	48.3	63.6	72.5	73.6
Hydraulic gradient	I	5.6	6.8	7.3	7.5
Elapsed time , min	t	7.0	3.0	1.0	1.0
Water temperature, ^0C	T	21.9	22.0	22.0	22.0
Viscosity correction factor	R_T	0.9556	0.9533	0.9533	0.9533
Coefficient of permeability, cm/sec	k_{20}	7.51E-05	8.33E-05	2.61E-05	4.86E-05
Average k_{20} , cm/sec		**5.83E-05**			

Notes:

(1). Correction factor for viscosity of water at 20^0C obtained from table.

(2). $$k_{20} = \frac{a\,L\,R_t}{2\,A\,t}\ \mathrm{Ln}\,(h_1/h_2)$$

Remarks: Sample had voids throughout

Sample compacted to 95% of Maximum Dry Density

Tested By: JM Computed By: JV Checked By: RN Plate No. FW-1

CRAIG TESTING LABORATORIES, INC.

5434 Harding Highway, Mays Landing, NJ Tel: (609) 625-0386

Summarized Test Results of DuPont Clay (used at NAPTF) and DuPont Clay (received from Original Pit)

Source/Material	Atterberg Limit Test			USCS Classification	Specific Gravity	% Fines		% Sand	Permeability k_{20} (cm/sec)	OMC, Max. Density
	LL	*PL*	*PI*			*Silt*	*Clay*			
DuPont Clay (NAPTF)	53	29	24	CH	2.541	55.4	39.9	4.7	1.84E-06	(19-20.8), (101.8-113.9)
DuPont Clay (Original Pit)	56	23	33	CH	2.589	27.4	68.7	3.9	5.83E-05	(20.9, 110.9)

New Samples

58.3×10^{-6}

CBR Numbers on DuPont Clay (Original Pit)

Moisture Content, %	CBR, %
16.1	59.1
20.4	21.0
30.3	7.1
34.2	2.5