APPENDIX B

LABORATORY PROGRAM

The laboratory testing program was directed to toward a quantitative evaluation of physical and engineering soil properties that would be relevant for the design of the proposed power plant. Soil samples were selected for laboratory testing based on the conditions encountered, and our understanding of the project design requirements.

Moisture Content: The natural water content was determined (ASTM D2216) on more than 282 samples of the materials recovered from the borings. These water contents are recorded on the boring logs at the appropriate sample depths.

Dry Densities: In place dry density determinations (ASTM D2937) were performed on more than 252 samples to measure the unit weight of the subsurface soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

Plasticity Index: Plasticity Index determinations (ASTM D4318) were performed on 28 samples of the subsurface soils to measure the range of water contents over which these materials exhibit plasticity. The Plasticity Index was used to classify the soil in accordance with the Unified Soil Classification System and to evaluate the soil expansion potential. Results of these tests are presented on Figure B-1 and on the logs of the borings at the appropriate sample depths.

Washed Sieve Analyses: The percent soil fraction passing the No. 200 sieve (ASTM D1140) was determined on 34 samples of the subsurface soils to aid in the classification of these soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

Sieve and Hydrometer Analyses: Gradation and washed sieve analyses (ASTM D422 and D2217) were performed on three samples of the subsurface soils to aid in soil classification. Results of these tests are included in this appendix.

Unconfined Compression: Unconfined compression tests (ASTM D2166) were performed on 4 undisturbed samples of the clayey subsurface soils to evaluate the undrained shear strengths of these materials. Samples tested had a diameter of 2.8 inches and a height-to-diameter ratio of at least 2. Failure was taken as the peak normal stress. Results of these tests are presented on the boring logs at the appropriate sample depths.

Consolidation: Consolidation tests (ASTM D2435) were performed on 12 undisturbed samples of the subsurface clayey soils to assist in evaluating the compressibility properties of these soils. Results of the consolidation tests are attached to this appendix. The table below summarizes our interpretation of the consolidation tests.

Table B-1 Consolidation Test Interpretation Summary

Boring Number	Sample Depth (feet)	Virgin Index (strain based)	Recompression Index (strain based)	OCR
RW-1	7	0.12	0.01	6
RW-1	23.5	0.13	0.015	1.8
RW-2	13.5	0.11	0.015	2.2
RW-3	9	0.11	0.01	2.5
RW-4	8	0.11	0.01	1.6
RW-4	26	0.14	0.017	2.4
RW-6	18.5	0.15	0.01	1.9
RW-7	18.5	0.12	0.01	2.0
RW-8	8	0.14	0.015	4.5
RW-8	38.5	0.14	0.01	1.4
RW-9	13.5	0.11	0.01	1.8
RW-10	14	0.16	0.01	2.5

Consolidated Undrained Shear Strength (CU): Twelve triaxial consolidated-undrained shear tests were performed to estimate the undrained shear strength for foundation design.. Results of these tests are included in this appendix.

Unconsolidated Undrained Shear Strength (UU): Two triaxial unconsolidated-undrained shear tests were performed to estimate the undrained shear strength of the subsurface soils for foundation design.

Hydraulic Conductivity: Two samples were tested for hydraulic conductivity to aid in future seepage analysis for detention pond design. Results of these tests are included in this appendix.

R-Values: R-value (resistance) tests (California Test Method No. 301) were performed on 3 samples of the surface soils at the site to provide data for pavement design. The results of the tests are attached as part of this appendix.

Corrosivity: 16 soil samples were submitted to an independent laboratory to test for corrosivity. Each sample was tested for electrical resistivity, pH, soluble sulfate and chloride content. The results of the testing attached to this appendix.

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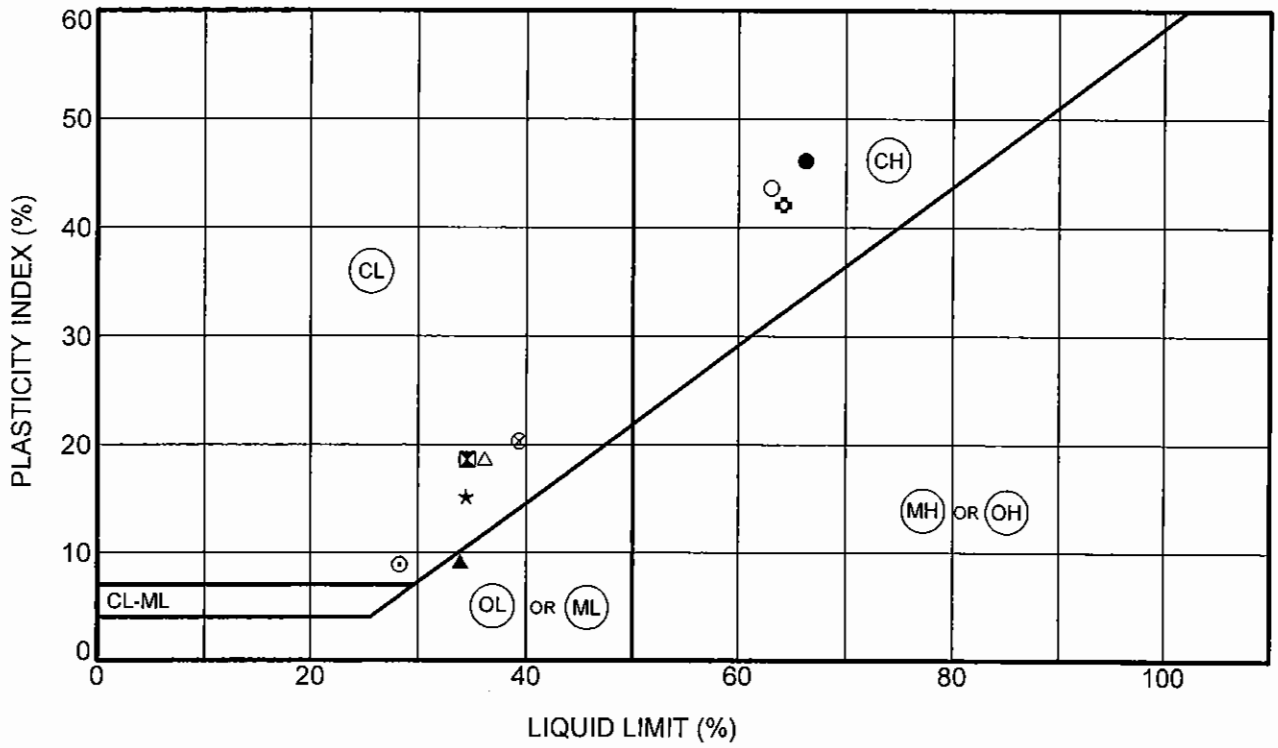


Symbol	Boring No.	Depth (ft.)	Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing No. 200 Sieve	Unified Soil Classification Description
●	H-1	3.0	27	66	20	46		FAT CLAY (CH)
⊠	H-11	9.0	22	35	16	19		LEAN CLAY (CL)
▲	H-11	14.5	30	34	25	9		SILT (ML)
★	H-11	19.5	23	34	19	15		LEAN CLAY (CL)
⊙	H-11	24.5	20	28	19	9		LEAN CLAY WITH SAND (CL)
✿	H-3	4.0	25	64	22	42		FAT CLAY WITH SAND (CH)[FILL]
○	H-4	2.0	25	63	19	44		FAT CLAY (CH)
△	H-5	4.0	21	36	17	19		LEAN CLAY (CL)
⊗	H-8	4.5	24	39	19	20		LEAN CLAY WITH SAND (CL)[FILL]

TRC Lowney

PLASTICITY CHART AND DATA

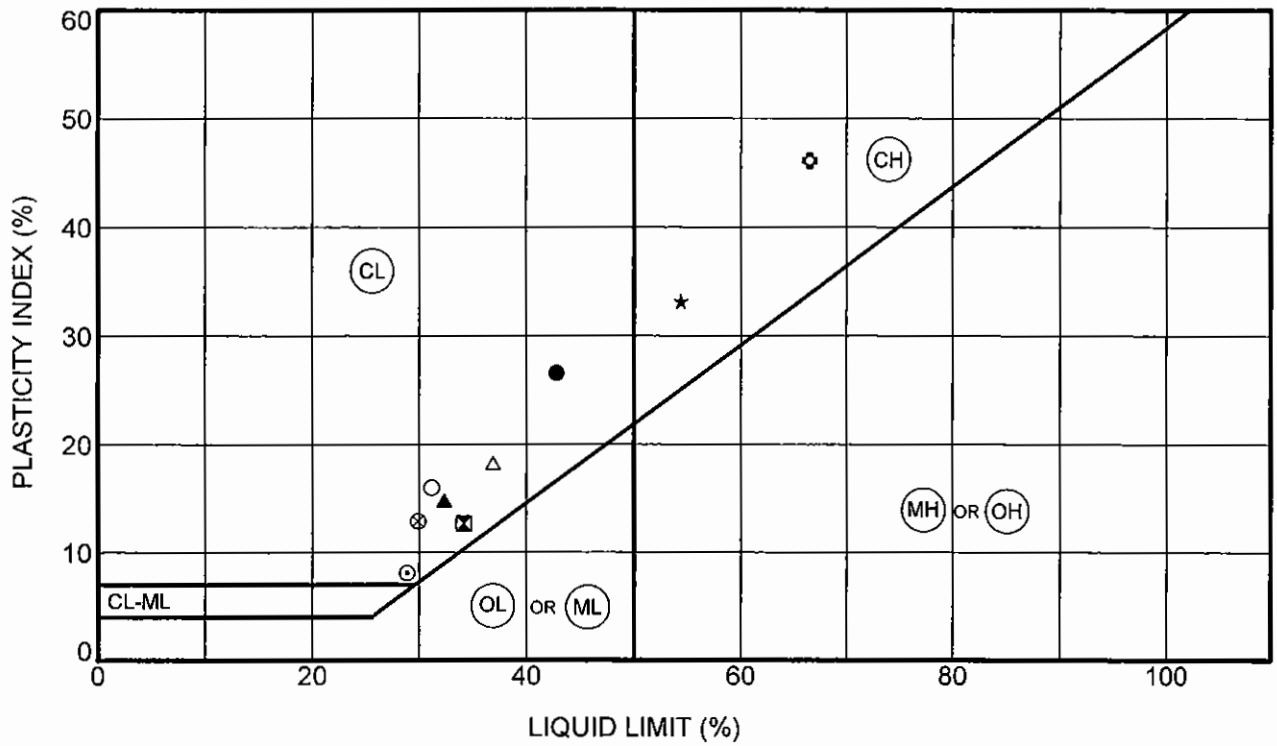
Project: RUSSELL CITY ENERGY CENTER

Location: HAYWARD, CA

Project No.: 2289-1

FIGURE B-1

LA_CORP.GDT 1/19/07 MV* FL



Symbol	Boring No.	Depth (ft.)	Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing No. 200 Sieve	Unified Soil Classification Description
●	RW-1	2.0	20	43	16	27		LEAN CLAY (CL)
⊠	RW-1	64.5	24	34	21	13		LEAN CLAY (CL)
▲	RW-10	2.0	18	32	17	15		SANDY LEAN CLAY (CL)
★	RW-10	9.0	27	54	21	33		FAT CLAY (CH)
⊙	RW-10	47.0	24	29	21	8		SANDY LEAN CLAY (CL)
✿	RW-2	2.0	28	66	20	46		FAT CLAY (CH)
○	RW-3	2.0	16	31	15	16		LEAN CLAY WITH SAND (CL)[FILL]
△	RW-3	59.5	22	37	19	18		LEAN CLAY (CL)
⊗	RW-3	69.5	20	30	17	13		LEAN CLAY WITH SAND (CL)

TRC Lowney

PLASTICITY CHART AND DATA

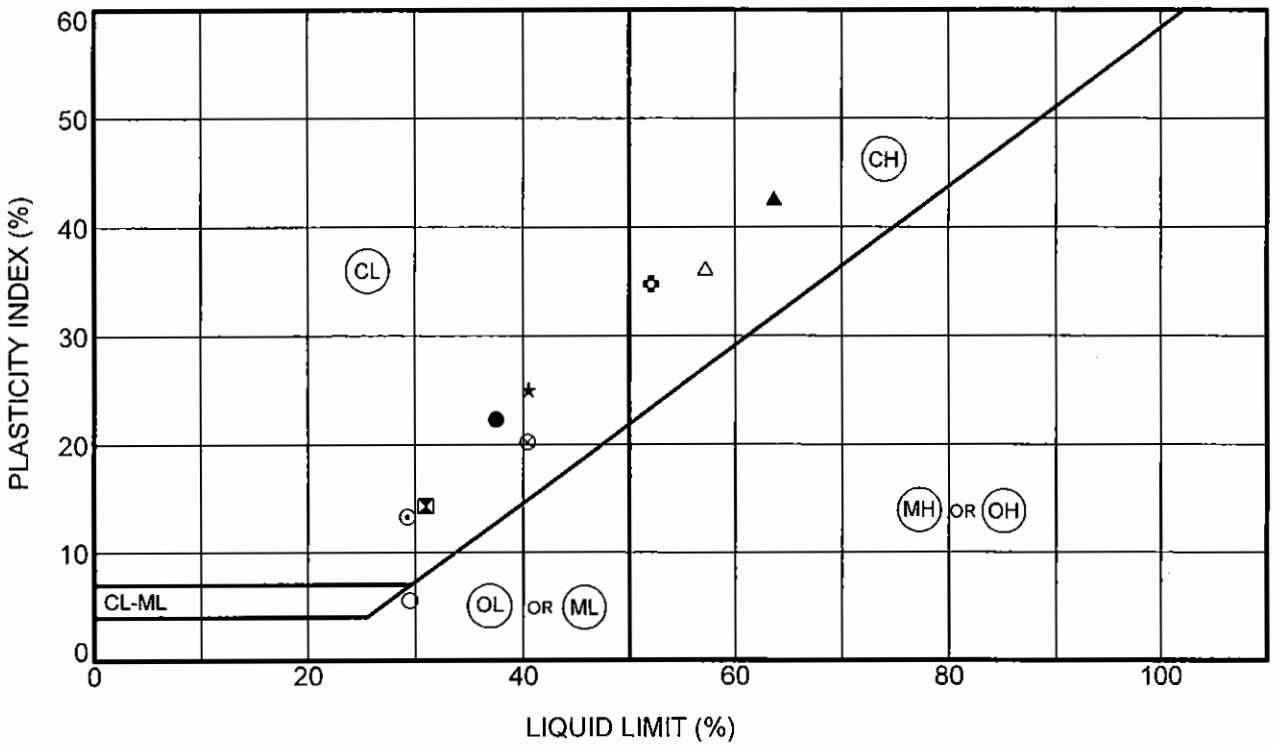
Project: RUSSELL CITY ENERGY CENTER

Location: HAYWARD, CA

Project No.: 2289-1

FIGURE B-1

LA_CORP.GDT 1/19/07 MV* FL



Symbol	Boring No.	Depth (ft.)	Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing No. 200 Sieve	Unified Soil Classification Description
●	RW-4	2.0	19	37	15	22		LEAN CLAY WITH SAND (CL) [FILL]
⊠	RW-4	4.0	20	31	17	14		LEAN CLAY WITH SAND (CL) [FILL]
▲	RW-5	2.0	27	64	21	43		FAT CLAY (CH)
★	RW-5	6.0	21	41	15	26		LEAN CLAY (CL)
⊙	RW-5	24.5	21	29	16	13		LEAN CLAY (CL)
✿	RW-6	4.0	23	52	17	35		FAT CLAY (CH)
○	RW-6	59.5	24	30	24	6		SANDY SILT (ML)
△	RW-7	4.0	26	57	21	36		FAT CLAY (CH)
⊗	RW-8	14.5	22	40	20	20		LEAN CLAY (CL)

TRC Lowney

PLASTICITY CHART AND DATA

Project: RUSSELL CITY ENERGY CENTER

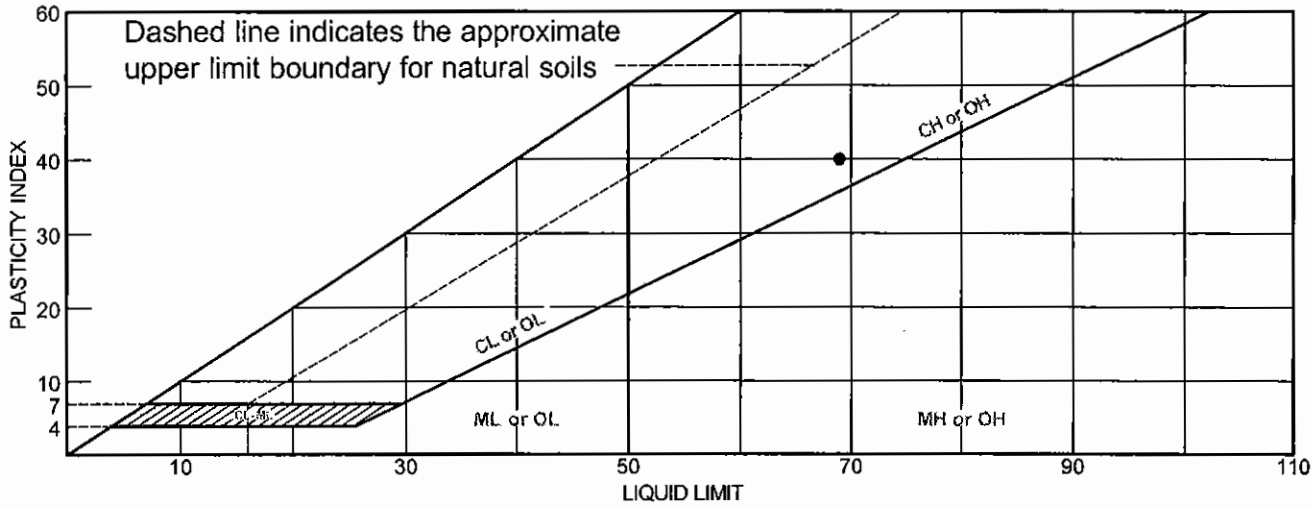
Location: HAYWARD, CA

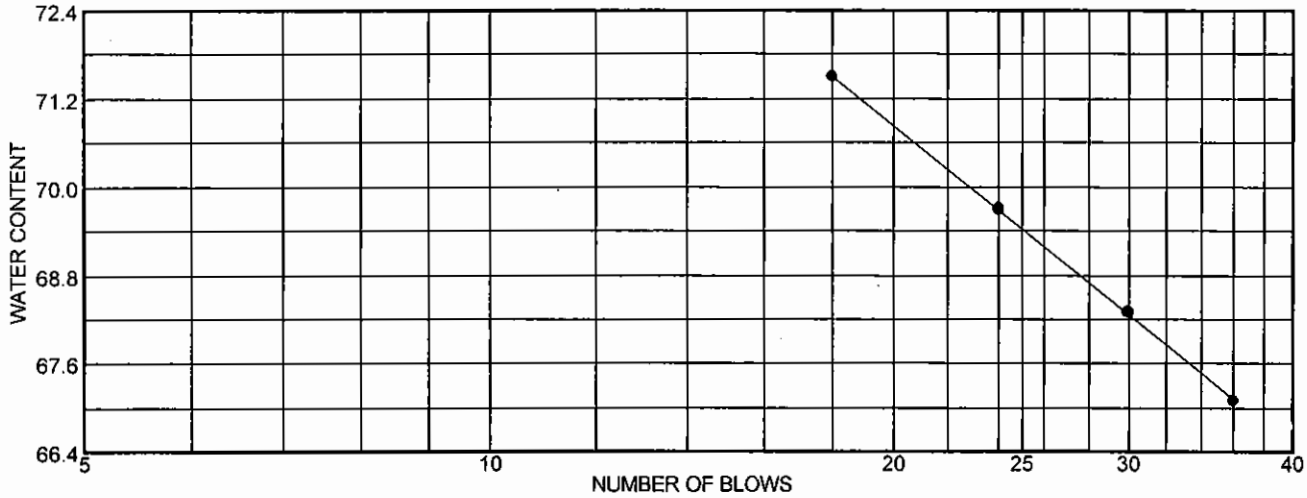
Project No.: 2289-1

FIGURE B-1

LA_CORP.GDT 1/19/07 MV* FL

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Brown Organic Fat CLAY	69	29	40			

Project No. 028-1950 **Client:** TRC Lowney

Project: Russel City Energy Center - 2289-1

● **Source:** H-8 **Sample No.:** 3B **Elev./Depth:** 7.0'

Remarks:

● Sample was prepared using Method A (wet prep.)

LIQUID AND PLASTIC LIMITS TEST REPORT

COOPER TESTING LABORATORY

Figure

COOPER TESTING LABORATORY

Organic Content Test

ASTM D 2974-00 (Method C - 440 °C)

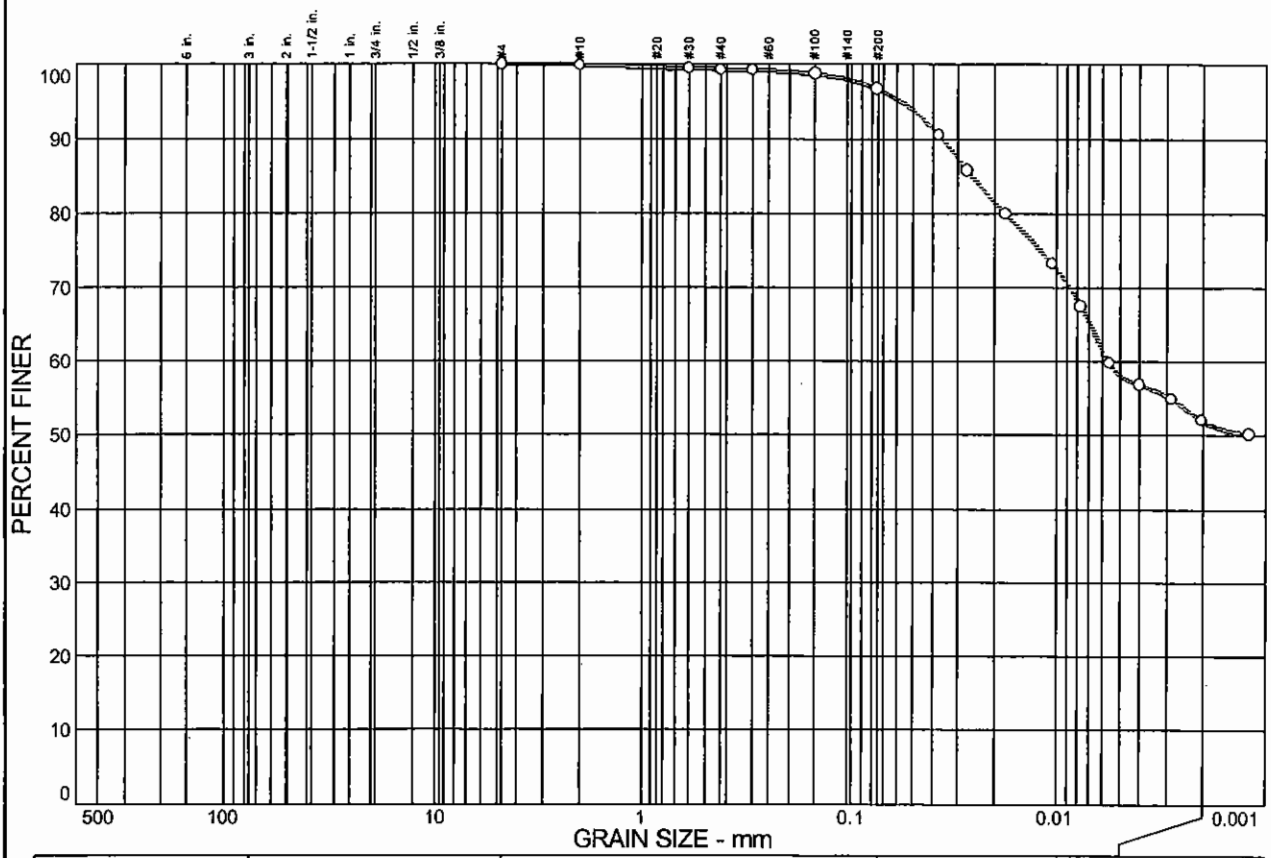
CTL JOB NO.	028-1950			**PROJECT:**	Russell City Energy Center			**DATE:**	12/11/2006
CLIENT :	TRC Lowney			**PROJECT NO.:**	2289-1			**BY:**	RU

Boring :	H-8							
Sample :	3B							
Depth (ft.):	7							
Visual Description:	Dark Brown Organic Fat CLAY							
Dish No.								
Dish wt., gm	80.19							
Soil, Org, Dish & H_2O, gm	140.98							
Oven Dry wt (105°C), gm	110.69							
Furnace Dry wt. (440°C), gm	100.72							
Moisture Content, % of Oven Dry Mass	99.3							
Organic Matter, %	32.7							

Note: When describing soils where we know the % organic matter and the wet/dry liquid limit data is not available, we use the following guidelines:

0-5%: The organics are either not mentioned or mentioned as being "trace".
5-15%: The soil is considered as inorganic and is classified, as per ASTM 2487, with "with organics" included in the desc
15-50%: The soil is considered as organic and is described, per ASTM 2487.
> 50%: The soil is described as "Peat".

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.1	0.6	2.6	44.7	52.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#30	99.4		
#40	99.3		
#50	99.2		
#100	98.7		
#200	96.7		
0.0375 mm.	90.5		
0.0272 mm.	85.7		
0.0177 mm.	79.9		
0.0106 mm.	73.2		
0.0077 mm.	67.5		
0.0056 mm.	59.8		
0.0040 mm.	56.9		
0.0029 mm.	55.0		
0.0020 mm.	52.1		
0.0012 mm.	50.2		

* (no specification provided)

Soil Description

Gray CLAY

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.0259 D_{60}= 0.0057 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

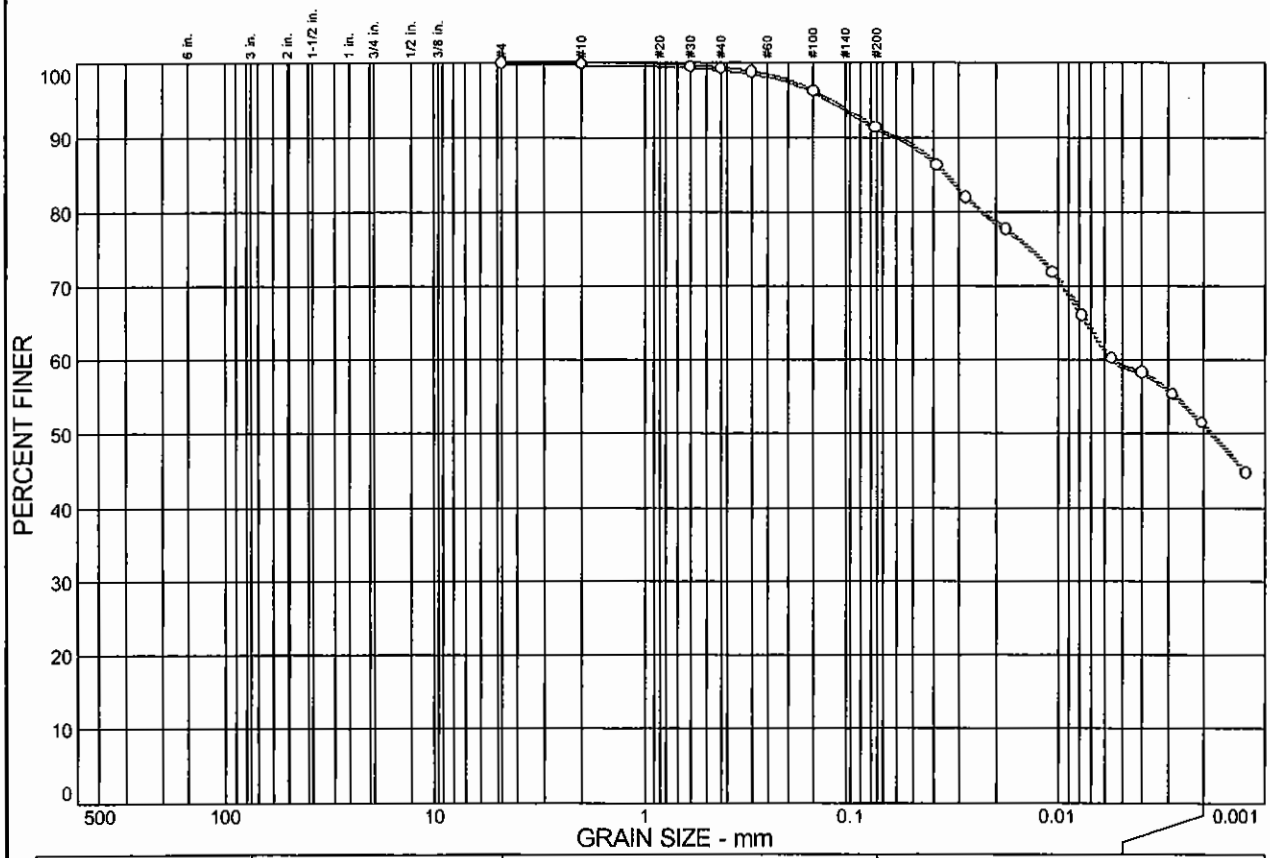
Remarks

Sample No.: 1B **Source of Sample:** H-1 **Date:**
Location: **Elev./Depth:** 3.0'

COOPER TESTING LABORATORY

Client: TRC Lowney
Project: Russel City Energy Center - 2289-1
Project No: 028-1950 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	0.0	0.1	0.7	7.9	40.1	51.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#30	99.5		
#40	99.2		
#50	98.7		
#100	96.2		
#200	91.3		
0.0384 mm.	86.3		
0.0278 mm.	81.9		
0.0180 mm.	77.6		
0.0106 mm.	71.8		
0.0077 mm.	66.0		
0.0056 mm.	60.2		
0.0040 mm.	58.3		
0.0029 mm.	55.4		
0.0020 mm.	51.5		
0.0012 mm.	44.7		

* (no specification provided)

Soil Description

Grayish Brown CLAY

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.0348 D_{60}= 0.0055 D_{50}= 0.0018
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

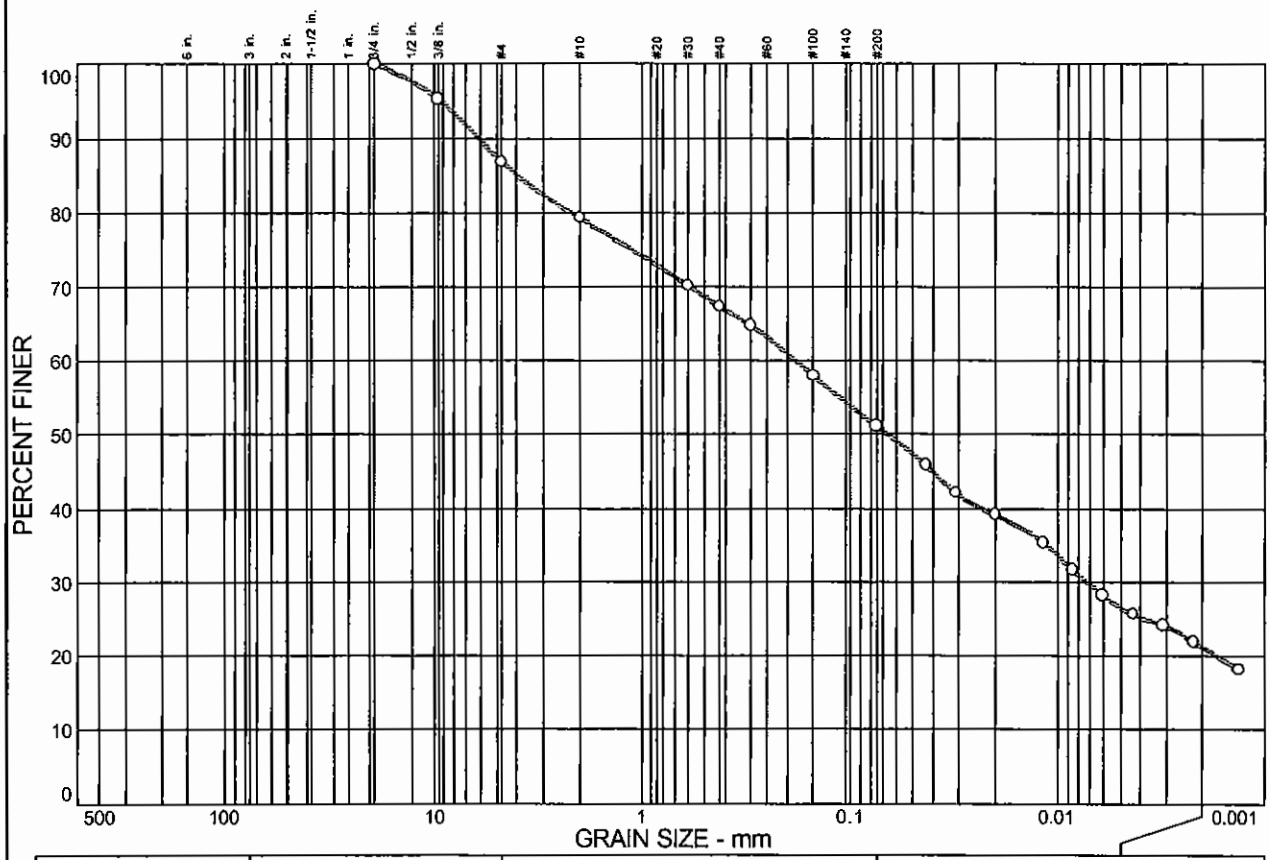
Remarks

Sample No.: 1B **Source of Sample:** H-10 **Date:**
Location: **Elev./Depth:** 2.0'

COOPER TESTING LABORATORY

Client: TRC Lowney
Project: Russel City Energy Center - 2289-1
Project No: 028-1950 **Figure**

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
0.0	0.0	13.1	7.6	11.9	16.2	30.0	21.2

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4 in.	100.0		
3/8 in.	95.3		
#4	86.9		
#10	79.3		
#30	70.2		
#40	67.4		
#50	64.8		
#100	58.0		
#200	51.2		
0.0435 mm.	45.9		
0.0314 mm.	42.2		
0.0201 mm.	39.2		
0.0118 mm.	35.4		
0.0085 mm.	31.7		
0.0061 mm.	28.3		
0.0044 mm.	25.7		
0.0031 mm.	24.2		
0.0022 mm.	22.0		
0.0013 mm.	18.2		

* (no specification provided)

Soil Description

Gray Sandy CLAY

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 3.98 D_{60}= 0.182 D_{50}= 0.0658
D_{30}= 0.0073 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample No.: 1B **Source of Sample:** H-3 **Date:**
Location: **Elev./Depth:** 2.0'

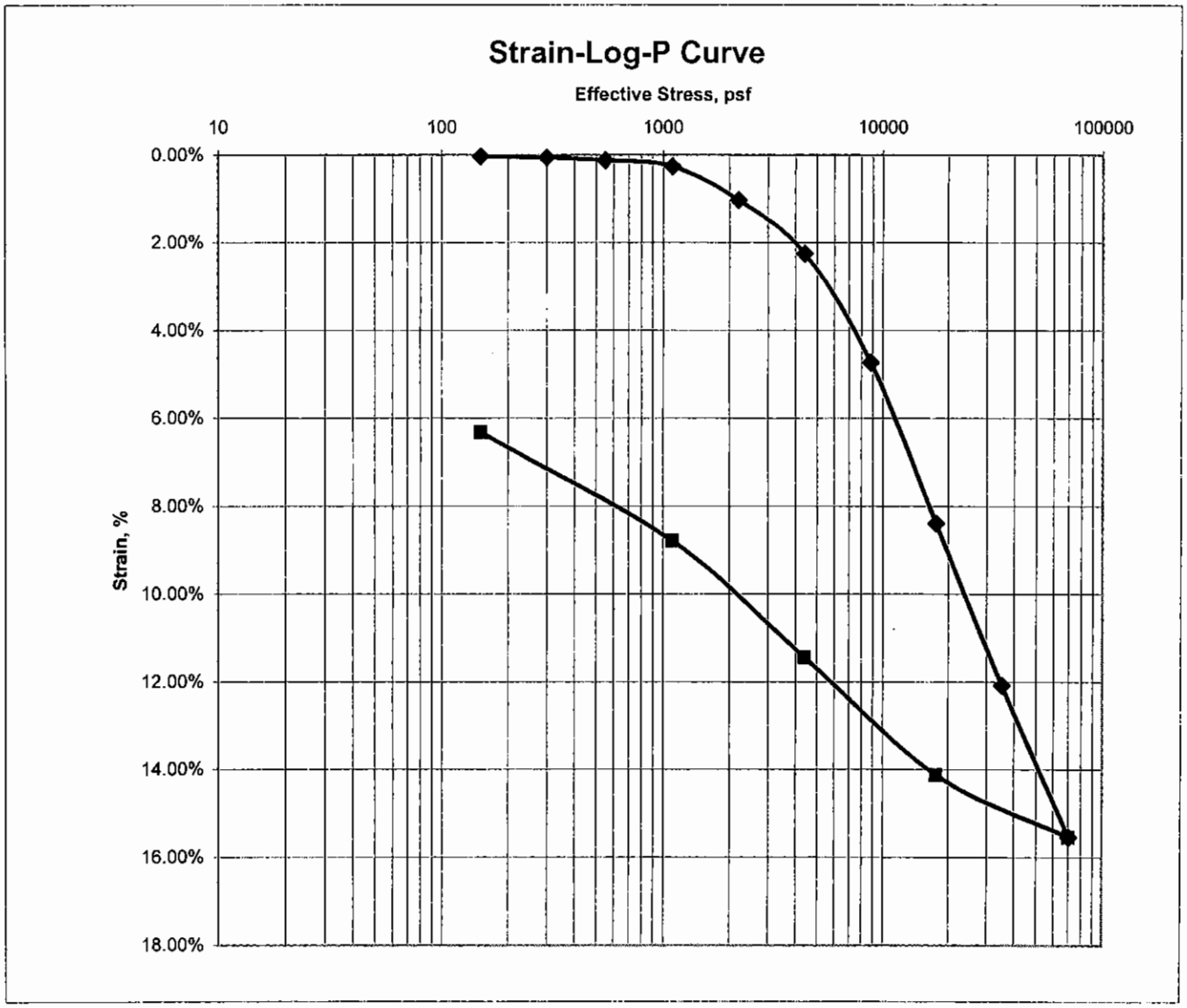
COOPER TESTING LABORATORY

Client: TRC Lowney
Project: Russel City Energy Center - 2289-1
Project No: 028-1950 **Figure**

Consolidation Test

ASTM D2435

Job No.:	028-1933	**Boring:**	RW1	**Run By:**	MD
Client:	TRC Lowney	**Sample:**	4A	**Reduced:**	PJ
Project:	2289-1	**Depth, ft.:**	7.0'	**Checked:**	PJ/DC
Soil Type:	Olive Gray CLAY w/Sand			**Date:**	12/1/2006



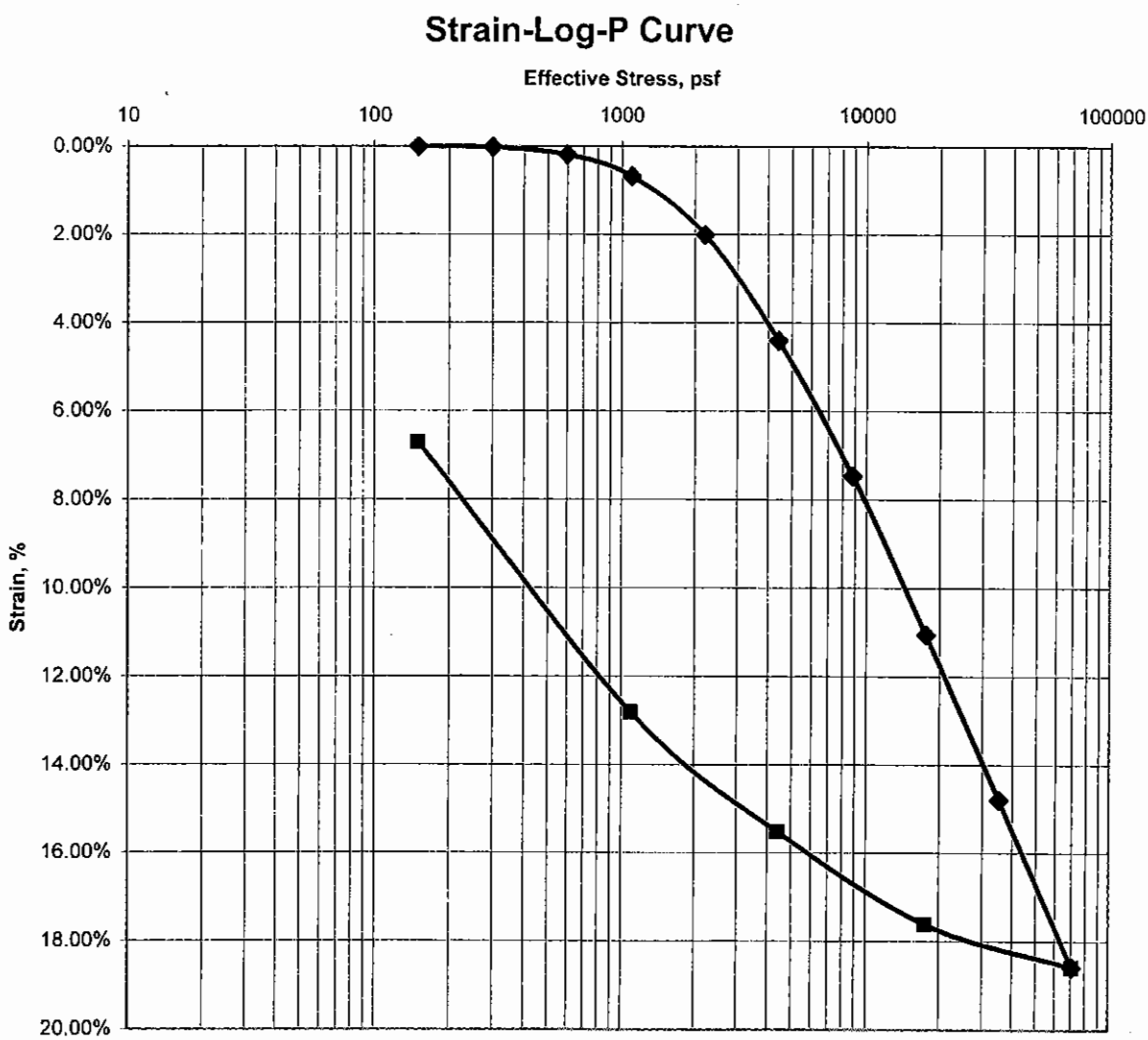
Ass. Gs = 2.75	Initial	Final
Moisture %:	21.1	20.5
Dry Density, pcf:	103.3	110.0
Void Ratio:	0.662	0.561
% Saturation:	87.7	100

Remarks:

Consolidation Test

ASTM D2435

Job No.:	028-1933	**Boring:**	RW-1	**Run By:**	MD
Client:	TRC Lowney	**Sample:**	8A	**Reduced:**	PJ
Project:	2289-1	**Depth, ft.:**	23.5'	**Checked:**	PJ/DC
Soil Type:	Brown CLAY w/ Sand & nodules, trace root holes (Silty)			**Date:**	11/30/2006



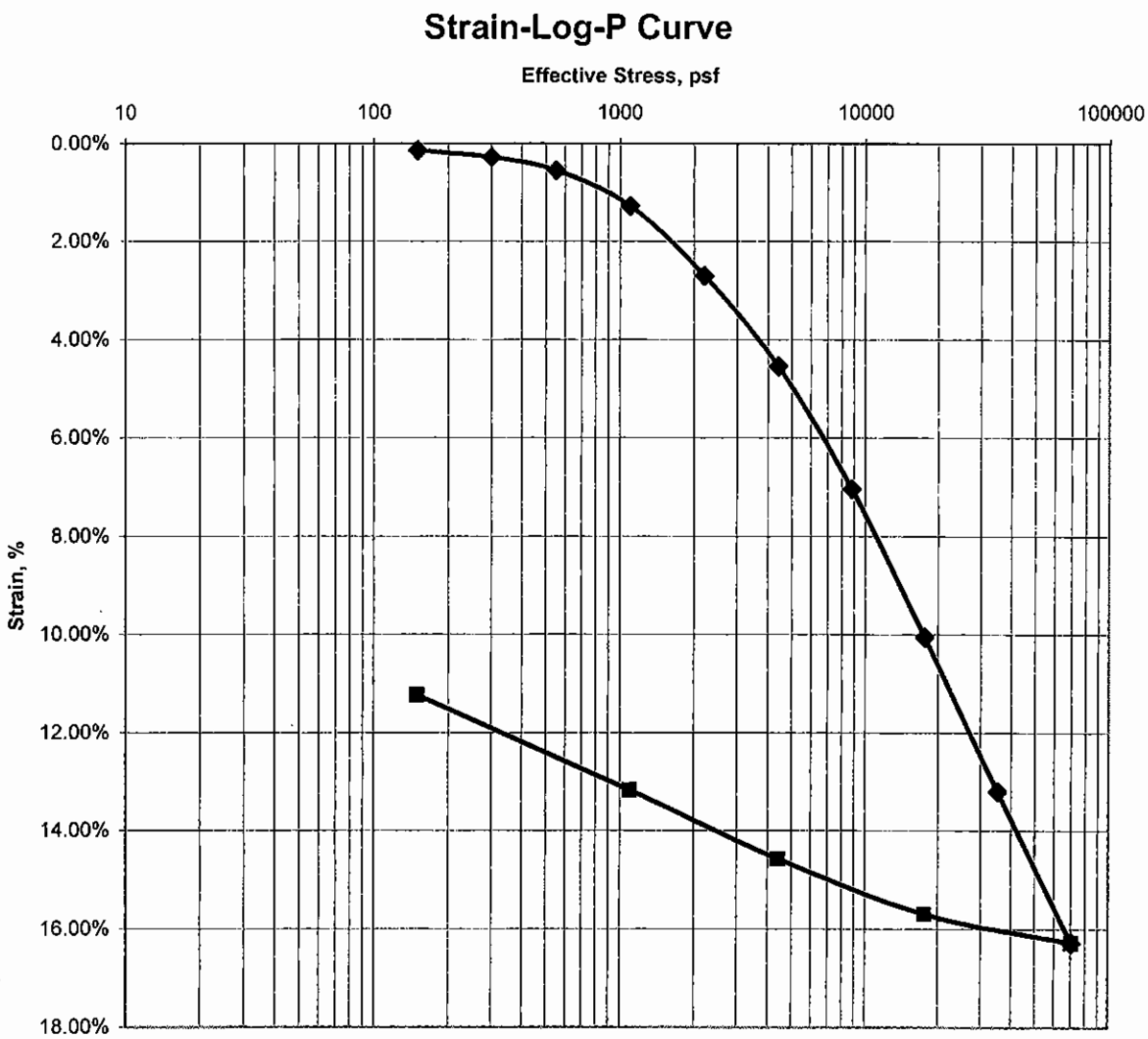
Ass. Gs = 2.65	Initial	Final
Moisture %:	24.2	22.4
Dry Density, pcf:	97.1	103.8
Void Ratio:	0.703	0.593
% Saturation:	91.4	100

Remarks: The 550 psf point wasa shifted to 600 psf in order to smooth the curve.

Consolidation Test

ASTM D2435

Job No.:	028-1933	**Boring:**	RW-2	**Run By:**	MD
Client:	TRC Lowney	**Sample:**	5A	**Reduced:**	PJ
Project:	2289-1	**Depth, ft.:**	13.5	**Checked:**	PJ/DC
Soil Type:	Gray & Brown Clayey SAND (Silty)			**Date:**	11/30/2006



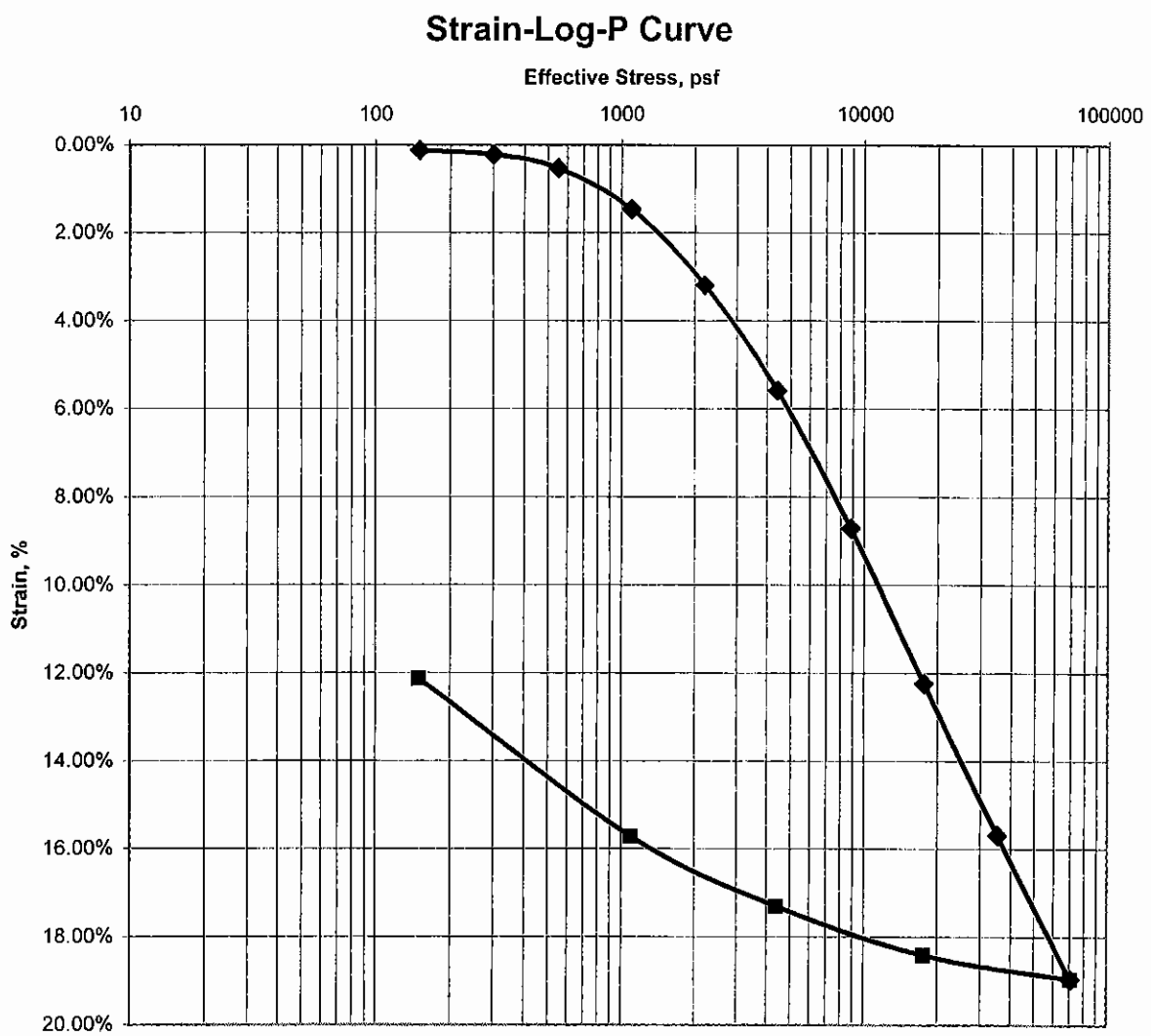
Ass. Gs = 2.7	Initial	Final
Moisture %:	22.8	17.5
Dry Density, pcf:	103.1	114.6
Void Ratio:	0.634	0.471
% Saturation:	96.9	100

Remarks:

Consolidation Test

ASTM D2435

Job No.:	028-1933	**Boring:**	RW-3	**Run By:**	MD
Client:	TRC Lowney	**Sample:**	5A	**Reduced:**	PJ
Project:	2289-1	**Depth, ft.:**	9.0	**Checked:**	PJ/DC
Soil Type:	Brown Clayey SAND w/ root holes, trace nodules			**Date:**	11/30/2006



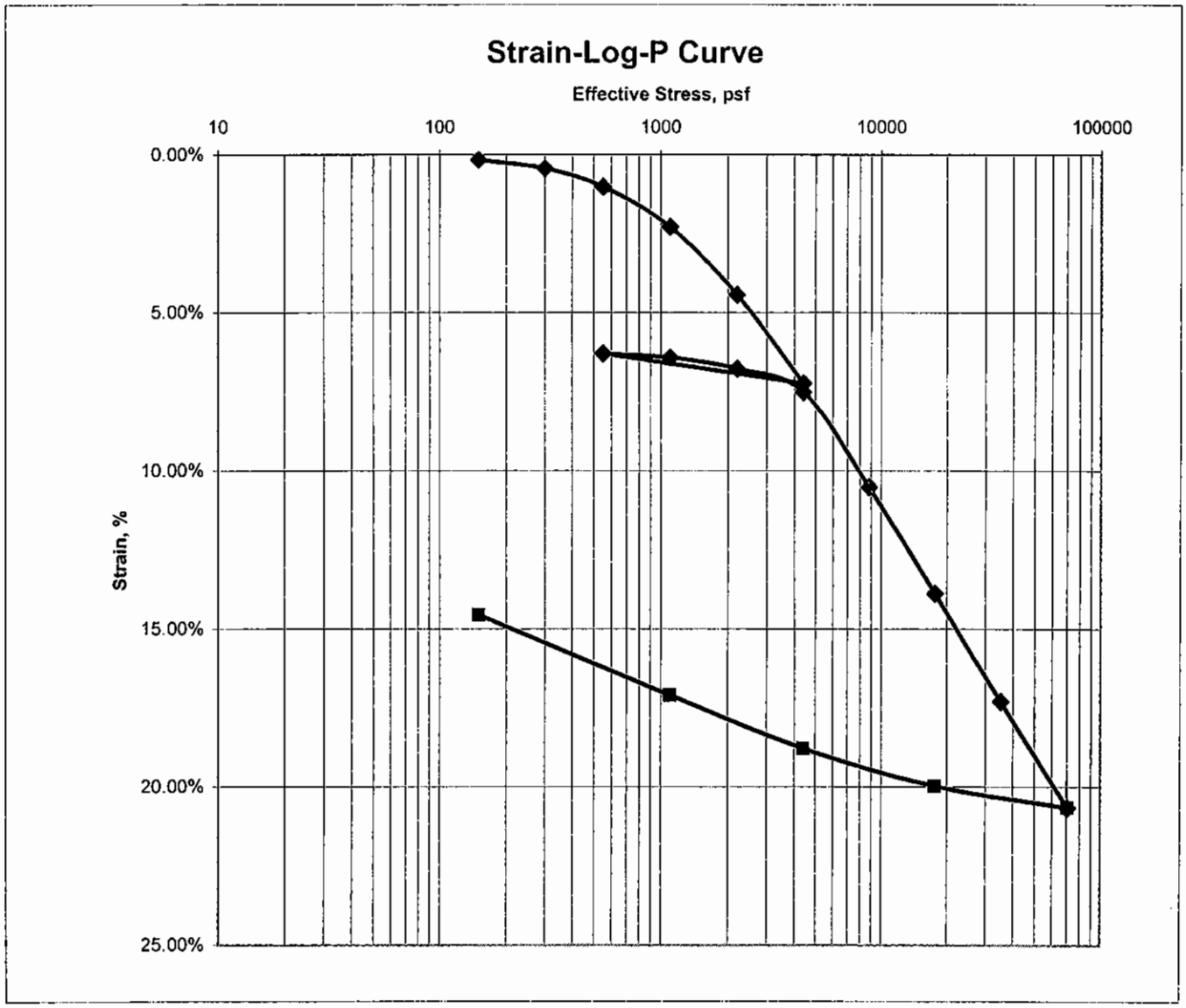
Ass. Gs = 2.65	Initial	Final
Moisture %:	22.8	18.0
Dry Density, pcf:	98.8	112.1
Void Ratio:	0.675	0.476
% Saturation:	89.7	100

Remarks:

Consolidation Test

ASTM D2435

Job No.:	028-1933	**Boring:**	RW-4	**Run By:**	MD
Client:	TRC Lowney	**Sample:**	4A	**Reduced:**	PJ
Project:	Russel City Energy Center	**Depth, ft.:**	8.0	**Checked:**	PJ/DC
Soil Type:	Brown CLAy w/ Sand and trace root holes (Silty)			**Date:**	12/4/2006



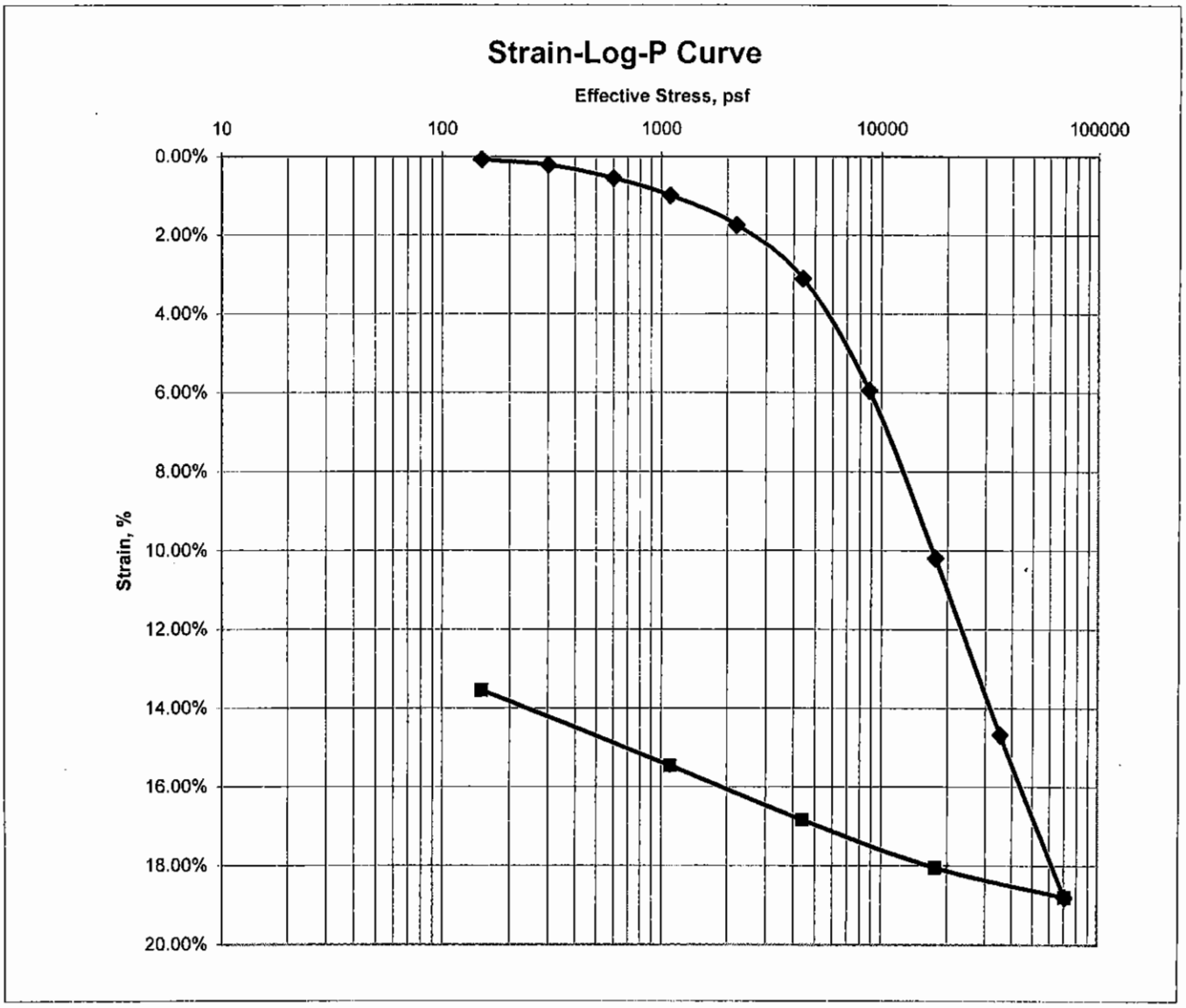
Ass. Gs = 2.7	Initial	Final
Moisture %:	26.6	19.0
Dry Density, pcf:	96.5	111.4
Void Ratio:	0.746	0.513
% Saturation:	96.4	100

Remarks:

Consolidation Test

ASTM D2435

Job No.:	028-1933	**Boring:**	RW-4	**Run By:**	MD
Client:	TRC Lowney	**Sample:**	9A	**Reduced:**	PJ
Project:	2289-1	**Depth, ft.:**	26.0'	**Checked:**	PJ/DC
Soil Type:	Brown CLAY w/ Sand			**Date:**	11/30/2006



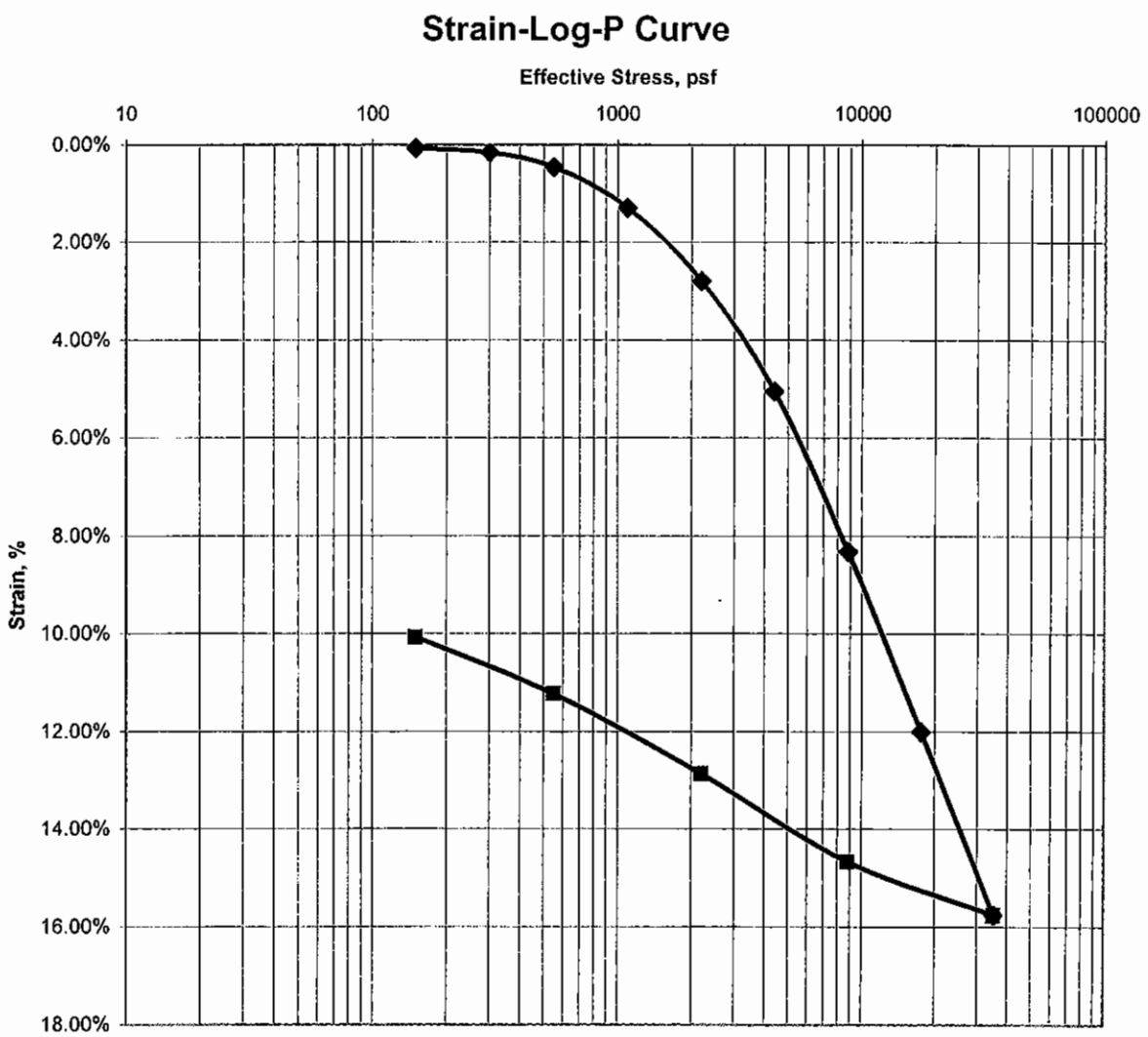
Ass. Gs = 2.75	Initial	Final
Moisture %:	25.9	20.0
Dry Density, pcf:	97.0	110.9
Void Ratio:	0.771	0.548
% Saturation:	92.5	100

Remarks: The 550 psf point was shifted to 600 psf in order to smooth the curve.

Consolidation Test

ASTM D2435

Job No.:	028-1938	**Boring:**	RW-6	**Run By:**	MD
Client:	TRC Lowney	**Sample:**	6A	**Reduced:**	PJ
Project:	Russell City Energy Center - 2289-1	**Depth, ft.:**	18.5	**Checked:**	PJ/DC
Soil Type:	Brown CLAY w/ Sand & nodules			**Date:**	12/18/2006



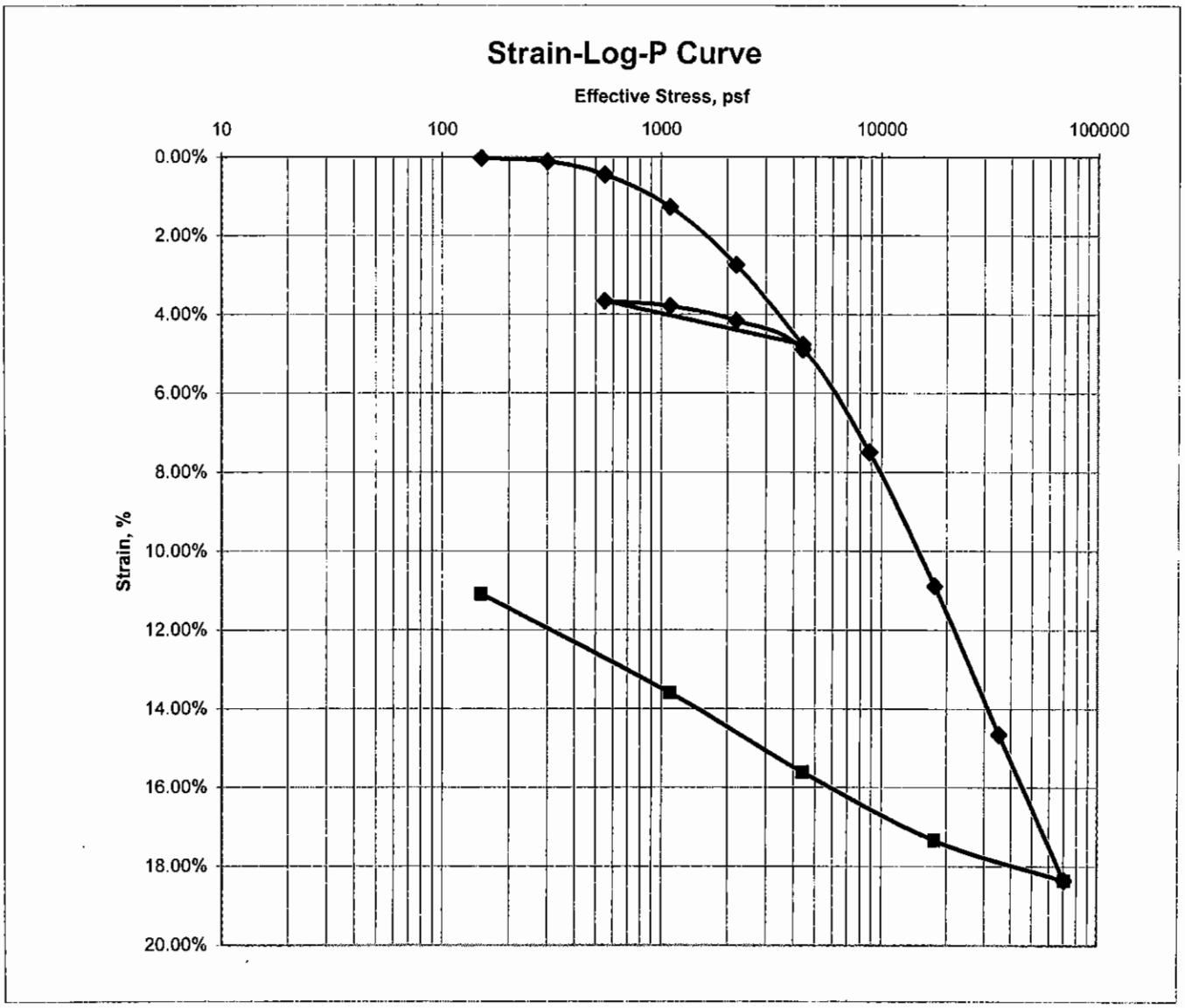
Ass. Gs = 2.7	Initial	Final
Moisture %:	25.1	21.6
Dry Density, pcf:	97.6	106.6
Void Ratio:	0.727	0.581
% Saturation:	93.5	100

Remarks:

Consolidation Test

ASTM D2435

Job No.:	028-1938	**Boring:**	RW-7	**Run By:**	MD
Client:	TRC Lowney	**Sample:**	6A	**Reduced:**	PJ
Project:	Russell City Energy Center - 2289-1	**Depth, ft.:**	18.5	**Checked:**	PJ/DC
Soil Type:	Brown CLAY, trace Sand nodules (Silty)			**Date:**	12/18/2006



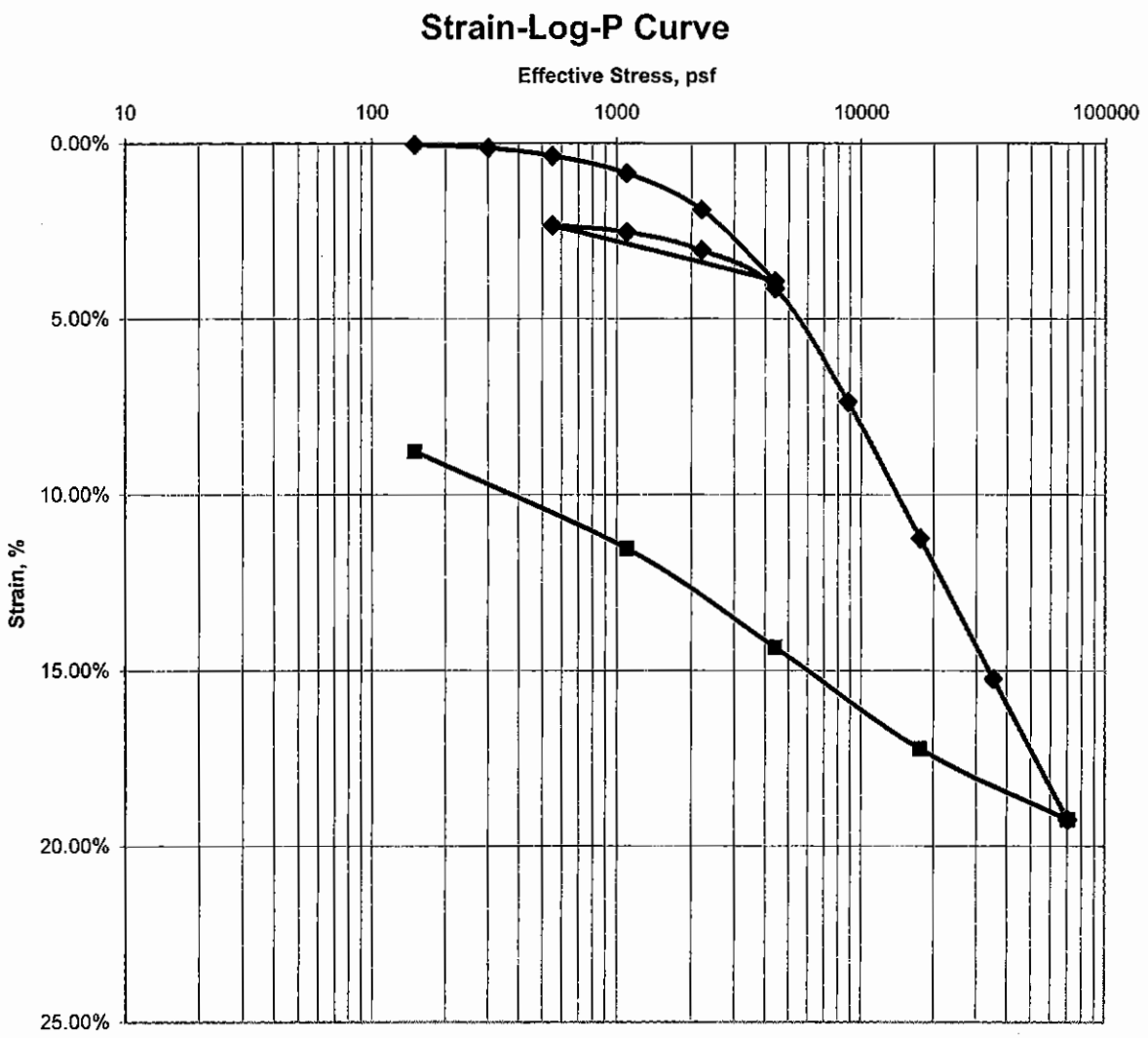
Ass. Gs = 2.7	Initial	Final
Moisture %:	24.4	19.7
Dry Density, pcf:	100.2	110.2
Void Ratio:	0.682	0.530
% Saturation:	96.7	100

Remarks:

Consolidation Test

ASTM D2435

Job No.:	028-1938	**Boring:**	RW-8	**Run By:**	MD
Client:	TRC Lowney	**Sample:**	2A	**Reduced:**	PJ
Project:	Russell City Energy Center - 2289-1	**Depth, ft.:**	8.0	**Checked:**	PJ/DC
Soil Type:	Gray CLAY, trace Sand			**Date:**	12/18/2006



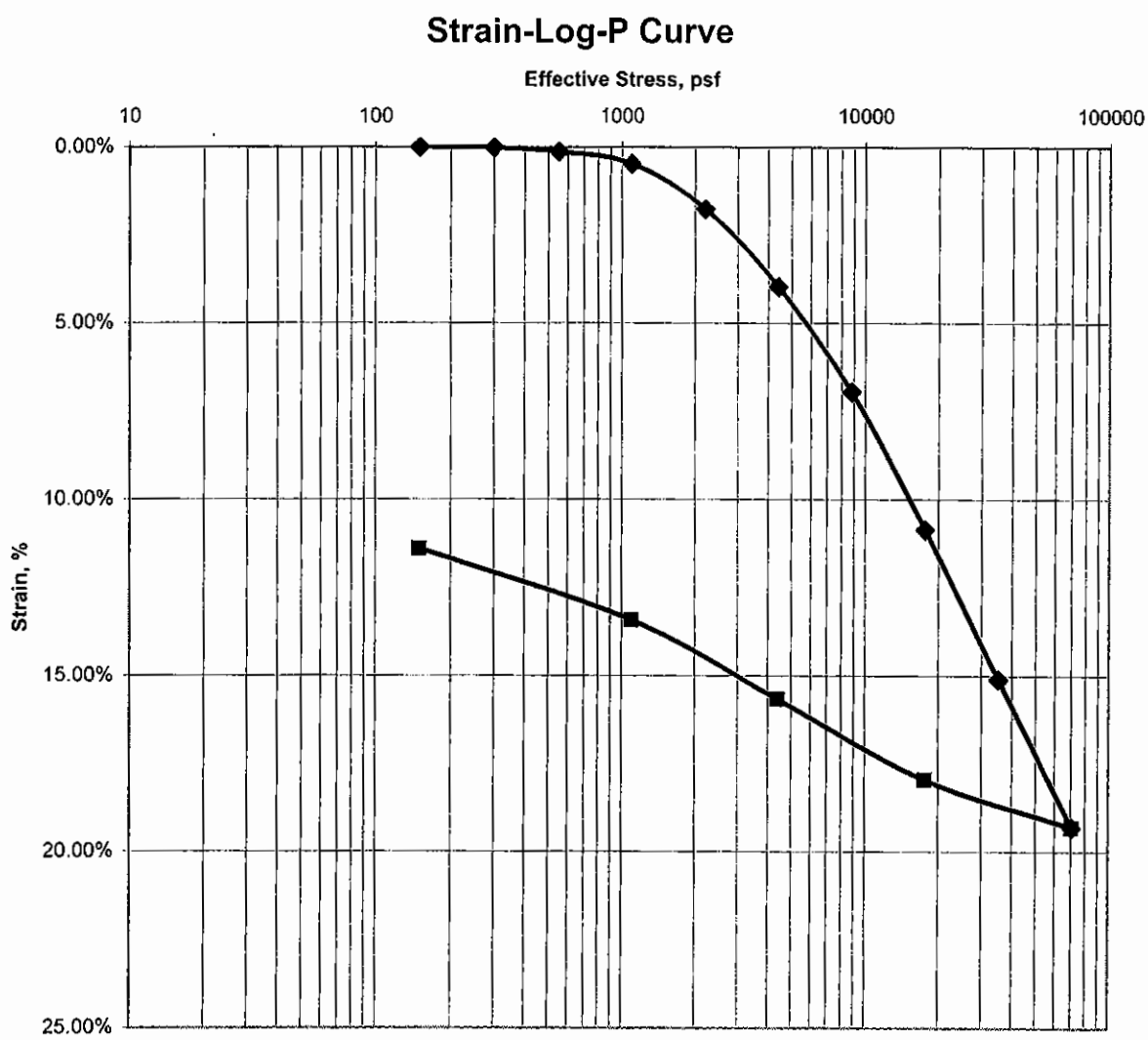
Ass. Gs = 2.7	Initial	Final
Moisture %:	26.9	24.6
Dry Density, pcf:	94.6	101.3
Void Ratio:	0.781	0.664
% Saturation:	93.0	100

Remarks:

Consolidation Test

ASTM D2435

Job No.:	028-1938	**Boring:**	RW-8	**Run By:**	MD
Client:	TRC Lowney	**Sample:**	8A	**Reduced:**	PJ
Project:	Russell City Energy Center - 2289-1	**Depth, ft.:**	38.5	**Checked:**	PJ/DC
Soil Type:	Brown & Gray CLAY, trace Sand			**Date:**	12/18/2006



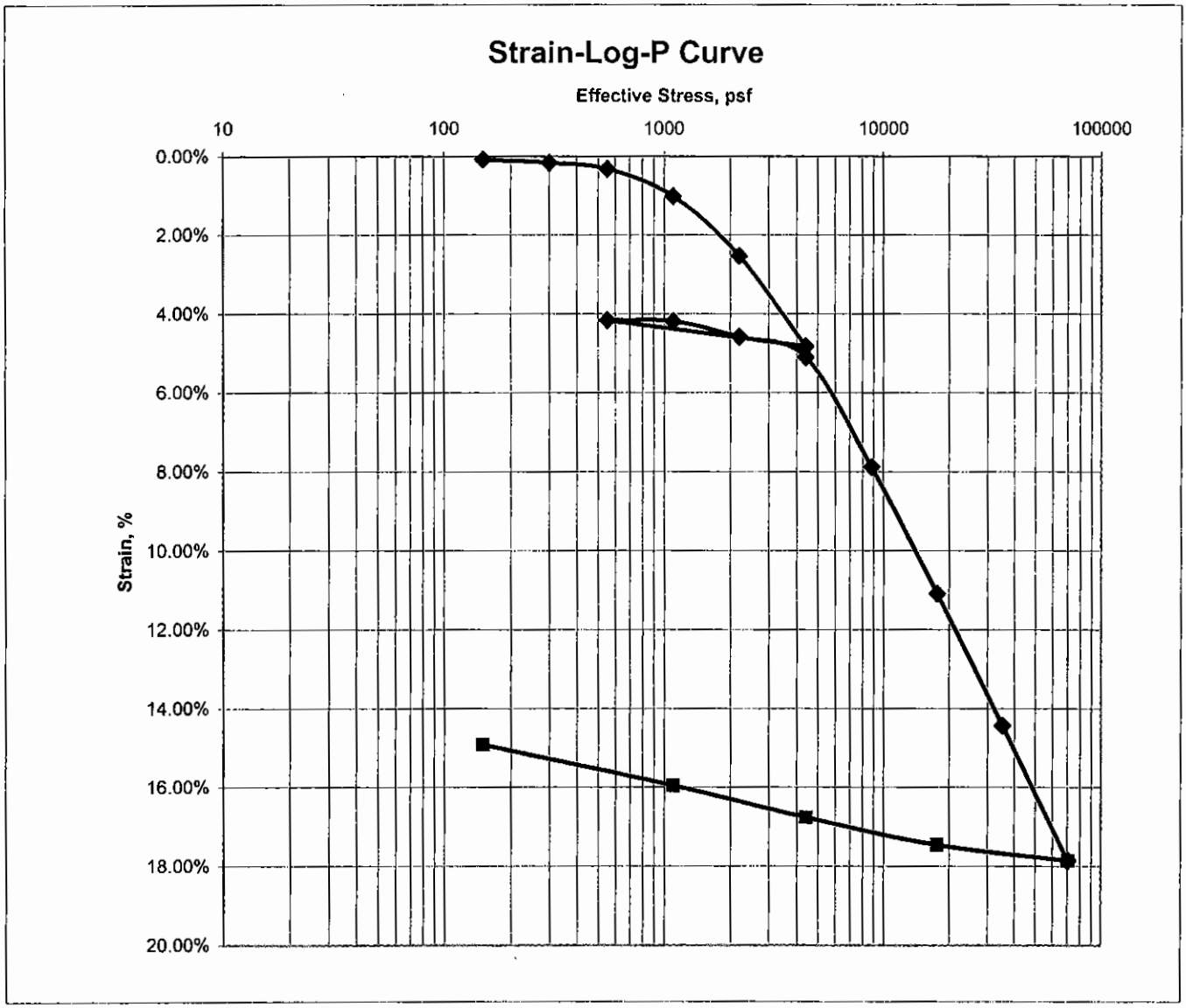
Ass. Gs = 2.7	Initial	Final
Moisture %:	26.8	21.1
Dry Density, pcf:	97.5	107.5
Void Ratio:	0.729	0.568
% Saturation:	99.3	100

Remarks:

Consolidation Test

ASTM D2435

Job No.:	028-1938	**Boring:**	RW-9	**Run By:**	MD
Client:	TRC Lowney	**Sample:**	4A	**Reduced:**	PJ
Project:	Russell City Energy Center - 2289-1	**Depth, ft.:**	13.5	**Checked:**	PJ/DC
Soil Type:	Brown Sandy Clay w/ nodules (Silty)			**Date:**	12/18/2006



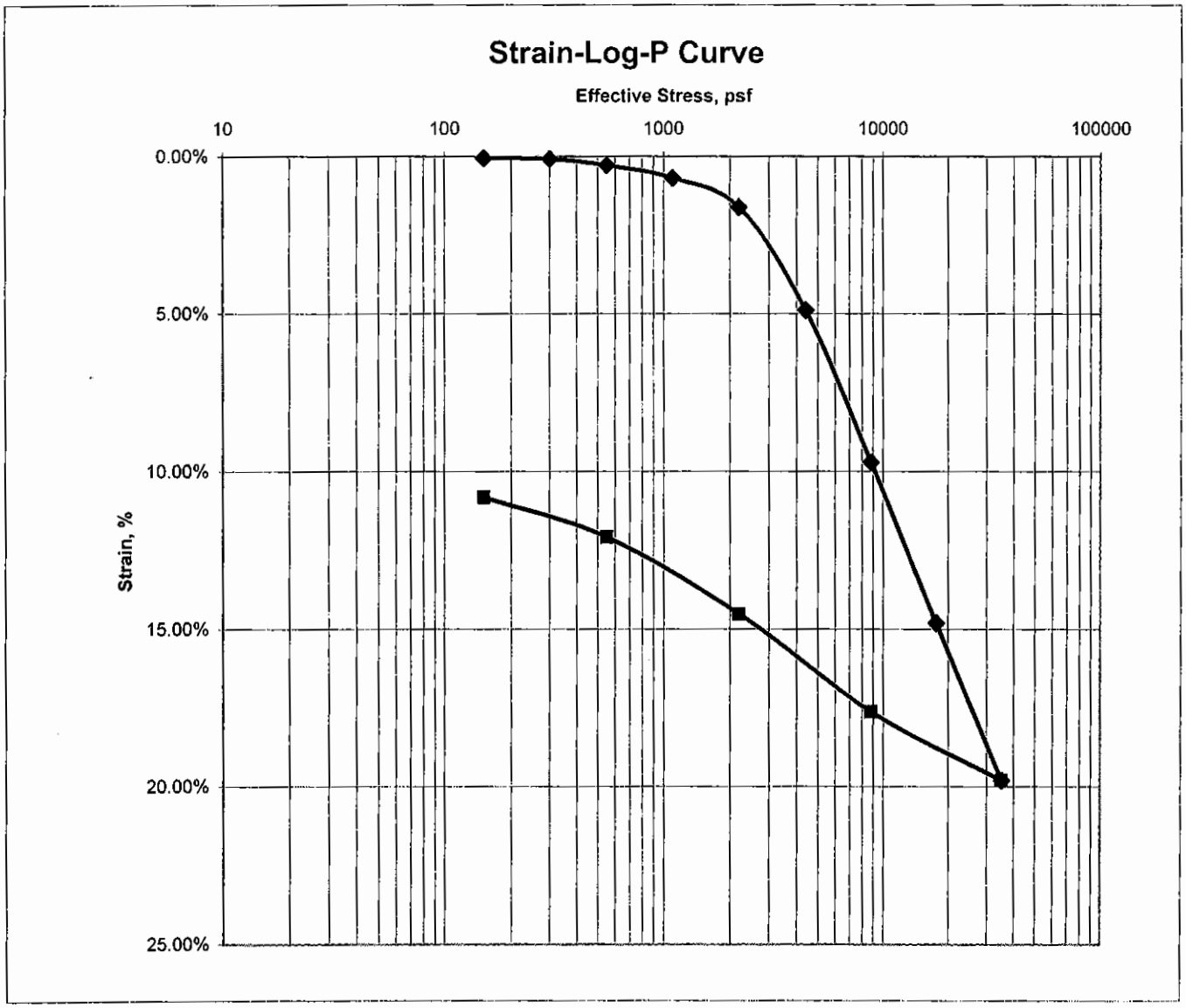
Ass. Gs = 2.7	Initial	Final
Moisture %:	24.4	18.3
Dry Density, pcf:	96.2	112.9
Void Ratio:	0.752	0.493
% Saturation:	87.6	100

Remarks:

Consolidation Test

ASTM D2435

Job No.:	028-1938	**Boring:**	R-10	**Run By:**	MD
Client:	TRC Lowney	**Sample:**	4	**Reduced:**	PJ
Project:	Russell City Energy Center - 2289-1	**Depth, ft.:**	14.0	**Checked:**	PJ/DC
Soil Type:	Gray CLAY			**Date:**	12/12/2006

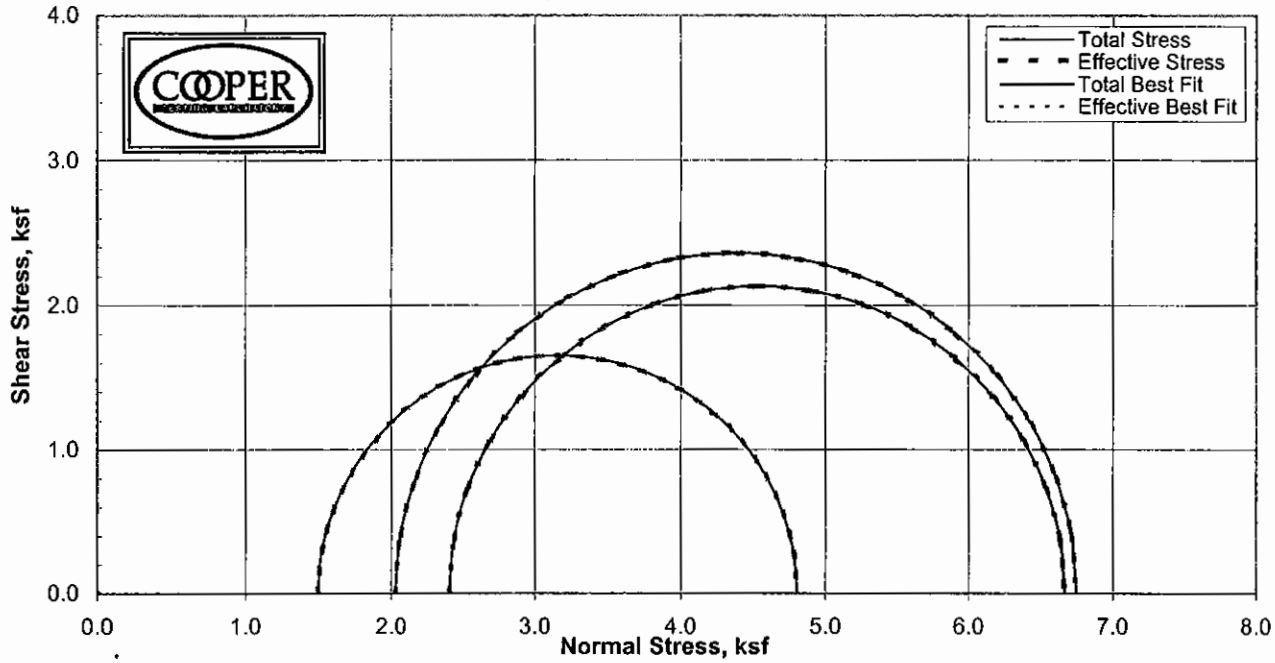


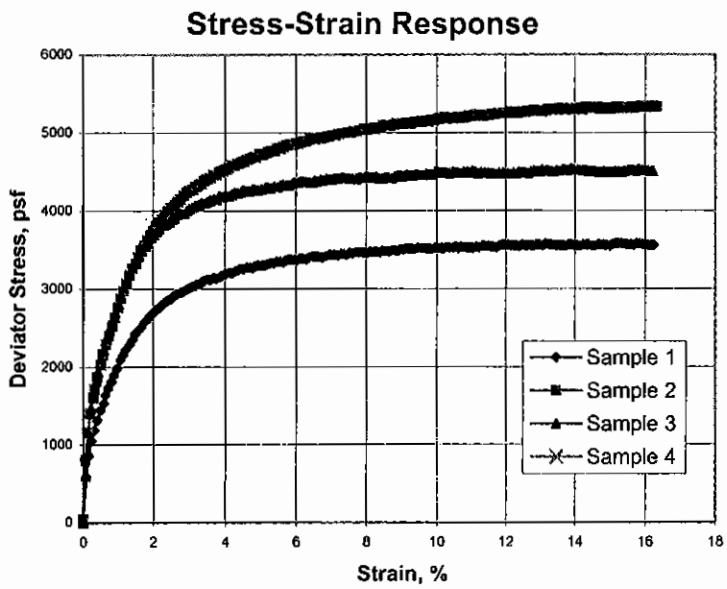
Ass. Gs = 2.7	Initial	Final
Moisture %:	35.1	30.5
Dry Density, pcf:	85.9	92.5
Void Ratio:	0.962	0.822
% Saturation:	98.6	100

Remarks:

Triaxial Consolidated Undrained

(ASTM D4767)





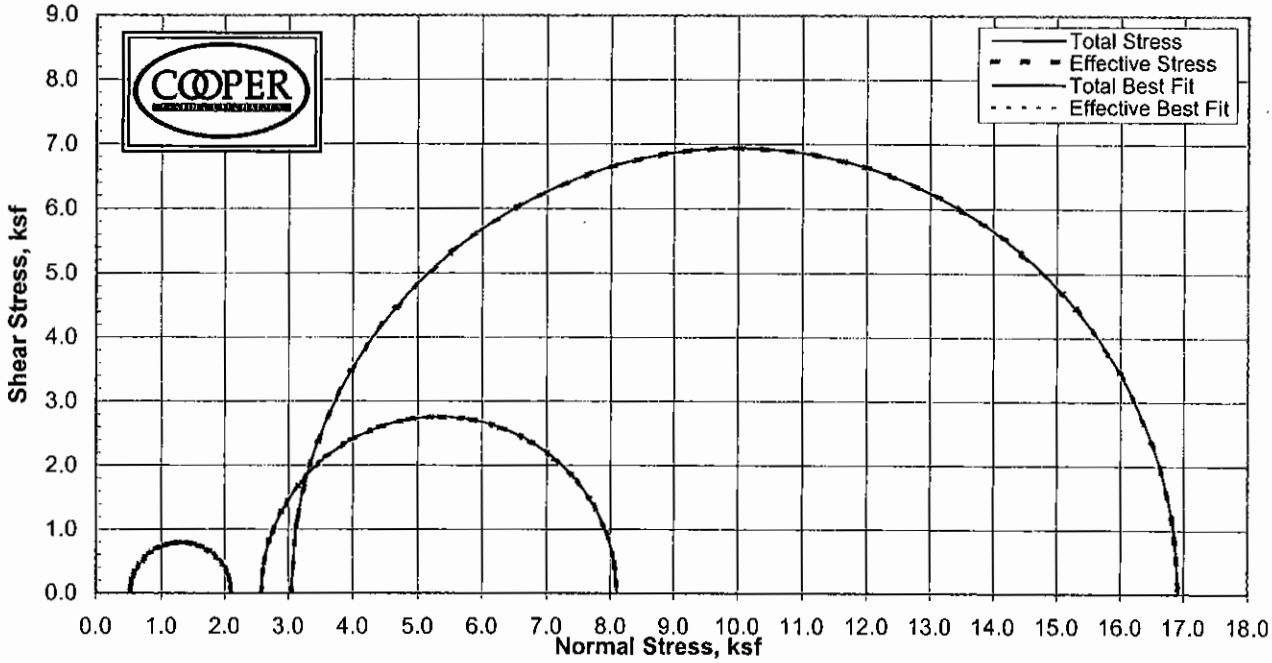
Sample:	1	2	3	4
MC, %	24.8	20.0	24.0	
Dry Dens, pcf	100.3	107.3	102.1	
Sat. %	98.5	94.8	99.5	
Void Ratio	0.680	0.570	0.651	
Diameter in	2.87	2.87	2.87	
Height, in	6.00	6.00	6.00	
	Final			
MC, %	25.6	20.1	23.6	
Dry Dens, pcf	99.7	109.3	102.8	
Sat. %	100.0	100.0	100.0	
Void Ratio	0.690	0.542	0.638	
Diameter, in	2.89	2.86	2.87	
Height, in	5.97	5.92	5.97	
Cell, psi	48.9	53.1	55.2	
BP, psi	38.5	39.0	38.5	
	Effective Stresses At:			
Strain, %	5.0	5.0	5.0	
Deviator ksf	3.307	4.720	4.264	
Excess PP	0.000	0.000	0.000	
Sigma 1	4.805	6.750	6.669	
Sigma 3	1.498	2.030	2.405	
P, ksf	3.151	4.390	4.537	
Q, ksf	1.654	2.360	2.132	
Stress Ratio	3.208	3.325	2.773	
Rate in/min	0.001	0.001	0.001	
Total C	N/A	ksf		
Total Phi	N/A	Degrees		
Eff. C	N/A	ksf		
Eff. Phi	N/A	Degrees		

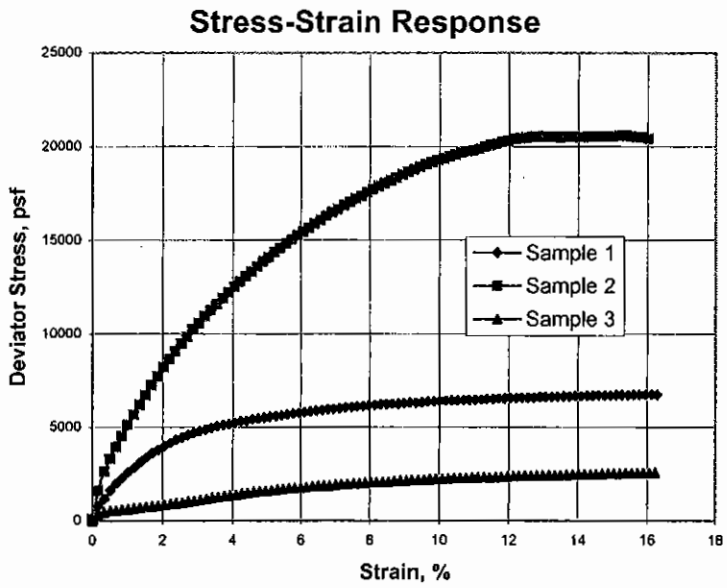
Job No.:	028-1933	Date:	11/29/2006
Client:	TRC Lowney		BY:MD/DC
Project:	2289-1		
Sample 1)	RW3, 12A @ 38.5' Blue Gray CLAY		
Sample 2)	RW2, 12A @ 48.5' Greenish Gray CLAY w/Sand		
Sample 3)	RW4, 15A @ 68.5' Greenish Gray CLAY		
Sample 4)			

REMARKS: Strengths picked at 5% strain.

Triaxial Consolidated Undrained

(ASTM D4767)





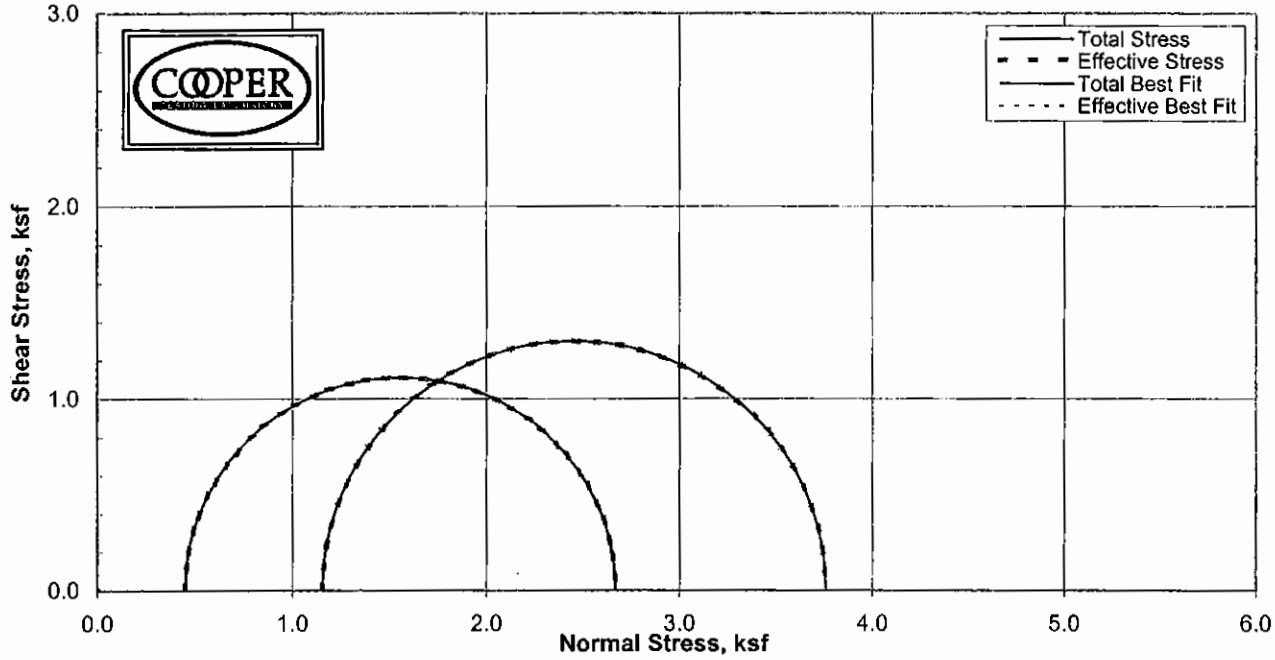
Sample:	1	2	3	4
MC, %	26.6	19.9	21.6	
Dry Dens, pcf	96.7	109.7	103.7	
Sat. %	96.7	100.6	93.3	
Void Ratio	0.743	0.535	0.624	
Diameter in	2.87	2.87	2.87	
Height, in	6.00	6.00	6.00	
	Final			
MC, %	26.3	19.0	22.3	
Dry Dens, pcf	98.5	111.4	105.1	
Sat. %	100.0	100.0	100.0	
Void Ratio	0.711	0.513	0.603	
Diameter, in	2.85	2.85	2.87	
Height, in	5.96	6.00	5.92	
Cell, psi	55.8	60.0	42.3	
BP, psi	37.9	38.9	38.7	
	Effective Stresses At:			
Strain, %	5.0	5.0	5.0	
Deviator ksf	5.520	13.878	1.585	
Excess PP	0.000	0.000	0.000	
Sigma 1	8.098	16.916	2.103	
Sigma 3	2.578	3.038	0.518	
P, ksf	5.338	9.977	1.311	
Q, ksf	2.760	6.939	0.793	
Stress Ratio	3.142	5.568	4.057	
Rate in/min	0.001	0.001	0.001	
Total C	N/A	ksf		
Total Phi	N/A	Degrees		
Eff. C	N/A	ksf		
Eff. Phi	N/A	Degrees		

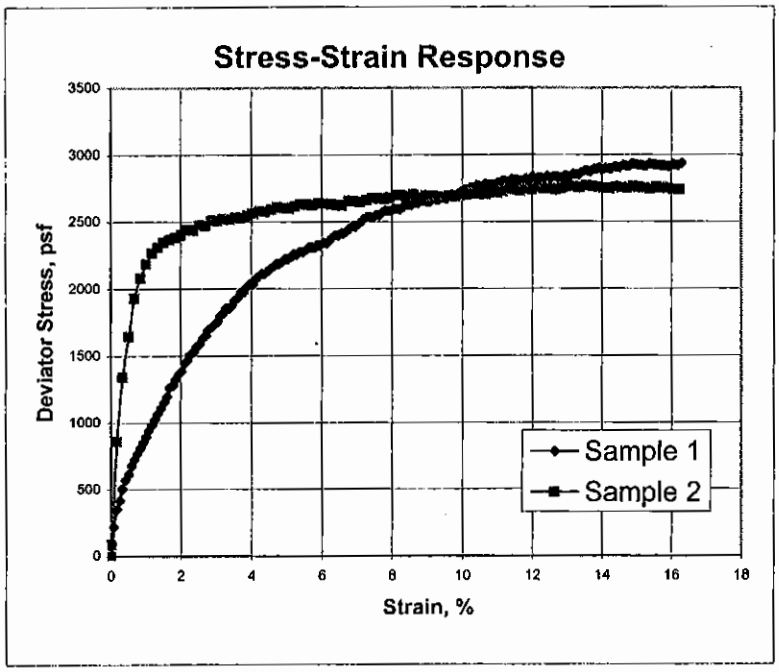
Job No.:	028-1933a	Date:	11/29/2006
Client:	TRC Lowney		BY:MD/DC
Project:	2289-1		
Sample 1)	RW1, 14A @ 53.5'	Greenish Gray CLAY grading Silty w/Sand	
Sample 2)	RW1, 18A @ 73.5'	Greenish Gray Silty SAND	
Sample 3)	RW3, 5A @ 9'	Brown Clayey SAND w/Nodules	
Sample 4)			

REMARKS: Strengths picked at 5% strain.

Triaxial Consolidated Undrained

(ASTM D4767)





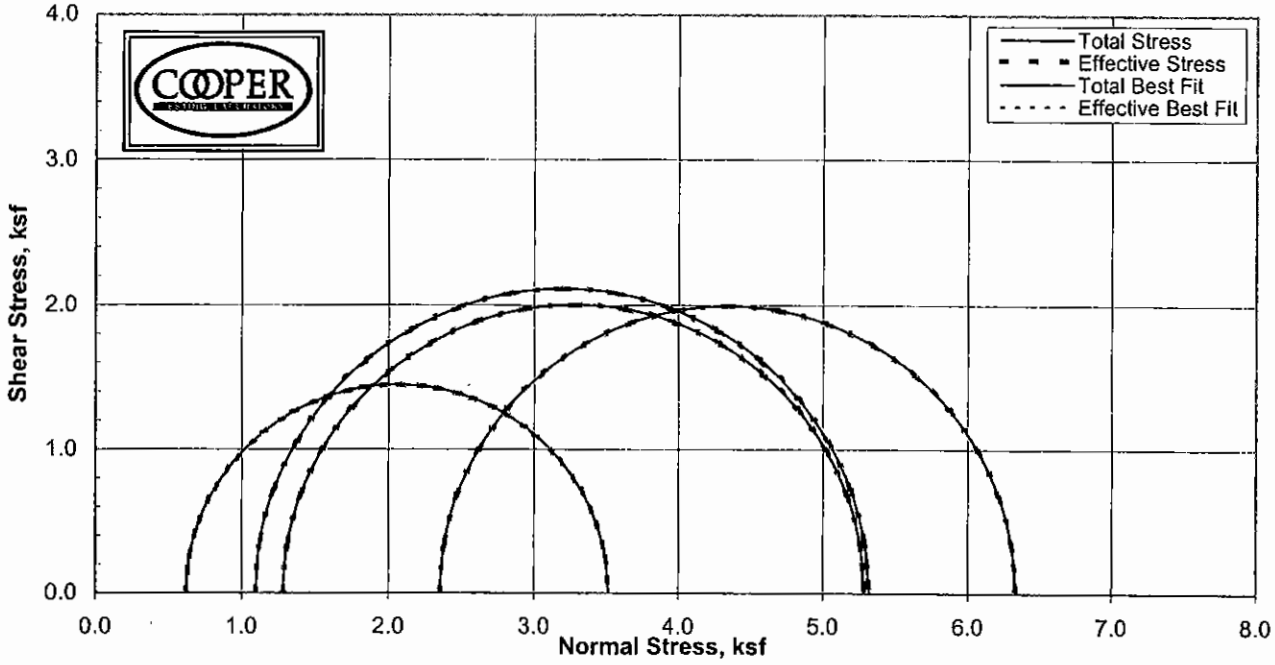
Sample:	1	2	3	4
MC, %	20.9	26.1		
Dry Dens, pcf	107.5	98.0		
Sat. %	99.3	98.0		
Void Ratio	0.567	0.719		
Diameter in	2.87	2.87		
Height, in	6.00	6.01		
	Final			
MC, %	21.1	26.8		
Dry Dens, pcf	107.3	97.8		
Sat. %	100.0	100.0		
Void Ratio	0.570	0.722		
Diameter, in	2.88	2.88		
Height, in	5.96	5.98		
Cell, psi	42.0	46.8		
BP, psi	38.9	38.8		
	Effective Stresses At:			
Strain, %	5.0	5.0		
Deviator ksf	2.224	2.604		
Excess PP	0.000	0.000		
Sigma 1	2.671	3.756		
Sigma 3	0.446	1.152		
P, ksf	1.559	2.454		
Q, ksf	1.112	1.302		
Stress Ratio	5.983	3.261		
Rate in/min	0.002	0.002	0.002	
Total C	N/A	ksf		
Total Phi	N/A	Degrees		
Eff. C	N/A	ksf		
Eff. Phi	N/A	Degrees		

Job No.:	028-1933	Date:	12/4/2006
Client:	TRC Lowney		BY:MD/DC
Project:	2289-1		
Sample 1)	RW2, 5A @ 13.5'	Gray Mottled Brown Clayey SAND (Silty)	
Sample 2)	RW4, 9A @ 26'	Brown CLAY w/Sand	
Sample 3)			
Sample 4)			

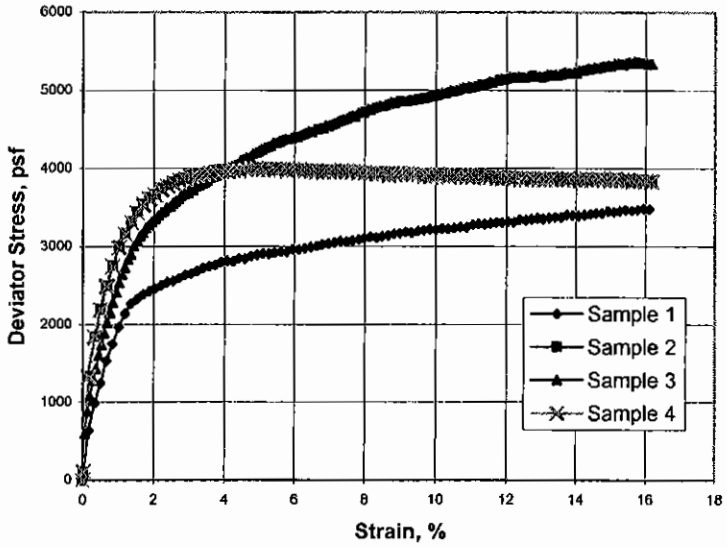
REMARKS: Strengths picked at 5% strain.

Triaxial Consolidated Undrained

(ASTM D4767)



Stress-Strain Response



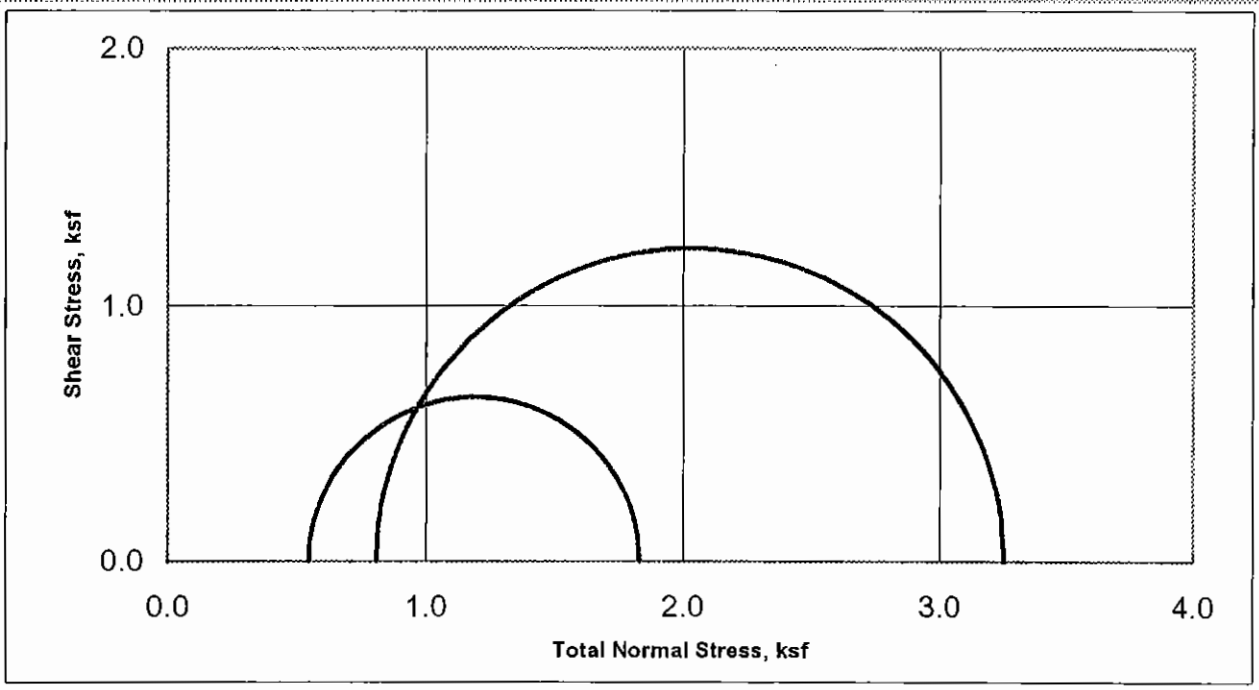
Sample:	1	2	3	4
MC, %	19.9	18.0	19.8	29.4
Dry Dens, pcf	107.7	111.7	108.2	94.2
Sat. %	95.1	95.4	95.8	98.4
Void Ratio	0.564	0.508	0.558	0.821
Diameter in	2.88	2.87	2.87	2.87
Height, in	6.00	5.98	6.00	5.99
	Final			
MC, %	21.0	18.7	20.7	29.4
Dry Dens, pcf	107.5	112.1	108.0	94.2
Sat. %	100.0	100.0	100.0	98.4
Void Ratio	0.567	0.504	0.560	0.821
Diameter, in	2.88	2.87	2.88	2.87
Height, in	5.98	5.95	5.97	5.99
Cell, psi	42.7	46.8	46.8	55.2
BP, psi	38.4	37.9	39.2	38.9
	Effective Stresses At:			
Strain, %	5.0	5.0	5.0	5.0
Deviator ksf	2.895	4.004	4.223	3.988
Excess PP	0.000	0.000	0.000	0.000
Sigma 1	3.514	5.285	5.318	6.335
Sigma 3	0.619	1.282	1.094	2.347
P, ksf	2.066	3.283	3.206	4.341
Q, ksf	1.447	2.002	2.112	1.994
Stress Ratio	5.675	4.124	4.859	2.699
Rate in/min	0.001	0.001	0.001	0.001
Total C	N/A	ksf		
Total Phi	N/A	Degrees		
Eff. C	N/A	ksf		
Eff. Phi	N/A	Degrees		

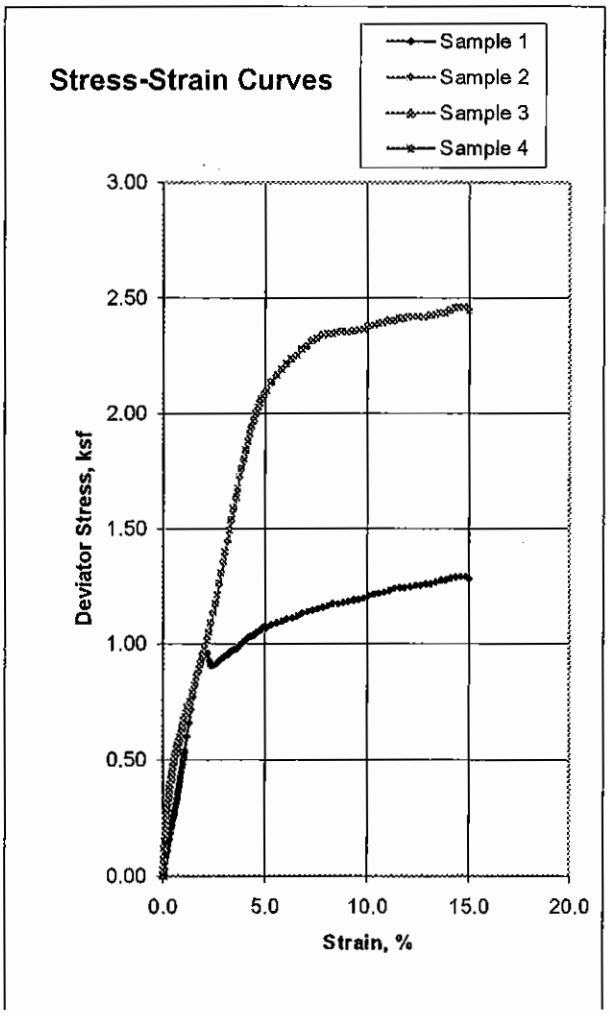
Job No.:	028-1938	**Date:**	12/11/2006
Client:	TRC Lowney		BY:MD/DC
Project:	2289-1		
Sample 1)	RW9, 6A @ 23.5'	Brown CLAY w/Sand & Nodules	
Sample 2)	RW8, 6A @ 28.5'	Brown Clayey SAND	
Sample 3)	RW5, 8A @ 28.5'	Yellow-Brown Clayey SAND	
Sample 4)	RW5, 14A @ 58.5'	Mottled Gray CLAY	

REMARKS: Strengths picked at 5% strain.

Unconsolidated-Undrained Triaxial Test

ASTM D-2850





Sample Data	1	2	3	4
Moisture %	28.5	25.3		
Dry Den,pcf	94.5	99.1		
Void Ratio	0.784	0.702		
Saturation %	98.0	97.3		
Height in	6.00	6.00		
Diameter in	2.87	2.88		
Cell psi	3.8	5.6		
Strain %	14.10	14.30		
Deviator, ksf	1.293	2.462		
Rate %/min	1.00	1.00		
in/min	0.060	0.060		
Job No.:	028-1938			
Client:	TRC Lowney			
Project:	Russel City - 2289-1			
Boring:	RW-6	RW-8		
Sample:	4A	4A		
Depth ft:	9.0	18.5		

Visual Soil Description	
Sample #	
1	Brown CLAY w/ Sand & Root holes
2	Brown CLAY (Silty)
3	
4	

Remarks:

Hydraulic Conductivity

ASTM D 5084

Method C: Falling Head Rising Tailwater

Job No:	028-1938	**Boring:**	R10	**Date:**	12/14/06
Client:	TRC Lowney	**Sample:**	2	**By:**	MD/PJ
Project:	Russell City Energy Center - 2289-1	**Depth, ft.:**	4	**Remolded:**	

Visual Classification: Dark Brown CLAY w/ Sand & Root holes

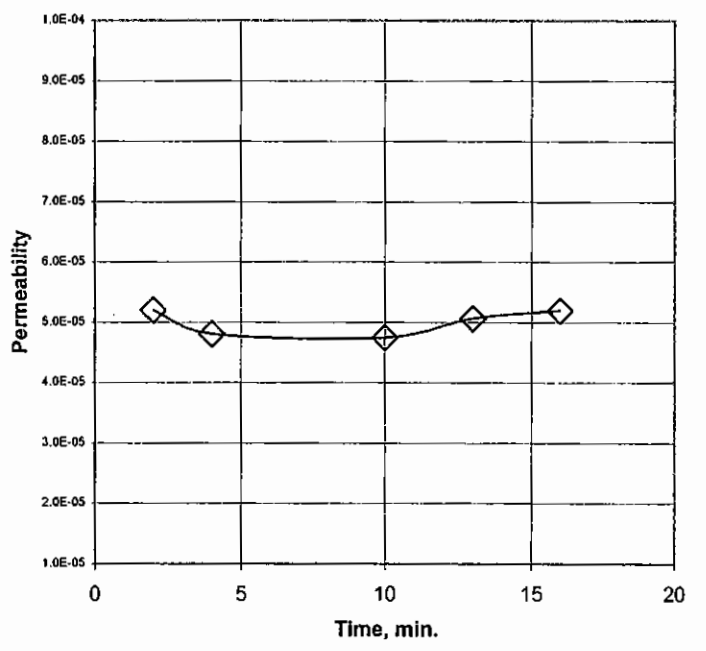
Max Sample Pressures, psi:

Cell:	Bottom	Top	Avg. Sigma3
51.5	48.5	48.5	3

B: = >0.95 **("B" is an indication of saturation)**

Max Hydraulic Gradient: = 26

Date	Minutes	Head, (in)	K,cm/sec
12/10/2006	0.00	25.80	Start of Test
12/10/2006	2.00	23.90	5.2E-05
12/10/2006	4.00	22.40	4.8E-05
12/10/2006	10.00	18.20	4.7E-05
12/10/2006	13.00	15.90	5.1E-05
12/10/2006	16.00	14.00	5.2E-05



Average Permeability: **5.E-05** **cm/sec**

Sample Data:	Initial		Final
Height, in	2.99		2.99
Diameter, in	2.87		2.89
Area, in2	6.47		6.56
Volume in3	19.34		19.61
Total Volume, cc	317.0		321.4
Volume Solids, cc	187.4		187.4
Volume Voids, cc	129.6		134.0
Void Ratio	0.7		0.7
Total Porosity, %	40.9		41.7
Air-Filled Porosity, %	2.4		0.5
Water-Filled Porosity,%	38.4		41.2
Saturation, %	94.0		98.8
Specific Gravity	2.70	Assumed	2.70
Wet Weight, gm	627.8		638.4
Dry Weight, gm	506.0		506.0
Tare, gm	0.00		0.00
Moisture, %	24.1		26.2
Dry Density, pcf	99.6		98.2

Remarks:

Hydraulic Conductivity

ASTM D 5084

Method C: Falling Head Rising Tailwater

Job No:	028-1938	**Boring:**	RW-9	**Date:**	12/14/06
Client:	TRC Lowney	**Sample:**	2A	**By:**	MD/PJ
Project:	Russell City Energy Center - 2289-1	**Depth, ft.:**	4	**Remolded:**	

Visual Classification: Dark Brown CLAY

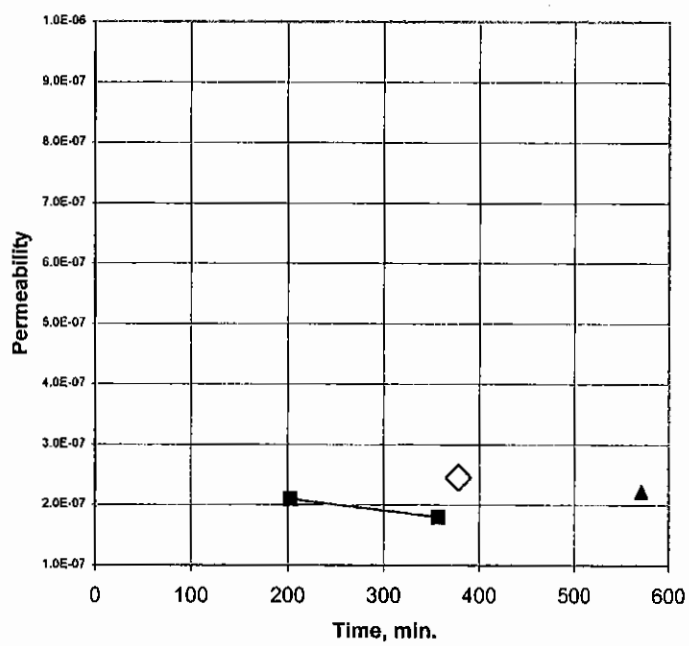
Max Sample Pressures, psi:

Cell:	Bottom	Top	Avg. Sigma3
51.5	49.5	47.5	3

B: = >0.95 ("B" is an indication of saturation)

Max Hydraulic Gradient: = 168

Date	Minutes	Head, (in)	K,cm/sec
12/6/2006	0.00	165.66	Start of Test
12/6/2006	378.00	154.56	2.5E-07
12/6/2006	203.00	128.50	2.1E-07
12/6/2006	357.00	126.50	1.8E-07
12/11/2006	571.00	154.26	2.2E-07



Average Permeability: 2.E-07 cm/sec

Sample Data:	Initial		Final
Height, in	2.99		3.05
Diameter, in	2.87		2.89
Area, in2	6.47		6.56
Volume in3	19.34		20.01
Total Volume, cc	317.0		327.9
Volume Solids, cc	185.3		185.3
Volume Voids, cc	131.7		142.6
Void Ratio	0.7		0.8
Total Porosity, %	41.5		43.5
Air-Filled Porosity, %	2.5		1.3
Water-Filled Porosity,%	39.0		42.2
Saturation, %	94.0		97.0
Specific Gravity	2.70	Assumed	2.70
Wet Weight, gm	624.0		638.6
Dry Weight, gm	500.3		500.3
Tare, gm	0.00		0.00
Moisture, %	24.7		27.6
Dry Density, pcf	98.5		95.2

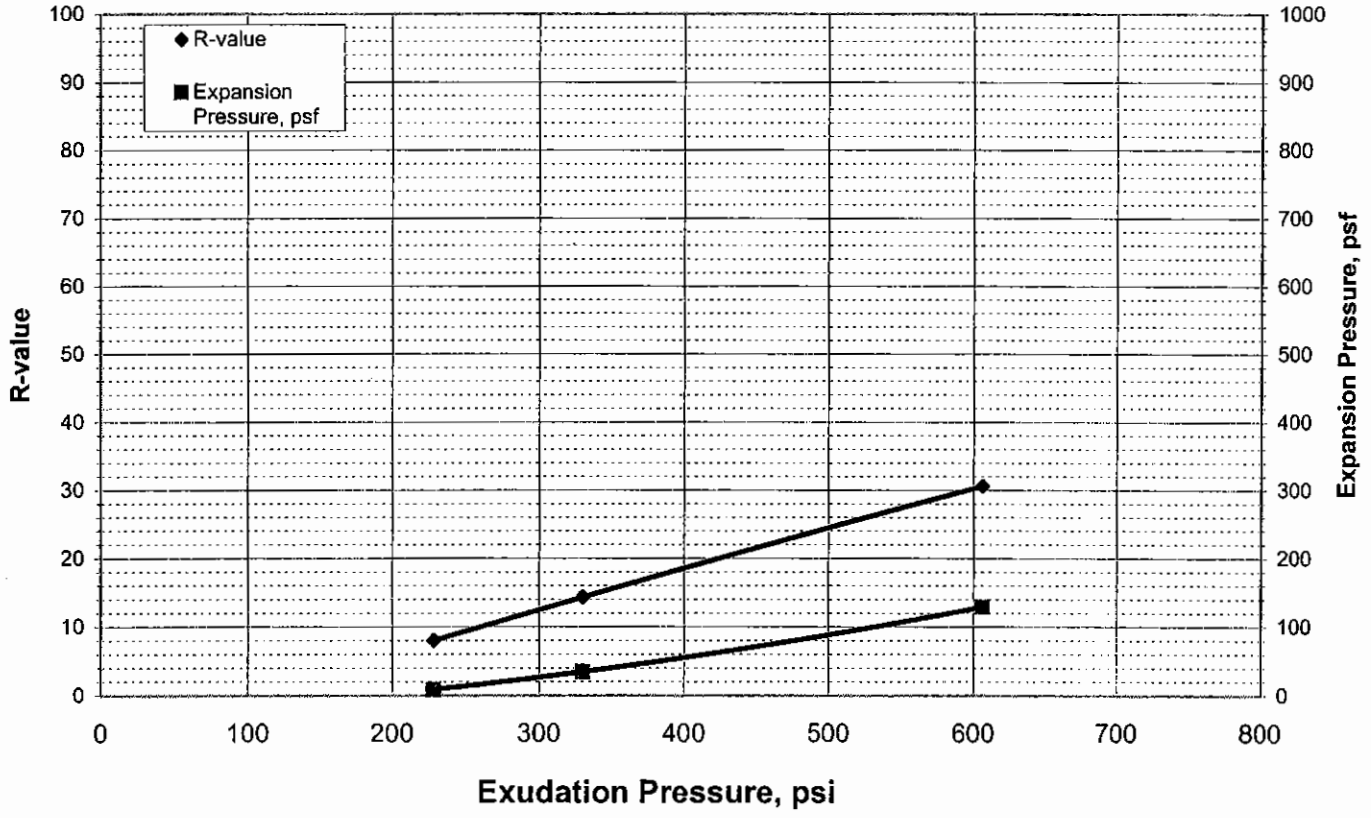
Remarks:

R-value Test Report (Caltrans 301)

Job No.:	028-1943	**Date:**	12/05/06	**Initial Moisture,**	12.4%
Client:	TRC Lowney	**Tested**	MD	**R-value by Stabilometer**	12
Project:	Russell City Energy Center - 2289-1	**Reduced**	RU		
Sample	TP-3 @ 0-2'	**Checked**	DC	**Expansion Pressure**	25 psf
Soil Type:	Brown Clayey SAND				

Specimen Number	A	B	C	D
Exudation Pressure, psi	330	606	228	
Prepared Weight, grams	1200	1200	1200	
Final Water Added, grams/cc	40	15	61	
Weight of Soil & Mold, grams	3165	3132	3137	
Weight of Mold, grams	2089	2123	2097	
Height After Compaction, in.	2.48	2.34	2.47	
Moisture Content, %	16.2	13.9	18.2	
Dry Density, pcf	113.1	114.7	107.9	
Expansion Pressure, psf	34.4	129.0	8.6	
Stabilometer @ 1000				
Stabilometer @ 2000	128	98	142	
Turns Displacement	3.7	3.05	3.9	
R-value	14	31	8	

Remarks:

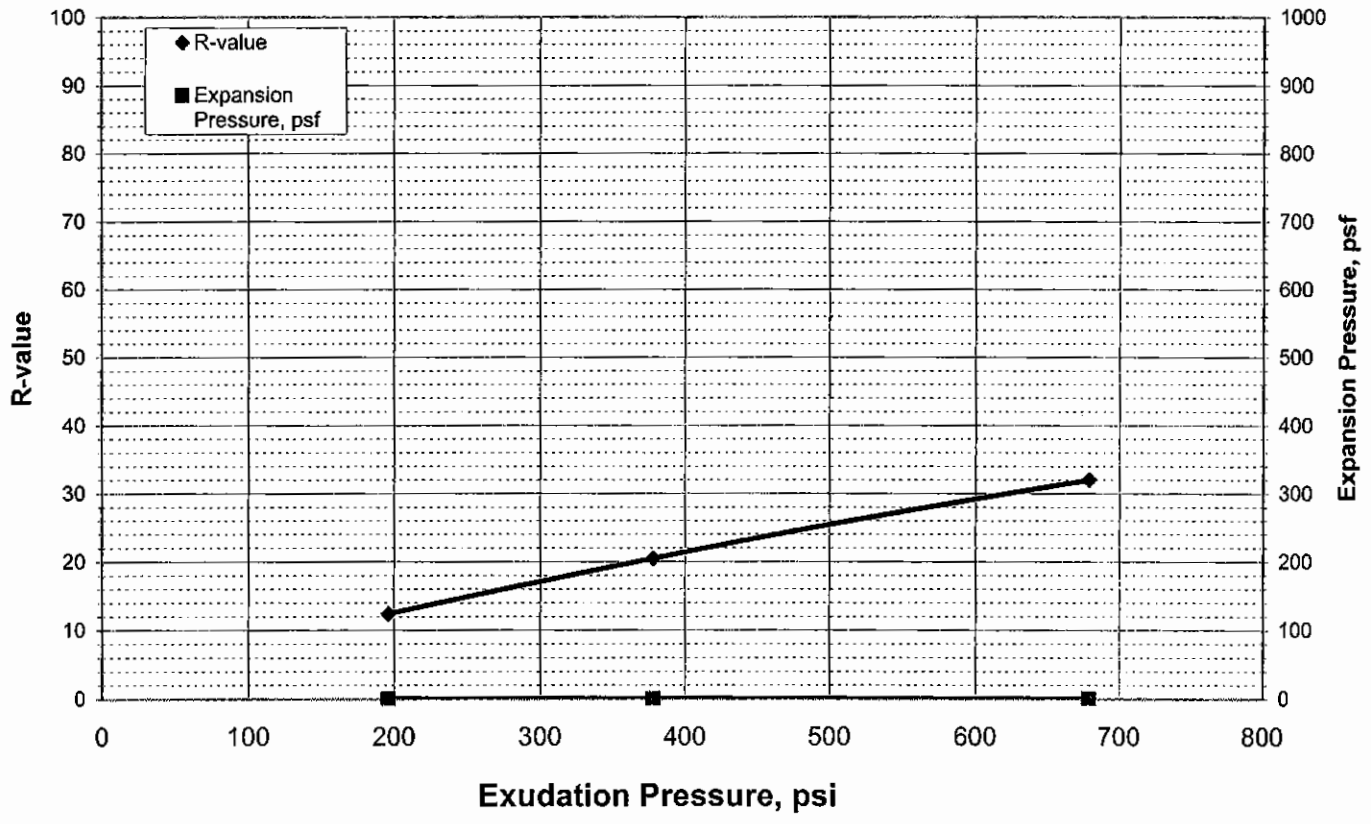


R-value Test Report (Caltrans 301)

Job No.:	028-1943	**Date:**	12/06/06	**Initial Moisture,**	10.9%
Client:	TRC Lowney	**Tested**	MD	**R-value by Stabilometer**	17
Project:	Russell City Energy Center - 2289-1	**Reduced**	RU		
Sample	TP-4 @ 0-2'	**Checked**	DC	**Expansion Pressure**	0 psf
Soil Type:	Brown Sandy CLAY w/ Gravel				

Specimen Number	A	B	C	D
Exudation Pressure, psi	679	378	196	
Prepared Weight, grams	1200	1200	1200	
Final Water Added, grams/cc	50	75	95	
Weight of Soil & Mold, grams	3120	3185	3151	
Weight of Mold, grams	2081	2123	2092	
Height After Compaction, in.	2.45	2.57	2.6	
Moisture Content, %	15.5	17.8	19.7	
Dry Density, pcf	111.2	106.2	103.1	
Expansion Pressure, psf	0.0	0.0	0.0	
Stabilometer @ 1000				
Stabilometer @ 2000	106	121	133	
Turns Displacement	2.7	3.3	3.8	
R-value	32	21	12	

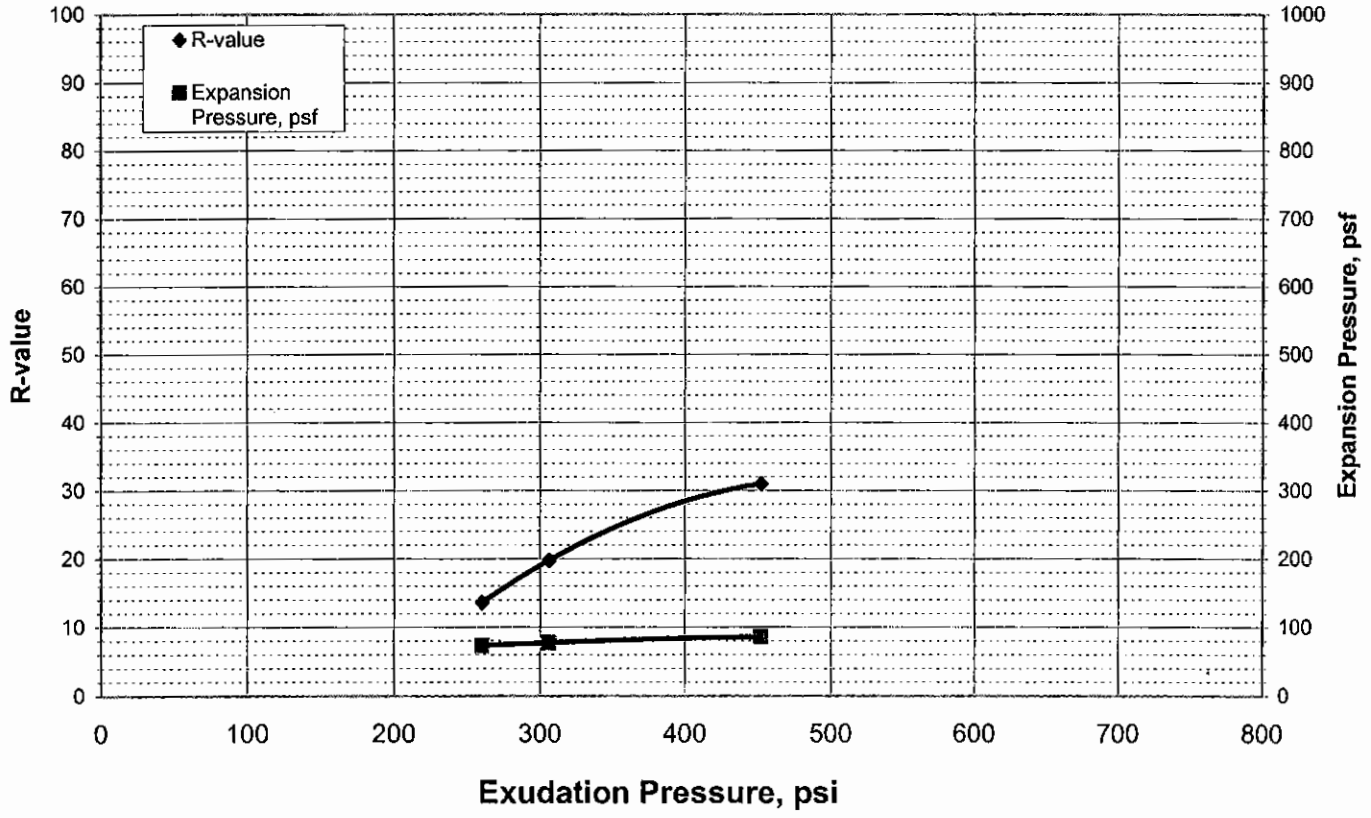
Remarks:



R-value Test Report (Caltrans 301)

Job No.:	028-1943	Date:	12/11/06	Initial Moisture,	11.2%
Client:	TRC Lowney	Tested	MD	R-value by Stabilometer	19
Project:	Russell City Energy Center - 2289-1	Reduced	RU		
Sample	TP-1 @ 0-2'	Checked	DC	Expansion Pressure	80 psf
Soil Type:	Olive Brown Clayey SAND w/ Gravel				

Specimen Number	A	B	C	D	Remarks:
Exudation Pressure, psi	306	260	452		
Prepared Weight, grams	1200	1200	1200		
Final Water Added, grams/cc	35	50	20		
Weight of Soil & Mold, grams	3209	3198	3231		
Weight of Mold, grams	2089	2123	2104		
Height After Compaction, in.	2.5	2.5	2.48		
Moisture Content, %	14.4	15.8	13.0		
Dry Density, pcf	118.6	112.4	121.8		
Expansion Pressure, psf	77.4	73.1	86.0		
Stabilometer @ 1000					
Stabilometer @ 2000	122	132	106		
Turns Displacement	3.16	3.36	2.78		
R-value	20	14	31		



Corrosivity Test Summary

COOPER TESTING LABORATORY

CTL # 028-1940 **Date:** 12/4/2006 **Tested By:** PJ **Checked:** PJ

Client: TRC Lowney **Project:** Russell City Energy Center **Proj. No:** 2289-1

Remarks:

Sample Location or ID			Resistivity @ 15.5 °C (Ohm-cm)			Chloride	Sulfate-(water soluble)		pH	ORP	Moisture	Soil Visual Description
Boring	Sample, No.	Depth, ft.	As Rec.	Minimum	Saturated	mg/kg	mg/kg	%		(Redox)	%	
						Dry Wt.	Dry Wt.	Dry Wt.		mv	At Test	
			ASTM G57	Cal 643	ASTM G57	Cal 422-mod.	Cal 417-mod.	Cal 417-mod.	ASTM G51	SM 2580B	ASTM D2216	
RW-1	2B	4.0	-	-	905	183	136	0.0136	8.0	-	18.5	Mottled Gray Clayey SAND
RW-1	5B	11.0	-	-	692	225	219	0.0219	7.6	-	21.7	Mottled Gray Clayey SAND
RW-2	2B	4.0	-	-	841	118	152	0.0152	7.9	-	21.4	Dark Gray CLAY
RW-3	2A	3.5	-	-	1,498	85	164	0.0164	8.0	-	17.5	Brown Clayey SAND (Silty)
RW-3	3A	5.5	-	-	683	115	267	0.0267	7.5	-	30.5	Mottled Gray Clayey SAND
RW-4	3B	6.0	-	-	923	61	46	0.0046	7.4	-	26.9	Mottled Greenish Gray Sandy CLAY

Corrosivity Test Summary

COOPER TESTING LABORATORY

CTL # 028-1949 Date: 12/15/2006 Tested By: PJ Checked: PJ

Client: TRC Lowney Project: Russell City Energy Center Proj. No: 2289-1

Remarks:

Sample Location or ID			Resistivity @ 15.5 °C (Ohm-cm)			Chloride	Sulfate-(water soluble)		pH	ORP	Moisture	Soil Visual Description
Boring	Sample, No.	Depth, ft.	As Rec.	Minimum	Saturated	mg/kg	mg/kg	%		(Redox)	%	
						Dry Wt.	Dry Wt.	Dry Wt.		mv	At Test	
			ASTM G57	Cal 643	ASTM G57	Cal 422-mod.	Cal 417-mod.	Cal 417-mod.	ASTM G51	SM 2580B	ASTM D2216	
RW-5	3A	5.5	-	-	503	206	471	0.0471	8.2	-	31.4	Brownish Gray CLAY
RW-6	1B	2.0	-	-	923	90	287	0.0287	7.6	-	16.4	Brown Sandy CLAY w/ Gravel & CaCO3
RW-6	3B	6.0	-	-	1,727	28	<5	<0.0005	7.7	-	18.1	Mottled Grayish Brown Clayey SAND
RW-7	5A	14.0	-	-	1,057	102	<5	<0.0005	7.8	-	21.1	Mottled Grayish Brown Clayey SAND
R-10	3A	9.0	-	-	665	34	212	0.0212	7.7	-	26.4	Mottled Grayish Brown CLAY

Corrosivity Test Summary

COOPER TESTING LABORATORY

CTL # 028-1950 **Date:** 12/19/2006 **Tested By:** PJ **Checked:** PJ

Client: TRC Lowney **Project:** Russell City Energy Center **Proj. No:** 2289-1

Remarks:

Sample Location or ID			Resistivity @ 15.5 °C (Ohm-cm)			Chloride	Sulfate-(water soluble)		pH	ORP	Moisture	Soil Visual Description
Boring	Sample, No.	Depth, ft.	As Rec.	Minimum	Saturated	mg/kg	mg/kg	%		(Redox)	%	
						Dry Wt.	Dry Wt.	Dry Wt.		mv	At Test	
			ASTM G57	Cal 643	ASTM G57	Cal 422-mod.	Cal 417-mod.	Cal 417-mod.	ASTM G51	SM 2580B	ASTM D2216	
H-1	2B	5.0	-	-	585	40	280	0.0280	8.4	-	24.4	Brown CLAY w/ CaCO3
H-2	1B	3.0	-	-	682	137	295	0.0295	8.0	-	23.4	Brownish Gray Sandy CLAY
H-2	3B	7.0	-	-	372	714	505	0.0505	7.6	-	24.6	Brown CLAY
H-5	2B	4.0	-	-	1,205	53	<5	<0.0005	7.6	-	23.5	Dark Brown Sandy CLAY
H-6	2A	3.5	-	-	604	116	<5	<0.0005	8.0	-	25.8	Dark Brown CLAY w/ Sand