

MACTEC ENGINEERING AND CONSULTING, INC.

REPORT OF THE STANDARD TEST METHOD FOR SPECIFIC GRAVITY OF SOILS Performed in General Accordance with ASTM D 854-06 (Method B)

PROJECT NAME: EXELON COL PROJECT (VICTORIA)

PROJECT NUMBER: 6468071777

DATE: 4/8/08

SAMPLE IDENTIFICATION: B-2319UD, UD-10 @ 95-97 (bottom) Ft.

(A) Mass of oven-dried soil, grams:	37.62
(B) Mass of pycnometer filled with water at test temperature (T), grams:	339.40
(C) Mass of pycnometer, water and soil, grams:	363.20
(T) Temperature of pycnometer, water and soil, °C when mass (C) determined:	23.6
(G) Specific Gravity at observed temperature:	$A / [B - (C - A)]$ 2.722
(F) Correction factor:	0.99919
(G x F) SPECIFIC GRAVITY @ 20°C:	2.720

MATERIAL TESTED:

☐

- # 4

☒

- # 10

PREPARATION METHOD:

☒

DRY

☐

WET (dispersed)

REMARKS: Estimated % Passing # 4 : 98

Poorly Graded SAND (SP) - Visual

EQUIPMENT USED

SCALES : 418

OVEN : 144

THERMOMETER : 2759

PYCNOMETER : 2053

TESTED BY: EH *EH*

\\Test Reports\\Soils\\SPECIFIC GRAVITY(ref).xls

REVIEWED BY: Harry Johnson *HJ*

KAW 5/9/08

U.S. Sieve Opening in Inches

U.S. STANDARD SIEVE NUMBERS

HYDROMETER

PERCENT FINER

GRAIN SIZE - mm.

Grain Size (mm)	Percent Finer (%)
100	100
75	100
60	100
40	100
30	100
20	100
10	100
7.5	100
60	95
40	85
30	75
20	70
10	64
7.5	62
60	58
40	55
30	52
20	46
10	41

[illegible][illegible]

Project No. 6468071777

Figure NA

Raleigh, North Carolina

○ Specific Gravity = 2.709 (ASTM D854-06)
NM obtained from consolidation test specimen

KAW 5/8/08

Checked By: LBJ

GRAIN SIZE DISTRIBUTION TEST DATA

5/8/2008

Client: Bechtel

Project: Exelon Texas COL (Victoria Reservoir)

Project Number: 6468071777

Location: Boring B-2321UD

Depth: 3.5-5.2'

Sample Number: UD-1

Material Description: Dark Gray Sandy Lean CLAY

Date: 2/3/08

Natural Moisture: 17.4

Liquid Limit: 42

Plastic Limit: 13

USCS Class.: CL

Testing Remarks: Specific Gravity = 2.709 (ASTM D854-06)

NM obtained from consolidation test specimen

Tested by: CS

Checked by: LBj

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
228.19	0.00	0.00	#10	0.00	100.0
47.97	0.00	0.00	#20	0.48	99.0
			#40	1.00	97.9
			#60	2.55	94.7
			#100	7.10	85.2
			#140	11.94	75.1
			#200	14.36	70.1

Hydrometer Test Data

Hydrometer test uses material passing #10

Percent passing #10 based upon complete sample = 100.0

Weight of hydrometer sample = 47.97

Hygroscopic moisture correction:

Moist weight and tare = 28.99

Dry weight and tare = 28.44

Tare weight = 15.50

Hygroscopic moisture = 4.3%

Table of composite correction values:

Temp., deg. C: 11.3 29.5

Comp. corr.: -8.0 -3.0

Meniscus correction only = 1.0

Specific gravity of solids = 2.709

Hydrometer type = 152H

Hydrometer effective depth equation: $L = 16.294964 - 0.164 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.7	35.0	29.9	0.0131	36.0	10.4	0.0299	64.0
5.00	21.7	34.0	28.9	0.0131	35.0	10.6	0.0191	61.9
15.00	21.7	32.0	26.9	0.0131	33.0	10.9	0.0112	57.6
30.00	21.7	31.0	25.9	0.0131	32.0	11.0	0.0080	55.5
60.00	21.7	29.5	24.4	0.0131	30.5	11.3	0.0057	52.2
250.00	22.3	26.5	21.5	0.0130	27.5	11.8	0.0028	46.2
1440.00	21.9	24.0	18.9	0.0131	25.0	12.2	0.0012	40.6

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Fractional Components

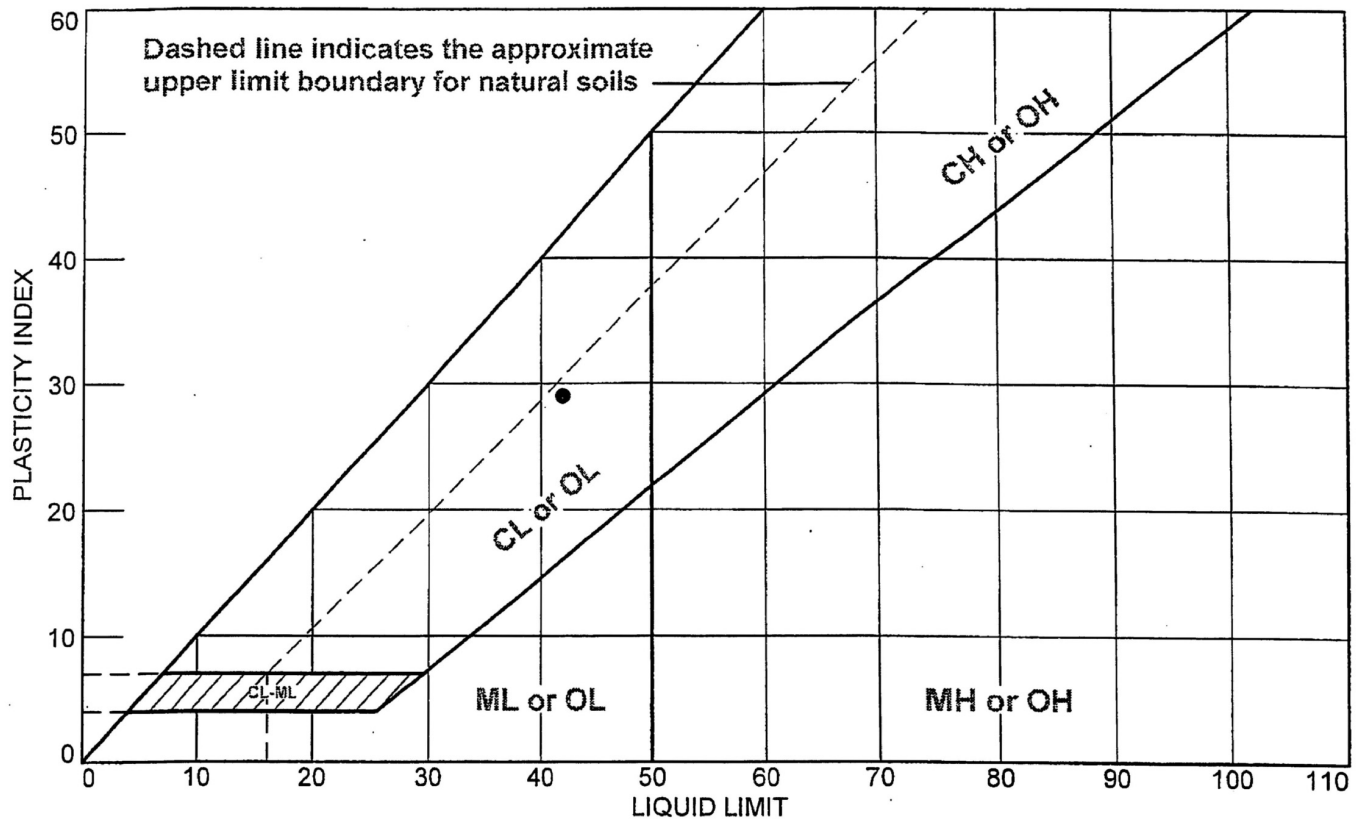
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	2.1	27.8	29.9	19.1	51.0	70.1

D ₁₀	D ₁₅	D ₂₀	D ₃₀	D ₅₀	D ₆₀	D ₈₀	D ₈₅	D ₉₀	D ₉₅
				0.0045	0.0150	0.1263	0.1489	0.1833	0.2577

Fineness Modulus
0.21

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LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318 (05)



SOIL DATA								
	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
•	Boring B-2321UD	UD-1	3.5-5.2'	17.4	13	42	29	CL

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Raleigh, North Carolina

Client: Bechtel

Project: Exelon Texas COL (Victoria Reservoir)

Project No.: 6468071777

Figure **NA**

Tested By: CS

Checked By: LBJ

KAW 5/8/08

LIQUID AND PLASTIC LIMIT TEST DATA

5/7/2008

Client: Bechtel

Project: Exelon Texas COL (Victoria Reservoir)

Project Number: 6468071777

Location: Boring B-2321UD

Depth: 3.5-5.2'

Sample Number: UD-1

Material Description: Dark Gray Sandy Lean CLAY

USCS: CL

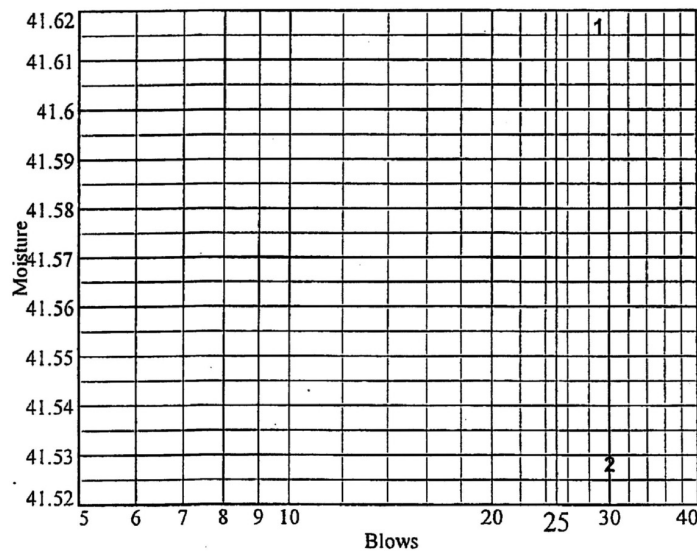
AASHTO: A-7-6(18)

Tested by: CS

Checked by: LBJ

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	25.03	19.67				
Dry+Tare	22.25	17.17				
Tare	15.57	11.15				
# Blows	29	30				
Moisture	41.6	41.5				



Liquid Limit= 42
 Plastic Limit= 13
 Plasticity Index= 29
 Natural Moisture= 17.4
 Liquidity Index= 0.2

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	21.73	21.92			
Dry+Tare	21	21.18			
Tare	15.46	15.46			
Moisture	13.2	12.9			

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RALEIGH, NORTH CAROLINA

REPORT OF THE STANDARD TEST METHOD FOR SPECIFIC GRAVITY OF SOILS
Performed in General Accordance with ASTM D 854-06 (Method B)

PROJECT NAME: EXELON COL PROJECT (VICTORIA)

PROJECT NUMBER: 6468071777

DATE: 4/20/08

SAMPLE IDENTIFICATION: B-2321UD, UD-1

(A) Mass of oven-dried soil, grams:	48.42
(B) Mass of pycnometer filled with water at test temperature (T), grams:	656.48
(C) Mass of pycnometer, water and soil, grams:	687.03
(T) Temperature of pycnometer, water and soil, °C when mass (C) determined:	21.8
(G) Specific Gravity at observed temperature:	$A / [B - (C - A)]$ 2.710
(F) <i>Correction factor:</i>	0.99961
(G x F) SPECIFIC GRAVITY @ 20°C:	2.709

MATERIAL TESTED:

☒

- # 4

☐

- # 10

PREPARATION METHOD:

☒

DRY

☐

WET (dispersed)

REMARKS: Estimated % Passing # 4 : 100

Sandy Lean CLAY (CL)

EQUIPMENT USED

SCALES : 3.1.99

OVEN : 5.1.16

THERMOMETER : 5.1.01

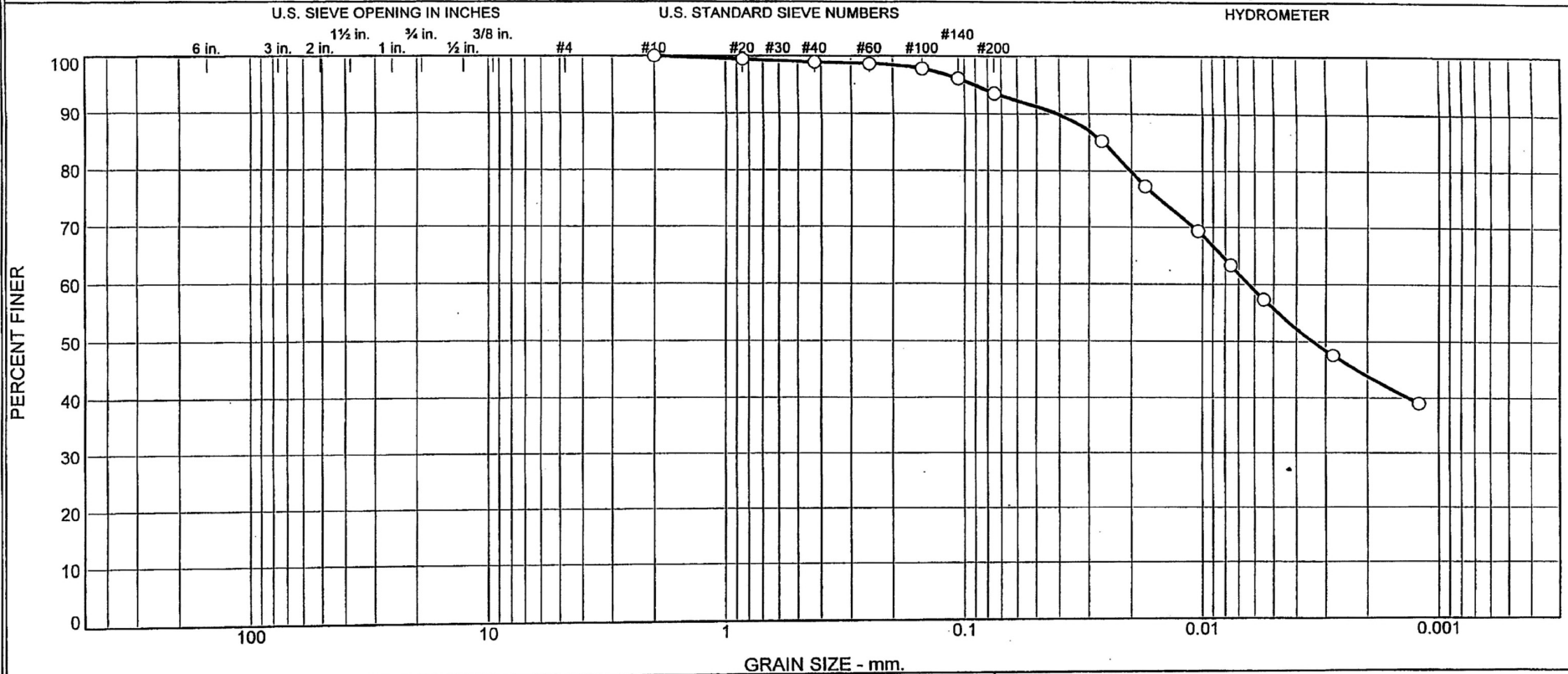
PYCNO METER : P-6

TESTED BY: CS

REVIEWED BY: Brian Johnson

KAW 5/8/08

Particle Size Distribution Report / ASTM D422-63(2002)e1



GRAIN SIZE DISTRIBUTION TEST DATA

5/7/2008

Client: Bechtel

Project: Exelon Texas COL (Victoria Reservoir)

Project Number: 6468071777

Location: Boring B-2321UD

Depth: 10.0-11.7

Sample Number: UD-3

Material Description: Mottled Very Pale Brown and Brownish Yellow Fat CLAY

Date: 2/3/08

Natural Moisture: 17.1

Liquid Limit: 51

Plastic Limit: 16

USCS Class.: CH

Testing Remarks: Specific Gravity = 2.711 (ASTM D854-06)

NM is average of values obtained from consolidation and triaxial test specimens

Tested by: CS

Checked by: LBj

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
290.54	0.00	0.00	#10	0.00	100.0
50.30	0.00	0.00	#20	0.30	99.4
			#40	0.55	98.9
			#60	0.70	98.6
			#100	1.13	97.8
			#140	1.99	96.0
			#200	3.27	93.5

Hydrometer Test Data

Hydrometer test uses material passing #10

Percent passing #10 based upon complete sample = 100.0

Weight of hydrometer sample = 50.30

Hygroscopic moisture correction:

Moist weight and tare = 28.24

Dry weight and tare = 28.08

Tare weight = 15.15

Hygroscopic moisture = 1.2%

Table of composite correction values:

Temp., deg. C: 11.3 29.5

Comp. corr.: -8.0 -3.0

Meniscus correction only = 1.0

Specific gravity of solids = 2.711

Hydrometer type = 152H

Hydrometer effective depth equation: $L = 16.294964 - 0.164 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	21.9	48.0	42.9	0.0131	49.0	8.3	0.0266	85.2
5.00	21.9	44.0	38.9	0.0131	45.0	8.9	0.0175	77.3
15.00	21.9	40.0	34.9	0.0131	41.0	9.6	0.0105	69.3
30.00	21.9	37.0	31.9	0.0131	38.0	10.1	0.0076	63.4
60.00	21.9	34.0	28.9	0.0131	35.0	10.6	0.0055	57.4
250.00	21.9	29.0	23.9	0.0131	30.0	11.4	0.0028	47.5
1440.00	20.9	25.0	19.6	0.0133	26.0	12.0	0.0012	39.0

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Fractional Components

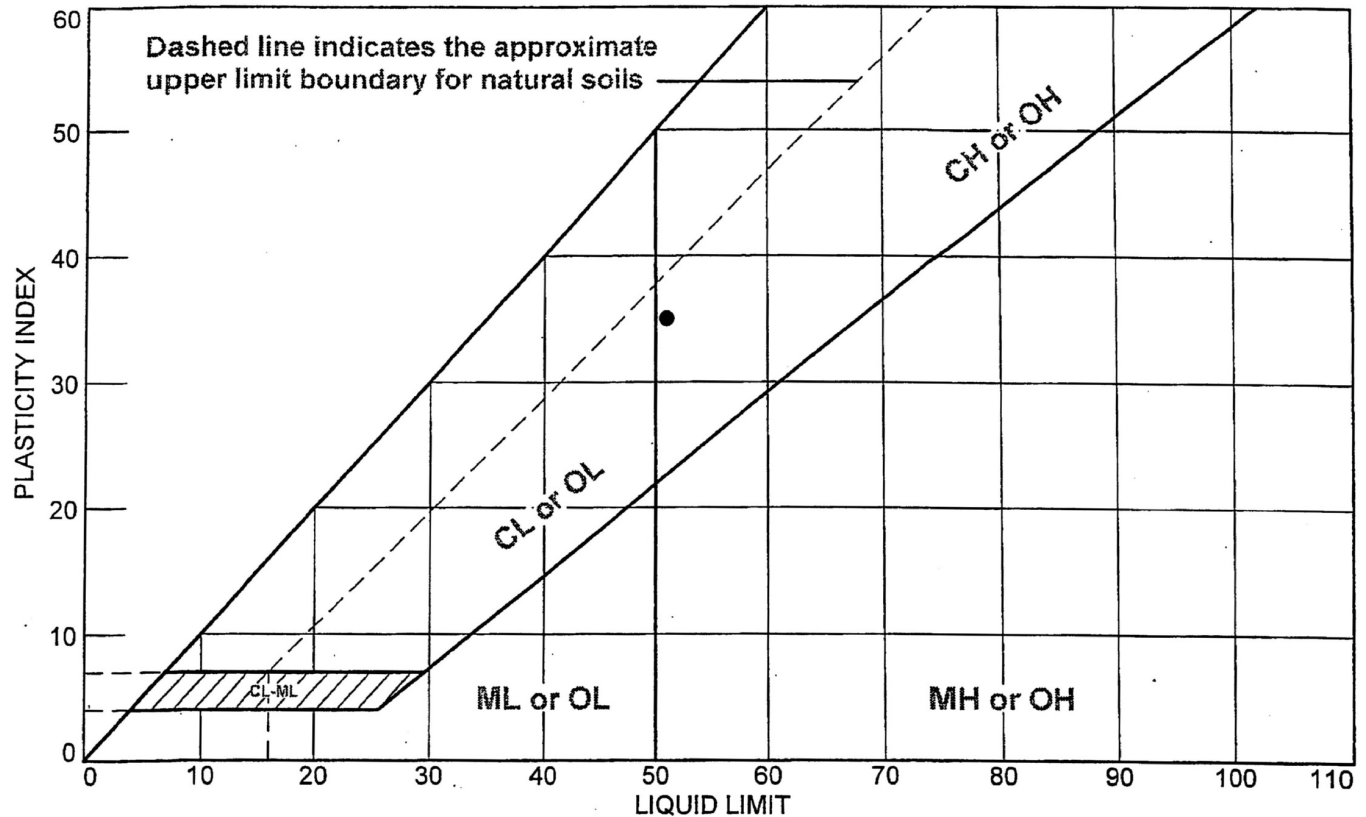
Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	1.1	5.4	6.5	37.7	55.8	93.5

D10	D15	D20	D30	D50	D60	D80	D85	D90	D95
				0.0034	0.0063	0.0202	0.0263	0.0408	0.0919

Fineness Modulus
0.05

MACTEC, Inc.

LIQUID AND PLASTIC LIMITS TEST REPORT ASTM D4318 (05)



SOIL DATA								
	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
•	Boring B-2321UD	UD-3	10.0-11.7	17.1	16	51	35	CH

MACTEC, Inc.

Raleigh, North Carolina

Client: Bechtel

Project: Exelon Texas COL (Victoria Reservoir)

Project No.: 6468071777

Figure *NA*

Tested By: CS

Checked By: LBJ

KAW 5/8/08

LIQUID AND PLASTIC LIMIT TEST DATA

5/7/2008

Client: Bechtel

Project: Exelon Texas COL (Victoria Reservoir)

Project Number: 6468071777

Location: Boring B-2321UD

Depth: 10.0-11.7

Sample Number: UD-3

Material Description: Mottled Very Pale Brown and Brownish Yellow Fat CLAY

USCS: CH

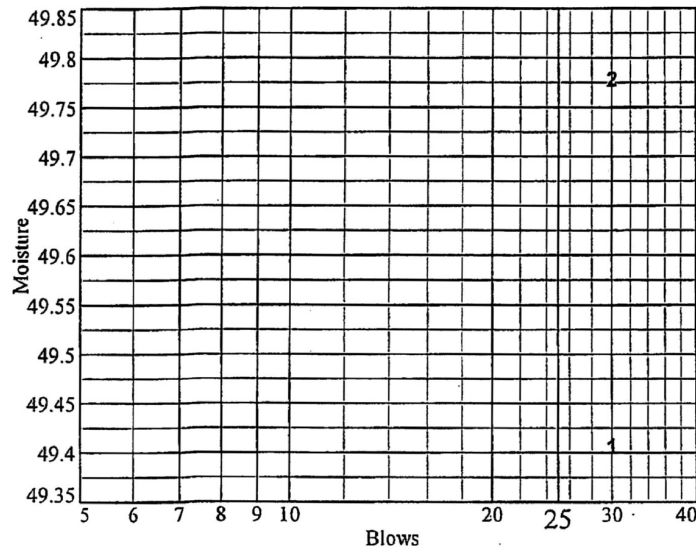
AASHTO: A-7-6(35)

Tested by: CS

Checked by: LBJ

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	23.15	22.23				
Dry+Tare	20.65	19.98				
Tare	15.59	15.46				
# Blows	30	30				
Moisture	49.4	49.8				



Liquid Limit= 51
 Plastic Limit= 16
 Plasticity Index= 35
 Natural Moisture= 17.1
 Liquidity Index= 0.0

Plastic Limit Data

Run No.	1	2	3	4
Wet+Tare	22.80	22.20		
Dry+Tare	21.84	21.30		
Tare	15.78	15.53		
Moisture	15.8	15.6		

MACTEC, Inc.

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RALEIGH, NORTH CAROLINA

REPORT OF THE STANDARD TEST METHOD FOR SPECIFIC GRAVITY OF SOILS
Performed in General Accordance with ASTM D 854-06 (Method B)

PROJECT NAME: EXELON COL PROJECT (VICTORIA)

PROJECT NUMBER: 6468071777

DATE: 3/12/08

SAMPLE IDENTIFICATION: B-2321UD, UD-3

(A) Mass of oven-dried soil, grams:	51.60
(B) Mass of pycnometer filled with water at test temperature (T), grams:	656.55
(C) Mass of pycnometer, water and soil, grams:	689.12
(T) Temperature of pycnometer, water and soil, °C when mass (C) determined:	21.1
(G) Specific Gravity at observed temperature:	$A / [B - (C - A)]$ 2.712
(F) Correction factor:	0.99977
(G x F) SPECIFIC GRAVITY @ 20°C:	2.711

MATERIAL TESTED:

☒

- # 4

☐

- # 10

PREPARATION METHOD:

☒

DRY

☐

WET (dispersed)

REMARKS: Estimated % Passing # 4 : 100

Fat CLAY (CH)

EQUIPMENT USED

SCALES : 3.1.99

OVEN : 5.1.16

THERMOMETER : 5.1.01

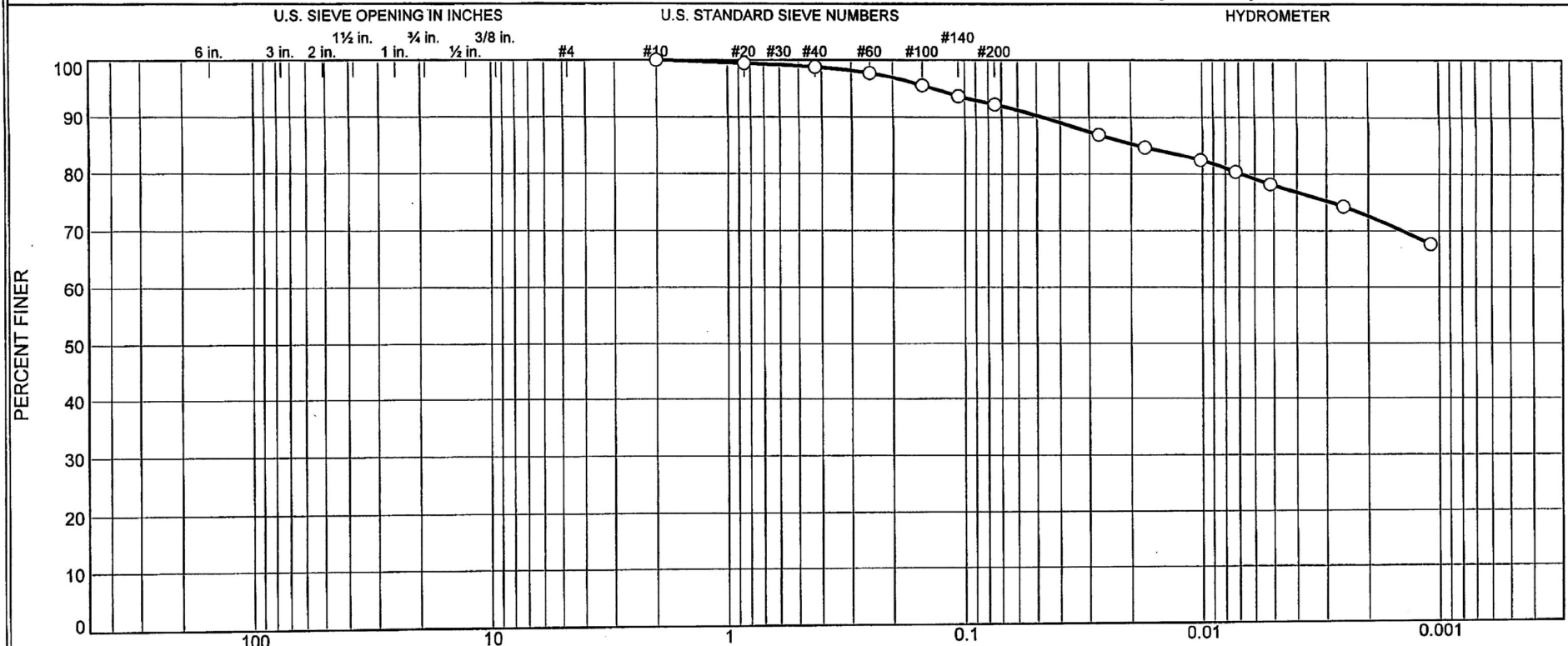
PYCNO METER : P-6

TESTED BY: CS

REVIEWED BY: Brian Johnson

Kaw 5/8/08

Particle Size Distribution Report / ASTM D422-63(2002)e1



% +3"		% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0		0.0	0.0	0.0	1.2	6.6	14.2	78.0

Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
Boring B-2321UD	UD-4	13.5-15.2	2/3/08	CH	Mottled Brownish Yellow and Light Gray Fat CLAY	21.8	81	22

Client Bechtel		MACTEC, Inc. Raleigh, North Carolina	Specific Gravity = 2.720 (ASTM D854-06) NM obtained from consolidation test specimen
Project Exelon Texas COL (Victoria Reservoir)			
Project No. 6468071777	Figure <i>NA</i>		

Tested By: CS Checked By: LBJ

KAW 5/8/08

GRAIN SIZE DISTRIBUTION TEST DATA

5/8/2008

Client: Bechtel

Project: Exelon Texas COL (Victoria Reservoir)

Project Number: 6468071777

Location: Boring B-2321UD

Depth: 13.5-15.2

Sample Number: UD-4

Material Description: Mottled Brownish Yellow and Light Gray Fat CLAY

Date: 2/3/08

Natural Moisture: 21.8

Liquid Limit: 81

Plastic Limit: 22

USCS Class.: CH

Testing Remarks: Specific Gravity = 2.720 (ASTM D854-06)

NM obtained from consolidation test specimen

Tested by: CS

Checked by: LBJ

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
165.10	0.00	0.00	#10	0.00	100.0
47.23	0.00	0.00	#20	0.27	99.4
			#40	0.57	98.8
			#60	1.07	97.7
			#100	2.08	95.6
			#140	2.99	93.7
			#200	3.67	92.2

Hydrometer Test Data

Hydrometer test uses material passing #10

Percent passing #10 based upon complete sample = 100.0

Weight of hydrometer sample = 47.23

Hygroscopic moisture correction:

Moist weight and tare = 27.29

Dry weight and tare = 26.53

Tare weight = 15.46

Hygroscopic moisture = 6.9%

Table of composite correction values:

Temp., deg. C: 11.3 29.5

Comp. corr.: -8.0 -3.0

Meniscus correction only = 1.0

Specific gravity of solids = 2.720

Hydrometer type = 152H

Hydrometer effective depth equation: $L = 16.294964 - 0.164 \times R_m$

Elapsed Time (min.)	Temp. (deg. C.)	Actual Reading	Corrected Reading	K	Rm	Eff. Depth	Diameter (mm.)	Percent Finer
2.00	22.3	44.0	39.0	0.0130	45.0	8.9	0.0274	86.9
5.00	22.3	43.0	38.0	0.0130	44.0	9.1	0.0175	84.7
15.00	22.4	42.0	37.0	0.0130	43.0	9.2	0.0102	82.5
30.00	22.6	41.0	36.1	0.0129	42.0	9.4	0.0072	80.4
60.00	22.6	40.0	35.1	0.0129	41.0	9.6	0.0052	78.2
250.00	23.5	38.0	33.4	0.0128	39.0	9.9	0.0025	74.3
1440.00	23.5	35.0	30.4	0.0128	36.0	10.4	0.0011	67.6

MACTEC, Inc.

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.0	1.2	6.6	7.8	14.2	78.0	92.2

D10	D15	D20	D30	D50	D60	D80	D85	D90	D95
						0.0068	0.0187	0.0474	0.1350

Fineness Modulus
0.07

MACTEC, Inc.

Dashed line indicates the approximate upper limit boundary for natural soils

CL or ML

CH or OH

ML or OL

MH or OH

SOIL DATA							
SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
• Boring B-2321UD	UD-4	13.5-152	21.8	22	81	59	CH

Figure NA

KAW 5/8/08

LIQUID AND PLASTIC LIMIT TEST DATA

5/7/2008

Client: Bechtel

Project: Exelon Texas COL (Victoria Reservoir)

Project Number: 6468071777

Location: Boring B-2321UD

Depth: 13.5-152

Sample Number: UD-4

Material Description: Mottled Brownish Yellow and Light Gray Fat CLAY

USCS: CH

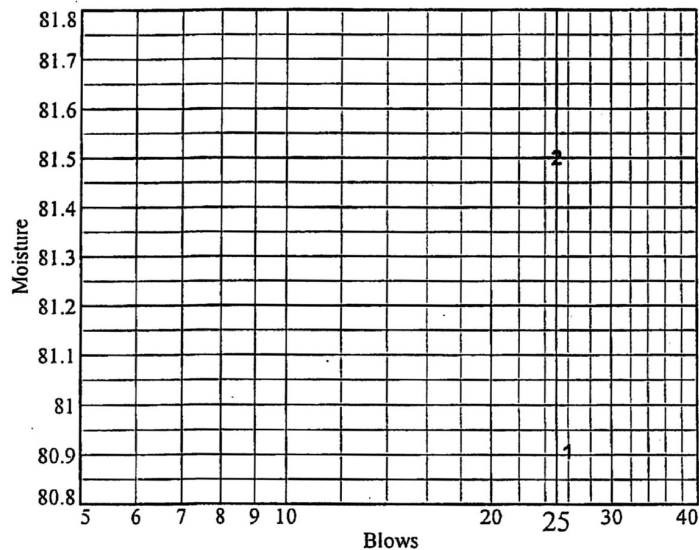
AASHTO: A-7-6(61)

Tested by: CS

Checked by: LBJ

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	23.18	22.24				
Dry+Tare	19.79	19.20				
Tare	15.60	15.47				
# Blows	26	25				
Moisture	80.9	81.5				



Liquid Limit= 81
 Plastic Limit= 22
 Plasticity Index= 59
 Natural Moisture= 21.8
 Liquidity Index= 0.0

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	21.85	22.59			
Dry+Tare	20.69	21.39			
Tare	15.50	15.80			
Moisture	22.4	21.5			

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