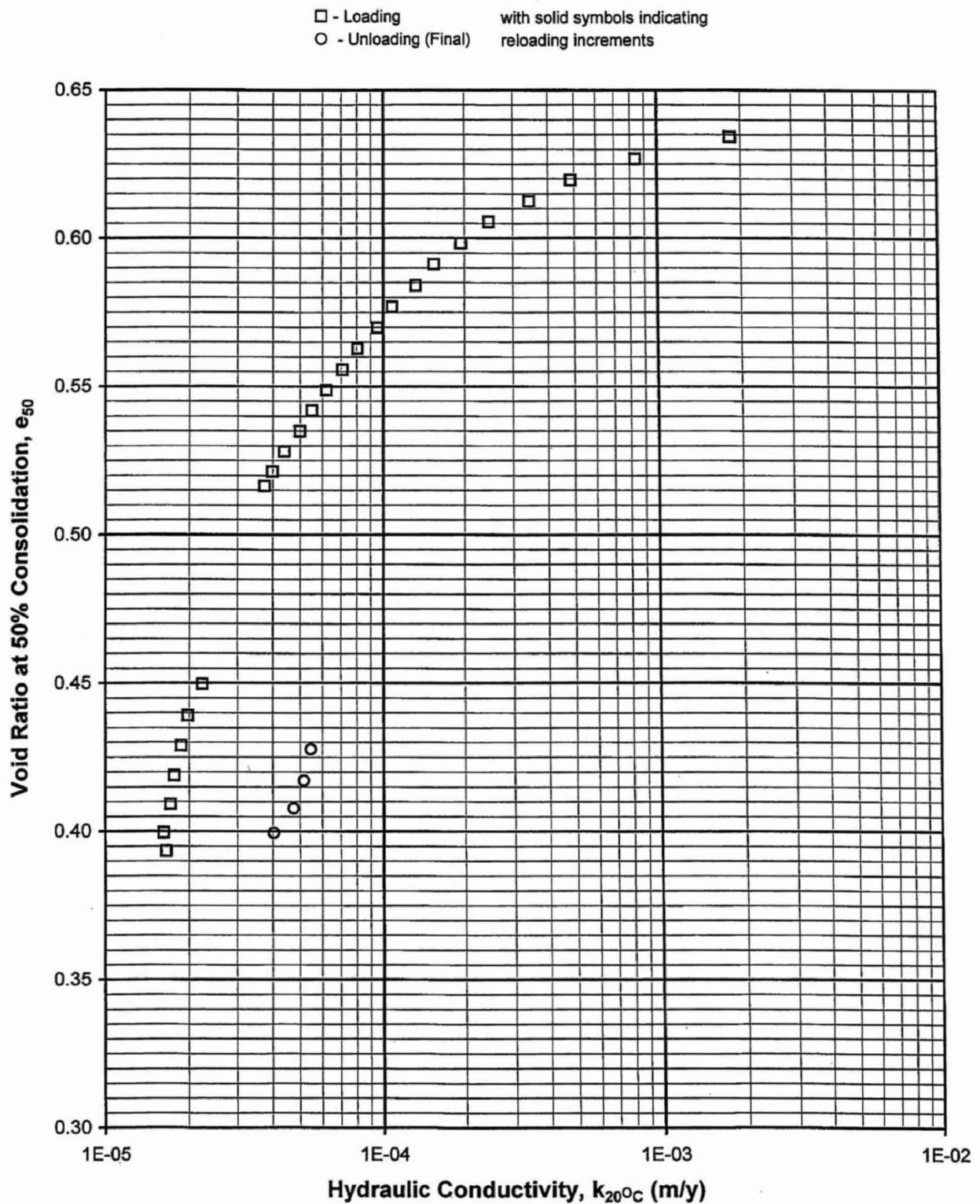




ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-3 File Name: B-2321_UD9a
 Task No.: NA Specific Gravity, G_s: 2.680 ☒ Meas. ; ☐ Assumed Ring No.: 3
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area, A_r (cm²) = 31.723
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ LPC Core	☐ Impact/Rammer		Rammer Wgt. (lb) =	No. Layers =	
Sample No.: UD-9	Composite No.:	☐ Pluviated:		Tamper Force (lb) =	Drop (in.) =	
Depth (ft): 58.5 - 61.0	Specimen No.: A	☐ Kneading		☐ Undercompaction:	U _{ri} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample			Ref. Effort =	% Comp. =	± Opt. =

Water Content (W);	Initial - Trimming Location			Final, W _{at} (see below)	Soil and Ring Masses	Initial	Final	
	Top (W1)	Bottom (W2)	Sides (W3)		Mass Moist Soil + Ring (g)	332.83	329.00	
Container No.	116	777	2005	893	Mass Ring (g)	211.72		
Mass Moist Soil + Container (g)	123.75	116.33	95.26	59.71	Mass Moist Soil, M _{Lo} or M _{Lat} (g)	121.11	117.28	
Mass Dry Soil + Container (g)	108.35	102.68	84.97	55.84	EXCESS DRY SOIL (soil not incl. in final mass above)			
Mass Container (g)	29.70	31.78	30.54	32.27	Container No.		2041	
WATER CONTENT (%)	19.58	19.25	18.91	16.42	Mass Dry Soil + Container (g)		31.24	
Avg. Initial Water Content, W4 (%)	19.25	Final W _{at} :	X	Slice ;	Whole Spec.	Mass Container (g)		30.79
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil, M _{d,es} (g)		0.45	

Soil Height: Measurements (mm)				Soil Height: Calculations, (mm)		Initial	Final
Initial		Final		Height of Gauge Block, H _{gb} (1)		0.000	12.740
with Spec.	without Spec.	with Spec.	without Spec.	Reading on Gauge Block, d _{gb}		0.000	0.000
19.240	0.000	17.150	13.120	Avg. Reading on Soil, d _{soil}		19.218	17.138
19.250	0.000	17.030	13.060	Avg. Reading on Apparatus without Specimen, d _{app}		0.000	13.072
19.160	0.000	17.120	13.070	Soil Height, H = d _{soil} - d _{app} + H _{gb} - d _{gb}		19.218	16.806
19.180	0.000	17.260	13.080	Soil Height: Final by Dial Change During Test (mm)			
19.260	0.000	17.130	13.030	Initial Height, H _o		19.218	
☐ Yes ;	☒ No	☒ Yes ;	☐ No	Require H _{gb} & d _{gb} (1)		Final (end of test) Corr. Total Spec. Deformation, ΔH _{o,f}	
☐ Yes ;	☒ No	☒ Yes ;	☐ No	Filter Paper Included:		Final Calculated Height, H _{f,c} = H _o - ΔH _{o,f}	
(1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS - 25 mm				Final Soil Height Measurement, H _{f,m}		16.806	
Enter value of H _{gb} & d _{gb} only when that value has to be included in the determination of the soil height.				Normalized Difference in %, (H _{f,c} - H _{f,m})/H _o		-0.06	

Estimated Initial Unit Weight				Soil Extruded During Loading	
Total, $\gamma_{t,0}$ (pcf)= 124.01		Dry, $\gamma_{d,0}$ (pcf)= 104.00		Container No.	
Filter Paper Used: ☒		Whatman No. 54; ☐		Mass Dry Soil + Cont. (g)	
Incremental Test: Top & Bottom: ☐		Yes ; ☐		Mass Cont. (g)	
CRS Test: Top Only: ☒		Yes ; ☐		Dry Mass - Soil Extruded During Loading, $M_{d,el}$ (g)	
				0.00	

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Mottled Very Pale Brown and Brownish Yellow Lean CLAY with sand (CL)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw

Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: DH Take Down By: JTG
 Date: 4/4/2008 Date: 4/4/2008 Final Calc. By: DH Date: 4/9/2008
 Reviewed By: HP

Note: NA - Not Applicable

KAW 7/16/08

ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-3 File Name: B-2321_UD9a
 Task No.: NA Specific Gravity, G_s : 2.680 ☒ Measured ; ☐ Assumed.
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = _____ g/kg

Cal.- Routine	ITEM	Water Content, (%)	Mass Dry Soil, (g)	Degree of Saturation, S in %		
				Height Initial	Final Height Meas.	Dial
1	Initial, Top, W1	19.58	101.28	86.0	103.7	104.0
2	" Bottom, W2	19.25	101.56	85.2	102.6	102.9
3	" Sides, W3	18.91	101.85	84.3	101.4	101.6
4	" Average, W4	19.25	101.56	85.1	102.6	102.8
5	" Back Calculated (1)	19.69	101.19 (3)	86.2	104.1	104.3
6	Final	16.42	101.19 (2)	86.2	104.1	104.3

Calculated Specific Gravity for Final Saturation = 100%:	
Used Cal. Routine No. 5	to obtain the mass of dry soil
and final height by: ☒ Measurement; ☐ Dial Change.	
Back Cal. G_s = 2.725	
Avg. G_s (measured/assumed) & Back Cal. G_s = 2.703	

Calculation Constant, K	
= (unit conversion) / $G_s \times \rho_w \times A_r$	
Estimated, K_e	0.11783
Final Selected, K_f	0.11783

Calculated Mass Dry Soil for Final Saturation = 100%:		using measured/assumed G_s
and final height by: ☒ Measurement; ☐ Dial Change.		
Back Cal. Mass Dry Soil, (g) = 102.19		
Avg. Back Calculated and Measured Mass Dry Soil (g) = 101.69		

Summary of Specimen Physical Properties									
Specific Gravity $G_s = 2.680$				Assumed		To make $S_f = 100\%$ at end of test.			
			X	Measured		Avg. of measured/assumed G_s and G_s to make $S_f = 100\%$			
Mass Dry Soil, (g)	Initial: 101.19		X	From Cal. Routine No.		5	Note: Routine #5 is based on final measurements.		
	Final (4): NA			Make $S_f = 100\%$, or,			Avg. of measured & make $S_f = 100\%$		
Initial Height (mm) =				19.22	X	Measured ;			Back Calculated Back-cal. Sat. (%) = NA
Final Height (mm) =				16.81	X	Measured ;			Initial H_o & dial change during loading
	Water Content, w (%)	Void Ratio, e	Degree of Saturation, S (%)	Total Unit Weight, γ_t (pcf)	Dry Unit Weight, γ_d (pcf)	Height of Solids, H_s (2,4) (mm)		Extruded soil loss proportioned in increasing loading increments (5)	
Initial	19.7	0.612	86.2	124.0	103.6	11.923		From	To (ksf)
Final	15.9	0.409	104.1	137.3	118.5	NA		NA	NA

Graphical Construction	σ'_p (ksf)	ε_a (%)	CR	RR	OCR	Liquid Limit (LL)	49	Minus 200 (%)
Casagrande Method	15.70	NA	0.115	0.054	2.3	Plastic Limit (PL)	14	77.0
Becker Method	NA	Becker minimum σ'_p (ksf):			NA	Plasticity Index (PI)	35	

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: DH Reviewed By: HP *HP*
 Date: 4/15/2008

ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686 Test Station No.: CRS-3 File Name: B-2321_UD9a
 Task No.: NA Date, Start: 4/4/2008 Initial Height, H_0 (mm): 19.22
 Project Name: Exelon (Victoria) Completed: 4/9/2008 Ring Area, A_r (cm²): 31.7233
 Test: Initial / Pressure Gauge Back Pressure, U_G (psi): 70 ☒ Undisturbed or ; ☐ Reconstituted - Specimen.
 Reference Values: Back Pressure, $U_{b,BE}$ (psi): 70.65522, V : 0.02312865 Piston Uplift, P_{up} (lbf): 34.73
 Back Pressure, $U_{b,CS}$ (psi): 70.68333, V : 0.02313793 Setup DT_{ref} (V): 0.04770969
 Displacement Transducer No.: DT-103 Calib. Factor (mm/V): -213.848 Ch. No.: 7
 Pore Press. Transducer No.: PT-108 Calib. Factor (psi/V): 3029.501 Ref. Zero (V): -0.000194 Ch. No.: 8
 Force Cell No.: FT-103 Calib. Factor (lbf/V): 161103.256 Ref. Zero (V): 0.000104 Ch. No.: 9

Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain
 US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress (σ_v), corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: DH Reviewed By: HP *HP*

Remarks:

Load- ing Info. (1)	Julian Day (dd)	Hour (hr.:min.:s)	Elapsed Time from Start of Loading, Δt_n (min)	Total Vertical Stress, $\sigma_{v,n}$ (2) (ksf)	Excess Pore-Water Pressure, ΔU_n (ksf)	Total Specimen Deformation, ΔH_n (3) (mm)	Apparatus Flexibility Correction, $\Delta d_{afc,n}$ (mm)	Corr. Total Specimen Deformation, $\Delta H_{c,n}$ (4) (mm)	Strain Rate, between n & $n-1$, $\Delta \epsilon_{ac,rate}$ (%/hr)
S	95	14 : 09 : 00		0.19		0.000			
BS	95	14 : 28 : 00		0.92		0.055	0.019	0.036	
BE	96	10 : 01 : 00		1.27	-0.004	0.053	0.030	0.023	
CS	96	10 : 02 : 00	0	1.28	0.000	0.053	0.030	0.023	
	96	10 : 28 : 00	26	2.15	0.094	0.116	0.050	0.066	0.509
	96	10 : 54 : 00	52	2.66	0.261	0.182	0.059	0.123	0.687
US	96	11 : 22 : 00	80	3.28	0.561	0.252	0.069	0.183	0.670
	96	12 : 14 : 00	132	4.66	1.422	0.358	0.086	0.273	0.538
	96	13 : 06 : 00	184	6.67	2.904	0.463	0.104	0.359	0.516
	96	13 : 58 : 00	236	8.57	4.234	0.558	0.118	0.439	0.484
	96	14 : 50 : 00	288	11.37	6.390	0.658	0.136	0.522	0.499
	96	15 : 42 : 00	340	14.27	8.580	0.756	0.151	0.605	0.493
	96	16 : 34 : 00	392	17.40	10.880	0.854	0.166	0.688	0.504
	96	17 : 26 : 00	444	20.69	13.253	0.951	0.180	0.771	0.495
	96	18 : 18 : 00	496	24.03	15.610	1.048	0.193	0.855	0.507
	96	19 : 10 : 00	548	27.70	18.124	1.143	0.207	0.936	0.485
	96	20 : 02 : 00	600	31.69	20.915	1.240	0.220	1.019	0.499
	96	20 : 54 : 00	652	35.96	23.858	1.335	0.234	1.100	0.487
	96	21 : 46 : 00	704	40.39	26.905	1.430	0.248	1.181	0.488
	96	22 : 38 : 00	756	45.07	30.099	1.524	0.262	1.262	0.483
	96	23 : 30 : 00	808	49.79	33.249	1.617	0.275	1.342	0.480
	97	00 : 22 : 00	860	54.95	36.794	1.712	0.289	1.423	0.484
	97	01 : 14 : 00	912	60.00	40.129	1.804	0.302	1.501	0.473
	97	02 : 06 : 00	964	65.50	43.793	1.896	0.316	1.580	0.473

ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Load- ing Info. (1)	Julian Day (dd)	Hour (hr.:min.:s)	Elapsed Time from Start of Loading, Δt_n (min)	Total Vertical Stress, $\sigma_{v,n}$ (2) (ksf)	Excess Pore-Water Pressure, ΔU_n (ksf)	Total Specimen Deformation, ΔH_n (3) (mm)	Apparatus Flexibility Correction, $\Delta d_{afc,n}$ (mm)	Corr. Total Specimen Deformation, $\Delta H_{c,n}$ (4) (mm)	Strain Rate, between n & n-1, $\Delta \varepsilon_{ac,rate}$ (%/hr)
UE	97	02 : 30 : 00	988	68.08	45.518	1.939	0.323	1.617	0.476
	97	02 : 32 : 00	990	67.60	45.149	1.941	0.322	1.619	0.429
	97	04 : 52 : 00	1130	44.61	18.342	1.973	0.270	1.703	0.187
	97	07 : 12 : 00	1270	23.84	-1.810	1.901	0.214	1.686	-0.038
	97	09 : 32 : 00	1410	12.24	-8.996	1.801	0.174	1.627	-0.132
US	97	11 : 52 : 00	1550	6.16	-9.272	1.676	0.143	1.533	-0.209
	97	14 : 12 : 00	1690	2.76	-9.168	1.539	0.113	1.426	-0.240
	97	16 : 32 : 00	1830	0.86	-9.030	1.398	0.084	1.314	-0.248
	97	18 : 52 : 00	1970	0.19	-8.568	1.254	0.119	1.134	-0.402
UE	97	19 : 32 : 00	2010	0.13	-8.351	1.210	0.156	1.054	-0.626
	97	20 : 04 : 00	2042	0.10	-8.157	1.176	0.188	0.988	-0.644
	98	01 : 52 : 00	2390	0.09	-5.515	0.911	0.202	0.709	-0.250
	98	02 : 36 : 00	2434	0.61	-4.888	0.831	0.081	0.750	0.292
	98	03 : 14 : 00	2472	1.68	-3.835	0.908	0.098	0.810	0.491
	98	04 : 36 : 00	2554	5.88	0.344	1.062	0.141	0.922	0.425
US	98	05 : 58 : 00	2636	11.75	6.122	1.207	0.172	1.035	0.431
	98	07 : 20 : 00	2718	19.22	12.816	1.346	0.200	1.146	0.423
	98	08 : 42 : 00	2800	27.92	20.095	1.484	0.226	1.258	0.424
	98	10 : 04 : 00	2882	37.09	27.244	1.621	0.251	1.370	0.428
	98	11 : 26 : 00	2964	47.40	34.767	1.758	0.277	1.482	0.425
	98	12 : 48 : 00	3046	57.69	41.391	1.893	0.300	1.593	0.424
	98	14 : 10 : 00	3128	68.46	47.630	2.029	0.323	1.705	0.428
	98	15 : 32 : 00	3210	79.61	53.919	2.167	0.350	1.817	0.425
	98	16 : 54 : 00	3292	90.76	60.653	2.303	0.374	1.929	0.426
	98	18 : 16 : 00	3374	101.48	64.877	2.444	0.397	2.047	0.450
	98	19 : 38 : 00	3456	110.35	65.863	2.591	0.415	2.176	0.492
	98	21 : 00 : 00	3538	119.11	64.685	2.741	0.432	2.309	0.506
	98	22 : 22 : 00	3620	127.17	63.898	2.884	0.447	2.437	0.487
	98	23 : 44 : 00	3702	137.71	66.512	3.022	0.467	2.555	0.451
	99	01 : 06 : 00	3784	148.57	67.092	3.159	0.486	2.673	0.448
	99	02 : 28 : 00	3866	160.47	66.418	3.294	0.506	2.787	0.435
	99	03 : 50 : 00	3948	172.41	66.697	3.427	0.526	2.901	0.430
	99	05 : 12 : 00	4030	185.05	65.493	3.556	0.546	3.010	0.415
	99	05 : 38 : 00	4056	188.37	63.112	3.596	0.552	3.045	0.420
UE	99	05 : 40 : 00	4058	187.88	62.963	3.598	0.551	3.047	0.440
	99	08 : 24 : 00	4222	170.40	52.533	3.648	0.525	3.123	0.144
	99	11 : 08 : 00	4386	136.70	18.781	3.602	0.472	3.130	0.013
	99	13 : 52 : 00	4550	104.54	-5.208	3.528	0.417	3.111	-0.036
	99	16 : 36 : 00	4714	77.14	-9.349	3.433	0.366	3.067	-0.083
US	99	19 : 20 : 00	4878	55.53	-9.310	3.319	0.320	2.999	-0.130
	99	22 : 04 : 00	5042	39.14	-9.428	3.193	0.281	2.913	-0.165
	100	00 : 48 : 00	5206	26.94	-9.706	3.057	0.248	2.809	-0.197

ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

[illegible]

ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

Project Number: 0411-08-1686 Test Station No.: CRS-3 ☒ Undisturbed or; ☐ Reconstituted - Specimen. File Name: B-2321_UD9

Task No.: NA Date: Start: 4/4/2008 Back Pressure, $U_{b,CS}$ (psi): 70.7 Piston Uplift, P_{up} (lb): 34.73

Project Name: Exelon (Victoria) Completed: 4/9/2008 Transient Time Factor, $T_v = (C_v \cdot t) / H^2 = 0.5$

4186-06-Summary of Methods: NA ☐ Data corrected for salt _____; in ☐ g/kg

Final Description of Specimen: Mottled Very Pale Brown and Brownish Yellow Lean CLAY with sand (CL) 0

Ring No.: 3 Area, A_r (cm²): 31.723 Solids Ht., H_s (mm): 11.923 Specific Gravity, $G_s = 2.680$ ☒ Meas.; ☐ Assumed

Initial: Height H_o : 19.22 Water 19.7 Void 0.612 Deg. of 86.2 Total Unit 124.0 Dry Unit 103.6

Final: (mm): H_f : 16.81 Content, w (%): 15.9 Ratio, e : 0.409 Sat., S (%): 104.1 Weight, γ_t (pcf): 137.3 Weight, γ_d (pcf): 118.5

Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain, US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate or ΔU_n to erratic
- (2) Excess pore-water pressure measured at the base of the specimen.
- (3) Only applicable during stress controlled (SC) loading.

Data Management by: DH

Reviewed by: HP *MP*

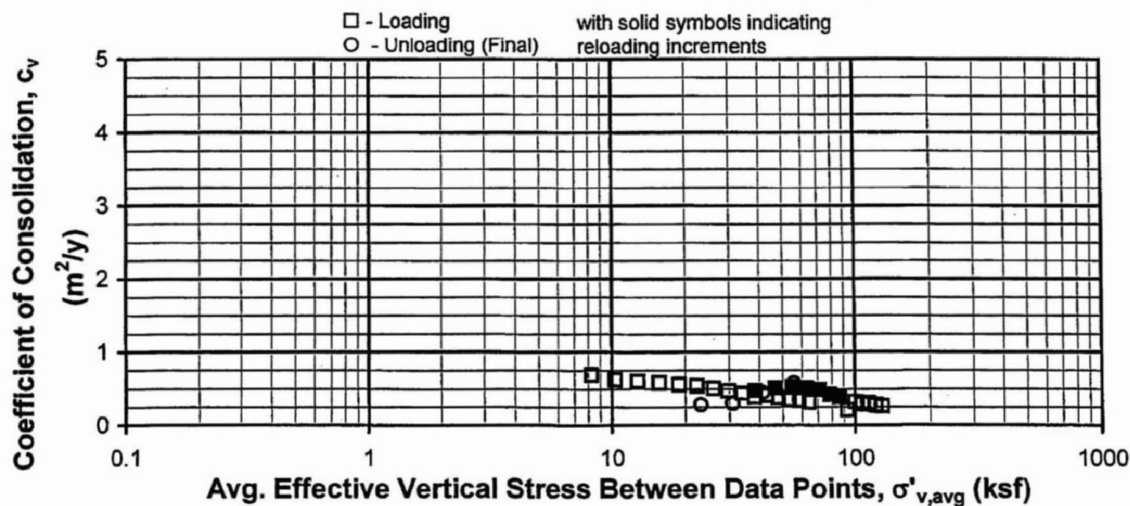
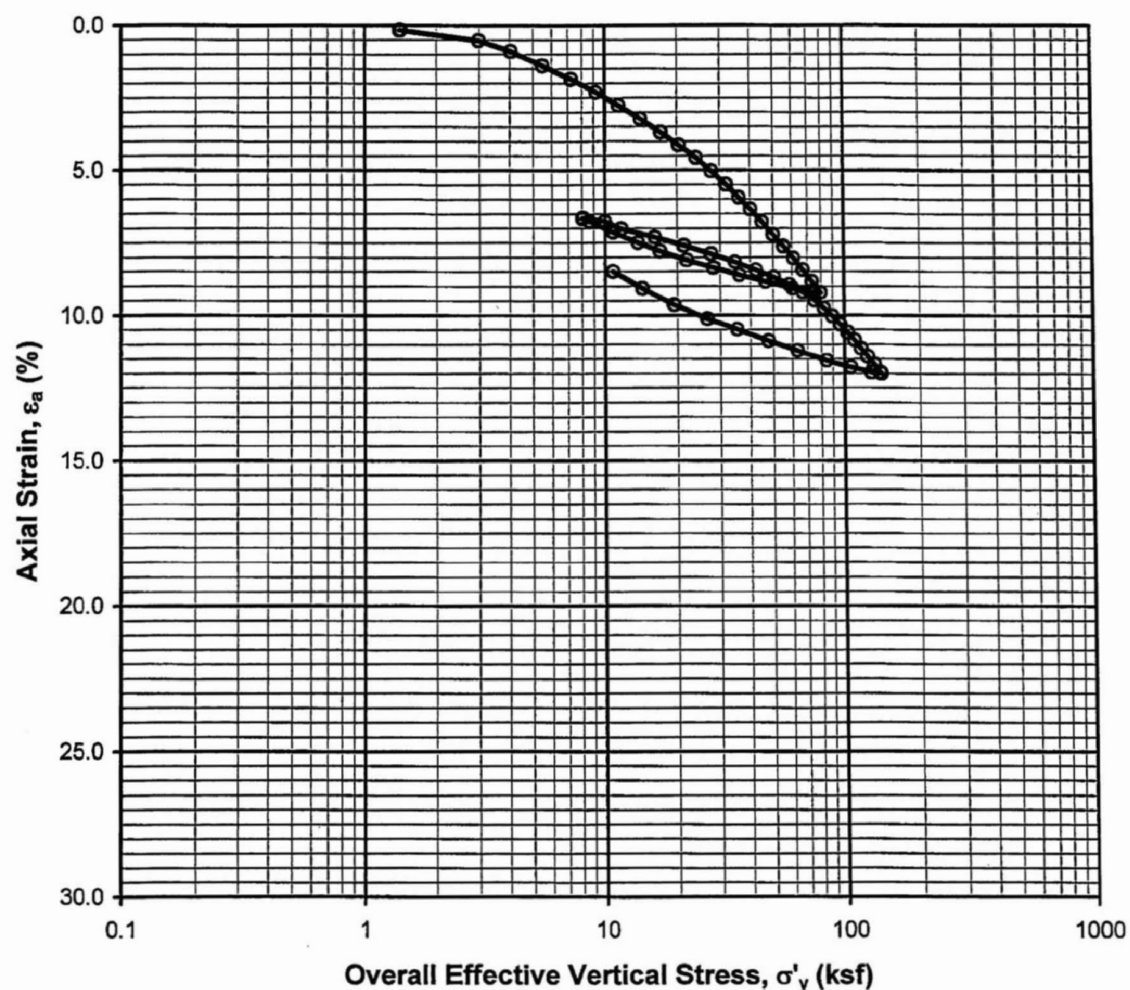
Load- ing Info. (1)	Elapsed Time from Start of Loading, Δt_n (min)	Overall Effective Vertical Stress, $\sigma'_{v,n}$ (ksf)	Corrected Volumetric (Axial) Strain, $\epsilon_{v,n}$ ($\epsilon_{ac,n}$) $\Delta H_{c,n} / H_o$ (%)	Overall Void Ratio, e_n	Total Vertical Stress, $\sigma_{v,n}$ (ksf)	Excess Pore-Water Pressure, ΔU_n (2) (ksf)	Loading Pore-Water Pressure Ratio, R_u $\Delta U_n / \sigma_{v,n}$ (%)	Corrected Specimen Height, $H_{c,n}$ (mm)	Calculations Between n and n-1				Steady State Ratio, $SSR_n =$ $\frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$	Rate of Secondary Comp. (3), $C_\alpha =$ $\Delta d_{a,sc} / H_o$ ($\times 10^{-4}$)
									Average Effective Vertical Stress, $\sigma'_{v,avg}$ (ksf)	Coefficient of Consolidation, C_v (m ² /y)	Average Void Ratio, e_{avg}	Hydraulic Conductivity, k @ 20°C (m/y)		
S					0.19				Data on given line represents average conditions					
BS			0.19	0.609	0.92			19.182	between that line and the previous line of data.					
BE		1.27	0.12	0.610	1.27	-0.004	-0.3	19.195			0.609			
CS	0	1.28	0.12	0.610	1.28	0.000	0.0	19.195			0.610			
	26	2.08	0.34	0.606	2.15	0.094	4.4	19.152	1.68		0.608			
	52	2.49	0.64	0.601	2.66	0.261	9.8	19.095	2.28		0.604			
US	80	2.89	0.95	0.596	3.28	0.561	17.1	19.035	2.69		0.599			
	132	3.66	1.42	0.589	4.66	1.422	30.5	18.945	3.27	2.23	0.593	1.85E-03	1.23	
	184	4.55	1.87	0.582	6.67	2.904	43.6	18.859	4.10	1.34	0.585	8.36E-04	1.49	
	236	5.44	2.29	0.575	8.57	4.234	49.4	18.779	5.00	0.71	0.578	4.86E-04	1.19	
	288	6.55	2.72	0.568	11.37	6.390	56.2	18.696	6.00	0.66	0.571	3.43E-04	1.48	
	340	7.73	3.15	0.561	14.27	8.580	60.1	18.613	7.14	0.46	0.565	2.45E-04	1.30	
	392	9.04	3.58	0.554	17.40	10.880	62.5	18.530	8.39	0.36	0.558	1.94E-04	1.25	
	444	10.45	4.01	0.547	20.69	13.253	64.1	18.447	9.75	0.30	0.551	1.55E-04	1.21	
	496	11.95	4.45	0.540	24.03	15.610	65.0	18.363	11.20	0.25	0.544	1.32E-04	1.16	
	548	13.64	4.87	0.533	27.70	18.124	65.4	18.282	12.79	0.23	0.537	1.08E-04	1.21	
	600	15.44	5.30	0.526	31.69	20.915	66.0	18.199	14.54	0.21	0.530	9.53E-05	1.26	

ONE - DIMENSIONAL CONSOLIDATION TEST: CRS LOADING RESULTS (Load Time - Deformation Properties)

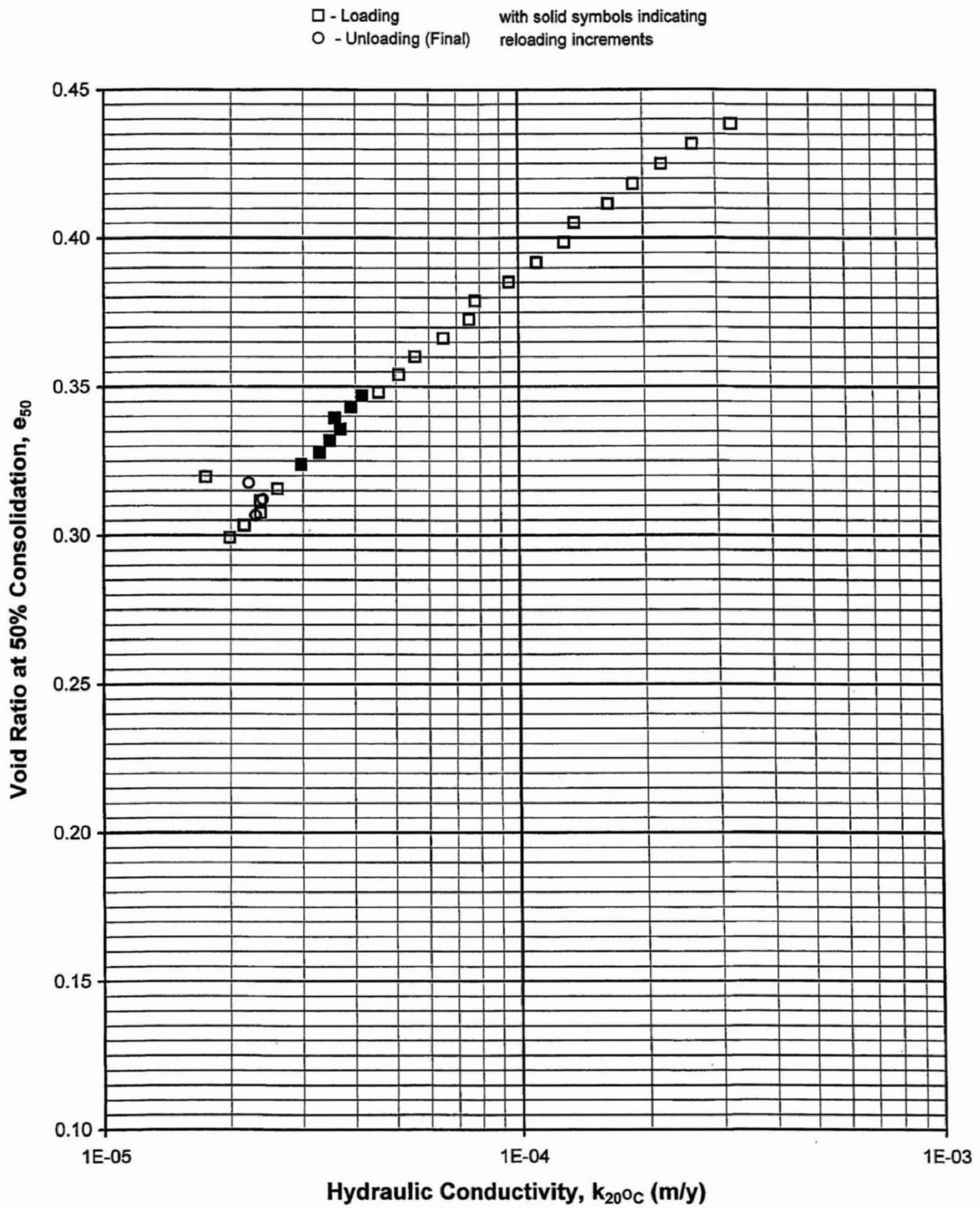
Load- ing Info. (1)	Elapsed Time from Start of Loading, Δt_n (min)	Overall Effective Vertical Stress, $\sigma'_{v,n}$ (ksf)	Corrected Volumetric (Axial) Strain, $\epsilon_{v,n} (\epsilon_{ac,n})$ $\Delta H_{c,n} / H_o$ (%)	Overall Void Ratio, e_n	Total Vertical Stress, $\sigma_{v,n}$ (ksf)	Excess Pore-Water Pressure, $\Delta U_n (2)$ (ksf)	Loading Pore-Water Pressure Ratio, R_u $\Delta U_n / \sigma_{v,n}$ (%)	Corrected Specimen Height, $H_{c,n}$ (mm)	Calculations Between n and n-1				Steady State Ratio, $SSR_n =$ $\frac{C_v \cdot t_n \cdot UCF}{T_v \cdot (H_{c,avg})^2}$	Rate of Secondary Comp. (3), $C_\alpha =$ $\Delta d_{a,sc} / H_o$ ($\times 10^{-4}$)
									Average Effective Vertical Stress, $\sigma'_{v,avg}$ (ksf)	Coefficient of Consolidation, C_v (m^2/y)	Average Void Ratio, e_{avg}	Hydraulic Conductivity, $k @ 20^\circ C$ (m/y)		
	652	17.39	5.72	0.520	35.96	23.858	66.4	18.118	16.42	0.19	0.523	8.06E-05	1.28	
	704	19.44	6.15	0.513	40.39	26.905	66.6	18.037	18.42	0.18	0.516	7.08E-05	1.28	
	756	21.62	6.57	0.506	45.07	30.099	66.8	17.956	20.53	0.16	0.509	6.20E-05	1.30	
	808	23.88	6.98	0.499	49.79	33.249	66.8	17.876	22.75	0.15	0.503	5.50E-05	1.26	
	860	26.26	7.40	0.492	54.95	36.794	67.0	17.795	25.07	0.14	0.496	4.98E-05	1.34	
	912	28.72	7.81	0.486	60.00	40.129	66.9	17.717	27.49	0.13	0.489	4.39E-05	1.27	
	964	31.37	8.22	0.479	65.50	43.793	66.9	17.638	30.04	0.13	0.483	3.98E-05	1.35	
UE	988	32.60	8.41	0.476	68.08	45.518	66.9	17.601	31.99	0.12	0.478	3.74E-05	1.32	
	990	32.42	8.43	0.476	67.60	45.149	66.8	17.599	32.51		0.476			
	1130	31.34	8.86	0.469	44.61	18.342	41.1	17.515	31.88		0.472			
	1270	25.03	8.77	0.470	23.84	-1.810	-7.6	17.532	28.19		0.470			
	1410	17.68	8.47	0.475	12.24	-8.996	-73.5	17.591	21.35		0.473			
US	1550	11.36	7.98	0.483	6.16	-9.272	-150.6	17.685	14.52		0.479			
	1690	7.33	7.42	0.492	2.76	-9.168	-331.6	17.792	9.34		0.488		0.71	
	1830	4.39	6.84	0.502	0.86	-9.030	-1045.1	17.904	5.86	0.39	0.497	6.72E-05	1.30	
	1970	2.43	5.90	0.517	0.19	-8.568	-4587.7	18.084	3.41	0.32	0.509	1.19E-04	1.60	
UE	2010	2.10	5.48	0.523	0.13	-8.351	-6503.4	18.164	2.26	0.20	0.520	2.03E-04	1.08	
	2042	1.90	5.14	0.529	0.10	-8.157	-8053.8	18.230	2.00		0.526			
	2390	1.43	3.69	0.552	0.09	-5.515	-5943.1	18.509	1.67		0.541			
	2434	2.65	3.90	0.549	0.61	-4.888	-795.2	18.468	2.04		0.551			
	2472	3.72	4.21	0.544	1.68	-3.835	-227.7	18.408	3.18		0.546			
	2554	5.64	4.80	0.534	5.88	0.344	5.9	18.296	4.68		0.539			
US	2636	7.19	5.38	0.525	11.75	6.122	52.1	18.183	6.42		0.530			
	2718	9.23	5.96	0.516	19.22	12.816	66.7	18.072	8.21		0.520		0.52	
	2800	11.96	6.54	0.506	27.92	20.095	72.0	17.960	10.60		0.511		0.62	
	2882	15.32	7.13	0.497	37.09	27.244	73.5	17.848	13.64		0.502		0.65	
	2964	19.63	7.71	0.488	47.40	34.767	73.3	17.736	17.48		0.492		0.74	
	3046	24.84	8.29	0.478	57.69	41.391	71.7	17.625	22.24		0.483		0.76	
	3128	30.97	8.87	0.469	68.46	47.630	69.6	17.513	27.90		0.473		0.84	
	3210	37.45	9.45	0.459	79.61	53.919	67.7	17.401	34.21		0.464		0.91	

DCN# EXE808

FUGRO CONSULTANTS, INC.



1-D CONSOLIDATION TEST: CRS
 Sample No. UD-10A - Depth 63.0 - 65.5 ft
 Boring B-2321UD



1-D CONSOLIDATION TEST: CRS
 Sample No. UD-10A - Depth 63.0 - 65.5 ft
 Boring B-2321UD

ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-12 File Name: B-2321_UD10a
 Task No.: NA Specific Gravity, G_s : 2.670 ☒ Meas. ; ☐ Assumed Ring No.: 17
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area, A_r (cm²) = 31.682
 TEST TYPE: ☒ CRS (D 4186-06); ☐ Method A; ☐ Method B; ☐ Method C; ☐ Method D; Ring Height (mm) = NA
☐ Method E; ☐ Method F; ☐ Method G; ☐ Method H; ☐ Method I; ☐ Method J; Summary of Methods: NA

☒ Tube	☐ Field Extruded	☐ Liner	☐ Remolded	Tamping	Constant Effort:	Blows/Tamps per Layer =
Boring No.: B-2321UD	☐ LPC Core			Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-10	Compostite No.:			Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 63.0 - 65.5	Specimen No.: A			Kneading	Undercompaction: U_{nl} (%) =	Dia. (in.) =
☐ Spec. Selection by X-ray;	☐ Geomarine Sample				Ref. Effort =	% Comp. = $\pm$ Opt. =

Water Content (W);	Initial - Trimming Location			Final, W _{at} (see below)	Soil and Ring Masses	Initial	Final
	Top (W1)	Bottom (W2)	Sides (W3)		Mass Moist Soil + Ring (g)	346.51	344.43
Container No.	863	901	2008	752	Mass Ring (g)	217.42	
Mass Moist Soil + Container (g)	124.87	123.78	87.02	61.26	Mass Moist Soil, M _{t,o} or M _{t,at} (g)	129.09	127.01
Mass Dry Soil + Container (g)	113.37	113.29	80.08	57.91	EXCESS DRY SOIL (soil not incl. in final mass above)		
Mass Container (g)	31.63	32.04	30.56	31.99	Container No.	892	
WATER CONTENT (%)	14.07	12.91	14.01	12.92	Mass Dry Soil + Container (g)	31.76	
Avg. Initial Water Content, W ₄ (%)	13.66	Final W _{at} : X Slice ;		Whole Spec.	Mass Container (g)	31.71	
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil, M _{d,es} (g)	0.05	

Soil Height: Measurements (mm)				Soil Height: Calculations, (mm)		Initial	Final
Initial		Final		Height of Gauge Block, H_{gb} (1)		0.000	0.000
with Spec.	without Spec.	with Spec.	without Spec.	Reading on Gauge Block, d_{gb}		0.000	0.000
19.240	0.000	24.240	6.510	Avg. Reading on Soil, d_{soil}		19.216	24.244
19.230	0.000	24.210	6.520	Avg. Reading on Apparatus without Specimen, d_{app}		0.000	6.454
19.190	0.000	24.280	6.520	Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$		19.216	17.790
19.190	0.000	24.290	6.380	Soil Height: Final by Dial Change During Test (mm)			
19.230	0.000	24.200	6.340	Initial Height, H_o		19.216	
☐ Yes ;	☒ No	☒ Yes ;	☐ No	Require H_{gb} & d_{gb} (1)		Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,r}$	
☐ Yes ;	☒ No	☒ Yes ;	☐ No	Filter Paper Included:		Final Calculated Height, $H_{f,c} = H_o - \Delta H_{c,r}$	
(1) Req. block ht. to set bench comparator so the final soil ht. can be determined directly by the diff. between the reading with and without spec. : ~ 12.7 mm; CRS ~ 25 mm				Final Soil Height Measurement, $H_{f,m}$		17.790	
Enter value of H_{gb} & d_{gb} only when that value has to be included in the determination of the soil height.				Normalized Difference in %, $(H_{f,c} - H_{f,m})/H_o$		-1.07	

Estimated Initial Unit Weight		Soil Extruded During Loading	
Total, $\gamma_{t,o}$ (pcf) = 132.37	Dry, $\gamma_{d,o}$ (pcf) = 116.46	Container No.	
Filter Paper Used: ☒ Whatman No. 54; ☐ Other		Mass Dry Soil + Cont. (g)	NA
Incremental Test: Top & Bottom: ☐ Yes ; ☐ No		Mass Cont. (g)	NA
CRS Test: Top Only: ☒ Yes ; ☐ No		Dry Mass - Soil Extruded During Loading, $M_{d,el}$ (g)	0.00

Photo taken of Sliced Test Specimen: ☐ Yes ; ☒ No

Final Visual Description: Light Olive Gray Sandy Lean CLAY (CL)

Trimming/Etc. Remarks:

Method of trimming periphery: ☒ "Casagrande" Lathe ; ☐ Cutting Shoe ; ☐ Wire Saw ; ☐ Other
 Method of trimming ends: ☐ Wire Saw & Sharp (knife) Straight Edge ; ☒ Wire Saw & Straight Edge ; ☐ Wire Saw

Trim./Recon. By: JTG Setup By: JTG Prelim. Calc. By: DH Take Down By: JTG
 Date: 4/1/2008 Date: 4/1/2008 Final Calc. By: DH Date: 4/8/2008
 Reviewed By: HP

Note: NA - Not Applicable

KAW 7/16/08

ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: CRS-12 File Name: B-2321_UD10a
 Task No.: NA Specific Gravity, G_s : 2.670 ☒ Measured ; ☐ Assumed.
 Calculations Corrected for Salt (dissolved solids): ☒ No or, ☐ Yes, with Concentration = _____ g/kg

Cal.- Routine	ITEM	Water Content, (%)	Mass Dry Soil, (g)	Degree of Saturation, S in %		
				Height Initial	Final Height Meas.	Dial
1	Initial, Top, W1	14.07	113.17	86.6	99.8	104.7
2	" Bottom, W2	12.91	114.33	82.2	94.3	99.1
3	" Sides, W3	14.01	113.22	86.4	99.5	104.4
4	" Average, W4	13.66	113.57	85.1	97.9	102.8
5	" Back Calculated (1)	14.72	112.52 (3)	88.9	102.6	107.6
6	Final	12.92	112.52 (2)	88.9	102.6	107.6

Calculated Specific Gravity for Final Saturation = 100%:
 Used Cal. Routine No. 5 to obtain the mass of dry soil
 and final height by: ☒ Measurement; ☐ Dial Change.
 Back Cal. G_s = 2.694
 Avg. G_s (measured/assumed) & Back Cal. G_s = 2.682

Calculation Constant, K
 = (unit conversion) / $G_s \times \rho_w \times A_r$
 Estimated, K_e 0.11843
 Final Selected, K_f 0.11843

Calculated Mass Dry Soil for Final Saturation = 100%: using measured/assumed G_s
 and final height by: ☒ Measurement; ☐ Dial Change.
 Back Cal. Mass Dry Soil, (g) = 113.11
 Avg. Back Calculated and Measured Mass Dry Soil (g) = 112.82

Summary of Specimen Physical Properties									
Specific Gravity $G_s =$ 2.670			Assumed		To make $S_r = 100\%$ at end of test.				
		X	Measured		Avg. of measured/assumed G_s and G_s to make $S_r = 100\%$				
Mass Dry Soil, (g)	Initial:	112.52	X	From Cal. Routine No.	5	Note: Routine #5 is based on final measurements.			
	Final (4):	NA		Make $S_r = 100\%$, or;		Avg. of measured & make $S_r = 100\%$			
Initial Height (mm) =			19.22	X	Measured ;		Back Calculated Back-cal. Sat. (%) = NA		
Final Height (mm) =			17.79	X	Measured ;		Initial H_o & dial change during loading		
	Water Content, w (%)	Void Ratio, e	Degree of Saturation, S (%)	Total Unit Weight, γ_t (pcf)	Dry Unit Weight, γ_d (pcf)	Height of Solids, H_s (2,4) (mm)	Extruded soil loss proportioned in increasing loading increments (5) :		
Initial	14.7	0.442	88.9	132.4	115.4	13.326	From	To (ksf)	
Final	12.9	0.335	102.6	140.7	124.6	NA	NA	NA	

Graphical Construction	σ'_p (ksf)	ϵ_a (%)	CR	RR	OCR	Liquid Limit (LL)	36	Minus 200 (%)
Casagrande Method	31.00	NA	0.110	0.029	4.3	Plastic Limit (PL)	14	60.1
Becker Method	NA	Becker minimum σ'_p (ksf):			NA	Plasticity Index (PI)	22	

NA - Indicates not applicable

Notes:

- (1) Back Calculated based on final mass of oven-dry soil (corrected for dry mass of any excess and extruded soil).
- (2) Corrected for any excess dry soil (soil stuck to ring, filter paper, etc.).
- (3) This value is only different from the final value if there is soil extrusion during loading.
- (4) Final is only different from the initial value if there is soil extrusion during loading.
- (5) There should not be any soil loss in a CRS test, unless stress increments are applied.

Calculated By: DH Reviewed By: HP **HP**
 Date: 4/11/2008

ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686 Test Station No.: CRS-12 File Name: B-2321_UD10a
 Task No.: NA Date; Start: 4/1/2008 Initial Height, H_o (mm): 19.22
 Project Name: Exelon (Victoria) Completed: 4/8/2008 Ring Area, A_r (cm²): 31.6819
 Test: Initial / Pressure Gauge Back Pressure, U_G (psi): 70 ☒ Undisturbed or ; ☐ Reconstituted - Specimen.
 Reference Values: Back Pressure, $U_{b,BE}$ (psi): 69.96667, V : 0.023059831 Piston Uplift, P_{up} (lbf): 34.36
 Back Pressure, $U_{b,CS}$ (psi): 69.97429, V : 0.023062352 Setup DT_{ref} (V): 0.000991781
 Displacement Transducer No.: DT-100 Calib. Factor (mm/V): 376.22281 Ch. No.: 2
 Pore Press. Transducer No.: PT-124 Calib. Factor (psi/V): 3022.80878 Ref. Zero (V): -0.000086 Ch. No.: 3
 Force Cell No.: FT-109 Calib. Factor (lbf/V): -154608.61 Ref. Zero (V): -0.001415 Ch. No.: 1

Notes:

- (1) S - Seating, BS - Start of Back Pressure, BE - End of Back Pressure, SC - Stress Controlled, CS - Constant Rate of Strain
 US - Start of Uniform Strain Rate, UE - End of Uniform Strain Rate
- (2) Total Vertical Stress (σ_v) corrected to account for the force caused by the back pressure acting on the piston (Piston Uplift).
- (3) Increasing deformation value indicates: ☒ compression; or ☐ swell.
- (4) "App. Flex. Corr." values based on the apparatus calibration.

Data Management By: DH Reviewed By: HP **HP**

Remarks:

Load- ing Info. (1)	Julian Day (dd)	Hour (hr.:min.:s)	Elapsed Time from Start of Loading, Δt_n (min)	Total Vertical Stress, $\sigma_{v,n}$ (2) (ksf)	Excess Pore-Water Pressure, ΔU_n (ksf)	Total Specimen Deformation, ΔH_n (3) (mm)	Apparatus Flexibility Correction, $\Delta d_{afc,n}$ (mm)	Corr. Total Specimen Deformation, $\Delta H_{c,n}$ (4) (mm)	Strain Rate, between n & n-1, $\Delta \epsilon_{ac,rate}$ (%/hr)
S	92	17 : 24 : 11		0.26		0.000			
BS	92	17 : 39 : 15		0.79		0.040	0.000	0.040	
BE	93	09 : 03 : 18		1.39	-0.001	0.031	0.000	0.031	
CS	93	09 : 03 : 22	0	1.41	0.000	0.031	0.000	0.031	
	93	09 : 41 : 27	38	3.56	0.830	0.101	0.000	0.101	0.575
	93	10 : 49 : 27	106	4.82	1.101	0.173	0.000	0.173	0.330
US	93	12 : 39 : 28	216	6.62	1.640	0.266	0.000	0.266	0.263
	93	14 : 29 : 30	326	8.82	2.277	0.355	0.000	0.355	0.253
	93	16 : 19 : 32	436	11.21	2.838	0.444	0.000	0.444	0.251
	93	18 : 09 : 34	546	13.87	3.414	0.532	0.000	0.532	0.250
	93	19 : 59 : 35	656	16.93	3.961	0.620	0.000	0.620	0.251
	93	21 : 49 : 36	766	20.31	4.484	0.708	0.000	0.708	0.248
	93	23 : 39 : 37	876	23.95	5.047	0.795	0.000	0.795	0.247
	94	01 : 29 : 40	986	27.97	5.734	0.878	0.000	0.878	0.234
	94	03 : 19 : 40	1096	32.29	6.526	0.967	0.000	0.967	0.255
	94	05 : 09 : 42	1206	36.85	7.338	1.055	0.000	1.055	0.249
	94	06 : 59 : 43	1316	41.71	8.310	1.140	0.000	1.140	0.243
	94	08 : 49 : 44	1426	46.48	8.957	1.219	0.000	1.219	0.223
	94	10 : 39 : 45	1536	52.11	10.127	1.303	0.000	1.303	0.240
	94	12 : 29 : 47	1646	57.99	11.185	1.386	0.000	1.386	0.234
	94	14 : 19 : 48	1756	63.98	12.339	1.464	0.000	1.464	0.222
	94	16 : 09 : 50	1866	70.42	13.417	1.543	0.000	1.543	0.224
UE	94	17 : 59 : 51	1976	77.04	14.514	1.620	0.000	1.620	0.220
	94	19 : 49 : 53	2087	84.29	15.773	1.698	0.000	1.698	0.220

**ONE - DIMENSIONAL CONSOLIDATION TEST:
CALCULATED CRS LOADING DATA**

Load- ing Info. (1)	Julian Day (dd)	Hour (hr.:min.:s)	Elapsed Time from Start of Loading, Δt_n (min)	Total Vertical Stress, $\sigma_{v,n}$ (2) (ksf)	Excess Pore-Water Pressure, ΔU_n (ksf)	Total Specimen Deformation, ΔH_n (3) (mm)	Apparatus Flexibility Correction, $\Delta d_{af,n}$ (mm)	Corr. Total Specimen Deformation, $\Delta H_{c,n}$ (4) (mm)	Strain Rate, between n & n-1, $\Delta \varepsilon_{ac,rate}$ (%/hr)
	94	21 : 34 : 38	2191	91.71	16.926	1.771	0.000	1.771	0.217
	94	21 : 39 : 54	2197	90.55	15.946	1.770	0.000	1.770	-0.023
	95	00 : 49 : 57	2387	70.93	-1.332	1.765	0.000	1.765	-0.010
	95	03 : 59 : 59	2577	59.12	-2.373	1.742	0.000	1.742	-0.036
US	95	07 : 10 : 00	2767	43.17	-5.155	1.698	0.000	1.698	-0.072
	95	10 : 21 : 04	2958	33.18	-4.334	1.654	0.000	1.654	-0.072
	95	13 : 31 : 06	3148	24.82	-5.292	1.608	0.000	1.608	-0.076
	95	16 : 41 : 08	3338	18.14	-5.902	1.556	0.000	1.556	-0.085
	95	19 : 51 : 10	3528	12.99	-6.430	1.496	0.000	1.496	-0.100
UE	95	23 : 01 : 11	3718	9.93	-6.304	1.442	0.000	1.442	-0.088
	96	02 : 11 : 15	3908	7.01	-6.585	1.371	0.000	1.371	-0.116
	96	05 : 21 : 16	4098	5.00	-6.366	1.300	0.000	1.300	-0.117
	96	06 : 17 : 57	4155	4.44	-6.362	1.279	0.000	1.279	-0.119
	96	06 : 21 : 17	4158	4.59	-6.172	1.278	0.000	1.278	-0.076
	96	07 : 51 : 17	4248	11.06	1.503	1.300	0.000	1.300	0.077
	96	09 : 21 : 18	4338	16.80	6.940	1.348	0.000	1.348	0.166
	96	10 : 51 : 19	4428	23.09	9.530	1.404	0.000	1.404	0.194
US	96	12 : 21 : 20	4518	29.51	11.402	1.460	0.000	1.460	0.192
	96	13 : 51 : 22	4608	36.26	12.261	1.515	0.000	1.515	0.191
	96	15 : 21 : 23	4698	43.56	12.735	1.570	0.000	1.570	0.191
	96	16 : 51 : 24	4788	51.23	12.673	1.621	0.000	1.621	0.180
	96	18 : 21 : 26	4878	59.39	12.876	1.671	0.000	1.671	0.172
	96	19 : 51 : 27	4968	67.99	13.334	1.718	0.000	1.718	0.164
	96	21 : 21 : 28	5058	76.62	13.973	1.769	0.000	1.769	0.178
	96	22 : 51 : 29	5148	85.32	14.936	1.821	0.000	1.821	0.179
	97	00 : 21 : 31	5238	93.45	16.170	1.874	0.000	1.874	0.184
	97	01 : 51 : 32	5328	101.58	17.402	1.926	0.000	1.926	0.180
	97	04 : 21 : 34	5478	109.39	18.596	1.980	0.000	1.980	0.114
	97	05 : 51 : 36	5568	117.28	20.240	2.033	0.000	2.033	0.184
	97	07 : 21 : 37	5658	124.87	21.020	2.085	0.000	2.085	0.179
	97	08 : 51 : 40	5748	133.23	22.735	2.140	0.000	2.140	0.191
	97	10 : 21 : 42	5838	141.42	23.936	2.194	0.000	2.194	0.187
UE	97	11 : 51 : 43	5928	149.54	24.489	2.246	0.000	2.246	0.181
	97	13 : 21 : 45	6018	157.90	25.385	2.299	0.000	2.299	0.183
	97	13 : 37 : 19	6034	159.51	25.149	2.306	0.000	2.306	0.143
	97	13 : 41 : 45	6038	158.63	24.215	2.307	0.000	2.307	0.082
	97	18 : 31 : 49	6328	127.60	-2.666	2.298	0.000	2.298	-0.010
	97	23 : 21 : 54	6619	104.58	-2.976	2.264	0.000	2.264	-0.037
	98	04 : 11 : 59	6909	81.24	-4.925	2.220	0.000	2.220	-0.048
US	98	09 : 02 : 04	7199	58.42	-7.671	2.156	0.000	2.156	-0.068
	98	13 : 52 : 08	7489	42.40	-8.241	2.090	0.000	2.090	-0.072
	98	18 : 42 : 13	7779	29.57	-8.918	2.015	0.000	2.015	-0.080