

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-12 ☒ Undisturbed or ; ☐ Reconstituted - Specimen. File Name: B-2321_UD10
 Task No.: NA Date, Start: 4/1/2008 Back Pressure, $U_{b,CS}$ (psi): 70.0 Piston Uplift, P_{up} (lb): 34.36
 Project Name: Exelon (Victoria) Completed: 4/8/2008 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: Light Olive Gray Sandy Lean CLAY (CL)

Ring No.: 17 Area, A_r (cm²): 31.682 Solids Ht., H_s (mm): 13.326 Specific Gravity, $G_s = 2.670$ ☒ Meas. ; ☐ Assumed
Initial: Height H_o : 19.22 Water 14.7 Void 0.442 Deg. of 88.9 Total Unit 132.4 Dry Unit 115.4
Final: (mm): H_f : 17.79 Content, w (%): 12.9 Ratio, e : 0.335 Sat., S (%): 102.6 Weight, γ_t (pcf): 140.7 Weight, γ_d (pcf): 124.6

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 *HP*

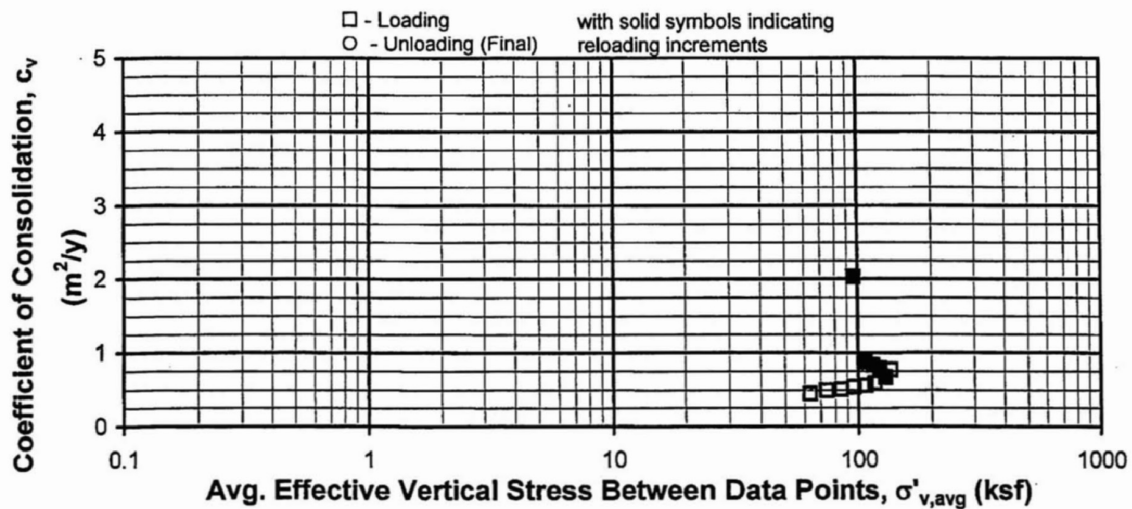
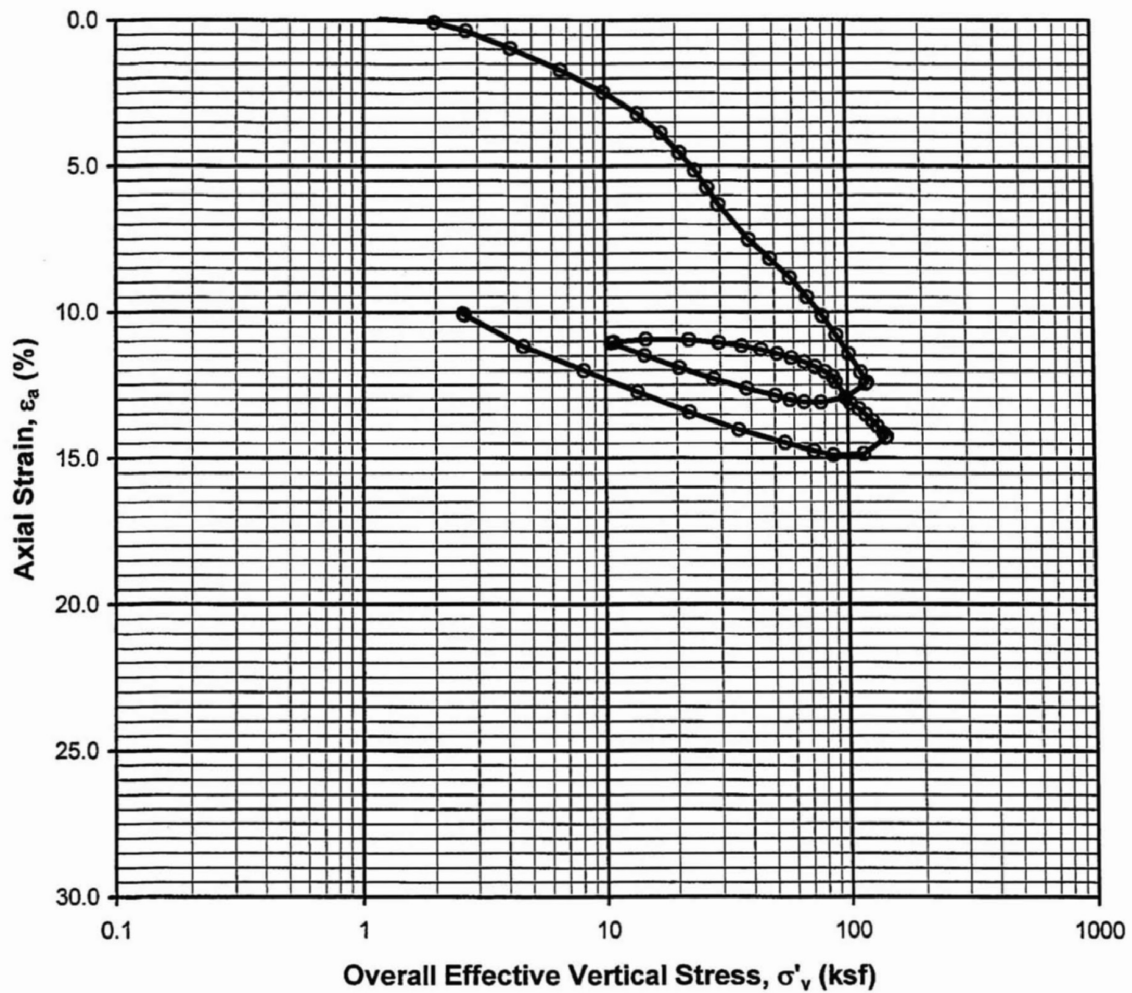
Loading Info. (1)	Elapsed Time from Start of Loading, Δt_n (min)	Overall Effective Vertical Stress, $\sigma'_{v,n}$ (ksf)	Corrected Volumetric (Axial) Strain, $\epsilon_{v,n}$ ($\epsilon_{ac,n}$) $\Delta H_{c,n} / H_o$ (%)	Overall Void Ratio, e_n	Total Vertical Stress, $\sigma_{v,n}$ (ksf)	Excess Pore-Water 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), $C_\alpha = \frac{\Delta d_{a,sc}}{H_o} (\times 10^{-4})$
									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					0.26				Data on given line represents average conditions					
BS			0.21	0.439	0.79			19.176	between that line and the previous line of data.					
BE		1.39	0.16	0.440	1.39	-0.001	-0.1	19.185			0.439			
CS	0	1.41	0.16	0.440	1.41	0.000	0.0	19.185			0.440			
	38	2.98	0.53	0.434	3.56	0.830	23.3	19.115	2.20		0.437			
	106	4.06	0.90	0.429	4.82	1.101	22.8	19.043	3.52		0.432			
US	216	5.48	1.38	0.422	6.62	1.640	24.8	18.950	4.77		0.426			
	326	7.22	1.85	0.415	8.82	2.277	25.8	18.861	6.35		0.419		0.98	
	436	9.23	2.31	0.409	11.21	2.838	25.3	18.772	8.22	0.69	0.412	3.28E-04	1.63	
	546	11.49	2.77	0.402	13.87	3.414	24.6	18.684	10.36	0.62	0.405	2.65E-04	2.23	
	656	14.17	3.23	0.395	16.93	3.961	23.4	18.596	12.83	0.60	0.399	2.22E-04	2.91	
	766	17.20	3.68	0.389	20.31	4.484	22.1	18.508	15.69	0.58	0.392	1.90E-04	3.54	
	876	20.46	4.14	0.382	23.95	5.047	21.1	18.421	18.83	0.55	0.386	1.65E-04	4.08	
	986	24.00	4.57	0.376	27.97	5.734	20.5	18.338	22.23	0.54	0.379	1.37E-04	4.66	
	1096	27.78	5.03	0.369	32.29	6.526	20.2	18.249	25.89	0.50	0.373	1.29E-04	5.05	
	1206	31.77	5.49	0.363	36.85	7.338	19.9	18.161	29.78	0.47	0.366	1.11E-04	5.31	
	1316	35.97	5.93	0.356	41.71	8.310	19.9	18.076	33.87	0.44	0.360	9.47E-05	5.59	

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

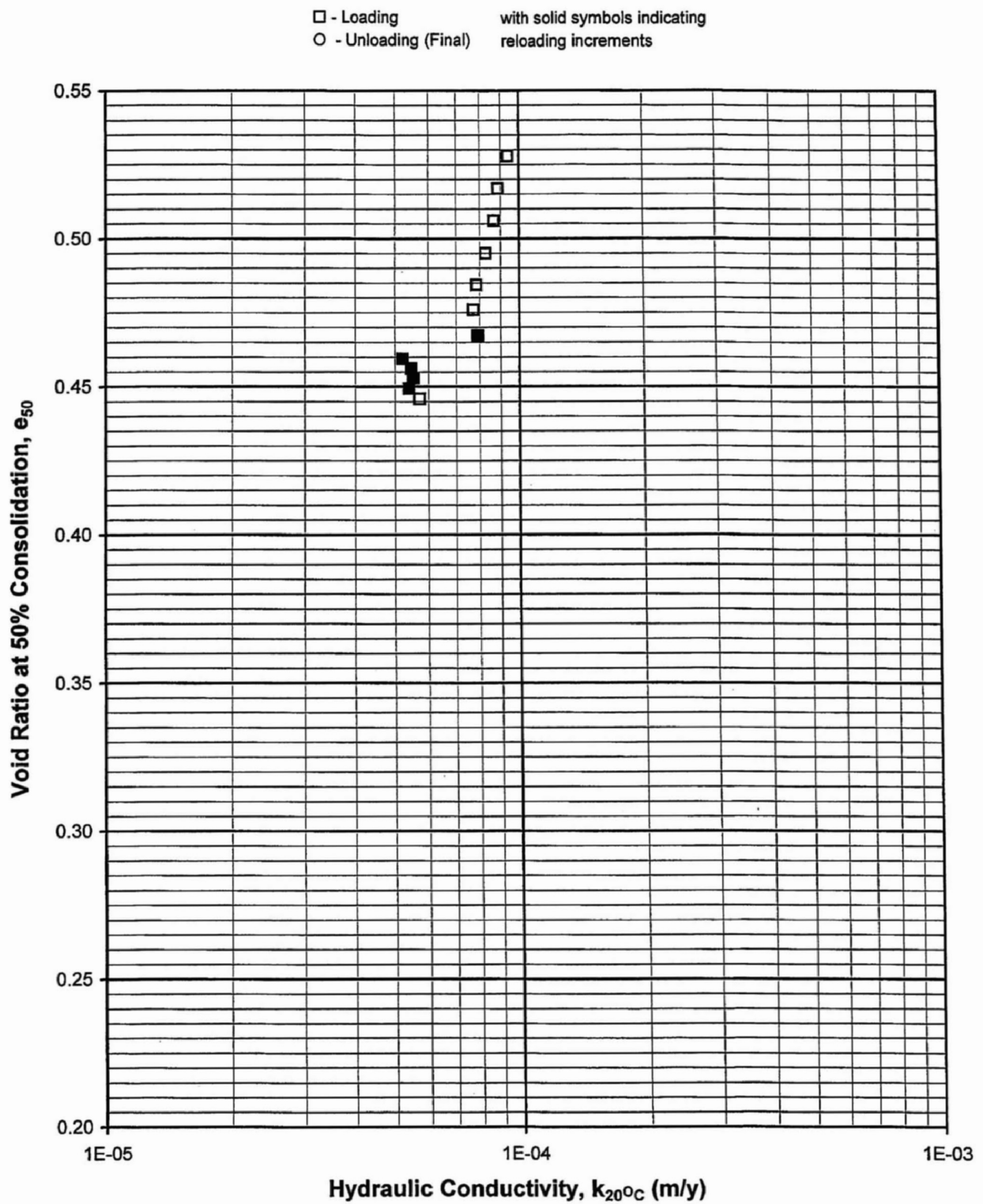
Loading Info. (1)	Elapsed Time from Start of Loading, Δt_n (min)	Overall Effective Vertical Stress, $\sigma'_{v,n}$ (ksf)	Corrected Volumetric (Axial) Strain, $\epsilon_{v,n}$ ($\epsilon_{ac,n}$) $\Delta H_{c,n} / H_0$ (%)	Overall Void Ratio, e_n	Total Vertical Stress, $\sigma_{v,n}$ (ksf)	Excess Pore-Water 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), $C_{\alpha} = \frac{\Delta \epsilon_{s,sc}}{H_0} (\times 10^{-4})$
									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)		
	1426	40.30	6.34	0.351	46.48	8.957	19.3	17.997	38.13	0.39	0.353	7.80E-05	5.46	
	1536	45.12	6.78	0.344	52.11	10.127	19.4	17.913	42.71	0.41	0.347	7.53E-05	6.38	
	1646	50.27	7.21	0.338	57.99	11.185	19.3	17.830	47.69	0.38	0.341	6.51E-05	6.46	
	1756	55.47	7.62	0.332	63.98	12.339	19.3	17.752	52.87	0.35	0.335	5.55E-05	6.43	
	1866	61.17	8.03	0.326	70.42	13.417	19.1	17.673	58.32	0.34	0.329	5.07E-05	6.76	
UE	1976	67.03	8.43	0.320	77.04	14.514	18.8	17.596	64.10	0.32	0.323	4.54E-05	6.84	
	2087	73.41	8.84	0.315	84.29	15.773	18.7	17.518	70.22		0.317			
	2191	80.05	9.22	0.309	91.71	16.926	18.5	17.445	76.73		0.312			
	2197	79.58	9.21	0.309	90.55	15.946	17.6	17.446	79.82		0.309			
	2387	71.81	9.18	0.310	70.93	-1.332	-1.9	17.451	75.70		0.309			
	2577	60.69	9.07	0.311	59.12	-2.373	-4.0	17.474	66.25		0.310			
US	2767	46.54	8.84	0.315	43.17	-5.155	-11.9	17.518	53.62		0.313			
	2958	36.01	8.61	0.318	33.18	-4.334	-13.1	17.562	41.28	0.95	0.316	4.09E-05	2.25	
	3148	28.23	8.37	0.321	24.82	-5.292	-21.3	17.608	32.12	0.81	0.320	4.26E-05	3.79	
	3338	21.89	8.10	0.325	18.14	-5.902	-32.5	17.660	25.06	0.58	0.323	4.09E-05	4.07	
	3528	16.98	7.78	0.330	12.99	-6.430	-49.5	17.720	19.44	0.43	0.327	4.30E-05	4.01	
UE	3718	13.79	7.51	0.334	9.93	-6.304	-63.5	17.774	15.38	0.26	0.332	3.64E-05	3.04	
	3908	10.90	7.14	0.339	7.01	-6.585	-93.9	17.845	12.34		0.336			
	4098	8.65	6.77	0.344	5.00	-6.366	-127.2	17.916	9.77		0.342			
	4155	8.04	6.65	0.346	4.44	-6.362	-143.1	17.937	8.34		0.345			
	4158	8.10	6.65	0.346	4.59	-6.172	-134.4	17.938	8.07		0.346			
	4248	10.03	6.77	0.344	11.06	1.503	13.6	17.916	9.07		0.345			
	4338	11.78	7.02	0.341	16.80	6.940	41.3	17.868	10.91		0.343			
	4428	16.19	7.31	0.337	23.09	9.530	41.3	17.812	13.99		0.339			
US	4518	21.31	7.60	0.332	29.51	11.402	38.6	17.756	18.75		0.335			
	4608	27.54	7.88	0.328	36.26	12.261	33.8	17.701	24.43		0.330		0.46	
	4698	34.59	8.17	0.324	43.56	12.735	29.2	17.646	31.07		0.326		0.98	
	4788	42.39	8.44	0.320	51.23	12.673	24.7	17.595	38.49	0.47	0.322	4.16E-05	1.56	
	4878	50.46	8.70	0.317	59.39	12.876	21.7	17.545	46.43	0.51	0.318	3.91E-05	2.25	
	4968	58.78	8.94	0.313	67.99	13.334	19.6	17.498	54.62	0.53	0.315	3.57E-05	2.93	

DCN# EXE808

FUGRO CONSULTANTS, INC.



1-D CONSOLIDATION TEST: CRS
 Sample No. UD-15A - Depth 130.5 - 132.5 ft
 Boring B-2321UD



1-D CONSOLIDATION TEST: CRS
Sample No. UD-15A - Depth 130.5 - 132.5 ft
Boring B-2321UD

ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-3 File Name: B-2321_UD15a
 Task No.: NA Specific Gravity, G_s : 2.710 ☒ 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. (lbf) =	No. Layers =
Sample No.: UD-15	Composite No.:			Pluviated:	Tamper Force (lbf) =	Drop (in.) =
Depth (ft): 130.5 - 132.5	Specimen No.: A			Kneading	Undercompaction: U_{ni} (%) =	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)	331.13	334.48
Container No.	148	829	2024	777	Mass Ring (g)	211.72	
Mass Moist Soil + Container (g)	126.71	137.08	99.57	69.07	Mass Moist Soil, M_{L0} or M_{L1} (g)	119.41	122.76
Mass Dry Soil + Container (g)	109.99	118.13	88.08	61.13	EXCESS DRY SOIL (soil not incl. in final mass above)		
Mass Container (g)	30.03	32.30	30.51	31.78	Container No.	1156	
WATER CONTENT (%)	20.91	22.08	19.96	27.05	Mass Dry Soil + Container (g)	33.00	
Avg. Initial Water Content, W_4 (%)	20.98	Final W_{at} : ☒ Slice ;	Whole Spec.		Mass Container (g)	32.26	
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil, $M_{d,es}$ (g)	0.74	

Soil Height: Measurements (mm)				Soil Height: Calculations, (mm)		Initial	Final
Initial		Final		Height of Gauge Block, H_{gb} (1)		0.000	19.070
with Spec.	without Spec.	with Spec.	without Spec.	Reading on Gauge Block, d_{gb}		0.000	0.000
19.050	0.000	13.350	13.110	Avg. Reading on Soil, d_{soil}		19.012	13.346
19.030	0.000	13.180	13.190	Avg. Reading on Apparatus without Specimen, d_{app}		0.000	13.114
18.990	0.000	13.310	13.110	Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$		19.012	19.302
19.020	0.000	13.520	13.110	Soil Height: Final by Dial Change During Test (mm)			
18.970	0.000	13.370	13.050	Initial Height, H_0		19.012	
☐ Yes ;	☒ No	☒ Yes ;	☐ No	Require H_{gb} & d_{gb} (1)	Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{c,f}$	-0.157	
☐ Yes ;	☒ No	☒ Yes ;	☐ No	Filter Paper Included:	Final Calculated Height, $H_{f,c} = H_0 - \Delta H_{c,f}$	19.169	
(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, $H_{f,m}$	19.302	
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 %, $(H_{f,c} - H_{f,m})/H_0$	-0.70	

Estimated Initial Unit Weight				Soil Extruded During Loading	
Total, $\gamma_{t,0}$ (pcf) = 123.60		Dry, $\gamma_{d,0}$ (pcf) = 102.16		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: Pale Yellow Fat CLAY with sand (CH)

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: LF Take Down By: JTG
 Date: 3/25/2008 Date: 3/25/2008 Final Calc. By: LF Date: 3/28/2008
 Reviewed By: HP 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_UD15a
 Task No.: NA Specific Gravity, G_s : 2.710 ☒ 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	20.91	98.76	86.9	97.2	98.9
2	" Bottom, W2	22.08	97.81	89.6	99.7	101.4
3	" Sides, W3	19.96	99.54	84.6	95.2	96.9
4	" Average, W4	20.98	98.70	87.1	97.4	99.1
5	" Back Calculated (1)	22.65	97.36 (3)	90.8	100.8	102.5
6	Final	27.05	97.36 (2)	90.8	100.8	102.5

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 = 2.718

Calculation Constant, K

= (unit conversion) / $G_s \times \rho_w \times A_r$

Estimated, K_e 0.11653

Final Selected, K_f 0.11653

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) = 97.68

Avg. Back Calculated and Measured Mass Dry Soil (g) = 97.52

Summary of Specimen Physical Properties

Specific Gravity $G_s = 2.710$		X	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: 97.36	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) =			19.01	X	Measured ;		Back Calculated	Back-cal. Sat. (%) = NA
Final Height (mm) =			19.30	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	22.6	0.676	90.8	123.6	100.8	11.345	From	To (ksf)
Final	26.1	0.701	100.8	125.2	99.3	NA	NA	NA

Graphical Construction	σ'_p (ksf)	ε_a (%)	CR	RR	OCR	Liquid Limit (LL)	61	Minus 200 (%)
Casagrande Method	13.10	NA	0.120	0.020	1.1	Plastic Limit (PL)	17	77.0
Becker Method	NA	Becker minimum σ'_p (ksf):		NA		Plasticity Index (PI)	44	

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: LF

Reviewed By: HP

Date: 3/31/2008

ONE - DIMENSIONAL CONSOLIDATION TEST: CALCULATED CRS LOADING DATA

Project Number: 0411-08-1686 Test Station No.: CRS-3 File Name: B-2321_UD15a
 Task No.: NA Date: Start: 3/25/2008 Initial Height, H_o (mm): 19.01
 Project Name: Exelon (Victoria) Completed: 3/28/2008 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): 70.60013 ,V: 0.02310008 Piston Uplift, P_{up} (lbf): 34.68
 Back Pressure, $U_{b,CS}$ (psi): 70.59707 ,V: 0.02309907 Setup DT_{ref} (V): 0.04994261
 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): -0.000204 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: LF 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, $\Delta \varepsilon_{ac,rate}$ (%/hr)
S	85	16 : 00 : 00		0.41		0.000			
BS	85	16 : 12 : 00		0.89		0.033	0.018	0.015	
BE	86	09 : 28 : 00		1.17	0.000	0.019	0.027	-0.008	
CS	86	09 : 29 : 00	0	1.18	0.000	0.019	0.027	-0.008	
	86	09 : 43 : 00	14	1.98	0.000	0.062	0.047	0.015	0.529
	86	09 : 57 : 00	28	2.70	0.000	0.131	0.060	0.071	1.260
	86	10 : 18 : 00	49	4.11	0.003	0.262	0.079	0.182	1.672
	86	10 : 46 : 00	77	6.60	0.012	0.431	0.103	0.327	1.634
	86	11 : 14 : 00	105	9.98	0.121	0.598	0.127	0.470	1.614
	86	11 : 42 : 00	133	14.44	0.944	0.760	0.152	0.608	1.552
	86	12 : 10 : 00	161	20.10	3.884	0.916	0.177	0.738	1.467
US	86	12 : 38 : 00	189	26.96	8.752	1.068	0.204	0.864	1.415
	86	13 : 06 : 00	217	35.15	15.306	1.211	0.232	0.979	1.301
	86	13 : 34 : 00	245	43.32	22.223	1.347	0.257	1.090	1.245
	86	14 : 02 : 00	273	53.22	31.117	1.485	0.285	1.200	1.246
	86	14 : 58 : 00	329	73.52	44.653	1.764	0.336	1.428	1.283
	86	15 : 26 : 00	357	82.69	45.924	1.908	0.357	1.552	1.395
	86	15 : 54 : 00	385	91.88	45.661	2.055	0.377	1.678	1.422
	86	16 : 22 : 00	413	101.75	45.765	2.202	0.397	1.804	1.421
	86	16 : 50 : 00	441	112.40	46.023	2.346	0.419	1.927	1.391
	86	17 : 18 : 00	469	123.29	46.055	2.492	0.440	2.052	1.403
	86	17 : 46 : 00	497	134.73	46.451	2.635	0.461	2.174	1.379
	86	18 : 14 : 00	525	146.66	46.499	2.776	0.482	2.294	1.348
UE	86	18 : 30 : 00	541	153.83	46.743	2.857	0.495	2.362	1.349

**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, $\Delta \epsilon_{ac,rate}$ (%/hr)
	86	18 : 32 : 00	543	152.39	46.788	2.862	0.493	2.369	1.080
	86	19 : 22 : 00	593	133.14	48.402	2.921	0.462	2.459	0.569
	86	20 : 12 : 00	643	108.85	43.501	2.911	0.420	2.491	0.199
	86	21 : 02 : 00	693	84.84	26.471	2.864	0.376	2.488	-0.018
	86	21 : 52 : 00	743	63.23	7.886	2.805	0.332	2.473	-0.096
	86	22 : 42 : 00	793	45.16	-7.992	2.736	0.291	2.445	-0.175
	86	23 : 32 : 00	843	31.21	-11.337	2.654	0.255	2.398	-0.295
	87	00 : 22 : 00	893	21.07	-11.495	2.562	0.225	2.337	-0.390
US	87	01 : 12 : 00	943	13.61	-11.519	2.464	0.199	2.265	-0.453
	87	02 : 02 : 00	993	8.15	-11.453	2.359	0.174	2.185	-0.504
	87	02 : 50 : 00	1041	4.58	-11.437	2.251	0.151	2.101	-0.553
	87	02 : 52 : 00	1043	4.82	-11.437	2.250	0.153	2.097	-0.576
UE	87	03 : 04 : 00	1055	8.35	-11.418	2.254	0.175	2.078	-0.488
	87	03 : 16 : 00	1067	15.55	-11.368	2.289	0.206	2.083	0.111
	87	03 : 28 : 00	1079	22.55	-11.295	2.329	0.230	2.099	0.435
	87	03 : 40 : 00	1091	29.72	-11.198	2.372	0.251	2.121	0.561
	87	03 : 52 : 00	1103	37.02	-11.071	2.415	0.271	2.145	0.639
	87	04 : 04 : 00	1115	44.27	-10.904	2.460	0.289	2.171	0.692
US	87	04 : 16 : 00	1127	51.88	-10.675	2.506	0.307	2.199	0.738
	87	04 : 28 : 00	1139	59.56	-10.341	2.553	0.324	2.229	0.777
	87	04 : 40 : 00	1151	67.18	-9.811	2.600	0.340	2.260	0.818
	87	04 : 52 : 00	1163	74.96	-8.850	2.648	0.356	2.292	0.832
	87	05 : 04 : 00	1175	82.74	-6.540	2.696	0.372	2.324	0.855
	87	05 : 16 : 00	1187	90.82	1.990	2.742	0.387	2.355	0.817
	87	06 : 16 : 00	1247	136.35	46.654	2.964	0.467	2.497	0.747
	87	06 : 28 : 00	1259	144.72	47.016	3.013	0.480	2.532	0.930
	87	06 : 40 : 00	1271	152.67	47.290	3.063	0.493	2.570	0.990
	87	06 : 52 : 00	1283	160.20	47.553	3.115	0.506	2.609	1.018
	87	07 : 04 : 00	1295	166.60	47.708	3.163	0.516	2.647	1.004
	87	07 : 16 : 00	1307	173.97	47.801	3.216	0.529	2.688	1.076
UE	87	07 : 24 : 00	1315	178.57	48.010	3.250	0.536	2.714	1.033
	87	07 : 26 : 00	1317	177.40	47.923	3.255	0.534	2.720	0.989
	87	08 : 44 : 00	1395	151.22	49.013	3.321	0.494	2.826	0.429
	87	10 : 02 : 00	1473	109.89	32.314	3.258	0.426	2.833	0.026
	87	11 : 20 : 00	1551	75.35	4.415	3.167	0.361	2.806	-0.108
	87	12 : 38 : 00	1629	47.78	-11.042	3.053	0.301	2.753	-0.215
	87	13 : 56 : 00	1707	28.40	-11.373	2.917	0.251	2.666	-0.351
US	87	15 : 14 : 00	1785	15.53	-11.446	2.762	0.210	2.552	-0.460
	87	16 : 32 : 00	1863	7.27	-11.436	2.595	0.173	2.422	-0.526
	87	17 : 50 : 00	1941	2.69	-11.414	2.419	0.136	2.283	-0.564
	87	19 : 08 : 00	2019	0.67	-11.387	2.228	0.104	2.123	-0.646
UE	87	20 : 26 : 00	2097	0.14	-11.401	2.024	0.104	1.920	-0.825

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_UD1!
 Task No.: NA Date; Start: 3/25/2008 Back Pressure, $U_{b,CS}$ (psi): 70.6 Piston Uplift, P_{up} (lbf): 34.68
 Project Name: Exelon (Victoria) Completed: 3/28/2008 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: Pale Yellow Fat CLAY with sand (CH)
 Initial: Ring No.: 3 Area, A_r (cm²): 31.723 Solids Ht., H_s (mm): 11.345 Specific Gravity, $G_s =$ 2.710 ☒ Meas.; ☐ Assumed
 Height H_o : 19.01 Water 22.6 Void 0.676 Deg. of 90.8 Total Unit 123.6 Dry Unit 100.8
 Final: (mm): H_f : 19.30 Content, w (%): 26.1 Ratio, e : 0.701 Sat., S (%): 100.8 Weight, γ_t (pcf): 125.2 Weight, γ_d (pcf): 99.3

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: LF

Reviewed By: HP

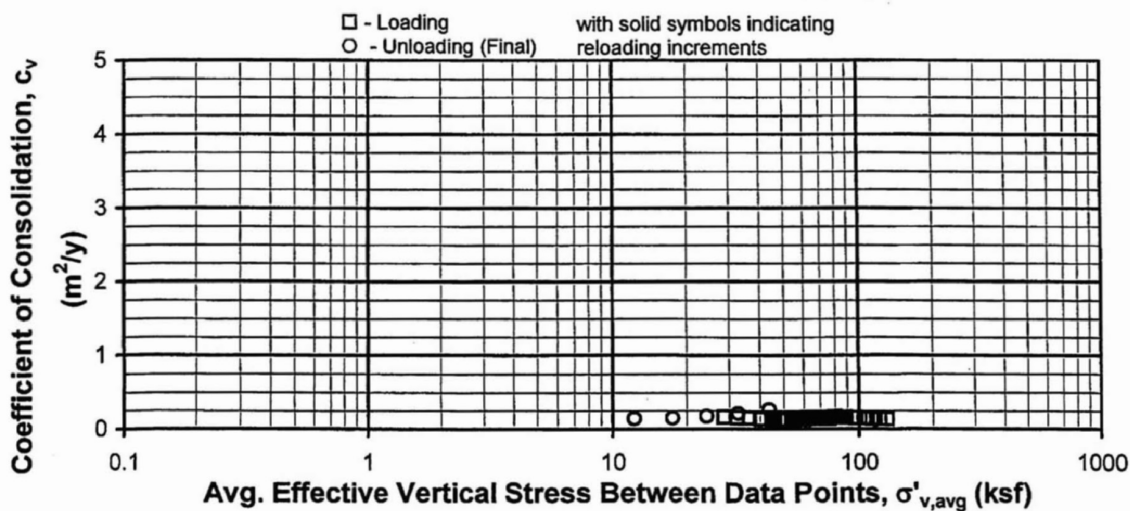
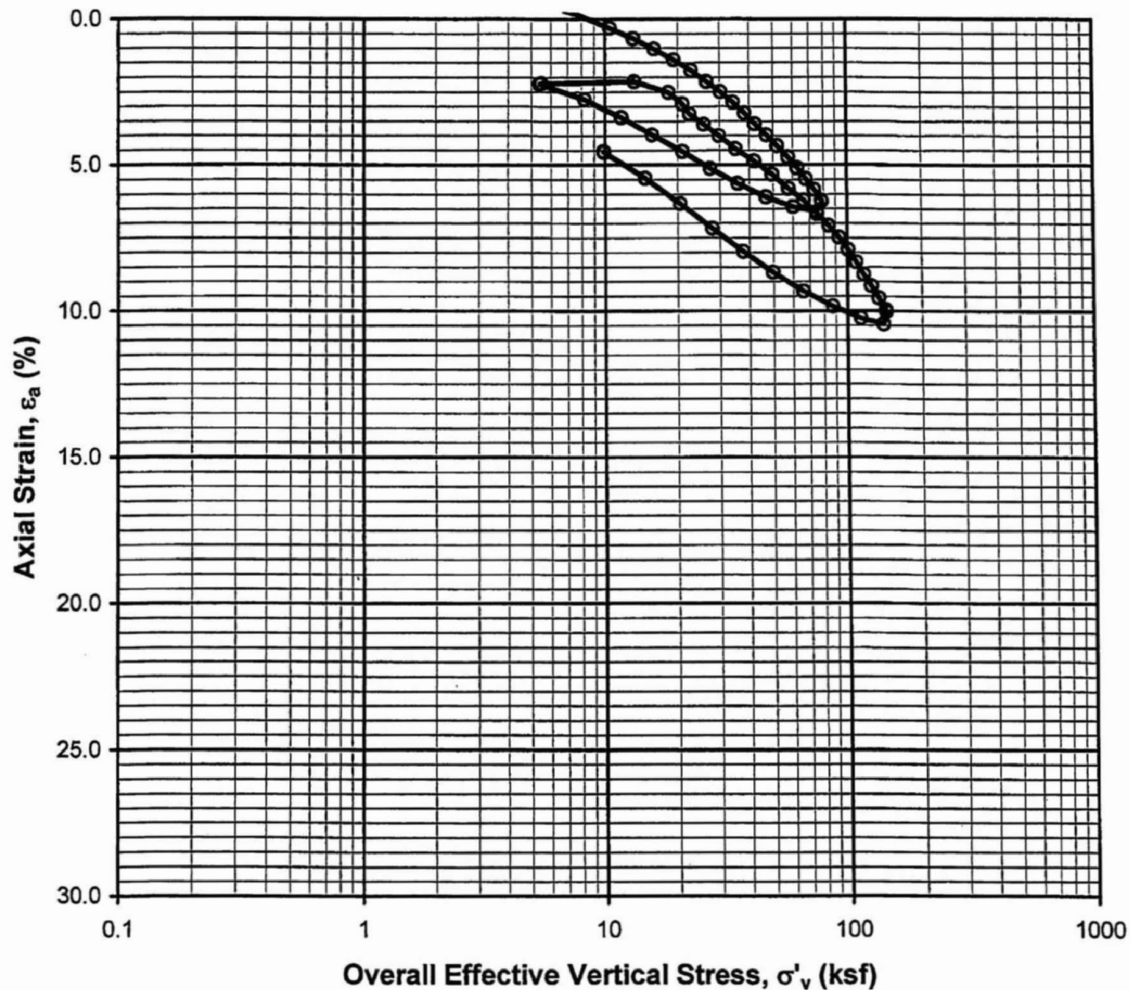
Loading Info. (1)	Elapsed Time from Start of Loading, Δt_n (min)	Overall Effective Vertical Stress, $\sigma'_{v,n}$ (ksf)	Corrected Volumetric (Axial) Strain, $\epsilon_{v,n}$ ($\epsilon_{ac,n}$) $\Delta H_{c,n} / H_o$ (%)	Overall Void Ratio, e_n	Total Vertical Stress, $\sigma_{v,n}$ (ksf)	Excess Pore-Water 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					0.41				Data on given line represents average conditions					
BS			0.08	0.674	0.89			18.997	between that line and the previous line of data.					
BE		1.17	-0.04	0.676	1.17	0.000	0.0	19.020			0.675			
CS	0	1.18	-0.04	0.676	1.18	0.000	0.0	19.020			0.676			
	14	1.98	0.08	0.674	1.98	0.000	0.0	18.997	1.58		0.675			
	28	2.70	0.37	0.669	2.70	0.000	0.0	18.941	2.34		0.672			
	49	4.11	0.96	0.660	4.11	0.003	0.1	18.830	3.40		0.665			
	77	6.59	1.72	0.647	6.60	0.012	0.2	18.685	5.35		0.653			
	105	9.90	2.47	0.634	9.98	0.121	1.2	18.542	8.24		0.641			
	133	13.80	3.20	0.622	14.44	0.944	6.5	18.404	11.85		0.628			
	161	17.42	3.88	0.611	20.10	3.884	19.3	18.274	15.61		0.616			
US	189	20.76	4.54	0.600	26.96	8.752	32.5	18.148	19.09		0.605			
	217	24.01	5.15	0.589	35.15	15.306	43.5	18.033	22.38		0.595		0.54	
	245	26.81	5.73	0.580	43.32	22.223	51.3	17.922	25.41		0.585		0.64	
	273	29.63	6.31	0.570	53.22	31.117	58.5	17.812	28.22		0.575		0.77	
	329	39.42	7.51	0.550	73.52	44.653	60.7	17.584	34.52		0.560		0.89	
	357	48.17	8.16	0.539	82.69	45.924	55.5	17.460	43.79		0.544		0.81	

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

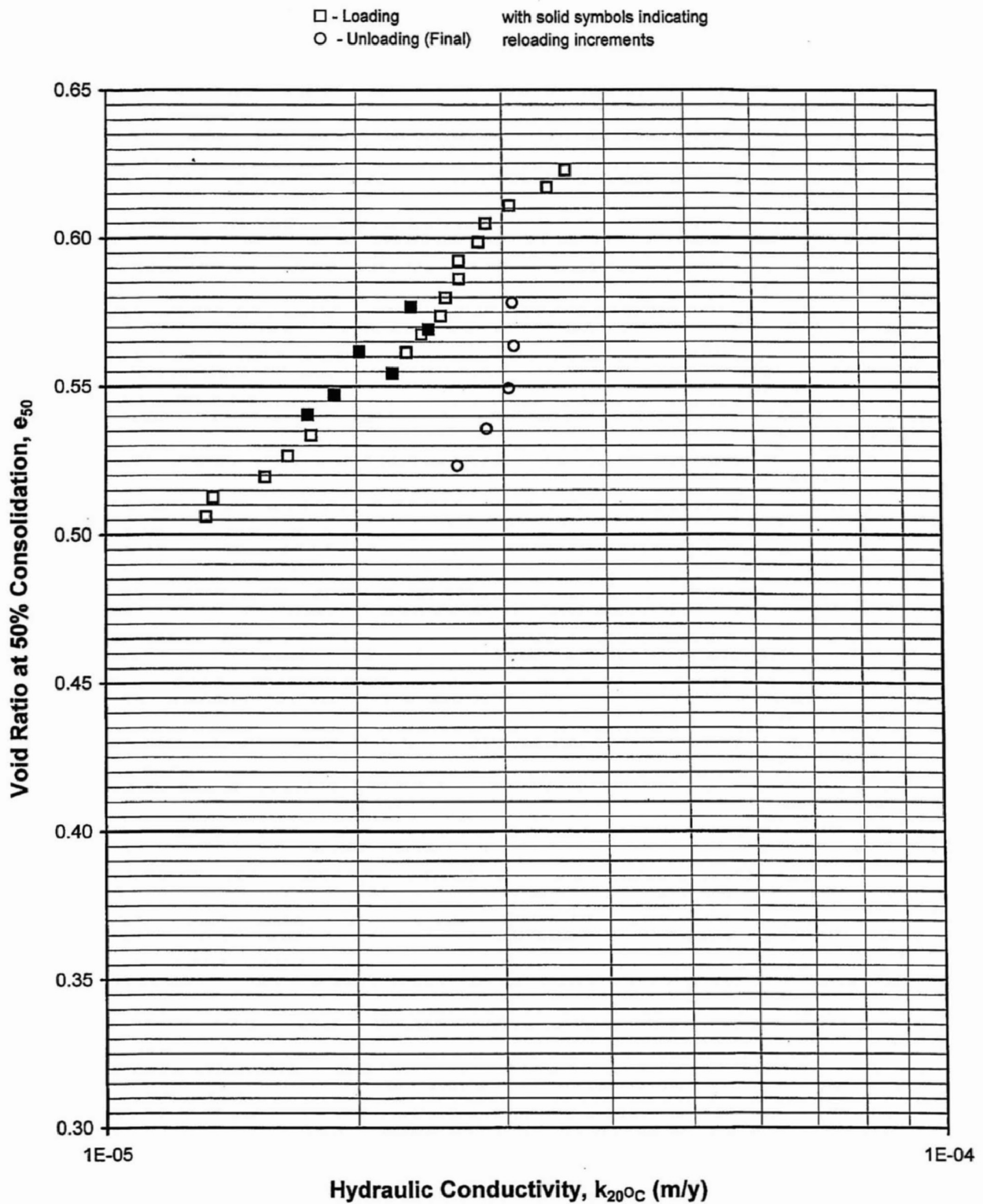
Load- ing Info. (1)	Elapsed Time from Start of Loading, Δt_n (min)	Overall Effective Vertical Stress, $\sigma'_{v,n}$ (ksf)	Corrected Volumetric (Axial) Strain, $\epsilon_{v,n} (\epsilon_{ac,n})$ $\Delta H_{c,n} / H_o$ (%)	Overall Void Ratio, e_n	Total Vertical Stress, $\sigma_{v,n}$ (ksf)	Excess Pore-Water 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), $C_\alpha = \frac{\Delta d_{s,sc}}{H_o}$ ($\times 10^{-4}$)
									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)		
	385	58.11	8.83	0.528	91.88	45.661	49.7	17.334	53.14		0.533		0.99	
	413	68.32	9.49	0.517	101.75	45.765	45.0	17.208	63.22	0.45	0.522	9.39E-05	1.28	
	441	79.11	10.14	0.506	112.40	46.023	40.9	17.085	73.71	0.49	0.511	8.87E-05	1.60	
	469	90.27	10.79	0.495	123.29	46.055	37.4	16.960	84.69	0.51	0.500	8.67E-05	1.87	
	497	101.64	11.44	0.484	134.73	46.451	34.5	16.838	95.95	0.54	0.489	8.27E-05	2.20	
	525	113.74	12.07	0.474	146.66	46.499	31.7	16.718	107.69	0.56	0.479	7.86E-05	2.54	
UE	541	120.83	12.43	0.468	153.83	46.743	30.4	16.650	117.28	0.59	0.471	7.71E-05	2.83	
	543	119.34	12.46	0.467	152.39	46.788	30.7	16.643	120.08		0.467			
	593	98.51	12.94	0.459	133.14	48.402	36.4	16.553	108.92		0.463			
	643	77.46	13.10	0.456	108.85	43.501	40.0	16.521	87.99		0.458			
	693	66.12	13.09	0.456	84.84	26.471	31.2	16.524	71.79		0.456			
	743	57.86	13.01	0.458	63.23	7.886	12.5	16.539	61.99		0.457			
	793	50.35	12.86	0.460	45.16	-7.992	-17.7	16.567	54.10		0.459			
	843	38.37	12.62	0.464	31.21	-11.337	-36.3	16.614	44.36		0.462			
	893	28.17	12.29	0.470	21.07	-11.495	-54.5	16.675	33.27		0.467			
US	943	20.48	11.91	0.476	13.61	-11.519	-84.7	16.747	24.32		0.473			
	993	14.64	11.49	0.483	8.15	-11.453	-140.4	16.827	17.56		0.480		0.71	
	1041	10.55	11.05	0.491	4.58	-11.437	-249.7	16.911	12.59	0.87	0.487	1.09E-04	1.14	
	1043	10.84	11.03	0.491	4.82	-11.437	-237.4	16.915	10.70		0.491		-2.04	
UE	1055	14.83	10.93	0.493	8.35	-11.418	-136.8	16.934	12.83		0.492		-5.10	
	1067	22.42	10.95	0.492	15.55	-11.368	-73.1	16.929	18.63		0.492			
	1079	29.56	11.04	0.491	22.55	-11.295	-50.1	16.913	25.99		0.491			
	1091	36.78	11.15	0.489	29.72	-11.198	-37.7	16.891	33.17		0.490			
	1103	44.08	11.28	0.487	37.02	-11.071	-29.9	16.867	40.43		0.488			
	1115	51.27	11.42	0.484	44.27	-10.904	-24.6	16.841	47.67		0.486			
US	1127	58.77	11.57	0.482	51.88	-10.675	-20.6	16.813	55.02		0.483			
	1139	66.27	11.72	0.479	59.56	-10.341	-17.4	16.783	62.52		0.481		-0.80	
	1151	73.58	11.89	0.477	67.18	-9.811	-14.6	16.752	69.92		0.478		-1.63	
	1163	80.75	12.05	0.474	74.96	-8.850	-11.8	16.720	77.16		0.475		-2.66	
	1175	87.04	12.22	0.471	82.74	-6.540	-7.9	16.688	83.90		0.472		-4.24	

DCN# EXE808

FUGRO CONSULTANTS, INC.



1-D CONSOLIDATION TEST: CRS
 Sample No. UD-4A - Depth 35.0 - 36.7 ft
 Boring B-2359UD



1-D CONSOLIDATION TEST: CRS
 Sample No. UD-4A - Depth 35.0 - 36.7 ft
 Boring B-2359UD

ONE - DIMENSIONAL CONSOLIDATION TEST: Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Station No.: CRS-2 File Name: B-2359_UD4a
 Task No.: NA Specific Gravity, G_s : 2.730 ☒ Meas.; ☐ Assumed Ring No.: 10
 Project Name: Exelon (Victoria) Assig. Remarks: Ring Area, A_r (cm^2) = 31.644
 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-2359UD	☐ LPC Core			Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =
Sample No.: UD-4	Compostite No.:			Pluviated:	Tamper Force (lb) =	Drop (in.) =
Depth (ft): 35.0 - 36.7	Specimen No.: A			Kneading	Undercompaction: U_{ni} (%) =	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)	338.38	336.61
Container No.	765	1109	5057	678	Mass Ring (g)	215.51	
Mass Moist Soil + Container (g)	116.68	124.90	91.77	62.40	Mass Moist Soil, $M_{t,o}$ or $M_{t,at}$ (g)	122.87	121.10
Mass Dry Soil + Container (g)	101.60	108.30	80.94	57.06	EXCESS DRY SOIL (soil not incl. in final mass above)		
Mass Container (g)	31.77	31.82	30.55	32.03	Container No.	2009	
WATER CONTENT (%)	21.60	21.71	21.49	21.33	Mass Dry Soil + Container (g)	30.98	
Avg. Initial Water Content, W_4 (%)	21.60	Final W_{at} : ☒ Slice ;	Whole Spec.		Mass Container (g)	30.52	
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil, M_{des} (g)	0.46	

Soil Height: Measurements (mm)				Soil Height: Calculations, (mm)		Initial	Final
Initial		Final		Height of Gauge Block, H_{gb} (1)		0.000	19.060
with Spec.	without Spec.	with Spec.	without Spec.	Reading on Gauge Block, d_{gb}		0.000	0.000
19.200	0.000	11.890	12.770	Avg. Reading on Soil, d_{soil}		19.176	11.874
19.170	0.000	11.770	12.820	Avg. Reading on Apparatus without Specimen, d_{app}		0.000	12.796
19.180	0.000	11.890	12.780	Soil Height, $H = d_{soil} - d_{app} + H_{gb} - d_{gb}$		19.176	18.138
19.130	0.000	11.960	12.830	Soil Height: Final by Dial Change During Test (mm)			
19.200	0.000	11.860	12.780	Initial Height, H_o		19.176	
☐ Yes ;	☒ No	☒ Yes ;	☐ No	Require H_{gb} & d_{gb} (1)		Final (end of test) Corr. Total Spec. Deformation, $\Delta H_{e,r}$	
☐ Yes ;	☒ No	☒ Yes ;	☐ No	Filter Paper Included:		Final Calculated Height, $H_{f,c} = H_o - \Delta H_{e,r}$	
(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, $H_{f,m}$		18.138	
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 %, $(H_{f,c} - H_{f,m})/H_o$		0.80	

Estimated Initial Unit Weight		Soil Extruded During Loading	
Total, $\gamma_{t,o}$ (pcf) = 126.41	Dry, $\gamma_{d,o}$ (pcf) = 103.96	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 Gray Fat CLAY (CH)

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: 4/7/2008 Date: 4/7/2008 Final Calc. By: DH Date: 4/17/2008
 Reviewed By: HP

Note: NA - Not Applicable

KAW 7/15/08