

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: 9G File Name: Comp-Bi
 Task Number: NA Specific Gravity: 2.693 ☒ Measured; ☐ Assumed
 Type Test: SDSS Specimen: ☐ "Undisturbed"; ☒ Reconstituted; ☒ Remolded Boring No.: TP2317/TP2334
 Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = ppm Sample No.: Comp-Bi

Consolidation Stress Summary and Loading Summary									
Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate = <u>NA</u> (%/hr or)				
Nominal Vertical Stress, σ'_v (ksf)	NA	8.64	NA		Cyclic Rate (Hz):	<u>0.1</u>	<u>1</u>	Other =	
Axial/Vertical Force, $P_{v,n}$ (lbf)	NA	NA	NA		During/End of Loading			Static	Cyclic
Horizontal Force, $P_{h,n}$ (lbf)	NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)			NA	NA
Nominal OCR	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)			NA	NA
t_c (ON,days,hrs)	NA	0.65 days	NA		Post Cy.Displ. Reset to Null Position:			Yes;	No

Undrained ambient stress applied: with Delta shear force (lbf) = NA & Duration (min) = NA & Delta disp., $\Delta d_{h,ua}$ (mm) = NA

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):					
Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Selet., $W_{o,s}$	Back Cal.
W_o 16.21			16.21	16.21	15.68
S_o 96.6			96.6	96.6	94.9
Measured final mass of moist soil, M_{lat} (g)					139.75
Final mass of moist soil corrected for excess dry soil, $M_{lat,c}$ (g)					139.75

Calculated Mass of Dry Soil (g)	
Initial Selected Water Content (%)	16.21
Initial, $M_{d,o}$	119.62
Final, $M_{d,at}$	120.17
Selected, M_d	119.88

Initial Back Cal. Specific Gravity (TS):

Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary			
Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	8.640	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.657		
Total Equip. Comp., $\Sigma \Delta d_{afc}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.657		
ΔV_n using A_o - spec. (cm ³)	2.29		
ΔV_n using $A_{c,n}$ - app. (cm ³)	2.29		
ΔV_n using burette meas. (cm ³)	-0.30		
Selected ΔV_n (cm ³)	2.29	NA	NA = ΔV_{UL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{at,c}$ (%)			NA

Calculation of ΔV_c by Different Procedures			
By Selected Volumes		By Change in Mass	
ΔV_c (cm ³)	2.29	$\sim M_{t,o} - (M_{lat,c} + \Delta V_L + \Delta V_{UL})$	
By Cal. Height & App. Area		ΔV_c (cm ³)	-0.74
ΔV_c (cm ³)	2.29	By Saturation = 100% and Spec. Unloaded to 0 Stress	
By Cal. Ht. & Init. Spec. Area		ΔV_c (cm ³)	NA
ΔV_c (cm ³)	2.29		

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	14.74
Back Cal. WC at Max. Stress, $W_{cmax,bc}$ (%)	NA

Consolidation & Preshear Conclusions	ΔV_c (cm ³) =	2.30	ΔH_c (mm) =	0.657	$\epsilon_{a,c}$ (%) =	3.55	$\Delta V_{c,max}$ (cm ³) =	NA
	V_c (cm ³) =	62.30	H_c (mm) =	17.868	$\epsilon_{v,c}$ (%) =	3.56	$\epsilon_{ac,max}$ (%) =	NA
	A_c (cm ²) =	34.87	$\Delta \gamma_c$ (mm) =	NA	γ_c (%) =	NA	Preshear: γ_{ua} (%) =	NA

Summary of Specimen Physical Properties:								
Specific Gravity: $G_s = 2.693$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition: Initial (as trimmed)	18.525	64.60	34.87	16.0	134.3	115.9	95.8	0.451
After to $\sigma'_{v,c}$	17.868	62.30	34.87	14.7	137.8	120.1	100.0	0.400
Consol.: to $\sigma'_{v,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant. 4 - Based on change in height & volume.
 & Note(s) 2 - Initial measured value corrected for applied stress. NA - Not Applicable
 3 - Uses measured value at appropriate stress level (NA for rings).

Calculated By: LF
 Reviewed By: HP

Remarks: t95 for max stress = 1.3 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 9G File Name: Comp-Bi
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☐ Tube	☐ Field Extruded	☐ Liner	☒ Remolded	☒ Tamping	Constant Effort:	Blows/Tamps per Layer = 11
Boring No.: TP2317/TP2334	☐ LPC Core			Impact/Rammer	Rammer Wgt. (lb) =	No. Layers = 3.00
Sample No.: Comp-B	Composite No.:			Pluviated:	Tamper Force (lb) = 4.00	Drop (in.) = 12.00
Depth (ft): NA	Specimen No.: I			Kneading	☒ Undercompaction:	U _{nl} (%) = Dia. (in.) = 1.40
Spec. Selection by X-ray:	☐ Geomarine Sample				Ref. Effort = MOD	% Comp. = 95.0 ± Opt. = +4

Type Consolidation:	☒ K _o at:	☒ Incremental CRS	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c,DSS}	☐ Used Automated System	Remarks:
Loading Conditions:	☒ Static Dynamic	☒ Strain Stress	☐ Creep Post Cyclic	☒ Const. Vol./Ht Drained	☒ Without - Water Bath	☐ Cyclic (Hz) Rate: 0.1; 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity: G _s = 2.693 Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight		Saturation (%)	LL PL	-200 %	Void Ratio, e
Condition:					Total (pcf)	Dry (pcf)		PI		
Initial	18.53	64.60	34.87	15.96	134.3	115.9	95.8	44	73.6	0.451
After to σ' _{v,c}	17.87	62.30	34.87	14.74	137.8	120.1	100.0	15	NA	0.400
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	29	NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate = 4.7 %/hr.				
Vert. Consol. Stress, σ'_{vc}	(ksf)	NA	8.731	NA		Cyclic Rate (Hz):		0.1;	1;	Other =
Induced OCR:	-	NA	NA	NA		During/End of Loading			Static	Cyclic
Axial Strain during Consol., $\epsilon_{ax,c}$	%	NA	3.55	NA		Change in Height, $\Delta H_{L,n}$ (mm):			NA	NA
Horiz. Consol. Stress, τ_{hc}	(ksf)	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³):			NA	NA
Consol. Stress Ratio, τ_{hc} / σ'_{vc}	-	NA	NA	NA		Post Cy.Displ. Reset to Null Pos.:		Yes;		No
Shear Strain during Consol., $\epsilon_{h,c}$	%	NA	NA	NA		Number of Loading Cycles, N = NA				
Undr. Ambient Shear Stress, τ_{huw}	(ksf)	NA	NA	NA		$\pm\tau_h$ = NA (ksf)		$\pm\gamma$ = NA %		
Undr. Ambient Shear Strain, ϵ_{uw}	%	NA	NA	NA		at end of cyclic loading, $\sigma'_{vcy,f}$ = NA (ksf)				

Weight Top Cap, etc., M _{tc} (lb): 1.17	Data Normalization: ☒ Yes ☐ No Value: 8.731 (ksf)
Data corr. for M _{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No
Wire Reinforced Membrane, Model:	Data corr. for Membr. strength: ☒ Yes ☐ No
☒ Regular Membrane with Rings	☒ Pre-Shear Conditions ☐ Post-Cyclic Conditions
	Maximum Stress during Consol. ☐

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

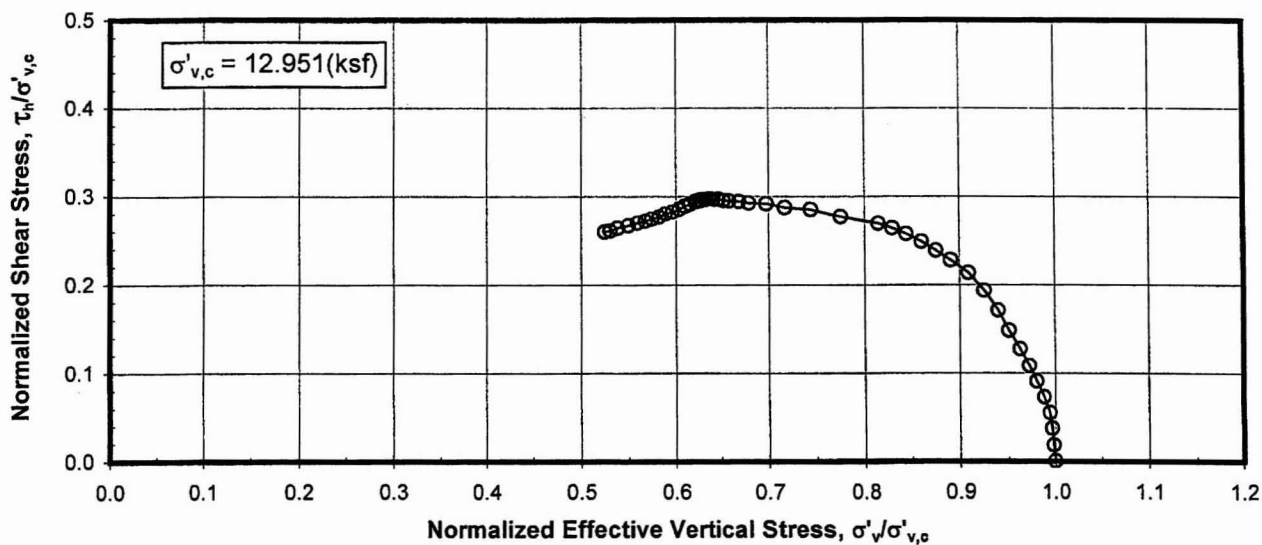
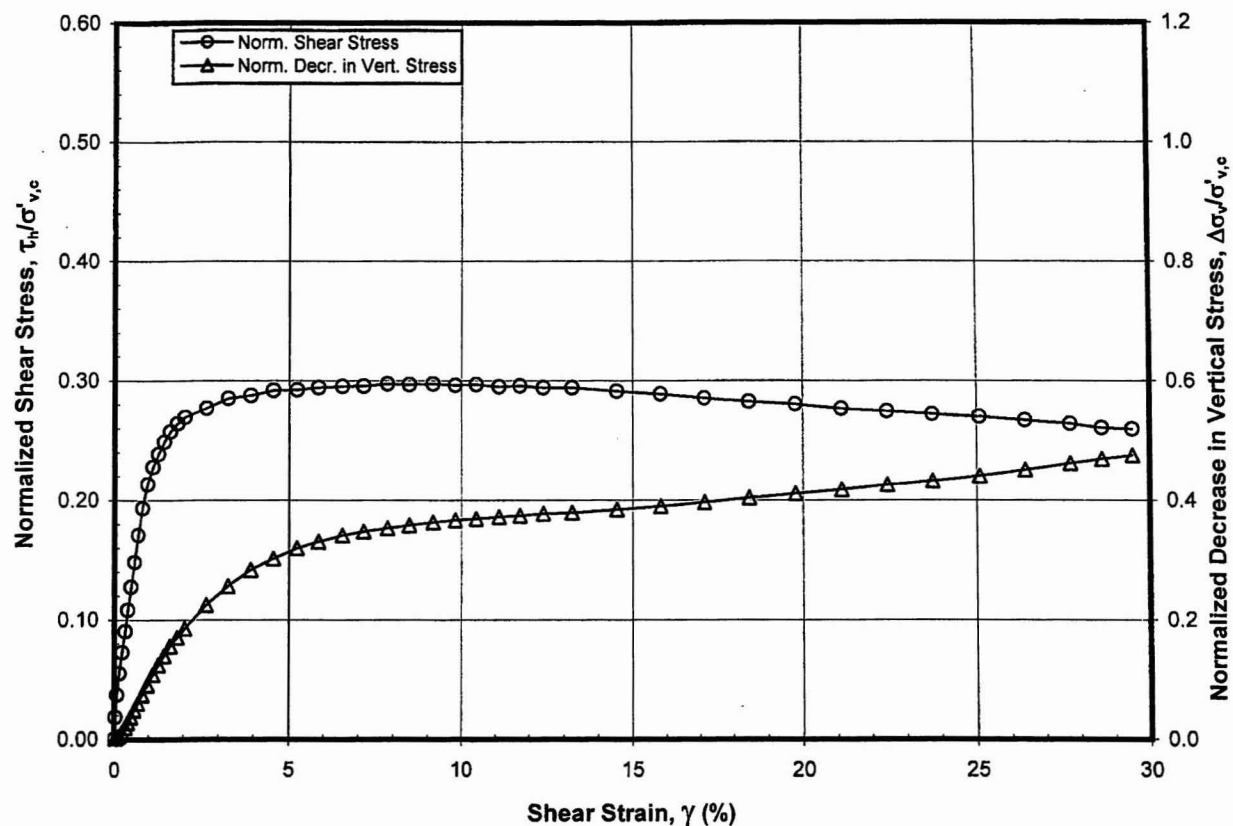
NA - Not Applicable

Final Visual Description and Remarks: Gray Lean CLAY with sand (CL)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v -	Δσ' _v /σ' _{vc} -	c _u /σ' _{vc} -
at Peak Shear Stress	3.823	14.30	7.642	0.500	0.125	0.438
at Maximum Strain	3.455	29.79	7.145	0.483	0.182	-

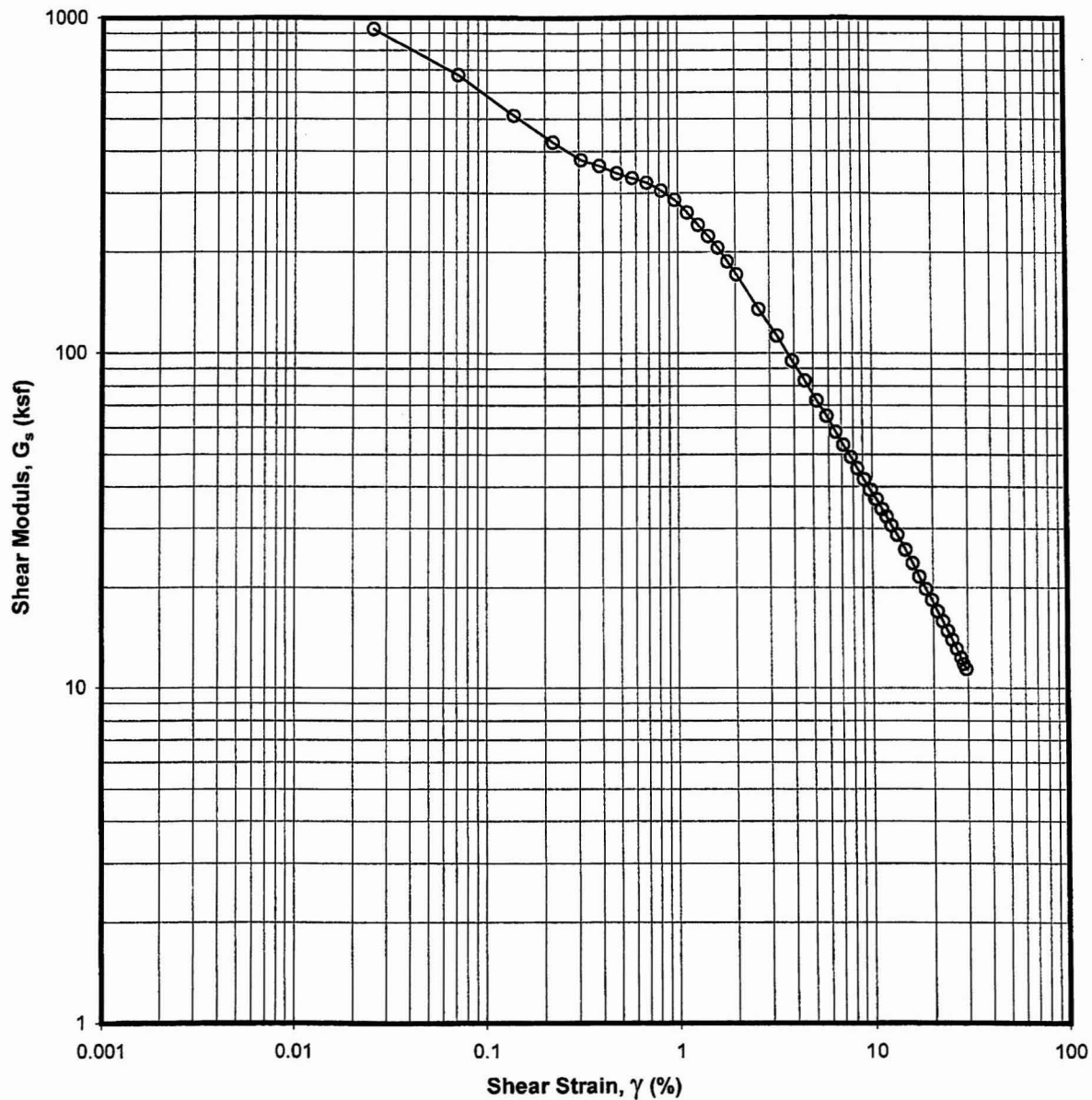
Boring No.: TP2317/TP2334 Sample No.: Comp-BI

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{DSS} (°)
0.0	0.00	-0.007	8.731	0.000	-	-	-0.001	1.000	0.000	-0.04
2.5	0.04	0.369	8.716	0.015	859.970	628.575	0.042	0.998	0.002	2.43
5.1	0.10	0.608	8.734	-0.003	592.146	356.624	0.070	1.000	0.000	3.98
7.7	0.17	0.817	8.700	0.031	484.815	292.610	0.094	0.996	0.004	5.36
10.2	0.24	1.014	8.691	0.040	419.792	261.714	0.116	0.995	0.005	6.66
12.8	0.32	1.207	8.668	0.063	380.416	279.217	0.138	0.993	0.007	7.93
15.4	0.40	1.448	8.613	0.118	365.236	293.165	0.166	0.986	0.014	9.55
17.9	0.50	1.746	8.488	0.243	347.870	258.189	0.200	0.972	0.028	11.62
20.5	0.63	2.037	8.417	0.314	325.358	197.504	0.233	0.964	0.036	13.60
23.1	0.77	2.268	8.239	0.492	294.672	133.408	0.260	0.944	0.056	15.39
25.6	0.92	2.430	8.012	0.719	263.555	86.367	0.278	0.918	0.082	16.87
28.2	1.09	2.542	7.791	0.940	233.431	57.527	0.291	0.892	0.108	18.07
30.8	1.26	2.622	7.578	1.153	209.091	44.902	0.300	0.868	0.132	19.08
33.3	1.43	2.692	7.398	1.333	189.164	39.739	0.308	0.847	0.153	19.99
35.9	1.62	2.767	7.176	1.555	170.844	34.278	0.317	0.822	0.178	21.08
38.4	1.83	2.829	7.112	1.619	155.224	27.854	0.324	0.815	0.185	21.69
41.0	2.03	2.879	7.001	1.730	142.425	23.527	0.330	0.802	0.198	22.35
43.6	2.23	2.923	6.920	1.811	131.471	20.717	0.335	0.793	0.207	22.90
51.3	2.79	3.034	6.772	1.959	108.835	16.696	0.347	0.776	0.224	24.13
59.0	3.41	3.118	6.685	2.046	91.769	13.375	0.357	0.766	0.234	25.01
66.6	3.99	3.193	6.667	2.064	80.294	12.064	0.366	0.764	0.236	25.59
74.3	4.64	3.266	6.665	2.066	70.585	9.601	0.374	0.763	0.237	26.11
82.0	5.25	3.315	6.684	2.047	63.288	9.195	0.380	0.766	0.234	26.38
89.7	5.89	3.382	6.739	1.992	57.552	8.916	0.387	0.772	0.228	26.65
97.3	6.50	3.427	6.795	1.936	52.818	9.735	0.393	0.778	0.222	26.77
105.0	7.11	3.501	6.881	1.851	49.314	8.754	0.401	0.788	0.212	26.97
112.7	7.73	3.535	6.946	1.785	45.815	7.871	0.405	0.796	0.204	26.97
120.4	8.35	3.598	7.040	1.691	43.185	7.520	0.412	0.806	0.194	27.07
128.1	9.01	3.630	7.055	1.676	40.362	5.823	0.416	0.808	0.192	27.22
135.8	9.62	3.671	7.178	1.553	38.249	5.579	0.421	0.822	0.178	27.09
143.5	10.28	3.700	7.246	1.485	36.055	3.777	0.424	0.830	0.170	27.05
151.2	10.87	3.719	7.316	1.415	34.276	4.959	0.426	0.838	0.162	26.95
158.8	11.51	3.761	7.393	1.338	32.750	5.315	0.431	0.847	0.153	26.96
166.5	12.11	3.786	7.458	1.274	31.306	3.839	0.434	0.854	0.146	26.91
176.7	12.98	3.818	7.540	1.191	29.455	2.055	0.437	0.864	0.136	26.85
192.1	14.30	3.823	7.642	1.090	26.789	-2.418	0.438	0.875	0.125	26.58
207.5	15.59	3.755	7.643	1.088	24.136	-3.048	0.430	0.875	0.125	26.17
222.8	16.85	3.745	7.676	1.055	22.266	-0.716	0.429	0.879	0.121	26.01
238.2	18.15	3.737	7.706	1.025	20.627	-0.963	0.428	0.883	0.117	25.87
253.5	19.43	3.720	7.701	1.030	19.177	-0.989	0.426	0.882	0.118	25.78
268.9	20.72	3.712	7.693	1.038	17.947	-1.200	0.425	0.881	0.119	25.76
284.3	22.05	3.688	7.638	1.093	16.758	-1.651	0.422	0.875	0.125	25.78
299.6	23.37	3.668	7.516	1.215	15.722	-1.961	0.420	0.861	0.139	26.01
315.0	24.67	3.637	7.497	1.234	14.770	-2.162	0.417	0.859	0.141	25.88
330.4	25.96	3.612	7.436	1.295	13.941	-3.133	0.414	0.852	0.148	25.91
345.7	27.24	3.557	7.348	1.383	13.083	-4.367	0.407	0.842	0.158	25.83
361.1	28.52	3.500	7.257	1.474	12.295	-3.995	0.401	0.831	0.169	25.75
376.5	29.79	3.455	7.145	1.586	11.617	-3.554	0.396	0.818	0.182	25.80



STATIC DSS TEST
 K_o Consolidation - OCR = NA
 Sample: Comp-BJ - Depth: NA ft
 Boring TP2317/TP2334
 Exelon (Victoria)

KAW 7/16/08



STATIC DSS TEST
 K_o Consolidation - OCR = NA
 Sample: Comp-BJ - Depth: NA ft
 Boring TP2317/TP2334

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 10G File Name: Comp-Bj
 Task No.: NA Assign, $\sigma'_{v,c}$ = 12.96 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA, NA, NA & NA
 Assig. Remarks: Specific Gravity: 2.693 ☒ Meas.; ☐ Assumed

☐ Tube	☐ Field Extruded	☐ Liner	☒ Remolded	☒ Tamping	Constant Effort:	Blows/Tamps per Layer = 11
Boring No.: TP2317/TP2334		☐ LPC Core		☐ Impact/Rammer	Rammer Wgt. (lb) =	No. Layers = 3.00
Sample No.: Comp-B		Composite No.:		☐ Pluviated:	Tamper Force (lb) = 4.00	Drop (in.) = 12.00
Depth (ft): NA		Specimen No.: J		☐ Kneading	☒ Undercompaction: U_{hi} (%) =	Dia. (in.) = 1.40
☐ Spec. Selection by X-ray;		☐ Geomarine Sample			Ref. Effort =	% Comp. = 95.0 ± Opt. = +4

Type Consolidation:	☒ K_o at:	☒ Incremental	☐ Anisotropic at:	Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
		CRS		90° Stress Path	Remarks:
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water
	Rapid	Stress	Post Cyclic	Drained	With - Bath
					Cyclic (Hz) Rate: 0.1;
					Strain 1; Stress Other:

Water Content (WC);	Initial - Trimming Location			Final, W_{at} (see below)	Soil and Ring Masses		Initial	Final
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)		Mass Moist Soil + Tare (g)	Mass Tare (g)		
Container No.	821			1102	Mass Moist Soil, $M_{t,o}$ Mt,at (g)	183.30	144.04	
Mass Moist Soil + Cont. (g)	119.20			75.37		138.02	4.96	
Mass Dry Soil + Container (g)	107.14			68.88	Excess Dry Soil (soil not included in final mass above)			
Mass Container (g)	32.23			31.51	Container No.			
WATER CONTENT (%)	16.10			17.37	Mass Dry Soil + Container (g)			
Avg. Initial WC, $W_{o,avg}$ (%)	16.10	Final W_{at} : ☒ Slice ;		Whole Spec.	Mass Container (g)			
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)			
					0.00			

Specimen Trimming:				
☐ Trimming Ring for Fugro Apparatus	NL6	Large-ring ID #		
☒ Trimming Ring for NGI Apparatus		Small-ring ID #		
$H_{s,t}$ (mm):	18.53	$A_{s,t}$ (cm ²):	34.68	
$D_{s,t}$ (mm):	66.45	$V_{s,t}$ (cm ³):	64.24	
Remarks:				
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)				
Height (H_t)	Diameter (D_o)	Remarks:		
1 18.550	1-T NA	For Free Standing or Reconstituted Spec.:		
2 18.540	2-M NA			
3 18.510	3-B NA			
4 18.530	1'-T NA			
5 18.540	2'-M NA			
Avg.	3'-B NA	A_{tr} (cm ²):	NA	
= 18.525	Avg NA	V_{tr} (cm ³):	NA	

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³) =	134.13
Dry, $\gamma_{d,o}$ (lb/ft ³) =	115.53

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PiTape (mm) Meas.	Corr.	Area, $A_{c,n}$ (cm ²)	(in ²)
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No.	10	ID, Rings (mm)		
Thickness (mm):	Top: 0.66		= 67.13	
☐ Single	Bottom: 0.70		Corr. for mem.	
☒ Double	Membr. Thick. = 0.34		= 66.450	
Area Ring with mem., A_o (cm ²) =		34.68	; (in ²) = 5.375	
Mass Top Cap, etc., M_{tc} =		528.2 g	1.16	lbf
Data corr. for M_{tc} :	☒ Yes;	☐ No	Plattens with Pins:	☐ Yes; ☒ No

Final Visual Description: Gray Lean CLAY with sand (CL)

Other Remarks:

Trim./ Recon. By: DBN

Setup By: HC

Take Down By: HC

Date: 5/9/2008

Date: 5/7/2008

Date: 5/11/2008

Prelim. Calc. By: LF

Final Calc. By: LF

Reviewed By: HP **HP**

Specimen Take Down: ☒ Spec. removed right after shearing
☐ Spec. unloaded to zero stress with access to water

Remarks:

KAW 6/13/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686

Test Station No.: 10G

File Name: Comp-Bj

Task Number: NA

Specific Gravity: 2.693

☒ Measured; ☐ Assumed

Type Test: SDSS

 Specimen: ☐ "Undisturbed"; ☒ Reconstituted; ☒ Remolded

Boring No.: TP2317/TP2334

 Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm

Sample No.: Comp-BJ

Consolidation Stress Summary and Loading Summary

Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate =	NA	(%/hr or)
Nominal Vertical Stress, σ'_v (ksf)	NA	12.96	NA		Cyclic Rate (Hz):	0.1;	1; Other =
Axial/Vertical Force, $P_{v,n}$ (lbf)	NA	NA	NA		During/End of Loading	Static	Cyclic
Horizontal Force, $P_{h,n}$ (lbf)	NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)	NA	NA
Nominal OCR	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)	NA	NA
t_c (ON, days, hrs)	NA	0.70 days	NA		Post Cy. Displ. Reset to Null Position:	Yes;	No

 Undrained ambient stress applied: with Delta shear force (lbf) = NA & Duration (min) = NA & Delta disp., $\Delta d_{h,ua}$ (mm) = NA

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Selct., $W_{o,s}$	Back Cal.
W_o	16.10			16.10	16.10	16.47
S_o	95.8			95.8	95.8	97.0
Measured final mass of moist soil, $M_{t,at}$ (g)						139.08
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)						139.08

Calculated Mass of Dry Soil (g)

Initial Selected Water Content (%)	16.10
Initial, $M_{d,o}$	118.88
Final, $M_{d,at}$	118.50
Selected, M_d	118.69

Initial Back Cal. Specific Gravity (TS):

Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary

Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	12.960	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	1.034		
Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	1.034		
ΔV_n using A_o - spec. (cm ³)	3.59		
ΔV_n using $A_{c,n}$ - app. (cm ³)	3.59		
ΔV_n using burette meas. (cm ³)	1.90		
Selected ΔV_n (cm ³)	3.59	NA	NA = ΔV_{uL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{a,c}$ (%)			NA

Lateral Confinement Area Cal. Approach (LCA); Method 1, 2, 3 or 4: 1

Calculation of ΔV_c by Different Procedures

By Selected Volumes	By Change in Mass
ΔV_c (cm ³)	3.59
By Cal. Height & App. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	3.59
By Cal. Ht. & Init. Spec. Area	ΔV_c (cm ³)
ΔV_c (cm ³)	3.59

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	13.88
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

Consolidation & Preshear	ΔV_c (cm ³) = 3.58	ΔH_c (mm) = 1.034	$\varepsilon_{a,c}$ (%) = 5.58	$\Delta V_{c,max}$ (cm ³) = NA
Conclusions	V_c (cm ³) = 60.66	H_c (mm) = 17.491	$\varepsilon_{v,c}$ (%) = 5.57	$\varepsilon_{ac,max}$ (%) = NA
	A_c (cm ²) = 34.68	$\Delta \gamma_c$ (mm) = NA	γ_c (%) = NA	Preshear: γ_{ub} (%) = NA

Summary of Specimen Physical Properties:

Specific Gravity: $G_s = 2.693$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	18.525	64.24	34.68	16.3	134.1	115.3	96.4	0.457
After to $\sigma'_{v,c}$	17.491	60.66	34.68	13.9	139.1	122.2	100.0	0.376
Consol.: to $\sigma'_{v,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant.

4 - Based on change in height & volume.

Calculated By: LF

& Note(s) 2 - Initial measured value corrected for applied stress.

NA - Not Applicable

Reviewed By: HP

3 - Uses measured value at appropriate stress level (NA for rings).

Remarks: t95 for max stress = 3.1 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 10G File Name: Comp-Bj
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

Tube	Field Extruded	Liner	X	Remolded	X	Tamping	Constant Effort:	Blows/Tamps per Layer =	11
Boring No.:	TP2317/TP2334	LPC Core				Impact/Rammer	Rammer Wgt. (lb) =	No. Layers =	3.00
Sample No.:	Comp-B	Compostite No.:				Pluviated:	Tamper Force (lb) =	Drop (in.) =	12.00
Depth (ft):	NA	Specimen No.:	J			Kneading	X Undercompaction:	U _{ni} (%) =	Dia. (in.) =
Spec. Selection by X-ray:		Geomarine Sample					Ref. Effort =	% Comp. =	95.0 ± Opt. =
									+4

Type Consolidation:	X	K _o at:	X	Incremental CRS		Anisotropic at:		Inclined Stress Path, K _{c,DSS}		Used Automated System	
Loading Conditions:	X	Static	X	Strain Stress		Creep Post Cyclic	X	Const. Vol./Ht Drained	X	Without - Water With - Bath	
		Dynamic								Cyclic (Hz) Rate: 0.1; 1; Other:	

Summary of Specimen Physical Properties										
Specific Gravity: G _s = 2.693 Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	LL PL	-200 %	Void Ratio, e
Condition: Initial	18.53	64.24	34.68	16.29	134.1	115.3	96.4	44	73.6	0.457
After to σ' _{v,c}	17.49	60.66	34.68	13.88	139.1	122.2	100.0	15	NA	0.376
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	29	NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate = 4.7 %/hr.				
Vert. Consol. Stress, σ'_{vc}	(ksf)	NA	12.951	NA		Cyclic Rate (Hz):	0.1;	1;	Other =	
Induced OCR:	-	NA	NA	NA		During/End of Loading		Static	Cyclic	
Axial Strain during Consol., $\epsilon_{a,c}$	%	NA	5.58	NA		Change in Height, $\Delta H_{L,n}$ (mm):		NA	NA	
Horiz. Consol. Stress, $\tau_{h,c}$	(ksf)	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³):		NA	NA	
Consol. Stress Ratio, $\tau_{h,c} / \sigma'_{vc}$	-	NA	NA	NA		Post Cy.Displ. Reset to Null Pos.:		Yes;	No	
Shear Strain during Consol., $\epsilon_{h,c}$	%	NA	NA	NA		Number of Loading Cycles, N = NA				
Undr. Ambient Shear Stress, $\tau_{h,ua}$	(ksf)	NA	NA	NA		$\pm \tau_h =$ NA (ksf)		$\pm \gamma =$ NA %		
Undr. Ambient Shear Strain, $\epsilon_{h,ua}$	%	NA	NA	NA		at end of cyclic loading, $\sigma'_{vcy,t} =$ NA (ksf)				

Weight Top Cap, etc., M _{tc} (lb):	1.16	Data Normalization:	X	Yes		No	Value:	12.951 (ksf)
Data corr. for M _{tc} :	X	Yes;		No	Plattens with Pins:	Yes;	X	No
Wire Reinforced Membrane, Model:		Data corr. for Membr. strength	X	Pre-Shear Conditions		Post-Cyclic Conditions		
X Regular Membrane with Rings		Yes	X	No	Maximum Stress during Consol.			

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

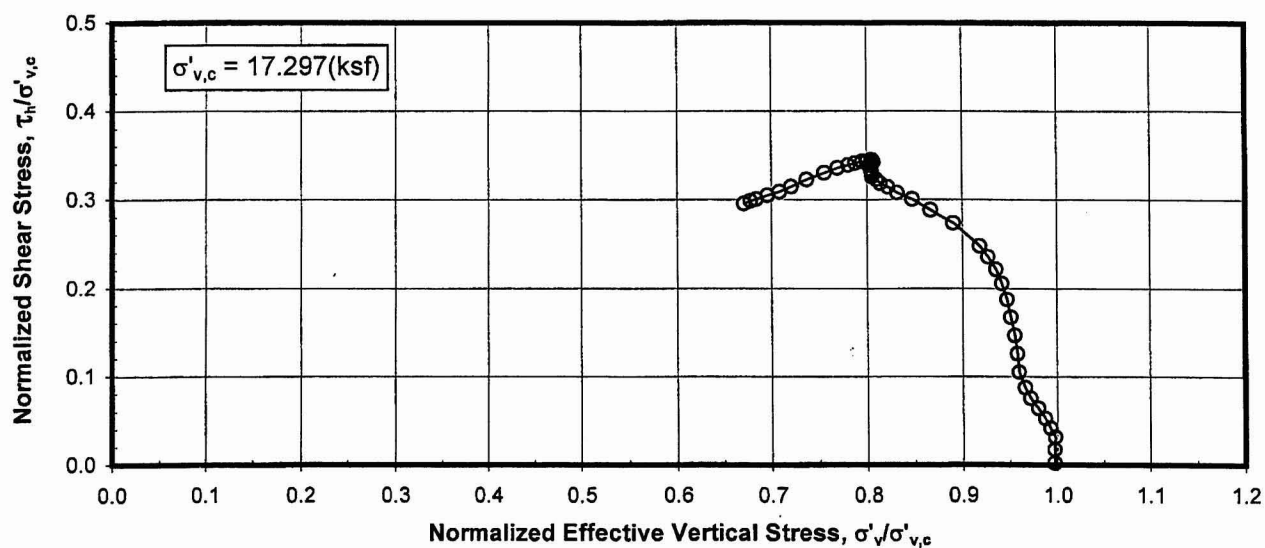
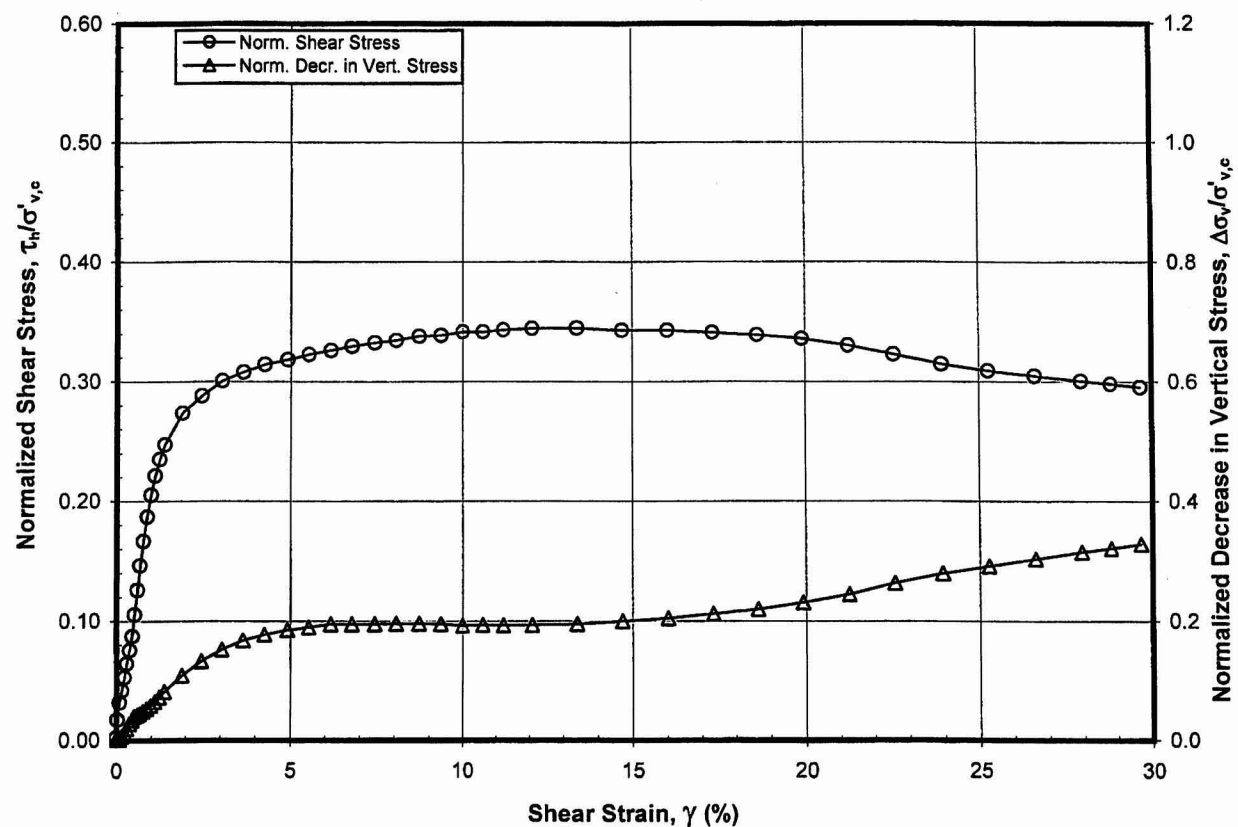
NA - Not Applicable

Final Visual Description and Remarks: Gray Lean CLAY with sand (CL)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v	Δσ' _v /σ' _{v,c}	c _d /σ' _{v,c}
at Peak Shear Stress	3.850	9.16	8.251	0.467	0.363	0.297
at Maximum Strain	3.360	29.51	6.801	0.494	0.475	-

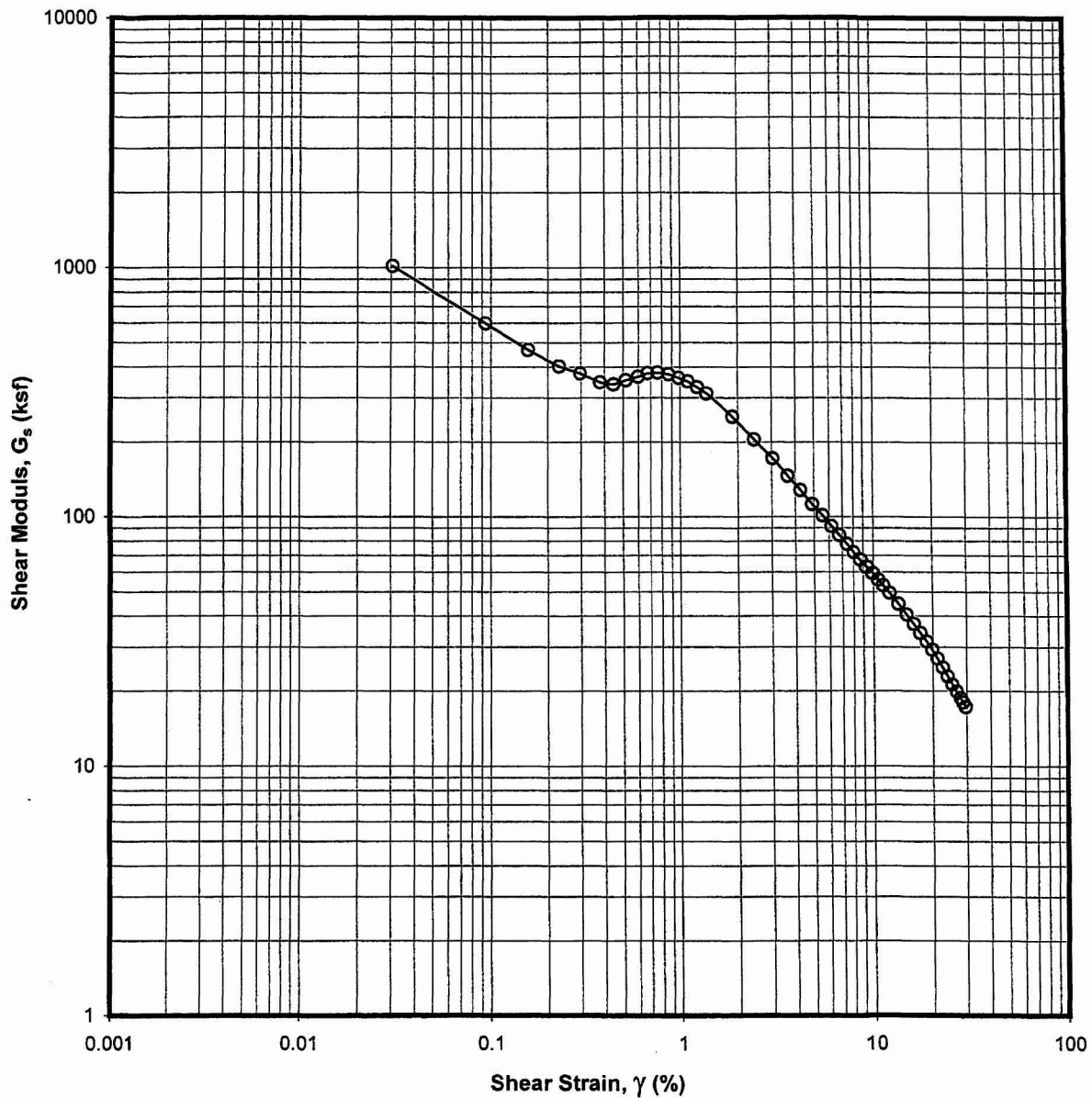
Boring No.: TP2317/TP2334 Sample No.: Comp-BJ

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{DSS} (°)
0.0	0.00	0.004	12.951	0.000	-	-	0.000	1.000	0.000	0.02
2.6	0.03	0.240	12.931	0.020	924.676	729.579	0.019	0.998	0.002	1.06
5.2	0.07	0.485	12.910	0.041	674.379	436.794	0.037	0.997	0.003	2.15
7.9	0.14	0.714	12.879	0.071	511.282	309.663	0.055	0.994	0.006	3.17
10.5	0.22	0.943	12.799	0.152	425.561	267.937	0.073	0.988	0.012	4.22
13.1	0.31	1.170	12.696	0.254	376.944	278.729	0.090	0.980	0.020	5.26
15.7	0.39	1.402	12.592	0.359	361.951	285.437	0.108	0.972	0.028	6.36
18.3	0.48	1.649	12.466	0.485	344.135	273.249	0.127	0.963	0.037	7.54
20.9	0.58	1.919	12.318	0.632	332.880	270.736	0.148	0.951	0.049	8.85
23.6	0.69	2.213	12.174	0.777	321.709	241.558	0.171	0.940	0.060	10.30
26.2	0.82	2.502	11.985	0.966	305.150	197.963	0.193	0.925	0.075	11.79
28.8	0.97	2.762	11.776	1.175	285.617	147.317	0.213	0.909	0.091	13.20
31.4	1.12	2.949	11.547	1.404	262.004	103.896	0.228	0.892	0.108	14.32
34.0	1.28	3.090	11.345	1.606	240.887	85.558	0.239	0.876	0.124	15.24
36.7	1.44	3.221	11.144	1.806	223.051	72.167	0.249	0.861	0.139	16.12
39.3	1.62	3.332	10.934	2.017	205.632	52.362	0.257	0.844	0.156	16.95
41.9	1.82	3.416	10.745	2.206	187.386	36.990	0.264	0.830	0.170	17.64
44.5	2.03	3.485	10.552	2.399	171.249	24.184	0.269	0.815	0.185	18.28
52.3	2.65	3.583	10.041	2.909	135.069	16.460	0.277	0.775	0.225	19.64
60.2	3.28	3.691	9.638	3.313	112.366	10.814	0.285	0.744	0.256	20.95
68.0	3.93	3.720	9.288	3.663	94.631	6.602	0.287	0.717	0.283	21.83
75.9	4.56	3.775	9.040	3.911	82.712	5.001	0.291	0.698	0.302	22.66
83.7	5.24	3.784	8.806	4.145	72.192	2.620	0.292	0.680	0.320	23.26
91.6	5.86	3.808	8.667	4.284	64.907	2.857	0.294	0.669	0.331	23.72
99.4	6.55	3.821	8.531	4.420	58.296	1.310	0.295	0.659	0.341	24.13
107.2	7.17	3.826	8.451	4.499	53.334	1.981	0.295	0.653	0.347	24.36
115.1	7.84	3.847	8.376	4.575	49.025	1.231	0.297	0.647	0.353	24.67
122.9	8.48	3.843	8.308	4.642	45.254	0.175	0.297	0.642	0.358	24.82
130.8	9.16	3.850	8.251	4.700	41.998	-0.487	0.297	0.637	0.363	25.01
138.6	9.82	3.836	8.203	4.748	39.045	-0.609	0.296	0.633	0.367	25.06
146.5	10.45	3.842	8.173	4.778	36.730	-1.243	0.297	0.631	0.369	25.18
154.3	11.12	3.819	8.128	4.822	34.313	-1.020	0.295	0.628	0.372	25.17
162.2	11.74	3.827	8.107	4.844	32.578	-0.923	0.296	0.626	0.374	25.27
170.0	12.42	3.806	8.066	4.885	30.617	-1.427	0.294	0.623	0.377	25.26
180.5	13.25	3.808	8.045	4.906	28.722	-1.389	0.294	0.621	0.379	25.33
196.1	14.54	3.769	7.976	4.975	25.889	-2.646	0.291	0.616	0.384	25.29
211.8	15.83	3.740	7.901	5.050	23.601	-2.941	0.289	0.610	0.390	25.33
227.5	17.14	3.692	7.821	5.129	21.525	-3.221	0.285	0.604	0.396	25.27
243.2	18.46	3.655	7.728	5.223	19.776	-2.419	0.282	0.597	0.403	25.31
258.9	19.79	3.628	7.632	5.319	18.311	-2.857	0.280	0.589	0.411	25.42
274.6	21.12	3.579	7.547	5.404	16.935	-2.836	0.276	0.583	0.417	25.38
290.2	22.45	3.553	7.444	5.506	15.806	-2.271	0.274	0.575	0.425	25.51
305.9	23.77	3.519	7.357	5.593	14.793	-2.301	0.272	0.568	0.432	25.56
321.6	25.09	3.492	7.247	5.703	13.905	-2.489	0.270	0.560	0.440	25.73
337.3	26.40	3.454	7.119	5.832	13.067	-2.850	0.267	0.550	0.450	25.88
353.0	27.72	3.417	6.973	5.978	12.315	-3.763	0.264	0.538	0.462	26.11
363.4	28.63	3.374	6.875	6.075	11.769	-3.138	0.260	0.531	0.469	26.14
373.9	29.51	3.360	6.801	6.150	11.373	-1.541	0.259	0.525	0.475	26.29



STATIC DSS TEST
 K_o Consolidation - OCR = NA
 Sample: Comp-BK - Depth: NA ft
 Boring TP2317/TP2334
 Exelon (Victoria)

KAW 7/16/08



STATIC DSS TEST
 K_0 Consolidation - OCR = NA
 Sample: Comp-BK - Depth: NA ft
 Boring TP2317/TP2334

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 7G File Name: Comp-Bk
 Task No.: NA Assign, $\sigma'_{v,c}$ = 17.28 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA, NA, NA & NA
 Assig. Remarks: _____ Specific Gravity: 2.693 ☒ Meas.; ☐ Assumed

Tube ☐	Field Extruded	Liner ☒	Remolded	Tamping	Constant Effort: Blows/Tamps per Layer = <u>11</u>
Boring No.: <u>TP2317/TP2334</u>		☐	LPC Core	Impact/Rammer	Rammer Wgt.(lbf)= _____ No. Layers = <u>3.00</u>
Sample No.: <u>Comp-B</u>	Composite No.: _____			Pluviated:	Tamper Force (lbf)= <u>4.00</u> Drop (in.) = <u>12.00</u>
Depth (ft): <u>NA</u>	Specimen No.: <u>K</u>			Kneading	☒ Undercompaction: U_{ni} (%) = _____ Dia. (in.) = <u>1.40</u>
Spec. Selection by X-ray;	☐	Geomarine Sample			Ref. Effort= MOD % Comp. = <u>95.0</u> $\pm$ Opt.= <u>+4</u>

Type	X K_o at:	X Incremental	; ☐ Anisotropic at:	Inclined Stress Path, $K_{c,DSS}$	Used Automated System
Consolidation:		CRS		90° Stress Path	Remarks: _____
Loading	X Static	X Strain	☐ Creep	X Const. Vol./Ht	X Without - Water
Conditions:	Rapid	Stress	Post Cyclic	Drained	With - Bath
					Cyclic (Hz) Rate: <u>0.1</u> ; ☐ Strain ☐ Stress

Water Content (WC);	Initial - Trimming Location			Final, W_{at}	Soil and Ring Masses	Initial	Final
	Top ($W_{o,1}$)	Bottom ($W_{o,2}$)	Sides ($W_{o,3}$)	(see below)	Mass Moist Soil + Tare (g)		
Container No.	612			D-11	Mass Tare (g)	325.77	143.97
Mass Moist Soil + Cont. (g)	110.25			62.70	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	186.79	4.78
Mass Dry Soil + Container (g)	99.90			58.39		138.98	139.19
Mass Container (g)	31.82			30.24	Excess Dry Soil (soil not included in final mass above)		
WATER CONTENT (%)	15.20			15.31	Container No.		
Avg. Initial WC, $W_{o,avg}$ (%)	15.20	Final W_{at} :	X Slice ;	Whole Spec.	Mass Dry Soil + Container (g)		
See attached data sheet(s) for additional water contents					Mass Container (g)		
					Mass Excess Dry Soil (g)		0.00

Specimen Trimming:				
☐	Trimming Ring for Fugro Apparatus	NL3	Large-ring ID #	
☒	Trimming Ring for NGI Apparatus		Small-ring ID #	
	$H_{s,t}$ (mm):	18.53	$A_{s,t}$ (cm ²):	34.87
	$D_{s,t}$ (mm):	66.63	$V_{s,t}$ (cm ³):	64.60
Remarks: _____				
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)				
	Height (H_{tr})	Diameter (D_o)	Remarks:	
1	18.540	1-T	NA	
2	18.510	2-M	NA	
3	18.550	3-B	NA	
4	18.540	1'-T	NA	For Free Standing
5	18.530	2'-M	NA	or Reconstituted Spec.:
	Avg.	3'-B	NA	A_{tr} (cm ²): NA
=	18.525	Avg	NA	V_{tr} (cm ³): NA

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft ³)=	134.31
Dry, $\gamma_{d,o}$ (lb/ft ³)=	116.59

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) = _____		
Stress Level	Dia. by PiTape (mm)	Area, $A_{c,n}$		
	Meas.	Corr.	(cm ²)	(in ²)
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒	Regular Membrane with Ring Set No. <u>7</u>		ID, Rings (mm)	
	Thickness (mm): Top: <u>0.60</u>		= <u>67.26</u>	
	Single Bottom: <u>0.65</u>		Corr. for mem.	
☒	Double Membr. Thick. = <u>0.31</u>		= <u>66.630</u>	
	Area Ring with mem., A_o (cm ²)= <u>34.87</u>		; (in ²)= <u>5.405</u>	
	Mass Top Cap, etc., M_{tc} = <u>527.2</u> g,		1.16 lbf	
Data corr. for M_{tc} :	☒ Yes;	☐ No	Plattens with Pins:	☐ Yes; ☒ No

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Final Visual Description: Gray Lean CLAY with sand (CL)

Other Remarks: _____

Trim./ Recon. By: DBN

Setup By: HC

Take Down By: PL

Date: 5/16/2008

Date: 5/16/2008

Date: 5/19/2008

Prelim. Calc. By: HC

Final Calc. By: LF

Reviewed By: HP HP

Specimen Take Down: ☒ Spec. removed right after shearing

Remarks: _____

☐ Spec. unloaded to zero stress with access to water

KAW 6/13/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686

Test Station No.: 7G

File Name: Comp-Bk

Task Number: NA

Specific Gravity: 2.693

☒ Measured; ☐ Assumed

Type Test: SDSS

 Specimen: ☐ "Undisturbed"; ☐ Reconstituted; ☒ Remolded

Boring No.: TP2317/TP2334

 Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm

Sample No.: Comp-BK

Consolidation Stress Summary and Loading Summary

Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate =	NA	(%/hr or)
Nominal Vertical Stress, σ'_v (ksf)	NA	17.28	NA		Cyclic Rate (Hz):	0.1;	1; Other =
Axial/Vertical Force, $P_{v,n}$ (lbf)	NA	NA	NA		During/End of Loading		
Horizontal Force, $P_{h,n}$ (lbf)	NA	0	NA		Change in Height, $\Delta H_{L,n}$ (mm)		
Nominal OCR	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³)		
t_c (ON, days, hrs)	NA	1.76 days	NA		Post Cy. Displ. Reset to Null Position:		
						Yes;	No
Undrained ambient stress applied: with Delta shear force (lbf) = NA & Duration (min) = NA & Delta disp., $\Delta d_{h,ua}$ (mm) = NA							

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):

	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Selct., $W_{o,s}$	Back Cal.
W_o	15.20			15.20	15.20	15.14
S_o	93.2			93.2	93.2	92.9
Measured final mass of moist soil, $M_{t,at}$ (g)						139.19
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)						139.19

Calculated Mass of Dry Soil (g)

Initial Selected Water Content (%)	15.20
Initial, $M_{d,o}$	120.64
Final, $M_{d,at}$	120.71
Selected, M_d	120.68

Initial Back Cal. Specific Gravity (TS):

Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary

Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	17.280	NA	NA
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.880		
Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.880		
ΔV_n using A_o - spec. (cm ³)	3.07		
ΔV_n using $A_{c,n}$ - app. (cm ³)	3.07		
ΔV_n using burette meas. (cm ³)	0.40		
Selected ΔV_n (cm ³)	3.07	NA	NA = ΔV_{uL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{a,c}$ (%)			NA

Lateral Confinement Area Cal. Approach (LCA); Method 1, 2, 3 or 4: 1

Calculation of ΔV_c by Different Procedures

By Selected Volumes		By Change in Mass	
ΔV_c (cm ³)	3.07	$\sim M_{t,o} - (M_{t,at,c} + \Delta V_L + \Delta V_{uL})$	
By Cal. Height & App. Area		ΔV_c (cm ³)	-0.21
ΔV_c (cm ³)	3.07	By Saturation = 100% and Spec. Unloaded to 0 Stress	
By Cal. Ht. & Init. Spec. Area		ΔV_c (cm ³)	NA
ΔV_c (cm ³)	3.07		

Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	13.76
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

Consolidation & Preshear Conclusions	ΔV_c (cm ³) =	3.07	ΔH_c (mm) =	0.880	$\varepsilon_{a,c}$ (%) =	4.75	$\Delta V_{c,max}$ (cm ³) =	NA
	V_c (cm ³) =	61.52	H_c (mm) =	17.645	$\varepsilon_{v,c}$ (%) =	4.76	$\varepsilon_{ac,max}$ (%) =	NA
	A_c (cm ²) =	34.87	$\Delta \gamma_c$ (mm) =	NA	γ_c (%) =	NA	Preshear: γ_{ua} (%) =	NA

Summary of Specimen Physical Properties:

Specific Gravity: $G_s = 2.693$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	18.525	64.60	34.87	15.2	134.3	116.6	93.0	0.442
After to $\sigma'_{v,c}$	17.645	61.52	34.87	13.8	139.3	122.4	100.0	0.373
Consol.: to $\sigma'_{v,max}$	NA	NA	NA	NA	NA	NA	NA	NA

LCA-Method: 1- Initial measured value remains constant.

4 - Based on change in height & volume.

Calculated By: LF

& Note(s) 2 - Initial measured value corrected for applied stress.

NA - Not Applicable

Reviewed By: HP

3 - Uses measured value at appropriate stress level (NA for rings).

Remarks: t95 for max stress = 2.4 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 7G File Name: _Comp-Bk
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☐ Tube	☐ Field Extruded	☐ Liner	☒ Remolded	☐ Tamping	☐ Constant Effort:	Blows/Tamps per Layer = 11
Boring No.: TP2317/TP2334	☐ LPC Core	☐ Impact/Rammer		Rammer Wgt. (lb) =	No. Layers = 3.00	
Sample No.: Comp-B	Composite No.:	☐ Pluviated:		Tamper Force (lb) = 4.00	Drop (in.) = 12.00	
Depth (ft): NA	Specimen No.: K	☐ Kneading		☒ Undercompaction:	U _{nl} (%) =	Dia. (in.) = 1.40
☐ Spec. Selection by X-ray;	☐ Geomarine Sample			Ref. Effort= MOD	% Comp. = 95.0	± Opt. = +4

Type Consolidation:	☒ K _o at:	☒ Incremental CRS	☐ Anisotropic at:	☐ Inclined Stress Path, K _{c,DSS}	☐ Used Automated System	Remarks:
Loading Conditions:	☒ Static	☒ Strain Stress	☐ Creep Post Cyclic	☒ Const. Vol./Ht Drained	☒ Without - Water Bath	☐ Cyclic (Hz) Rate: 0.1; 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity: G _s = 2.693 Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Unit Weight (pcf)	Dry (pcf)	Saturation (%)	LL PL	-200 %	Void Ratio, e
Condition: Initial	18.53	64.60	34.87	15.17	134.3	116.6	93.0	44	73.6	0.442
After to σ' _{v,c}	17.64	61.52	34.87	13.76	139.3	122.4	100.0	15	NA	0.373
Consol.: to σ' _{vc,max}	NA	NA	NA	NA	NA	NA	NA	29	NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate = 4.6 %/hr.				
Vert. Consol. Stress, $\sigma'_{v,c}$	(ksf)	NA	17.297	NA		Cyclic Rate (Hz):		0.1;	1;	Other =
Induced OCR:	-	NA	NA	NA		During/End of Loading			Static	Cyclic
Axial Strain during Consol., $\epsilon_{a,c}$	%	NA	4.75	NA		Change in Height, $\Delta H_{L,n}$ (mm):			NA	NA
Horiz. Consol. Stress, $\tau_{h,c}$	(ksf)	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³):			NA	NA
Consol. Stress Ratio, $\tau_{h,c} / \sigma'_{v,c}$	-	NA	NA	NA		Post Cy.Displ. Reset to Null Pos.:		Yes;		No
Shear Strain during Consol., $\epsilon_{h,c}$	%	NA	NA	NA		Number of Loading Cycles, N = NA				
Undr. Ambient Shear Stress, $\tau_{h,un}$	(ksf)	NA	NA	NA		$\pm \tau_h =$ NA (ksf)		$\pm \gamma =$ NA %		
Undr. Ambient Shear Strain, $\epsilon_{h,un}$	%	NA	NA	NA		at end of cyclic loading, $\sigma'_{vcy,r} =$ NA (ksf)				

Weight Top Cap, etc., M _{tc} (lb): 1.16	Data Normalization: ☒ Yes ☐ No Value: 17.297 (ksf)
Data corr. for M _{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No
Wire Reinforced Membrane, Model:	Data corr. for Membr. strength: ☐ Yes ☒ No
☒ Regular Membrane with Rings	☒ Pre-Shear Conditions ☐ Post-Cyclic Conditions
	Maximum Stress during Consol.

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

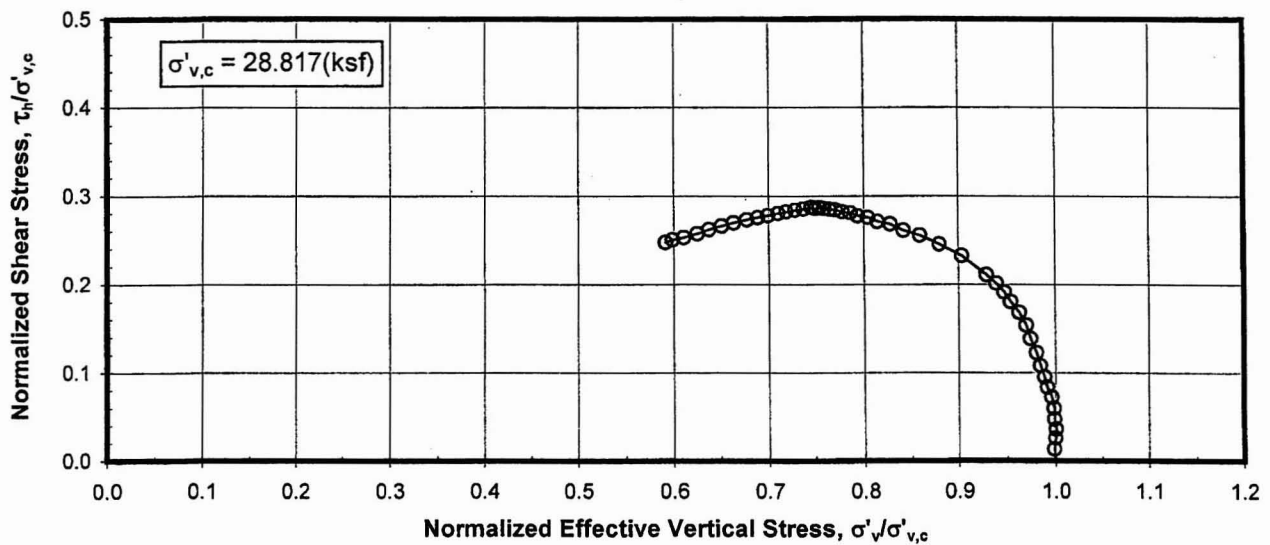
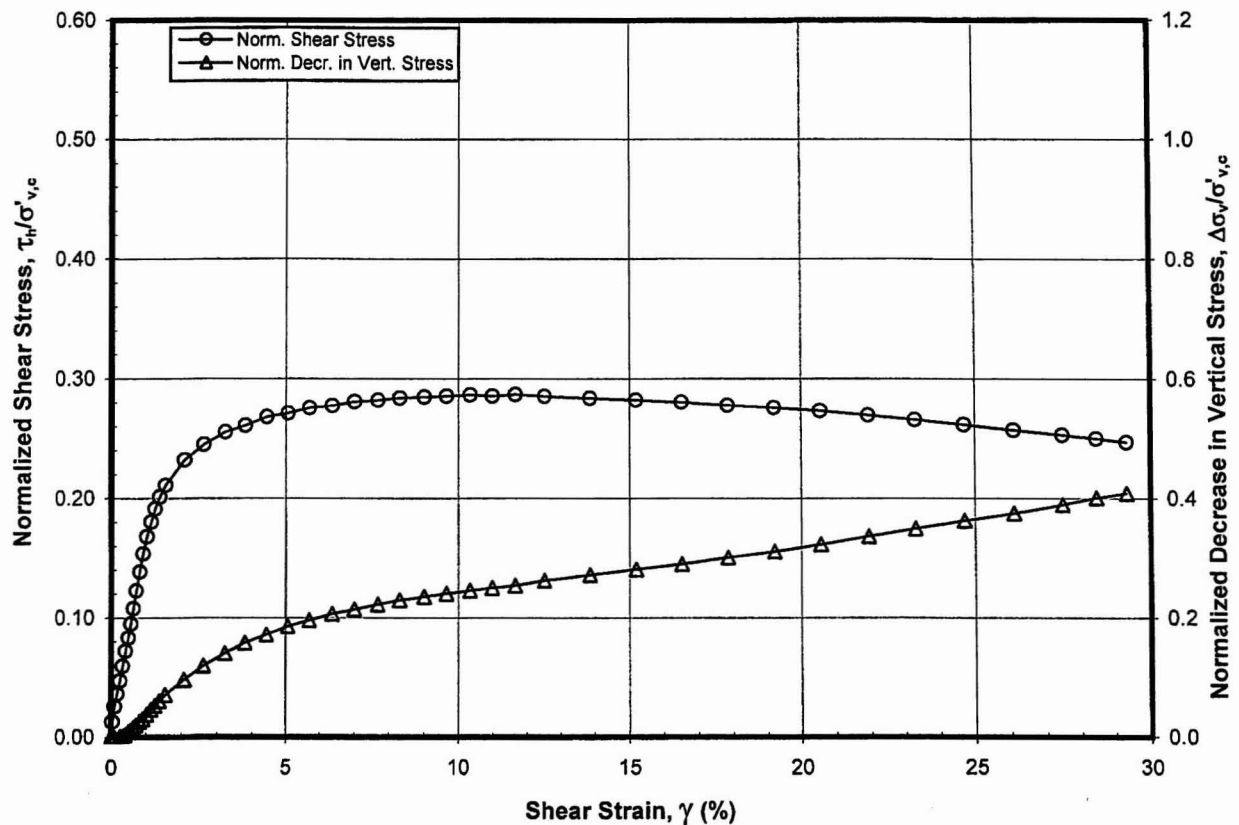
NA - Not Applicable

Final Visual Description and Remarks: Gray Lean CLAY with sand (CL)

Loading Summary						
	τ _h (ksf)	γ (%)	σ' _v (ksf)	τ _h /σ' _v	Δσ' _v /σ' _{v,c}	C _u /σ' _{v,c}
at Peak Shear Stress	5.965	13.41	13.929	0.428	0.195	0.345
at Maximum Strain	5.111	29.67	11.612	0.440	0.329	-

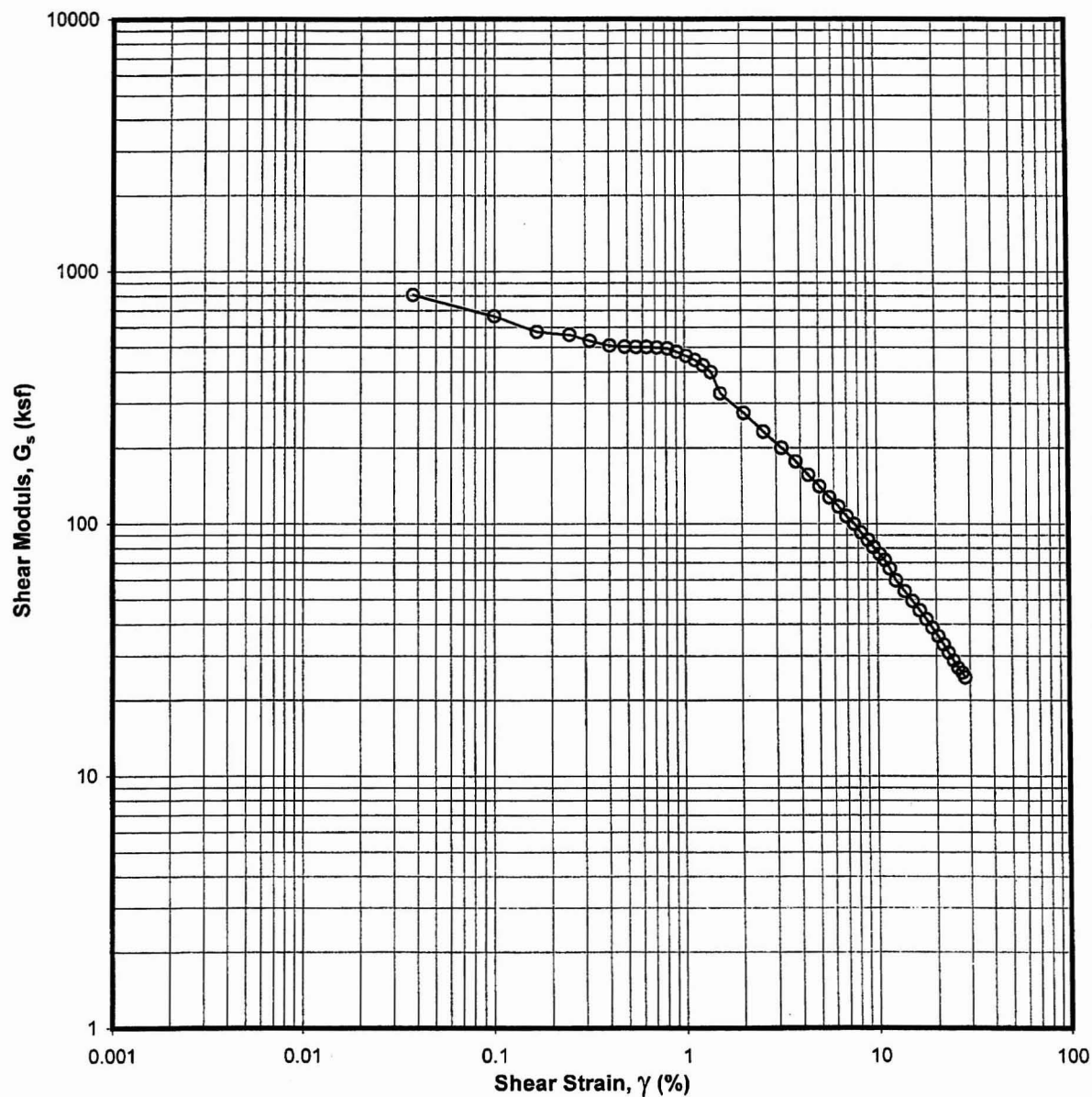
Boring No.: TP2317/TP2334 Sample No.: Comp-BK

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decc. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{DSS} (°)
0.0	0.00	-0.014	17.297	0.000	-	-	-0.001	1.000	0.000	-0.05
2.6	0.00	0.040	17.255	0.043	-	-	0.002	0.998	0.002	0.13
5.2	0.03	0.298	17.253	0.044	1013.837	589.227	0.017	0.997	0.003	0.99
7.8	0.09	0.548	17.265	0.033	598.166	336.872	0.032	0.998	0.002	1.82
10.4	0.16	0.726	17.175	0.123	468.450	267.075	0.042	0.993	0.007	2.42
13.0	0.23	0.911	17.082	0.215	401.739	274.736	0.053	0.988	0.012	3.05
15.6	0.30	1.110	16.953	0.345	377.025	265.085	0.064	0.980	0.020	3.75
18.2	0.38	1.303	16.817	0.481	347.004	269.712	0.075	0.972	0.028	4.43
20.8	0.45	1.508	16.712	0.586	340.261	369.771	0.087	0.966	0.034	5.16
23.4	0.52	1.818	16.602	0.695	353.515	438.627	0.105	0.960	0.040	6.25
25.9	0.60	2.177	16.573	0.724	365.288	453.279	0.126	0.958	0.042	7.48
28.5	0.68	2.531	16.526	0.771	376.645	433.640	0.146	0.955	0.045	8.71
31.1	0.76	2.886	16.456	0.842	379.459	367.313	0.167	0.951	0.049	9.95
33.7	0.87	3.236	16.388	0.909	373.937	300.903	0.187	0.947	0.053	11.17
36.3	0.99	3.550	16.295	1.002	361.396	255.301	0.205	0.942	0.058	12.29
38.9	1.10	3.828	16.187	1.111	349.016	210.904	0.221	0.936	0.064	13.30
41.5	1.23	4.067	16.043	1.255	330.683	163.256	0.235	0.927	0.073	14.22
44.1	1.38	4.278	15.886	1.412	311.565	118.667	0.247	0.918	0.082	15.07
51.9	1.88	4.733	15.413	1.884	252.213	67.268	0.274	0.891	0.109	17.07
59.7	2.45	4.984	15.003	2.294	204.194	40.123	0.288	0.867	0.133	18.38
67.4	3.04	5.197	14.674	2.624	171.316	28.063	0.300	0.848	0.152	19.50
75.2	3.66	5.322	14.405	2.892	145.756	19.151	0.308	0.833	0.167	20.28
83.0	4.27	5.432	14.236	3.062	127.539	14.395	0.314	0.823	0.177	20.89
90.8	4.92	5.502	14.097	3.200	112.100	11.555	0.318	0.815	0.185	21.32
98.6	5.54	5.578	14.024	3.273	101.021	10.698	0.322	0.811	0.189	21.69
106.3	6.17	5.636	13.935	3.363	91.548	9.393	0.326	0.806	0.194	22.02
114.1	6.78	5.695	13.936	3.361	84.221	8.879	0.329	0.806	0.194	22.23
121.9	7.43	5.747	13.929	3.369	77.516	7.042	0.332	0.805	0.195	22.42
129.7	8.06	5.785	13.911	3.386	71.947	7.511	0.334	0.804	0.196	22.58
137.5	8.72	5.844	13.914	3.383	67.215	5.657	0.338	0.804	0.196	22.78
145.2	9.35	5.859	13.921	3.376	62.789	4.950	0.339	0.805	0.195	22.82
153.0	10.00	5.907	13.969	3.329	59.232	3.678	0.342	0.808	0.192	22.92
160.8	10.61	5.906	13.951	3.346	55.780	2.360	0.341	0.807	0.193	22.95
168.6	11.23	5.936	13.960	3.338	53.000	3.805	0.343	0.807	0.193	23.04
178.9	12.10	5.960	13.952	3.346	49.389	1.552	0.345	0.807	0.193	23.13
194.5	13.41	5.965	13.929	3.369	44.588	-1.033	0.345	0.805	0.195	23.18
210.0	14.71	5.933	13.845	3.453	40.431	-1.333	0.343	0.800	0.200	23.20
225.6	16.02	5.931	13.754	3.544	37.102	-1.370	0.343	0.795	0.205	23.33
241.1	17.34	5.897	13.625	3.673	34.097	-2.632	0.341	0.788	0.212	23.40
256.7	18.64	5.862	13.497	3.800	31.528	-3.537	0.339	0.780	0.220	23.47
272.2	19.92	5.806	13.303	3.995	29.219	-5.710	0.336	0.769	0.231	23.58
287.7	21.25	5.712	13.067	4.231	26.945	-8.428	0.330	0.755	0.245	23.61
303.3	22.59	5.581	12.748	4.549	24.765	-10.018	0.323	0.737	0.263	23.64
318.8	23.95	5.441	12.466	4.831	22.776	-8.773	0.315	0.721	0.279	23.58
334.4	25.28	5.345	12.255	5.043	21.202	-6.337	0.309	0.708	0.292	23.56
349.9	26.61	5.273	12.045	5.252	19.870	-5.461	0.305	0.696	0.304	23.64
365.5	27.94	5.199	11.837	5.460	18.658	-5.097	0.301	0.684	0.316	23.71
375.8	28.80	5.159	11.732	5.565	17.961	-5.055	0.298	0.678	0.322	23.74
386.2	29.67	5.111	11.612	5.685	17.273	-5.462	0.295	0.671	0.329	23.76



STATIC DSS TEST
K₀ Consolidation - OCR = NA
Sample: Comp-BL - Depth: NA ft
Boring TP2317/TP2334
Exelon (Victoria)

KAW 7116/08



STATIC DSS TEST
 K_o Consolidation - OCR = NA
 Sample: Comp-BL - Depth: NA ft
 Boring TP2317/TP2334

KAW 7/16/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Setup / Take Down

Project Number: 0411-08-1686 Test Type: SDSS Sta. No.: 5G File Name: Comp-BI
 Task No.: NA Assign. $\sigma'_{v,c}$ = 28.80 ksf $K_{c,DSS} (\tau_{h,c} / \sigma'_{v,c})$ = NA
 Project Name: Exelon (Victoria) Induced OCR = NA $K_{ub,DSS} (\tau_{hu,b} / \sigma'_{v,c})$ = NA
 Test No.: NA Test Series for/on: NA Type Stage: NA = NA, NA, NA & NA
 Assig. Remarks: _____ Specific Gravity: 2.693 ☒ Meas.; ☐ Assumed

☐ Tube	☐ Field Extruded	☐ Liner	☒ Remolded	☒ Tamping	☒ Constant Effort:	Blows/Tamps per Layer = <u>11</u>
Boring No.: <u>TP2317/TP2334</u>		☐ LPC Core		☐ Impact/Rammer	Rammer Wgt.(lb)= _____	No. Layers = <u>3.00</u>
Sample No.: <u>Comp-B</u>		Compostite No.: _____		☐ Pluviated:	Tamper Force (lb)= <u>4.00</u>	Drop (in.) = <u>12.00</u>
Depth (ft): <u>NA</u>		Specimen No.: <u>L</u>		☐ Kneading	☒ Undercompaction: $U_{nl} (%)$ = _____	Dia. (in.) = <u>1.40</u>
☐ Spec. Selection by X-ray;		☐ Geomarine Sample		Ref. Effort= MOD		% Comp. = <u>95.0</u> $\pm$ Opt.= <u>+4</u>

Type Consolidation:	☒ K_o at:	☒ Incremental	☐ Anisotropic at:	☐ Inclined Stress Path, $K_{c,DSS}$	☐ Used Automated System
		CRS		90° Stress Path	Remarks: _____
Loading Conditions:	☒ Static	☒ Strain	☐ Creep	☒ Const. Vol./Ht	☒ Without - Water
	☐ Rapid	☐ Stress	☐ Post Cyclic	☐ Drained	☐ With - Bath
					Cyclic (Hz) Rate: <u>0.1</u> ; ☐ 1; Other: _____

Water Content (WC);	Initial - Trimming Location			Final, W_{at}	Soil and Ring Masses	Initial	Final
	Top ($W_{0,1}$)	Bottom ($W_{0,2}$)	Sides ($W_{0,3}$)	(see below)	Mass Moist Soil + Tare (g)		
Container No.	758			5005	Mass Tare (g)	327.79	145.42
Mass Moist Soil + Cont. (g)	116.99			62.35	Mass Moist Soil, $M_{t,0}$ Mt,at (g)	186.79	4.45
Mass Dry Soil + Container (g)	105.29			58.22		141.00	140.97
Mass Container (g)	31.79			31.43	Excess Dry Soil (soil not included in final mass above)		
WATER CONTENT (%)	15.92			15.42		Container No.	
Avg. Initial WC, $W_{0,avg} (%)$	15.92					Mass Dry Soil + Container (g)	
			Final W_{at} : ☒ Slice ;	Whole Spec.		Mass Container (g)	
See attached data sheet(s) for additional water contents						Mass Excess Dry Soil (g)	0.00

Specimen Trimming:			
☐ Trimming Ring for Fugro Apparatus	NL3	Large-ring ID #	
☒ Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	18.53	$A_{s,t}$ (cm ²):	34.87
$D_{s,t}$ (mm):	66.63	$V_{s,t}$ (cm ³):	64.60
Remarks: _____			
☐ Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height (H_r)	Diameter (D_o)	Remarks:	
1 18.520	1-T NA		
2 18.550	2-M NA		
3 18.540	3-B NA		
4 18.510	1'-T NA	For Free Standing	
5 18.560	2'-M NA	or Reconstituted Spec.:	
Avg.	3'-B NA	A_r (cm ²):	NA
= 18.525	Avg NA	V_r (cm ³):	NA

Note: NA indicates not applicable.

F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Estimated Initial Unit Weight	
Total, $\gamma_{t,0}$ (lb/ft ³)=	136.26
Dry, $\gamma_{d,0}$ (lb/ft ³)=	117.55

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PiTape (mm) Meas.	Corr.	Area, $A_{c,n}$ (cm ²)	(in ²)
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
☒ Regular Membrane with Ring Set No. <u>5</u>	ID, Rings (mm)			
Thickness (mm):	Top: <u>0.63</u>		=	67.28
☐ Single	Bottom: <u>0.67</u>		Corr. for mem.	
☒ Double	Membr. Thick. = <u>0.33</u>		=	66.630
Area Ring with mem., A_o (cm ²)=		<u>34.87</u>	; (in ²)=	5.405
Mass Top Cap, etc., M_{tc} =		528.0 g	1.16	lb
Data corr. for M_{tc} :	☒ Yes;	☐ No	Plattens with Pins:	☐ Yes; ☒ No

Final Visual Description: Gray Lean CLAY with sand (CL)

Other Remarks: _____

Trim./ Recon. By: DBN

Setup By: HC

Take Down By: PL

Date: 5/22/2008

Date: 5/22/2008

Date: 5/27/2008

Prelim. Calc. By: HC

Final Calc. By: LF

Reviewed By: HP

Specimen Take Down: ☒ Spec. removed right after shearing

☐ Spec. unloaded to zero stress with access to water

Remarks: _____

KAW 6/13/08

DIRECT SIMPLE SHEAR TEST (ASTM D 6528-07): Specimen Calculations & Summary

Project Number: 0411-08-1686 Test Station No.: 5G File Name: Comp-BI
 Task Number: NA Specific Gravity: 2.693 ☒ Measured; ☐ Assumed
 Type Test: SDSS Specimen: ☐ "Undisturbed"; ☒ Reconstituted; ☒ Remolded Boring No.: TP2317/TP2334
 Calculations Corr. for Salt (dissolved solids): ☒ No or, ☐ Yes, with concentration = _____ ppm Sample No.: Comp-BL

Consolidation Stress Summary and Loading Summary									
Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	☒	Static Strain Rate = <u>NA</u> (%/hr or)				
Nominal Vertical Stress, σ'_v (ksf)	<u>NA</u>	<u>28.8</u>	<u>NA</u>		Cyclic Rate (Hz):	<u>0.1;</u>	<u>1;</u>	Other =	
Axial/Vertical Force, $P_{v,n}$ (lbf)	<u>NA</u>	<u>NA</u>	<u>NA</u>		During/End of Loading		Static	Cyclic	
Horizontal Force, $P_{h,n}$ (lbf)	<u>NA</u>	<u>0</u>	<u>NA</u>		Change in Height, $\Delta H_{L,n}$ (mm)		<u>NA</u>	<u>NA</u>	
Nominal OCR	<u>NA</u>	<u>NA</u>	<u>NA</u>		Change in Vol., $\Delta V_{L,n}$ (cm ³)		<u>NA</u>	<u>NA</u>	
t_c (ON, days, hrs)	<u>NA</u>	<u>1.69 days</u>	<u>NA</u>		Post Cy. Displ. Reset to Null Position:		<u>Yes;</u>	<u>No</u>	

☐ Undrained ambient stress applied: with Delta shear force (lbf) = NA & Duration (min) = NA & Delta disp., $\Delta d_{h,ua}$ (mm) = NA

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):					
	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Select., $W_{o,s}$
W_o	<u>15.92</u>			<u>15.92</u>	<u>15.92</u>
S_o	<u>100.3</u>			<u>100.3</u>	<u>100.3</u>
Measured final mass of moist soil, $M_{t,at}$ (g)					<u>140.97</u>
Final mass of moist soil corrected for excess dry soil, $M_{t,c}$ (g)					<u>140.97</u>

Calculated Mass of Dry Soil (g)	
Initial Selected Water Content (%)	<u>15.92</u>
Initial, $M_{d,o}$	<u>121.64</u>
Final, $M_{d,at}$	<u>122.14</u>
Selected, M_d	<u>121.89</u>

Initial Back Cal. Specific Gravity (TS):	
Selected S_o (%)	
Selected W_o (%)	
Specific Gravity, $G_{s,bc}$	

Height/Volume Change Summary			
Variation in Height & Volume During Consol.	During Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{vc,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	<u>28.800</u>	<u>NA</u>	<u>NA</u>
Sign Convention: (+) ΔV out & ΔH down; (-) ΔV in & ΔH up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	<u>1.496</u>		
Total Equip. Comp., $\Sigma \Delta d_{afc}$ (mm)	<u>0.000</u>		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	<u>1.496</u>		
ΔV_n using A_o - spec. (cm ³)	<u>5.22</u>		
ΔV_n using $A_{c,n}$ - app. (cm ³)	<u>5.22</u>		
ΔV_n using burette meas. (cm ³)	<u>4.50</u>		
Selected ΔV_n (cm ³)	<u>5.22</u>	<u>NA</u>	<u>NA</u> = ΔV_{uL}
After Test WC Corr. for ΔV during Shear & Unloading, $W_{at,c}$ (%)			<u>NA</u>

Calculation of ΔV_c by Different Procedures			
By Selected Volumes		By Change in Mass	
ΔV_c (cm ³)	<u>5.22</u>	$\sim M_{t,o} - (M_{t,c} + \Delta V_L + \Delta V_{uL})$	
By Cal. Height & App. Area		ΔV_c (cm ³)	<u>0.03</u>
ΔV_c (cm ³)	<u>5.22</u>	By Saturation = 100% and Spec. Unloaded to 0 Stress	
By Cal. Ht. & Init. Spec. Area		ΔV_c (cm ³)	<u>NA</u>
ΔV_c (cm ³)	<u>5.22</u>		

Back Cal. Water Content During Consol. - Based on the Consolidation Conclusions Given Below	
Assumed Saturation (%)	<u>100.00</u>
Back Cal. WC before Loading, $W_{c,bc}$ (%)	<u>11.49</u>
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	<u>NA</u>

Consolidation & Preshear Conclusions	ΔV_c (cm ³) =	<u>5.22</u>	ΔH_c (mm) =	<u>1.496</u>	$\epsilon_{a,c}$ (%) =	<u>8.08</u>	$\Delta V_{c,max}$ (cm ³) =	<u>NA</u>
	V_c (cm ³) =	<u>59.38</u>	H_c (mm) =	<u>17.029</u>	$\epsilon_{v,c}$ (%) =	<u>8.08</u>	$\epsilon_{ac,max}$ (%) =	<u>NA</u>
	A_c (cm ²) =	<u>34.87</u>	$\Delta \gamma_c$ (mm) =	<u>NA</u>	γ_c (%) =	<u>NA</u>	Preshear: γ_{ua} (%) =	<u>NA</u>

Summary of Specimen Physical Properties:								
Specific Gravity: $G_s = 2.693$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	<u>18.525</u>	<u>64.60</u>	<u>34.87</u>	<u>15.7</u>	<u>136.3</u>	<u>117.8</u>	<u>99.4</u>	<u>0.427</u>
After to $\sigma'_{v,c}$	<u>17.029</u>	<u>59.38</u>	<u>34.87</u>	<u>11.5</u>	<u>142.9</u>	<u>128.2</u>	<u>100.0</u>	<u>0.312</u>
Consol.: to $\sigma'_{vc,max}$	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>

LCA-Method: 1 - Initial measured value remains constant. 4 - Based on change in height & volume. Calculated By: LF
 & Note(s) 2 - Initial measured value corrected for applied stress. NA - Not Applicable Reviewed By: HP
 3 - Uses measured value at appropriate stress level (NA for rings).

Remarks: t95 for max stress = 39.3 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 5G File Name: Comp-BI
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

☐ Tube	☐ Field Extruded	☐ Liner	☒ Remolded	☒ Tamping	☒ Constant Effort:	Blows/Tamps per Layer = 11
Boring No.: TP2317/TP2334	☐ LPC Core			Impact/Rammer	Rammer Wgt. (lb) =	No. Layers = 3.00
Sample No.: Comp-B	Compostite No.:			Pluviated:	Tamper Force (lb) = 4.00	Drop (in.) = 12.00
Depth (ft): NA	Specimen No.: L			Kneading	☒ Undercompaction: U_{ni} (%) =	Dia. (in.) = 1.40
Spec. Selection by X-ray:	☐ Geomarine Sample				Ref. Effort= MOD	% Comp. = 95.0 $\pm$ Opt. = +4

Type Consolidation:	☒ K_o at:	☒ Incremental CRS	☐ Anisotropic at:	☐ Inclined Stress Path, $K_{c,ps}$	☐ Used Automated System	Remarks:
Loading Conditions:	☒ Static	☒ Strain Stress	☐ Creep Post Cyclic	☒ Const. Vol./Ht Drained	☒ Without - Water Bath	☐ Cyclic (Hz) Rate: 0.1; ☐ Strain 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity: $G_s = 2.693$ Measured	Height (mm)	Volume (cm ³)	Area (cm ²)	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	LL PL	-200 %	Void Ratio, e
Condition: Initial	18.53	64.60	34.87	15.68	136.3	117.8	99.4	44	73.6	0.427
After to $\sigma'_{v,c}$	17.03	59.38	34.87	11.49	142.9	128.2	100.0	15	NA	0.312
Consol.: to $\sigma'_{vc,max}$	NA	NA	NA	NA	NA	NA	NA	29	NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	X	Static Strain Rate = 4.6 %/hr.				
Vert. Consol. Stress, $\sigma'_{v,c}$	(ksf)	NA	28.817	NA		Cyclic Rate (Hz):		0.1;		1; Other =
Induced OCR:	-	NA	NA	NA		During/End of Loading		Static		Cyclic
Axial Strain during Consol., $\epsilon_{a,c}$	%	NA	8.08	NA		Change in Height, $\Delta H_{L,n}$ (mm):		NA		NA
Horiz. Consol. Stress, $\tau_{h,c}$	(ksf)	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm ³):		NA		NA
Consol. Stress Ratio, $\tau_{h,c} / \sigma'_{v,c}$	-	NA	NA	NA		Post Cy. Displ. Reset to Null Pos.:		Yes;		No
Shear Strain during Consol., $\epsilon_{h,c}$	%	NA	NA	NA		Number of Loading Cycles, N = NA				
Undr. Ambient Shear Stress, $\tau_{h,ub}$	(ksf)	NA	NA	NA		$\pm \tau_h =$ NA (ksf)		$\pm \gamma =$ NA %		
Undr. Ambient Shear Strain, $\epsilon_{h,ub}$	%	NA	NA	NA		at end of cyclic loading, $\sigma'_{vc,y} =$ NA (ksf)				

Weight Top Cap, etc., M_{tc} (lb): 1.16	Data Normalization: ☒ Yes ☐ No Value: 28.817 (ksf)
Data corr. for M_{tc} : ☒ Yes; ☐ No	Plattens with Pins: ☐ Yes; ☒ No
Wire Reinforced Membrane, Model: _____	Data corr. for Membr. strength: ☐ Yes ☒ No
☒ Regular Membrane with Rings	☒ Pre-Shear Conditions ☐ Post-Cyclic Conditions
	Maximum Stress during Consol. ☐

Notes: See Fugro South, Inc. Notation Listing for definition of symbols and acronyms.

F or G in the Test Sta. No. indicates Fugro or GEOTAC apparatus.

NA - Not Applicable

Final Visual Description and Remarks: Gray Lean CLAY with sand (CL)

Loading Summary						
	τ_h (ksf)	γ (%)	σ'_v (ksf)	τ_h / σ'_v	$\Delta \sigma'_v / \sigma'_{v,c}$	$c_u / \sigma'_{v,c}$
at Peak Shear Stress	8.268	11.66	21.499	0.385	0.254	0.287
at Maximum Strain	7.122	29.32	17.055	0.418	0.408	-

Boring No.: TP2317/TP2334 Sample No.: Comp-BL

Elapsed Time (min)	Shear Strain γ (%)	Shear Stress τ_h (ksf)	Effective Vertical Stress σ'_v (ksf)	Calculated Pore Press. Change $\Delta U = \Delta \sigma'_v$ (ksf)	Secant Shear Modulus G_s (ksf)	Tangent Modulus G_T (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decc. in V. Stress $\Delta \sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle ϕ'_{DSS} (°)
0.0	0.00	-0.071	28.817	0.000	-	-	-0.002	1.000	0.000	-0.14
2.7	0.04	0.369	28.781	0.036	1174.632	881.515	0.013	0.999	0.001	0.73
5.4	0.10	0.737	28.821	-0.004	808.259	520.220	0.026	1.000	0.000	1.46
8.0	0.17	1.044	28.846	-0.029	664.292	421.598	0.036	1.001	-0.001	2.07
10.7	0.25	1.360	28.791	0.026	575.418	447.246	0.047	0.999	0.001	2.71
13.4	0.32	1.711	28.782	0.036	559.660	461.011	0.059	0.999	0.001	3.40
16.1	0.41	2.075	28.714	0.104	529.434	409.673	0.072	0.996	0.004	4.13
18.8	0.49	2.399	28.578	0.239	508.001	433.047	0.083	0.992	0.008	4.80
21.5	0.56	2.732	28.496	0.321	502.537	477.327	0.095	0.989	0.011	5.48
24.2	0.63	3.107	28.374	0.443	500.930	492.300	0.108	0.985	0.015	6.25
26.9	0.72	3.532	28.255	0.562	500.269	485.260	0.123	0.980	0.020	7.12
29.5	0.82	3.987	28.082	0.735	497.316	469.557	0.138	0.974	0.026	8.08
32.2	0.91	4.424	27.950	0.867	493.867	415.481	0.154	0.970	0.030	9.00
34.9	1.02	4.841	27.745	1.072	479.786	337.597	0.168	0.963	0.037	9.90
37.6	1.14	5.194	27.490	1.327	462.559	288.328	0.180	0.954	0.046	10.70
40.3	1.25	5.505	27.312	1.505	444.598	246.500	0.191	0.948	0.052	11.40
43.0	1.38	5.795	27.075	1.742	424.066	199.774	0.201	0.940	0.060	12.08
45.6	1.54	6.077	26.781	2.036	398.119	146.126	0.211	0.929	0.071	12.78
53.7	2.07	6.688	26.046	2.771	327.251	93.149	0.232	0.904	0.096	14.40
61.7	2.60	7.059	25.372	3.445	273.907	58.594	0.245	0.880	0.120	15.55
69.8	3.22	7.355	24.772	4.045	230.800	37.800	0.255	0.860	0.140	16.54
77.8	3.80	7.515	24.267	4.550	199.592	30.056	0.261	0.842	0.158	17.21
85.9	4.43	7.721	23.867	4.950	175.844	22.663	0.268	0.828	0.172	17.93
94.0	5.07	7.801	23.472	5.346	155.390	16.486	0.271	0.814	0.186	18.39
102.0	5.71	7.933	23.178	5.639	140.098	14.641	0.275	0.804	0.196	18.89
110.1	6.37	7.992	22.879	5.938	126.563	12.065	0.277	0.794	0.206	19.25
118.1	7.01	8.088	22.654	6.163	116.432	10.457	0.281	0.786	0.214	19.65
126.1	7.68	8.127	22.416	6.401	106.744	7.339	0.282	0.778	0.222	19.93
134.2	8.32	8.184	22.218	6.599	99.261	6.075	0.284	0.771	0.229	20.22
142.2	9.01	8.206	22.038	6.779	91.865	3.081	0.285	0.765	0.235	20.42
150.3	9.65	8.225	21.884	6.933	85.994	3.731	0.285	0.759	0.241	20.60
158.4	10.35	8.257	21.749	7.069	80.497	-0.125	0.287	0.755	0.245	20.79
166.4	10.99	8.226	21.616	7.201	75.497	0.725	0.285	0.750	0.250	20.83
174.5	11.66	8.268	21.499	7.319	71.514	0.194	0.287	0.746	0.254	21.03
185.2	12.52	8.217	21.260	7.558	66.185	-4.652	0.285	0.738	0.262	21.13
201.3	13.86	8.171	20.996	7.821	59.473	-3.474	0.284	0.729	0.271	21.26
217.4	15.19	8.124	20.718	8.099	53.959	-3.757	0.282	0.719	0.281	21.41
233.5	16.52	8.071	20.469	8.348	49.291	-4.762	0.280	0.710	0.290	21.52
249.6	17.85	7.998	20.156	8.661	45.199	-4.919	0.278	0.699	0.301	21.64
265.7	19.20	7.939	19.853	8.964	41.723	-4.852	0.276	0.689	0.311	21.80
281.8	20.56	7.866	19.521	9.296	38.602	-6.586	0.273	0.677	0.323	21.95
297.9	21.93	7.759	19.118	9.699	35.708	-7.826	0.269	0.663	0.337	22.09
314.0	23.30	7.652	18.758	10.059	33.154	-8.005	0.266	0.651	0.349	22.19
330.1	24.70	7.538	18.365	10.452	30.806	-8.755	0.262	0.637	0.363	22.31
346.2	26.09	7.408	18.015	10.802	28.669	-9.044	0.257	0.625	0.375	22.35
362.3	27.47	7.287	17.608	11.209	26.790	-8.492	0.253	0.611	0.389	22.48
373.0	28.43	7.208	17.264	11.554	25.602	-8.960	0.250	0.599	0.401	22.66
383.7	29.32	7.122	17.055	11.763	24.537	-9.674	0.247	0.592	0.408	22.67

Consolidation (Load Controlled) Tests – Composite Soils

Consolidation (Load Controlled) Test Reports for
Composite A and Composite B will be
Included in Rev 1 of this report