

**STATIC DSS TEST**  
K<sub>o</sub> Consolidation - OCR = NA  
Sample: Comp-AH - Depth: NA ft  
Boring TP2319/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.: 9G File Name: Comp-Ah  
 Task No.: NA Assign,  $\sigma'_{v,c}$  = 4.32 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: 2.659  Meas.;  Assumed

<input type="checkbox"/> Tube	<input type="checkbox"/> Field Extruded	<input type="checkbox"/> Liner	<input checked="" type="checkbox"/> Remolded	<input checked="" type="checkbox"/> Tamping	Constant Effort:	Blows/Tamps per Layer = <u>11</u>
Boring No.: <u>TP2319/TP2334</u>				<input type="checkbox"/> Impact/Rammer	Rammer Wgt. (lbf) = _____	No. Layers = <u>3.00</u>
Sample No.: <u>Comp-A</u>		Composite No.: _____		<input type="checkbox"/> Pluviated:	Tamper Force (lbf) = <u>4.00</u>	Drop (in.) = <u>12.00</u>
Depth (ft): <u>NA</u>		Specimen No.: <u>H</u>		<input checked="" type="checkbox"/> Kneading	<input checked="" type="checkbox"/> Undercompaction: $U_{ni}$ (%) = _____	Dia. (in.) = <u>1.40</u>
<input type="checkbox"/> Spec. Selection by X-ray;		<input type="checkbox"/> Geomarine Sample			Ref. Effort = MOD	% Comp. = <u>95.0</u> $\pm$ Opt. = <u>+4</u>

Type Consolidation:	<input checked="" type="checkbox"/> $K_o$ at:	<input checked="" type="checkbox"/> Incremental	<input type="checkbox"/> Anisotropic at:	<input type="checkbox"/> Inclined Stress Path, $K_{c,DSS}$	<input type="checkbox"/> Used Automated System
		<input type="checkbox"/> CRS		<input type="checkbox"/> 90° Stress Path	Remarks:
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain	<input type="checkbox"/> Creep	<input checked="" type="checkbox"/> Const. Vol./Ht	<input checked="" type="checkbox"/> Without - Water
	<input type="checkbox"/> Rapid	<input type="checkbox"/> Stress	<input type="checkbox"/> Post Cyclic	<input type="checkbox"/> Drained	<input type="checkbox"/> With - Bath
					Cyclic (Hz) Rate: <u>0.1</u>
					Strain <input type="checkbox"/> Stress <input type="checkbox"/>
					1; 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.	4045			191	328.12	186.80	147.14	4.85
Mass Moist Soil + Cont. (g)	103.43			66.35	141.32	142.29		
Mass Dry Soil + Container (g)	94.65			61.52	Excess Dry Soil (soil not included in final mass above)			
Mass Container (g)	30.35			30.76	Container No. _____			
WATER CONTENT (%)	13.65			15.70	Mass Dry Soil + Container (g) _____			
Avg. Initial WC, $W_{o,avg}$ (%)	13.65		Final $W_{at}$ : <input checked="" type="checkbox"/> Slice ;	Whole Spec.	Mass Container (g) _____			
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)		0.00	

Specimen Trimming:			
<input type="checkbox"/> Trimming Ring for Fugro Apparatus	NL3	Large-ring ID #	
<input checked="" type="checkbox"/> Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	18.53	$A_{s,t}$ (cm <sup>2</sup> ):	34.87
$D_{s,t}$ (mm):	66.63	$V_{s,t}$ (cm <sup>3</sup> ):	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 18.470	2-M NA		
3 18.550	3-B NA		
4 18.500	1'-T NA	For Free Standing	
5 18.530	2'-M NA	or Reconstituted Spec.:	
Avg.	3'-B NA	$A_{tr}$ (cm <sup>2</sup> ):	NA
= 18.525	Avg NA	$V_{tr}$ (cm <sup>3</sup> ):	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 <sup>3</sup> ) =	136.57
Dry, $\gamma_{d,o}$ (lb/ft <sup>3</sup> ) =	120.16

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PiTape (mm) Meas. Corr.	Area, $A_{c,n}$ (cm <sup>2</sup> ) (in <sup>2</sup> )		
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
<input checked="" type="checkbox"/> Regular Membrane with Ring Set No. <u>9</u>	ID, Rings (mm)			
Thickness (mm):	Top: <u>0.70</u>	= <u>67.34</u>		
<input type="checkbox"/> Single	Bottom: <u>0.72</u>	Corr. for mem.		
<input checked="" type="checkbox"/> Double Membr. Thick. = <u>0.36</u>		= <u>66.630</u>		
Area Ring with mem., $A_o$ (cm <sup>2</sup> ) =	<u>34.87</u>	; (in <sup>2</sup> ) = <u>5.405</u>		
Mass Top Cap, etc., $M_{tc}$ =	<u>528.7</u> g,	<u>1.17</u> lbf		
Data corr. for $M_{tc}$ : <input checked="" type="checkbox"/> Yes;	<input type="checkbox"/> No	Plattens with Pins: <input type="checkbox"/> Yes;	<input checked="" type="checkbox"/> No	

Final Visual Description: Light Brown Clayey SAND (SC)

Other Remarks: \_\_\_\_\_

Trim./Recon. By: DBN

Setup By: HC

Take Down By: HC

Date: 5/2/2008

Date: 5/2/2008

Date: 5/5/2008

Prelim. Calc. By: LF

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.: 9G File Name: Comp-Ah  
 Task Number: NA Specific Gravity: 2.659  Measured;  Assumed  
 Type Test: SDSS Specimen:  "Undisturbed";  Reconstituted;  Remolded Boring No.: TP2319/TP2334  
 Calculations Corr. for Salt (dissolved solids):  No or,  Yes, with concentration = \_\_\_\_\_ ppm Sample No.: Comp-AH

Consolidation Stress Summary and Loading Summary							
Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	<input checked="" type="checkbox"/>	Static Strain Rate =	NA (%/hr or )	
Nominal Vertical Stress, $\sigma'_v$ (ksf)	NA	4.32	NA	<input checked="" type="checkbox"/>	Cyclic Rate (Hz):	0.1; 1; Other =	
Axial/Vertical Force, $P_{v,r,n}$ (lbf)	NA	NA	NA	During/End of Loading		Static	Cyclic
Horizontal Force, $P_{h,r,n}$ (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 <sup>3</sup> )		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) = <u>NA</u> & Duration (min) = <u>NA</u> & Delta disp., $\Delta d_{h,ua}$ (mm) = <u>NA</u>							

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.
$W_o$ 13.65			13.65	13.65	14.91
$S_o$ 95.8			95.8	95.8	100.6
Measured final mass of moist soil, $M_{t,at}$ (g)					142.29
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)					142.29

Calculated Mass of Dry Soil (g)	
Initial Selected Water Content (%)	13.65
Initial, $M_{d,o}$	124.34
Final, $M_{d,at}$	122.98
Selected, $M_d$	123.66

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 $\sigma'_{v,c,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	4.320	NA	NA
Sign Convention: (+) $\Delta V$ out & $\Delta H$ down; (-) $\Delta V$ in & $\Delta H$ up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.570		
Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.570		
$\Delta V_n$ using $A_o$ - spec. (cm <sup>3</sup> )	1.99		
$\Delta V_n$ using $A_{c,n}$ - app. (cm <sup>3</sup> )	1.99		
$\Delta V_n$ using burette meas. (cm <sup>3</sup> )	0.20		
Selected $\Delta V_n$ (cm <sup>3</sup> )	1.99	NA	NA = $\Delta V_{uL}$
After Test WC Corr. for $\Delta V$ during Shear & Unloading, $W_{at,c}$ (%)			NA

Calculation of $\Delta V_c$ by Different Procedures			
By Selected Volumes		By Change in Mass	
$\Delta V_c$ (cm <sup>3</sup> )	1.99	$\sim M_{t,o} - (M_{t,at,c} + \Delta V_L + \Delta V_{uL})$	
By Cal. Height & App. Area		$\Delta V_c$ (cm <sup>3</sup> )	-0.97
$\Delta V_c$ (cm <sup>3</sup> )	1.99	By Saturation = 100% and Spec. Unloaded to 0 Stress	
By Cal. Ht. & Init. Spec. Area		$\Delta V_c$ (cm <sup>3</sup> )	NA
$\Delta V_c$ (cm <sup>3</sup> )	1.99		

Back Cal. Water Content During Consol. - Based on the Consolidation Conclusions Given Below	
Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	12.93
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

<b>Consolidation &amp; Preshear</b>	$\Delta V_c$ (cm <sup>3</sup> ) = 1.99	$\Delta H_c$ (mm) = 0.570	$\epsilon_{a,c}$ (%) = 3.08	$\Delta V_{c,max}$ (cm <sup>3</sup> ) = NA
<b>Conclusions</b>	$V_c$ (cm <sup>3</sup> ) = 62.61	$H_c$ (mm) = 17.955	$\epsilon_{v,c}$ (%) = 3.08	$\epsilon_{ac,max}$ (%) = NA
	$A_c$ (cm <sup>2</sup> ) = 34.87	$\Delta \gamma_c$ (mm) = NA	$\gamma_c$ (%) = NA	Preshear: $\gamma_{ua}$ (%) = NA

Summary of Specimen Physical Properties:								
Specific Gravity: $G_s = 2.659$ Measured	Height (mm)	Volume (cm <sup>3</sup> )	Area (cm <sup>2</sup> )	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition: Initial (as trimmed)	18.525	64.60	34.87	14.3	136.6	119.5	98.2	0.389
After Consol.: to $\sigma'_{v,c}$	17.955	62.61	34.87	12.9	139.3	123.3	100.0	0.346
to $\sigma'_{v,c,max}$	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 HP  
 3 - Uses measured value at appropriate stress level (NA for rings).  
 Remarks: t95 for max stress = 1.3 min

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

<input type="checkbox"/> Tube	<input type="checkbox"/> Field Extruded	<input type="checkbox"/> Liner	<input checked="" type="checkbox"/> Remolded	<input checked="" type="checkbox"/> Tamping	Constant Effort:	Blows/Tamps per Layer = <u>11</u>
Boring No.: <u>TP2319/TP2334</u>	<input type="checkbox"/> LPC Core			Impact/Rammer	Rammer Wgt.(lbf)=	No. Layers = <u>3.00</u>
Sample No.: <u>Comp-A</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>H</u>			Kneading	<input checked="" type="checkbox"/> Undercompaction: $U_{ni}$ (%) =	Dia. (in.) = <u>1.40</u>
<input type="checkbox"/> Spec. Selection by X-ray;	<input type="checkbox"/> Geomarine Sample				Ref. Effort= MOD	% Comp. = <u>95.0</u> ± Opt.= <u>+4</u>

Type Consolidation:	<input checked="" type="checkbox"/> $K_o$ at:	<input type="checkbox"/> Incremental CRS	<input type="checkbox"/> Anisotropic at:	<input type="checkbox"/> Inclined Stress Path, $K_{c,DSS}$	<input type="checkbox"/> Used Automated System	Remarks:
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain Stress	<input type="checkbox"/> Creep Post Cyclic	<input checked="" type="checkbox"/> Const. Vol./Ht Drained	<input checked="" type="checkbox"/> Without - Water With - Bath	<input type="checkbox"/> Cyclic (Hz) Rate: <u>0.1</u> ;
	<input type="checkbox"/> Dynamic					Strain <u>1</u> ; Other:

Summary of Specimen Physical Properties											
Specific Gravity: $G_s = 2.659$ Measured	Height (mm)	Volume (cm <sup>3</sup> )	Area (cm <sup>2</sup> )	Water Content (%)	Unit Weight (pcf)		Saturation (%)	LL	PL	-200 %	Void Ratio, e
Condition:					Total	Dry		PI			
Initial	18.53	64.60	34.87	14.28	136.6	119.5	98.2	34		46.4	0.389
After to $\sigma'_{v,c}$	17.96	62.61	34.87	12.93	139.3	123.3	100.0	12		NA	0.346
Consol.: to $\sigma'_{vc,max}$	NA	NA	NA	NA	NA	NA	NA	22		NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	<input checked="" type="checkbox"/> Static Strain Rate = <u>4.8</u> %/hr.					
Vert. Consol. Stress, $\sigma'_{vc}$	(ksf)	NA	4.397	NA	Cyclic Rate (Hz):	<u>0.1</u> ;	<u>1</u> ;	Other =		
Induced OCR:	-	NA	NA	NA	During/End of Loading		Static	Cyclic		
Axial Strain during Consol., $\epsilon_{a,c}$	%	NA	3.08	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 <sup>3</sup> ):		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 = <u>NA</u>					
Undr. Ambient Shear Stress, $\tau_{h,ua}$	(ksf)	NA	NA	NA	$\pm \tau_h =$ <u>NA</u> (ksf)		$\pm \gamma =$ <u>NA</u> %			
Undr. Ambient Shear Strain, $\epsilon_{h,ua}$	%	NA	NA	NA	at end of cyclic loading, $\sigma'_{vcy,r} =$ <u>NA</u> (ksf)					

Weight Top Cap, etc., $M_{tc}$ (lbf): <u>1.17</u>	Data Normalization: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Value: <u>4.397</u> (ksf)
Data corr. for $M_{tc}$ : <input checked="" type="checkbox"/> Yes; <input type="checkbox"/> No	Plattens with Pins: <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No	Using Effective Vertical Stress:
<input type="checkbox"/> Wire Reinforced Membrane, Model: _____	Data corr. for Membr. strength: <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Pre-Shear Conditions <input type="checkbox"/> Post-Cyclic Conditions
<input checked="" type="checkbox"/> Regular Membrane with Rings		<input type="checkbox"/> 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.

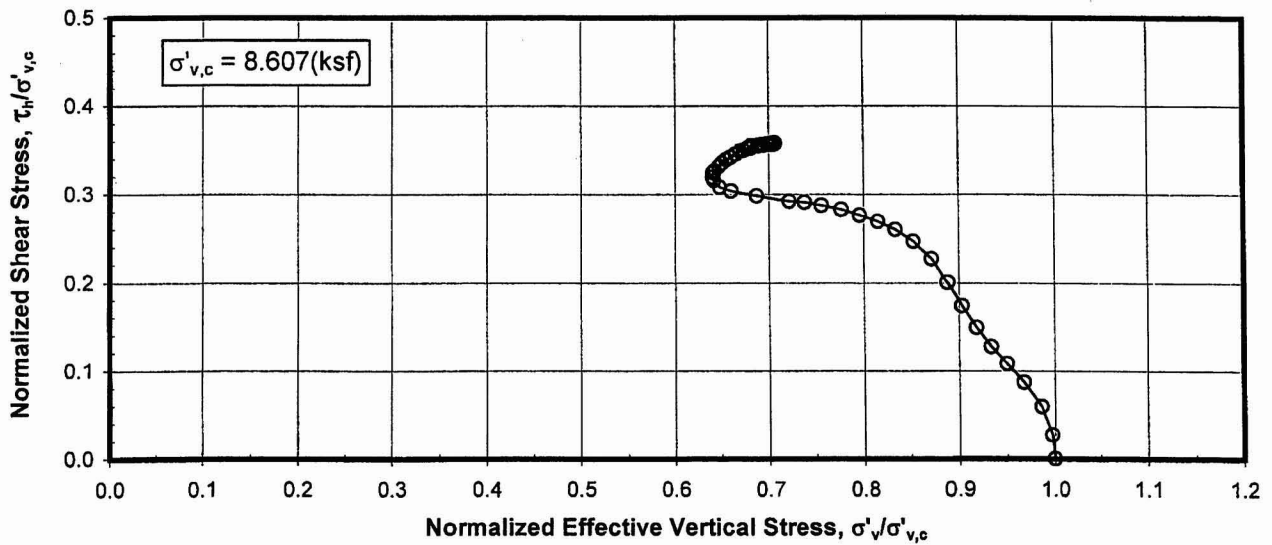
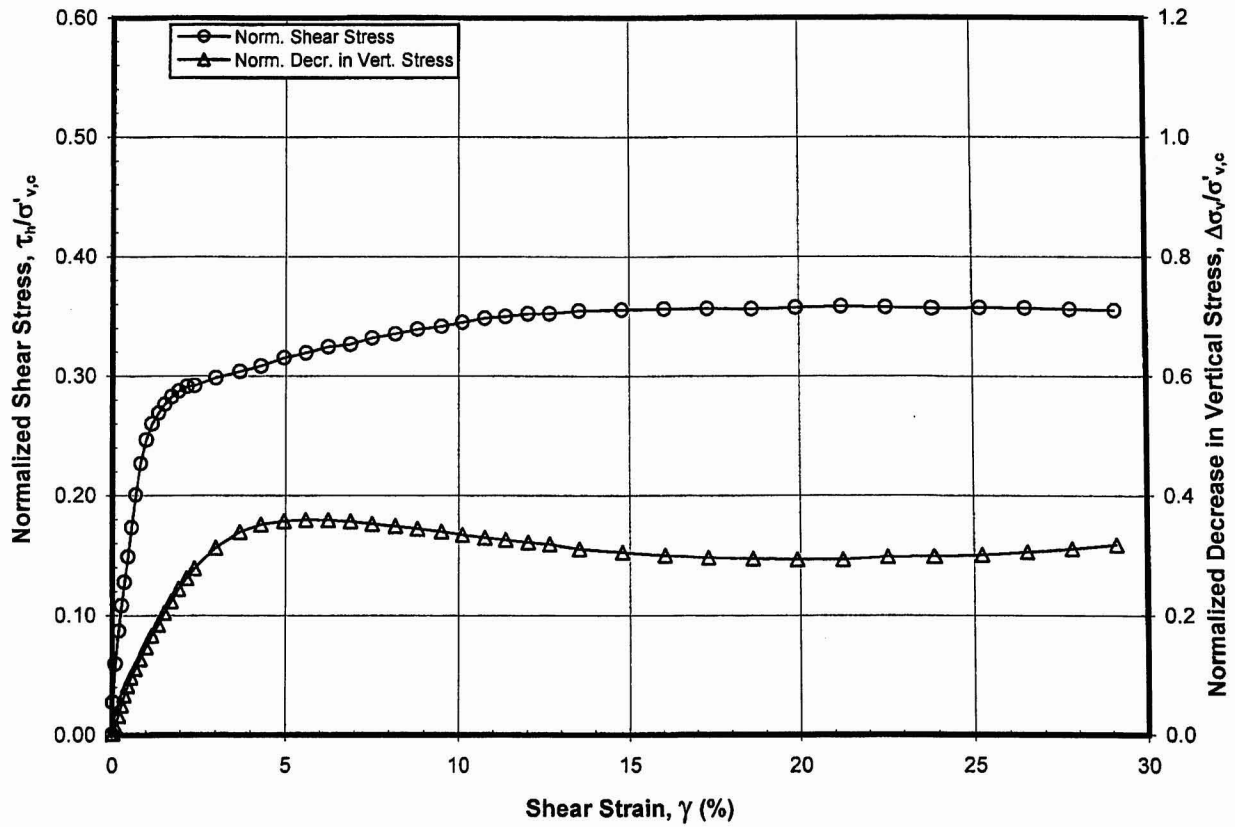
NA - Not Applicable

Final Visual Description and Remarks: Light Brown Clayey SAND (SC)

Loading Summary						
	$\tau_h$ (ksf)	$\gamma$ (%)	$\sigma'_v$ (ksf)	$\tau_h / \sigma'_v$	$\Delta \sigma'_v / \sigma'_{v,c}$	$c_u / \sigma'_{v,c}$
at Peak Shear Stress	2.005	29.30	3.413	0.588	0.224	0.456
at Maximum Strain	2.005	29.30	3.413	0.588	0.224	-

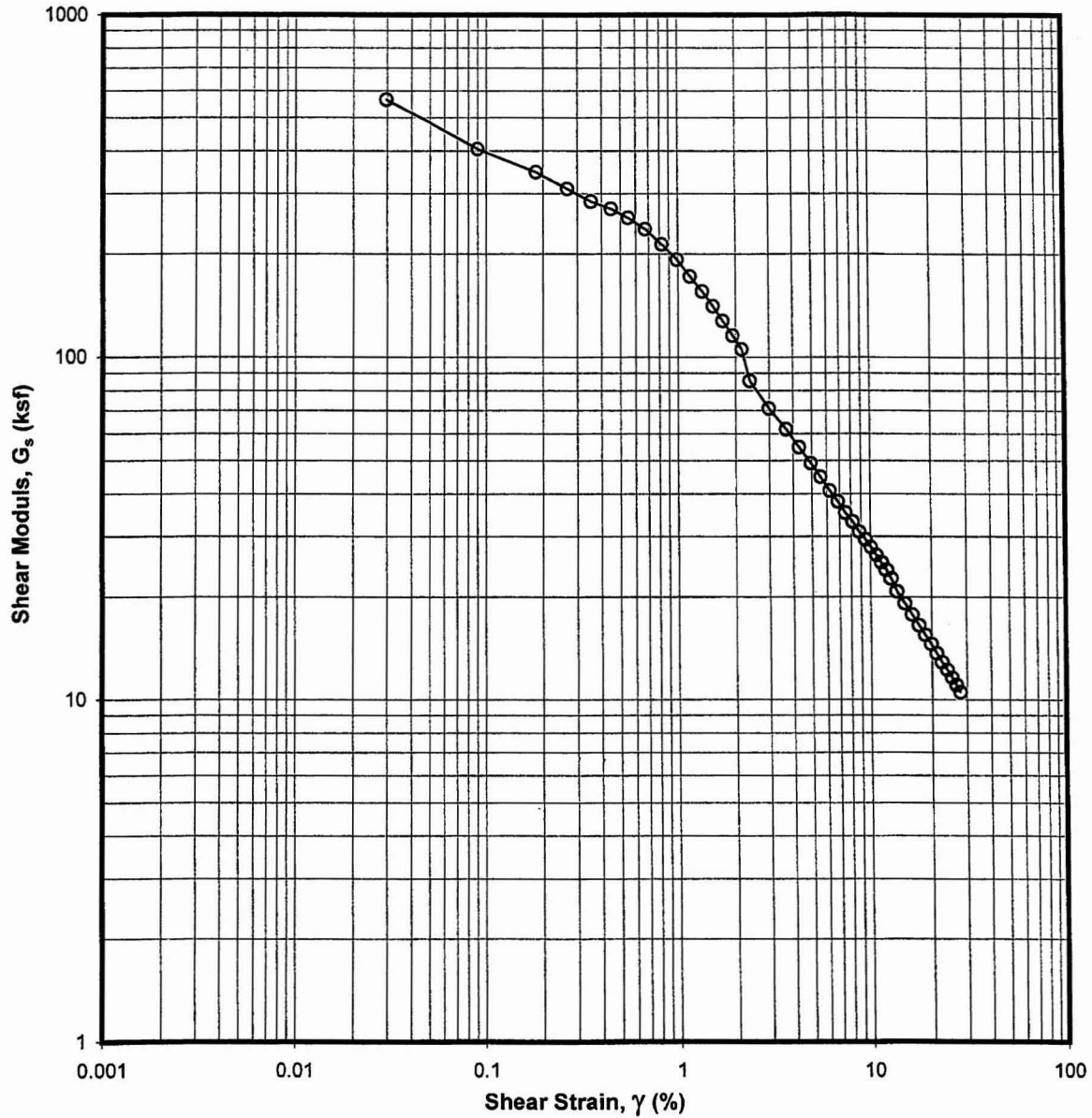
Boring No.: TP2319/TP2334 Sample No.: Comp-AH

Elapsed Time (min)	Shear Strain $\gamma$ (%)	Shear Stress $\tau_h$ (ksf)	Effective Vertical Stress $\sigma'_v$ (ksf)	Calculated Pore Press. Change $\Delta U = \Delta\sigma'_{v,c}$ (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 $\phi'_{bss}$ (°)
0.0	0.00	-0.004	4.397	0.000	-	-	-0.001	1.000	0.000	-0.05
2.5	0.05	0.222	4.316	0.081	427.528	344.541	0.051	0.982	0.018	2.95
5.1	0.12	0.391	4.244	0.152	336.308	229.136	0.089	0.965	0.035	5.26
7.7	0.19	0.535	4.148	0.248	282.731	176.819	0.122	0.943	0.057	7.35
10.2	0.28	0.679	4.094	0.303	241.818	164.807	0.154	0.931	0.069	9.42
12.8	0.38	0.850	3.961	0.436	223.828	141.426	0.193	0.901	0.099	12.11
15.3	0.52	1.003	3.793	0.604	193.473	72.567	0.228	0.863	0.137	14.82
17.9	0.69	1.062	3.521	0.876	154.918	18.707	0.242	0.801	0.199	16.78
20.4	0.89	1.067	3.228	1.169	119.792	4.524	0.243	0.734	0.266	18.29
23.0	1.10	1.081	2.975	1.422	98.591	7.570	0.246	0.677	0.323	19.96
25.6	1.32	1.099	2.813	1.584	83.594	9.126	0.250	0.640	0.360	21.35
28.1	1.53	1.120	2.676	1.721	73.271	8.284	0.255	0.609	0.391	22.71
30.6	1.75	1.135	2.581	1.816	65.149	5.416	0.258	0.587	0.413	23.74
33.2	1.95	1.143	2.524	1.873	58.824	3.829	0.260	0.574	0.426	24.36
35.8	2.15	1.150	2.457	1.940	53.755	4.489	0.262	0.559	0.441	25.09
38.3	2.35	1.161	2.384	2.013	49.623	3.970	0.264	0.542	0.458	25.96
40.9	2.57	1.167	2.345	2.052	45.461	1.337	0.265	0.533	0.467	26.46
43.4	2.80	1.167	2.283	2.114	41.846	1.154	0.265	0.519	0.481	27.07
51.1	3.40	1.181	2.185	2.212	34.793	2.528	0.268	0.497	0.503	28.39
58.7	4.05	1.199	2.047	2.350	29.650	2.721	0.273	0.465	0.535	30.36
66.4	4.71	1.216	2.079	2.318	25.915	4.130	0.277	0.473	0.527	30.32
74.0	5.34	1.252	2.093	2.304	23.498	5.053	0.285	0.476	0.524	30.88
81.7	5.99	1.281	2.132	2.265	21.434	5.583	0.291	0.485	0.515	31.00
89.3	6.58	1.320	2.185	2.212	20.122	5.951	0.300	0.497	0.503	31.13
97.0	7.21	1.353	2.200	2.197	18.817	5.655	0.308	0.500	0.500	31.59
104.6	7.80	1.389	2.273	2.124	17.845	5.805	0.316	0.517	0.483	31.43
112.3	8.47	1.426	2.302	2.095	16.877	5.949	0.324	0.524	0.476	31.78
119.9	9.09	1.465	2.369	2.028	16.164	5.814	0.333	0.539	0.461	31.73
127.6	9.75	1.500	2.400	1.997	15.423	5.737	0.341	0.546	0.454	32.00
135.2	10.37	1.539	2.463	1.934	14.869	6.559	0.350	0.560	0.440	32.00
142.9	10.99	1.581	2.522	1.875	14.423	6.464	0.360	0.574	0.426	32.08
150.5	11.59	1.618	2.581	1.816	13.986	6.356	0.368	0.587	0.413	32.08
158.2	12.18	1.657	2.661	1.736	13.633	5.523	0.377	0.605	0.395	31.91
165.9	12.80	1.684	2.687	1.710	13.186	5.223	0.383	0.611	0.389	32.07
176.0	13.63	1.735	2.713	1.684	12.753	5.436	0.394	0.617	0.383	32.59
191.3	14.87	1.794	2.868	1.528	12.090	4.714	0.408	0.652	0.348	32.02
206.6	16.12	1.852	2.989	1.408	11.512	4.206	0.421	0.680	0.320	31.78
221.9	17.38	1.899	3.092	1.305	10.951	2.846	0.432	0.703	0.297	31.56
237.2	18.62	1.923	3.182	1.215	10.349	0.318	0.437	0.724	0.276	31.15
252.5	19.93	1.906	3.222	1.175	9.581	-1.475	0.434	0.733	0.267	30.61
267.8	21.29	1.884	3.296	1.101	8.866	-0.257	0.428	0.750	0.250	29.75
283.1	22.55	1.898	3.320	1.077	8.432	1.891	0.432	0.755	0.245	29.76
298.4	23.80	1.931	3.331	1.066	8.128	2.124	0.439	0.758	0.242	30.10
313.6	25.07	1.952	3.360	1.037	7.800	1.802	0.444	0.764	0.236	30.15
329.0	26.32	1.977	3.365	1.032	7.522	1.517	0.450	0.765	0.235	30.43
344.2	27.59	1.990	3.379	1.017	7.225	0.703	0.453	0.769	0.231	30.49
354.4	28.45	1.993	3.394	1.003	7.016	0.922	0.453	0.772	0.228	30.42
364.6	29.30	2.005	3.413	0.984	6.856	1.480	0.456	0.776	0.224	30.44



**STATIC DSS TEST**  
 $K_0$  Consolidation - OCR = NA  
 Sample: Comp-AI - Depth: NA ft  
 Boring TP2319/TP2334  
 Exelon (Victoria)

KAW 7/16/08



**STATIC DSS TEST**  
K<sub>0</sub> Consolidation - OCR = NA  
Sample: Comp-A1 - Depth: NA ft  
Boring TP2319/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-Ai  
 Task No.: NA      Assign,  $\sigma'_{v,c}$  = 8.64 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: 2.659       Meas.;       Assumed

<input type="checkbox"/> Tube	<input type="checkbox"/> Field Extruded	<input type="checkbox"/> Liner	<input checked="" type="checkbox"/> Remolded	<input checked="" type="checkbox"/> Tamping	Constant Effort:	Blows/Tamps per Layer = <u>11</u>
Boring No.: <u>TP2319/TP2334</u>	<input type="checkbox"/> LPC Core			Impact/Rammer	Rammer Wgt. (lbf) = _____	No. Layers = <u>3.00</u>
Sample No.: <u>Comp-A</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>I</u>			Kneading	<input checked="" type="checkbox"/> Undercompaction: $U_{nl}$ (%) = _____	Dia. (in.) = <u>1.40</u>
<input type="checkbox"/> Spec. Selection by X-ray;	<input type="checkbox"/> Geomarine Sample				Ref. Effort = MOD	% Comp. = <u>95.0</u> ± Opt. = <u>+4</u>

Type Consolidation:	<input checked="" type="checkbox"/> $K_o$ at:	<input checked="" type="checkbox"/> Incremental CRS	<input type="checkbox"/> Anisotropic at:	Inclined Stress Path, $K_{c,DSS}$ 90° Stress Path	<input type="checkbox"/> Used Automated System	Remarks: _____
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain	<input type="checkbox"/> Creep	<input checked="" type="checkbox"/> Const. Vol./Ht	<input checked="" type="checkbox"/> Without - Water	<input type="checkbox"/> Cyclic (Hz)
	<input type="checkbox"/> Rapid	<input type="checkbox"/> Stress	<input type="checkbox"/> Post Cyclic	<input type="checkbox"/> Drained	<input type="checkbox"/> With - Bath	Rate: <input type="checkbox"/> 0.1; <input type="checkbox"/> 1; 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.	<u>1144</u>			<u>848</u>	<u>328.11</u>	<u>186.79</u>	<u>141.32</u>	<u>146.40</u>
Mass Moist Soil + Cont. (g)	<u>106.03</u>			<u>75.11</u>	<u>141.32</u>	<u>4.35</u>	<u>142.05</u>	
Mass Dry Soil + Container (g)	<u>96.99</u>			<u>69.56</u>	Excess Dry Soil (soil not included in final mass above)			
Mass Container (g)	<u>32.41</u>			<u>32.13</u>	Container No. _____			
WATER CONTENT (%)	<u>14.00</u>			<u>14.83</u>	Mass Dry Soil + Container (g)			
Avg. Initial WC, $W_{o,avg}$ (%)	<u>14.00</u>				Mass Container (g)			
			Final $W_{at}$ : <input checked="" type="checkbox"/> Slice ;	Whole Spec.	Mass Excess Dry Soil (g)			<u>0.00</u>

See attached data sheet(s) for additional water contents

Specimen Trimming:			
<input type="checkbox"/> Trimming Ring for Fugro Apparatus	NL3	Large-ring ID #	
<input checked="" type="checkbox"/> Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	<u>18.53</u>	$A_{s,t}$ (cm <sup>2</sup> ):	<u>34.87</u>
$D_{s,t}$ (mm):	<u>66.63</u>	$V_{s,t}$ (cm <sup>3</sup> ):	<u>64.60</u>
Remarks: _____			
<input type="checkbox"/> Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height ( $H_{tr}$ )	Diameter ( $D_o$ )	Remarks:	
<u>1</u> <u>18.540</u>	<u>1-T</u> <u>NA</u>		
<u>2</u> <u>18.500</u>	<u>2-M</u> <u>NA</u>		
<u>3</u> <u>18.530</u>	<u>3-B</u> <u>NA</u>		
<u>4</u> <u>18.530</u>	<u>1'-T</u> <u>NA</u>	For Free Standing or Reconstituted Spec.:	
<u>5</u> <u>18.510</u>	<u>2'-M</u> <u>NA</u>		
Avg.	<u>3-B</u> <u>NA</u>	$A_{tr}$ (cm <sup>2</sup> ):	<u>NA</u>
<u>=</u> <u>18.525</u>	Avg	$V_{tr}$ (cm <sup>3</sup> ):	<u>NA</u>

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft <sup>3</sup> ) =	<u>136.57</u>
Dry, $\gamma_{d,o}$ (lb/ft <sup>3</sup> ) =	<u>119.80</u>

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PiTape (mm) Meas.	Corr.	Area, $A_{c,n}$ (cm <sup>2</sup> )	(in <sup>2</sup> )
<u>0</u>				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
<input checked="" type="checkbox"/> Regular Membrane with Ring Set No. <u>10</u>	ID, Rings (mm)			
Thickness (mm):	Top: <u>0.61</u>		=	<u>67.25</u>
<input type="checkbox"/> Single	Bottom: <u>0.63</u>		Corr. for mem.	
<input checked="" type="checkbox"/> Double	Membr. Thick. = <u>0.31</u>		=	<u>66.630</u>
Area Ring with mem., $A_o$ (cm <sup>2</sup> ) =		<u>34.87</u>	;	(in <sup>2</sup> ) = <u>5.405</u>
Mass Top Cap, etc., $M_{tc}$ =	<u>528.2</u> g,	<u>1.16</u> lbf		
Data corr. for $M_{tc}$ :	<input checked="" type="checkbox"/> Yes;	<input type="checkbox"/> No	Plattens with Pins:	<input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No

Note: NA indicates not applicable.

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

Final Visual Description: Light Brown Clayey SAND (SC)

Other Remarks: \_\_\_\_\_

Trim./ Recon. By: <u>DBN</u>	Setup By: <u>HC</u>	Take Down By: <u>HC</u>
Date: <u>5/7/2008</u>	Date: <u>5/7/2008</u>	Date: <u>5/9/2008</u>
Prelim. Calc. By: <u>HC</u>	Final Calc. By: <u>LF</u>	Reviewed By: <u>HP</u>

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-Ai

 Task Number: NA

 Specific Gravity: 2.659
 Measured;  Assumed

 Type Test: SDSS

 Specimen:  "Undisturbed";  Reconstituted;  Remolded

 Boring No.: TP2319/TP2334

 Calculations Corr. for Salt (dissolved solids):  No or,  Yes, with concentration = \_\_\_\_\_ ppm

 Sample No.: Comp-AI

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, $\sigma'_v$ (ksf)	NA	8.64	NA		Cyclic Rate (Hz):		0.1;	1;	Other =
Axial/Vertical Force, $P_{vr,n}$ (lbf)	NA	NA	NA		During/End of Loading			Static	Cyclic
Horizontal Force, $P_{hr,n}$ (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 <sup>3</sup> )			NA	NA
$t_c$ (ON,days,hrs)	NA	0.97 days	NA		Post Cy.Displ. Reset to Null Position:			Yes;	No
Undrained ambient stress applied: with Delta shear force (lbf) = <u>NA</u> & Duration (min) = <u>NA</u> & Delta disp., $\Delta d_{h,ua}$ (mm) = <u>NA</u>									

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.
$W_o$	14.00			14.00	14.00	14.24
$S_o$	97.2			97.2	97.2	98.1
Measured final mass of moist soil, $M_{t,at}$ (g)						142.05
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)						142.05

Calculated Mass of Dry Soil (g)	
Initial Selected Water Content (%)	14.00
Initial, $M_{d,o}$	123.96
Final, $M_{d,at}$	123.71
Selected, $M_d$	123.66

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 $\sigma'_{v,c,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	8.640	NA	NA
Sign Convention: (+) $\Delta V$ out & $\Delta H$ down; (-) $\Delta V$ in & $\Delta H$ up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.970		
Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.970		
$\Delta V_n$ using $A_o$ - spec. (cm <sup>3</sup> )	3.38		
$\Delta V_n$ using $A_{c,n}$ - app. (cm <sup>3</sup> )	3.38		
$\Delta V_n$ using burette meas. (cm <sup>3</sup> )	0.70		
Selected $\Delta V_n$ (cm <sup>3</sup> )	3.38	NA	NA = $\Delta V_{UL}$
After Test WC Corr. for $\Delta V$ during Shear & Unloading, $W_{s,t,c}$ (%)			NA

Calculation of $\Delta V_c$ by Different Procedures			
By Selected Volumes		By Change in Mass	
$\Delta V_c$ (cm <sup>3</sup> )	3.38	$\sim M_{t,o} - (M_{t,at,c} + \Delta V_L + \Delta V_{UL})$	
By Cal. Height & App. Area		$\Delta V_c$ (cm <sup>3</sup> )	-0.73
$\Delta V_c$ (cm <sup>3</sup> )	3.38	By Saturation = 100% and Spec. Unloaded to 0 Stress	
By Cal. Ht. & Init. Spec. Area		$\Delta V_c$ (cm <sup>3</sup> )	NA
$\Delta V_c$ (cm <sup>3</sup> )	3.38		

Back Cal. Water Content During Consol. - Based on the Consolidation Conclusions Given Below	
Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	11.80
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

<b>Consolidation &amp; Preshear</b>	$\Delta V_c$ (cm <sup>3</sup> ) =	<u>3.39</u>	$\Delta H_c$ (mm) =	<u>0.970</u>	$\epsilon_{a,c}$ (%) =	<u>5.24</u>	$\Delta V_{c,max}$ (cm <sup>3</sup> ) =	<u>NA</u>
	$V_c$ (cm <sup>3</sup> ) =	<u>61.21</u>	$H_c$ (mm) =	<u>17.555</u>	$\epsilon_{v,c}$ (%) =	<u>5.24</u>	$\epsilon_{ac,max}$ (%) =	<u>NA</u>
	<b>Conclusions</b>	$A_c$ (cm <sup>2</sup> ) =	<u>34.87</u>	$\Delta \gamma_c$ (mm) =	<u>NA</u>	$\gamma_c$ (%) =	<u>NA</u>	Preshear: $\gamma_{ua}$ (%) =

Summary of Specimen Physical Properties:								
Specific Gravity: $G_s = 2.659$ Measured	Height (mm)	Volume (cm <sup>3</sup> )	Area (cm <sup>2</sup> )	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition: Initial (as trimmed)	18.525	64.60	34.87	14.3	136.6	119.5	98.2	0.389
After to $\sigma'_{v,c}$	17.555	61.21	34.87	11.8	141.0	126.1	100.0	0.316
Consol.: to $\sigma'_{v,c,max}$	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-Ai  
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

<input type="checkbox"/> Tube	<input type="checkbox"/> Field Extruded	<input type="checkbox"/> Liner	<input checked="" type="checkbox"/> Remolded	<input checked="" type="checkbox"/> Tamping	<input type="checkbox"/> Constant Effort:	Blows/Tamps per Layer = <u>11</u>
Boring No.: <u>TP2319/TP2334</u>	<input type="checkbox"/> LPC Core	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Impact/Rammer	Rammer Wgt. (lbf) = <u>          </u>	No. Layers = <u>3.00</u>
Sample No.: <u>Comp-A</u>	Composite No.: <u>          </u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Pluviated:	Tamper Force (lbf) = <u>4.00</u>	Drop (in.) = <u>12.00</u>
Depth (ft): <u>NA</u>	Specimen No.: <u>I</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Kneading	<input checked="" type="checkbox"/> Undercompaction: $U_{ni}$ (%) = <u>          </u>	Dia. (in.) = <u>1.40</u>
<input type="checkbox"/> Spec. Selection by X-ray;	<input type="checkbox"/> Geomarine Sample	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ref. Effort = MOD	% Comp. = <u>95.0</u> ± Opt. = <u>+4</u>

Type Consolidation:	<input checked="" type="checkbox"/> $K_0$ at:	<input checked="" type="checkbox"/> Incremental CRS	<input type="checkbox"/> Anisotropic at:	<input type="checkbox"/> Inclined Stress Path, $K_{c,BSS}$	<input type="checkbox"/> Used Automated System	Remarks:
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain Stress	<input type="checkbox"/> Creep Post Cyclic	<input checked="" type="checkbox"/> Const. Vol./Ht Drained	<input checked="" type="checkbox"/> Without - Water Bath	<input type="checkbox"/> Cyclic (Hz) Rate: <u>0.1</u> ;
	<input type="checkbox"/> Dynamic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> With - Bath	<input type="checkbox"/> Strain 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity: $G_s = 2.659$ Measured	Height (mm)	Volume (cm <sup>3</sup> )	Area (cm <sup>2</sup> )	Water Content (%)	Unit Weight (pcf)		Saturation (%)	LL	-200 %	Void Ratio, e
Condition:					Total	Dry		PL		
Initial	18.53	64.60	34.87	14.28	136.6	119.5	98.2	34	46.4	0.389
After Consol. to $\sigma'_{v,c}$	17.56	61.21	34.87	11.80	141.0	126.1	100.0	12	NA	0.316
to $\sigma'_{v,c,max}$	NA	NA	NA	NA	NA	NA	NA	22	NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	Static Strain Rate = <u>4.8 %/hr.</u>					
Vert. Consol. Stress, $\sigma'_{v,c}$	(ksf)	NA	8.607	NA	Cyclic Rate (Hz):		<u>0.1</u> ;	<u>1</u> ;	Other =	
Induced OCR:	-	NA	NA	NA	During/End of Loading			Static	Cyclic	
Axial Strain during Consol., $\epsilon_{h,c}$	%	NA	5.24	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 <sup>3</sup> ):			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 = <u>NA</u>					
Undr. Ambient Shear Stress, $\tau_{h,ua}$	(ksf)	NA	NA	NA	$\pm \tau_h =$ <u>NA</u> (ksf)		$\pm \gamma =$ <u>NA</u> %		at end of cyclic loading, $\sigma'_{v,c,r} =$ <u>NA</u> (ksf)	
Undr. Ambient Shear Strain, $\epsilon_{ua}$	%	NA	NA	NA						

Weight Top Cap, etc., $M_{tc}$ (lbf): <u>1.16</u>	Data Normalization: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Value: <u>8.607</u> (ksf)
Data corr. for $M_{tc}$ : <input checked="" type="checkbox"/> Yes; <input type="checkbox"/> No	Plattens with Pins: <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No	Using Effective Vertical Stress:
<input type="checkbox"/> Wire Reinforced Membrane, Model: <u>          </u>	Data corr. for Membr. strength: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Pre-Shear Conditions <input type="checkbox"/> Post-Cyclic Conditions
<input checked="" type="checkbox"/> Regular Membrane with Rings	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> 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.

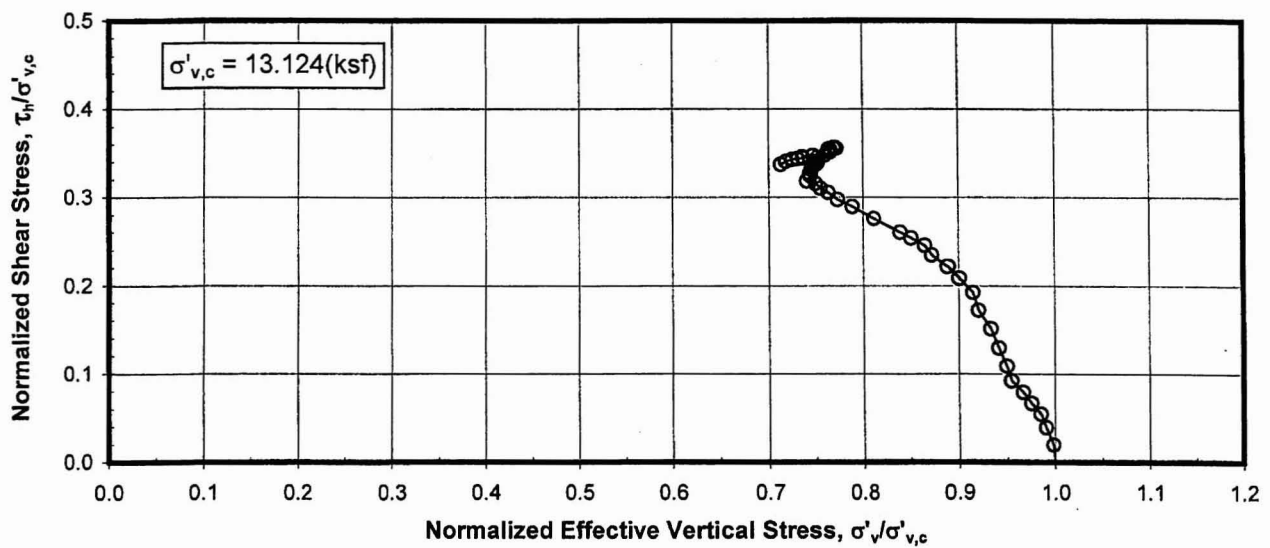
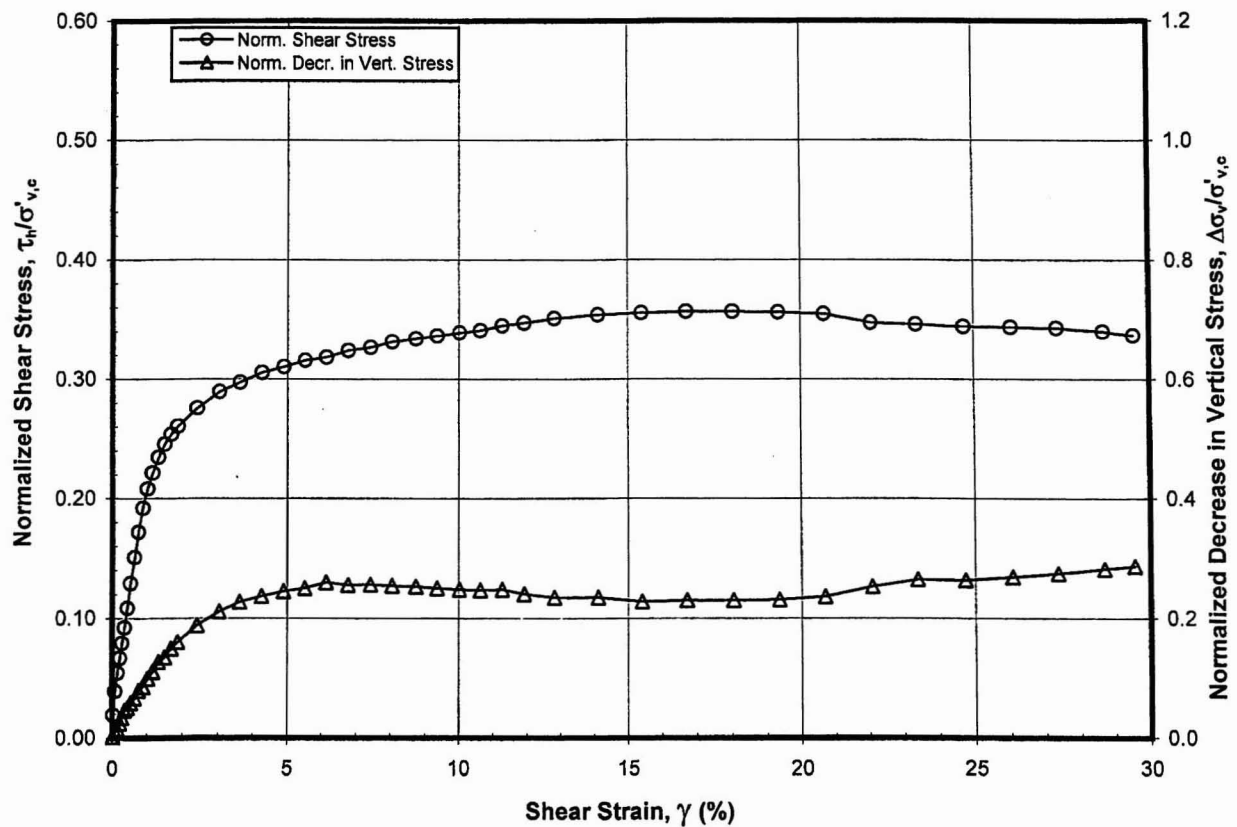
NA - Not Applicable

Final Visual Description and Remarks: Light Brown Clayey SAND (SC)

Loading Summary						
	$\tau_h$ (ksf)	$\gamma$ (%)	$\sigma'_v$ (ksf)	$\tau_h / \sigma'_v$	$\Delta \sigma'_v / \sigma'_{v,c}$	$c_u / \sigma'_{v,c}$
at Peak Shear Stress	3.085	21.23	6.082	0.507	0.293	0.358
at Maximum Strain	3.057	29.13	5.869	0.521	0.318	-

Boring No.: TP2319/TP2334 Sample No.: Comp-AI

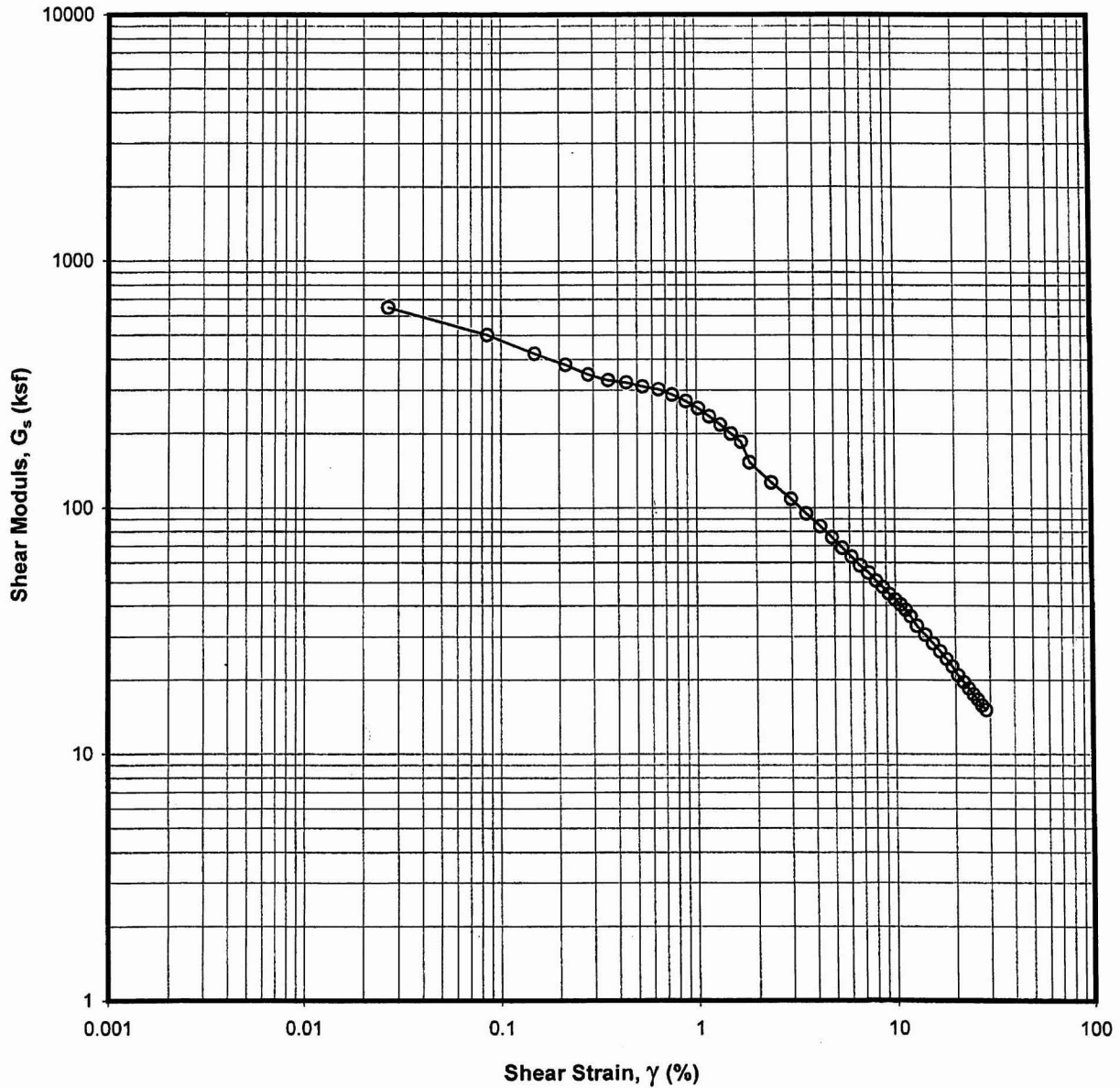
Elapsed Time (min)	Shear Strain $\gamma$ (%)	Shear Stress $\tau_h$ (ksf)	Effective Vertical Stress $\sigma'_v$ (ksf)	Calculated Pore Press. Change $\Delta U = \Delta\sigma'_v$ (ksf)	Secant Shear Modulus $G_s$ (ksf)	Tangent Modulus $G_T$ (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta\sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle $\phi'_{DSS}$ (°)
0.0	0.00	0.002	8.607	0.000	-	-	0.000	1.000	0.000	0.02
2.6	0.03	0.237	8.587	0.021	788.268	621.841	0.028	0.998	0.002	1.58
5.2	0.09	0.511	8.490	0.117	565.660	353.570	0.059	0.986	0.014	3.44
7.8	0.18	0.747	8.330	0.277	405.323	235.087	0.087	0.968	0.032	5.13
10.4	0.27	0.930	8.179	0.429	346.811	205.955	0.108	0.950	0.050	6.49
13.1	0.35	1.098	8.036	0.572	309.339	193.412	0.128	0.934	0.066	7.78
15.7	0.45	1.283	7.902	0.705	284.627	201.547	0.149	0.918	0.082	9.22
18.3	0.55	1.494	7.776	0.831	270.955	197.641	0.174	0.903	0.097	10.87
20.9	0.68	1.727	7.652	0.955	255.054	169.013	0.201	0.889	0.111	12.72
23.5	0.82	1.954	7.514	1.093	236.582	126.204	0.227	0.873	0.127	14.57
26.1	0.99	2.123	7.347	1.260	213.250	83.869	0.247	0.854	0.146	16.12
28.7	1.16	2.238	7.179	1.428	192.159	55.467	0.260	0.834	0.166	17.31
31.3	1.35	2.317	7.020	1.588	171.777	38.311	0.269	0.816	0.184	18.27
33.9	1.53	2.378	6.852	1.756	155.274	30.999	0.276	0.796	0.204	19.14
36.5	1.73	2.434	6.684	1.923	140.928	23.575	0.283	0.777	0.223	20.01
39.1	1.94	2.474	6.507	2.100	127.351	16.514	0.287	0.756	0.244	20.82
41.7	2.17	2.507	6.355	2.252	115.438	8.719	0.291	0.738	0.262	21.53
44.3	2.39	2.514	6.212	2.395	105.184	5.913	0.292	0.722	0.278	22.03
52.2	3.00	2.568	5.916	2.691	85.445	7.872	0.298	0.687	0.313	23.46
60.0	3.69	2.615	5.686	2.921	70.882	6.576	0.304	0.661	0.339	24.70
67.8	4.30	2.653	5.579	3.028	61.679	7.569	0.308	0.648	0.352	25.43
75.6	4.96	2.712	5.528	3.079	54.648	7.281	0.315	0.642	0.358	26.13
83.4	5.60	2.748	5.512	3.095	49.068	6.076	0.319	0.640	0.360	26.50
91.3	6.24	2.790	5.516	3.091	44.675	4.829	0.324	0.641	0.359	26.83
99.1	6.88	2.810	5.536	3.072	40.784	5.091	0.326	0.643	0.357	26.91
106.9	7.51	2.855	5.573	3.034	37.957	5.667	0.332	0.647	0.353	27.12
114.7	8.20	2.884	5.603	3.005	35.150	5.006	0.335	0.651	0.349	27.24
122.6	8.82	2.920	5.642	2.965	33.079	4.378	0.339	0.655	0.345	27.36
130.4	9.50	2.940	5.682	2.925	30.927	3.959	0.342	0.660	0.340	27.36
138.2	10.11	2.970	5.729	2.879	29.345	4.630	0.345	0.666	0.334	27.41
146.0	10.77	2.999	5.766	2.841	27.825	3.123	0.348	0.670	0.330	27.48
153.8	11.38	3.010	5.801	2.807	26.436	2.640	0.350	0.674	0.326	27.43
161.6	12.03	3.032	5.839	2.769	25.184	1.581	0.352	0.678	0.322	27.45
169.5	12.66	3.031	5.865	2.742	23.919	1.177	0.352	0.681	0.319	27.33
179.9	13.53	3.053	5.932	2.675	22.553	1.541	0.355	0.689	0.311	27.24
195.5	14.78	3.060	5.982	2.626	20.688	0.536	0.355	0.695	0.305	27.09
211.1	16.05	3.067	6.025	2.582	19.093	0.349	0.356	0.700	0.300	26.98
226.8	17.33	3.069	6.059	2.548	17.692	-0.016	0.357	0.704	0.296	26.86
242.4	18.63	3.066	6.073	2.534	16.449	0.294	0.356	0.706	0.294	26.79
258.0	19.92	3.076	6.085	2.522	15.429	0.715	0.357	0.707	0.293	26.82
273.7	21.23	3.085	6.082	2.525	14.518	0.069	0.358	0.707	0.293	26.89
289.3	22.56	3.078	6.045	2.563	13.634	-0.512	0.358	0.702	0.298	26.99
305.0	23.90	3.071	6.038	2.569	12.840	-0.116	0.357	0.701	0.299	26.96
320.6	25.22	3.075	6.014	2.593	12.181	0.020	0.357	0.699	0.301	27.08
336.2	26.52	3.072	5.975	2.632	11.576	-0.460	0.357	0.694	0.306	27.21
351.9	27.82	3.063	5.929	2.679	11.002	-0.562	0.356	0.689	0.311	27.32
367.5	29.13	3.057	5.869	2.738	10.488	-0.422	0.355	0.682	0.318	27.51



**STATIC DSS TEST**  
 K<sub>0</sub> Consolidation - OCR = NA  
 Sample: Comp-AJ - Depth: NA ft  
 Boring TP2319/TP2334  
 Exelon (Victoria)

KAW 7116/08





**STATIC DSS TEST**  
 $K_o$  Consolidation - OCR = NA  
Sample: Comp-AJ - Depth: NA ft  
Boring TP2319/TP2334

# 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-Aj  
 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  
 Assig. Remarks: \_\_\_\_\_      Specific Gravity: 2.659       Meas.;       Assumed

<input type="checkbox"/> Tube	<input type="checkbox"/> Field Extruded	<input type="checkbox"/> Liner	<input checked="" type="checkbox"/> Remolded	<input checked="" type="checkbox"/> Tamping	Constant Effort:	Blows/Tamps per Layer = <u>11</u>
Boring No.: <u>TP2319/TP2334</u>	<input type="checkbox"/> LPC Core			Impact/Rammer	Rammer Wgt. (lbf) = _____	No. Layers = <u>3.00</u>
Sample No.: <u>Comp-A</u>	Compostite No.: _____			Pluviated:	Tamper Force (lbf) = <u>4.00</u>	Drop (in.) = <u>12.00</u>
Depth (ft): <u>NA</u>	Specimen No.: <u>J</u>			Kneading	<input checked="" type="checkbox"/> Undercompaction: $U_{ri}$ (%) = _____	Dia. (in.) = <u>1.40</u>
<input type="checkbox"/> Spec. Selection by X-ray;	<input type="checkbox"/> Geomarine Sample				Ref. Effort = <u>MOD</u>	% Comp. = <u>95.0</u> $\pm$ Opt. = <u>+4</u>

Type Consolidation:	<input checked="" type="checkbox"/> $K_o$ at:	<input checked="" type="checkbox"/> Incremental	;	<input type="checkbox"/> Anisotropic at:	<input type="checkbox"/> Inclined Stress Path, $K_{c,DSS}$	<input type="checkbox"/> Used Automated System
		<u>CRS</u>			<u>90° Stress Path</u>	Remarks: _____
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain	<input type="checkbox"/> Creep	<input checked="" type="checkbox"/> Const. Vol./Ht	<input checked="" type="checkbox"/> Without - Water	<input type="checkbox"/> Cyclic (Hz)
	<input type="checkbox"/> Rapid	<input type="checkbox"/> Stress	<input type="checkbox"/> Post Cyclic	<input type="checkbox"/> Drained	<input type="checkbox"/> With - Bath	Rate: <input type="checkbox"/> 0.1; <input type="checkbox"/> 1; 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.	<u>1102</u>			<u>4083</u>	<u>324.31</u>	<u>183.30</u>	<u>145.66</u>	
Mass Moist Soil + Cont. (g)	<u>115.06</u>			<u>77.75</u>	<u>141.01</u>	<u>4.74</u>	<u>140.92</u>	
Mass Dry Soil + Container (g)	<u>104.76</u>			<u>71.95</u>	Excess Dry Soil (soil not included in final mass above)			
Mass Container (g)	<u>31.51</u>			<u>30.19</u>	Container No. _____			
WATER CONTENT (%)	<u>14.06</u>			<u>13.89</u>	Mass Dry Soil + Container (g) _____			
Avg. Initial WC, $W_{o,avg}$ (%)	<u>14.06</u>		Final $W_{at}$ : <input checked="" type="checkbox"/> Slice ;	Whole Spec.	Mass Container (g) _____			
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)		<u>0.00</u>	

Specimen Trimming:			
<input type="checkbox"/> Trimming Ring for Fugro Apparatus	NL6	Large-ring ID #	
<input checked="" type="checkbox"/> Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	<u>18.55</u>	$A_{s,t}$ (cm <sup>2</sup> ):	<u>34.68</u>
$D_{s,t}$ (mm):	<u>66.45</u>	$V_{s,t}$ (cm <sup>3</sup> ):	<u>64.32</u>
Remarks: _____			
<input type="checkbox"/> Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height ( $H_{tr}$ )	Diameter ( $D_o$ )	Remarks:	
1 <u>18.530</u>	1-T <u>NA</u>		
2 <u>18.560</u>	2-M <u>NA</u>		
3 <u>18.500</u>	3-B <u>NA</u>		
4 <u>18.540</u>	1-T <u>NA</u>	For Free Standing or Reconstituted Spec.:	
5 <u>18.560</u>	2-M <u>NA</u>		
Avg.	3-B <u>NA</u>	$A_{tr}$ (cm <sup>2</sup> ):	<u>NA</u>
= <u>18.550</u>	Avg <u>NA</u>	$V_{tr}$ (cm <sup>3</sup> ):	<u>NA</u>

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft <sup>3</sup> ) =	<u>136.86</u>
Dry, $\gamma_{d,o}$ (lb/ft <sup>3</sup> ) =	<u>119.98</u>

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) = _____		
Stress Level	Dia. by PiTape (mm) Meas.	Corr.	Area, $A_{c,n}$ (cm <sup>2</sup> )	(in <sup>2</sup> )
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
<input checked="" type="checkbox"/> Regular Membrane with Ring Set No. <u>9</u>	ID, Rings (mm)			
Thickness (mm):	Top: <u>0.66</u>		= <u>67.10</u>	
<input type="checkbox"/> Single	Bottom: <u>0.63</u>		Corr. for mem.	
<input checked="" type="checkbox"/> Double Membr. Thick. = <u>0.32</u>			= <u>66.450</u>	
Area Ring with mem., $A_o$ (cm <sup>2</sup> ) =	<u>34.68</u>		; (in <sup>2</sup> ) = <u>5.375</u>	
Mass Top Cap, etc., $M_{tc}$ =	<u>528.7</u> g,	<u>1.17</u> lbf		
Data corr. for $M_{tc}$ :	<input checked="" type="checkbox"/> Yes;	<input type="checkbox"/> No	Plattens with Pins:	<input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No

Note: NA indicates not applicable.

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

Final Visual Description: Light Brown Clayey SAND (SC)

Other Remarks: \_\_\_\_\_

Trim./ Recon. By: DBN

Setup By: HC

Take Down By: HC

Date: 5/7/2008

Date: 5/7/0/08

Date: 5/9/2008

Prelim. Calc. By: HC

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-Aj  
 Task Number: NA      Specific Gravity: 2.659       Measured;       Assumed  
 Type Test: SDSS      Specimen:  "Undisturbed";       Reconstituted;       Remolded      Boring No.: TP2319/TP2334  
 Calculations Corr. for Salt (dissolved solids):  No or,  Yes, with concentration = \_\_\_\_\_ ppm      Sample No.: Comp-AJ

Consolidation Stress Summary and Loading Summary									
Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	<input checked="" type="checkbox"/>	Static Strain Rate = <u>NA</u> (%/hr or )				
Nominal Vertical Stress, $\sigma'_v$ (ksf)	<u>NA</u>	<u>12.96</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 <sup>3</sup> )			<u>NA</u>	<u>NA</u>	
$t_c$ (ON,days,hrs)	<u>NA</u>	<u>0.98 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., $W_{o,avg}$	Selct., $W_{o,s}$	Back Cal.
$W_o$	<u>14.06</u>			<u>14.06</u>	<u>14.06</u>	<u>13.96</u>
$S_o$	<u>98.1</u>			<u>98.1</u>	<u>98.1</u>	<u>97.8</u>
Measured final mass of moist soil, $M_{lat}$ (g)						<u>140.92</u>
Final mass of moist soil corrected for excess dry soil, $M_{lat,c}$ (g)						<u>140.92</u>

Calculated Mass of Dry Soil (g)	
Initial Selected Water Content (%)	<u>14.06</u>
Initial, $M_{d,o}$	<u>123.63</u>
Final, $M_{d,at}$	<u>123.73</u>
Selected, $M_d$	<u>123.68</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 Initial Consol. to $\sigma'_{v,c}$ or $\sigma'_{v,c,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	<u>12.960</u>	<u>NA</u>	<u>NA</u>
Sign Convention: (+) $\Delta V$ out & $\Delta H$ down; (-) $\Delta V$ in & $\Delta H$ up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	<u>1.135</u>		
Total Equip. Comp., $\Sigma \Delta d_{afc}$ (mm)	<u>0.000</u>		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	<u>1.135</u>		
$\Delta V_n$ using $A_o$ - spec. (cm <sup>3</sup> )	<u>3.93</u>		
$\Delta V_n$ using $A_{c,n}$ - app. (cm <sup>3</sup> )	<u>3.93</u>		
$\Delta V_n$ using burette meas. (cm <sup>3</sup> )	<u>1.40</u>		
Selected $\Delta V_n$ (cm <sup>3</sup> )	<u>3.93</u>	<u>NA</u>	<u>NA</u> = $\Delta V_{UL}$
After Test WC Corr. for $\Delta V$ during Shear & Unloading, $W_{at,c}$ (%)			

Calculation of $\Delta V_c$ by Different Procedures			
By Selected Volumes		By Change in Mass	
$\Delta V_c$ (cm <sup>3</sup> )	<u>3.93</u>	$\sim M_{t,o} - (M_{lat,c} + \Delta V_L + \Delta V_{UL})$	
By Cal. Height & App. Area		By Saturation = 100% and Spec. Unloaded to 0 Stress	
$\Delta V_c$ (cm <sup>3</sup> )	<u>3.93</u>	$\Delta V_c$ (cm <sup>3</sup> )	<u>0.09</u>
By Cal. Ht. & Init. Spec. Area		$\Delta V_c$ (cm <sup>3</sup> )	<u>NA</u>
$\Delta V_c$ (cm <sup>3</sup> )	<u>3.93</u>	$\Delta V_c$ (cm <sup>3</sup> )	<u>NA</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>11.14</u>
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	<u>NA</u>

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

<b>Consolidation &amp; Preshear</b>	$\Delta V_c$ (cm <sup>3</sup> ) =	<u>3.93</u>	$\Delta H_c$ (mm) =	<u>1.135</u>	$\epsilon_{a,c}$ (%) =	<u>6.12</u>	$\Delta V_{c,max}$ (cm <sup>3</sup> ) =	<u>NA</u>	
	$V_c$ (cm <sup>3</sup> ) =	<u>60.40</u>	$H_c$ (mm) =	<u>17.415</u>	$\epsilon_{v,c}$ (%) =	<u>6.10</u>		$\epsilon_{ac,max}$ (%) =	<u>NA</u>
	<b>Conclusions</b>	$A_c$ (cm <sup>2</sup> ) =	<u>34.68</u>	$\Delta \gamma_c$ (mm) =	<u>NA</u>	$\gamma_c$ (%) =		<u>NA</u>	Preshear: $\gamma_{ua}$ (%) =

### Summary of Specimen Physical Properties:

Specific Gravity:	Height	Volume	Area	Water Content	Total Unit Weight	Dry Unit Weight	Saturation	Void Ratio, e
$G_s = 2.659$ Measured	(mm)	(cm <sup>3</sup> )	(cm <sup>2</sup> )	(%)	(pcf)	(pcf)	(%)	
Condition:								
Initial (as trimmed)	<u>18.550</u>	<u>64.32</u>	<u>34.68</u>	<u>14.0</u>	<u>136.9</u>	<u>120.0</u>	<u>97.9</u>	<u>0.383</u>
After to $\sigma'_{v,c}$	<u>17.415</u>	<u>60.40</u>	<u>34.68</u>	<u>11.1</u>	<u>142.1</u>	<u>127.8</u>	<u>100.0</u>	<u>0.298</u>
Consol.: to $\sigma'_{v,c,max}$	<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 = 4.7 min

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

<input type="checkbox"/> Tube	<input type="checkbox"/> Field Extruded	<input type="checkbox"/> Liner	<input checked="" type="checkbox"/> Remolded	<input checked="" type="checkbox"/> Tamping	Constant Effort:	Blows/Tamps per Layer = <u>11</u>
Boring No.: <u>TP2319/TP2334</u>	<input type="checkbox"/> LPC Core			Impact/Rammer	Rammer Wgt. (lb)=	No. Layers = <u>3.00</u>
Sample No.: <u>Comp-A</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>J</u>			Kneading	<input checked="" type="checkbox"/> Undercompaction: $U_{ni}$ (%) =	Dia. (in.) = <u>1.40</u>
<input type="checkbox"/> Spec. Selection by X-ray;	<input type="checkbox"/> Geomarine Sample				Ref. Effort= MOD	% Comp. = <u>95.0</u> ± Opt.= <u>+4</u>

Type Consolidation:	<input checked="" type="checkbox"/> $K_o$ at:	<input checked="" type="checkbox"/> Incremental CRS	<input type="checkbox"/> Anisotropic at:	<input type="checkbox"/> Inclined Stress Path, $K_{c,DSS}$	<input type="checkbox"/> Used Automated System	Remarks:
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain	<input type="checkbox"/> Creep Post Cyclic	<input checked="" type="checkbox"/> Const. Vol./Ht Drained	<input checked="" type="checkbox"/> Without - Water With - Bath	<input type="checkbox"/> Cyclic (Hz) Rate: <u>0.1</u> ;
	<input type="checkbox"/> Dynamic	<input type="checkbox"/> Stress				<input type="checkbox"/> Strain 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity: $G_s = 2.659$ Measured	Height (mm)	Volume (cm <sup>3</sup> )	Area (cm <sup>2</sup> )	Water Content (%)	Unit Weight		Saturation (%)	LL PL PI	-200 %	Void Ratio, e
					Total (pcf)	Dry (pcf)				
Condition: Initial	18.55	64.32	34.68	14.01	136.9	120.0	97.9	34	46.4	0.383
After to $\sigma'_{v,c}$	17.42	60.40	34.68	11.14	142.1	127.8	100.0	12	NA	0.298
Consol.: to $\sigma'_{vc,max}$	NA	NA	NA	NA	NA	NA	NA	22	NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	<input checked="" type="checkbox"/> Static Strain Rate = <u>4.6 %/hr.</u>					
Vert. Consol. Stress, $\sigma'_{v,c}$	(ksf)	NA	13.124	NA	Cyclic Rate (Hz):	<u>0.1</u> ;	<u>1</u> ;	Other =		
Induced OCR:	-	NA	NA	NA	During/End of Loading	Static	Cyclic			
Axial Strain during Consol., $\epsilon_{a,c}$	%	NA	6.12	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 <sup>3</sup> ):	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	$\pm \tau_h =$ <u>NA</u> (ksf)	$\pm \gamma =$ <u>NA</u> %				
Undr. Ambient Shear Strain, $\epsilon_{ub}$	%	NA	NA	NA	at end of cyclic loading, $\sigma'_{vc,yf} =$	NA (ksf)				

Weight Top Cap, etc., $M_{tc}$ (lb):	<u>1.17</u>	Data Normalization:	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Value: <u>13.124</u> (ksf)
Data corr. for $M_{tc}$ :	<input checked="" type="checkbox"/> Yes; <input type="checkbox"/> No	Plattens with Pins:	<input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No	Using Effective Vertical Stress:	
<input type="checkbox"/> Wire Reinforced Membrane, Model:		Data corr. for Membr. strength	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Pre-Shear Conditions	<input type="checkbox"/> Post-Cyclic Conditions
<input checked="" type="checkbox"/> Regular Membrane with Rings		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<input type="checkbox"/> 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

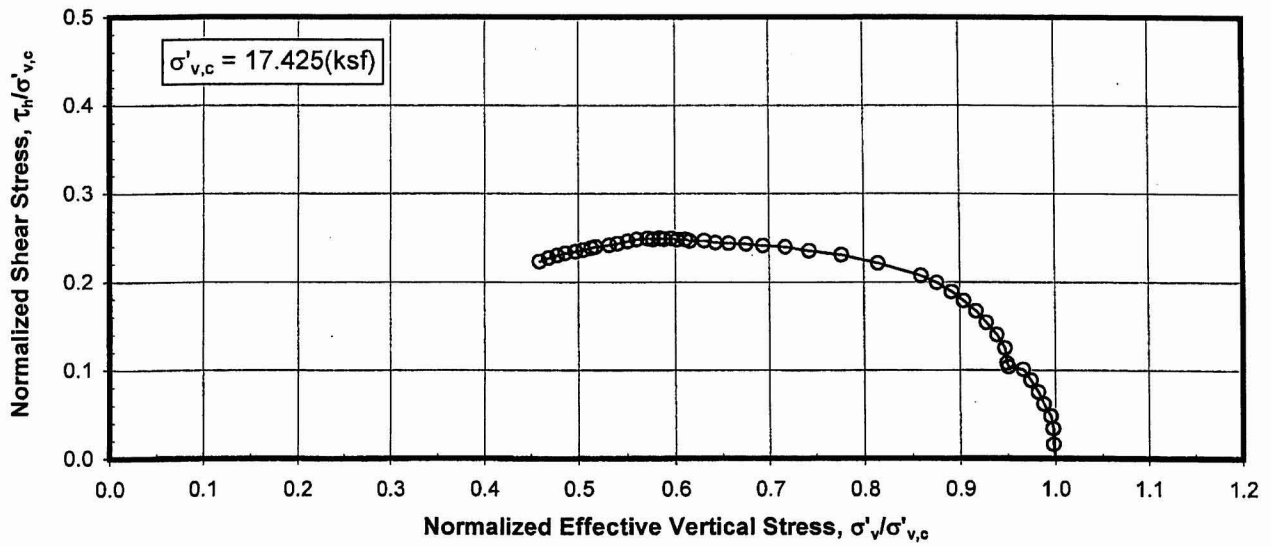
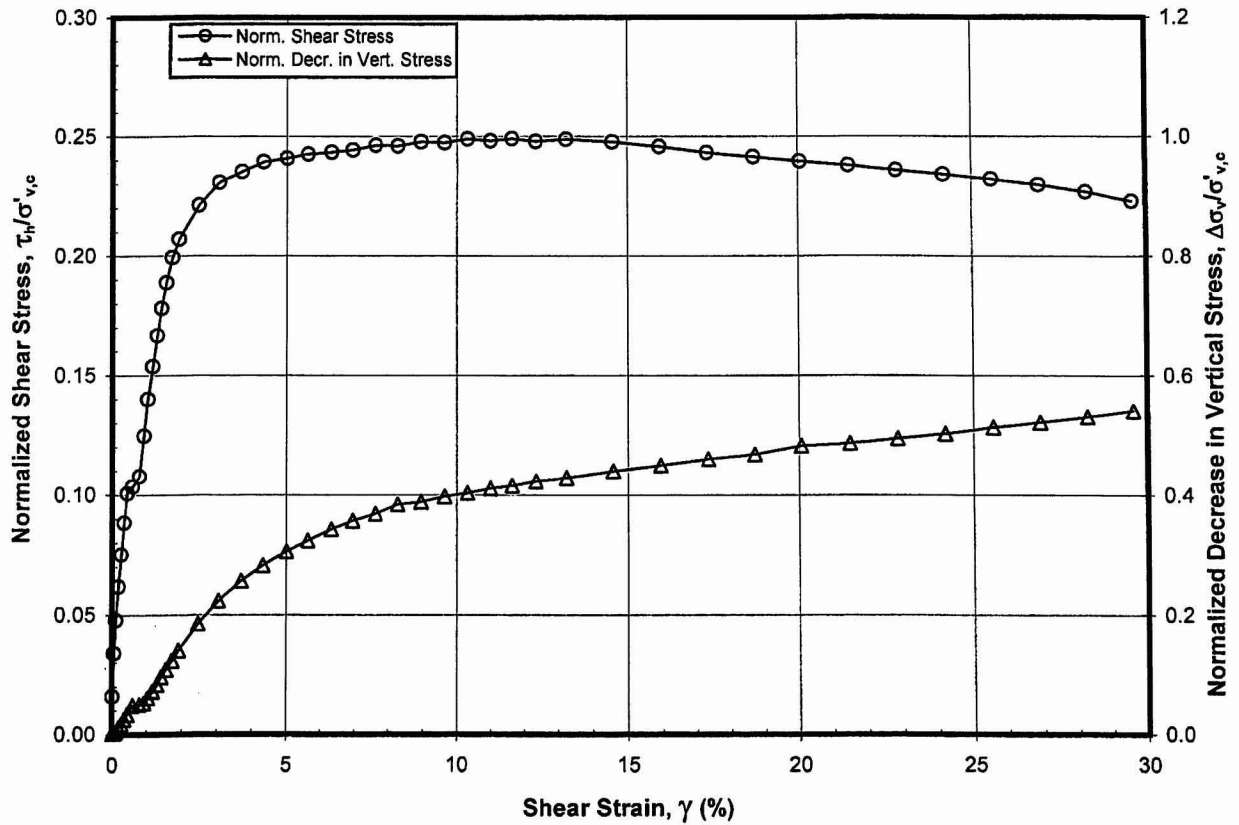
Final Visual Description and Remarks: Light Brown Clayey SAND (SC)

Loading Summary						
	$\tau_h$ (ksf)	$\gamma$ (%)	$\sigma'_v$ (ksf)	$\tau_h/\sigma'_v$	$\Delta\sigma'_v/\sigma'_{v,c}$	$c_v/\sigma'_{v,c}$
at Peak Shear Stress	4.679	16.72	10.112	0.463	0.230	0.357
at Maximum Strain	4.420	29.55	9.358	0.472	0.287	-

Boring No.: TP2319/TP2334 Sample No.: Comp-AJ

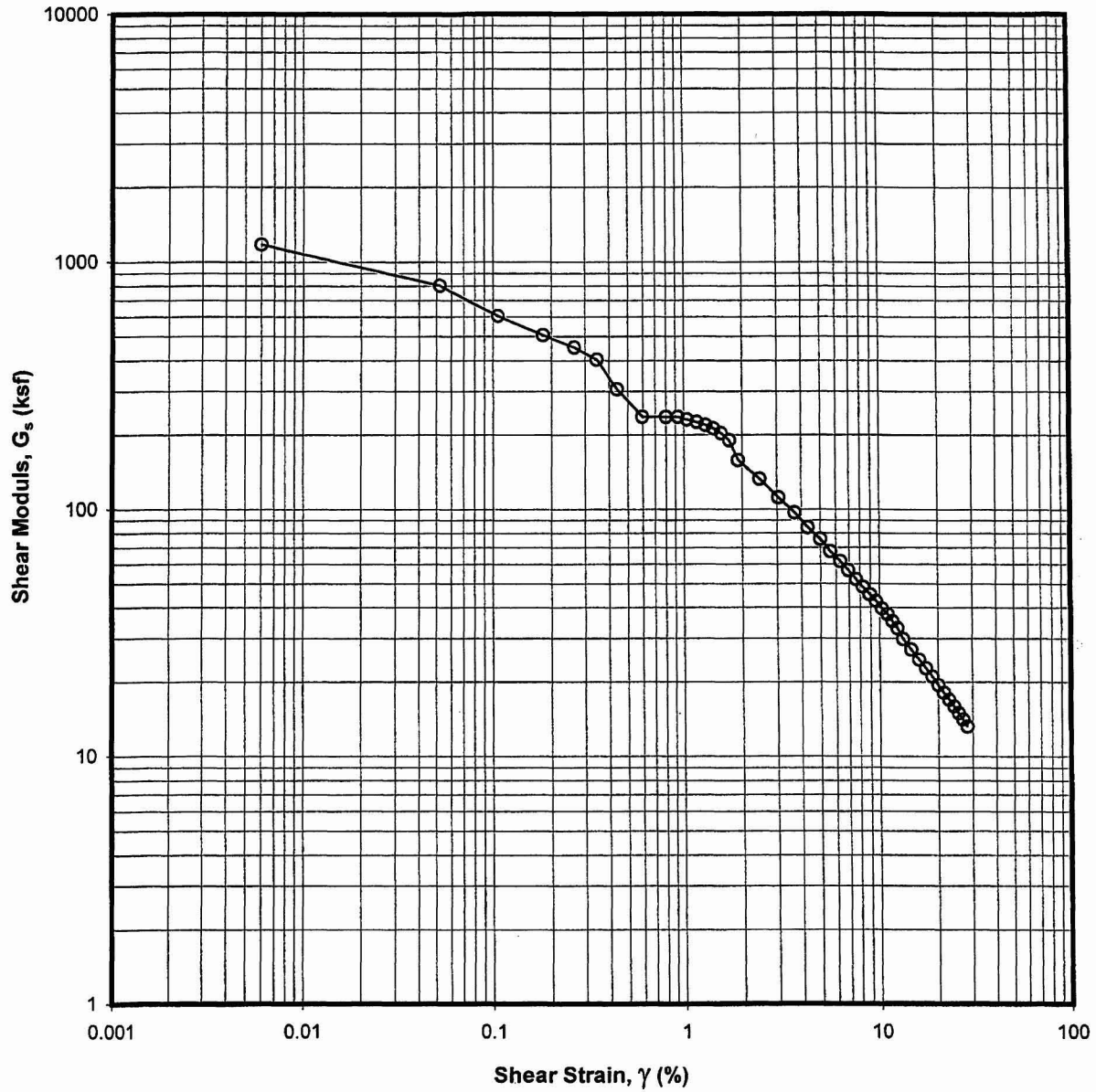
Elapsed Time (min)	Shear Strain $\gamma$ (%)	Shear Stress $\tau_h$ (ksf)	Effective Vertical Stress $\sigma'_v$ (ksf)	Calculated Pore Press. Change $\Delta U = \Delta\sigma'_v$ (ksf)	Secant Shear Modulus $G_s$ (ksf)	Tangent Modulus $G_T$ (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta\sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle $\phi'_{DSS}$ (°)
0.0	0.00	-0.036	13.124	0.000	-	-	-0.003	1.000	0.000	-0.16
2.6	0.03	0.253	13.103	0.021	1086.337	767.251	0.019	0.998	0.002	1.11
5.3	0.09	0.515	12.999	0.124	648.251	377.620	0.039	0.991	0.009	2.27
7.9	0.15	0.713	12.930	0.194	501.427	274.209	0.054	0.985	0.015	3.15
10.6	0.22	0.874	12.801	0.323	421.059	243.810	0.067	0.975	0.025	3.91
13.2	0.28	1.039	12.686	0.437	379.637	235.885	0.079	0.967	0.033	4.68
15.9	0.36	1.209	12.524	0.600	347.339	238.422	0.092	0.954	0.046	5.51
18.5	0.44	1.424	12.466	0.658	328.795	269.951	0.109	0.950	0.050	6.52
21.1	0.54	1.693	12.357	0.767	321.823	271.095	0.129	0.942	0.058	7.80
23.8	0.65	1.978	12.252	0.872	310.021	251.999	0.151	0.934	0.066	9.17
26.4	0.76	2.254	12.080	1.044	301.375	226.605	0.172	0.920	0.080	10.57
29.1	0.89	2.519	12.007	1.117	286.905	180.566	0.192	0.915	0.085	11.85
31.7	1.02	2.730	11.823	1.301	270.142	143.114	0.208	0.901	0.099	13.00
34.3	1.16	2.906	11.678	1.446	253.303	115.659	0.221	0.890	0.110	13.98
37.0	1.33	3.075	11.459	1.665	234.803	93.198	0.234	0.873	0.127	15.02
39.6	1.50	3.221	11.363	1.760	217.089	70.650	0.245	0.866	0.134	15.82
42.3	1.69	3.329	11.175	1.949	199.673	53.163	0.254	0.852	0.148	16.59
44.9	1.86	3.415	11.025	2.099	185.066	42.883	0.260	0.840	0.160	17.21
52.8	2.40	3.616	10.654	2.470	152.291	32.993	0.276	0.812	0.188	18.75
60.7	3.03	3.796	10.352	2.772	126.309	22.732	0.289	0.789	0.211	20.14
68.6	3.63	3.899	10.148	2.976	108.267	17.014	0.297	0.773	0.227	21.02
76.5	4.27	4.006	10.021	3.103	94.637	13.397	0.305	0.764	0.236	21.79
84.4	4.90	4.069	9.913	3.210	83.760	10.640	0.310	0.755	0.245	22.32
92.3	5.52	4.139	9.846	3.277	75.590	8.488	0.315	0.750	0.250	22.80
100.2	6.15	4.175	9.721	3.403	68.499	8.596	0.318	0.741	0.259	23.24
108.1	6.78	4.248	9.773	3.351	63.166	8.562	0.324	0.745	0.255	23.49
116.0	7.43	4.284	9.764	3.359	58.127	7.703	0.326	0.744	0.256	23.69
123.9	8.06	4.346	9.790	3.334	54.343	7.460	0.331	0.746	0.254	23.94
131.8	8.75	4.381	9.809	3.314	50.507	5.053	0.334	0.747	0.253	24.07
139.7	9.36	4.412	9.843	3.281	47.503	5.203	0.336	0.750	0.250	24.14
147.6	10.03	4.448	9.871	3.252	44.718	4.551	0.339	0.752	0.248	24.26
155.5	10.64	4.471	9.885	3.239	42.347	6.035	0.341	0.753	0.247	24.34
163.4	11.29	4.525	9.874	3.250	40.403	6.527	0.345	0.752	0.248	24.62
171.3	11.93	4.555	9.971	3.153	38.483	5.067	0.347	0.760	0.240	24.55
181.9	12.83	4.604	10.048	3.076	36.177	4.234	0.351	0.766	0.234	24.62
197.7	14.12	4.643	10.048	3.075	33.137	2.344	0.354	0.766	0.234	24.80
213.4	15.41	4.664	10.134	2.989	30.499	1.412	0.355	0.772	0.228	24.71
229.2	16.72	4.679	10.112	3.012	28.210	0.542	0.357	0.770	0.230	24.83
245.0	18.04	4.678	10.109	3.014	26.141	-0.240	0.356	0.770	0.230	24.83
260.8	19.35	4.673	10.098	3.026	24.338	-0.914	0.356	0.769	0.231	24.83
276.6	20.70	4.654	10.029	3.095	22.661	-4.257	0.355	0.764	0.236	24.89
292.4	22.08	4.555	9.810	3.313	20.791	-4.252	0.347	0.748	0.252	24.91
308.2	23.40	4.537	9.658	3.466	19.544	-1.393	0.346	0.736	0.264	25.16
324.0	24.72	4.519	9.671	3.452	18.423	-1.042	0.344	0.737	0.263	25.04
339.8	26.04	4.509	9.597	3.527	17.454	-0.721	0.344	0.731	0.269	25.17
355.6	27.35	4.500	9.521	3.603	16.583	-1.781	0.343	0.725	0.275	25.30
371.4	28.67	4.463	9.427	3.697	15.694	-3.824	0.340	0.718	0.282	25.33
381.9	29.55	4.420	9.358	3.766	15.083	-4.822	0.337	0.713	0.287	25.28





**STATIC DSS TEST**  
 K<sub>o</sub> Consolidation - OCR = NA  
 Sample: Comp-AK - Depth: NA ft  
 Boring TP2319/TP2334  
 Exelon (Victoria)

KAW 7/16/08



**STATIC DSS TEST**  
K<sub>o</sub> Consolidation - OCR = NA  
Sample: Comp-AK - Depth: NA ft  
Boring TP2319/TP2334

KAW 7116108

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

Project Number: 0411-08-1686      Test Type: SDSS      Sta. No.: 9G      File Name: Comp-Ak  
 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: 2.659       Meas.;       Assumed

<input type="checkbox"/> Tube	<input type="checkbox"/> Field Extruded	<input type="checkbox"/> Liner	<input checked="" type="checkbox"/> Remolded	<input checked="" type="checkbox"/> Tamping	<input checked="" type="checkbox"/> Constant Effort:	Blows/Tamps per Layer = <u>11</u>
Boring No.: <u>TP2319/TP2334</u>	<input type="checkbox"/> LPC Core			<input type="checkbox"/> Impact/Rammer	Rammer Wgt.(lb)= _____	No. Layers = <u>3.00</u>
Sample No.: <u>Comp-A</u>	Composite No.: _____			<input type="checkbox"/> Pluviated:	Tamp Force (lbf) = <u>4.00</u>	Drop (in.) = <u>12.00</u>
Depth (ft): <u>NA</u>	Specimen No.: <u>K</u>			<input type="checkbox"/> Kneading	<input checked="" type="checkbox"/> Undercompaction: $U_{ni}$ (%) = _____	Dia. (in.) = <u>1.40</u>
<input type="checkbox"/> Spec. Selection by X-ray;	<input type="checkbox"/> Geomarine Sample				Ref. Effort= MOD	% Comp. = <u>95.0</u> ± Opt.= <u>+4</u>

Type Consolidation:	<input checked="" type="checkbox"/> $K_o$ at:	<input checked="" type="checkbox"/> Incremental CRS	<input type="checkbox"/> Anisotropic at:	<input type="checkbox"/> Inclined Stress Path, $K_{c,DSS}$	<input type="checkbox"/> Used Automated System	Remarks: _____
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain	<input type="checkbox"/> Creep	<input checked="" type="checkbox"/> Const. Vol./Ht	<input checked="" type="checkbox"/> Without - Water	<input type="checkbox"/> Cyclic (Hz)
	<input type="checkbox"/> Rapid	<input type="checkbox"/> Stress	<input type="checkbox"/> Post Cyclic	<input type="checkbox"/> Drained	<input type="checkbox"/> With - Bath	Rate: <u>0.1</u> ; <u>1</u> ; 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.	<u>5045</u>			<u>766</u>	<u>324.60</u>	<u>183.30</u>	<u>141.30</u>	<u>144.20</u>
Mass Moist Soil + Cont. (g)	<u>101.80</u>			<u>62.59</u>	<u>141.30</u>	<u>4.12</u>	<u>140.08</u>	
Mass Dry Soil + Container (g)	<u>92.19</u>			<u>58.65</u>	Excess Dry Soil (soil not included in final mass above)			
Mass Container (g)	<u>30.77</u>			<u>31.92</u>	Container No. _____			
WATER CONTENT (%)	<u>15.65</u>			<u>14.74</u>	Mass Dry Soil + Container (g) _____			
Avg. Initial WC, $W_{o,avg}$ (%)	<u>15.65</u>		Final $W_{at}$ : <input checked="" type="checkbox"/> Slice ;	Whole Spec.	Mass Container (g) _____			
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)		<u>0.00</u>	

Specimen Trimming:			
<input type="checkbox"/> Trimming Ring for Fugro Apparatus	<u>NL6</u>	Large-ring ID #	
<input checked="" type="checkbox"/> Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	<u>18.55</u>	$A_{s,t}$ (cm <sup>2</sup> ):	<u>34.68</u>
$D_{s,t}$ (mm):	<u>66.45</u>	$V_{s,t}$ (cm <sup>3</sup> ):	<u>64.32</u>
Remarks: _____			
<input type="checkbox"/> Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height ( $H_{tr}$ )	Diameter ( $D_o$ )	Remarks:	
<u>1</u>	<u>18.580</u>	<u>1-T</u>	<u>NA</u>
<u>2</u>	<u>18.540</u>	<u>2-M</u>	<u>NA</u>
<u>3</u>	<u>18.560</u>	<u>3-B</u>	<u>NA</u>
<u>4</u>	<u>18.510</u>	<u>1'-T</u>	<u>NA</u>
<u>5</u>	<u>18.540</u>	<u>2'-M</u>	<u>NA</u>
Avg.	<u>3'-B</u>	<u>NA</u>	<u>NA</u>
$A_{tr}$ (cm <sup>2</sup> ):			<u>NA</u>
$V_{tr}$ (cm <sup>3</sup> ):			<u>NA</u>

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 <sup>3</sup> ) =	<u>137.14</u>
Dry, $\gamma_{d,o}$ (lb/ft <sup>3</sup> ) =	<u>118.58</u>

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) = _____		
Stress Level	Dia. by PiTape (mm) Meas.	Corr.	Area, $A_{c,n}$ (cm <sup>2</sup> )	(in <sup>2</sup> )
<u>0</u>				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
<input checked="" type="checkbox"/> Regular Membrane with Ring Set No. <u>9</u>	ID, Rings (mm)			
Thickness (mm):	Top: <u>0.60</u>		= <u>67.02</u>	
<input type="checkbox"/> Single	Bottom: <u>0.53</u>		Corr. for mem. _____	
<input checked="" type="checkbox"/> Double Membr. Thick. = <u>0.28</u>			= <u>66.450</u>	
Area Ring with mem., $A_o$ (cm <sup>2</sup> ) =	<u>34.68</u>		; (in <sup>2</sup> ) = <u>5.375</u>	
Mass Top Cap, etc., $M_{tc}$ =	<u>528.7</u> g,	<u>1.17</u> lbf		
Data corr. for $M_{tc}$ : <input checked="" type="checkbox"/> Yes;	<input type="checkbox"/> No	Plattens with Pins: <input type="checkbox"/> Yes;	<input checked="" type="checkbox"/> No	

Final Visual Description: Light Brown Clayey SAND (SC)

Other Remarks: \_\_\_\_\_

Trim./ Recon. By: DBN

Setup By: PL

Take Down By: PL

Date: 5/50/08

Date: 5/20/2008

Date: 5/23/2008

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.: 9G      File Name: Comp-Ak  
 Task Number: NA      Specific Gravity: 2.659       Measured;     Assumed  
 Type Test: SDSS      Specimen:  "Undisturbed";     Reconstituted;     Remolded      Boring No.: TP2319/TP2334  
 Calculations Corr. for Salt (dissolved solids):  No or,     Yes, with concentration = \_\_\_\_\_ ppm      Sample No.: Comp-AK

Consolidation Stress Summary and Loading Summary							
Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	<input checked="" type="checkbox"/>	Static Strain Rate = <u>NA</u> (%/hr or )		
Nominal Vertical Stress, $\sigma'_v$ (ksf)	<u>NA</u>	<u>17.28</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, $P_{hr,n}$ (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 <sup>3</sup> )		<u>NA</u> <u>NA</u>
$t_c$ (ON, days, hrs)	<u>NA</u>	<u>1.57 days</u>	<u>NA</u>		Post Cy. Displ. Reset to Null Position:		<input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No
Undrained ambient stress applied:      with Delta shear force (lbf) = <u>NA</u> & Duration (min) = <u>NA</u> & Delta disp., $\Delta d_{h,ua}$ (mm) = <u>NA</u>							

Trimmed Specimen (TS) - Initial Water Contents over Saturation (%):					
	Top, $W_{o,1}$	Bottom, $W_{o,2}$	Sides, $W_{o,3}$	Avg., $W_{o,avg}$	Back Cal.
$W_o$	<u>15.65</u>			<u>15.65</u>	<u>15.65</u>
$S_o$	<u>104.7</u>			<u>104.7</u>	<u>104.7</u>
Measured final mass of moist soil, $M_{t,at}$ (g)					<u>140.08</u>
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)					<u>140.08</u>

Calculated Mass of Dry Soil (g)	
Initial Selected Water Content (%)	<u>15.65</u>
Initial, $M_{d,o}$	<u>122.18</u>
Final, $M_{d,at}$	<u>122.08</u>
Selected, $M_d$	<u>122.13</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>17.280</u>	<u>NA</u>	<u>NA</u>
Sign Convention: (+) $\Delta V$ out & $\Delta H$ down; (-) $\Delta V$ in & $\Delta H$ up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	<u>1.590</u>		
Total Equip. Comp., $\Sigma \Delta d_{afc}$ (mm)	<u>0.000</u>		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	<u>1.590</u>		
$\Delta V_n$ using $A_o$ - spec. (cm <sup>3</sup> )	<u>5.51</u>		
$\Delta V_n$ using $A_{c,n}$ - app. (cm <sup>3</sup> )	<u>5.51</u>		
$\Delta V_n$ using burette meas. (cm <sup>3</sup> )	<u>3.30</u>		
Selected $\Delta V_n$ (cm <sup>3</sup> )	<u>5.51</u>	<u>NA</u>	<u>NA</u> = $\Delta V_{UL}$
After Test WC Corr. for $\Delta V$ during Shear & Unloading, $W_{a,c}$ (%)			<u>NA</u>

Calculation of $\Delta V_c$ by Different Procedures			
By Selected Volumes		By Change in Mass	
$\Delta V_c$ (cm <sup>3</sup> )	<u>5.51</u>	$\sim M_{t,o} - (M_{t,at,c} + \Delta V_L + \Delta V_{UL})$	
By Cal. Height & App. Area		$\Delta V_c$ (cm <sup>3</sup> )	<u>1.22</u>
$\Delta V_c$ (cm <sup>3</sup> )	<u>5.51</u>	By Saturation = 100% and Spec. Unloaded to 0 Stress	
By Cal. Ht. & Init. Spec. Area		$\Delta V_c$ (cm <sup>3</sup> )	<u>NA</u>
$\Delta V_c$ (cm <sup>3</sup> )	<u>5.51</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>10.46</u>
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	<u>NA</u>

<b>Consolidation &amp; Preshear Conclusions</b>	$\Delta V_c$ (cm <sup>3</sup> ) = <u>5.51</u>	$\Delta H_c$ (mm) = <u>1.590</u>	$\epsilon_{a,c}$ (%) = <u>8.57</u>	$\Delta V_{c,max}$ (cm <sup>3</sup> ) = <u>NA</u>
	$V_c$ (cm <sup>3</sup> ) = <u>58.82</u>	$H_c$ (mm) = <u>16.960</u>	$\epsilon_{v,c}$ (%) = <u>8.56</u>	$\epsilon_{a,c,max}$ (%) = <u>NA</u>
	$A_c$ (cm <sup>2</sup> ) = <u>34.68</u>	$\Delta \gamma_c$ (mm) = <u>NA</u>	$\gamma_c$ (%) = <u>NA</u>	Preshear: $\gamma_{ub}$ (%) = <u>NA</u>

Summary of Specimen Physical Properties:								
Specific Gravity: $G_s = 2.659$ Measured	Height (mm)	Volume (cm <sup>3</sup> )	Area (cm <sup>2</sup> )	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	<u>18.550</u>	<u>64.32</u>	<u>34.68</u>	<u>15.7</u>	<u>137.1</u>	<u>118.5</u>	<u>104.9</u>	<u>0.400</u>
After to $\sigma'_{v,c}$	<u>16.960</u>	<u>58.82</u>	<u>34.68</u>	<u>10.5</u>	<u>143.2</u>	<u>129.6</u>	<u>100.0</u>	<u>0.280</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 HP  
 3 - Uses measured value at appropriate stress level (NA for rings).  
 Remarks: t95 for max stress = 198.1 min

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

<input type="checkbox"/> Tube	<input type="checkbox"/> Field Extruded	<input type="checkbox"/> Liner	<input checked="" type="checkbox"/> Remolded	<input checked="" type="checkbox"/> Tamping	<input checked="" type="checkbox"/> Constant Effort:	Blows/Tamps per Layer = <u>11</u>
Boring No.: <u>TP2319/TP2334</u>	<input type="checkbox"/> LPC Core			<input type="checkbox"/> Impact/Rammer	Rammer Wgt.(lbf)= <u>          </u>	No. Layers = <u>3.00</u>
Sample No.: <u>Comp-A</u>	Composite No.: <u>          </u>			<input type="checkbox"/> Pluviated:	Tamper Force (lbf)= <u>4.00</u>	Drop (in.) = <u>12.00</u>
Depth (ft): <u>NA</u>	Specimen No.: <u>K</u>			<input type="checkbox"/> Kneading	<input checked="" type="checkbox"/> Undercompaction: $U_{ni}$ (%) = <u>          </u>	Dia. (in.) = <u>1.40</u>
<input type="checkbox"/> Spec. Selection by X-ray;	<input type="checkbox"/> Geomarine Sample				Ref. Effort= MOD % Comp. = <u>95.0</u>	$\pm$ Opt.= <u>+4</u>

Type Consolidation:	<input checked="" type="checkbox"/> $K_o$ at:	<input checked="" type="checkbox"/> Incremental CRS	<input type="checkbox"/> Anisotropic at:	<input type="checkbox"/> Inclined Stress Path, $K_{c,DSS}$	<input type="checkbox"/> Used Automated System	Remarks:
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain Stress	<input type="checkbox"/> Creep Post Cyclic	<input checked="" type="checkbox"/> Const. Vol./Ht Drained	<input checked="" type="checkbox"/> Without - Water Bath	<input type="checkbox"/> Cyclic (Hz) Rate: <u>0.1</u> ;
	<input type="checkbox"/> Dynamic	<input type="checkbox"/> Stress			<input type="checkbox"/> With - Bath	<input type="checkbox"/> Strain 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity:	Height	Volume	Area	Water Content	Unit Weight		Saturation	LL	-200	Void Ratio,
$G_s = 2.659$ Measured	(mm)	( $cm^3$ )	( $cm^2$ )	(%)	Total (pcf)	Dry (pcf)	(%)	PL	%	e
Condition: Initial	18.55	64.32	34.68	15.69	137.1	118.5	104.9	34	46.4	0.400
After to $\sigma'_{v,c}$	16.96	58.82	34.68	10.46	143.2	129.6	100.0	12	NA	0.280
Consol.: to $\sigma'_{vc,max}$	NA	NA	NA	NA	NA	NA	NA	22	NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	<input checked="" type="checkbox"/> Static Strain Rate = <u>4.7 %/hr.</u>					
Vert. Consol. Stress, $\sigma'_{vc}$	(ksf)	NA	17.425	NA	Cyclic Rate (Hz): <u>0.1</u> ;	<u>1</u> ;	Other =			
Induced OCR:	-	NA	NA	NA	During/End of Loading		Static	Cyclic		
Axial Strain during Consol., $\epsilon_{a,c}$	%	NA	8.57	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 = <u>NA</u>					
Undr. Ambient Shear Stress, $\tau_{h,un}$	(ksf)	NA	NA	NA	$\pm \tau_h =$ <u>NA</u> (ksf)		$\pm \gamma =$ <u>NA</u> %		at end of cyclic loading, $\sigma'_{vc,yr} =$ <u>NA</u> (ksf)	
Undr. Ambient Shear Strain, $\epsilon_{un}$	%	NA	NA	NA						

Weight Top Cap, etc., $M_{tc}$ (lbf): <u>1.17</u>	Data Normalization: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Value: <u>17.425</u> (ksf)
Data corr. for $M_{tc}$ : <input checked="" type="checkbox"/> Yes; <input type="checkbox"/> No	Plattens with Pins: <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No
Wire Reinforced Membrane, Model: <u>          </u>	Data corr. for Membr. strength: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<input checked="" type="checkbox"/> Regular Membrane with Rings	<input checked="" type="checkbox"/> Pre-Shear Conditions <input type="checkbox"/> Post-Cyclic Conditions
	<input type="checkbox"/> 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

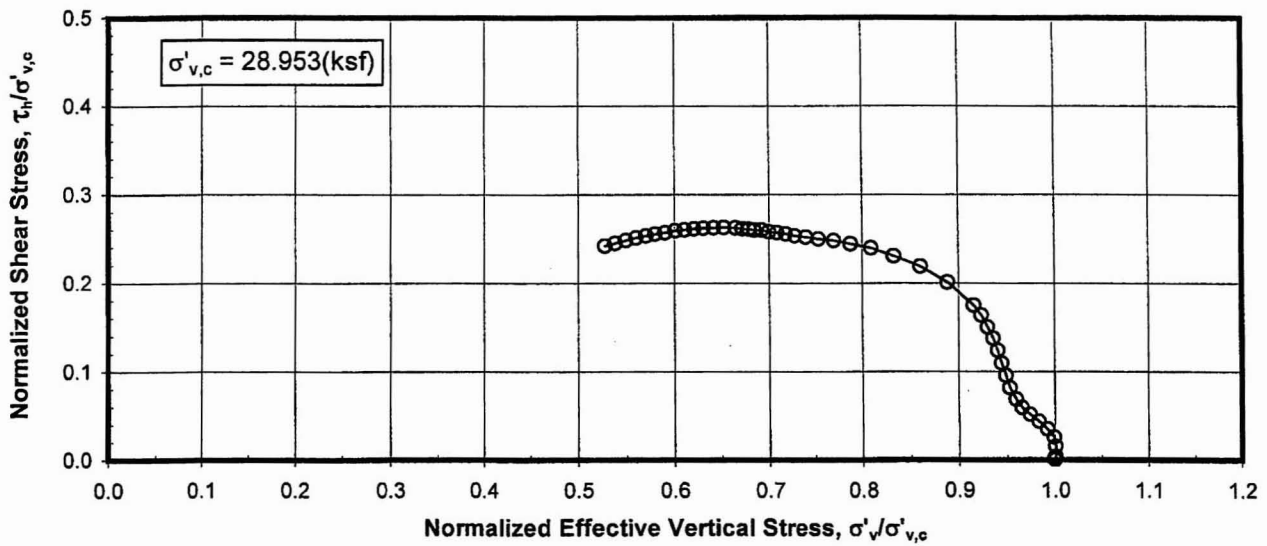
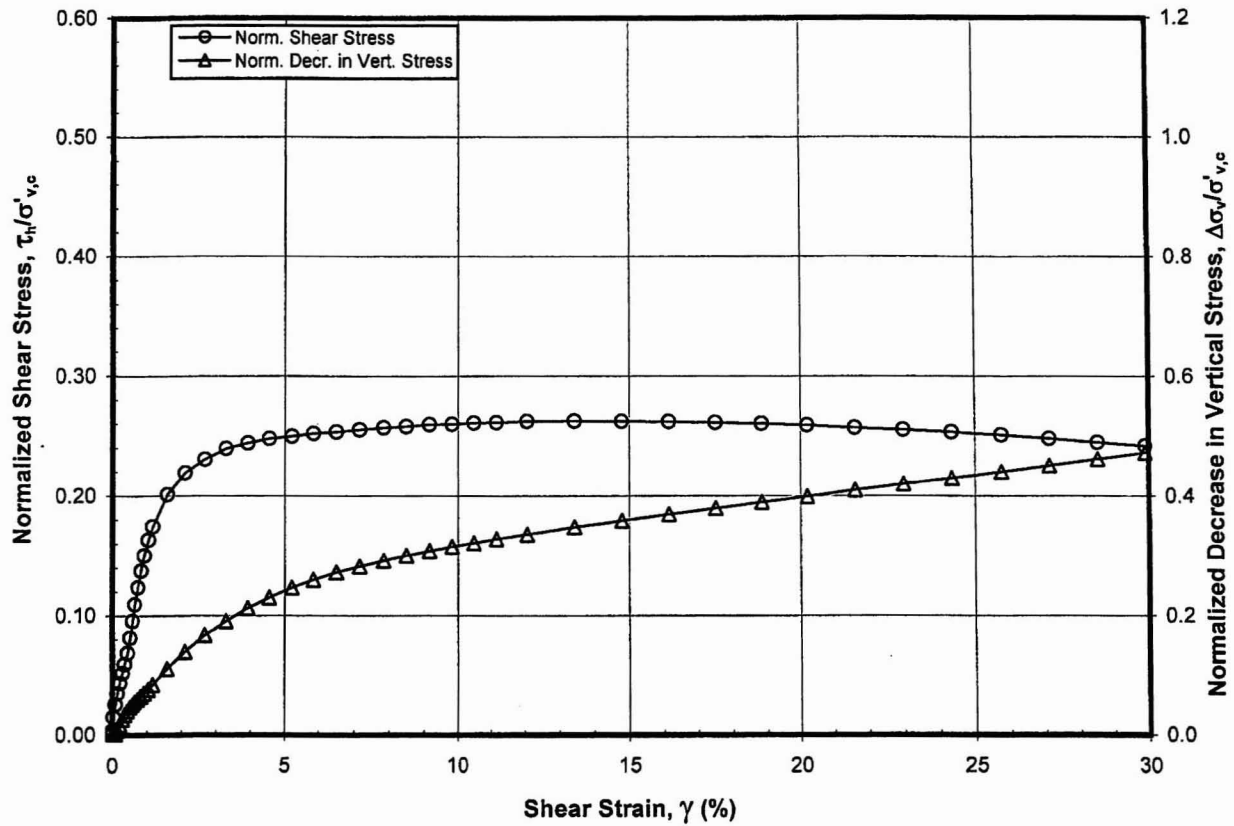
Final Visual Description and Remarks: Light Brown Clayey SAND (SC)

Loading Summary						
	$\tau_h$ (ksf)	$\gamma$ (%)	$\sigma'_v$ (ksf)	$\tau_h / \sigma'_v$	$\Delta \sigma'_v / \sigma'_{v,c}$	$c_u / \sigma'_{v,c}$
at Peak Shear Stress	4.341	11.64	10.183	0.426	0.416	0.249
at Maximum Strain	3.886	29.59	8.002	0.486	0.541	-

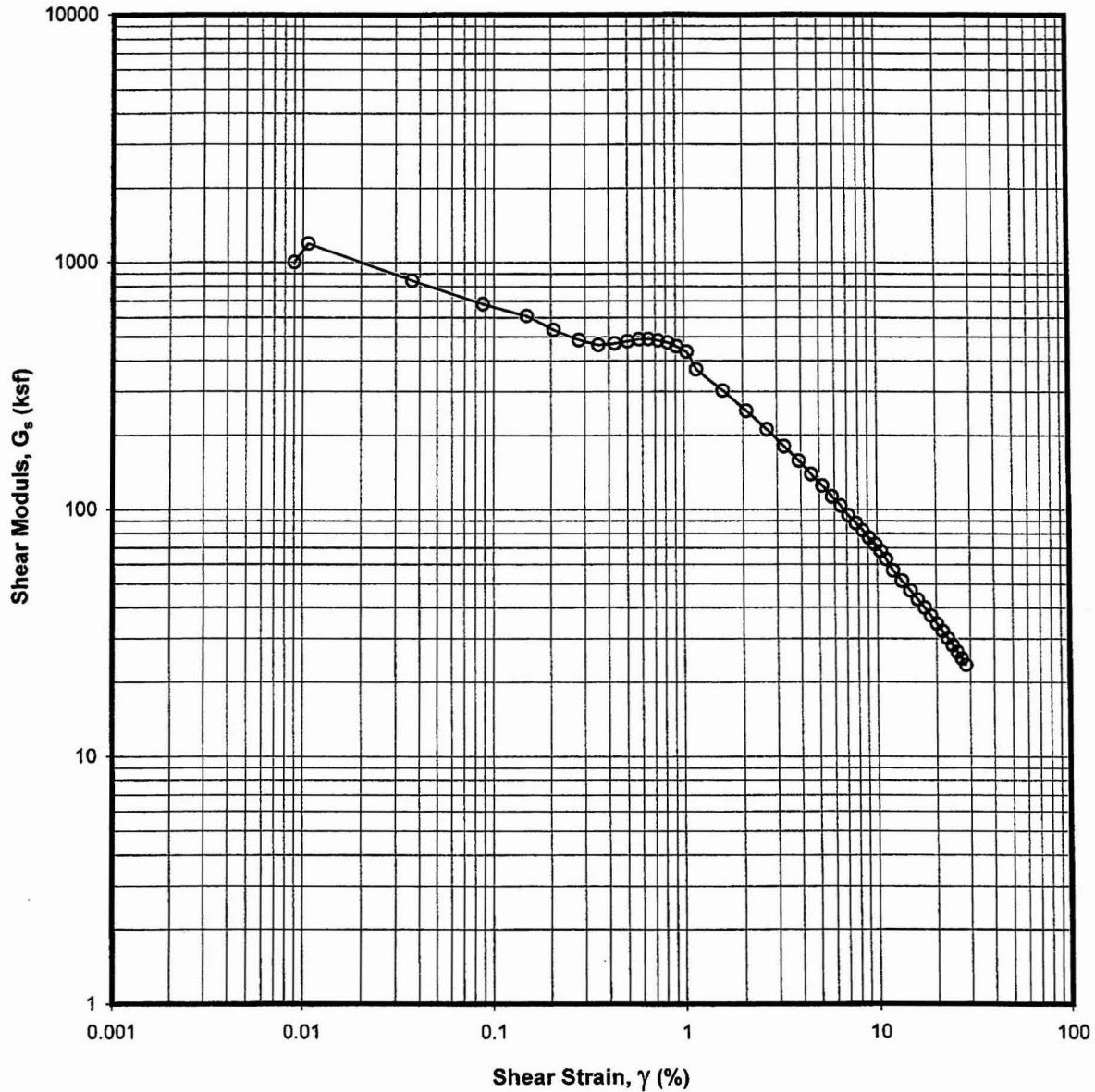


Boring No.: TP2319/TP2334 Sample No.: Comp-AK

Elapsed Time (min)	Shear Strain $\gamma$ (%)	Shear Stress $\tau_h$ (ksf)	Effective Vertical Stress $\sigma'_v$ (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 $\phi'_{DSS}$ ( $^\circ$ )
0.0	0.00	-0.022	17.425	0.000	-	-	-0.001	1.000	0.000	-0.07
2.7	0.01	0.279	17.400	0.025	4998.744	2837.346	0.016	0.999	0.001	0.92
5.4	0.05	0.591	17.395	0.031	1174.656	559.978	0.034	0.998	0.002	1.95
8.1	0.11	0.833	17.351	0.075	801.489	384.269	0.048	0.996	0.004	2.75
10.8	0.18	1.078	17.230	0.195	604.254	304.474	0.062	0.989	0.011	3.58
13.5	0.26	1.308	17.129	0.296	505.563	282.127	0.075	0.983	0.017	4.37
16.2	0.35	1.542	16.992	0.433	451.156	253.103	0.089	0.975	0.025	5.19
18.9	0.44	1.756	16.850	0.575	403.065	128.305	0.101	0.967	0.033	5.95
21.6	0.60	1.803	16.576	0.849	305.243	33.072	0.103	0.951	0.049	6.21
24.3	0.80	1.877	16.548	0.877	236.167	134.782	0.108	0.950	0.050	6.47
27.0	0.93	2.173	16.512	0.913	235.827	236.635	0.125	0.948	0.052	7.50
29.7	1.04	2.439	16.366	1.060	236.230	211.206	0.140	0.939	0.061	8.48
32.4	1.17	2.680	16.170	1.255	230.225	178.490	0.154	0.928	0.072	9.41
35.1	1.30	2.903	15.981	1.444	224.701	166.486	0.167	0.917	0.083	10.30
37.8	1.43	3.103	15.758	1.667	218.884	147.778	0.178	0.904	0.096	11.14
40.5	1.56	3.290	15.544	1.881	211.726	125.139	0.189	0.892	0.108	11.95
43.2	1.72	3.472	15.276	2.149	202.593	92.957	0.199	0.877	0.123	12.80
45.9	1.91	3.606	14.987	2.438	189.927	58.636	0.207	0.860	0.140	13.53
54.0	2.46	3.854	14.203	3.222	157.435	36.388	0.221	0.815	0.185	15.18
62.1	3.06	4.019	13.538	3.888	132.274	20.120	0.231	0.777	0.223	16.54
70.2	3.70	4.099	12.954	4.471	111.310	11.960	0.235	0.743	0.257	17.56
78.3	4.33	4.172	12.508	4.917	96.776	7.570	0.239	0.718	0.282	18.45
86.4	5.01	4.197	12.093	5.332	84.155	4.305	0.241	0.694	0.306	19.14
94.4	5.63	4.228	11.778	5.648	75.429	3.468	0.243	0.676	0.324	19.75
102.5	6.33	4.241	11.454	5.971	67.317	2.172	0.243	0.657	0.343	20.32
110.6	6.96	4.257	11.207	6.219	61.492	3.774	0.244	0.643	0.357	20.80
118.7	7.64	4.291	10.996	6.429	56.476	2.313	0.246	0.631	0.369	21.32
126.8	8.29	4.288	10.728	6.697	51.964	1.889	0.246	0.616	0.384	21.79
134.9	8.97	4.317	10.654	6.772	48.383	1.726	0.248	0.611	0.389	22.06
143.0	9.64	4.311	10.503	6.922	44.940	1.670	0.247	0.603	0.397	22.32
151.1	10.31	4.339	10.394	7.032	42.279	1.066	0.249	0.596	0.404	22.66
159.2	11.00	4.325	10.263	7.162	39.528	0.217	0.248	0.589	0.411	22.85
167.3	11.64	4.341	10.183	7.242	37.473	-0.285	0.249	0.584	0.416	23.09
175.3	12.35	4.320	10.062	7.363	35.164	-0.650	0.248	0.577	0.423	23.24
186.1	13.24	4.335	9.963	7.463	32.899	0.152	0.249	0.572	0.428	23.52
202.3	14.58	4.317	9.768	7.657	29.756	-1.939	0.248	0.561	0.439	23.84
218.5	15.94	4.283	9.600	7.825	27.003	-2.858	0.246	0.551	0.449	24.04
234.7	17.33	4.238	9.417	8.009	24.578	-2.704	0.243	0.540	0.460	24.23
250.8	18.70	4.208	9.270	8.156	22.622	-2.269	0.241	0.532	0.468	24.42
267.0	20.06	4.176	9.023	8.402	20.922	-2.213	0.240	0.518	0.482	24.83
283.2	21.46	4.147	8.950	8.476	19.422	-2.325	0.238	0.514	0.486	24.86
299.4	22.84	4.111	8.805	8.620	18.096	-2.386	0.236	0.505	0.495	25.03
315.6	24.20	4.082	8.665	8.760	16.957	-2.373	0.234	0.497	0.503	25.22
331.7	25.57	4.047	8.483	8.942	15.913	-2.883	0.232	0.487	0.513	25.50
347.9	26.90	4.004	8.335	9.090	14.963	-3.503	0.230	0.478	0.522	25.66
364.1	28.24	3.953	8.176	9.249	14.074	-4.372	0.227	0.469	0.531	25.80
380.3	29.59	3.886	8.002	9.424	13.204	-4.945	0.223	0.459	0.541	25.90



**STATIC DSS TEST**  
 K<sub>0</sub> Consolidation - OCR = NA  
 Sample: Comp-AL - Depth: NA ft  
 Boring TP2319/TP2334  
 Exelon (Victoria)



**STATIC DSS TEST**  
K<sub>0</sub> Consolidation - OCR = NA  
Sample: Comp-AL - Depth: NA ft  
Boring TP2319/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-AI  
 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: 2.659       Meas.;       Assumed

<input type="checkbox"/> Tube	<input type="checkbox"/> Field Extruded	<input type="checkbox"/> Liner	<input checked="" type="checkbox"/> Remolded	<input checked="" type="checkbox"/> Tamping	Constant Effort:	Blows/Tamps per Layer = <u>11</u>
Boring No.: <u>TP2319/TP2334</u>	<input type="checkbox"/> LPC Core			<input type="checkbox"/> Impact/Rammer	Rammer Wgt. (lb) = _____	No. Layers = <u>3.00</u>
Sample No.: <u>Comp-A</u>	Compostite No.: _____			<input type="checkbox"/> Pluviated:	Tamper Force (lb) = <u>4.00</u>	Drop (in.) = <u>12.00</u>
Depth (ft): <u>NA</u>	Specimen No.: <u>L</u>			<input type="checkbox"/> Kneading	<input checked="" type="checkbox"/> Undercompaction: $U_{ni}$ (%) = _____	Dia. (in.) = <u>1.40</u>
<input type="checkbox"/> Spec. Selection by X-ray;	<input type="checkbox"/> Geomarine Sample				Ref. Effort = MOD	% Comp. = <u>± Opt. = +4</u>

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

Water Content (WC);	Initial - Trimming Location			Final, $W_{at}$ (see below)	Soil and Ring Masses	
	Top ( $W_{o,1}$ )	Bottom ( $W_{o,2}$ )	Sides ( $W_{o,3}$ )		Initial	Final
Container No.	766			592	Mass Moist Soil + Tare (g)	324.25      144.35
Mass Moist Soil + Cont. (g)	122.05			66.10	Mass Tare (g)	183.30      4.53
Mass Dry Soil + Container (g)	110.95			62.10	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	140.95      139.82
Mass Container (g)	31.95			31.77	<b>Excess Dry Soil (soil not included in final mass above)</b>	
WATER CONTENT (%)	14.05			13.19	Container No. _____	
Avg. Initial WC, $W_{o,avg}$ (%)	14.05		Final $W_{at}$ : <input checked="" type="checkbox"/> Slice ;	Whole Spec.	Mass Dry Soil + Container (g) _____	
					Mass Container (g) _____	
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)      0.00	

Specimen Trimming:			
<input type="checkbox"/> Trimming Ring for Fugro Apparatus	NL6	Large-ring ID #	
<input checked="" type="checkbox"/> Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	18.55	$A_{s,t}$ (cm <sup>2</sup> ):	34.68
$D_{s,t}$ (mm):	66.45	$V_{s,t}$ (cm <sup>3</sup> ):	64.32
Remarks: _____			
Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height ( $H_{tr}$ )	Diameter ( $D_o$ )		Remarks:
1    18.570	1-T	NA	For Free Standing or Reconstituted Spec.:
2    18.530	2-M	NA	
3    18.540	3-B	NA	
4    18.510	1'-T	NA	
5    18.550	2'-M	NA	
Avg.	3'-B	NA	$A_{tr}$ (cm <sup>2</sup> ):      NA
= 18.550	Avg	NA	$V_{tr}$ (cm <sup>3</sup> ):      NA

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft <sup>3</sup> ) =	136.80
Dry, $\gamma_{d,o}$ (lb/ft <sup>3</sup> ) =	119.94

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) = _____		
Stress Level	Dia. by PiTape (mm) Meas.	Corr.	Area, $A_{c,n}$ (cm <sup>2</sup> )	(in <sup>2</sup> )
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
<input checked="" type="checkbox"/> Regular Membrane with Ring Set No. <u>7</u>	ID, Rings (mm)			
Thickness (mm):	Top: <u>0.57</u>		= <u>67.03</u>	
<input type="checkbox"/> Single	Bottom: <u>0.59</u>		Corr. for mem. _____	
<input checked="" type="checkbox"/> Double	Membr. Thick. = <u>0.29</u>		= <u>66.450</u>	
Area Ring with mem., $A_o$ (cm <sup>2</sup> ) =		<u>34.68</u>	; (in <sup>2</sup> ) = <u>5.375</u>	
Mass Top Cap, etc., $M_{tc}$ =	<u>527.2</u> g,	<u>1.16</u> lbf		
Data corr. for $M_{tc}$ :	<input checked="" type="checkbox"/> Yes;	<input type="checkbox"/> No	Plattens with Pins:	<input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No

Note: NA indicates not applicable.  
F or G in the Sta. No. indicates Fugro or GEOTAC apparatus.

Final Visual Description: Light Brown Clayey SAND (SC)

Other Remarks: \_\_\_\_\_

Trim./ Recon. By: <u>DBN</u>	Setup By: <u>HC</u>	Take Down By: <u>PL</u>
Date: <u>5/13/2008</u>	Date: <u>5/13/2008</u>	Date: <u>5/16/2008</u>
Prelim. Calc. By: <u>HC</u>	Final Calc. By: <u>LF</u>	Reviewed By: <u>HP</u> <b>HP</b>

Specimen Take Down:  Spec. removed right after shearing  
 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-AL  
 Task Number: NA      Specific Gravity: 2.659       Measured;     Assumed  
 Type Test: SDSS      Specimen:  "Undisturbed";     Reconstituted;     Remolded      Boring No.: TP2319/TP2334  
 Calculations Corr. for Salt (dissolved solids):  No or,     Yes, with concentration = \_\_\_\_\_ ppm      Sample No.: Comp-AL

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, $\sigma'_v$ (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 <sup>3</sup> )			<u>NA</u>	<u>NA</u>
$t_c$ (ON,days,hrs)	<u>NA</u>	<u>2.0 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) = <u>NA</u> & Duration (min) = <u>NA</u> & Delta disp., $\Delta d_{h,ua}$ (mm) = <u>NA</u>									

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.
$W_o$	<u>14.05</u>			<u>14.05</u>	<u>14.05</u>	<u>14.10</u>
$S_o$	<u>97.9</u>			<u>97.9</u>	<u>97.9</u>	<u>98.1</u>
Measured final mass of moist soil, $M_{lat}$ (g)						<u>139.82</u>
Final mass of moist soil corrected for excess dry soil, $M_{lat,c}$ (g)						<u>139.82</u>

Calculated Mass of Dry Soil (g)	
Initial Selected Water Content (%)	<u>14.05</u>
Initial, $M_{d,o}$	<u>123.59</u>
Final, $M_{d,at}$	<u>123.53</u>
Selected, $M_d$	<u>123.56</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: (+) $\Delta V$ out & $\Delta H$ down; (-) $\Delta V$ in & $\Delta H$ up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	<u>1.743</u>		
Total Equip. Comp., $\Sigma \Delta d_{afc}$ (mm)	<u>0.000</u>		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	<u>1.743</u>		
$\Delta V_n$ using $A_o$ - spec. (cm <sup>3</sup> )	<u>6.04</u>		
$\Delta V_n$ using $A_{c,n}$ - app. (cm <sup>3</sup> )	<u>6.04</u>		
$\Delta V_n$ using burette meas. (cm <sup>3</sup> )	<u>1.90</u>		
Selected $\Delta V_n$ (cm <sup>3</sup> )	<u>6.04</u>	<u>NA</u>	<u>NA</u> = $\Delta V_{ul}$
After Test WC Corr. for $\Delta V$ during Shear & Unloading, $W_{at,c}$ (%)			
<u>NA</u>			

Calculation of $\Delta V_c$ by Different Procedures			
By Selected Volumes		By Change in Mass	
$\Delta V_c$ (cm <sup>3</sup> )	<u>6.04</u>	$\sim M_{t,o} - (M_{lat,c} + \Delta V_L + \Delta V_{ul})$	
By Cal. Height & App. Area		$\Delta V_c$ (cm <sup>3</sup> )	
$\Delta V_c$ (cm <sup>3</sup> )	<u>6.04</u>	<u>1.13</u>	
By Cal. Ht. & Init. Spec. Area		By Saturation = 100% and Spec. Unloaded to 0 Stress	
$\Delta V_c$ (cm <sup>3</sup> )	<u>6.04</u>	$\Delta V_c$ (cm <sup>3</sup> )	<u>NA</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>9.48</u>
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	<u>NA</u>

<b>Consolidation &amp; Preshear Conclusions</b>	$\Delta V_c$ (cm <sup>3</sup> ) = <u>6.04</u>	$\Delta H_c$ (mm) = <u>1.743</u>	$\epsilon_{a,c}$ (%) = <u>9.39</u>	$\Delta V_{c,max}$ (cm <sup>3</sup> ) = <u>NA</u>	
	$V_c$ (cm <sup>3</sup> ) = <u>58.29</u>	$H_c$ (mm) = <u>16.807</u>	$\epsilon_{v,c}$ (%) = <u>9.38</u>		$\epsilon_{ac,max}$ (%) = <u>NA</u>
	$A_c$ (cm <sup>2</sup> ) = <u>34.68</u>	$\Delta \gamma_c$ (mm) = <u>NA</u>	$\gamma_c$ (%) = <u>NA</u>		Preshear: $\gamma_{ua}$ (%) = <u>NA</u>

Summary of Specimen Physical Properties:								
Specific Gravity: $G_s = 2.659$ Measured	Height (mm)	Volume (cm <sup>3</sup> )	Area (cm <sup>2</sup> )	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	<u>18.550</u>	<u>64.32</u>	<u>34.68</u>	<u>14.1</u>	<u>136.8</u>	<u>119.9</u>	<u>98.0</u>	<u>0.384</u>
After to $\sigma'_{v,c}$	<u>16.807</u>	<u>58.29</u>	<u>34.68</u>	<u>9.5</u>	<u>144.9</u>	<u>132.3</u>	<u>100.0</u>	<u>0.254</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 = 240.7 min



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

<input type="checkbox"/> Tube	<input type="checkbox"/> Field Extruded	<input type="checkbox"/> Liner	<input checked="" type="checkbox"/> Remolded	<input checked="" type="checkbox"/> Tamping	Constant Effort: Blows/Tamps per Layer = <u>11</u>	
Boring No.: <u>TP2319/TP2334</u>	<input type="checkbox"/> LPC Core			<input type="checkbox"/> Impact/Rammer	Rammer Wgt. (lbf) = _____	No. Layers = <u>3.00</u>
Sample No.: <u>Comp-A</u>	Composite No.: _____			<input type="checkbox"/> Pluviated:	Tamper Force (lbf) = <u>4.00</u>	Drop (in.) = <u>12.00</u>
Depth (ft): <u>NA</u>	Specimen No.: <u>L</u>			<input type="checkbox"/> Kneading	<input checked="" type="checkbox"/> Undercompaction: $U_{ni}$ (%) = _____	Dia. (in.) = <u>1.40</u>
<input type="checkbox"/> Spec. Selection by X-ray;	<input type="checkbox"/> Geomarine Sample				Ref. Effort= MOD % Comp. = _____	$\pm$ Opt.= <u>+4</u>

Type Consolidation:	<input checked="" type="checkbox"/> $K_o$ at:	<input checked="" type="checkbox"/> Incremental CRS	<input type="checkbox"/> Anisotropic at:	<input type="checkbox"/> Inclined Stress Path, $K_{c,DSS}$	<input type="checkbox"/> Used Automated System	Remarks:
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain Stress	<input type="checkbox"/> Creep Post Cyclic	<input checked="" type="checkbox"/> Const. Vol./Ht Drained	<input checked="" type="checkbox"/> Without - Water Bath	<input type="checkbox"/> Cyclic (Hz) Rate: <u>0.1</u> ;
	<input type="checkbox"/> Dynamic	<input type="checkbox"/> Stress			<input type="checkbox"/> With - Bath	<input type="checkbox"/> Strain 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity:	Height	Volume	Area	Water Content	Unit Weight		Saturation	LL	-200	Void Ratio,
$G_s = 2.659$ Measured	(mm)	( $cm^3$ )	( $cm^2$ )	(%)	Total (pcf)	Dry (pcf)	(%)	PL	%	$e$
Condition:								PI		
Initial	18.55	64.32	34.68	14.08	136.8	119.9	98.0	34	46.4	0.384
After to $\sigma'_{v,c}$	16.81	58.29	34.68	9.48	144.9	132.3	100.0	12	NA	0.254
Consol.: to $\sigma'_{vc,max}$	NA	NA	NA	NA	NA	NA	NA	22	NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	<input checked="" type="checkbox"/> Static Strain Rate = <u>4.5 %/hr.</u>					
Vert. Consol. Stress, $\sigma'_{v,c}$	(ksf)	NA	28.953	NA	Cyclic Rate (Hz):	<u>0.1</u> ;	<u>1</u> ;	Other =		
Induced OCR:	-	NA	NA	NA	During/End of Loading		Static	Cyclic		
Axial Strain during Consol., $\epsilon_{a,c}$	%	NA	9.39	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	$\pm \tau_h =$ <u>NA</u> (ksf)		$\pm \gamma =$ <u>NA</u> %			
Undr. Ambient Shear Strain, $\epsilon_{ub}$	%	NA	NA	NA	at end of cyclic loading, $\sigma'_{vc,yr} =$ <u>NA</u> (ksf)					

Weight Top Cap, etc., $M_{tc}$ (lbf): <u>1.16</u>	Data Normalization: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Value: <u>28.953</u> (ksf)
Data corr. for $M_{tc}$ : <input checked="" type="checkbox"/> Yes; <input type="checkbox"/> No	Plattens with Pins: <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No
Wire Reinforced Membrane, Model: _____	Data corr. for Membr. strength: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<input checked="" type="checkbox"/> Regular Membrane with Rings	<input checked="" type="checkbox"/> Pre-Shear Conditions <input type="checkbox"/> Post-Cyclic Conditions
	<input type="checkbox"/> 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.

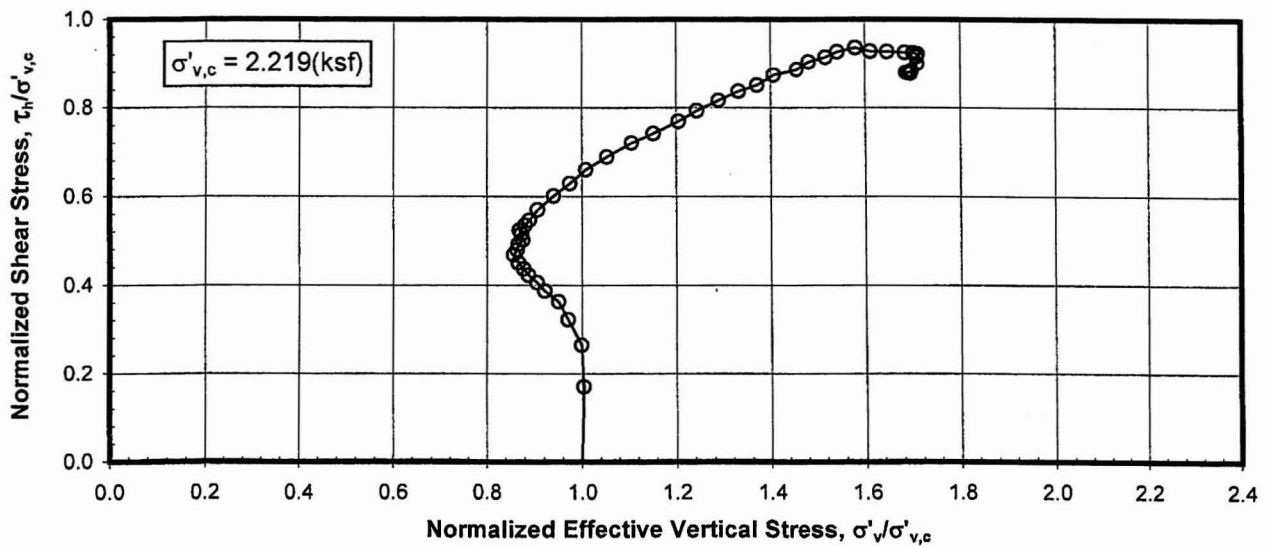
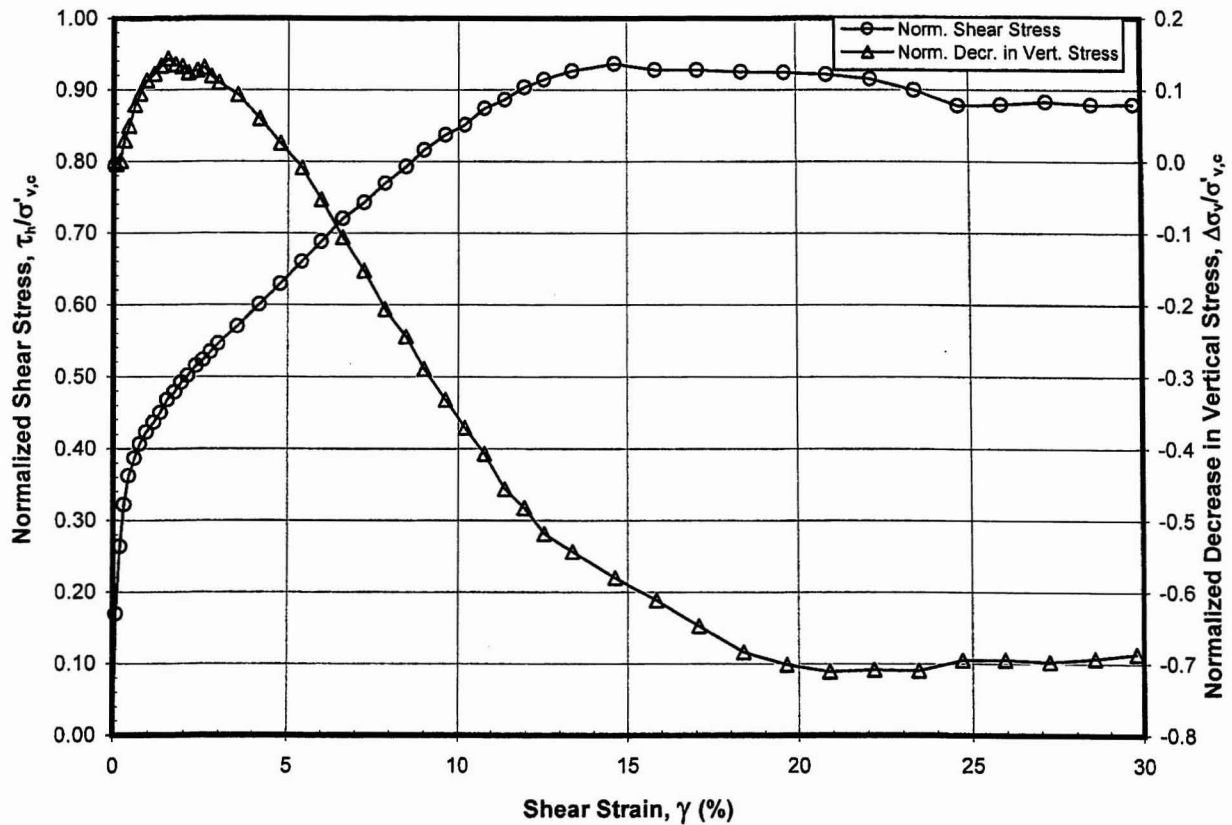
NA - Not Applicable

Final Visual Description and Remarks: Light Brown Clayey SAND (SC)

Loading Summary						
	$\tau_h$ (ksf)	$\gamma$ (%)	$\sigma'_v$ (ksf)	$\tau_h/\sigma'_v$	$\Delta\sigma'_v/\sigma'_{v,c}$	$c_u/\sigma'_{v,c}$
at Peak Shear Stress	7.597	13.42	18.892	0.402	0.347	0.262
at Maximum Strain	7.000	29.90	15.276	0.458	0.472	-

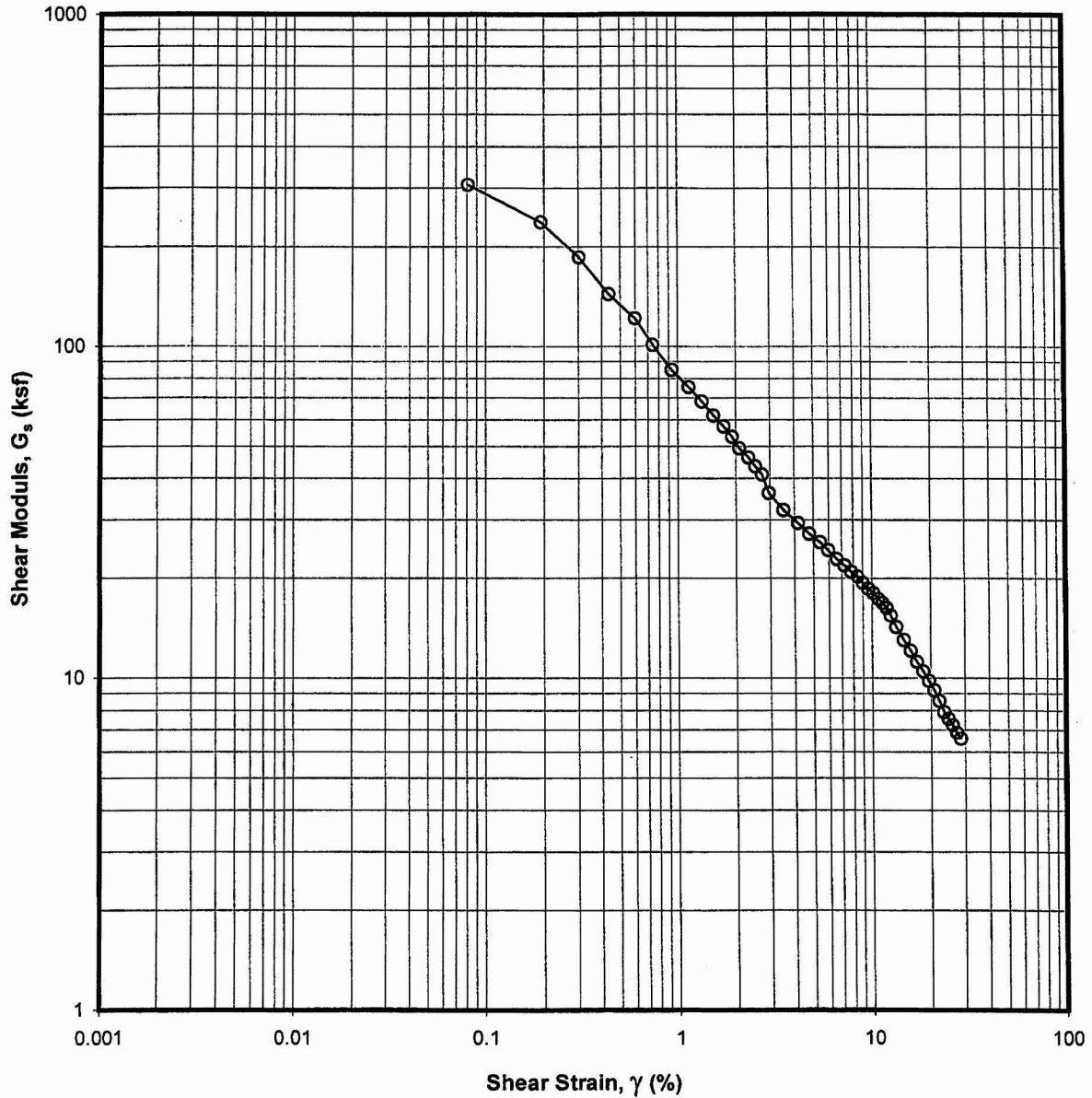
Boring No.: TP2319/TP2334 Sample No.: Comp-AL

Elapsed Time (min)	Shear Strain $\gamma$ (%)	Shear Stress $\tau_h$ (ksf)	Effective Vertical Stress $\sigma'_v$ (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 $\phi'_{bss}$ (°)
0.0	0.00	-0.003	28.953	0.000	-	-	0.000	1.000	0.000	-0.01
2.7	0.01	0.023	28.937	0.016	290.042	2564.765	0.001	0.999	0.001	0.05
5.5	0.01	0.104	28.974	-0.021	999.840	3056.620	0.004	1.001	-0.001	0.21
8.2	0.04	0.434	28.978	-0.025	1193.858	934.030	0.015	1.001	-0.001	0.86
10.9	0.09	0.738	28.939	0.014	844.207	519.151	0.025	1.000	0.000	1.46
13.6	0.15	1.012	28.730	0.223	679.108	435.508	0.035	0.992	0.008	2.02
16.4	0.21	1.259	28.481	0.472	608.714	374.082	0.043	0.984	0.016	2.53
19.1	0.28	1.494	28.204	0.749	533.535	310.923	0.052	0.974	0.026	3.03
21.8	0.35	1.715	27.961	0.991	485.345	330.544	0.059	0.966	0.034	3.51
24.5	0.43	1.986	27.777	1.176	463.443	435.014	0.069	0.959	0.041	4.09
27.2	0.50	2.356	27.591	1.362	470.135	523.802	0.081	0.953	0.047	4.88
30.0	0.58	2.759	27.474	1.478	478.949	551.307	0.095	0.949	0.051	5.73
32.7	0.65	3.163	27.346	1.606	488.406	530.435	0.109	0.945	0.055	6.60
35.4	0.73	3.577	27.228	1.725	489.296	462.312	0.124	0.940	0.060	7.48
38.2	0.82	3.975	27.092	1.861	482.436	410.495	0.137	0.936	0.064	8.35
40.9	0.92	4.347	26.924	2.028	473.173	358.844	0.150	0.930	0.070	9.17
43.6	1.04	4.726	26.738	2.215	456.499	292.208	0.163	0.924	0.076	10.02
46.3	1.16	5.051	26.517	2.436	435.220	221.483	0.174	0.916	0.084	10.78
54.5	1.58	5.819	25.745	3.208	368.626	142.543	0.201	0.889	0.111	12.74
62.7	2.09	6.341	24.927	4.026	302.954	79.420	0.219	0.861	0.139	14.27
70.8	2.67	6.671	24.124	4.829	250.023	49.594	0.230	0.833	0.167	15.46
79.0	3.29	6.930	23.445	5.508	210.807	31.290	0.239	0.810	0.190	16.47
87.2	3.93	7.063	22.815	6.138	179.868	19.088	0.244	0.788	0.212	17.20
95.3	4.56	7.172	22.306	6.646	157.466	12.809	0.248	0.770	0.230	17.82
103.5	5.22	7.226	21.824	7.129	138.608	9.073	0.250	0.754	0.246	18.32
111.7	5.85	7.289	21.436	7.516	124.602	7.908	0.252	0.740	0.260	18.78
119.8	6.51	7.328	21.084	7.869	112.678	7.483	0.253	0.728	0.272	19.16
128.0	7.15	7.386	20.789	8.164	103.321	7.716	0.255	0.718	0.282	19.56
136.2	7.85	7.431	20.513	8.440	94.705	5.798	0.257	0.708	0.292	19.91
144.4	8.49	7.464	20.265	8.688	87.908	6.180	0.258	0.700	0.300	20.22
152.5	9.16	7.512	20.054	8.899	82.013	3.673	0.259	0.693	0.307	20.54
160.7	9.82	7.514	19.830	9.123	76.502	2.934	0.260	0.685	0.315	20.75
168.9	10.48	7.551	19.661	9.292	72.070	3.201	0.261	0.679	0.321	21.01
177.1	11.16	7.556	19.459	9.494	67.735	2.037	0.261	0.672	0.328	21.22
187.9	12.07	7.586	19.250	9.703	62.874	2.071	0.262	0.665	0.335	21.51
204.3	13.42	7.597	18.892	10.061	56.616	0.074	0.262	0.653	0.347	21.91
220.6	14.78	7.588	18.580	10.373	51.360	-0.684	0.262	0.642	0.358	22.22
237.0	16.14	7.578	18.271	10.682	46.974	-1.314	0.262	0.631	0.369	22.53
253.3	17.50	7.552	17.984	10.969	43.168	-1.800	0.261	0.621	0.379	22.78
269.6	18.84	7.530	17.693	11.260	39.975	-2.162	0.260	0.611	0.389	23.05
285.9	20.20	7.494	17.405	11.548	37.107	-3.600	0.259	0.601	0.399	23.29
302.3	21.60	7.430	17.101	11.852	34.403	-3.793	0.257	0.591	0.409	23.48
318.6	22.99	7.388	16.802	12.151	32.149	-3.669	0.255	0.580	0.420	23.74
335.0	24.35	7.329	16.523	12.430	30.112	-4.641	0.253	0.571	0.429	23.92
351.3	25.75	7.260	16.219	12.734	28.199	-5.391	0.251	0.560	0.440	24.11
367.6	27.12	7.180	15.907	13.045	26.479	-6.201	0.248	0.549	0.451	24.29
384.0	28.51	7.088	15.585	13.368	24.868	-6.465	0.245	0.538	0.462	24.46
400.3	29.90	7.000	15.276	13.676	23.420	-6.338	0.242	0.528	0.472	24.62



**STATIC DSS TEST**  
 K<sub>o</sub> Consolidation - OCR = NA  
 Sample: Comp-BA - Depth: NA ft  
 Boring TP2317/TP2334  
 Exelon (Victoria)

KAW 7/16/08



**STATIC DSS TEST**  
 $K_0$  Consolidation - OCR = NA  
Sample: Comp-BA - 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.: 6G      File Name: Comp-Ba  
 Task No.: NA      Assign,  $\sigma'_{v,c}$  = 2.16 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

<input type="checkbox"/> Tube	<input type="checkbox"/> Field Extruded	<input type="checkbox"/> Liner	<input checked="" type="checkbox"/> Remolded	<input checked="" type="checkbox"/> Tamping	Constant Effort:	Blows/Tamps per Layer = <u>11</u>
Boring No.: <u>TP2317/TP2334</u>	<input type="checkbox"/> LPC Core			Impact/Rammer	Rammer Wgt.(lb)= _____	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>A</u>			Kneading	<input checked="" type="checkbox"/> Undercompaction: $U_{ni}$ (%) = _____	Dia. (in.) = <u>1.40</u>
<input type="checkbox"/> Spec. Selection by X-ray;	<input type="checkbox"/> Geomarine Sample				Ref. Effort= MOD	% Comp. = <u>95.0</u> ± Opt.= <u>+4</u>

Type Consolidation:	<input checked="" type="checkbox"/> $K_o$ at:	<input checked="" type="checkbox"/> Incremental	;	<input type="checkbox"/> Anisotropic at:	Inclined Stress Path, $K_{c,DSS}$	<input type="checkbox"/> Used Automated System
		CRS			90° Stress Path	Remarks: _____
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain	<input type="checkbox"/> Creep	<input checked="" type="checkbox"/> Const. Vol./Ht	<input checked="" type="checkbox"/> Without - Water	<input type="checkbox"/> Cyclic (Hz)
	<input type="checkbox"/> Rapid	<input type="checkbox"/> Stress	<input type="checkbox"/> Post Cyclic	<input type="checkbox"/> Drained	<input type="checkbox"/> With - Bath	Rate: <input type="checkbox"/> 0.1; <input type="checkbox"/> 1; 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 Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)		
Container No.	848			917	Mass Tare (g)	186.80	4.25	
Mass Moist Soil + Cont. (g)	114.63			66.79	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	138.95	140.31	
Mass Dry Soil + Container (g)	103.68			61.50	Excess Dry Soil (soil not included in final mass above)			
Mass Container (g)	32.12			31.94	Container No. _____			
WATER CONTENT (%)	15.30			17.90	Mass Dry Soil + Container (g) _____			
Avg. Initial WC, $W_{o,avg}$ (%)	15.30		Final $W_{at}$ : <input checked="" type="checkbox"/> Slice ;	Whole Spec.	Mass Container (g) _____			
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g) <u>0.00</u>			

Specimen Trimming:				
<input type="checkbox"/> Trimming Ring for Fugro Apparatus	NL3	Large-ring ID #		
<input checked="" type="checkbox"/> Trimming Ring for NGI Apparatus		Small-ring ID #		
$H_{s,t}$ (mm):	18.65	$A_{s,t}$ (cm <sup>2</sup> ):	34.87	
$D_{s,t}$ (mm):	66.63	$V_{s,t}$ (cm <sup>3</sup> ):	65.03	
Remarks: _____				
<input type="checkbox"/> Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)				
Height ( $H_{tr}$ )	Diameter ( $D_o$ )	Remarks:		
1 18.660	1-T NA	For Free Standing or Reconstituted Spec.:		
2 18.610	2-M NA			
3 18.650	3-B NA			
4 18.710	1-T NA			
5 18.660	2-M NA			
Avg.	3-B NA	$A_{tr}$ (cm <sup>2</sup> ):	NA	
= 18.650	Avg NA	$V_{tr}$ (cm <sup>3</sup> ):	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 <sup>3</sup> )=	133.38
Dry, $\gamma_{d,o}$ (lb/ft <sup>3</sup> )=	115.68

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PiTape (mm) Meas.	Corr.	Area, $A_{c,n}$ (cm <sup>2</sup> )	(in <sup>2</sup> )
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
<input checked="" type="checkbox"/> Regular Membrane with Ring Set No. <u>6</u>	ID, Rings (mm)			
Thickness (mm):	Top: <u>0.52</u>	=	<u>66.86</u>	
<input type="checkbox"/> Single	Bottom: <u>0.56</u>	=	Corr. for mem.	
<input checked="" type="checkbox"/> Double	Membr. Thick. = <u>0.27</u>	=	<u>66.320</u>	
Area Ring with mem., $A_o$ (cm <sup>2</sup> )=		<u>34.54</u>	; (in <sup>2</sup> )= <u>5.354</u>	
Mass Top Cap, etc., $M_{tc}$ =	<u>526.0</u> g,	<u>1.16</u> lbf		
Data corr. for $M_{tc}$ : <input checked="" type="checkbox"/> Yes;	<input type="checkbox"/> No	Plattens with Pins: <input type="checkbox"/> Yes;	<input checked="" type="checkbox"/> No	

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

Other Remarks: \_\_\_\_\_

Trim./ Recon. By: <u>DBN</u>	Setup By: <u>HC</u>	Take Down By: <u>HC</u>
Date: <u>4/18/2008</u>	Date: <u>4/18/2008</u>	Date: <u>4/21/2008</u>
Prelim. Calc. By: <u>LF</u>	Final Calc. By: <u>LF</u>	Reviewed By: <u>HP</u>

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.: 6G File Name: Comp-Ba  
 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-BA

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, $\sigma'_v$ (ksf)	<u>NA</u>	<u>2.16</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 <sup>3</sup> )			<u>NA</u>	<u>NA</u>
$t_c$ (ON, days, hrs)	<u>NA</u>	<u>0.88 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) = <u>NA</u> & Duration (min) = <u>NA</u> & Delta disp., $\Delta d_{h,ua}$ (mm) = <u>NA</u>									

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.
$W_o$	<u>15.30</u>			<u>15.30</u>	<u>15.30</u>	<u>16.75</u>
$S_o$	<u>91.4</u>			<u>91.4</u>	<u>91.4</u>	<u>96.2</u>
Measured final mass of moist soil, $M_{lat}$ (g)						<u>140.31</u>
Final mass of moist soil corrected for excess dry soil, $M_{lat,c}$ (g)						<u>140.31</u>

Calculated Mass of Dry Soil (g)	
Initial Selected Water Content (%)	<u>15.30</u>
Initial, $M_{d,o}$	<u>120.51</u>
Final, $M_{d,at}$	<u>119.01</u>
Selected, $M_d$	<u>119.76</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>2.160</u>	<u>NA</u>	<u>NA</u>
Sign Convention: (+) $\Delta V$ out & $\Delta H$ down; (-) $\Delta V$ in & $\Delta H$ up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	<u>0.360</u>		
Total Equip. Comp., $\Sigma \Delta d_{afc}$ (mm)	<u>0.000</u>		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	<u>0.360</u>		
$\Delta V_n$ using $A_o$ - spec. (cm <sup>3</sup> )	<u>1.26</u>		
$\Delta V_n$ using $A_{c,n}$ - app. (cm <sup>3</sup> )	<u>1.24</u>		
$\Delta V_n$ using burette meas. (cm <sup>3</sup> )	<u>-3.20</u>		
Selected $\Delta V_n$ (cm <sup>3</sup> )	<u>1.26</u>	<u>NA</u>	<u>NA</u> = $\Delta V_{ul}$
After Test WC Corr. for $\Delta V$ during Shear & Unloading, $W_{at,c}$ (%)			

Calculation of $\Delta V_c$ by Different Procedures			
By Selected Volumes		By Change in Mass	
$\Delta V_c$ (cm <sup>3</sup> )	<u>1.26</u>	$\sim M_{t,o} - (M_{lat,c} + \Delta V_L + \Delta V_{ul})$	
By Cal. Height & App. Area		$\Delta V_c$ (cm <sup>3</sup> )	<u>-1.36</u>
$\Delta V_c$ (cm <sup>3</sup> )	<u>1.24</u>	By Saturation = 100% and Spec. Unloaded to 0 Stress	
By Cal. Ht. & Init. Spec. Area		$\Delta V_c$ (cm <sup>3</sup> )	<u>NA</u>
$\Delta V_c$ (cm <sup>3</sup> )	<u>1.26</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>15.53</u>
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	<u>NA</u>

<b>Consolidation &amp; Preshear Conclusions</b>	$\Delta V_c$ (cm <sup>3</sup> ) = <u>1.85</u>	$\Delta H_c$ (mm) = <u>0.360</u>	$\epsilon_{a,c}$ (%) = <u>1.93</u>	$\Delta V_{c,max}$ (cm <sup>3</sup> ) = <u>NA</u>
	$V_c$ (cm <sup>3</sup> ) = <u>63.18</u>	$H_c$ (mm) = <u>18.290</u>	$\epsilon_{v,c}$ (%) = <u>2.85</u>	$\epsilon_{ac,max}$ (%) = <u>NA</u>
	$A_c$ (cm <sup>2</sup> ) = <u>34.54</u>	$\Delta \gamma_c$ (mm) = <u>NA</u>	$\gamma_c$ (%) = <u>NA</u>	Preshear: $\gamma_{ub}$ (%) = <u>NA</u>

Summary of Specimen Physical Properties:								
Specific Gravity: $G_s = 2.693$ Measured	Height (mm)	Volume (cm <sup>3</sup> )	Area (cm <sup>2</sup> )	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	<u>18.650</u>	<u>65.03</u>	<u>34.87</u>	<u>16.0</u>	<u>133.4</u>	<u>115.0</u>	<u>93.8</u>	<u>0.462</u>
After to $\sigma'_{v,c}$	<u>18.290</u>	<u>63.18</u>	<u>34.54</u>	<u>15.5</u>	<u>136.7</u>	<u>118.3</u>	<u>100.0</u>	<u>0.434</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 = 0.9 min

Project Number: 0411-08-1686 Test Type: SDSS Test Sta. No.: 6G File Name: \_Comp-Ba  
 Project Name: Exelon (Victoria) Task No.: NA Test No.: NA Test Series for: NA

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

Type Consolidation:	<input checked="" type="checkbox"/> $K_0$ at:	<input checked="" type="checkbox"/> Incremental CRS	<input type="checkbox"/> Anisotropic at:	<input type="checkbox"/> Inclined Stress Path, $K_{c,DSS}$	<input type="checkbox"/> Used Automated System	Remarks:
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain Stress	<input type="checkbox"/> Creep Post Cyclic	<input checked="" type="checkbox"/> Const. Vol./Ht Drained	<input checked="" type="checkbox"/> Without - Water Bath	<input type="checkbox"/> Cyclic (Hz) Rate: <u>0.1</u> ;
	<input type="checkbox"/> Dynamic	<input type="checkbox"/> Stress			<input type="checkbox"/> With - Bath	<input type="checkbox"/> Strain <input type="checkbox"/> Stress 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity: $G_s = 2.693$ Measured	Height (mm)	Volume (cm <sup>3</sup> )	Area (cm <sup>2</sup> )	Water Content (%)	Unit Weight (pcf)		Saturation (%)	LL PL	-200 %	Void Ratio, e
Condition: Initial	18.65	65.03	34.87	16.02	133.4	115.0	93.8	44	73.6	0.462
After to $\sigma'_{v,c}$	18.29	63.18	34.54	15.53	136.7	118.3	100.0	15	NA	0.434
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	<input checked="" type="checkbox"/> Static Strain Rate = <u>4.9 %/hr.</u>					
Vert. Consol. Stress, $\sigma'_{v,c}$ :	(ksf)	NA	2.219	NA	Cyclic Rate (Hz): <u>0.1</u> ;	1; Other =				
Induced OCR:	-	NA	NA	NA	During/End of Loading		Static	Cyclic		
Axial Strain during Consol., $\epsilon_{a,c}$ :	%	NA	1.93	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 <sup>3</sup> ):		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 = <u>NA</u>					
Undr. Ambient Shear Stress, $\tau_{h,ua}$ :	(ksf)	NA	NA	NA	$\pm \tau_h =$ <u>NA</u> (ksf)		$\pm \gamma =$ <u>NA</u> %		at end of cyclic loading, $\sigma'_{vc,yf} =$ <u>NA</u> (ksf)	
Undr. Ambient Shear Strain, $\epsilon_{ua}$ :	%	NA	NA	NA						

Weight Top Cap, etc., $M_{tc}$ (lbf): <u>1.16</u>	Data Normalization: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Value: <u>2.219</u> (ksf)
Data corr. for $M_{tc}$ : <input checked="" type="checkbox"/> Yes; <input type="checkbox"/> No	Plattens with Pins: <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No
Wire Reinforced Membrane, Model: <u>          </u>	Data corr. for Membr. strength: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<input checked="" type="checkbox"/> Regular Membrane with Rings	<input checked="" type="checkbox"/> Pre-Shear Conditions <input type="checkbox"/> Post-Cyclic Conditions
	Maximum Stress during Consol. <input type="checkbox"/>

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.

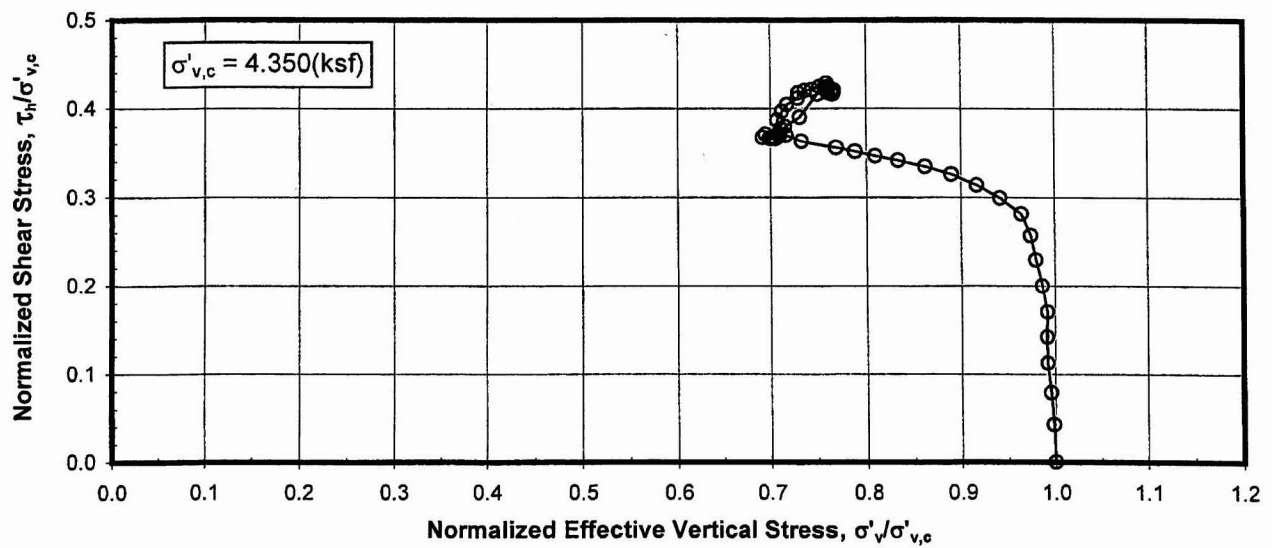
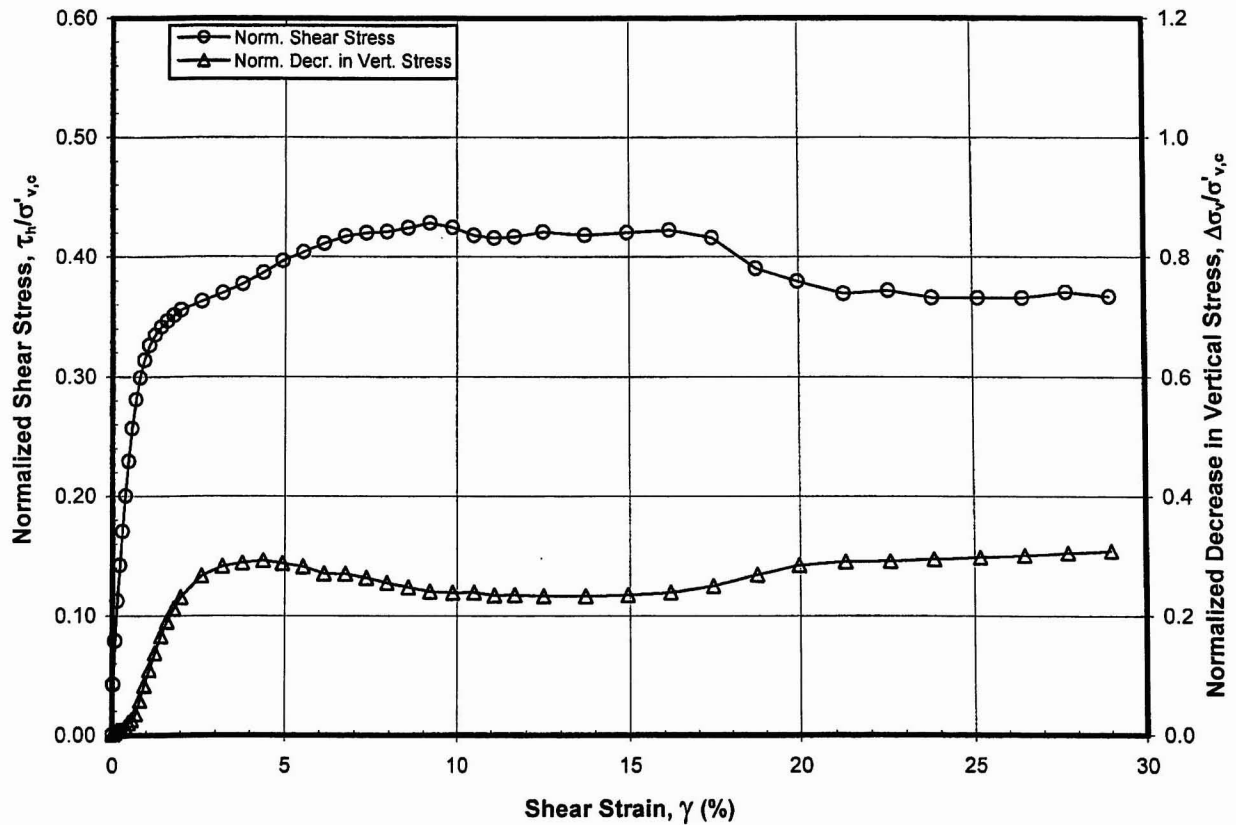
NA - Not Applicable

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

Loading Summary						
	$\tau_h$ (ksf)	$\gamma$ (%)	$\sigma'_v$ (ksf)	$\tau_h / \sigma'_v$	$\Delta \sigma'_v / \sigma'_{v,c}$	$c_u / \sigma'_{v,c}$
at Peak Shear Stress	2.078	14.63	3.508	0.592	-0.581	0.936
at Maximum Strain	1.953	29.78	3.743	0.522	-0.687	-

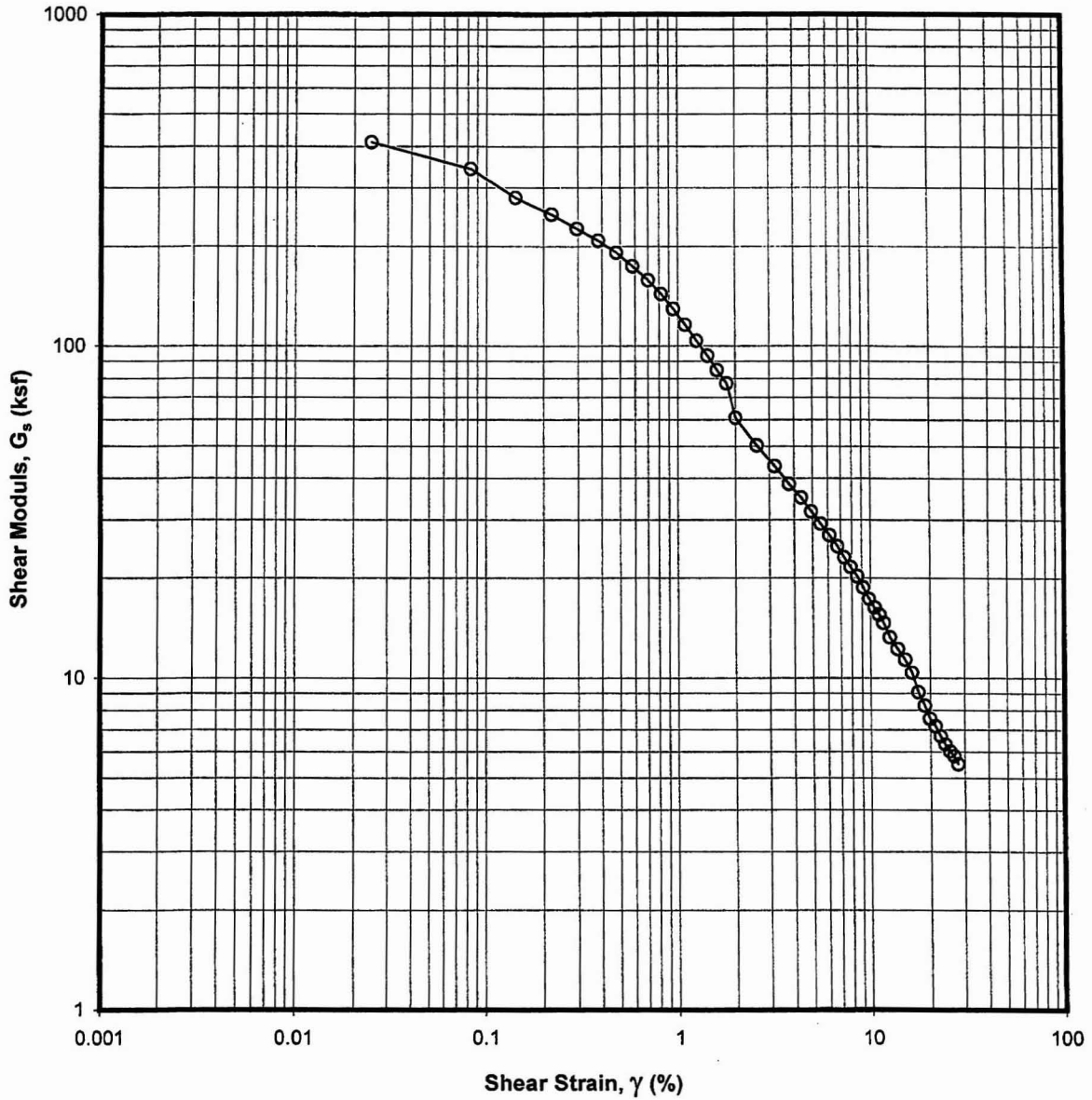
Boring No.: TP2317/TP2334 Sample No.: Comp-BA

Elapsed Time (min)	Shear Strain $\gamma$ (%)	Shear Stress $\tau_h$ (ksf)	Effective Vertical Stress $\sigma'_v$ (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 $\phi'_{bss}$ (°)
0.0	0.00	-0.005	2.219	0.000	-	-	-0.002	1.000	0.000	-0.13
2.5	0.08	0.376	2.228	-0.009	469.343	328.298	0.169	1.004	-0.004	9.58
5.0	0.19	0.586	2.218	0.002	305.983	151.567	0.264	0.999	0.001	14.79
7.5	0.30	0.714	2.155	0.065	236.693	91.842	0.322	0.971	0.029	18.33
10.0	0.44	0.804	2.109	0.110	185.408	50.327	0.362	0.950	0.050	20.86
12.5	0.60	0.857	2.044	0.175	143.753	31.279	0.386	0.921	0.079	22.76
15.0	0.75	0.901	2.009	0.210	121.396	24.608	0.406	0.905	0.095	24.15
17.5	0.94	0.938	1.969	0.250	100.782	17.011	0.423	0.887	0.113	25.47
20.0	1.15	0.968	1.948	0.271	84.980	15.108	0.436	0.878	0.122	26.43
22.5	1.33	0.998	1.924	0.296	75.201	18.063	0.450	0.867	0.133	27.42
25.1	1.53	1.038	1.901	0.318	68.114	16.238	0.468	0.857	0.143	28.64
27.6	1.73	1.062	1.919	0.301	61.757	13.849	0.479	0.865	0.135	28.96
30.1	1.92	1.091	1.925	0.294	57.236	13.613	0.492	0.867	0.133	29.55
32.6	2.09	1.112	1.944	0.275	53.390	12.259	0.501	0.876	0.124	29.76
35.1	2.33	1.142	1.937	0.282	49.277	10.979	0.515	0.873	0.127	30.53
37.6	2.53	1.160	1.929	0.291	46.125	10.424	0.523	0.869	0.131	31.03
40.1	2.74	1.186	1.955	0.265	43.452	11.549	0.534	0.881	0.119	31.24
42.6	2.97	1.211	1.974	0.245	40.991	10.446	0.546	0.890	0.110	31.52
50.1	3.52	1.265	2.012	0.208	36.034	10.074	0.570	0.906	0.094	32.16
57.6	4.18	1.333	2.087	0.133	32.056	10.422	0.601	0.940	0.060	32.57
65.1	4.78	1.396	2.163	0.056	29.295	10.613	0.629	0.975	0.025	32.83
72.6	5.41	1.465	2.239	-0.020	27.154	10.903	0.660	1.009	-0.009	33.19
80.1	5.99	1.527	2.337	-0.118	25.591	11.095	0.688	1.053	-0.053	33.17
87.6	6.62	1.598	2.454	-0.235	24.231	9.473	0.720	1.106	-0.106	33.08
95.2	7.25	1.647	2.558	-0.339	22.780	8.793	0.742	1.153	-0.153	32.77
102.7	7.86	1.708	2.676	-0.457	21.783	9.273	0.769	1.206	-0.206	32.54
110.2	8.47	1.760	2.761	-0.542	20.834	9.171	0.793	1.244	-0.244	32.51
117.7	9.00	1.811	2.862	-0.642	20.189	8.520	0.816	1.289	-0.289	32.33
125.2	9.63	1.857	2.957	-0.737	19.343	6.262	0.837	1.332	-0.332	32.14
132.7	10.21	1.888	3.044	-0.824	18.540	6.944	0.851	1.371	-0.371	31.81
140.2	10.80	1.939	3.123	-0.903	17.996	6.704	0.874	1.407	-0.407	31.84
147.7	11.40	1.967	3.233	-1.014	17.309	5.730	0.886	1.457	-0.457	31.32
155.2	11.97	2.006	3.291	-1.072	16.803	5.396	0.904	1.483	-0.483	31.36
162.7	12.54	2.029	3.371	-1.151	16.220	3.629	0.914	1.519	-0.519	31.05
172.7	13.37	2.055	3.426	-1.207	15.411	2.476	0.926	1.544	-0.544	30.96
187.7	14.63	2.078	3.508	-1.289	14.238	0.102	0.936	1.581	-0.581	30.64
202.7	15.85	2.059	3.577	-1.357	13.017	-0.784	0.928	1.612	-0.612	29.92
217.7	17.07	2.058	3.657	-1.437	12.089	-0.242	0.927	1.648	-0.648	29.38
232.7	18.37	2.052	3.737	-1.518	11.200	-0.295	0.925	1.684	-0.684	28.77
247.8	19.64	2.051	3.776	-1.556	10.470	-0.289	0.924	1.701	-0.701	28.51
262.8	20.90	2.045	3.798	-1.579	9.808	-0.764	0.921	1.711	-0.711	28.30
277.8	22.18	2.031	3.792	-1.573	9.181	-1.903	0.915	1.709	-0.709	28.18
292.8	23.45	1.996	3.794	-1.575	8.534	-3.290	0.900	1.710	-0.710	27.75
307.8	24.72	1.948	3.762	-1.543	7.902	-1.788	0.878	1.695	-0.695	27.37
322.8	25.94	1.951	3.761	-1.542	7.541	0.471	0.879	1.695	-0.695	27.42
337.8	27.23	1.960	3.768	-1.549	7.218	0.003	0.883	1.698	-0.698	27.48
352.8	28.53	1.951	3.757	-1.538	6.856	-0.278	0.879	1.693	-0.693	27.44
367.8	29.78	1.953	3.743	-1.524	6.573	0.112	0.880	1.687	-0.687	27.55



**STATIC DSS TEST**  
 K<sub>0</sub> Consolidation - OCR = NA  
 Sample: Comp-BB - Depth: NA ft  
 Boring TP2317/TP2334  
 Exelon (Victoria)

KAW 7/16/08



**STATIC DSS TEST**  
 $K_0$  Consolidation - OCR = NA  
Sample: Comp-BB - 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-Bb  
 Task No.: NA      Assign,  $\sigma'_{v,c} =$  4.32 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  
 Assig. Remarks: \_\_\_\_\_      Specific Gravity: 2.693       Meas.;       Assumed

<input type="checkbox"/> Tube	<input type="checkbox"/> Field Extruded	<input type="checkbox"/> Liner	<input checked="" type="checkbox"/> Remolded	<input checked="" type="checkbox"/> Tamping	Constant Effort:	Blows/Tamps per Layer = <u>11</u>
Boring No.: <u>TP2317/TP2334</u>	<input type="checkbox"/> 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>B</u>			Kneading	Undercompaction: $U_{nl} (%) =$ _____	Dia. (in.) = <u>1.40</u>
<input type="checkbox"/> Spec. Selection by X-ray;	<input type="checkbox"/> Geomarine Sample				Ref. Effort = <u>MOD</u>	% Comp. = <u>95.0</u> $\pm$ Opt. = <u>+4</u>

Type	<input checked="" type="checkbox"/> $K_o$ at:	<input checked="" type="checkbox"/> Incremental	;	<input type="checkbox"/> Anisotropic at:	<input type="checkbox"/> Inclined Stress Path, $K_{c,DSS}$	<input type="checkbox"/> Used Automated System
Consolidation:		<u>CRS</u>			<u>90° Stress Path</u>	Remarks: _____
Loading	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain		<input checked="" type="checkbox"/> Const. Vol./Ht	<input checked="" type="checkbox"/> Without - Water	<input type="checkbox"/> Cyclic (Hz)
Conditions:	<input type="checkbox"/> Rapid	<input type="checkbox"/> Stress		<input type="checkbox"/> Drained	<input type="checkbox"/> With - Bath	Rate: <input type="checkbox"/> 0.1; <input type="checkbox"/> 1; 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.	<u>4194</u>			<u>4018</u>	<u>321.41</u>	<u>144.01</u>		
Mass Moist Soil + Cont. (g)	<u>118.49</u>			<u>68.08</u>	<u>183.31</u>	<u>4.31</u>		
Mass Dry Soil + Container (g)	<u>106.28</u>			<u>62.27</u>	<u>138.10</u>	<u>139.70</u>		
Mass Container (g)	<u>29.57</u>			<u>30.11</u>	Excess Dry Soil (soil not included in final mass above)			
WATER CONTENT (%)	<u>15.92</u>			<u>18.07</u>	Container No.			
Avg. Initial WC, $W_{o,avg} (%)$	<u>15.92</u>				Mass Dry Soil + Container (g)			
					Mass Container (g)			
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)		<u>0.00</u>	

Specimen Trimming:			
<input type="checkbox"/> Trimming Ring for Fugro Apparatus	NL6	Large-ring ID #	
<input checked="" type="checkbox"/> Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t} (mm)$ :	<u>18.60</u>	$A_{s,t} (cm^2)$ :	<u>34.68</u>
$D_{s,t} (mm)$ :	<u>66.45</u>	$V_{s,t} (cm^3)$ :	<u>64.50</u>
Remarks:			
<input type="checkbox"/> Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height ( $H_{tr}$ )	Diameter ( $D_o$ )	Remarks:	
1 <u>18.650</u>	1-T <u>NA</u>		
2 <u>18.590</u>	2-M <u>NA</u>		
3 <u>18.610</u>	3-B <u>NA</u>		
4 <u>18.570</u>	1-T <u>NA</u>	For Free Standing or Reconstituted Spec.:	
5 <u>18.550</u>	2-M <u>NA</u>		
Avg.	3-B <u>NA</u>	$A_r (cm^2)$ :	<u>NA</u>
= <u>18.600</u>	Avg <u>NA</u>	$V_r (cm^3)$ :	<u>NA</u>

Estimated Initial Unit Weight	
Total, $\gamma_{t,o} (lb/ft^3) =$ <u>133.67</u>	Dry, $\gamma_{d,o} (lb/ft^3) =$ <u>115.32</u>

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				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
<input checked="" type="checkbox"/> Regular Membrane with Ring Set No. <u>5</u>	ID, Rings (mm)			
Thickness (mm):	Top: <u>0.59</u>		= <u>67.06</u>	
<input type="checkbox"/> Single	Bottom: <u>0.62</u>		Corr. for mem.	
<input checked="" type="checkbox"/> Double Membr. Thick. = <u>0.30</u>			= <u>66.450</u>	
Area Ring with mem., $A_o (cm^2) =$ <u>34.68</u>			; $(in^2) =$ <u>5.375</u>	
Mass Top Cap, etc., $M_{tc} =$ <u>528.0</u> g,	<u>1.16</u> lbf			
Data corr. for $M_{tc}$ :	<input checked="" type="checkbox"/> Yes;	<input type="checkbox"/> No	Plattens with Pins:	<input type="checkbox"/> Yes; <input checked="" type="checkbox"/> 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: HC

Date: 4/18/2008      Date: 4/18/2008      Date: 4/21/2008

Prelim. Calc. By: LF      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-Bb  
 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-BB

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, $\sigma'_v$ (ksf)	NA	4.32	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 <sup>3</sup> )			NA	NA	
$t_c$ (ON, days, hrs)	NA	0.75 days	NA	Post Cy. Displ. Reset to Null Position:			Yes;	No	
Undrained ambient stress applied: with Delta shear force (lbf) = <u>NA</u> & Duration (min) = <u>NA</u> & Delta disp., $\Delta d_{h,ua}$ (mm) = <u>NA</u>									

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.
$W_o$	15.92			15.92	15.92	16.71
$S_o$	94.2			94.2	94.2	96.7
Measured final mass of moist soil, $M_{t,at}$ (g)						139.70
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)						139.70

Calculated Mass of Dry Soil (g)	
Initial Selected Water Content (%)	15.92
Initial, $M_{d,o}$	119.13
Final, $M_{d,at}$	118.32
Selected, $M_d$	118.73

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)	4.320	NA	NA
Sign Convention: (+) $\Delta V$ out & $\Delta H$ down; (-) $\Delta V$ in & $\Delta H$ up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	0.320		
Total Equip. Comp., $\Sigma \Delta d_{afc}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	0.320		
$\Delta V_n$ using $A_o$ - spec. (cm <sup>3</sup> )	1.11		
$\Delta V_n$ using $A_{c,n}$ - app. (cm <sup>3</sup> )	1.11		
$\Delta V_n$ using burette meas. (cm <sup>3</sup> )	-1.30		
Selected $\Delta V_n$ (cm <sup>3</sup> )	1.11	NA	NA = $\Delta V_{UL}$
After Test WC Corr. for $\Delta V$ during Shear & Unloading, $W_{at,c}$ (%)			NA

Calculation of $\Delta V_o$ by Different Procedures			
By Selected Volumes		By Change in Mass	
$\Delta V_c$ (cm <sup>3</sup> )	1.11	$\sim M_{t,o} - (M_{t,at,c} + \Delta V_L + \Delta V_{UL})$	
By Cal. Height & App. Area		$\Delta V_c$ (cm <sup>3</sup> )	-1.60
$\Delta V_c$ (cm <sup>3</sup> )	1.11	By Saturation = 100% and Spec. Unloaded to 0 Stress	
By Cal. Ht. & Init. Spec. Area		$\Delta V_c$ (cm <sup>3</sup> )	NA
$\Delta V_c$ (cm <sup>3</sup> )	1.11		

Back Cal. Water Content During Consol. - Based on the Consolidation Conclusions Given Below	
Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	16.17
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

<b>Consolidation &amp; Preshear Conclusions</b>	$\Delta V_c$ (cm <sup>3</sup> ) =	1.10	$\Delta H_c$ (mm) =	0.320	$\epsilon_{a,c}$ (%) =	1.72	$\Delta V_{c,max}$ (cm <sup>3</sup> ) =	NA
	$V_c$ (cm <sup>3</sup> ) =	63.40	$H_c$ (mm) =	18.280	$\epsilon_{v,c}$ (%) =	1.71	$\epsilon_{ac,max}$ (%) =	NA
	$A_c$ (cm <sup>2</sup> ) =	34.68	$\Delta \gamma_c$ (mm) =	NA	$\gamma_c$ (%) =	NA	Preshear: $\gamma_{ua}$ (%) =	NA

Summary of Specimen Physical Properties:								
Specific Gravity: $G_s = 2.693$ Measured	Height (mm)	Volume (cm <sup>3</sup> )	Area (cm <sup>2</sup> )	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	18.600	64.50	34.68	16.3	133.7	114.9	95.4	0.463
After to $\sigma'_{v,c}$	18.280	63.40	34.68	16.2	135.8	116.9	100.0	0.438
Consol.: to $\sigma'_{vc,max}$	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 = 1.8 min

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

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

Type Consolidation:	<input checked="" type="checkbox"/> $K_o$ at:	<input checked="" type="checkbox"/> Incremental CRS	<input type="checkbox"/> Anisotropic at:	<input type="checkbox"/> Inclined Stress Path, $K_{c,DSS}$	<input type="checkbox"/> Used Automated System	Remarks:
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain Stress	<input type="checkbox"/> Creep Post Cyclic	<input checked="" type="checkbox"/> Const. Vol./Ht Drained	<input checked="" type="checkbox"/> Without - Water With - Bath	<input type="checkbox"/> Cyclic (Hz) Rate: <u>0.1</u> ;
	<input type="checkbox"/> Dynamic					Strain <u>1</u> ; Other:

Summary of Specimen Physical Properties										
Specific Gravity:	Height	Volume	Area	Water Content	Unit Weight		Saturation	LL	-200	Void Ratio,
$G_s = 2.693$ Measured	(mm)	(cm <sup>3</sup> )	(cm <sup>2</sup> )	(%)	Total (pcf)	Dry (pcf)	(%)	PL	%	e
Condition: Initial	18.60	64.50	34.68	16.32	133.7	114.9	95.4	44	73.6	0.463
After to $\sigma'_{v,c}$	18.28	63.40	34.68	16.17	135.8	116.9	100.0	15	NA	0.438
Consol.: to $\sigma'_{v,c,max}$	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 = <u>4.7</u> %/hr.					
Vert. Consol. Stress, $\sigma'_{v,c}$	(ksf)	NA	4.350	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	1.72	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 <sup>3</sup> ):		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, $\tau_{h,amb}$	(ksf)	NA	NA	NA	$\pm \tau_h =$ <u>NA</u> (ksf)		$\pm \gamma =$ <u>NA</u> %			
Undr. Ambient Shear Strain, $\epsilon_{h,amb}$	%	NA	NA	NA	at end of cyclic loading, $\sigma'_{v,c,r} =$ <u>NA</u> (ksf)					

Weight Top Cap, etc., $M_{tc}$ (lbf): <u>1.16</u>	Data Normalization: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Value: <u>4.350</u> (ksf)
Data corr. for $M_{tc}$ : <input checked="" type="checkbox"/> Yes; <input type="checkbox"/> No	Plattens with Pins: <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No	Using Effective Vertical Stress:
Wire Reinforced Membrane, Model: _____	Data corr. for Membr. strength: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Pre-Shear Conditions <input type="checkbox"/> Post-Cyclic Conditions
<input checked="" type="checkbox"/> Regular Membrane with Rings		<input type="checkbox"/> 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.

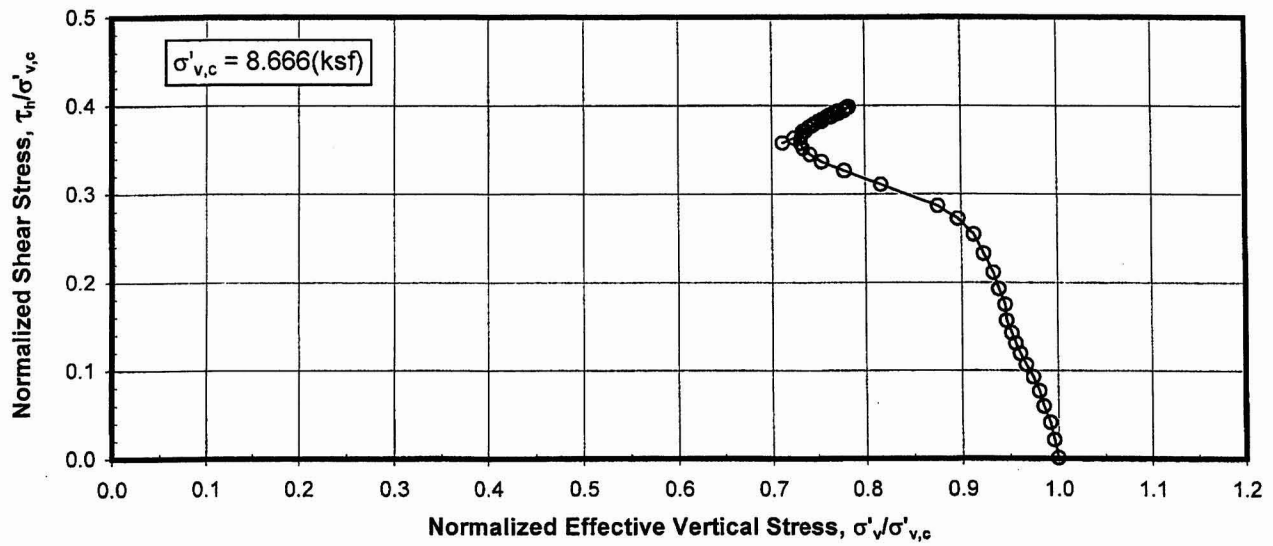
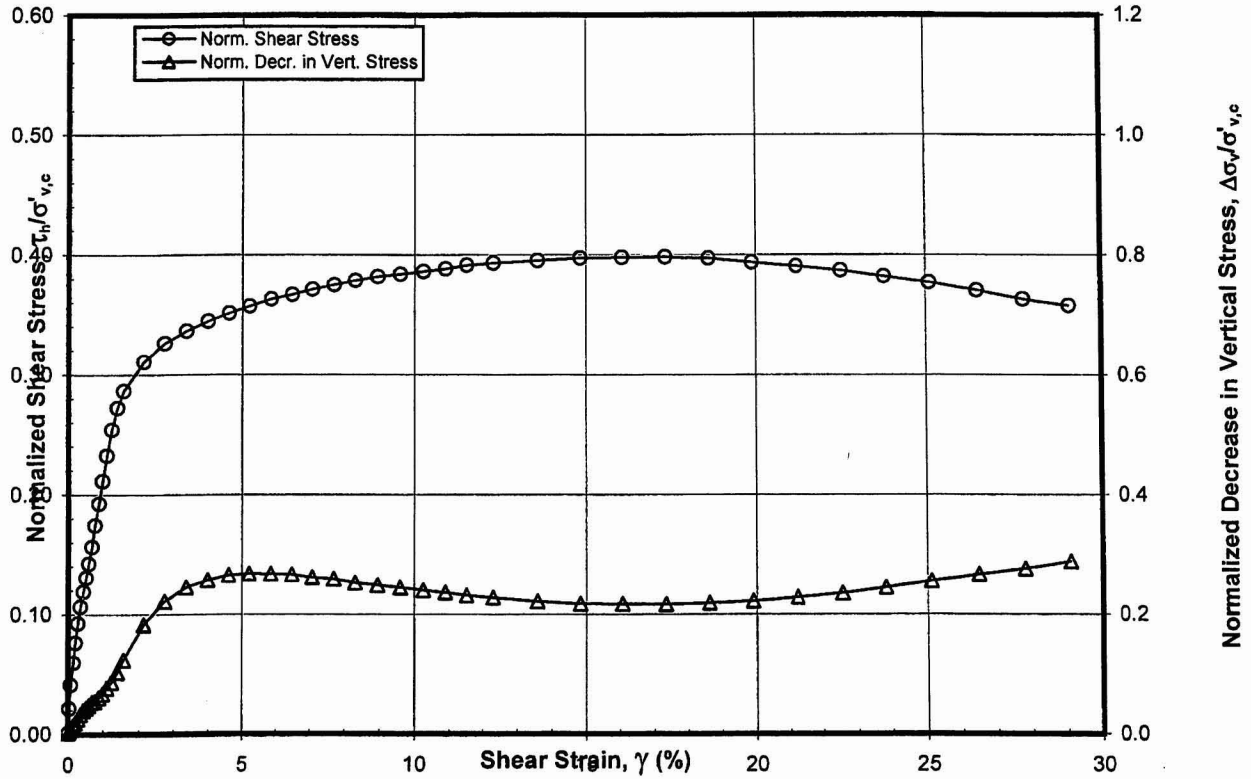
NA - Not Applicable

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

Loading Summary						
	$\tau_h$ (ksf)	$\gamma$ (%)	$\sigma'_v$ (ksf)	$\tau_h / \sigma'_v$	$\Delta \sigma'_v / \sigma'_{v,c}$	$c_u / \sigma'_{v,c}$
at Peak Shear Stress	1.863	9.20	3.305	0.564	0.240	0.428
at Maximum Strain	1.597	29.00	3.011	0.531	0.308	-

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

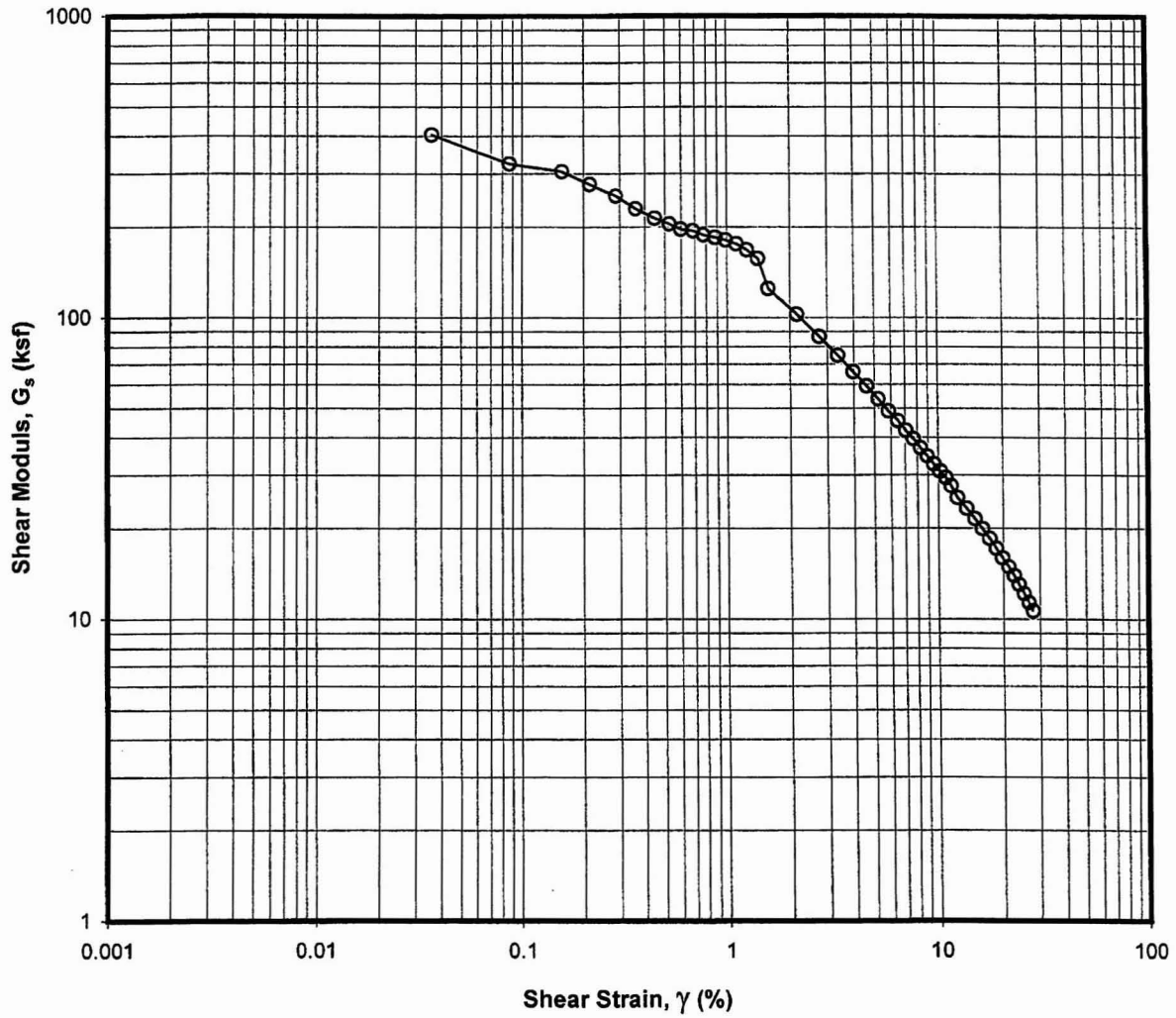
Elapsed Time (min)	Shear Strain $\gamma$ (%)	Shear Stress $\tau_h$ (ksf)	Effective Vertical Stress $\sigma'_v$ (ksf)	Calculated Pore Press. Change $\Delta U = \Delta\sigma'_v$ (ksf)	Secant Shear Modulus $G_s$ (ksf)	Tangent Modulus $G_T$ (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta\sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle $\phi^{DSS}$ (°)
0.0	0.00	0.002	4.350	0.000	-	-	0.000	1.000	0.000	0.02
2.5	0.02	0.186	4.344	0.006	747.578	508.717	0.043	0.999	0.001	2.45
5.0	0.08	0.343	4.333	0.018	411.814	256.923	0.079	0.996	0.004	4.53
7.5	0.14	0.490	4.316	0.035	341.478	204.752	0.113	0.992	0.008	6.47
10.0	0.22	0.618	4.315	0.036	279.558	163.753	0.142	0.992	0.008	8.15
12.6	0.30	0.742	4.316	0.035	249.257	154.245	0.171	0.992	0.008	9.75
15.1	0.38	0.871	4.293	0.058	225.780	140.743	0.200	0.987	0.013	11.47
17.6	0.48	0.997	4.263	0.087	207.999	124.459	0.229	0.980	0.020	13.17
20.1	0.58	1.116	4.239	0.112	191.137	101.345	0.257	0.974	0.026	14.75
22.6	0.70	1.223	4.196	0.154	173.674	77.019	0.281	0.965	0.035	16.25
25.1	0.82	1.301	4.098	0.252	157.869	57.766	0.299	0.942	0.058	17.61
27.6	0.95	1.365	3.989	0.362	143.542	43.697	0.314	0.917	0.083	18.89
30.1	1.09	1.418	3.874	0.476	129.495	30.248	0.326	0.890	0.110	20.11
32.6	1.26	1.456	3.751	0.599	115.823	19.924	0.335	0.862	0.138	21.21
35.2	1.43	1.485	3.628	0.722	103.530	14.421	0.341	0.834	0.166	22.26
37.7	1.61	1.507	3.522	0.829	93.460	11.728	0.346	0.810	0.190	23.17
40.2	1.80	1.529	3.430	0.920	84.660	10.487	0.351	0.788	0.212	24.02
42.7	2.00	1.548	3.347	1.003	77.196	7.563	0.356	0.769	0.231	24.82
50.2	2.60	1.579	3.191	1.159	60.793	5.109	0.363	0.734	0.266	26.33
57.7	3.20	1.610	3.120	1.230	50.206	5.322	0.370	0.717	0.283	27.29
65.2	3.78	1.642	3.095	1.255	43.407	6.210	0.378	0.711	0.289	27.95
72.8	4.38	1.683	3.079	1.272	38.387	7.176	0.387	0.708	0.292	28.66
80.3	4.94	1.726	3.100	1.250	34.884	6.556	0.397	0.713	0.287	29.10
87.8	5.54	1.758	3.123	1.227	31.712	5.341	0.404	0.718	0.282	29.38
95.3	6.13	1.789	3.175	1.175	29.149	4.753	0.411	0.730	0.270	29.40
102.8	6.74	1.816	3.178	1.172	26.896	3.150	0.417	0.731	0.269	29.74
110.3	7.33	1.827	3.208	1.143	24.890	1.371	0.420	0.737	0.263	29.67
117.9	7.93	1.832	3.241	1.109	23.066	1.532	0.421	0.745	0.255	29.47
125.4	8.57	1.846	3.275	1.075	21.535	2.468	0.424	0.753	0.247	29.41
132.9	9.20	1.863	3.305	1.045	20.231	0.081	0.428	0.760	0.240	29.41
140.4	9.87	1.847	3.315	1.036	18.700	-3.456	0.424	0.762	0.238	29.12
147.9	10.51	1.818	3.312	1.038	17.280	-2.967	0.418	0.761	0.239	28.76
155.4	11.10	1.809	3.332	1.018	16.283	-0.416	0.416	0.766	0.234	28.50
162.9	11.68	1.813	3.330	1.020	15.514	1.408	0.417	0.766	0.234	28.56
173.0	12.50	1.831	3.337	1.013	14.629	0.584	0.421	0.767	0.233	28.75
188.0	13.72	1.819	3.338	1.012	13.243	-0.100	0.418	0.767	0.233	28.59
203.0	14.94	1.828	3.329	1.021	12.227	0.791	0.420	0.765	0.235	28.77
218.0	16.19	1.838	3.311	1.039	11.347	-0.731	0.423	0.761	0.239	29.04
233.1	17.45	1.810	3.265	1.086	10.362	-5.454	0.416	0.750	0.250	29.00
248.1	18.75	1.698	3.184	1.166	9.046	-6.211	0.390	0.732	0.268	28.06
263.1	19.98	1.651	3.115	1.236	8.258	-3.632	0.380	0.716	0.284	27.93
278.1	21.27	1.606	3.089	1.261	7.540	-1.299	0.369	0.710	0.290	27.47
293.2	22.57	1.618	3.084	1.267	7.159	-0.548	0.372	0.709	0.291	27.68
308.2	23.84	1.592	3.071	1.279	6.670	-1.015	0.366	0.706	0.294	27.40
323.2	25.17	1.592	3.056	1.294	6.316	0.022	0.366	0.702	0.298	27.51
338.2	26.46	1.593	3.043	1.307	6.013	0.847	0.366	0.700	0.300	27.62
353.3	27.73	1.613	3.023	1.327	5.812	0.186	0.371	0.695	0.305	28.08
368.3	29.00	1.597	3.011	1.340	5.502	-1.242	0.367	0.692	0.308	27.95



**STATIC DSS TEST**  
 K<sub>0</sub> Consolidation - OCR = NA  
 Sample: Comp-BC - Depth: NA ft  
 Boring TP2317/TP2334  
 Exelon (Victoria)

KAW 7116/08





**STATIC DSS TEST**  
K<sub>0</sub> Consolidation - OCR = NA  
Sample: Comp-BC - 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-Bc  
 Task No.: NA      Assign,  $\sigma'_{v,c}$  = 8.64 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

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

Type Consolidation:	<input checked="" type="checkbox"/> $K_o$ at:	<input checked="" type="checkbox"/> Incremental	;	<input type="checkbox"/> Anisotropic at:	Inclined Stress Path, $K_{c,DSS}$	<input type="checkbox"/> Used Automated System
		<u>CRS</u>			<u>90° Stress Path</u>	Remarks: _____
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain	<input type="checkbox"/> Creep	<input checked="" type="checkbox"/> Const. Vol./Ht	<input checked="" type="checkbox"/> Without - Water	<input type="checkbox"/> Cyclic (Hz)
	<input type="checkbox"/> Rapid	<input type="checkbox"/> Stress	<input type="checkbox"/> Post Cyclic	<input type="checkbox"/> Drained	<input type="checkbox"/> With - Bath	Rate: <u>0.1</u> ; <input type="checkbox"/> 1; 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.	<u>4245</u>			<u>4031</u>	<u>324.84</u>	<u>186.80</u>	<u>143.37</u>	
Mass Moist Soil + Cont. (g)	<u>125.82</u>			<u>65.46</u>	<u>138.04</u>	<u>4.55</u>	<u>138.82</u>	
Mass Dry Soil + Container (g)	<u>112.45</u>			<u>60.25</u>	<b>Excess Dry Soil (soil not included in final mass above)</b>			
Mass Container (g)	<u>30.12</u>			<u>30.15</u>	Container No. _____			
WATER CONTENT (%)	<u>16.24</u>			<u>17.31</u>	Mass Dry Soil + Container (g) _____			
Avg. Initial WC, $W_{o,avg}$ (%)	<u>16.24</u>		Final $W_{at}$ : <input checked="" type="checkbox"/> Slice ;	Whole Spec.	Mass Container (g) _____			
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)		<u>0.00</u>	

Specimen Trimming:			
<input type="checkbox"/> Trimming Ring for Fugro Apparatus	NL3	Large-ring ID #	
<input checked="" type="checkbox"/> Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	<u>18.48</u>	$A_{s,t}$ (cm <sup>2</sup> ):	<u>34.87</u>
$D_{s,t}$ (mm):	<u>66.63</u>	$V_{s,t}$ (cm <sup>3</sup> ):	<u>64.42</u>
Remarks: _____			
Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height ( $H_r$ )	Diameter ( $D_o$ )	Remarks:	
1 <u>18.510</u>	1-T <u>NA</u>		
2 <u>18.500</u>	2-M <u>NA</u>		
3 <u>18.450</u>	3-B <u>NA</u>		
4 <u>18.480</u>	1'-T <u>NA</u>	For Free Standing or Reconstituted Spec.:	
5 <u>18.460</u>	2'-M <u>NA</u>		
Avg.	3'-B <u>NA</u>	$A_r$ (cm <sup>2</sup> ):	<u>NA</u>
= <u>18.475</u>	Avg <u>NA</u>	$V_r$ (cm <sup>3</sup> ):	<u>NA</u>

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft <sup>3</sup> ) = <u>133.76</u>	Dry, $\gamma_{d,o}$ (lb/ft <sup>3</sup> ) = <u>115.08</u>

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) = _____		
Stress Level	Dia. by PiTape (mm) Meas.	Corr.	Area, $A_{c,n}$ (cm <sup>2</sup> )	(in <sup>2</sup> )
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
<input checked="" type="checkbox"/> Regular Membrane with Ring Set No. <u>5</u>	ID, Rings (mm)			
Thickness (mm):	Top: <u>0.55</u>		= <u>67.17</u>	
<input type="checkbox"/> Single	Bottom: <u>0.53</u>		Corr. for mem.	
<input checked="" type="checkbox"/> Double	Membr. Thick. = <u>0.27</u>		= <u>66.630</u>	
Area Ring with mem., $A_o$ (cm <sup>2</sup> ) = <u>34.87</u>		; (in <sup>2</sup> ) = <u>5.405</u>		
Mass Top Cap, etc., $M_{tc}$ =	<u>500.0</u> g,	<u>1.10</u> lbf		
Data corr. for $M_{tc}$ :	<input checked="" type="checkbox"/> Yes;	<input type="checkbox"/> No	Plattens with Pins:	<input type="checkbox"/> Yes; <input checked="" type="checkbox"/> 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: <u>DBN</u>	Setup By: <u>HC</u>	Take Down By: <u>HC</u>
Date: <u>4/23/2008</u>	Date: <u>4/23/2008</u>	Date: <u>4/25/2008</u>
Prelim. Calc. By: <u>LF</u>	Final Calc. By: <u>LF</u>	Reviewed By: <u>HP</u> <b>HP</b>

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

**KAW613/08**

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

Project Number: 0411-08-1686 Test Station No.: 5G File Name: Comp-Bc  
 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-BC

Consolidation Stress Summary and Loading Summary									
Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	<input checked="" type="checkbox"/>	Static Strain Rate = <u>NA</u> (%/hr or )				
Nominal Vertical Stress, $\sigma'_v$ (ksf)	<u>NA</u>	<u>8.64</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 <sup>3</sup> )			<u>NA</u>	<u>NA</u>
$t_c$ (ON, days, hrs)	<u>NA</u>	<u>0.80 days</u>	<u>NA</u>		Post Cy. Displ. Reset to Null Position:			<input type="checkbox"/> Yes;	<input type="checkbox"/> No
Undrained ambient stress applied: with Delta shear force (lbf) = <u>NA</u> & Duration (min) = <u>NA</u> & Delta disp., $\Delta d_{h,ua}$ (mm) = <u>NA</u>									

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.
$W_o$	<u>16.24</u>			<u>16.24</u>	<u>16.24</u>	<u>16.65</u>
$S_o$	<u>95.4</u>			<u>95.4</u>	<u>95.4</u>	<u>96.7</u>
Measured final mass of moist soil, $M_{t,at}$ (g)						<u>138.82</u>
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)						<u>138.82</u>

Calculated Mass of Dry Soil (g)	
Initial Selected Water Content (%)	<u>16.24</u>
Initial, $M_{d,o}$	<u>118.75</u>
Final, $M_{d,at}$	<u>118.34</u>
Selected, $M_d$	<u>118.55</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 $\sigma'_{v,max}$ =	During Rebound to $\sigma'_{v,c}$ =	Specimen Unloaded After Test To
Stress Units (ksf)	<u>8.640</u>	<u>NA</u>	<u>NA</u>
Sign Convention: (+) $\Delta V$ out & $\Delta H$ down; (-) $\Delta V$ in & $\Delta H$ up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	<u>0.600</u>		
Total Equip. Comp., $\Sigma \Delta d_{afc}$ (mm)	<u>0.000</u>		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	<u>0.600</u>		
$\Delta V_n$ using $A_o$ - spec. (cm <sup>3</sup> )	<u>2.09</u>		
$\Delta V_n$ using $A_{c,n}$ - app. (cm <sup>3</sup> )	<u>2.09</u>		
$\Delta V_n$ using burette meas. (cm <sup>3</sup> )	<u>0.20</u>		
Selected $\Delta V_n$ (cm <sup>3</sup> )	<u>2.09</u>	<u>NA</u>	<u>NA</u> = $\Delta V_{UL}$
After Test WC Corr. for $\Delta V$ during Shear & Unloading, $W_{at,c}$ (%)			<u>NA</u>

Calculation of $\Delta V_c$ by Different Procedures			
By Selected Volumes		By Change in Mass	
$\Delta V_c$ (cm <sup>3</sup> )	<u>2.09</u>	$\sim M_{t,o} - (M_{t,at,c} + \Delta V_L + \Delta V_{UL})$	
By Cal. Height & App. Area		$\Delta V_c$ (cm <sup>3</sup> )	<u>-0.78</u>
$\Delta V_c$ (cm <sup>3</sup> )	<u>2.09</u>	By Saturation = 100% and Spec. Unloaded to 0 Stress	
By Cal. Ht. & Init. Spec. Area		$\Delta V_c$ (cm <sup>3</sup> )	<u>NA</u>
$\Delta V_c$ (cm <sup>3</sup> )	<u>2.09</u>	$\Delta V_c$ (cm <sup>3</sup> )	<u>NA</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>15.35</u>
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	<u>NA</u>

<b>Consolidation &amp; Preshear Conclusions</b>	$\Delta V_c$ (cm <sup>3</sup> ) = <u>2.10</u>	$\Delta H_c$ (mm) = <u>0.600</u>	$\epsilon_{a,c}$ (%) = <u>3.25</u>	$\Delta V_{c,max}$ (cm <sup>3</sup> ) = <u>NA</u>	
	$V_c$ (cm <sup>3</sup> ) = <u>62.33</u>	$H_c$ (mm) = <u>17.875</u>	$\epsilon_{v,c}$ (%) = <u>3.26</u>		$\epsilon_{ac,max}$ (%) = <u>NA</u>
	$A_c$ (cm <sup>2</sup> ) = <u>34.87</u>	$\Delta \gamma_c$ (mm) = <u>NA</u>	$\gamma_c$ (%) = <u>NA</u>		Preshear: $\gamma_{ua}$ (%) = <u>NA</u>

Summary of Specimen Physical Properties:								
Specific Gravity: $G_s = 2.693$ Measured	Height (mm)	Volume (cm <sup>3</sup> )	Area (cm <sup>2</sup> )	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	<u>18.475</u>	<u>64.42</u>	<u>34.87</u>	<u>16.4</u>	<u>133.8</u>	<u>114.9</u>	<u>96.1</u>	<u>0.464</u>
After to $\sigma'_{v,c}$	<u>17.875</u>	<u>62.33</u>	<u>34.87</u>	<u>15.3</u>	<u>137.0</u>	<u>118.7</u>	<u>100.0</u>	<u>0.416</u>
Consol.: to $\sigma'_{v,max}$	<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 = 0.5 min

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

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

Type Consolidation:	<input checked="" type="checkbox"/> $K_o$ at:	<input checked="" type="checkbox"/> Incremental CRS	<input type="checkbox"/> Anisotropic at:	<input type="checkbox"/> Inclined Stress Path, $K_{c,bss}$	<input type="checkbox"/> Used Automated System	Remarks:
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain	<input type="checkbox"/> Creep	<input checked="" type="checkbox"/> Const. Vol./Ht	<input checked="" type="checkbox"/> Without - Water	<input type="checkbox"/> Cyclic (Hz)
	<input type="checkbox"/> Dynamic	<input type="checkbox"/> Stress	<input type="checkbox"/> Post Cyclic	<input type="checkbox"/> Drained	<input type="checkbox"/> With - Bath	Rate: <input type="checkbox"/> 0.1; <input type="checkbox"/> 1; Other: <u>          </u>

Summary of Specimen Physical Properties										
Specific Gravity:	Height	Volume	Area	Water Content	Unit Weight		Saturation	LL	-200	Void Ratio,
$G_s = 2.693$ Measured	(mm)	( $cm^3$ )	( $cm^2$ )	(%)	Total (pcf)	Dry (pcf)	(%)	PL	%	e
Condition: Initial	18.48	64.42	34.87	16.44	133.8	114.9	96.1	44	73.6	0.464
After to $\sigma'_{v,c}$	17.88	62.33	34.87	15.35	137.0	118.7	100.0	15	NA	0.416
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	<input checked="" type="checkbox"/> Static Strain Rate = <u>4.6 %/hr.</u>					
Vert. Consol. Stress, $\sigma'_{v,c}$	(ksf)	NA	8.666	NA	Cyclic Rate (Hz):	<input type="checkbox"/> 0.1;	<input type="checkbox"/> 1;	Other = <u>          </u>		
Induced OCR:	-	NA	NA	NA	During/End of Loading		Static	Cyclic		
Axial Strain during Consol., $\epsilon_{a,c}$	%	NA	3.25	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 = <u>NA</u>					
Undr. Ambient Shear Stress, $\tau_{h,ua}$	(ksf)	NA	NA	NA	$\pm \tau_h =$ <u>NA</u> (ksf)		$\pm \gamma =$ <u>NA</u> %		at end of cyclic loading, $\sigma'_{vc,r} =$ <u>NA</u> (ksf)	
Undr. Ambient Shear Strain, $\epsilon_{h,ua}$	%	NA	NA	NA						

Weight Top Cap, etc., $M_{tc}$ (lbf): <u>1.10</u>	Data Normalization: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Value: <u>8.666</u> (ksf)
Data corr. for $M_{tc}$ : <input checked="" type="checkbox"/> Yes; <input type="checkbox"/> No	Plattens with Pins: <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No	Using Effective Vertical Stress:
<input type="checkbox"/> Wire Reinforced Membrane, Model: <u>          </u>	Data corr. for Membr. strength: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Pre-Shear Conditions <input type="checkbox"/> Post-Cyclic Conditions
<input checked="" type="checkbox"/> Regular Membrane with Rings	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Maximum Stress during Consol. <input type="checkbox"/> Post-Cyclic Conditions

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

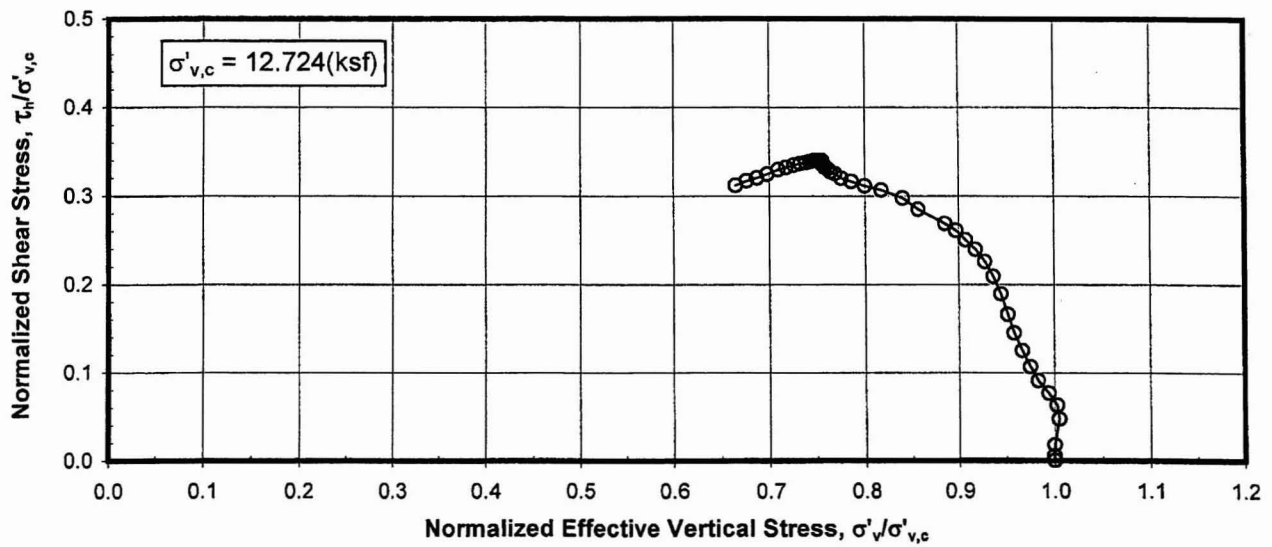
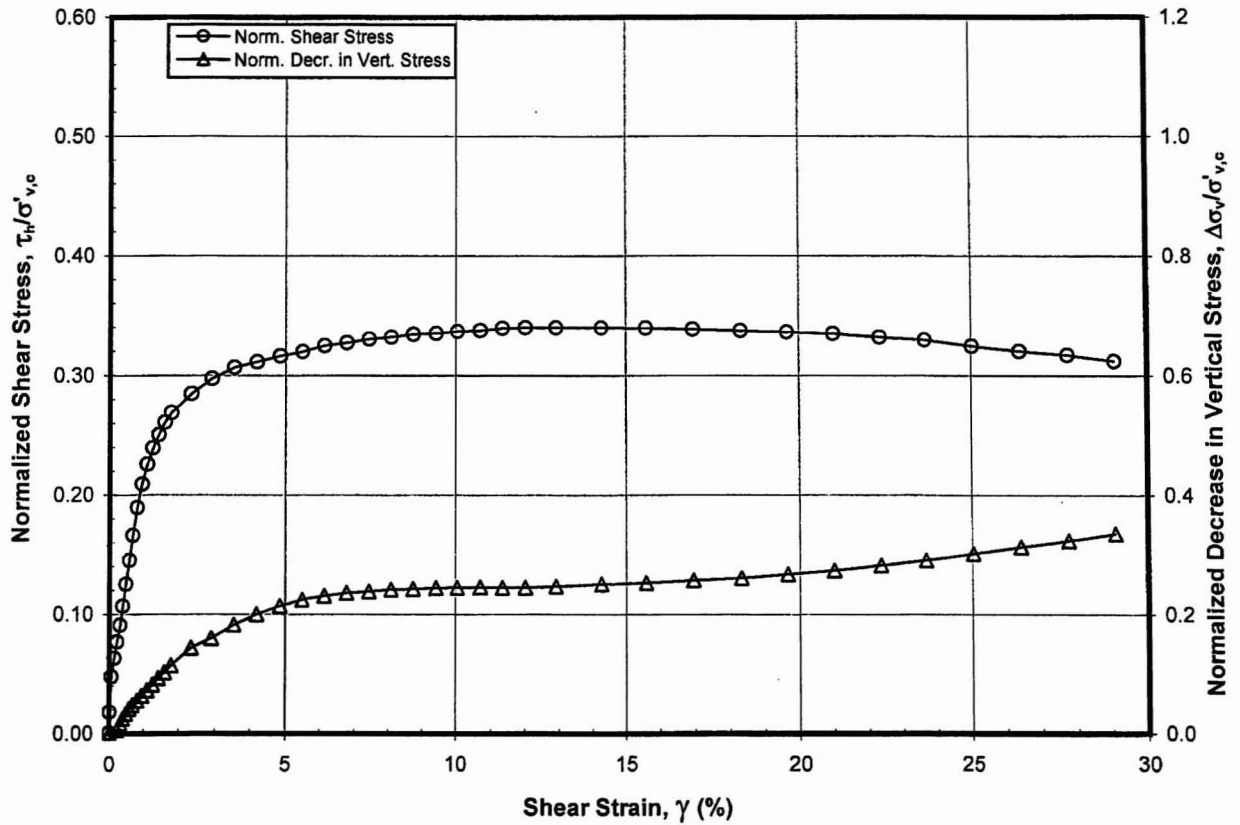
Final Visual Description and Remarks: Gray Lean CLAY with sand (CL)

Loading Summary						
	$\tau_h$ (ksf)	$\gamma$ (%)	$\sigma'_v$ (ksf)	$\tau_h / \sigma'_v$	$\Delta \sigma'_v / \sigma'_{v,c}$	$c_u / \sigma'_{v,c}$
at Peak Shear Stress	3.451	17.34	6.789	0.508	0.217	0.398
at Maximum Strain	3.098	29.09	6.171	0.502	0.288	-

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

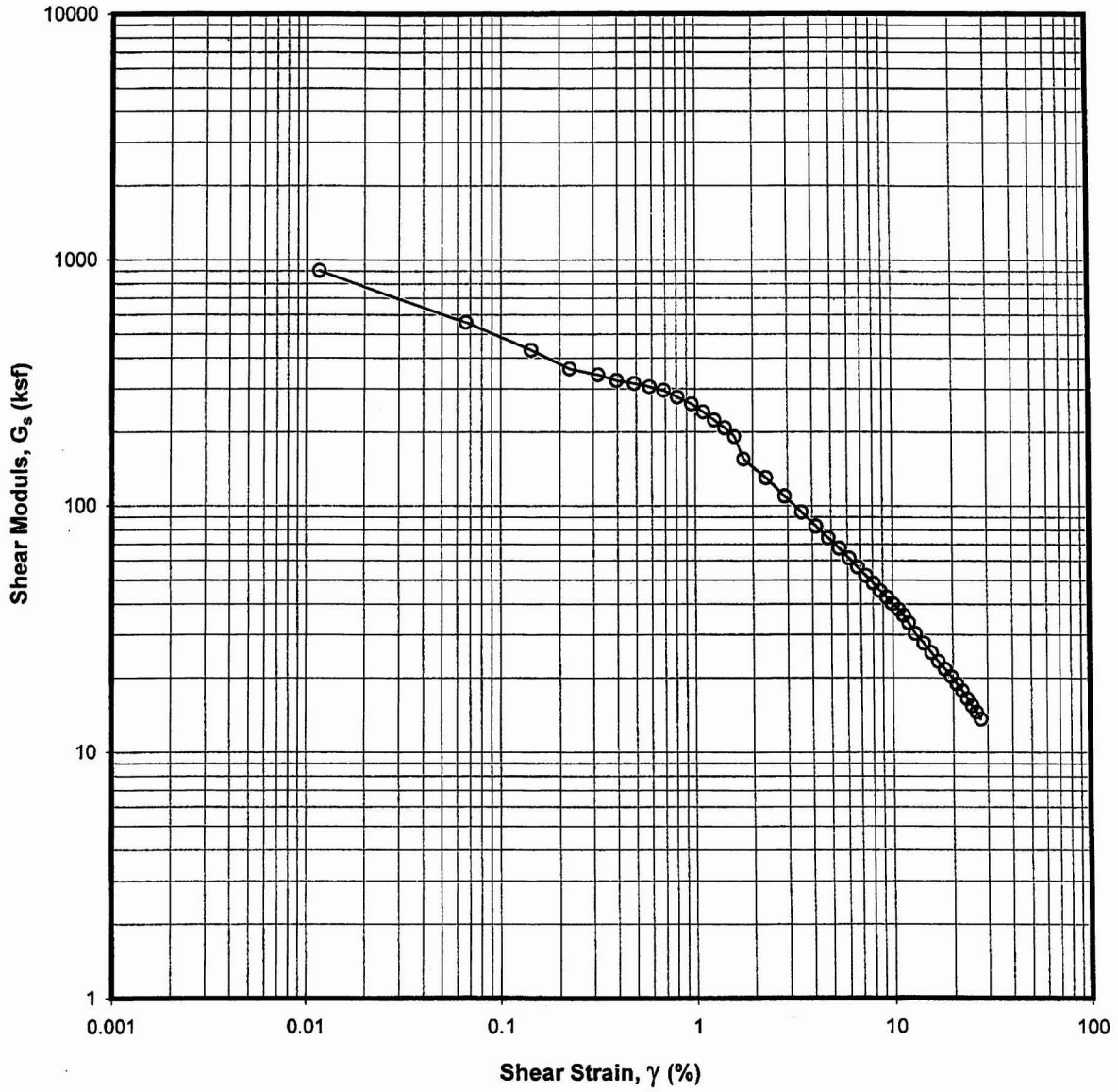
Elapsed Time (min)	Shear Strain $\gamma$ (%)	Shear Stress $\tau_h$ (ksf)	Effective Vertical Stress $\sigma'_v$ (ksf)	Calculated Pore Press. Change $\Delta U = \Delta\sigma'_v$ (ksf)	Secant Shear Modulus $G_s$ (ksf)	Tangent Modulus $G_T$ (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta\sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle $\phi'_{DSS}$ (°)
0.0	0.00	0.007	8.666	0.000	-	-	0.001	1.000	0.000	0.04
2.6	0.04	0.186	8.632	0.034	499.327	417.683	0.021	0.996	0.004	1.23
5.1	0.09	0.357	8.597	0.069	403.456	280.729	0.041	0.992	0.008	2.38
7.7	0.16	0.515	8.539	0.127	323.937	239.682	0.059	0.985	0.015	3.45
10.3	0.21	0.662	8.501	0.165	305.058	222.637	0.076	0.981	0.019	4.45
12.8	0.29	0.801	8.444	0.222	276.382	177.220	0.092	0.974	0.026	5.42
15.4	0.36	0.921	8.380	0.286	253.208	145.499	0.106	0.967	0.033	6.27
18.0	0.45	1.031	8.327	0.339	229.243	126.480	0.119	0.961	0.039	7.06
20.5	0.53	1.131	8.287	0.379	213.338	131.443	0.131	0.956	0.044	7.77
23.1	0.60	1.232	8.250	0.416	204.120	138.270	0.142	0.952	0.048	8.50
25.7	0.69	1.354	8.204	0.462	195.796	157.257	0.156	0.947	0.053	9.37
28.2	0.78	1.509	8.193	0.473	193.514	160.116	0.174	0.945	0.055	10.44
30.8	0.89	1.666	8.137	0.529	187.489	149.661	0.192	0.939	0.061	11.57
33.4	0.99	1.830	8.087	0.579	184.017	154.155	0.211	0.933	0.067	12.75
35.9	1.11	2.014	8.000	0.666	180.706	143.634	0.232	0.923	0.077	14.13
38.5	1.25	2.200	7.913	0.753	175.507	118.079	0.254	0.913	0.087	15.54
41.0	1.40	2.358	7.771	0.895	167.441	87.142	0.272	0.897	0.103	16.88
43.6	1.58	2.481	7.593	1.073	157.074	54.142	0.286	0.876	0.124	18.10
51.3	2.15	2.691	7.079	1.587	124.652	29.268	0.311	0.817	0.183	20.82
59.0	2.75	2.825	6.744	1.922	102.340	18.385	0.326	0.778	0.222	22.73
66.7	3.37	2.915	6.542	2.124	86.253	13.008	0.336	0.755	0.245	24.01
74.3	3.99	2.985	6.435	2.231	74.701	10.439	0.344	0.743	0.257	24.89
82.0	4.61	3.043	6.365	2.301	65.938	8.707	0.351	0.735	0.265	25.55
89.7	5.23	3.093	6.343	2.323	59.056	8.005	0.357	0.732	0.268	25.99
97.4	5.86	3.144	6.349	2.317	53.535	6.627	0.363	0.733	0.267	26.34
105.1	6.49	3.177	6.358	2.308	48.860	5.928	0.367	0.734	0.266	26.55
112.7	7.09	3.216	6.397	2.269	45.301	5.831	0.371	0.738	0.262	26.69
120.4	7.70	3.247	6.421	2.245	42.088	5.328	0.375	0.741	0.259	26.82
128.1	8.31	3.281	6.476	2.190	39.412	4.897	0.379	0.747	0.253	26.87
135.8	8.96	3.309	6.513	2.153	36.860	3.575	0.382	0.752	0.248	26.93
143.4	9.60	3.328	6.547	2.119	34.588	3.063	0.384	0.755	0.245	26.94
151.1	10.26	3.348	6.588	2.078	32.585	2.941	0.386	0.760	0.240	26.94
158.8	10.90	3.366	6.619	2.047	30.824	3.455	0.388	0.764	0.236	26.95
166.5	11.52	3.392	6.660	2.006	29.384	3.007	0.391	0.769	0.231	26.99
176.7	12.32	3.407	6.696	1.970	27.593	1.680	0.393	0.773	0.227	26.97
192.1	13.59	3.426	6.750	1.916	25.153	1.497	0.395	0.779	0.221	26.91
207.4	14.84	3.444	6.782	1.884	23.170	0.892	0.397	0.783	0.217	26.92
222.8	16.08	3.448	6.787	1.879	21.405	0.272	0.398	0.783	0.217	26.93
238.1	17.34	3.451	6.789	1.877	19.867	-0.270	0.398	0.783	0.217	26.94
253.5	18.62	3.441	6.773	1.893	18.446	-1.500	0.397	0.782	0.218	26.93
268.8	19.90	3.413	6.744	1.922	17.117	-2.155	0.394	0.778	0.222	26.84
284.2	21.22	3.385	6.691	1.975	15.922	-2.202	0.391	0.772	0.228	26.84
299.5	22.55	3.354	6.631	2.035	14.846	-2.863	0.387	0.765	0.235	26.83
314.9	23.82	3.311	6.545	2.121	13.874	-3.380	0.382	0.755	0.245	26.83
330.2	25.12	3.267	6.456	2.210	12.983	-3.813	0.377	0.745	0.255	26.85
345.6	26.47	3.210	6.360	2.306	12.102	-4.596	0.370	0.734	0.266	26.78
360.9	27.78	3.145	6.274	2.392	11.295	-4.271	0.363	0.724	0.276	26.62
376.2	29.09	3.098	6.171	2.495	10.626	-3.617	0.357	0.712	0.288	26.66





**STATIC DSS TEST**  
 K<sub>0</sub> Consolidation - OCR = NA  
 Sample: Comp-BD - Depth: NA ft  
 Boring TP2317/TP2334  
 Exelon (Victoria)

KAW 7/16/08



**STATIC DSS TEST**  
K<sub>0</sub> Consolidation - OCR = NA  
Sample: Comp-BD - Depth: NA ft  
Boring TP2317/TP2334

KAW 7/16/06

# 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-Bd  
 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

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

Type Consolidation:	<input checked="" type="checkbox"/> $K_o$ at:	<input checked="" type="checkbox"/> Incremental	;	<input type="checkbox"/> Anisotropic at:	Inclined Stress Path, $K_{c,DSS}$	<input type="checkbox"/> Used Automated System
		CRS			90° Stress Path	Remarks: _____
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain	<input type="checkbox"/> Creep	<input checked="" type="checkbox"/> Const. Vol./Ht	<input checked="" type="checkbox"/> Without - Water	<input type="checkbox"/> Cyclic (Hz)
	Rapid	Stress	Post Cyclic	Drained	With - Bath	Rate: <input type="checkbox"/> 0.1; <input type="checkbox"/> 1; 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.	<u>2030</u>			<u>4091</u>	<u>321.33</u>	<u>183.31</u>	<u>142.00</u>	
Mass Moist Soil + Cont. (g)	<u>139.57</u>			<u>74.12</u>	<u>138.02</u>	<u>4.24</u>	<u>137.76</u>	
Mass Dry Soil + Container (g)	<u>124.11</u>			<u>67.86</u>	Excess Dry Soil (soil not included in final mass above)			
Mass Container (g)	<u>30.78</u>			<u>30.69</u>	Container No. _____			
WATER CONTENT (%)	<u>16.56</u>			<u>16.84</u>	Mass Dry Soil + Container (g)			
Avg. Initial WC, $W_{o,avg}$ (%)	<u>16.56</u>		Final $W_{at}$ : <input checked="" type="checkbox"/> Slice ;	Whole Spec.	Mass Container (g)			
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)		<u>0.00</u>	

Specimen Trimming:			
<input type="checkbox"/> Trimming Ring for Fugro Apparatus	NL6	Large-ring ID #	
<input checked="" type="checkbox"/> Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	<u>18.53</u>	$A_{s,t}$ (cm <sup>2</sup> ):	<u>34.68</u>
$D_{s,t}$ (mm):	<u>66.45</u>	$V_{s,t}$ (cm <sup>3</sup> ):	<u>64.24</u>
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 18.540	3-B NA		
4 18.490	1-T NA	For Free Standing	
5 18.500	2-M NA	or Reconstituted Spec.:	
Avg.	3-B NA	$A_{tr}$ (cm <sup>2</sup> ):	NA
= 18.525	Avg	$V_{tr}$ (cm <sup>3</sup> ):	NA

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft <sup>3</sup> )=	<u>134.13</u>
Dry, $\gamma_{d,o}$ (lb/ft <sup>3</sup> )=	<u>115.07</u>

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) = _____		
Stress Level	Dia. by PiTape (mm) Meas. Corr.	Area, $A_{c,n}$ (cm <sup>2</sup> ) (in <sup>2</sup> )		
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
<input checked="" type="checkbox"/> Regular Membrane with Ring Set No. <u>7</u>	ID, Rings (mm)			
Thickness (mm):	Top: <u>0.56</u>	=	<u>67.00</u>	
<input type="checkbox"/> Single	Bottom: <u>0.53</u>	=	Corr. for mem.	
<input checked="" type="checkbox"/> Double	Membr. Thick. = <u>0.27</u>	=	<u>66.450</u>	
Area Ring with mem., $A_o$ (cm <sup>2</sup> )=		<u>34.68</u>	;	(in <sup>2</sup> )= <u>5.375</u>
Mass Top Cap, etc., $M_{tc}$ =	<u>527.2</u> g,	<u>1.16</u> lbf		
Data corr. for $M_{tc}$ :	<input checked="" type="checkbox"/> Yes;	<input type="checkbox"/> No	Plattens with Pins:	<input type="checkbox"/> Yes; <input checked="" type="checkbox"/> 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  
 Date: 4/23/2008  
 Prelim. Calc. By: LF

Setup By: HC  
 Date: 4/23/2008  
 Final Calc. By: LF

Take Down By: HC  
 Date: 4/25/2008  
 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.: 7G File Name: Comp-Bd  
 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-BD

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, $\sigma'_v$ (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 <sup>3</sup> )			NA	NA
$t_c$ (ON, days, hrs)	NA	0.63 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.
$W_o$	16.56			16.56	16.56	17.06
$S_o$	97.3			97.3	97.3	98.9
Measured final mass of moist soil, $M_{lat}$ (g)						137.76
Final mass of moist soil corrected for excess dry soil, $M_{lat,c}$ (g)						137.76

Calculated Mass of Dry Soil (g)	
Initial Selected Water Content (%)	16.56
Initial, $M_{d,o}$	118.41
Final, $M_{d,at}$	117.90
Selected, $M_d$	118.16

### 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: (+) $\Delta V$ out & $\Delta H$ down; (-) $\Delta V$ in & $\Delta H$ up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	1.350		
Total Equip. Comp., $\Sigma \Delta d_{af,c}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	1.350		
$\Delta V_n$ using $A_o$ - spec. (cm <sup>3</sup> )	4.68		
$\Delta V_n$ using $A_{c,n}$ - app. (cm <sup>3</sup> )	4.68		
$\Delta V_n$ using burette meas. (cm <sup>3</sup> )	0.90		
Selected $\Delta V_n$ (cm <sup>3</sup> )	4.68	NA	NA = $\Delta V_{UL}$
After Test WC Corr. for $\Delta V$ during Shear & Unloading, $W_{at,c}$ (%)			NA

Calculation of $\Delta V_c$ by Different Procedures			
By Selected Volumes		By Change in Mass	
$\Delta V_c$ (cm <sup>3</sup> )	4.68	$\sim M_{t,o} - (M_{lat,c} + \Delta V_L + \Delta V_{UL})$	
By Cal. Height & App. Area		$\Delta V_c$ (cm <sup>3</sup> )	0.26
$\Delta V_c$ (cm <sup>3</sup> )	4.68	By Saturation = 100% and Spec. Unloaded to 0 Stress	
By Cal. Ht. & Init. Spec. Area		$\Delta V_c$ (cm <sup>3</sup> )	NA
$\Delta V_c$ (cm <sup>3</sup> )	4.68		

### Back Cal. Water Content During Consol. -

Based on the Consolidation Conclusions Given Below

Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	13.19
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

<b>Consolidation &amp; Preshear Conclusions</b>	$\Delta V_c$ (cm <sup>3</sup> ) =	4.67	$\Delta H_c$ (mm) =	1.350	$\epsilon_{a,c}$ (%) =	7.29	$\Delta V_{c,max}$ (cm <sup>3</sup> ) =	NA
	$V_c$ (cm <sup>3</sup> ) =	59.56	$H_c$ (mm) =	17.175	$\epsilon_{v,c}$ (%) =	7.27	$\epsilon_{ac,max}$ (%) =	NA
	$A_c$ (cm <sup>2</sup> ) =	34.68	$\Delta \gamma_c$ (mm) =	NA	$\gamma_c$ (%) =	NA	Preshear: $\gamma_{ub}$ (%) =	NA

### Summary of Specimen Physical Properties:

Specific Gravity: $G_s = 2.693$ Measured	Height (mm)	Volume (cm <sup>3</sup> )	Area (cm <sup>2</sup> )	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition: Initial (as trimmed)	18.525	64.24	34.68	16.8	134.1	114.8	98.1	0.464
After to $\sigma'_{v,c}$	17.175	59.56	34.68	13.2	140.2	123.8	100.0	0.357
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 HP  
 3 - Uses measured value at appropriate stress level (NA for rings).

Remarks: t95 for max stress = 2.7 min

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

<input type="checkbox"/> Tube	<input type="checkbox"/> Field Extruded	<input type="checkbox"/> Liner	<input checked="" type="checkbox"/> Remolded	<input checked="" type="checkbox"/> Tamping	Constant Effort:	Blows/Tamps per Layer = <u>11</u>
Boring No.: <u>TP2317/TP2334</u>	<input type="checkbox"/> 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>D</u>			Kneading	<input checked="" type="checkbox"/> Undercompaction: $U_{ni}$ (%) = _____	Dia. (in.) = <u>1.40</u>
<input type="checkbox"/> Spec. Selection by X-ray;	<input type="checkbox"/> Geomarine Sample				Ref. Effort= MOD	% Comp. = <u>95.0</u> ± Opt.= <u>+4</u>

Type Consolidation:	<input checked="" type="checkbox"/> $K_o$ at:	<input checked="" type="checkbox"/> Incremental CRS	<input type="checkbox"/> Anisotropic at:	<input type="checkbox"/> Inclined Stress Path, $K_{c,DSS}$	<input type="checkbox"/> Used Automated System	Remarks:
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain	<input type="checkbox"/> Creep	<input checked="" type="checkbox"/> Const. Vol./Ht	<input checked="" type="checkbox"/> Without - Water	<input type="checkbox"/> Cyclic (Hz)
	<input type="checkbox"/> Dynamic	<input type="checkbox"/> Stress	<input type="checkbox"/> Post Cyclic	<input type="checkbox"/> Drained	<input type="checkbox"/> With - Bath	Rate: <input type="checkbox"/> 0.1; <input type="checkbox"/> 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity:	Height	Volume	Area	Water Content	Unit Weight		Saturation	LL	-200	Void Ratio,
$G_s = 2.693$ Measured	(mm)	(cm <sup>3</sup> )	(cm <sup>2</sup> )	(%)	Total	Dry	(%)	PL	%	e
Condition: Initial	18.53	64.24	34.68	16.81	134.1	114.8	98.1	44	73.6	0.464
After to $\sigma'_{v,c}$	17.18	59.56	34.68	13.19	140.2	123.8	100.0	15	NA	0.357
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	<input checked="" type="checkbox"/> Static Strain Rate = <u>4.6</u> %/hr.	Cyclic Rate (Hz): <input type="checkbox"/> 0.1; <input type="checkbox"/> 1; Other =				
Vert. Consol. Stress, $\sigma'_{v,c}$ :	(ksf)	NA	12.724	NA		During/End of Loading				
Induced OCR:	-	NA	NA	NA		Static		Cyclic		
Axial Strain during Consol., $\epsilon_{h,c}$ :	%	NA	7.29	NA		Change in Height, $\Delta H_{L,n}$ (mm):				
Horiz. Consol. Stress, $\tau_{h,c}$ :	(ksf)	NA	NA	NA		Change in Vol., $\Delta V_{L,n}$ (cm <sup>3</sup> ):				
Consol. Stress Ratio, $\tau_{h,c} / \sigma'_{v,c}$ :	-	NA	NA	NA		Post Cy. Displ. Reset to Null Pos.: <input type="checkbox"/> Yes; <input type="checkbox"/> No				
Shear Strain during Consol., $\epsilon_{h,c}$ :	%	NA	NA	NA		Number of Loading Cycles, N = <u>NA</u>				
Undr. Ambient Shear Stress, $\tau_{h,ub}$ :	(ksf)	NA	NA	NA		$\pm \tau_h =$ <u>NA</u> (ksf) $\pm \gamma =$ <u>NA</u> %				
Undr. Ambient Shear Strain, $\epsilon_{h,ub}$ :	%	NA	NA	NA		at end of cyclic loading, $\sigma'_{vc,yr} =$ <u>NA</u> (ksf)				

Weight Top Cap, etc., $M_{tc}$ (lbf): <u>1.16</u>	Data Normalization: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Value: <u>12.724</u> (ksf)
Data corr. for $M_{tc}$ : <input checked="" type="checkbox"/> Yes; <input type="checkbox"/> No	Plattens with Pins: <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No	
Wire Reinforced Membrane, Model: _____	Data corr. for Membr. strength: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Pre-Shear Conditions <input type="checkbox"/> Post-Cyclic Conditions
<input checked="" type="checkbox"/> Regular Membrane with Rings		<input type="checkbox"/> 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

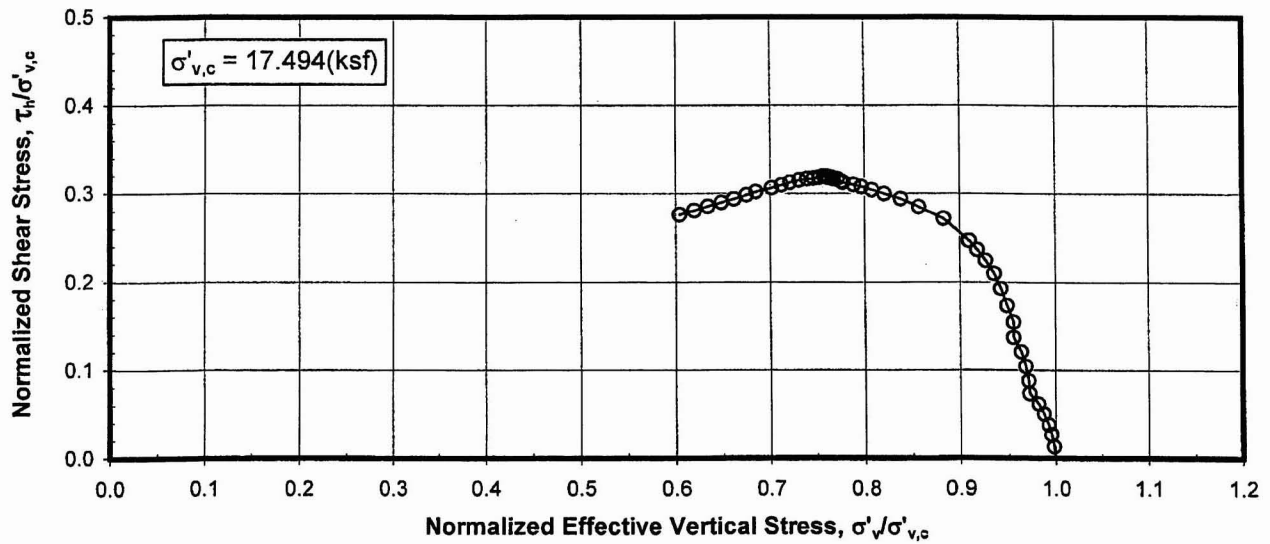
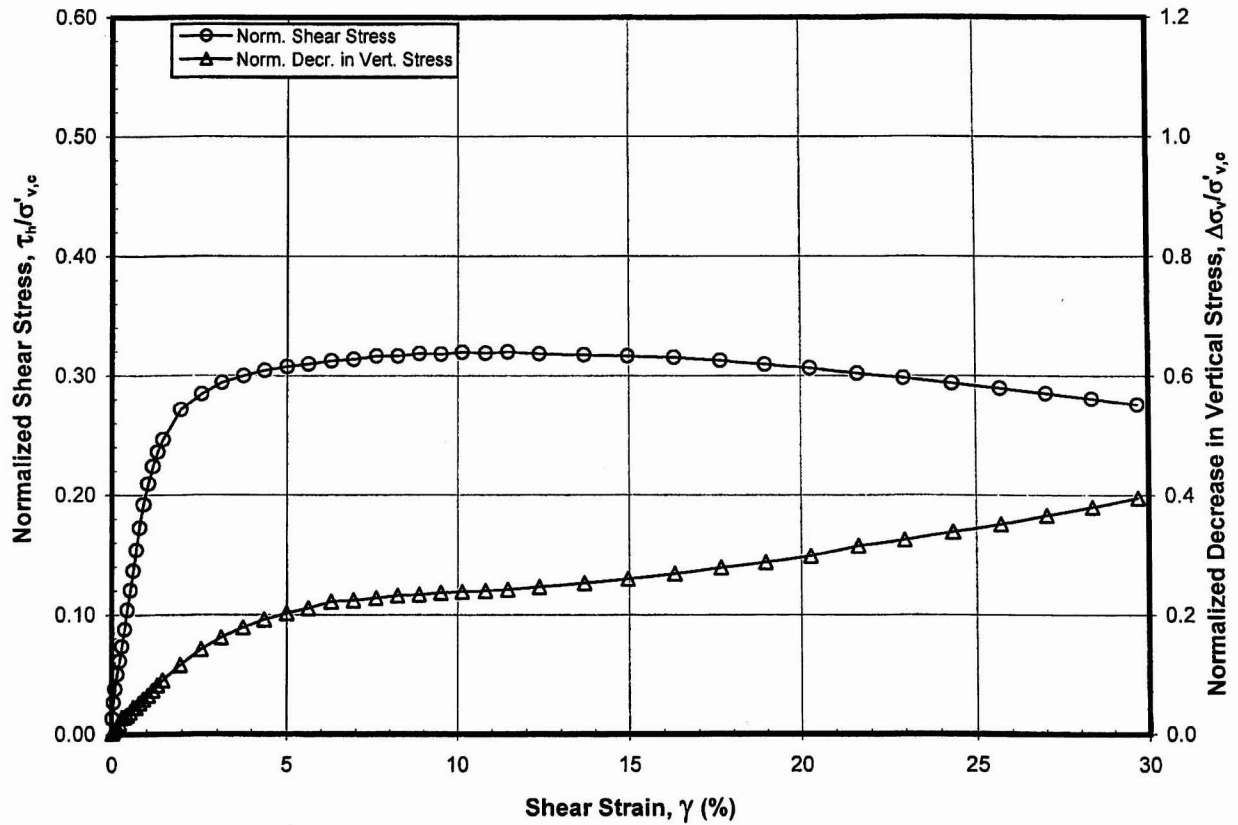
Final Visual Description and Remarks: Gray Lean CLAY with sand (CL)

Loading Summary						
	$\tau_h$ (ksf)	$\gamma$ (%)	$\sigma'_v$ (ksf)	$\tau_h/\sigma'_v$ -	$\Delta\sigma'_v/\sigma'_{v,c}$ -	$C_u/\sigma'_{v,c}$ -
at Peak Shear Stress	4.324	12.92	9.581	0.451	0.247	0.340
at Maximum Strain	3.967	29.08	8.458	0.469	0.335	-



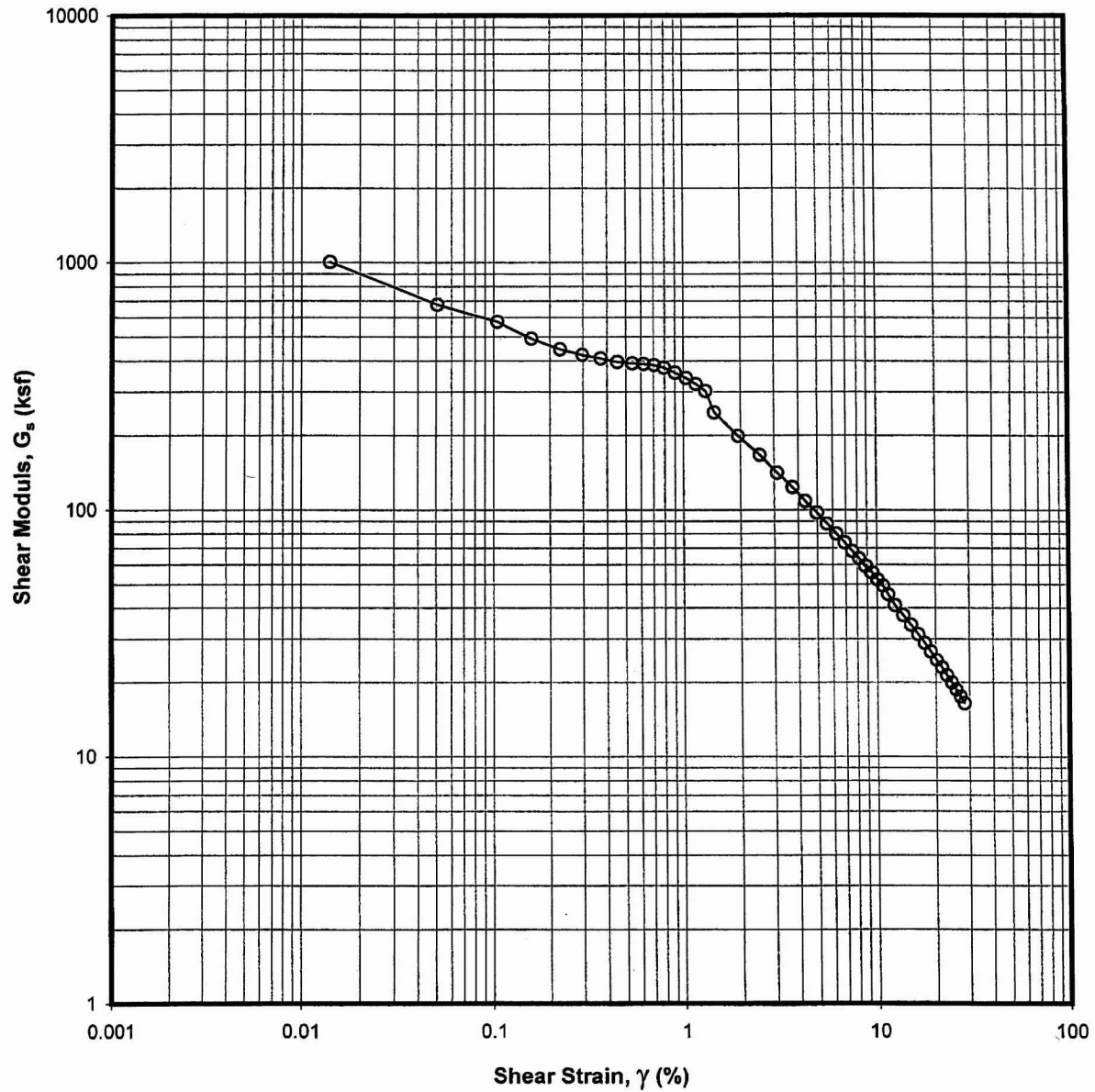
Boring No.: TP2317/TP2334 Sample No.: Comp-BD

Elapsed Time (min)	Shear Strain $\gamma$ (%)	Shear Stress $\tau_h$ (ksf)	Effective Vertical Stress $\sigma'_v$ (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 $\phi'_{DSS}$ (°)
0.0	0.00	0.006	12.724	0.000	-	-	0.000	1.000	0.000	0.03
2.7	-0.01	0.068	12.722	0.002	-	-	0.005	1.000	0.000	0.31
5.3	0.01	0.231	12.726	-0.002	1931.369	791.732	0.018	1.000	0.000	1.04
8.0	0.07	0.606	12.787	-0.063	902.201	470.680	0.048	1.005	-0.005	2.71
10.6	0.14	0.804	12.760	-0.036	556.801	233.890	0.063	1.003	-0.003	3.61
13.3	0.23	0.977	12.651	0.073	430.505	202.253	0.077	0.994	0.006	4.41
16.0	0.32	1.158	12.509	0.215	361.584	225.875	0.091	0.983	0.017	5.29
18.7	0.40	1.358	12.406	0.318	341.069	252.398	0.107	0.975	0.025	6.25
21.3	0.49	1.590	12.300	0.424	323.215	258.340	0.125	0.967	0.033	7.37
24.0	0.58	1.844	12.193	0.530	314.442	261.793	0.145	0.958	0.042	8.60
26.6	0.69	2.112	12.111	0.613	305.343	245.638	0.166	0.952	0.048	9.89
29.3	0.81	2.406	12.018	0.706	294.826	204.779	0.189	0.945	0.055	11.32
32.0	0.96	2.659	11.916	0.808	276.316	159.724	0.209	0.936	0.064	12.58
34.7	1.11	2.871	11.802	0.922	259.274	128.942	0.226	0.928	0.072	13.67
37.3	1.26	3.044	11.678	1.046	241.026	99.002	0.239	0.918	0.082	14.61
40.0	1.42	3.185	11.546	1.178	223.421	81.049	0.250	0.907	0.093	15.42
42.7	1.60	3.317	11.419	1.305	207.234	64.297	0.261	0.897	0.103	16.20
45.3	1.79	3.418	11.275	1.449	190.891	45.172	0.269	0.886	0.114	16.86
53.3	2.34	3.623	10.903	1.821	154.683	32.739	0.285	0.857	0.143	18.38
61.3	2.91	3.783	10.694	2.030	129.976	23.074	0.297	0.840	0.160	19.48
69.3	3.55	3.899	10.403	2.321	109.551	13.580	0.306	0.818	0.182	20.55
77.3	4.19	3.958	10.180	2.543	94.281	9.563	0.311	0.800	0.200	21.25
85.3	4.86	4.024	10.003	2.721	82.672	8.260	0.316	0.786	0.214	21.91
93.3	5.50	4.066	9.870	2.854	73.880	8.434	0.320	0.776	0.224	22.39
101.3	6.15	4.132	9.789	2.935	67.150	7.270	0.325	0.769	0.231	22.89
109.2	6.78	4.160	9.728	2.995	61.239	5.303	0.327	0.765	0.235	23.15
117.2	7.44	4.202	9.689	3.035	56.361	4.701	0.330	0.761	0.239	23.44
125.2	8.11	4.222	9.651	3.073	52.015	3.844	0.332	0.759	0.241	23.63
133.2	8.76	4.252	9.639	3.085	48.490	3.235	0.334	0.758	0.242	23.80
141.2	9.42	4.265	9.618	3.106	45.212	2.578	0.335	0.756	0.244	23.91
149.2	10.05	4.285	9.613	3.111	42.580	2.378	0.337	0.756	0.244	24.03
157.2	10.72	4.295	9.605	3.119	40.031	2.382	0.338	0.755	0.245	24.09
165.2	11.35	4.316	9.609	3.115	37.965	2.188	0.339	0.755	0.245	24.19
173.2	12.02	4.324	9.609	3.115	35.919	0.617	0.340	0.755	0.245	24.22
183.9	12.92	4.324	9.581	3.143	33.432	-0.008	0.340	0.753	0.247	24.29
199.8	14.26	4.323	9.537	3.187	30.270	-0.091	0.340	0.749	0.251	24.38
215.8	15.60	4.322	9.509	3.215	27.665	-0.540	0.340	0.747	0.253	24.44
231.8	16.95	4.308	9.455	3.269	25.385	-1.114	0.339	0.743	0.257	24.50
247.8	18.32	4.292	9.407	3.317	23.393	-1.119	0.337	0.739	0.261	24.52
263.8	19.66	4.278	9.327	3.397	21.732	-1.243	0.336	0.733	0.267	24.64
279.8	21.00	4.258	9.242	3.482	20.252	-2.059	0.335	0.726	0.274	24.74
295.7	22.35	4.223	9.135	3.589	18.867	-2.481	0.332	0.718	0.282	24.81
311.7	23.68	4.192	9.028	3.696	17.678	-3.544	0.329	0.710	0.290	24.90
327.7	25.04	4.127	8.883	3.841	16.461	-4.302	0.324	0.698	0.302	24.92
343.7	26.40	4.075	8.743	3.981	15.414	-3.475	0.320	0.687	0.313	24.99
359.6	27.75	4.033	8.606	4.118	14.512	-4.019	0.317	0.676	0.324	25.11
375.6	29.08	3.967	8.458	4.266	13.619	-4.926	0.312	0.665	0.335	25.13



**STATIC DSS TEST**  
 K<sub>o</sub> Consolidation - OCR = NA  
 Sample: Comp-BE - Depth: NA ft  
 Boring TP2317/TP2334  
 Exelon (Victoria)

KAW 7/16/08



**STATIC DSS TEST**  
K<sub>0</sub> Consolidation - OCR = NA  
Sample: Comp-BE - 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.: 9G      File Name: Comp-Be  
 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

<input type="checkbox"/> Tube	<input type="checkbox"/> Field Extruded	<input type="checkbox"/> Liner	<input checked="" type="checkbox"/> Remolded	<input checked="" type="checkbox"/> Tamping	Constant Effort:	Blows/Tamps per Layer = <u>11</u>
Boring No.: <u>TP2317/TP2334</u>	<input type="checkbox"/> 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>E</u>			Kneading	<input checked="" type="checkbox"/> Undercompaction: $U_{ni}$ (%) = _____	Dia. (in.) = <u>1.40</u>
<input type="checkbox"/> Spec. Selection by X-ray;	<input type="checkbox"/> Geomarine Sample				Ref. Effort = MOD	% Comp. = <u>95.0</u> ± Opt. = <u>+4</u>

Type Consolidation:	<input checked="" type="checkbox"/> $K_o$ at:	<input checked="" type="checkbox"/> Incremental	<input type="checkbox"/> Anisotropic at:	Inclined Stress Path, $K_{c,DSS}$	Used Automated System
		CRS		90° Stress Path	Remarks: _____
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain	<input type="checkbox"/> Creep	<input checked="" type="checkbox"/> Const. Vol./Ht	<input checked="" type="checkbox"/> Without - Water
	<input type="checkbox"/> Rapid	<input type="checkbox"/> Stress	<input type="checkbox"/> Post Cyclic	<input type="checkbox"/> Drained	<input type="checkbox"/> With - Bath
					Cyclic (Hz) Rate: <input type="checkbox"/> 0.1; <input type="checkbox"/> 1; 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 Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)		
Container No.	696			997	Mass Tare (g)	186.79	5.06	
Mass Moist Soil + Cont. (g)	111.46			72.83	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	139.01	138.59	
Mass Dry Soil + Container (g)	100.40			67.18	Excess Dry Soil (soil not included in final mass above)			
Mass Container (g)	31.89			31.61	Container No.			
WATER CONTENT (%)	16.14			15.88	Mass Dry Soil + Container (g)			
Avg. Initial WC, $W_{o,avg}$ (%)	16.14		Final $W_{at}$ : <input checked="" type="checkbox"/> Slice ;	Whole Spec.	Mass Container (g)			
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)		0.00	

Specimen Trimming:			
<input type="checkbox"/> Trimming Ring for Fugro Apparatus	NL3	Large-ring ID #	
<input checked="" type="checkbox"/> Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	18.53	$A_{s,t}$ (cm <sup>2</sup> ):	34.87
$D_{s,t}$ (mm):	66.63	$V_{s,t}$ (cm <sup>3</sup> ):	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 18.480	2-M NA		
3 18.550	3-B NA		
4 18.560	1-T NA	For Free Standing or Reconstituted Spec.:	
5 18.520	2-M NA		
Avg.	3-B NA	$A_{tr}$ (cm <sup>2</sup> ):	NA
= 18.525	Avg NA	$V_{tr}$ (cm <sup>3</sup> ):	NA

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft <sup>3</sup> ) =	134.34
Dry, $\gamma_{d,o}$ (lb/ft <sup>3</sup> ) =	115.67

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PiTape (mm) Meas. Corr.	Area, $A_{c,n}$ (cm <sup>2</sup> ) (in <sup>2</sup> )		
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
<input checked="" type="checkbox"/> Regular Membrane with Ring Set No. <u>9</u>	ID, Rings (mm)			
Thickness (mm):	Top: <u>0.75</u>	=	<u>67.36</u>	
<input type="checkbox"/> Single	Bottom: <u>0.71</u>	=	Corr. for mem.	
<input checked="" type="checkbox"/> Double Membr. Thick. = <u>0.37</u>		=	<u>66.630</u>	
Area Ring with mem., $A_o$ (cm <sup>2</sup> ) =	<u>34.87</u>	; (in <sup>2</sup> ) =	<u>5.405</u>	
Mass Top Cap, etc., $M_{tc}$ =	<u>528.7</u> g,	<u>1.17</u> lbf		
Data corr. for $M_{tc}$ : <input checked="" type="checkbox"/> Yes;	<input type="checkbox"/> No	Plattens with Pins: <input type="checkbox"/> Yes;	<input checked="" type="checkbox"/> 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: <u>DBN</u>	Setup By: <u>HC</u>	Take Down By: <u>HC</u>
Date: <u>4/28/2008</u>	Date: <u>4/28/2008</u>	Date: <u>5/3/2008</u>
Prelim. Calc. By: <u>HC</u>	Final Calc. By: <u>LF</u>	Reviewed By: <u>HP HP</u>

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.: 9G      File Name: \_Comp-Be  
 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-BE

Consolidation Stress Summary and Loading Summary							
Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	<input checked="" type="checkbox"/>	Static Strain Rate =	NA (%/hr or )	
Nominal Vertical Stress, $\sigma'_v$ (ksf)	NA	17.28	NA		Cyclic Rate (Hz):	0.1;	1; Other =
Axial/Vertical Force, $P_{w,n}$ (lbf)	NA	NA	NA		During/End of Loading		Static      Cyclic
Horizontal Force, $P_{hr,n}$ (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 <sup>3</sup> )		NA      NA
$t_c$ (ON,days,hrs)	NA	2.5 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.
$W_o$	16.14			16.14	16.14	16.24
$S_o$	96.4			96.4	96.4	96.7
Measured final mass of moist soil, $M_{t,at}$ (g)						138.59
Final mass of moist soil corrected for excess dry soil, $M_{lat,c}$ (g)						138.59

Calculated Mass of Dry Soil (g)	
Initial Selected Water Content (%)	16.14
Initial, $M_{d,o}$	119.69
Final, $M_{d,at}$	119.59
Selected, $M_d$	119.64

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 $\sigma'_{v,c,max}$	During Rebound to $\sigma'_{v,c}$	Specimen Unloaded After Test To
Stress Units (ksf)	17.280	NA	NA
Sign Convention: (+) $\Delta V$ out & $\Delta H$ down; (-) $\Delta V$ in & $\Delta H$ up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	1.064		
Total Equip. Comp., $\Sigma \Delta d_{atc}$ (mm)	0.000		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	1.064		
$\Delta V_n$ using $A_o$ - spec. (cm <sup>3</sup> )	3.71		
$\Delta V_n$ using $A_{c,n}$ - app. (cm <sup>3</sup> )	3.71		
$\Delta V_n$ using burette meas. (cm <sup>3</sup> )	0.60		
Selected $\Delta V_n$ (cm <sup>3</sup> )	3.71	NA	NA = $\Delta V_{ul}$
After Test WC Corr. for $\Delta V$ during Shear & Unloading, $W_{at,s}$ (%)			NA

Calculation of $\Delta V_c$ by Different Procedures			
By Selected Volumes		By Change in Mass	
$\Delta V_c$ (cm <sup>3</sup> )	3.71	$\sim M_{t,o} - (M_{lat,c} + \Delta V_L + \Delta V_{ul})$	
By Cal. Height & App. Area		$\Delta V_c$ (cm <sup>3</sup> )	0.42
$\Delta V_c$ (cm <sup>3</sup> )	3.71	By Saturation = 100% and Spec. Unloaded to 0 Stress	
By Cal. Ht. & Init. Spec. Area		$\Delta V_c$ (cm <sup>3</sup> )	NA
$\Delta V_c$ (cm <sup>3</sup> )	3.71		

Back Cal. Water Content During Consol. - Based on the Consolidation Conclusions Given Below	
Assumed Saturation (%)	100.00
Back Cal. WC before Loading, $W_{c,bc}$ (%)	13.66
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	NA

<b>Consolidation &amp; Preshear</b>	$\Delta V_c$ (cm <sup>3</sup> ) =	3.71	$\Delta H_c$ (mm) =	1.064	$\epsilon_{a,c}$ (%) =	5.74	$\Delta V_{c,max}$ (cm <sup>3</sup> ) =	NA	
	$V_c$ (cm <sup>3</sup> ) =	60.88	$H_c$ (mm) =	17.461	$\epsilon_{v,c}$ (%) =	5.75		$\epsilon_{ac,max}$ (%) =	NA
	<b>Conclusions</b>	$A_c$ (cm <sup>2</sup> ) =	34.87	$\Delta \gamma_c$ (mm) =	NA	$\gamma_c$ (%) =		NA	Preshear: $\gamma_{us}$ (%) =

Summary of Specimen Physical Properties:								
Specific Gravity: $G_s = 2.693$ Measured	Height (mm)	Volume (cm <sup>3</sup> )	Area (cm <sup>2</sup> )	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	18.525	64.60	34.87	16.2	134.3	115.6	96.5	0.454
After to $\sigma'_{v,c}$	17.461	60.88	34.87	13.7	139.4	122.7	100.0	0.371
Consol.: to $\sigma'_{v,c,max}$	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 = 33.1 min



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

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

Type Consolidation:	<input checked="" type="checkbox"/> $K_o$ at:	<input checked="" type="checkbox"/> Incremental CRS	<input type="checkbox"/> Anisotropic at:	<input type="checkbox"/> Inclined Stress Path, $K_{c,DSS}$	<input type="checkbox"/> Used Automated System	Remarks:
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain Stress	<input type="checkbox"/> Creep Post Cyclic	<input checked="" type="checkbox"/> Const. Vol./Ht Drained	<input checked="" type="checkbox"/> Without - Water Bath	<input type="checkbox"/> Cyclic (Hz) Rate: <u>0.1</u> ;
	<input type="checkbox"/> Dynamic	<input type="checkbox"/> Stress			<input type="checkbox"/> With - Bath	<input type="checkbox"/> Strain 1; Other:

Summary of Specimen Physical Properties										
Specific Gravity: $G_s = 2.693$ Measured	Height (mm)	Volume (cm <sup>3</sup> )	Area (cm <sup>2</sup> )	Water Content (%)	Unit Weight (pcf)		Saturation (%)	LL	-200 %	Void Ratio, e
Condition:					Total	Dry		PI		
Initial	18.53	64.60	34.87	16.19	134.3	115.6	96.5	44	73.6	0.454
After Consol. to $\sigma'_{vc,max}$	17.46	60.88	34.87	13.66	139.4	122.7	100.0	15	NA	0.371
	NA	NA	NA	NA	NA	NA	NA	29	NA	NA

Consolidation Stress Summary and Loading Summary										
Item	Unit	Max. Stress	Pre-Shear	Post Cyclic	<input checked="" type="checkbox"/> Static Strain Rate = <u>4.6 %/hr.</u>					
Vert. Consol. Stress, $\sigma'_{vc}$	(ksf)	NA	17.494	NA	Cyclic Rate (Hz):	<u>0.1</u> ;	<u>1</u> ;	Other =		
Induced OCR:	-	NA	NA	NA	During/End of Loading		Static	Cyclic		
Axial Strain during Consol., $\epsilon_{h,c}$	%	NA	5.74	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 <sup>3</sup> ):		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, $\tau_{h,ub}$	(ksf)	NA	NA	NA	$\pm \tau_h =$ <u>NA</u> (ksf)		$\pm \gamma =$ <u>NA</u> %			
Undr. Ambient Shear Strain, $\epsilon_{ub}$	%	NA	NA	NA	at end of cyclic loading, $\sigma'_{vc,yr} =$ <u>NA</u> (ksf)					

Weight Top Cap, etc., $M_{tc}$ (lbf): <u>1.17</u>	Data Normalization: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Value: <u>17.494</u> (ksf)
Data corr. for $M_{tc}$ : <input checked="" type="checkbox"/> Yes; <input type="checkbox"/> No	Plattens with Pins: <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No
Wire Reinforced Membrane, Model: _____	Data corr. for Membr. strength: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<input checked="" type="checkbox"/> Regular Membrane with Rings	<input checked="" type="checkbox"/> Pre-Shear Conditions <input type="checkbox"/> Post-Cyclic Conditions
	<input type="checkbox"/> 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.

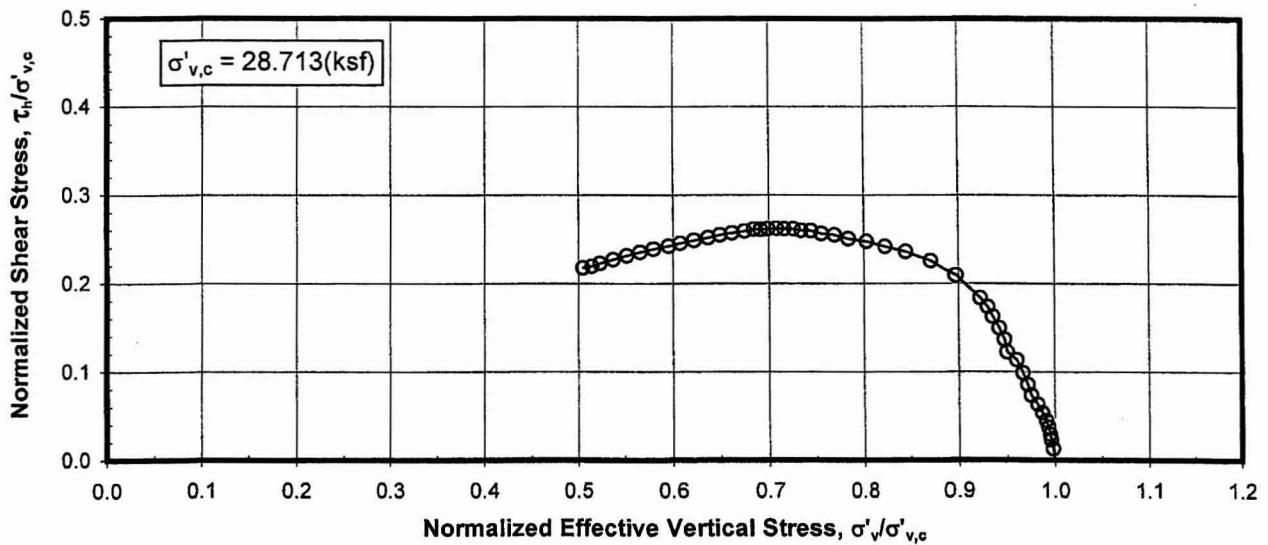
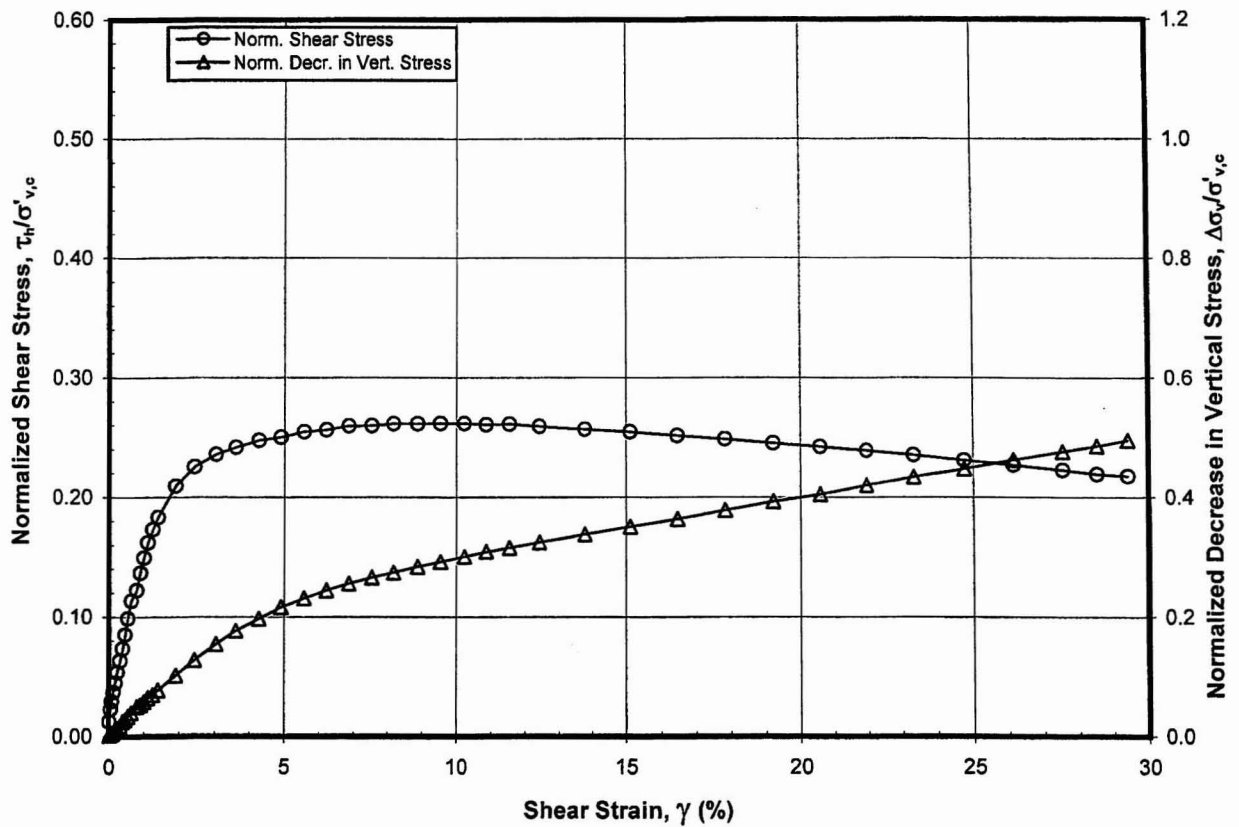
NA - Not Applicable

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

Loading Summary						
	$\tau_h$ (ksf)	$\gamma$ (%)	$\sigma'_v$ (ksf)	$\tau_h/\sigma'_v$	$\Delta\sigma'_v/\sigma'_{v,c}$	$C_u/\sigma'_{v,c}$
at Peak Shear Stress	5.591	11.46	13.259	0.422	0.242	0.320
at Maximum Strain	4.830	29.69	10.578	0.457	0.395	-

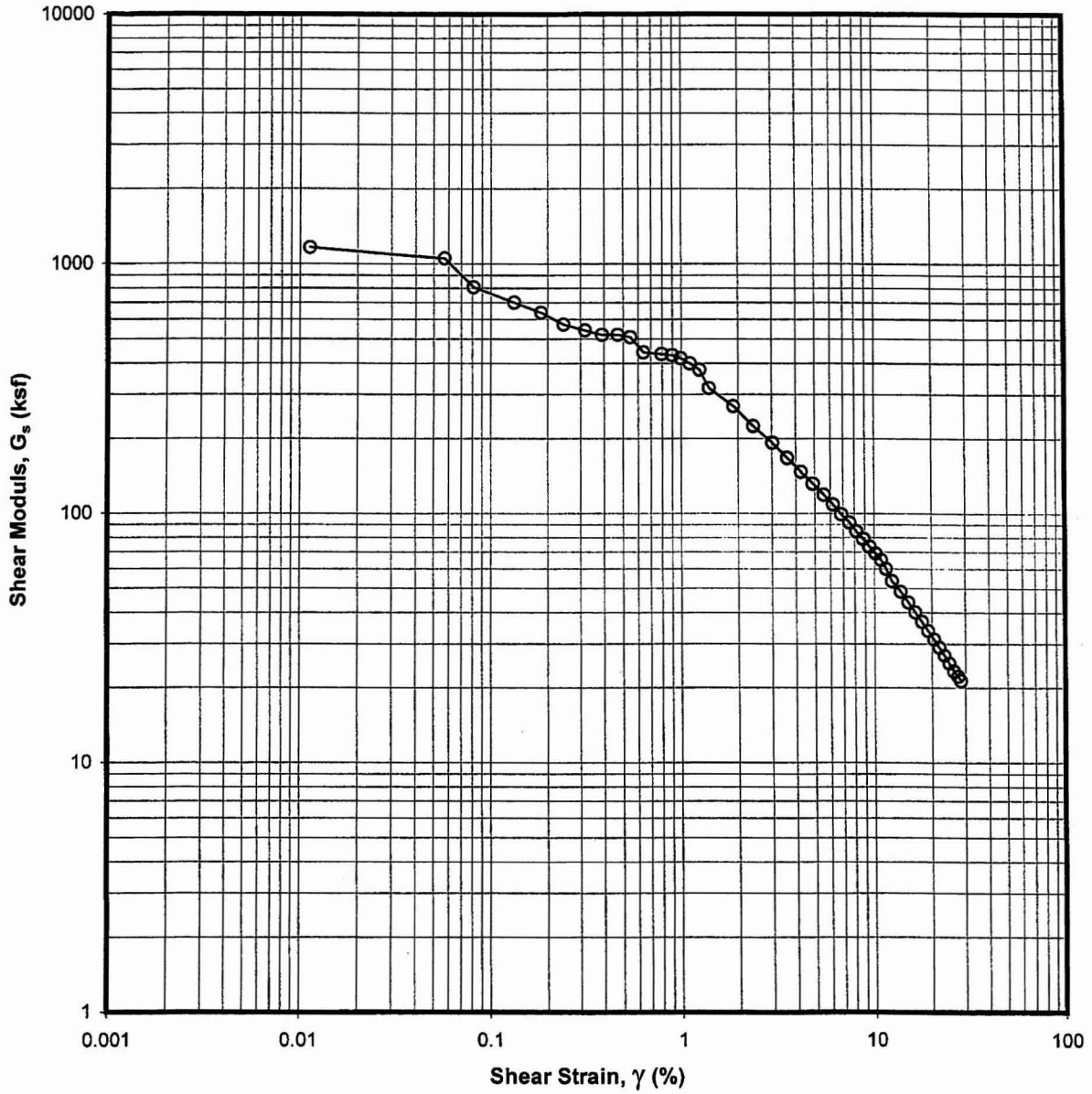
Boring No.: TP2317/TP2334 Sample No.: Comp-BE

Elapsed Time (min)	Shear Strain $\gamma$ (%)	Shear Stress $\tau_h$ (ksf)	Effective Vertical Stress $\sigma'_v$ (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 $\phi'_{DSS}$ (°)
0.0	0.00	-0.045	17.494	0.000	-	-	-0.003	1.000	0.000	-0.15
2.6	0.01	0.227	17.469	0.025	1935.160	1291.141	0.013	0.999	0.001	0.75
5.3	0.05	0.466	17.418	0.077	1002.842	507.330	0.027	0.996	0.004	1.53
7.9	0.10	0.664	17.365	0.129	676.250	375.268	0.038	0.993	0.007	2.19
10.5	0.16	0.874	17.278	0.217	575.352	337.469	0.050	0.988	0.012	2.90
13.1	0.23	1.070	17.175	0.319	491.595	293.642	0.061	0.982	0.018	3.56
15.7	0.30	1.279	17.007	0.487	444.812	314.444	0.073	0.972	0.028	4.30
18.4	0.37	1.533	16.989	0.505	422.206	342.019	0.088	0.971	0.029	5.15
21.0	0.46	1.818	16.935	0.560	409.361	338.836	0.104	0.968	0.032	6.13
23.6	0.54	2.105	16.850	0.645	396.082	341.926	0.120	0.963	0.037	7.12
26.2	0.62	2.392	16.708	0.787	390.993	361.132	0.137	0.955	0.045	8.15
28.9	0.71	2.693	16.707	0.787	388.033	360.346	0.154	0.955	0.045	9.16
31.5	0.80	3.021	16.593	0.901	384.219	331.792	0.173	0.948	0.052	10.32
34.1	0.91	3.362	16.477	1.018	375.017	271.831	0.192	0.942	0.058	11.53
36.7	1.04	3.662	16.360	1.134	357.759	217.932	0.209	0.935	0.065	12.62
39.3	1.16	3.919	16.208	1.286	340.520	178.958	0.224	0.926	0.074	13.59
42.0	1.30	4.131	16.057	1.438	321.450	140.644	0.236	0.918	0.082	14.43
44.6	1.44	4.310	15.915	1.579	301.756	106.013	0.246	0.910	0.090	15.15
52.4	1.94	4.750	15.470	2.024	246.727	63.340	0.272	0.884	0.116	17.07
60.3	2.53	4.978	15.011	2.484	198.299	33.611	0.285	0.858	0.142	18.35
68.2	3.12	5.145	14.670	2.824	166.393	22.016	0.294	0.839	0.161	19.33
76.0	3.75	5.243	14.368	3.126	140.965	14.291	0.300	0.821	0.179	20.05
83.9	4.36	5.322	14.138	3.357	123.205	11.041	0.304	0.808	0.192	20.63
91.7	5.00	5.381	13.950	3.544	108.478	7.535	0.308	0.797	0.203	21.09
99.6	5.62	5.418	13.808	3.686	97.138	6.561	0.310	0.789	0.211	21.42
107.5	6.28	5.465	13.612	3.882	87.677	5.059	0.312	0.778	0.222	21.87
115.3	6.93	5.485	13.579	3.916	79.824	5.223	0.314	0.776	0.224	21.99
123.2	7.59	5.533	13.512	3.982	73.524	3.603	0.316	0.772	0.228	22.27
131.0	8.23	5.532	13.440	4.055	67.771	2.711	0.316	0.768	0.232	22.37
138.9	8.87	5.568	13.409	4.085	63.306	2.244	0.318	0.766	0.234	22.55
146.7	9.51	5.561	13.358	4.136	58.936	1.516	0.318	0.764	0.236	22.60
154.6	10.13	5.587	13.323	4.171	55.575	1.105	0.319	0.762	0.238	22.75
162.5	10.81	5.573	13.296	4.199	51.967	0.392	0.319	0.760	0.240	22.74
170.3	11.46	5.591	13.259	4.235	49.189	-0.097	0.320	0.758	0.242	22.86
180.8	12.38	5.564	13.190	4.304	45.322	-1.996	0.318	0.754	0.246	22.87
196.5	13.68	5.550	13.077	4.418	40.894	-1.184	0.317	0.747	0.253	23.00
212.2	14.97	5.533	12.952	4.542	37.268	-1.451	0.316	0.740	0.260	23.13
227.9	16.31	5.512	12.805	4.690	34.074	-2.521	0.315	0.732	0.268	23.29
243.6	17.65	5.466	12.629	4.866	31.229	-3.743	0.312	0.722	0.278	23.40
259.3	18.95	5.413	12.466	5.028	28.796	-4.012	0.309	0.713	0.287	23.47
275.1	20.29	5.360	12.285	5.210	26.639	-4.853	0.306	0.702	0.298	23.57
290.8	21.65	5.282	11.989	5.505	24.611	-5.259	0.302	0.685	0.315	23.78
306.5	22.99	5.218	11.809	5.685	22.885	-5.253	0.298	0.675	0.325	23.84
322.2	24.35	5.140	11.575	5.919	21.290	-5.648	0.294	0.662	0.338	23.94
337.9	25.70	5.065	11.347	6.147	19.885	-5.486	0.290	0.649	0.351	24.05
353.6	27.03	4.993	11.092	6.402	18.636	-5.740	0.285	0.634	0.366	24.23
369.3	28.36	4.912	10.845	6.650	17.476	-6.110	0.281	0.620	0.380	24.37
385.0	29.69	4.830	10.578	6.916	16.418	-6.118	0.276	0.605	0.395	24.54



**STATIC DSS TEST**  
 K<sub>o</sub> Consolidation - OCR = NA  
 Sample: Comp-BF - Depth: NA ft  
 Boring TP2317/TP2334  
 Exelon (Victoria)

KAW 7116108



**STATIC DSS TEST**  
K<sub>0</sub> Consolidation - OCR = NA  
Sample: Comp-BF - 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-Bf  
 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

<input type="checkbox"/> Tube	<input type="checkbox"/> Field Extruded	<input type="checkbox"/> Liner	<input checked="" type="checkbox"/> Remolded	<input checked="" type="checkbox"/> Tamping	Constant Effort:	Blows/Tamps per Layer = <u>11</u>
Boring No.: <u>TP2317/TP2334</u>	<input type="checkbox"/> 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>F</u>			Kneading	<input checked="" type="checkbox"/> Undercompaction: $U_{ni}$ (%) = _____	Dia. (in.) = <u>1.40</u>
<input type="checkbox"/> Spec. Selection by X-ray;	<input type="checkbox"/> Geomarine Sample				Ref. Effort = MOD	% Comp. = <u>95.0</u> ± Opt. = <u>+4</u>

Type Consolidation:	<input checked="" type="checkbox"/> $K_c$ at:	<input checked="" type="checkbox"/> Incremental CRS	<input type="checkbox"/> Anisotropic at:	<input type="checkbox"/> Inclined Stress Path, $K_{c,DSS}$	<input type="checkbox"/> Used Automated System
				90° Stress Path	Remarks: _____
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain	<input type="checkbox"/> Creep	<input checked="" type="checkbox"/> Const. Vol./Ht	<input checked="" type="checkbox"/> Without - Water
	<input type="checkbox"/> Rapid	<input type="checkbox"/> Stress	<input type="checkbox"/> Post Cyclic	<input type="checkbox"/> Drained	<input type="checkbox"/> With - Bath
					Cyclic (Hz) Rate: <u>0.1</u> ;
					Strain 1; 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.	<u>1102</u>			<u>D-11</u>	<u>321.28</u>	<u>183.30</u>	<u>140.85</u>	
Mass Moist Soil + Cont. (g)	<u>103.85</u>			<u>64.23</u>	<u>137.98</u>	<u>4.19</u>	<u>136.66</u>	
Mass Dry Soil + Container (g)	<u>93.77</u>			<u>59.89</u>	Excess Dry Soil (soil not included in final mass above)			
Mass Container (g)	<u>31.51</u>			<u>30.26</u>	Container No. _____			
WATER CONTENT (%)	<u>16.19</u>			<u>14.65</u>	Mass Dry Soil + Container (g) _____			
Avg. Initial WC, $W_{o,avg}$ (%)	<u>16.19</u>				Mass Container (g) _____			
Avg. Initial WC, $W_{o,avg}$ (%)				Final $W_{at}$ : <input checked="" type="checkbox"/> Slice ; <input type="checkbox"/> Whole Spec.	Mass Excess Dry Soil (g)			<u>0.00</u>

See attached data sheet(s) for additional water contents

Specimen Trimming:			
<input type="checkbox"/>	Trimming Ring for Fugro Apparatus	NL6	Large-ring ID #
<input checked="" type="checkbox"/>	Trimming Ring for NGI Apparatus		Small-ring ID #
$H_{s,t}$ (mm):	<u>18.55</u>	$A_{s,t}$ (cm <sup>2</sup> ):	<u>34.68</u>
$D_{s,t}$ (mm):	<u>66.45</u>	$V_{s,t}$ (cm <sup>3</sup> ):	<u>64.32</u>
Remarks: _____			
<input type="checkbox"/> Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height ( $H_{tr}$ )	Diameter ( $D_o$ )	Remarks:	
<u>1</u>	<u>18.560</u>	<u>1-T</u>	<u>NA</u>
<u>2</u>	<u>18.520</u>	<u>2-M</u>	<u>NA</u>
<u>3</u>	<u>18.540</u>	<u>3-B</u>	<u>NA</u>
<u>4</u>	<u>18.550</u>	<u>1'-T</u>	<u>NA</u>
<u>5</u>	<u>18.520</u>	<u>2'-M</u>	<u>NA</u>
Avg.	<u>3-B</u>	<u>NA</u>	<u>NA</u>
$A_{tr}$ (cm <sup>2</sup> ):			<u>NA</u>
$V_{tr}$ (cm <sup>3</sup> ):			<u>NA</u>

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 <sup>3</sup> ) =	<u>133.92</u>
Dry, $\gamma_{d,o}$ (lb/ft <sup>3</sup> ) =	<u>115.26</u>

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) = _____		
Stress Level	Dia. by PiTape (mm) Meas.	Corr.	Area, $A_{c,n}$ (cm <sup>2</sup> )	(in <sup>2</sup> )
<u>0</u>				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
<input checked="" type="checkbox"/>	Regular Membrane with Ring Set No. <u>10</u>	ID, Rings (mm)		
Thickness (mm):	Top: <u>0.58</u>	=	<u>67.02</u>	
<input type="checkbox"/> Single	Bottom: <u>0.56</u>	Corr. for mem.		
<input checked="" type="checkbox"/> Double	Membr. Thick. = <u>0.29</u>	=	<u>66.450</u>	
Area Ring with mem., $A_o$ (cm <sup>2</sup> ) =		<u>34.68</u>	;	(in <sup>2</sup> ) = <u>5.375</u>
Mass Top Cap, etc., $M_{tc}$ =		<u>528.2</u> g,	<u>1.16</u> lbf	
Data corr. for $M_{tc}$ :	<input checked="" type="checkbox"/> Yes;	<input type="checkbox"/> No	Plattens with Pins:	<input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No

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

Other Remarks: \_\_\_\_\_

Trim./ Recon. By: DBN

Setup By: HC

Take Down By: HC

Date: 4/28/2008

Date: 4/28/2008

Date: 5/2/2008

Prelim. Calc. By: LF

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.: 10G      File Name: Comp-Bf  
 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-BF

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, $\sigma'_v$ (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, $P_{hr,n}$ (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 <sup>3</sup> )			<u>NA</u>	<u>NA</u>	
$t_c$ (ON, days, hrs)	<u>NA</u>	<u>2.43 days</u>	<u>NA</u>		Post Cy. Displ. Reset to Null Position:			<input type="checkbox"/> Yes;	<input type="checkbox"/> No	
Undrained ambient stress applied:    with Delta shear force (lbf) = <u>NA</u> & Duration (min) = <u>NA</u> & Delta disp., $\Delta d_{h,ua}$ (mm) = <u>NA</u>										

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.
$W_o$	<u>16.19</u>			<u>16.19</u>	<u>16.19</u>	<u>15.75</u>
$S_o$	<u>95.6</u>			<u>95.6</u>	<u>95.6</u>	<u>94.2</u>
Measured final mass of moist soil, $M_{t,at}$ (g)						<u>136.66</u>
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)						<u>136.66</u>

Calculated Mass of Dry Soil (g)	
Initial Selected Water Content (%)	<u>19.19</u>
Initial, $M_{d,o}$	<u>115.76</u>
Final, $M_{d,at}$	<u>119.20</u>
Selected, $M_d$	<u>117.48</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 $\sigma'_{v,max}$	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: (+) $\Delta V$ out & $\Delta H$ down; (-) $\Delta V$ in & $\Delta H$ up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	<u>1.630</u>		
Total Equip. Comp., $\Sigma \Delta d_{afc}$ (mm)	<u>0.000</u>		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	<u>1.630</u>		
$\Delta V_n$ using $A_o$ - spec. (cm <sup>3</sup> )	<u>5.65</u>		
$\Delta V_n$ using $A_{c,n}$ - app. (cm <sup>3</sup> )	<u>5.65</u>		
$\Delta V_n$ using burette meas. (cm <sup>3</sup> )	<u>0.00</u>		
Selected $\Delta V_n$ (cm <sup>3</sup> )	<u>5.65</u>	<u>NA</u>	<u>NA</u> = $\Delta V_{uL}$
After Test WC Corr. for $\Delta V$ during Shear & Unloading, $W_{at,c}$ (%)			
Lateral Confinement Area Cal. Approach (LCA); Method 1, 2, 3 or 4: <u>1</u>			

Calculation of $\Delta V_c$ by Different Procedures			
By Selected Volumes		By Change in Mass	
$\Delta V_c$ (cm <sup>3</sup> )	<u>5.65</u>	$\sim M_{t,o} - (M_{t,at,c} + \Delta V_L + \Delta V_{uL})$	
By Cal. Height & App. Area		$\Delta V_c$ (cm <sup>3</sup> )	<u>1.32</u>
$\Delta V_c$ (cm <sup>3</sup> )	<u>5.65</u>	By Saturation = 100% and Spec. Unloaded to 0 Stress	
By Cal. Ht. & Init. Spec. Area		$\Delta V_c$ (cm <sup>3</sup> )	<u>NA</u>
$\Delta V_c$ (cm <sup>3</sup> )	<u>5.65</u>	$\Delta V_c$ (cm <sup>3</sup> )	<u>NA</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>12.72</u>
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	<u>NA</u>

<b>Consolidation &amp; Preshear Conclusions</b>	$\Delta V_c$ (cm <sup>3</sup> ) = <u>5.64</u>	$\Delta H_c$ (mm) = <u>1.630</u>	$\epsilon_{a,c}$ (%) = <u>8.79</u>	$\Delta V_{c,max}$ (cm <sup>3</sup> ) = <u>NA</u>
	$V_c$ (cm <sup>3</sup> ) = <u>58.68</u>	$H_c$ (mm) = <u>16.920</u>	$\epsilon_{v,c}$ (%) = <u>8.77</u>	$\epsilon_{ac,max}$ (%) = <u>NA</u>
	$A_c$ (cm <sup>2</sup> ) = <u>34.68</u>	$\Delta \gamma_c$ (mm) = <u>NA</u>	$\gamma_c$ (%) = <u>NA</u>	Preshear: $\gamma_{ua}$ (%) = <u>NA</u>

Summary of Specimen Physical Properties:								
Specific Gravity: $G_s = 2.693$ Measured	Height (mm)	Volume (cm <sup>3</sup> )	Area (cm <sup>2</sup> )	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	<u>18.550</u>	<u>64.32</u>	<u>34.68</u>	<u>17.4</u>	<u>133.9</u>	<u>114.0</u>	<u>99.6</u>	<u>0.474</u>
After to $\sigma'_{v,c}$	<u>16.920</u>	<u>58.68</u>	<u>34.68</u>	<u>12.7</u>	<u>140.9</u>	<u>125.0</u>	<u>100.0</u>	<u>0.345</u>
Consol.: to $\sigma'_{v,max}$	<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 = 189.5 min

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

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

Type Consolidation:	<input checked="" type="checkbox"/> $K_o$ at:	<input type="checkbox"/> Incremental CRS	<input type="checkbox"/> Anisotropic at:	<input type="checkbox"/> Inclined Stress Path, $K_{c,DSS}$	<input type="checkbox"/> Used Automated System	Remarks:
Loading Conditions:	<input checked="" type="checkbox"/> Static Dynamic	<input checked="" type="checkbox"/> Strain Stress	<input type="checkbox"/> Creep Post Cyclic	<input checked="" type="checkbox"/> Const. Vol./Ht Drained	<input checked="" type="checkbox"/> Without - Water Bath	<input type="checkbox"/> Cyclic (Hz) Rate: <u>0.1</u> ;
<input type="checkbox"/> Strain Stress 1; Other:						

Summary of Specimen Physical Properties										
Specific Gravity:	Height	Volume	Area	Water Content	Unit Weight		Saturation	LL	-200	Void Ratio,
$G_s = 2.693$ Measured	(mm)	(cm <sup>3</sup> )	(cm <sup>2</sup> )	(%)	Total (pcf)	Dry (pcf)	(%)	PL	%	e
Condition: Initial	18.55	64.32	34.68	17.45	133.9	114.0	99.6	44	73.6	0.474
After to $\sigma'_{v,c}$	16.92	58.68	34.68	12.72	140.9	125.0	100.0	15	NA	0.345
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	<input checked="" type="checkbox"/> Static Strain Rate = <u>4.6 %/hr.</u>	Cyclic Rate (Hz): <u>0.1</u> ; <u>1</u> ; Other =				
Vert. Consol. Stress, $\sigma'_{v,c}$ :	(ksf)	NA	28.713	NA	During/End of Loading					
Induced OCR:	-	NA	NA	NA	Change in Height, $\Delta H_{L,n}$ (mm):		Static	Cyclic		
Axial Strain during Consol., $\epsilon_{a,c}$ :	%	NA	8.79	NA	Change in Vol., $\Delta V_{L,n}$ (cm <sup>3</sup> ):		NA	NA		
Horiz. Consol. Stress, $\tau_{h,c}$ :	(ksf)	NA	NA	NA	Post Cy. Displ. Reset to Null Pos.:		Yes;	No		
Consol. Stress Ratio, $\tau_{h,c} / \sigma'_{v,c}$ :	-	NA	NA	NA	Number of Loading Cycles, N = <u>NA</u>					
Shear Strain during Consol., $\epsilon_{s,c}$ :	%	NA	NA	NA	$\pm \tau_h =$ <u>NA</u> (ksf)		$\pm \gamma =$ <u>NA</u> %	at end of cyclic loading, $\sigma'_{vc,y}$ = <u>NA</u> (ksf)		
Undr. Ambient Shear Stress, $\tau_{h,ua}$ :	(ksf)	NA	NA	NA						
Undr. Ambient Shear Strain, $\epsilon_{s,ua}$ :	%	NA	NA	NA						

Weight Top Cap, etc., $M_{1c}$ (lbf): <u>1.16</u>	Data Normalization: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Value: <u>28.713</u> (ksf)
Data corr. for $M_{1c}$ : <input checked="" type="checkbox"/> Yes; <input type="checkbox"/> No	Plattens with Pins: <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No
Wire Reinforced Membrane, Model: _____	Data corr. for Membr. strength: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<input checked="" type="checkbox"/> Regular Membrane with Rings	<input checked="" type="checkbox"/> Pre-Shear Conditions <input type="checkbox"/> Post-Cyclic Conditions
	<input type="checkbox"/> 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.

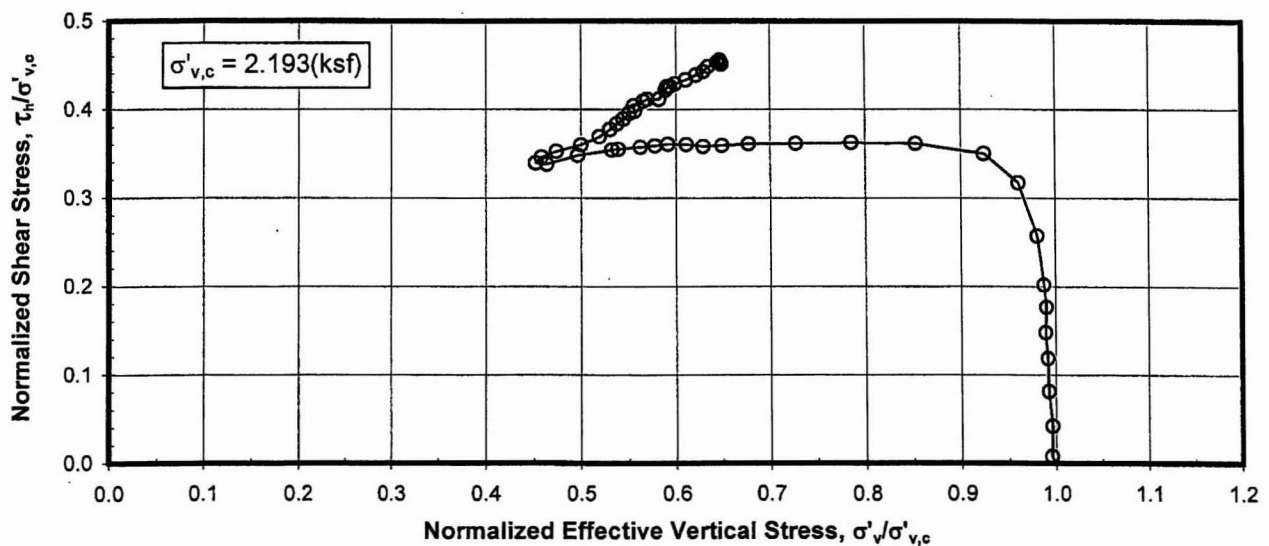
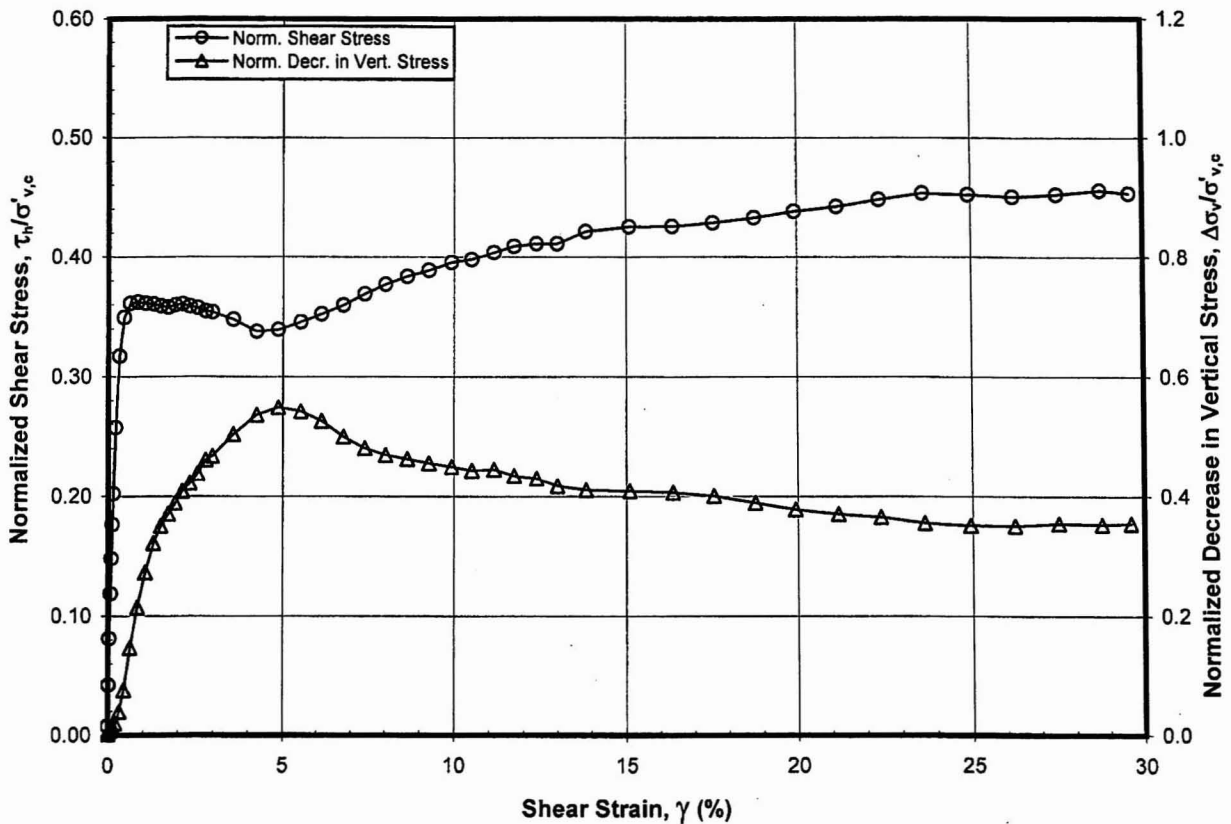
NA - Not Applicable

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

Loading Summary						
	$\tau_h$ (ksf)	$\gamma$ (%)	$\sigma'_v$ (ksf)	$\tau_h/\sigma'_v$	$\Delta\sigma'_v/\sigma'_{v,c}$	$c_u/\sigma'_{v,c}$
at Peak Shear Stress	7.512	9.54	20.336	0.369	0.292	0.262
at Maximum Strain	6.243	29.41	14.501	0.431	0.495	-

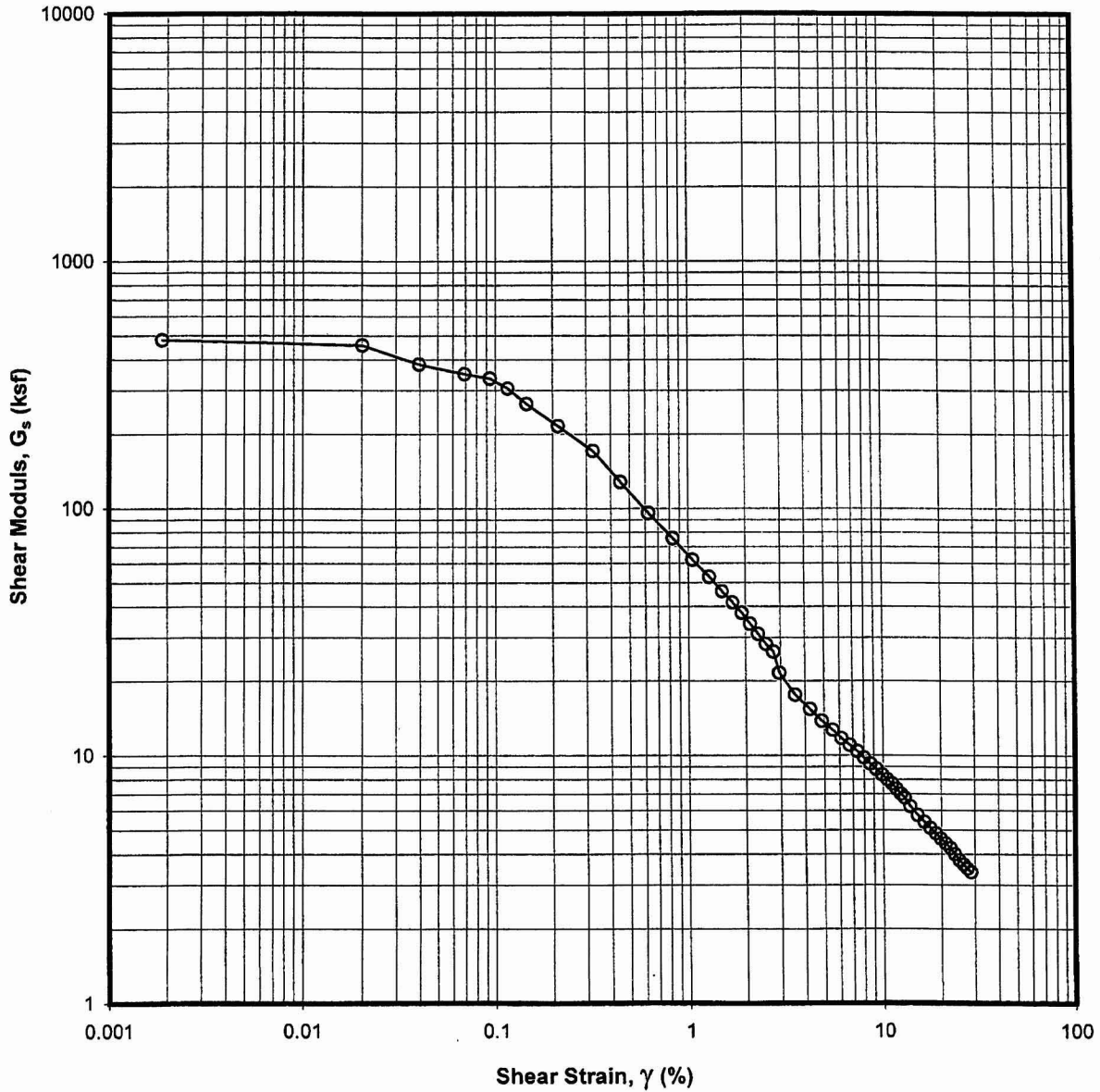
Boring No.: TP2317/TP2334 Sample No.: Comp-BF

Elapsed Time (min)	Shear Strain $\gamma$ (%)	Shear Stress $\tau_h$ (ksf)	Effective Vertical Stress $\sigma'_v$ (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 $\phi'_{DSS}$ (°)
0.0	0.00	-0.011	28.713	0.000	-	-	0.000	1.000	0.000	-0.02
2.7	0.01	0.358	28.672	0.042	3278.743	1958.172	0.012	0.999	0.001	0.72
5.4	0.06	0.651	28.610	0.103	1158.410	714.605	0.023	0.996	0.004	1.30
8.1	0.08	0.843	28.583	0.130	1048.835	609.710	0.029	0.995	0.005	1.69
10.8	0.13	1.065	28.530	0.183	807.071	427.844	0.037	0.994	0.006	2.14
13.5	0.18	1.285	28.461	0.253	701.751	431.720	0.045	0.991	0.009	2.58
16.2	0.24	1.539	28.345	0.369	637.863	397.057	0.054	0.987	0.013	3.11
18.9	0.32	1.811	28.214	0.500	571.423	382.062	0.063	0.983	0.017	3.67
21.7	0.39	2.106	28.014	0.699	540.601	411.817	0.073	0.976	0.024	4.30
24.4	0.47	2.438	27.912	0.802	519.917	466.453	0.085	0.972	0.028	4.99
27.1	0.55	2.829	27.761	0.953	519.212	481.607	0.099	0.967	0.033	5.82
29.8	0.64	3.252	27.576	1.137	508.789	306.842	0.113	0.960	0.040	6.73
32.5	0.80	3.509	27.285	1.428	441.904	274.009	0.122	0.950	0.050	7.33
35.2	0.90	3.915	27.208	1.505	434.934	384.074	0.136	0.948	0.052	8.19
37.9	1.00	4.287	27.059	1.654	430.153	351.887	0.149	0.942	0.058	9.00
40.6	1.11	4.653	26.864	1.850	418.627	277.106	0.162	0.936	0.064	9.83
43.3	1.25	4.970	26.711	2.003	398.955	212.045	0.173	0.930	0.070	10.54
46.0	1.40	5.256	26.490	2.224	376.097	170.126	0.183	0.923	0.077	11.22
54.1	1.89	6.005	25.784	2.929	317.784	120.653	0.209	0.898	0.102	13.11
62.3	2.41	6.470	25.047	3.666	268.434	68.548	0.225	0.872	0.128	14.48
70.4	3.03	6.765	24.286	4.427	223.548	38.237	0.236	0.846	0.154	15.57
78.5	3.61	6.932	23.650	5.064	192.105	27.416	0.241	0.824	0.176	16.34
86.6	4.28	7.106	23.069	5.644	166.390	18.901	0.247	0.803	0.197	17.12
94.7	4.91	7.179	22.516	6.197	146.441	15.631	0.250	0.784	0.216	17.69
102.8	5.58	7.310	22.092	6.621	131.291	13.193	0.255	0.769	0.231	18.31
111.0	6.22	7.354	21.697	7.016	118.400	10.401	0.256	0.756	0.244	18.72
119.1	6.87	7.445	21.386	7.327	108.559	7.496	0.259	0.745	0.255	19.19
127.2	7.54	7.451	21.091	7.623	98.981	4.349	0.259	0.735	0.265	19.46
135.3	8.18	7.501	20.848	7.866	91.782	3.818	0.261	0.726	0.274	19.79
143.4	8.89	7.500	20.572	8.141	84.534	0.814	0.261	0.716	0.284	20.03
151.6	9.54	7.512	20.336	8.377	78.893	0.527	0.262	0.708	0.292	20.27
159.7	10.24	7.507	20.084	8.630	73.432	-2.548	0.261	0.699	0.301	20.49
167.8	10.87	7.479	19.858	8.856	68.873	-1.366	0.260	0.692	0.308	20.64
175.9	11.56	7.490	19.659	9.055	64.912	-2.290	0.261	0.685	0.315	20.86
186.7	12.42	7.436	19.386	9.328	59.947	-5.555	0.259	0.675	0.325	20.99
203.0	13.77	7.370	19.005	9.709	53.591	-4.638	0.257	0.662	0.338	21.20
219.2	15.12	7.311	18.640	10.073	48.435	-5.822	0.255	0.649	0.351	21.42
235.4	16.46	7.214	18.278	10.435	43.897	-6.551	0.251	0.637	0.363	21.54
251.6	17.83	7.133	17.862	10.851	40.060	-6.541	0.248	0.622	0.378	21.77
267.9	19.21	7.034	17.453	11.261	36.672	-6.795	0.245	0.608	0.392	21.95
284.1	20.58	6.946	17.115	11.598	33.799	-6.509	0.242	0.596	0.404	22.09
300.3	21.96	6.855	16.668	12.046	31.271	-7.135	0.239	0.580	0.420	22.36
316.6	23.34	6.750	16.270	12.443	28.963	-8.003	0.235	0.567	0.433	22.53
332.8	24.75	6.632	15.866	12.848	26.843	-8.361	0.231	0.553	0.447	22.68
349.0	26.14	6.516	15.446	13.267	24.967	-8.612	0.227	0.538	0.462	22.87
365.3	27.54	6.391	15.039	13.675	23.246	-9.398	0.223	0.524	0.476	23.02
376.1	28.51	6.295	14.780	13.933	22.117	-7.837	0.219	0.515	0.485	23.07
386.9	29.41	6.243	14.501	14.212	21.265	-5.774	0.217	0.505	0.495	23.29



**STATIC DSS TEST**  
 K<sub>0</sub> Consolidation - OCR = NA  
 Sample: Comp-BG - Depth: NA ft  
 Boring TP2317/TP2334  
 Exelon (Victoria)

KAW 7116108



**STATIC DSS TEST**  
K<sub>0</sub> Consolidation - OCR = NA  
Sample: Comp-BG - 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-Bg  
 Task No.: NA      Assign,  $\sigma'_{v,c}$  = 2.16 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  
 Assign. Remarks: \_\_\_\_\_      Specific Gravity: 2.693       Meas.;       Assumed

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

Type Consolidation:	<input checked="" type="checkbox"/> $K_o$ at:	<input checked="" type="checkbox"/> Incremental CRS	; <input type="checkbox"/> Anisotropic at:	<input type="checkbox"/> Inclined Stress Path, $K_{c,DSS}$	<input type="checkbox"/> Used Automated System	Remarks:
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain	<input type="checkbox"/> Creep	<input checked="" type="checkbox"/> Const. Vol./Ht	<input checked="" type="checkbox"/> Without - Water	<input type="checkbox"/> Cyclic (Hz)
	<input type="checkbox"/> Rapid	<input type="checkbox"/> Stress	<input type="checkbox"/> Post Cyclic	<input type="checkbox"/> Drained	<input type="checkbox"/> With - Bath	Rate: <input type="checkbox"/> 0.1; <input type="checkbox"/> 1; 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.	<u>903</u>			<u>848</u>	<u>325.81</u>	<u>186.79</u>	<u>144.26</u>	
Mass Moist Soil + Cont. (g)	<u>115.35</u>			<u>73.06</u>	<u>139.02</u>	<u>4.46</u>	<u>139.80</u>	
Mass Dry Soil + Container (g)	<u>103.71</u>			<u>66.86</u>	Excess Dry Soil (soil not included in final mass above)			
Mass Container (g)	<u>32.17</u>			<u>32.13</u>	Container No. _____			
WATER CONTENT (%)	<u>16.27</u>			<u>17.85</u>	Mass Dry Soil + Container (g) _____			
Avg. Initial WC, $W_{o,avg}$ (%)	<u>16.27</u>		Final $W_{at}$ : <input checked="" type="checkbox"/> Slice ;	Whole Spec.	Mass Container (g) _____			
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)		<u>0.00</u>	

Specimen Trimming:				
<input type="checkbox"/>	Trimming Ring for Fugro Apparatus	NL3	Large-ring ID #	
<input checked="" type="checkbox"/>	Trimming Ring for NGI Apparatus		Small-ring ID #	
	$H_{s,t}$ (mm): <u>18.53</u>	$A_{s,t}$ (cm <sup>2</sup> ):	<u>34.87</u>	
	$D_{s,t}$ (mm): <u>66.63</u>	$V_{s,t}$ (cm <sup>3</sup> ):	<u>64.65</u>	
Remarks:				
<input type="checkbox"/> Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)				
	Height ( $H_{tr}$ )	Diameter ( $D_o$ )	Remarks:	
1	<u>18.540</u>	<u>1-T</u>	<u>NA</u>	
2	<u>18.560</u>	<u>2-M</u>	<u>NA</u>	
3	<u>18.520</u>	<u>3-B</u>	<u>NA</u>	
4	<u>18.520</u>	<u>1'-T</u>	<u>NA</u>	For Free Standing
5	<u>18.540</u>	<u>2'-M</u>	<u>NA</u>	or Reconstituted Spec.:
	Avg.	<u>3-B</u>	<u>NA</u>	$A_{tr}$ (cm <sup>2</sup> ): <u>NA</u>
=	<u>18.525</u>	Avg	<u>NA</u>	$V_{tr}$ (cm <sup>3</sup> ): <u>NA</u>

Estimated Initial Unit Weight	
Total, $\gamma_{t,o}$ (lb/ft <sup>3</sup> ) = <u>134.24</u>	Dry, $\gamma_{d,o}$ (lb/ft <sup>3</sup> ) = <u>115.45</u>

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) = _____		
Stress Level	Dia. by PiTape (mm) Meas.	Corr.	Area, $A_{c,n}$ (cm <sup>2</sup> )	(in <sup>2</sup> )
0				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
<input checked="" type="checkbox"/>	Regular Membrane with Ring Set No. <u>10</u>	ID, Rings (mm)		
	Thickness (mm): Top: <u>0.64</u>	=	<u>67.26</u>	
	Bottom: <u>0.62</u>	Corr. for mem.		
<input checked="" type="checkbox"/>	Double Membr. Thick. = <u>0.32</u>	=	<u>66.630</u>	
	Area Ring with mem., $A_o$ (cm <sup>2</sup> ) = <u>34.87</u>	;	(in <sup>2</sup> ) = <u>5.405</u>	
	Mass Top Cap, etc., $M_{tc}$ = <u>528.2</u> g,	<u>1.16</u> lbf		
	Data corr. for $M_{tc}$ : <input checked="" type="checkbox"/> Yes;	<input type="checkbox"/> No	Plattens with Pins: <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> 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: HC

Date: 5/5/2008

Date: 5/5/2008

Date: 5/7/2008

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.: 10G      File Name: Comp-Bg  
 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-BG

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, $\sigma'_v$ (ksf)	<u>NA</u>	<u>2.16</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 <sup>3</sup> )			<u>NA</u>	<u>NA</u>
$t_c$ (ON,days,hrs)	<u>NA</u>	<u>0.72</u> days	<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) = <u>NA</u> & Duration (min) = <u>NA</u> & Delta disp., $\Delta d_{h,ua}$ (mm) = <u>NA</u>									

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.
$W_o$	<u>16.27</u>			<u>16.27</u>	<u>16.27</u>	<u>17.19</u>
$S_o$	<u>96.6</u>			<u>96.6</u>	<u>96.6</u>	<u>99.6</u>
Measured final mass of moist soil, $M_{lat}$ (g)						<u>139.80</u>
Final mass of moist soil corrected for excess dry soil, $M_{lat,c}$ (g)						<u>139.80</u>

Calculated Mass of Dry Soil (g)	
Initial Selected Water Content (%)	<u>16.27</u>
Initial, $M_{d,o}$	<u>119.57</u>
Final, $M_{d,at}$	<u>118.62</u>
Selected, $M_d$	<u>119.09</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 $\sigma'_{v,c,max}$ =	During Rebound to $\sigma'_{v,c}$ =	Specimen Unloaded After Test To
Stress Units (ksf)	<u>2.160</u>	<u>NA</u>	<u>NA</u>
Sign Convention: (+) $\Delta V$ out & $\Delta H$ down; (-) $\Delta V$ in & $\Delta H$ up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	<u>0.321</u>		
Total Equip. Comp., $\Sigma \Delta d_{afc}$ (mm)	<u>0.000</u>		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	<u>0.321</u>		
$\Delta V_n$ using $A_o$ - spec. (cm <sup>3</sup> )	<u>1.12</u>		
$\Delta V_n$ using $A_{c,n}$ - app. (cm <sup>3</sup> )	<u>1.12</u>		
$\Delta V_n$ using burette meas. (cm <sup>3</sup> )	<u>-0.60</u>		
Selected $\Delta V_n$ (cm <sup>3</sup> )	<u>1.12</u>	<u>NA</u>	<u>NA</u> = $\Delta V_{UL}$
After Test WC Corr. for $\Delta V$ during Shear & Unloading, $W_{at,c}$ (%)			<u>NA</u>

Calculation of $\Delta V_c$ by Different Procedures			
By Selected Volumes		By Change in Mass	
$\Delta V_c$ (cm <sup>3</sup> )	<u>1.12</u>	$\sim M_{t,o} - (M_{lat,c} + \Delta V_L + \Delta V_{UL})$	
By Cal. Height & App. Area		$\Delta V_c$ (cm <sup>3</sup> )	<u>-0.78</u>
$\Delta V_c$ (cm <sup>3</sup> )	<u>1.12</u>	By Saturation = 100% and Spec. Unloaded to 0 Stress	
By Cal. Ht. & Init. Spec. Area		$\Delta V_c$ (cm <sup>3</sup> )	<u>NA</u>
$\Delta V_c$ (cm <sup>3</sup> )	<u>1.12</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>16.07</u>
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	<u>NA</u>

<b>Consolidation &amp; Preshear</b>	$\Delta V_c$ (cm <sup>3</sup> ) =	<u>1.12</u>	$\Delta H_c$ (mm) =	<u>0.321</u>	$\epsilon_{a,c}$ (%) =	<u>1.73</u>	$\Delta V_{c,max}$ (cm <sup>3</sup> ) =	<u>NA</u>
	$V_c$ (cm <sup>3</sup> ) =	<u>63.48</u>	$H_c$ (mm) =	<u>18.204</u>	$\epsilon_{v,c}$ (%) =	<u>1.74</u>	$\epsilon_{ac,max}$ (%) =	<u>NA</u>
	<b>Conclusions</b>	$A_c$ (cm <sup>2</sup> ) =	<u>34.87</u>	$\Delta \gamma_c$ (mm) =	<u>NA</u>	$\gamma_c$ (%) =	<u>NA</u>	Preshear: $\gamma_{ua}$ (%) =

Summary of Specimen Physical Properties:								
Specific Gravity: $G_s = 2.693$ Measured	Height (mm)	Volume (cm <sup>3</sup> )	Area (cm <sup>2</sup> )	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>16.7</u>	<u>134.3</u>	<u>115.1</u>	<u>98.3</u>	<u>0.461</u>
After to $\sigma'_{v,c}$	<u>18.204</u>	<u>63.48</u>	<u>34.87</u>	<u>16.1</u>	<u>135.9</u>	<u>117.1</u>	<u>100.0</u>	<u>0.435</u>
Consol.: to $\sigma'_{v,c,max}$	<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 = 2.1 min

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

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

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

Summary of Specimen Physical Properties										
Specific Gravity: $G_s = 2.693$ Measured	Height (mm)	Volume (cm <sup>3</sup> )	Area (cm <sup>2</sup> )	Water Content (%)	Unit Weight (pcf)		Saturation (%)	LL PL	-200 %	Void Ratio, e
Condition: Initial	18.53	64.60	34.87	16.74	134.3	115.1	98.3	44	73.6	0.461
After to $\sigma'_{v,c}$	18.20	63.48	34.87	16.07	135.9	117.1	100.0	15	NA	0.435
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	Static Strain Rate = <u>4.9 %/hr.</u>					
Vert. Consol. Stress, $\sigma'_{v,c}$	(ksf)	NA	2.193	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	1.73	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 <sup>3</sup> ):			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 = <u>NA</u>					
Undr. Ambient Shear Stress, $\tau_{h,ua}$	(ksf)	NA	NA	NA	$\pm \tau_h =$ <u>NA</u> (ksf)		$\pm \gamma =$ <u>NA</u> %		at end of cyclic loading, $\sigma'_{v,ey}$ = <u>NA</u> (ksf)	
Undr. Ambient Shear Strain, $\epsilon_{h,ua}$	%	NA	NA	NA						

Weight Top Cap, etc., $M_{tc}$ (lb): <u>1.16</u>	Data Normalization: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Value: <u>2.193</u> (ksf)
Data corr. for $M_{tc}$ : <input checked="" type="checkbox"/> Yes; <input type="checkbox"/> No	Plattens with Pins: <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No
Wire Reinforced Membrane, Model: _____	Data corr. for Membr. strength: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<input checked="" type="checkbox"/> Regular Membrane with Rings	<input checked="" type="checkbox"/> Pre-Shear Conditions <input type="checkbox"/> Post-Cyclic Conditions
	<input type="checkbox"/> 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.

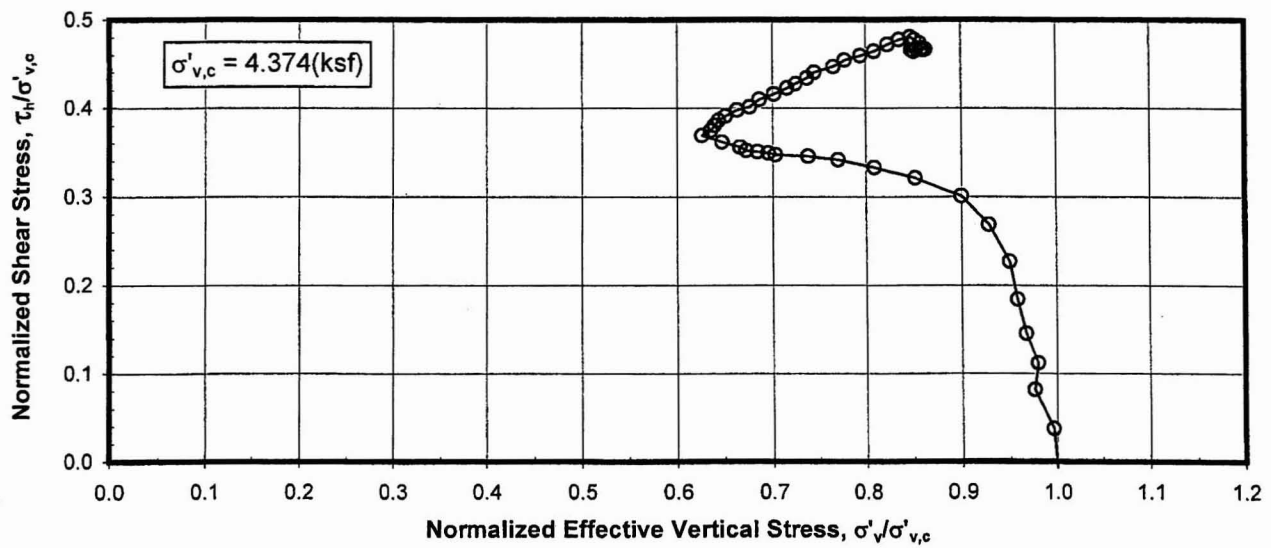
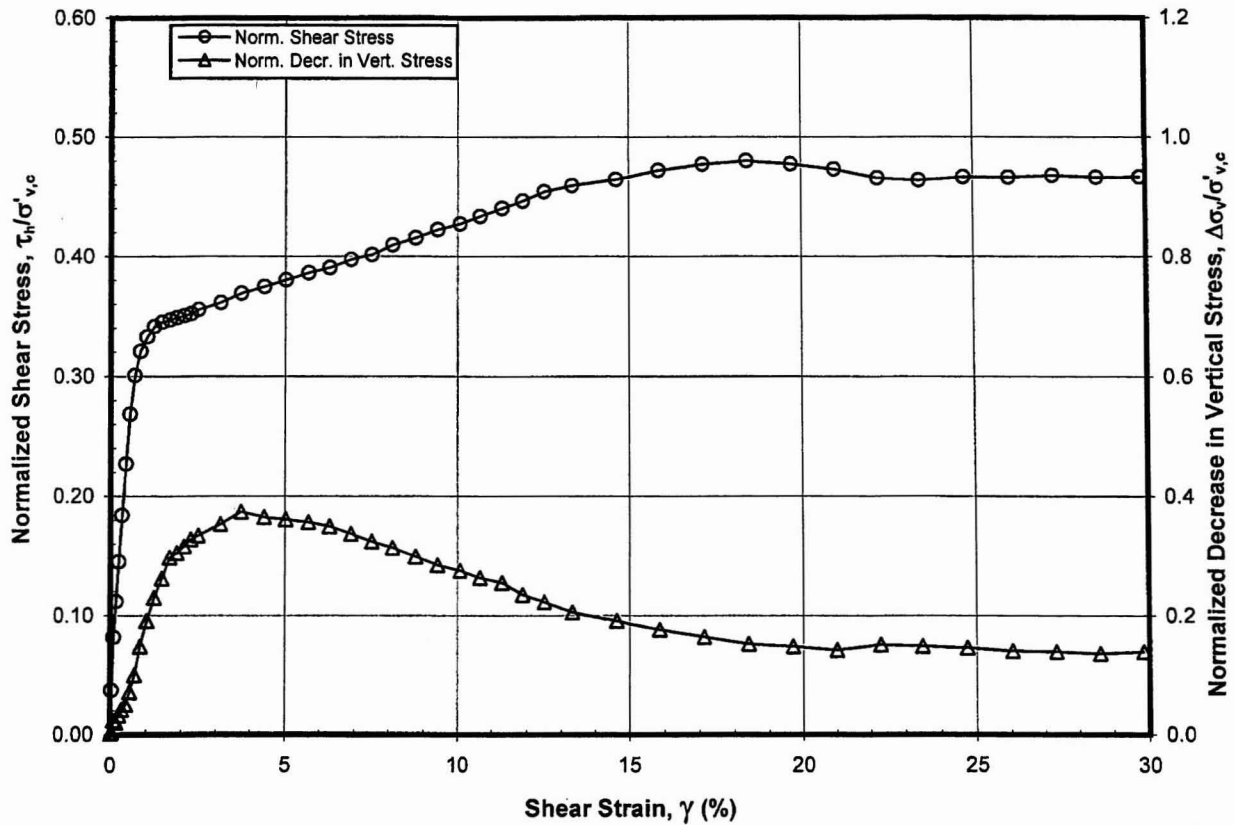
NA - Not Applicable

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

Loading Summary						
	$\tau_h$ (ksf)	$\gamma$ (%)	$\sigma'_v$ (ksf)	$\tau_h / \sigma'_v$	$\Delta \sigma'_v / \sigma'_{v,c}$	$c_u / \sigma'_{v,c}$
at Peak Shear Stress	1.000	28.75	1.420	0.704	0.353	0.456
at Maximum Strain	0.995	29.61	1.416	0.702	0.354	-

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

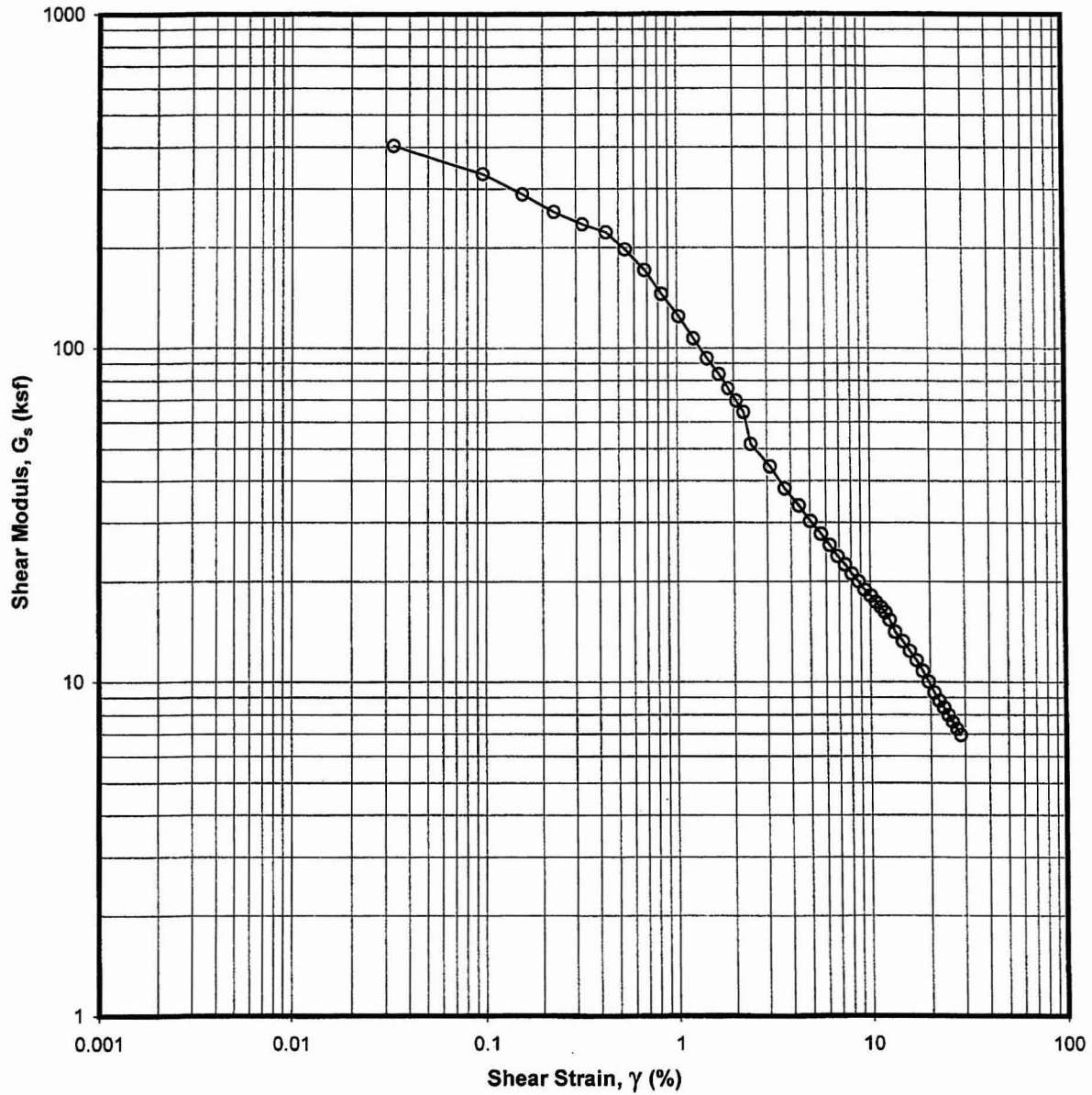
Elapsed Time (min)	Shear Strain $\gamma$ (%)	Shear Stress $\tau_h$ (ksf)	Effective Vertical Stress $\sigma'_v$ (ksf)	Calculated Pore Press. Change $\Delta U = \Delta\sigma'_v$ (ksf)	Secant Shear Modulus $G_s$ (ksf)	Tangent Modulus $G_T$ (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta\sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle $\phi'_{bss}$ (°)
0.0	0.00	-0.004	2.193	0.000	-	-	-0.002	1.000	0.000	-0.11
0.8	0.00	0.016	2.184	0.009	1075.736	747.055	0.007	0.996	0.004	0.43
1.7	0.02	0.092	2.185	0.008	480.095	425.981	0.042	0.996	0.004	2.42
2.5	0.04	0.178	2.177	0.016	457.105	357.692	0.081	0.993	0.007	4.67
3.4	0.07	0.260	2.175	0.018	382.806	270.157	0.119	0.992	0.008	6.82
4.2	0.09	0.324	2.170	0.023	349.985	268.092	0.148	0.989	0.011	8.50
5.0	0.12	0.387	2.172	0.021	335.952	232.631	0.176	0.990	0.010	10.10
5.9	0.15	0.443	2.166	0.027	305.613	182.384	0.202	0.988	0.012	11.56
7.5	0.21	0.564	2.150	0.043	264.795	148.005	0.257	0.980	0.020	14.69
10.1	0.33	0.695	2.107	0.087	215.132	87.654	0.317	0.961	0.039	18.27
12.6	0.45	0.767	2.027	0.166	170.733	35.680	0.350	0.924	0.076	20.71
15.1	0.62	0.792	1.872	0.321	127.595	7.888	0.361	0.854	0.146	22.94
17.6	0.83	0.794	1.724	0.470	95.829	-0.077	0.362	0.786	0.214	24.74
20.1	1.05	0.792	1.596	0.597	75.541	-0.706	0.361	0.728	0.272	26.39
22.6	1.29	0.791	1.487	0.707	61.879	-1.048	0.361	0.678	0.322	28.02
25.1	1.50	0.787	1.425	0.769	52.730	-1.394	0.359	0.650	0.350	28.93
27.6	1.72	0.785	1.381	0.813	46.018	0.549	0.358	0.629	0.371	29.63
30.2	1.92	0.790	1.341	0.853	41.390	1.462	0.360	0.611	0.389	30.49
32.7	2.12	0.791	1.298	0.895	37.553	-0.637	0.361	0.592	0.408	31.36
35.2	2.33	0.787	1.268	0.925	33.998	-1.686	0.359	0.578	0.422	31.82
37.7	2.55	0.784	1.234	0.960	30.914	-1.936	0.357	0.562	0.438	32.43
40.2	2.78	0.778	1.183	1.011	28.158	-1.712	0.355	0.539	0.461	33.34
42.7	2.97	0.776	1.169	1.025	26.259	-1.586	0.354	0.533	0.467	33.59
50.3	3.57	0.763	1.090	1.103	21.491	-2.760	0.348	0.497	0.503	34.98
57.8	4.25	0.741	1.018	1.175	17.515	-1.323	0.338	0.464	0.536	36.03
65.3	4.88	0.744	0.992	1.202	15.346	1.357	0.339	0.452	0.548	36.89
72.9	5.54	0.758	1.005	1.189	13.763	2.262	0.346	0.458	0.542	37.04
80.4	6.15	0.773	1.040	1.153	12.643	2.490	0.352	0.474	0.526	36.62
87.9	6.78	0.789	1.097	1.096	11.702	2.916	0.360	0.500	0.500	35.73
95.5	7.40	0.809	1.139	1.054	10.992	3.068	0.369	0.519	0.481	35.39
103.0	8.03	0.827	1.164	1.029	10.361	2.555	0.377	0.531	0.469	35.41
110.5	8.66	0.842	1.180	1.013	9.764	2.056	0.384	0.538	0.462	35.50
118.0	9.28	0.853	1.194	0.999	9.240	2.051	0.389	0.544	0.456	35.54
125.6	9.93	0.868	1.208	0.985	8.780	1.545	0.396	0.551	0.449	35.68
133.1	10.52	0.873	1.222	0.972	8.335	1.469	0.398	0.557	0.443	35.55
140.7	11.15	0.886	1.218	0.975	7.979	2.009	0.404	0.555	0.445	36.03
148.2	11.74	0.897	1.242	0.952	7.680	1.339	0.409	0.566	0.434	35.85
155.7	12.39	0.902	1.251	0.943	7.314	0.355	0.411	0.570	0.430	35.80
163.2	12.99	0.902	1.278	0.915	6.974	1.306	0.411	0.583	0.417	35.21
173.3	13.84	0.924	1.293	0.901	6.708	1.680	0.421	0.589	0.411	35.56
188.4	15.10	0.933	1.296	0.897	6.208	0.378	0.426	0.591	0.409	35.75
203.4	16.36	0.934	1.303	0.890	5.732	0.269	0.426	0.594	0.406	35.63
218.5	17.57	0.940	1.315	0.878	5.374	0.651	0.429	0.600	0.400	35.55
233.5	18.76	0.949	1.340	0.853	5.082	0.901	0.433	0.611	0.389	35.31
248.6	19.94	0.961	1.364	0.829	4.841	0.871	0.438	0.622	0.378	35.17
263.7	21.17	0.970	1.381	0.812	4.602	0.873	0.442	0.630	0.370	35.09
278.7	22.40	0.983	1.392	0.801	4.405	0.964	0.448	0.635	0.365	35.22
293.8	23.66	0.994	1.414	0.779	4.219	0.384	0.453	0.645	0.355	35.11
308.8	24.94	0.992	1.423	0.770	3.995	-0.243	0.452	0.649	0.351	34.89
323.9	26.22	0.988	1.424	0.769	3.783	0.002	0.450	0.649	0.351	34.75
339.0	27.49	0.992	1.416	0.777	3.624	0.459	0.452	0.646	0.354	35.02
354.1	28.75	1.000	1.420	0.773	3.491	0.004	0.456	0.647	0.353	35.15
364.1	29.61	0.995	1.416	0.777	3.374	-0.565	0.454	0.646	0.354	35.09



**STATIC DSS TEST**  
 K<sub>0</sub> Consolidation - OCR = NA  
 Sample: Comp-BH - Depth: NA ft  
 Boring TP2317/TP2334  
 Exelon (Victoria)

KAW 7/16/08





**STATIC DSS TEST**  
K<sub>o</sub> Consolidation - OCR = NA  
Sample: Comp-BH - 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.: 9G      File Name: Comp-Bh  
 Task No.: NA      Assign,  $\sigma'_{v,c}$  = 4.32 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

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

Type Consolidation:	<input checked="" type="checkbox"/> $K_o$ at:	<input checked="" type="checkbox"/> Incremental CRS	;	<input type="checkbox"/> Anisotropic at:	Inclined Stress Path, $K_{c,DSS}$	<input type="checkbox"/> Used Automated System
					90° Stress Path	Remarks: _____
Loading Conditions:	<input checked="" type="checkbox"/> Static	<input checked="" type="checkbox"/> Strain	<input type="checkbox"/> Creep	<input checked="" type="checkbox"/> Const. Vol./Ht	<input checked="" type="checkbox"/> Without - Water	<input type="checkbox"/> Cyclic (Hz)
	<input type="checkbox"/> Rapid	<input type="checkbox"/> Stress	<input type="checkbox"/> Post Cyclic	<input type="checkbox"/> Drained	<input type="checkbox"/> With - Bath	Rate: <input type="checkbox"/> 0.1; <input type="checkbox"/> 1; 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 Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)		
Container No.	4105			4044	Mass Tare (g)	183.30	4.43	
Mass Moist Soil + Cont. (g)	128.97			72.93	Mass Moist Soil, $M_{t,o}$ $M_{t,at}$ (g)	138.03	138.78	
Mass Dry Soil + Container (g)	115.25			66.73	Excess Dry Soil (soil not included in final mass above)			
Mass Container (g)	30.38			29.96	Container No. _____			
WATER CONTENT (%)	16.17			16.86	Mass Dry Soil + Container (g) _____			
Avg. Initial WC, $W_{o,avg}$ (%)	16.17		Final $W_{at}$ : <input checked="" type="checkbox"/> Slice ;	Whole Spec.	Mass Container (g) _____			
See attached data sheet(s) for additional water contents					Mass Excess Dry Soil (g)		0.00	

Specimen Trimming:			
<input type="checkbox"/>	Trimming Ring for Fugro Apparatus	NL6	Large-ring ID #
<input checked="" type="checkbox"/>	Trimming Ring for NGI Apparatus		Small-ring ID #
$H_{s,t}$ (mm):	18.53	$A_{s,t}$ (cm <sup>2</sup> ):	34.68
$D_{s,t}$ (mm):	66.45	$V_{s,t}$ (cm <sup>3</sup> ):	64.29
Remarks: _____			
Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height ( $H_{tr}$ )	Diameter ( $D_o$ )	Remarks: _____	
1	18.550	1-T	NA
2	18.510	2-M	NA
3	18.560	3-B	NA
4	18.530	1-T	NA
5	18.530	2-M	NA
For Free Standing or Reconstituted Spec.:			
Avg.	3-B	NA	$A_{tr}$ (cm <sup>2</sup> ): NA
=	18.525	Avg	NA
			$V_{tr}$ (cm <sup>3</sup> ): 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 <sup>3</sup> )=	134.04
Dry, $\gamma_{d,o}$ (lb/ft <sup>3</sup> )=	115.38

Specimen Lateral Confinement by:			
Wire Reinforced, Model:		Thickness (mm) = _____	
Stress Level	Dia. by PiTape (mm) Meas. Corr.	Area, $A_{c,n}$ (cm <sup>2</sup> ) (in <sup>2</sup> )	
0			
$\sigma'_{v,c}$			
$\sigma'_{v,max}$			
<input checked="" type="checkbox"/>	Regular Membrane with Ring Set No. <u>9</u>	ID, Rings (mm)	
Thickness (mm):	Top: <u>0.59</u>	= <u>67.05</u>	
<input type="checkbox"/> Single	Bottom: <u>0.61</u>	Corr. for mem.	
<input checked="" type="checkbox"/> Double	Membr. Thick. = <u>0.30</u>	= <u>66.450</u>	
Area Ring with mem., $A_o$ (cm <sup>2</sup> )=		<u>34.68</u>	; (in <sup>2</sup> )= <u>5.375</u>
Mass Top Cap, etc., $M_{tc}$ =		<u>528.7</u> g,	<u>1.17</u> lbf
Data corr. for $M_{tc}$ :	<input checked="" type="checkbox"/> Yes;	<input type="checkbox"/> No	Plattens with Pins: <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No

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

Other Remarks: \_\_\_\_\_

Trim./ Recon. By: <u>DBN</u>	Setup By: <u>HC</u>	Take Down By: <u>HC</u>
Date: <u>5/5/2008</u>	Date: <u>5/5/2008</u>	Date: <u>5/7/2008</u>
Prelim. Calc. By: <u>HC</u>	Final Calc. By: <u>LF</u>	Reviewed By: <u>HP</u>

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.: 9G File Name: Comp-Bh  
 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-BH

Consolidation Stress Summary and Loading Summary									
Test Stage:	Max. Stress	Pre-Shear	Post Cyclic	<input checked="" type="checkbox"/>	Static Strain Rate = <u>NA</u> (%/hr or )				
Nominal Vertical Stress, $\sigma'_v$ (ksf)	<u>NA</u>	<u>4.32</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, $P_{hr,n}$ (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 <sup>3</sup> )			<u>NA</u>	<u>NA</u>
$t_c$ (ON,days,hrs)	<u>NA</u>	<u>0.69 days</u>	<u>NA</u>		Post Cy.Displ. Reset to Null Position:			<input checked="" type="checkbox"/> Yes;	<input type="checkbox"/> No
Undrained ambient stress applied: with Delta shear force (lbf) = <u>NA</u> & Duration (min) = <u>NA</u> & Delta disp., $\Delta d_{h,ua}$ (mm) = <u>NA</u>									

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.
$W_o$	<u>16.17</u>			<u>16.17</u>	<u>16.17</u>	<u>16.23</u>
$S_o$	<u>95.8</u>			<u>95.8</u>	<u>95.8</u>	<u>96.0</u>
Measured final mass of moist soil, $M_{t,at}$ (g)						<u>138.78</u>
Final mass of moist soil corrected for excess dry soil, $M_{t,at,c}$ (g)						<u>138.78</u>

Calculated Mass of Dry Soil (g)	
Initial Selected Water Content (%)	<u>16.17</u>
Initial, $M_{d,o}$	<u>118.82</u>
Final, $M_{d,at}$	<u>118.76</u>
Selected, $M_d$	<u>118.78</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>4.320</u>	<u>NA</u>	<u>NA</u>
Sign Convention: (+) $\Delta V$ out & $\Delta H$ down; (-) $\Delta V$ in & $\Delta H$ up			
Delta Def. Read., $\Delta d_{ar,n}$ (mm)	<u>0.514</u>		
Total Equip. Comp., $\Sigma \Delta d_{afc}$ (mm)	<u>0.000</u>		
Corr. Total Def. $\Delta H_{c,n}$ (mm)	<u>0.514</u>		
$\Delta V_n$ using $A_o$ - spec. (cm <sup>3</sup> )	<u>1.78</u>		
$\Delta V_n$ using $A_{c,n}$ - app. (cm <sup>3</sup> )	<u>1.78</u>		
$\Delta V_n$ using burette meas. (cm <sup>3</sup> )	<u>-1.70</u>		
Selected $\Delta V_n$ (cm <sup>3</sup> )	<u>1.77</u>	<u>NA</u>	<u>NA</u> = $\Delta V_{UL}$
After Test WC Corr. for $\Delta V$ during Shear & Unloading, $W_{at,c}$ (%)			<u>NA</u>

Calculation of $\Delta V_c$ by Different Procedures			
By Selected Volumes		By Change in Mass	
$\Delta V_c$ (cm <sup>3</sup> )	<u>1.77</u>	$\sim M_{t,o} - (M_{t,at,c} + \Delta V_L + \Delta V_{UL})$	
By Cal. Height & App. Area		$\Delta V_c$ (cm <sup>3</sup> )	
$\Delta V_c$ (cm <sup>3</sup> )	<u>1.78</u>	<u>-0.75</u>	
By Cal. Ht. & Init. Spec. Area		By Saturation = 100% and Spec. Unloaded to 0 Stress	
$\Delta V_c$ (cm <sup>3</sup> )	<u>1.78</u>	$\Delta V_c$ (cm <sup>3</sup> )	<u>NA</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>15.36</u>
Back Cal. WC at Max. Stress, $W_{c,max,bc}$ (%)	<u>NA</u>

<b>Consolidation &amp; Preshear</b>	$\Delta V_c$ (cm <sup>3</sup> ) =	<u>1.77</u>	$\Delta H_c$ (mm) =	<u>0.514</u>	$\epsilon_{a,c}$ (%) =	<u>2.77</u>	$\Delta V_{c,max}$ (cm <sup>3</sup> ) = <u>NA</u>	
	$V_c$ (cm <sup>3</sup> ) =	<u>62.46</u>	$H_c$ (mm) =	<u>18.012</u>	$\epsilon_{v,c}$ (%) =	<u>2.76</u>		$\epsilon_{a,c,max}$ (%) = <u>NA</u>
	$A_c$ (cm <sup>2</sup> ) =	<u>34.68</u>	$\Delta \gamma_c$ (mm) =	<u>NA</u>	$\gamma_c$ (%) =	<u>NA</u>		Preshear: $\gamma_{ub}$ (%) = <u>NA</u>
<b>Conclusions</b>								

Summary of Specimen Physical Properties:								
Specific Gravity: $G_s = 2.693$ Measured	Height (mm)	Volume (cm <sup>3</sup> )	Area (cm <sup>2</sup> )	Water Content (%)	Total Unit Weight (pcf)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio, e
Condition:								
Initial (as trimmed)	<u>18.525</u>	<u>64.24</u>	<u>34.68</u>	<u>16.2</u>	<u>134.1</u>	<u>115.4</u>	<u>96.2</u>	<u>0.456</u>
After to $\sigma'_{v,c}$	<u>18.012</u>	<u>62.46</u>	<u>34.68</u>	<u>15.4</u>	<u>136.9</u>	<u>118.7</u>	<u>100.0</u>	<u>0.416</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:  $t_{95}$  for max stress = 1.1 min

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

Tube <input type="checkbox"/> Field Extruded	<input checked="" type="checkbox"/> Remolded	<input checked="" type="checkbox"/> Tamping	Constant Effort: Blows/Tamps per Layer = <u>11</u>
Boring No.: <u>TP2317/TP2334</u>	<input type="checkbox"/> Anisotropic at:	Impact/Rammer	Rammer Wgt. (lb) = _____ No. Layers = <u>3.00</u>
Sample No.: <u>Comp-B</u>	<input type="checkbox"/> Inclined Stress Path, $K_{c,DSS}$	Pluviated:	Tamper Force (lb) = <u>4.00</u> Drop (in.) = <u>12.00</u>
Depth (ft): <u>NA</u>	<input type="checkbox"/> Used Automated System	Kneading	<input checked="" type="checkbox"/> Undercompaction: $U_{ni}$ (%) = _____ Dia. (in.) = <u>1.40</u>
Spec. Selection by X-ray; <input type="checkbox"/> Geomarine Sample	Remarks:		Ref. Effort= MOD % Comp. = <u>95.0</u> $\pm$ Opt. = <u>+4</u>

Type Consolidation: <input checked="" type="checkbox"/> $K_o$ at: <input checked="" type="checkbox"/> Incremental CRS	<input type="checkbox"/> Anisotropic at:	<input type="checkbox"/> Inclined Stress Path, $K_{c,DSS}$	<input type="checkbox"/> Used Automated System
Loading Conditions: <input checked="" type="checkbox"/> Static Dynamic	<input checked="" type="checkbox"/> Strain Stress	<input checked="" type="checkbox"/> Const. Vol./Ht Drained	<input type="checkbox"/> Without - Water Bath
	<input type="checkbox"/> Creep Post Cyclic	<input checked="" type="checkbox"/> With - Bath	<input type="checkbox"/> Cyclic (Hz) Rate: <input type="checkbox"/> 0.1; <input type="checkbox"/> 1; Other: _____

Summary of Specimen Physical Properties										
Specific Gravity: $G_s = 2.693$ Measured	Height (mm)	Volume (cm <sup>3</sup> )	Area (cm <sup>2</sup> )	Water Content (%)	Unit Weight (pcf)		Saturation (%)	LL	-200 %	Void Ratio, e
Condition: Initial	18.53	64.24	34.68	16.21	134.1	115.4	96.2	44	73.6	0.456
After to $\sigma'_{v,c}$	18.01	62.46	34.68	15.36	136.9	118.7	100.0	15	NA	0.416
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	<input checked="" type="checkbox"/> Static Strain Rate = <u>4.8 %/hr.</u>					
Vert. Consol. Stress, $\sigma'_{vc}$	(ksf)	NA	4.374	NA	Cyclic Rate (Hz): <input type="checkbox"/> 0.1; <input type="checkbox"/> 1; Other = _____					
Induced OCR:	-	NA	NA	NA	During/End of Loading	Static	Cyclic			
Axial Strain during Consol., $\epsilon_{a,c}$	%	NA	2.77	NA	Change in Height, $\Delta H_{L,n}$ (mm):	NA	NA			
Horiz. Consol. Stress, $\tau_{hc}$	(ksf)	NA	NA	NA	Change in Vol., $\Delta V_{L,n}$ (cm <sup>3</sup> ):	NA	NA			
Consol. Stress Ratio, $\tau_{hc} / \sigma'_{vc}$	-	NA	NA	NA	Post Cy. Displ. Reset to Null Pos.:	Yes;	No			
Shear Strain during Consol., $\epsilon_{hs,c}$	%	NA	NA	NA	Number of Loading Cycles, N =	NA				
Undr. Ambient Shear Stress, $\tau_{hu}$	(ksf)	NA	NA	NA	$\pm \tau_h =$ <u>NA</u> (ksf) $\pm \gamma =$ <u>NA</u> %					
Undr. Ambient Shear Strain, $\epsilon_{hu}$	%	NA	NA	NA	at end of cyclic loading, $\sigma'_{vc,r} =$ <u>NA</u> (ksf)					

Weight Top Cap, etc., $M_{tc}$ (lb): <u>1.17</u>	Data Normalization: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Value: <u>4.374</u> (ksf)
Data corr. for $M_{tc}$ : <input checked="" type="checkbox"/> Yes; <input type="checkbox"/> No	Plattens with Pins: <input type="checkbox"/> Yes; <input checked="" type="checkbox"/> No
Wire Reinforced Membrane, Model: _____	Data corr. for Membr. strength: <input checked="" type="checkbox"/> Pre-Shear Conditions <input type="checkbox"/> Post-Cyclic Conditions
<input checked="" type="checkbox"/> Regular Membrane with Rings	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
	<input type="checkbox"/> 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

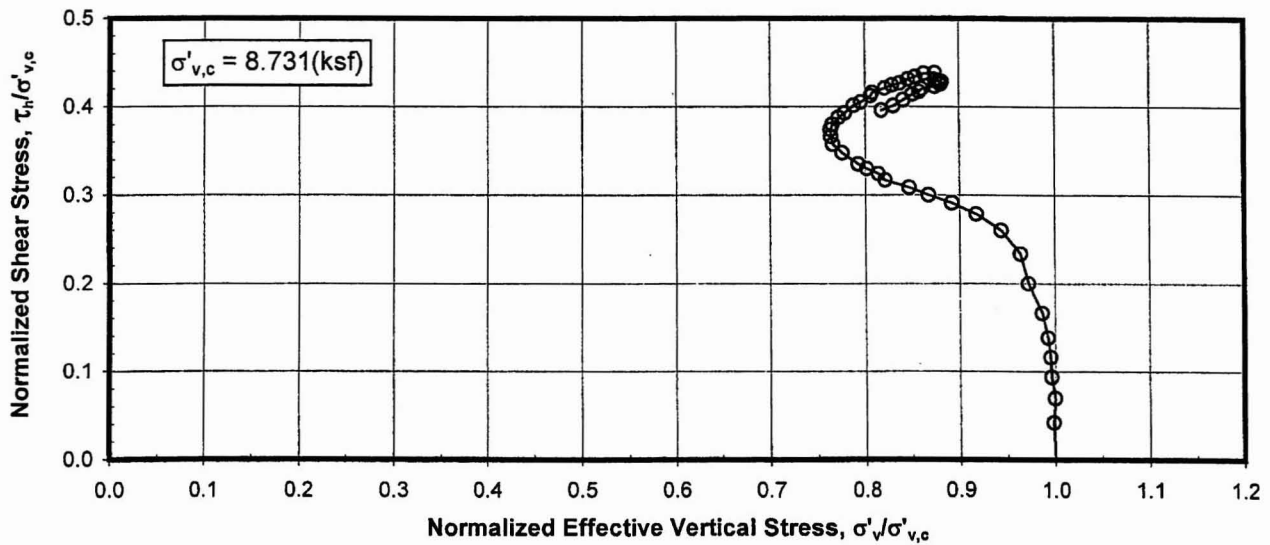
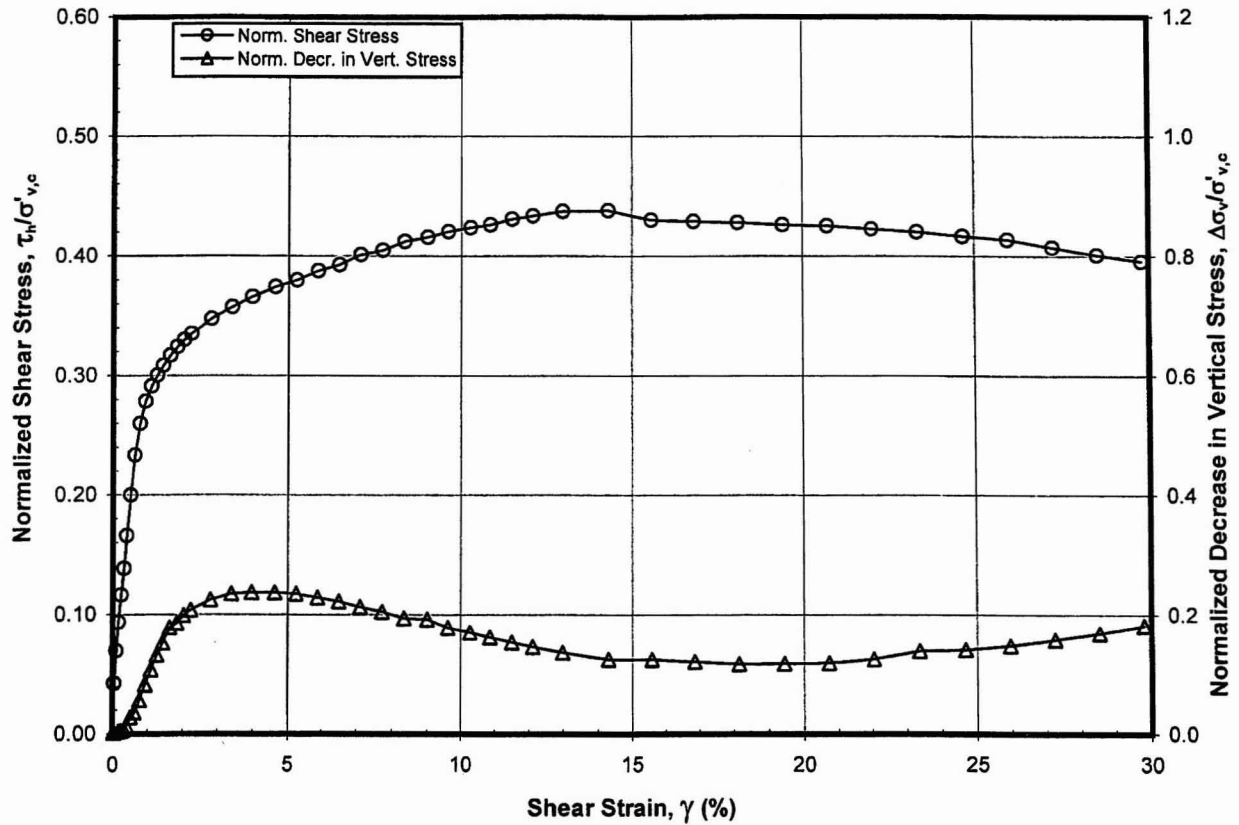
Final Visual Description and Remarks: Gray Lean CLAY with sand (CL)

Loading Summary						
	$\tau_h$ (ksf)	$\gamma$ (%)	$\sigma'_v$ (ksf)	$\tau_h / \sigma'_v$	$\Delta \sigma'_v / \sigma'_{v,c}$	$c_u / \sigma'_{v,c}$
at Peak Shear Stress	2.100	18.41	3.711	0.566	0.152	0.480
at Maximum Strain	2.041	29.84	3.766	0.542	0.139	-

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

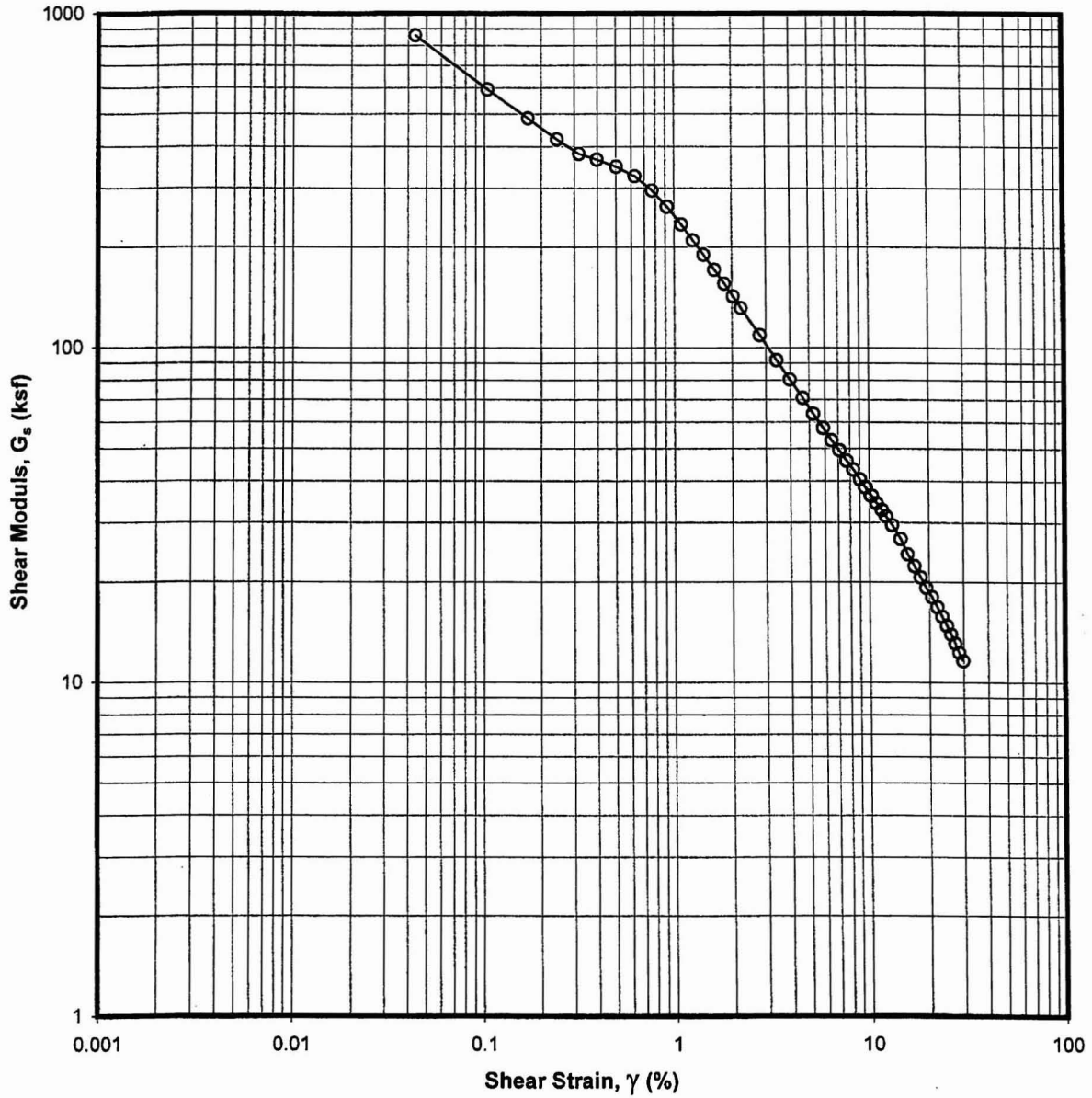
Elapsed Time (min)	Shear Strain $\gamma$ (%)	Shear Stress $\tau_h$ (ksf)	Effective Vertical Stress $\sigma'_v$ (ksf)	Calculated Pore Press. Change $\Delta U = \Delta\sigma'_v$ (ksf)	Secant Shear Modulus $G_s$ (ksf)	Tangent Modulus $G_T$ (ksf)	Norm. Shear Stress $\tau_h/\sigma'_{v,c}$	Norm. Vert. Stress $\sigma'_v/\sigma'_{v,c}$	Norm. Decr. in V. Stress $\Delta\sigma'_v/\sigma'_{v,c}$	Stress Ratio Angle $\phi'_{bss}$ (°)
0.0	0.00	-0.031	4.374	0.000	-	-	-0.007	1.000	0.000	-0.41
2.5	0.03	0.163	4.359	0.015	590.578	447.986	0.037	0.997	0.003	2.15
5.1	0.10	0.356	4.270	0.105	403.201	262.248	0.081	0.976	0.024	4.77
7.6	0.16	0.488	4.286	0.089	332.340	208.082	0.112	0.980	0.020	6.50
10.2	0.23	0.635	4.232	0.143	288.698	186.928	0.145	0.967	0.033	8.53
12.7	0.33	0.804	4.191	0.184	255.885	175.068	0.184	0.958	0.042	10.86
15.3	0.44	0.992	4.156	0.218	235.286	171.206	0.227	0.950	0.050	13.43
17.8	0.54	1.173	4.061	0.313	222.230	135.178	0.268	0.928	0.072	16.11
20.3	0.68	1.315	3.939	0.436	197.295	78.696	0.301	0.900	0.100	18.47
22.9	0.84	1.403	3.730	0.645	171.048	42.200	0.321	0.853	0.147	20.61
25.4	1.02	1.455	3.540	0.834	145.176	23.477	0.333	0.809	0.191	22.35
28.0	1.23	1.493	3.369	1.005	124.266	13.178	0.341	0.770	0.230	23.90
30.5	1.45	1.510	3.230	1.145	106.649	5.641	0.345	0.738	0.262	25.06
33.0	1.67	1.518	3.076	1.298	93.012	3.880	0.347	0.703	0.297	26.26
35.6	1.87	1.526	3.044	1.331	83.353	3.658	0.349	0.696	0.304	26.63
38.1	2.07	1.533	2.994	1.380	75.485	3.417	0.350	0.684	0.316	27.11
40.7	2.26	1.540	2.943	1.432	69.384	5.690	0.352	0.673	0.327	27.62
43.2	2.47	1.556	2.915	1.459	64.173	5.755	0.356	0.666	0.334	28.09
50.8	3.13	1.581	2.831	1.543	51.506	4.700	0.361	0.647	0.353	29.18
58.4	3.73	1.615	2.740	1.635	44.116	4.607	0.369	0.626	0.374	30.51
66.0	4.41	1.639	2.780	1.595	37.900	3.787	0.375	0.635	0.365	30.53
73.7	5.02	1.663	2.797	1.578	33.730	3.912	0.380	0.639	0.361	30.74
81.3	5.68	1.689	2.817	1.558	30.264	3.554	0.386	0.644	0.356	30.95
88.9	6.29	1.709	2.848	1.527	27.655	4.087	0.391	0.651	0.349	30.96
96.5	6.90	1.739	2.901	1.473	25.643	3.856	0.398	0.663	0.337	30.94
104.1	7.52	1.756	2.958	1.416	23.771	4.299	0.401	0.676	0.324	30.69
111.7	8.13	1.792	3.003	1.371	22.416	4.901	0.410	0.687	0.313	30.82
119.3	8.79	1.818	3.069	1.305	21.039	4.411	0.416	0.702	0.298	30.64
127.0	9.42	1.848	3.131	1.243	19.955	3.954	0.423	0.716	0.284	30.55
134.5	10.08	1.869	3.170	1.204	18.842	3.902	0.427	0.725	0.275	30.52
142.2	10.67	1.897	3.225	1.150	18.067	4.679	0.434	0.737	0.263	30.46
149.8	11.31	1.926	3.259	1.115	17.311	4.654	0.440	0.745	0.255	30.58
157.4	11.89	1.953	3.348	1.027	16.690	5.023	0.447	0.765	0.235	30.26
165.0	12.52	1.987	3.402	0.972	16.121	4.053	0.454	0.778	0.222	30.28
175.2	13.34	2.010	3.476	0.898	15.300	2.225	0.459	0.795	0.205	30.03
190.4	14.63	2.031	3.541	0.834	14.100	2.199	0.464	0.809	0.191	29.84
205.6	15.87	2.065	3.605	0.769	13.211	2.240	0.472	0.824	0.176	29.80
220.8	17.14	2.087	3.658	0.716	12.364	1.392	0.477	0.836	0.164	29.71
236.1	18.41	2.100	3.711	0.664	11.577	0.058	0.480	0.848	0.152	29.51
251.3	19.71	2.089	3.729	0.646	10.756	-1.172	0.477	0.852	0.148	29.25
266.5	21.00	2.070	3.755	0.620	10.005	-1.999	0.473	0.858	0.142	28.87
281.7	22.29	2.037	3.714	0.660	9.281	-1.619	0.466	0.849	0.151	28.74
297.0	23.49	2.029	3.726	0.648	8.771	0.162	0.464	0.852	0.148	28.57
312.2	24.74	2.042	3.738	0.636	8.377	0.456	0.467	0.855	0.145	28.64
327.4	26.04	2.040	3.761	0.614	7.957	0.211	0.466	0.860	0.140	28.48
342.6	27.33	2.047	3.766	0.608	7.605	-0.003	0.468	0.861	0.139	28.53
357.9	28.60	2.040	3.780	0.595	7.243	-0.228	0.466	0.864	0.136	28.36
373.1	29.84	2.041	3.766	0.609	6.945	0.072	0.467	0.861	0.139	28.46





**STATIC DSS TEST**  
 K<sub>0</sub> Consolidation - OCR = NA  
 Sample: Comp-BI - Depth: NA ft  
 Boring TP2317/TP2334  
 Exelon (Victoria)

KAW 7/16/08



**STATIC DSS TEST**  
K<sub>0</sub> Consolidation - OCR = NA  
Sample: Comp-B1 - Depth: NA ft  
Boring TP2317/TP2334

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

Project Number: 0411-08-1686      Test Type: SDSS      Sta. No.: 9G      File Name: Comp-Bi  
 Task No.: NA      Assign,  $\sigma'_{v,c}$  = 8.64 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

<input type="checkbox"/> Tube	<input type="checkbox"/> Field Extruded	<input type="checkbox"/> Liner	<input checked="" type="checkbox"/> Remolded	<input checked="" type="checkbox"/> Tamping	Constant Effort:	Blows/Tamps per Layer = <u>11</u>
Boring No.: <u>TP2317/TP2334</u>	<input type="checkbox"/> LPC Core			Impact/Rammer	Rammer Wgt.(lbf)= _____	No. Layers = <u>3.00</u>
Sample No.: <u>Comp-B</u>	Composiite No.: _____			Pluviated:	Tamper Force (lbf)= <u>4.00</u>	Drop (in.) = <u>12.00</u>
Depth (ft): <u>NA</u>	Specimen No.: <u>I</u>			Kneading	<input checked="" type="checkbox"/> Undercompaction: $U_n$ (%) = _____	Dia. (in.) = <u>1.40</u>
<input type="checkbox"/> Spec. Selection by X-ray;	<input type="checkbox"/> Geomarine Sample				Ref. Effort= MOD	% Comp. = <u>95.0</u> ± Opt.= <u>+4</u>

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

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.	<u>1143</u>			<u>4183</u>			<u>325.80</u>	<u>144.32</u>
Mass Moist Soil + Cont. (g)	<u>105.20</u>			<u>75.48</u>			<u>186.79</u>	<u>4.57</u>
Mass Dry Soil + Container (g)	<u>94.98</u>			<u>69.08</u>			<u>139.01</u>	<u>139.75</u>
Mass Container (g)	<u>31.93</u>			<u>29.81</u>	Excess Dry Soil (soil not included in final mass above)			
WATER CONTENT (%)	<u>16.21</u>			<u>16.30</u>				
Avg. Initial WC, $W_{o,avg}$ (%)	<u>16.21</u>		Final $W_{at}$ : <input checked="" type="checkbox"/> Slice ;	Whole Spec.				
See attached data sheet(s) for additional water contents							Mass Excess Dry Soil (g)	<u>0.00</u>

Specimen Trimming:			
<input type="checkbox"/> Trimming Ring for Fugro Apparatus	NL3	Large-ring ID #	
<input checked="" type="checkbox"/> Trimming Ring for NGI Apparatus		Small-ring ID #	
$H_{s,t}$ (mm):	<u>18.53</u>	$A_{s,t}$ (cm <sup>2</sup> ):	<u>34.87</u>
$D_{s,t}$ (mm):	<u>66.63</u>	$V_{s,t}$ (cm <sup>3</sup> ):	<u>64.60</u>
Remarks: _____			
Free Standing by Wire Saw Lathe or Reconstituted Spec. (mm)			
Height ( $H_{tr}$ )	Diameter ( $D_o$ )	Remarks:	
<u>1</u>	<u>18.540</u>	<u>1-T</u>	<u>NA</u>
<u>2</u>	<u>18.490</u>	<u>2-M</u>	<u>NA</u>
<u>3</u>	<u>18.510</u>	<u>3-B</u>	<u>NA</u>
<u>4</u>	<u>18.530</u>	<u>1-T</u>	<u>NA</u>
<u>5</u>	<u>18.520</u>	<u>2-M</u>	<u>NA</u>
Avg.	<u>3-B</u>	<u>NA</u>	<u>NA</u>
<u>18.525</u>	Avg	<u>NA</u>	<u>NA</u>
		$A_{tr}$ (cm <sup>2</sup> ):	<u>NA</u>
		$V_{tr}$ (cm <sup>3</sup> ):	<u>NA</u>

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 <sup>3</sup> )=	<u>134.34</u>
Dry, $\gamma_{d,o}$ (lb/ft <sup>3</sup> )=	<u>115.60</u>

Specimen Lateral Confinement by:				
Wire Reinforced, Model:		Thickness (mm) =		
Stress Level	Dia. by PITape (mm)	Area, $A_{c,n}$ (cm <sup>2</sup> )		(in <sup>2</sup> )
	Meas.	Corr.		
<u>0</u>				
$\sigma'_{v,c}$				
$\sigma'_{v,max}$				
<input checked="" type="checkbox"/> Regular Membrane with Ring Set No.	<u>9</u>	ID, Rings (mm)		
Thickness (mm):	Top: <u>0.63</u>	=	<u>67.25</u>	
<input type="checkbox"/> Single	Bottom: <u>0.61</u>	Corr. for mem.		
<input checked="" type="checkbox"/> Double Membr. Thick. =	<u>0.31</u>	=	<u>66.630</u>	
Area Ring with mem., $A_o$ (cm <sup>2</sup> )=	<u>34.87</u>	; (in <sup>2</sup> )=	<u>5.405</u>	
Mass Top Cap, etc., $M_{tc}$ =	<u>528.7</u> g,	<u>1.17</u> lbf		
Data corr. for $M_{tc}$ : <input checked="" type="checkbox"/> Yes;	<input type="checkbox"/> No	Plattens with Pins: <input type="checkbox"/> Yes;	<input checked="" type="checkbox"/> No	

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

Other Remarks: \_\_\_\_\_

Trim./ Recon. By: <u>DBN</u>	Setup By: <u>HC</u>	Take Down By: <u>HC</u>
Date: <u>5/9/2008</u>	Date: <u>5/9/2008</u>	Date: <u>5/12/2008</u>
Prelim. Calc. By: <u>HC</u>	Final Calc. By: <u>LF</u>	Reviewed By: <u>HP</u>

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

Remarks: \_\_\_\_\_

KAW 6113/08