

 Test Report by GEOLABS Limited
 Bucknalls Lane, Garston, Watford, Hertfordshire, WD25 9XX

 Client : Concept Engineering Consultants Limited, Unit 8, Warple Mews, Warple Way, London, W3 0RF





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C	CONCEPT SITE INVESTIGATIONS			ESTIGATIONS	Summary Tes	t Report	- Undrair	ned Triaxi	ial Compr	ession	Date R	eported:	19/01/2015
						ع) BS 137	7 : Part 7: 19	a ge) 90 Clause 8			Job	No.:	14/2669
Sit	te Locatio	on:	St Giles	Circus		Client:	Consolida	ated Devel	opments Li	mited			
BH No.	Sample Type	Sample No	Depth top (m)	Descriptio	'n	Cell pressure kN/m2	Strain at failure %	Bulk Density Mg/m3	Dry Density Mg/m3	NMC %	Max Dev. Stress kPa	Shear Strength kPa	Mode of failure/Comments
PB01	С	05	8.88	Firm, brownish grey slightly with white flecks	m, brownish grey slightly micaceous CLAY h white flecks		4.6	1.985	1.562	27	129	64	Brittle
PB01	С	10	16.70	Stiff, extremely closely to ve grey slightly micaceous CL bioturbation	iff, extremely closely to very closely fissured ey slightly micaceous CLAY with rare oturbation		3.1	1.984	1.550	28	151	76	Brittle
PB01	С	12	18.90	Stiff, brownish grey slightly with rare pockets of light an sand (<30mm), bioturbatior	tiff, brownish grey slightly micaceous CLAY th rare pockets of light and dark grey fine and (<30mm), bioturbation and foraminifera		3.5	1.991	1.583	26	304	152	Brittle
PB01	С	13	20.20	/ery stiff, grey slightly micaceous slightly sandy CLAY with occasional pockets of light and dark grey fine sand (<50mm) and rare pioturbation		404	4.2	2.038	1.647	24	623	312	Brittle
PB01	С	19	27.50	Stiff, grey slightly micaceou CLAY with occasional pock grey fine sand (<55mm), ra foraminifera	s slightly sandy ets of light and dark re bioturbation and	550	5.9	2.049	1.673	22	512	256	Brittle with slight plastic deformation
PB01	С	20	29.90	Stiff, brown slightly mottled with rare polished surfaces	bluish grey CLAY	598	3.7	2.139	1.782	20	201	100	Brittle
PB01	U	21	30.66	Stiff, brown mottled bluish o occasional polished surface	grey CLAY with es	613	0.9	2.091	1.722	21	125	62	Brittle
PB01	U	24	33.10	Stiff, multi-coloured CLAY	662	12.8	2.162	1.821	19	471	235	Brittle with plastic deformation (sample locally soft)	
Date - samples received: 26/11/2014 Date - samples tested: 08/01/2015 Approved Signatories: A G Bates AGB (Quality Mngr) - K Mazerant KM (Lab Mngr) Checked by: KM Date: 16/01/2015							47-49 Brune Te Email: Lab@	CONCEPT el Road, Londor el: 02087401553 conceptconsul	n W3 7XR 3 tants.co.uk		AGS	ABSOLITION OF ORDITIONICAL S COLUMNOW WATAL SPECIALISTS UKAS TESTING 4503	

C	ONCE	PT SI	TE INV	ESTIGATIONS	Summary Test	t Report · (S	- Undrain Single-Sta	ed Triaxi age)	al Compr	ession	Date R	eported:	19/01/2015
						BS 137	7 : Part 7: 199	0 Clause 8			Job	No.:	14/2669
Si	te Locatio	on:	St Giles	Circus		Client: Consolidated Developments Limited							
BH No.	Sample Type	Sample No	Depth top (m)	Descriptio	on	Cell pressure kN/m2	Strain at failure %	Bulk Density Mg/m3	Dry Density Mg/m3	NMC %	Max Dev. Stress kPa	Shear Strength kPa	Mode of failure/Comments
PB01	U	28	38.90	Very stiff, multi-coloured sli with rare pockets (<60mm) coarse gravel sized hemati	y stiff, multi-coloured slightly sandy CLAY rare pockets (<60mm) of red fine to rse gravel sized hematite nodules		5.8	2.239	1.971	14	618	309	Brittle
PB01	U	34	45.50	ery stiff, multi-coloured very sandy CLAY with ccasional pockets of white fine sand <55mm) and frequent black flecks		910	2.9	2.167	1.859	17	1378	689	Brittle
Date - samples received: 26/11/2014 Date - samples tested: 08/01/2015 Approved Signatories: A G Bates AGB (Quality Mngr) - K Mazerant KM (Lab Mngr) Checked by: 16/01/2015						47-49 Brune Te Email: Lab@	CONCEPT el Road, London el: 02087401553 conceptconsul	n W3 7XR 3 tants.co.uk		AGS			

C	once	PT SI	TE INV	ESTIGATIONS	Summary Tes	t Report	- Undrai	ned Triaxi	al Compr	ession	Date R	eported:	19/01/2015
						BS 137	7 : Part 7: 19	90 Clause 8			Job	No.:	14/2669
Sit	te Locatio	on:	St Giles	Circus		Client:	Consolid	ated Devel	opments Li	mited			
BH No.	Sample Type	Sample No	Depth top (m)	Descriptio	n	Cell pressure kN/m2	Strain at failure %	Bulk Density Mg/m3	Dry Density Mg/m3	NMC %	Max Dev. Stress kPa	Shear Strength kPa	Mode of failure/Comments
PB02	с	17	10.35	Soft, grey CLAY with rare po fine sand (<30mm) and a cl (60x85m) between 10.36 ar	ockets of dark grey aystone fragment nd 10.42m depth	207	16.8	1.861	1.378	35	44	22	Brittle with plastic deformation
PB02	С	22	17.40	Stiff, brownish grey slightly with occasional bioturbation foraminifera	iff, brownish grey slightly micaceous CLAY th occasional bioturbation and rare raminifera		3.9	1.988	1.568	27	228	114	Brittle
PB02	С	26	24.05	Stiff, grey slightly micaceou CLAY with frequent pockets grey fine sand (<50mm), oc foraminifera and bioturbatio	ff, grey slightly micaceous slightly sandy AY with frequent pockets of light and dark by fine sand (<50mm), occasional aminifera and bioturbation		5.4	2.068	1.720	20	739	369	Brittle with slight plastic deformation
PB02	с	34	31.50	/ery stiff, multi-coloured sandy CLAY		630	3.0	2.251	1.992	13	1475	737	Brittle
PB02	С	41	37.00	Very stiff, brown mottled bluish grey CLAY with frequent polished surfaces		740	1.0	2.088	1.704	23	442	221	Brittle
Date - samples received: 05/12/2014 Date - samples tested: 09/01/2015 Approved Signatories: A G Bates AGB (Quality Mngr) - K Mazerant KM (Lab Mngr) Checked by: KM Date: 16/01/2015				I		47-49 Brun Te Email: Lab@	OONOEPT el Road, Londo el: 0208740155: 2conceptconsul	n W3 7XR 3 tants.co.uk	<u>I</u>	AGS			

C	ONCE	PT SI	TE INV	ESTIGATIONS	Summary Tes	t Report (S BS 137	- Undraii Single-St	ned Triaxi age) 90 Clause 8	al Compr	ession	Date Re	eported:	23/12/2014
Si	te Locatio	on:	St Giles	Circus		Client:	Consolid	ated Devel	opments Li	mited			1 1/2000
BH No.	Sample Type	Sample No	Depth top (m)	Descriptio	n	Cell pressure kN/m2	Strain at failure %	Bulk Density Mg/m3	Dry Density Mg/m3	NMC %	Max Dev. Stress kPa	Shear Strength kPa	Mode of failure/Comments
PB04	UT	25	13.00	Firm, extremely closely fisse micaceous CLAY	ured grey slightly	260	5.7	2.030	1.597	27	226	113	Brittle
PB04	UT	33	19.00	Stiff, extremely closely to ve grey slightly micaceous CL/ flecks	iff, extremely closely to very closely fissured ey slightly micaceous CLAY with rare white ccks		4.0	1.967	1.533	28	266	133	Brittle
PB04	UT	41	25.00	Stiff, grey slightly micaceou occasional pockets of light sand (<45mm), foraminifera and pyrite nodules (<20mm	f, grey slightly micaceous CLAY with asional pockets of light and dark grey fine d (<45mm), foraminifera, rare bioturbation I pyrite nodules (<20mm)		4.6	2.021	1.621	25	555	277	Brittle
Date - sam Date - sam Approved S Checked by	Date - samples received: 21/11/2014 Date - samples tested: 16/12/2014 Approved Signatories: A G Bates AGB (Quality Mngr) - K Mazerant KM (Lab Mngr) Checked by: KM Date: 23/12/2014							47-49 Brund Te Email: Lab@	CONCEPT el Road, Londo el: 02087401553 conceptconsul	n W3 7XR 3 tants.co.uk		AGS	ASSOCIATION OF OROTICIPIE AL & GEOREVIRIONWIRITAL INFECTALISTS UKAS TESTING 4503

C	DUCE	EPT SI	TE INV	ESTIGATIONS	Summary Tes	t Report (१	- Undrair Single-St	ned Triaxi age)	al Compr	ession	Date Re	eported:	23/12/2014
						BS 137	'7 : Part 7: 19	90 Clause 8			Job	No.:	14/2669
Sit	te Locatio	on:	St Giles	Circus		Client:	Consolid	ated Devel	opments Li	mited			
BH No.	Sample Type	Sample No	Depth top (m)	Descriptio	n	Cell pressure kN/m2	Strain at failure %	Bulk Density Mg/m3	Dry Density Mg/m3	NMC %	Max Dev. Stress kPa	Shear Strength kPa	Mode of failure/Comments
PB05	UT	31	17.00	Stiff, extremely closely fissu slightly micaceous CLAY w	iff, extremely closely fissured brownish grey ightly micaceous CLAY with rare white flecks		5.3	1.964	1.536	28	270	135	Brittle
PB05	UT	35	20.00	Stiff, brownish grey slightly sandy CLAY with occasiona grey sand (<45mm) and rar	iff, brownish grey slightly micaceous slightly ndy CLAY with occasional pockets of dark ey sand (<45mm) and rare white flecks								Sample insufficient for testing
PB05	UT	43	26.00	Stiff, grey slightly micaceou CLAY with occasional pock sand (<35mm), rare foramin fragments (<6mm)	slightly micaceous slightly sandy occasional pockets of light grey fine mm), rare foraminifera and lignite (<6mm)		6.3	2.014	1.641	23	620	310	Brittle
			T										
Date - samp Date - samp Approved :	Date - samples received: 18/11/2014 Date - samples tested: 17/12/2014 Approved Signatories: A G Bates AGB (Quality Mngr) - K Mazerant KM (Lab Mngr)							47-49 Brun T€ Email: Lab@	CONCEPT el Road, Londo el: 0208740155 econceptconsu	in W3 7XR i3 iltants.co.uk		AGS	
Checked by	acked by: KM Date: 23/12/2014							·				UKAS TESTING 4503	

BS1377 : Part 8 : Clause 7 **Consolidated Undrained Triaxial Compression Test**

		with Me	asurement of Pore Pressure		
Borehole Num	per: PB01		Description:		
Sample Numbe	er: 09		Stiff dark brown CLAY		
Depth (m):	14.87 - 15.17				
SPECIMEN D	ETAILS				
Depth withi	n original sample		30mm from top		
Orientation	within original sample		Vertical		
Specimen	5 Prenaration		Undisturbed		
Cell Prepar	ation		Checks performed in accordance with (Clause 3.5	
Specimen I	Number		Single		
Initial Diam	eter	mm	99.2		
Initial Leng	th ure Content	mm	202.1		
Initial Wolst	Density	% Ma/m³	28		
Drainage C	conditions	mg/m	One end and radial boundary		
SATURATION	STAGE				
Final Cell F	Pressure	kPa	850		
Final Pore	Pressure	kPa	721		
Duration	Pressure Parameter B	dav(s)	3		
	ION STAGE		~		
Cell Pressu	ire	kPa	850		
Back Press	sure	kPa	650		
Effective P	ressure	kPa	200		
Final Pore	Pressure Pressure Dissination	кРа %	100		
Duration		day(s)	5		
SHEARING S	TAGE				
Cell Pressu	ire	kPa	850		
Rate of Axi	al Displacement	mm/min	0.0011		
Initial Effec	tive Stress	kPa kPa	200		
CONDITIONS	AT FAILURE	criteria	Maximum Principal Stress Ratio		
Pore Press	ure	kPa	737		
Minor Effect	tive Principal Stress	kPa kDa	113		
Major Effect	tive Principal Stress	кРа kPa	300		
Effective P	rincipal Stress Ratio	ni u	2.66		
Pore Press	ure Parameter A		0.47		
Axial Strain	applied to Doviator Stree	% ****	2.1		
Duration	applied to Deviator Stres	s kPa dav(s)	3		
Final Moist	ure Content	% %	28		
Final Wet	Density	Mg/m³	2.05		
EFFECTIVE S	TRESS PARAMETERS				
Cohesion	aar Dagigtanga	kPa	not applicable		
Angle of Si		uegrees			
FAILURE SKE	TCH				
Checked and	Project Number:			يىدىنى ئىلىدىنى	
Approved		65	·O / 22150	_ 💥 _	
Initials:	Project Name:	GE		-(≯≮)-	GEOLABS ®
RJP		ST GI	LES CIRCUS		
Date: 03/02/15			lumber 1//2669	U K A S TESTING	
00/02/10	P	roject r	NUTTINET 14/2009	1982	

Test Report by GEOLABS Limited Bucknalls Lane, Garston, Watford, Hertfordshire, WD25 9XX Authorised Signatories: [] J R Masters (Qual Mgr) [] C F Wallace (Tech Mgr) [] P T Heritage (Ops Mgr) [X] R J Platt (Lead Tech) Client: Concept Engineering Consultants Limited, Unit 8, Warple Mews, Warple Way, London W3 0RF

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BS1377 : Part 8 : Clause 7 **Consolidated Undrained Triaxial Compression Test**

		with Me	easurement of Pore Pressure
Borehole Numbe	er: PB01		Description:
Sample Number:	: 14		Stiff dark brown CLAY
Depth (m):	21.30 - 21.60		
SPECIMEN DET	TAILS		
Depth within	original sample		10mm from top
Orientation w	vithin original sample		Vertical
TEST DETAILS			
Specimen Pr	eparation		Undisturbed
Cell Flepalat	uon		
Initial Diamet	er	mm	100.8
Initial Length		mm	202.5
Initial Moistur	re Content	%	23
Initial Wet De	ensity	Mg/m³	2.08
Final Cell Pre		kPa	850
Final Pore Pr	essure	kPa	671
Final Pore Pr	essure Parameter B		0.95
Duration		day(s)	3
CONSOLIDATIO	ON STAGE		
Cell Pressure	9	kPa kPa	850
Effective Pressu	re ssure	кРа kPa	300
Final Pore Pr	essure	kPa	551
Final Pore Pr	essure Dissipation	%	99
Duration		day(s)	6
	AGE	40-	
Rate of Axial	e Displacement	KPa mm/min	
Initial Pore P	ressure	kPa	551
Initial Effectiv	ve Stress	kPa	299
CONDITIONS A	T FAILURE	criteria	Maximum Principal Stress Ratio
Pore Pressur	'e Ve Drie ein el Otrese	kPa	723
Deviator Stre	ve Principal Stress	kPa kPa	509
Major Effectiv	ve Principal Stress	kPa	636
Effective Prin	ncipal Stress Ratio		5.01
Pore Pressur	e Parameter A	0/	0.34
Axial Strain	onlied to Deviator Stress	% s kPa	1.8
Duration		day(s)	
Final Moistur	e Content	%	23
Final Wet De	nsity	Mg/m³	2.10
EFFECTIVE ST	RESS PARAMETERS		
Cohesion		, kPa	not applicable
Angle of She	ar Resistance	degrees	
FAILURE SKET	СН		
	Destination 1		
Checked and Project Number:			GÍD
Approved	Designed Marris	GE	EO / 22150
	Project Name:		
		ST GI	LES CIRCUS
03/02/15	Pi	roject N	Number 14/2669 1982

Test Report by GEOLABS Limited Bucknalls Lane, Garston, Watford, Hertfordshire, WD25 9XX Authorised Signatories: [] J R Masters (Qual Mgr) [] C F Wallace (Tech Mgr) [] P T Heritage (Ops Mgr) [X] R J Platt (Lead Tech) Client: Concept Engineering Consultants Limited, Unit 8, Warple Mews, Warple Way, London W3 0RF

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BS1377 : Part 8 : Clause 7 **Consolidated Undrained Triaxial Compression Test**

	with Me	asurement of Pore Pressure
Borehole Number: PB01		Description:
Sample Number: 18		Stiff to very stiff dark brown silty CLAY
Depth (m): 26.86 - 27.1	6	
Depth within original sample		20mm from top
Orientation within original sample	9	Vertical
TEST DETAILS		
Specimen Preparation		Undisturbed
Cell Preparation		Checks performed in accordance with Clause 3.5
Specimen Number		Single
Initial Diameter	mm mm	100.8
Initial Moisture Content	%	23
Initial Wet Density	Mg/m³	2.08
Drainage Conditions		One end and radial boundary
SATURATION STAGE		
Final Cell Pressure	kPa kPa	850
Final Pore Pressure Parameter F	кга З	0.96
Duration	day(s)	3
CONSOLIDATION STAGE		
Cell Pressure	kPa	850
Back Pressure	kPa	450
Effective Pressure	kPa kPa	400
Final Pore Pressure Dissipation	кга %	100
Duration	day(s)	4
SHEARING STAGE		
Cell Pressure	kPa	850
Rate of Axial Displacement	mm/min	0.0020
Initial Pore Pressure	kPa kPa	450
	criteria	Maximum Principal Stress Ratio
Pore Pressure	kPa	627
Minor Effective Principal Stress	kPa	223
Deviator Stress	kPa	450
Major Effective Principal Stress	kPa	6/3
Pore Pressure Parameter A		0.39
Axial Strain	%	2.1
Correction applied to Deviator St	ress kPa	4
Duration	day(s)	4
Final Moisture Content	%	23
	ıvıg/m ^s	2.09
Cobesion	() kPa	not applicable
Angle of Shear Resistance	degrees	not applicable
	0	
FAILURE SKETCH		
Charles a project Number		
	GE	iO / 22150
	A-	
	ST GI	
04/02/15	Project N	Number 14/2669 1982

Test Report by GEOLABS Limited Bucknalls Lane, Garston, Watford, Hertfordshire, WD25 9XX Authorised Signatories: [] J R Masters (Qual Mgr) [] C F Wallace (Tech Mgr) [] P T Heritage (Ops Mgr) [X] R J Platt (Lead Tech) Client: Concept Engineering Consultants Limited, Unit 8, Warple Mews, Warple Way, London W3 0RF

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BS1377 : Part 8 : Clause 7 **Consolidated Undrained Triaxial Compression Test**

		with Me	easurement of Pore Pressure	
Borehole Num	per: PB01		Description:	
Sample Numbe	er: 18		Stiff to very stiff dark brown CLAY	
Depth (m):	26.86 - 27.16			
SPECIMEN D Depth withi Orientation	ETAILS n original sample within original sample		20mm from top Vertical	
TEST DETAIL Specimen I Cell Prepar	S Preparation ation		Undisturbed Checks performed in accordance with Clause 3.5	
Specimen I	Number		Single	
Initial Diam	eter	mm	100.8	
Initial Leng	n ure Content	mm %	202.8	
Initial Wet I	Density	Mg/m³	2.08	
Drainage C	onditions	0	One end and radial boundary	
SATURATION	STAGE			
Final Cell F	Pressure	kPa	850	
Final Pore	Pressure Pressure Parameter B	kPa	547	
Duration	Flessule Falameter D	dav(s)	3	
CONSOLIDAT	ION STAGE	uuj(0)		
Cell Pressu	ire	kPa	850	
Back Press	sure	kPa	450	
Effective P	ressure	kPa	400	
Final Pore	Pressure Pressure Dissination	kPa ∞	450	
Duration		// dav(s)	4	
SHEARING S	TAGE			
Cell Pressu	ire	kPa	850	
Rate of Axi	al Displacement	mm/min	0.0020	
Initial Pore	Pressure	kPa kPa	450	
		KPa	400 Maximum Drineinal Stragg Datia	
Pore Press		kPa	627	
Minor Effect	tive Principal Stress	kPa	223	
Deviator St	ress	kPa	450	
Major Effect	tive Principal Stress	kPa	673	
Effective P	rincipal Stress Ratio		3.02	
Axial Strain		%	21	
Correction	applied to Deviator Stres	s kPa	4	
Duration		day(s)	4	
Final Moist	ure Content	%	23	
Final Wet D	Density	Mg/m³	2.09	
EFFECTIVE S Cohesion Angle of St	TRESS PARAMETERS	kPa degrees	not applicable	
FAILURE SKE	ТСН			
Chooked and	Project Number		, *	
Initials:	Project Name	GE	20 / 22150	
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Date: 04/00/4F	SI GILE		LES GIRGUS UKAS TESTING	
04/02/15	P	roject N	Number 14/2669 1982	

Test Report by GEOLABS Limited Bucknalls Lane, Garston, Watford, Hertfordshire, WD25 9XX Authorised Signatories: [] J R Masters (Qual Mgr) [] C F Wallace (Tech Mgr) [] P T Heritage (Ops Mgr) [X] R J Platt (Lead Tech) Client: Concept Engineering Consultants Limited, Unit 8, Warple Mews, Warple Way, London W3 0RF

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C	Consolidat Base a	ed Anisotropically I nd Mid-plane Pore V	Jndrained Tria Nater Pressure	xial Compressi a, Local Strain a	on Test with M and Shearwave	easurement c Velocities	of	
Derehole Nev	DD04		Custom Procedure	Agreed By Client				
Somela Dafe	PB01		Description:					
Sample Rei:	47.50 47.0		Very stiff fissure	ed grey CLAY.				
Depth (m):	17.50 - 17.8	80						
	Initi	al Specimen Conditions	5	Initial				
		Location within sar	nple	50mm from top				
		Orientation		Vertical				
		Condition		Undisturbed				
		Diameter		97.5 mm				
		Height		199.5 mm		Final		
		Moisture content		24.4 %		25.0 %		
		Bulk density		2.03 Mg/m ³		2.03 Mg/m ³		
		Dry density		1.63 Mg/m³		1.62 Mg/m ³		
	At E	End of Saturation		base	mid-plane			
		Cell pressure		1206	kPa			
		Pore pressure		827 kPa	827 kPa			
		B value		1.00	1.00			
		Method used		Back pressu	re assisted			
	At E	End of Isotropic Consoli	dation	base	mid-plane			
		Cell pressure		1206	kPa			
		Back pressure		966 k	кРа			
		Pore pressure		966 kPa	966 kPa			
	At E	End of Anisotropic Stage	9					
		Cell pressure		1257	kPa			
		Back pressure		967 k	кРа			
		Deviator stress		-51 k	(Pa			
		Base pore pressur	e	967 kPa	967 kPa			
		Ко		1.21	1.21			
	She	aring Stage (compressi Initial conditions:	on)	base	mid-plane			
		Cell pressure		1257	kPa			
		Pore pressure		967 kPa	967 kPa			
		Mean effective stres	s, p ₀ ', (σ ₁ '+2σ ₃ ')/3	273 kPa	273 kPa			
		Set rate of externa	l axial strain	0.20 %	%/hr			
Notes:	All shearing strength cor	stage calculations includ rrection. See calculations	e area correction. page at end for ful	Values indicated as I details.	s 'corrected' also in	clude filter drain		
Checked and	Project Numb	per:						
Approved			GEO / 22150				<u></u>	
Initials	Project Name	:					GEOLABS	
CFW			ST GILES	CIRCUS				
16/03/2015			Project Num	Project Number 14/2669				

	Consolidated Anisotropically Base and Mid-plane Pore	Undrained Triaxial Compre Water Pressure, Local Stra	ssion Test with N in and Shearwave	leasurement o e Velocities	of
Borehole No:	PB01	Description:			
Sample Ref	C11	Description.			
Depth (m):	17 50 - 17 80	Very stiff fissured grey CLAY.			
,		Stiffnesses From Shear Sta	ge		
			-		
			External	Local	
	Secant Modulus, Eu, at 0.01% ax	ial strain	217.9 MPa	219.8 MPa	
	- normalized with respect to mear	n effective stress, p'o	798	805	
	Secant Modulus, Eu, at 0.1% axia	al strain	114.8 MPa	108.5 MPa	
	- normalized with respect to mear	n effective stress, p'o	421	412	
	Degree of Non-Linearity, L		0.53	0.51	
		Local Axial Creep Rates			
	Immediately prior to chooring		0 0000 % /br		
	Immediately prior to unloading		0.0000 %/hr		
	Immediately prior to unloading		-0 0090 %/hr		
		(f - 1)			
	Condition	S at failure (with filter drain stre	ngth correction) base	mid-plane	
	Failure criteria		Maximum de	viator stress	
	External axial strain		2.34	4 %	
	Local axial strain		2.92	2 %	
	Deviator stress		444.1	kPa	
	Filter drain strength correction to	deviator stress	3.5	kPa	
	Pore pressure		222.1 11/0 0 kPc	1136 2 kDo	
	Axial effective stress of		550 2 kPa	563.8 kPa	
	Radial effective stress. o.		106.1 kPa	119.7 kPa	
	s' [(σ ₁ '+σ ₃ ')/2]		328.2 kPa	341.8 kPa	
	t [(σ ₁ -σ ₃)/2]		222.1	kPa	
	Pore pressure parameter A, $(u - b)$	$(\sigma_v - \sigma_{vo})/(\sigma_v - \sigma_{vo})$	0.37	0.34	
	Principal stress ratio		5.19	4.71	
Notes:	All shearing stage calculations includ strength correction. See calculations	le area correction. Values indicated page at end for full details.	d as 'corrected' also in	clude filter drain	
Checked and	Project Number:				
Approved		GEO / 22150			
Initials	Project Name:				GEOLABS®
CFW		ST GILES CIRCUS			
40/00/0045		Project Number 14/2669			1

Authorised Signatories: [] J R Masters (Qual. Mgr) [] C F Wallace (Tech. Mgr) [] J J M Powell (Tech. Dir) Client: Concept Engineering Consultants Limited, Unit 8, Warple Mews, Warple Way, London W3 0RF

Consolidated Anisotropically Undrained Triaxial Compression Test with Measurement of Base and Mid-plane Pore Water Pressure, Local Strain and Shearwave Velocities

Custom Procedure Agreed By Client

Borehole No:	PB01
Sample Ref:	C11
Depth (m):	17.50 - 17.80

Shear Wave Velocities

Gmax Determination Using First Arrival Shear Wave Velocities from Bender Elements

Note: The travel time determinations can be subjective, so the associated Gmax and Wave Velocity values should be taken as guide only

					Shear Wave
Svh Determination	Bulk	Travel time	Travel	Gmax	Velocity
At End Of Stage:	Density		Length		Svh
	(Mg/m³)	(s)	(m)	(MPa)	(m/s)
Saturation	2.031	0.000626	0.1961	199.2	313.2
Isotropic Consolidation	2.024	0.000680	0.1968	169.6	289.4
Anisotropic Consolidation	2.025	0.000673	0.1968	173.2	292.5
End of Unload (before reload	2.025	0.000684	0.1966	167.3	287.5
Shh Determination	Bulk	Travel time	Travel	Gmax	Volocity
At End Of Stage:	Donsity		Longth	Gillax	Shh
At Life Of Stage.	(Mg/m ³)	(s)	(m)	(MPa)	(m/s)
Saturation	2.031	0.000307	0.0947	193.2	308.4
Isotropic Consolidation	2.024	0.000326	0.0948	171.2	290.8
Anisotropic Consolidation	2.025	0.000321	0.0948	176.5	295.3
End of Unload (before reload	2.025	0.000331	0.0947	165.7	286.1

Checked and	Project Number:	
Approved	GEO / 22150	
Initials	Project Name:	GEOLABS
CFW	ST GILES CIRCUS	
16/03/2015	Project Number 14/2669	
Test Report by GEOLABS Lin	vited, Bucknalls Lane, Garston, Watford, Hertfordshire, WD25 9XX.	Page 3 of 1

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Consolidated Anisotropically Undrained Triaxial Compression Test with Measurement of Base and Mid-plane Pore Water Pressure, Local Strain and Shearwave Velocities						
	DD 04					
Borenole No:	PBUI	F 1 (1 . 1				
Sample Ref:	C11	End of test photograph				
		<complex-block></complex-block>				
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Checked and	Project Number:					
Approved		GEO / 22150				
Initials	Project Name:		GEULABS			
UTW 16/02/20145		Project Number 14/2669				
Test Report by GEOLABS	Limited, Bucknalls Lane, Garston, Watford, Hertfordshire,	WD25 9XX.	Page 4 of 19			



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Authorised Signatories: [] J R Masters (Qual. Mgr) [] C F Wallace (Tech. Mgr) [] J J M Powell (Tech. Dir) Client: Concept Engineering Consultants Limited, Unit 8, Warple Mews, Warple Way, London W3 ORF





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Authorised Signatories: [] J R Masters (Qual. Mgr) [x] C F Wallace (Tech. Mgr) [] J J M Powell (Tech. Dir)

Base and Mid-plane Pore Water Pressure, Local Strain and Shearwave Velocities Data Barry In Ref. C11 Shearing Stage - Calculations Notes Depth (m): 7.50 - 17.80 Shearing Stage - Calculations Notes Cross-Sectional Area Calculations Image: Carceling Carceli		Consolidated Anisotropically	Undrained Triaxial Compression Test with Measurement of	of
Checked and Project Harter		Base and Mid-plane Pore	Water Pressure, Local Strain and Shearwave Velocities	
Biterbal Mile PB01 Supple Ret: 011 Shearing Stage - Calculations Notes Depth (m): 17.50 - 17.80 Cross-Sectional Area Calculations In The cross-Sectional area is calculated assuming a right-cylinder deformation of the specimen. Membrane Corrections In Corrections for membrane restraint are according to BS1377.Part 8:1990 Filter Paper Corrections In Corrections for strength due to peripheral filter papers are according to BS1377.Part 8:1990 but with the correction from 0 to 27% strain proportionally increasing from 0 kPa to the value calculated at 2% strain. Strain proportionally increasing from 0 kPa to the value calculated at 2% strain.				
Sample Ref: C11 Shearing Stage - Calculations Notes Depth (m): 17.50 - 17.80 Cross-Sectional Area Calculations a) The cross-sectional Area Calculated assuming a right-cylinder deformation of the specimen. Membrane Corrections . b) Corrections for membrane restraint are according to BS1377:Part 8:1990 Filter Paper Corrections . c) Correction for strength due to peripheral filter papers are according to BS1377:Part 8:1990 but with the correction from 0 to 2% strain proportionally increasing from 0 kPa to the value calculated at 2% strain.	Borehole No:	PB01		
Depth (m): 17.50 · 17.80 Cross-Sectional Area Calculations The cross-sectional area is calculated assuming a right-cylinder deformation of the specimen. Membrane Corrections Corrections for membrane restraint are according to BS1377:Part B:1990 Filter Paper Corrections Corrections for strength due to peripheral filter papers are according to BS1377:Part B:1990 but with the correction from 0 to 2% strain proportionally increasing from 0 kPa to the value calculated at 2% strain. Checked and Project Number: Ordectioned Project Number: OFDC/22150 Project Number:	Sample Ref:	C11	Shearing Stage - Calculations Notes	
Cross-Sectional Area Calculations a) The cross-sectional area is calculated assuming a right-cylinder deformation of the specimen. Membrane Corrections c) Corrections for membrane restraint are according to BS1377.Part 8:1980 D) Corrections for strength due to peripheral filter papers are according to BS1377.Part 8:1980 but with the correction from 0 to 2% strain proportionally increasing from 0 kPa to the value calculated at 2% strain.	Depth (m):	17.50 - 17.80		
Cross-Sectional Area Calculations (a) The cross-sectional area is calculated assuming a right-cylinder deformation of the specimen. Membrane Corrections (b) Corrections for membrane restraint are according to BS1377:Part 8:1980 Filter Paper Corrections (c) Corrections for strength due to peripheral filter papers are according to BS1377:Part 8:1990 but with the correction from 0 to 2% strain proportionally increasing from 0 kPa to the value calculated at 2% strain. Checked and Paper Number: Checked Add Paper Number: Checke				
e) The cross-sectional area is calculated assuming a right-cylinder deformation of the specimen. Membrane Corrections b) Corrections for membrane restraint are according to BS1377.Part 8:1990 Filter Paper Corrections c) Corrections for strength due to peripheral filter papers are according to BS1377.Part 8:1990 but with the correction from 0 to 2% strain proportionally increasing from 0 kPa to the value calculated at 2% strain.		Cross-Sectional Area Calculations	5	
Membrane Corrections c) Corrections for membrane restraint are according to BS1377:Part 8:1990 Filter Paper Corrections c) Corrections for strength due to peripheral filter papers are according to BS1377.Part 8:1990 but with the correction from 0 to 2% strain proportionally increasing from 0 kPa to the value calculated at 2% strain.	a)	The cross-sectional area is calculate	ed assuming a right-cylinder deformation of the specimen.	
Checked and Proper Number: GED / 22150	-)			
Membrane Corrections b) Corrections for membrane restraint are according to BS1377:Part 8:1990 Filter Paper Corrections c) Corrections for strength due to peripheral filter papers are according to BS1377:Part 8:1990 but with the correction from 0 to 2% strain proportionally increasing from 0 kPa to the value calculated at 2% strain.				
b) Corrections for membrane restraint are according to BS1377:Part 8:1990 Filter Paper Corrections c) Corrections for strength due to peripheral filter papers are according to BS1377.Part 8:1990 but with the correction from 0 to 2% strain proportionally increasing from 0 kPa to the value calculated at 2% strain.		Membrane Corrections		
Checked and Project Number: Crecked and Project Number: Project N	b)	Corrections for membrane restraint	are according to R\$1377-Part 8:1000	
Fiter Paper Corrections • Corrections for strength due to peripheral filter papers are according to BS1377.Part 8:1990 but with the correction from 0 to 2% strain proportionally increasing from 0 kPa to the value calculated at 2% strain.	6)			
Filter Paper Corrections • Corrections for strength due to peripheral filter papers are according to BS1377;Part 8:1990 but with the correction from 0 to 2% strain proportionally increasing from 0 kPa to the value calculated at 2% strain.				
Checked and Projet Number: Checked and Projet Number:		Filter Paper Corrections		
Checked and Project Number: GEO / 22150 Project Number:	-)			
Checked and Project Number:	C)	Corrections for strength due to perip	neral littler papers are according to BS1377.Part 8: 1990	no in
Checked and Projet Number:		but with the correction from 0 to 2%	strain proportionally increasing from 0 kPa to the value calculated at 2% st	rain.
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Initials Project Name:	Initials	Project Name:		
16/03/2015 Project Number 14/2669	UFW 16/03/2015		Project Number 14/2669	

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Authorised Signatories: [] J R Masters (Qual. Mgr) [] C F Wallace (Tech. Mgr) [] J J M Powell (Tech. Dir)





Consolidated Anisotropically Undrained Triaxial Compression Test with Measurement of Base and Mid-plane Pore Water Pressure, Local Strain and Shearwave Velocities Custom Procedure Agreed By Client Borehole No: PB01 Description: Sample Ref: C17 Very stiff fissured grey CLAY. Depth (m): 25.56 - 25.86 **Initial Specimen Conditions** Initial Location within sample 90mm from top Orientation Vertical Condition Undisturbed Diameter 97.9 mm 198.9 mm Final Height Moisture content 27.0 % 26.4 % Bulk density 2.01 Mg/m³ 2.04 Mg/m³ Dry density 1.59 Mg/m³ 1.61 Mg/m³ At End of Saturation base mid-plane Cell pressure 1030 kPa Pore pressure 803 kPa 803 kPa B value 0.99 0.98 Method used Constant moisture content At End of Isotropic Consolidation base mid-plane 1030 kPa Cell pressure 650 kPa Back pressure Pore pressure 650 kPa 650 kPa At End of Anisotropic Stage 1100 kPa Cell pressure 650 kPa Back pressure -71 kPa **Deviator stress** 650 kPa Base pore pressure 650 kPa Ko 1.19 1.19 Shearing Stage (compression) mid-plane base Initial conditions: Cell pressure 1100 kPa 650 kPa 650 kPa Pore pressure Mean effective stress, p_0', (σ_1 '+2 σ_3 ')/3 427 kPa 426 kPa Set rate of external axial strain 0.20 %/hr All shearing stage calculations include area correction. Values indicated as 'corrected' also include filter drain Notes: strength correction. See calculations page at end for full details. Checked and Project Number: GEO / 22150 Approved **GEOLABS**[®] Initials Project Name: ST GILES CIRCUS CFW Project Number 14/2669 16/03/2015

Test Report by GEOLABS Limited, Bucknalls Lane, Garston, Watford, Hertfordshire, WD25 9XX. Authorised Signatories: [] J R Masters (Qual. Mgr) [x] C F Wallace (Tech. Mgr) [] J J M Powell (Tech. Dir) Client: Concept Engineering Consultants Limited, Unit 8, Warple Mews, Warple Way, London W3 0RF

	Consolidated Anisotropically Undrained Triaxial Compression Test with Measurement of Base and Mid-plane Pore Water Pressure, Local Strain and Shearwave Velocities					
D 1 1 N		Custom Procedure Agreed by Client				
Borehole No:	PB01	Description:				
Sample Ref:	C17	Very stiff fissured grey CLAY.				
Depth (m):	25.56 - 25.86					
		Stiffnesses From Shear Stag	e			
			External	Local		
	Secant Modulus, Eu, at 0.01% ax	ial strain	163.1 MPa	181.9 MPa		
	- normalized with respect to mean	n effective stress, p'o	383	427		
	Secant Modulus, Eu, at 0.1% axia	al strain	104.3 MPa	95.6 MPa		
	- normalized with respect to mean	n effective stress, p'o	245	225		
	Denne of New Linearity L		0.04	0.50		
	Degree of Non-Linearity, L		0.64	0.53		
		Local Axial Creep Rates				
	Immediately sets to standard		0.0004.04 //			
	Immediately prior to shearing		0.0004 %/hr			
	Immediately prior to unloading		0.0123 %/hr			
	immediately prior to reloading		-0.0074 %/11			
	Condition	s at failure (with filter drain streng	th correction) base	mid-plane		
	Failure criteria		Maximum de	viator stress	SEE NOTE	
	External axial strain		8.93	3 %		
	Local axial strain		outside	range		
	Deviator stress		294.9	kPa		
	Filter drain strength correction to	deviator stress	3.91	кРа		
	Undrained shear strength		147.5	kPa		
	Pore pressure		810.9 kPa	789.0 kPa		
	Axial effective stress, σ_v '		584.0 kPa	605.9 kPa		
	Radial effective stress, σ_h'		289.1 kPa	311.0 kPa		
	s' [(σ ₁ '+σ ₃ ')/2]		436.6 kPa	458.5 kPa		
	t [$(\sigma_1 - \sigma_3)/2$]		147.5	kPa		
	Pore pressure parameter A, $(u \cdot$	$(\sigma_{\rm v} - \sigma_{\rm vo})$	0.44	0.38		
	Principal stress ratio		2.02	1.95		
	Note:					
	Shearing stage stopped due to de triaxial cell. Deviator stress had n	eformation of specimen forcing pie ot peaked at this point, but was or	zo bender elemer nly rising very slow	nts against /ly.		
Notes:	All shearing stage calculations incluc strength correction. See calculations	le area correction. Values indicated a page at end for full details.	s 'corrected' also ind	clude filter drain		
Checked and	Project Number:					
Approved		GEO / 22150				
Initials	Project Name:				GEOLABS	
CFW		ST GILES CIRCUS				
16/03/2015		Project Number 14/2669				
Test Report by GEOLABS	Limited, Bucknalls Lane, Garston, Watford, Hertfordshire, WD2	5 9XX.			Page 2 of 19	

Consolidated Anisotropically Undrained Triaxial Compression Test with Measurement of Base and Mid-plane Pore Water Pressure, Local Strain and Shearwave Velocities

Custom Procedure Agreed By Client

Borehole No:	PB01
Sample Ref:	C17
Depth (m):	25.56 - 25.86

Shear Wave Velocities

Gmax Determination Using First Arrival Shear Wave Velocities from Bender Elements

Note: The travel time determinations can be subjective, so the associated Gmax and Wave Velocity values should be taken as guide only

					Shear Wave
Svh Determination	Bulk	Travel time	Travel	Gmax	Velocity
At End Of Stage:	Density		Length		Svh
	(Mg/m³)	(s)	(m)	(MPa)	(m/s)
Saturation	2.014	0.000850	0.1958	106.8	230.3
Isotropic Consolidation	2.027	0.000755	0.1943	134.2	257.3
Anisotropic Consolidation	2.029	0.000743	0.1943	138.8	261.6
End of Unload (before reload	2.029	0.000750	0.1942	136.0	258.9
Shb Determination	Dulle		Trough	Cmay	Velocity
	Buik	i ravei time	Iravei	Gmax	velocity
At End Of Stage:	Density		Length		Snn
	(Mg/m³)	(s)	(m)	(MPa)	(m/s)
Saturation	2.014	0.000397	0.0952	115.8	239.8
Isotropic Consolidation	2.027	0.000355	0.0949	144.9	267.4
Anisotropic Consolidation	2.029	0.000342	0.0948	155.9	277.2
End of Unload (before reload	2.029	0.000351	0.0952	149.3	271.2

Checked and	Project Number:	
Approved	GEO / 22150	®
Initials	Project Name:	GEOLABS
CFW	ST GILES CIRCUS	
16/03/2015	Project Number 14/2669	
Test Report by GEOLABS Lin	ited, Bucknalls Lane, Garston, Watford, Hertfordshire, WD25 9XX.	Page 3 of 1

Consolidated Anisotropically Undrained Triaxial Compression Test with Measurement of Base and Mid-plane Pore Water Pressure, Local Strain and Shearwave Velocities

Custom Procedure Agreed By Client

Borehole No:PB01Sample Ref:C17Depth (m):25.56 - 25.86

End of test photograph



	~**	Project Na: 22180 Project Name: 800ile Okeas Borehole Ref. P801 Sample ref. C17 Depth (m) 25.56 - 25.86	CAUC ther Test	
		<image/> <text><text></text></text>		
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Initials	Project Name:			GEOLABS

ST GILES CIRCUS

Project Number 14/2669

 16/03/2015
 Project

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 Authorised Signatories: [] J R Masters (Qual. Mgr) [] C F Wallace (Tech. Mgr) [] J J M Powell (Tech. Dir)

 Client: Concept Engineering Consultants Limited, Unit 8, Warple Mews, Warple Way, London W3 0RF
 Clients Concept Engineering Consultants Limited, Unit 8, Warple Mews, Warple Way, London W3 0RF

CFW



Authorised Signatories: [] J R Masters (Qual. Mgr) [x] C F Wallace (Tech. Mgr) [] J J M Powell (Tech. Dir)



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	Consolidated Anisotropically Undrained Triaxial Compression Test with Measurement of Base and Mid-plane Pore Water Pressure, Local Strain and Shearwave Velocities				
		Custom Procedure Agreed By Client			
Borehole No:	PB01				
Sample Ref:	C17	Shearing Stage - Calculations Notes			
Depth (m):	25.56 - 25.86				
	Cross-Sectional Area Calculations	5			
a)	The cross-sectional area is calculate	ed assuming a right-cylinder deformation of the specimen.			
	Membrane Corrections				
b)	Corrections for membrane restraint a	are according to BS1377:Part 8:1990			
	Filter Paper Corrections				
c)	Corrections for strength due to perip	heral filter papers are according to BS1377:Part 8:1990			
	but with the correction from 0 to 2%	strain proportionally increasing from 0 kPa to the value calculated at 2% st	rain.		
Checked and	Project Number:				
Approved		GEO / 22150			
Initials	Project Name:		GEOLABS		
CFW		ST GILES CIRCUS			
16/03/2015		Project Number 14/2669			

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Consolidated Anisotropically Undrained Triaxial Compression Test with Measurement of Base and Mid-plane Pore Water Pressure, Local Strain and Shearwave Velocities

	Dase and mid-plane r d	Custom Procedure Ag	reed By Client	ind Shear wave velocities	
Borehole No:	PB01	Description:	-		
Sample Ref:	C26	Decemption			
Depth (m):	35.80 - 36.10	Very stiff fissured b	prown mottled bl	ueish grey CLAY.	
2 opt.: ().					
	Initial Specimen Condi	tions	Initial		
	Location withi	n sample 50	mm from top		
	Orientation		Vertical		
	Condition	ι	Jndisturbed		
	Diameter		98.1 mm		
	Height		197.4 mm	Final	
	Moisture cont	ent	21.4 %	20.9 %	
	Bulk density	:	2.12 Mg/m³	2.14 Mg/m³	
	Dry density		1.75 Mg/m³	1.77 Mg/m³	
	At End of Saturation		base	mid-plane	
	Cell pressure		1432	<pa< td=""><td></td></pa<>	
	Pore pressure	9	1155 kPa	1155 kPa	
	B value		0.98	0.99	
	Method used		Constant mois	ture content	
	At End of Isotropic Cor	nsolidation	base	mid-plane	
	Cell pressure		1432 k	<pa< td=""><td></td></pa<>	
	Back pressure	9	842 k	Pa	
	Pore pressure	9	842 kPa	842 kPa	
	At End of Anisotropic S	Stage			
	Cell pressure		1552 k	κΡa	
	Back pressure	e	843 k	Pa	
	Deviator stres	S	-122 k	(Pa	
	Base pore pre	essure	842 kPa	842 kPa	
	Ко		1.21	1.21	
			h	and a law a	
	Snearing Stage (compr	ession)	base	mid-plane	
		ions:	4550	-D-	
	Cell pressure		1552 4		
	Pore pressure	etrees = 1 (= 1, 0= 1)/2	842 kPa	842 kPa	
	Mean enective	stress, p_0 , $(\sigma_1 + 2\sigma_3)/3$	669 KPa	669 KPa	
	Set rate of ex	ternal axial strain	0.20 %	6/nr	
Notes:	All shearing stage calculations in	nclude area correction. Valu	ues indicated as	'corrected' also include filter drain	
	strength correction. See calculat	tions page at end for full de	tails.		
Checked and	Project Number:				
Approved		GEO / 22 ⁻	150		R
Initials	Project Name:				GEOLABS
CFW		ST GILES CI	RCUS		
16/03/2015		Project Number	14/2669		

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	Consolidated Anisotropically Base and Mid-plane Pore	Undrained Triaxial Compres Water Pressure, Local Strai Custom Procedure Agreed By Client	ssion Test with N n and Shearwave	leasurement o e Velocities	of
Borehole No:	PB01	Description:			
Sample Ref:	C26	2000000000			
Depth (m):	35.80 - 36.10	Very stiff fissured brown mottled	d blueish grey CLAY.		
		Stiffnesses From Shear Stag	ge		
			External	Local	
	Secant Modulus, Eu, at 0.01% ax	ial strain	256.7 MPa	376.5 MPa	
	- normalized with respect to mear	n effective stress, p'o	384	563	
	Secant Modulus, Eu, at 0.1% axia	al strain	170.2 MPa	181.6 MPa	
	 normalized with respect to mean 	n effective stress, p'o	255	272	
	Degree of Non-Linearity, L		0.67	0.48	
		Local Axial Creep Rates			
	Immediately prior to shearing		-0.0003 %/hr		
	Immediately prior to unloading		0.0094 %/hr		
	Immediately prior to reloading		-0.0030 %/hr		
	Condition	s at failure (with filter drain stren	ngth correction) base	mid-plane	
	Failure criteria		Maximum de	viator stress	SEE NOTE
	External axial strain		3.45	5 %	
	Local axial strain		outside	range	
	Deviator stress		584.6	i kPa	
	Filter drain strength correction to	deviator stress	3.7	kPa 2 kPa	
	Poro prossuro		292.3 1004 7 kPa	1026 6 kPa	
	Avial effective stress σ		1094.7 KFa	1020.0 KFa	
	Radial effective stress out		457.3 kPa	525.4 kPa	
	s' [$(\sigma_1' + \sigma_3')/2$]		749.6 kPa	817.7 kPa	
	t [(σ ₁ -σ ₃)/2]		292.3	kPa	
	Pore pressure parameter A, (u -	$(\sigma_v - \sigma_{vo})/(\sigma_v - \sigma_{vo})$	0.36	0.26	
	Principal stress ratio		2.28	2.11	
	Note: Shearing stage stopped due to de triaxial cell. Deviator stress had n	eformation of specimen forcing p ot peaked at this point, but was o	iezo bender elemer only rising very slov	nts against vly.	
Notes:	All shearing stage calculations includ strength correction. See calculations	le area correction. Values indicated page at end for full details.	as 'corrected' also in	clude filter drain	
Checked and	Project Number:				
Approved		GEO / 22150			R
Initials	Project Name:				GEOLABS
CFW		ST GILES CIRCUS			
16/03/2015 Test Report by GEOLABS I	imited, Bucknalls Lane, Garston, Watford, Hertfordshire, WD25				Page 2 of 19

Consolidated Anisotropically Undrained Triaxial Compression Test with Measurement of Base and Mid-plane Pore Water Pressure, Local Strain and Shearwave Velocities

Custom Procedure Agreed By Client

Borehole No:	PB01
Sample Ref:	C26
Depth (m):	35.80 - 36.10

Shear Wave Velocities

Gmax Determination Using First Arrival Shear Wave Velocities from Bender Elements

Note: The travel time determinations can be subjective, so the associated Gmax and Wave Velocity values should be taken as guide only

					Shear Wave
Svh Determination	Bulk	Travel time	Travel	Gmax	Velocity
At End Of Stage:	Density		Length		Svh
	(Mg/m³)	(s)	(m)	(MPa)	(m/s)
Saturation	2.121	0.000633	0.1939	199.0	306.3
Isotropic Consolidation	2.136	0.000561	0.1929	252.4	343.8
Anisotropic Consolidation	2.138	0.000562	0.1929	251.8	343.2
End of Unload (before reload	2.138	0.000569	0.1927	245.2	338.6
Chika a statistica					
Snn Determination	Bulk	Travel time	Travel	Gmax	Velocity
At End Of Stage:	Density		Length		Shh
	(Mg/m³)	(s)	(m)	(MPa)	(m/s)
Saturation	2.121	0.000319	0.0953	189.3	298.7
Isotropic Consolidation	2.136	0.000288	0.0949	232.0	329.6
Anisotropic Consolidation	2.138	0.000280	0.0948	245.1	338.6
End of Unload (before reload	2.138	0.000285	0.0953	239.0	334.4

Checked and	Project Number:	
Approved	GEO / 22150	R
Initials	Project Name:	GEOLABS
CFW	ST GILES CIRCUS	
16/03/2015	Project Number 14/2669	
Test Report by GEOLABS Lin	iited, Bucknalls Lane, Garston, Watford, Hertfordshire, WD25 9XX.	Page 3 of 1

Base and Mid-plane Pore Water Pressure, Local Strain and Shearwave Velocities Custom Procedure Agreed By Client
Custom Procedure Agreed By Client
Develople Next DD04
Sample Kel: C26 End of test photograph
Checked and Project Number:
Approved GEO / 22150
Initials Project Name: GEOLABS
C/W ST GILES CIRCUS Project Number 14/2669
16/U3/2015 10/U3/2015 Test Report by GEOLABS Limited, Bucknalls Lane, Garston, Watford, Hertfordshire, WD25 9XX. Page 4 of



Authorised Signatories: [] J R Masters (Qual. Mgr) [x] C F Wallace (Tech. Mgr) [] J J M Powell (Tech. Dir)



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	Consolidated Anisotropically Base and Mid-plane Pore	Undrained Triaxial Compression Test with Measurement of Water Pressure, Local Strain and Shearwave Velocities Custom Procedure Agreed By Client	of
Borehole No:	PB01		
Sample Ref:	C26	Shearing Stage - Calculations Notes	
Depth (m):	35.80 - 36.10		
	Cross-Sectional Area Calculations	S	
a)	The cross-sectional area is calculate	ed assuming a right-cylinder deformation of the specimen.	
b)	Corrections for membrane restraint a	are according to BS1377:Part 8:1990	
	Filter Paper Corrections		
c)	Corrections for strength due to perip but with the correction from 0 to 2%	heral filter papers are according to BS1377:Part 8:1990 strain proportionally increasing from 0 kPa to the value calculated at 2% st	rain.
Checked and	Project Number:		
Approved		GEO / 22150	®
Initials	Project Name:		GEOLABS
CFW		ST GILES CIRCUS	
16/03/2015		Project Number 14/2669	

Test Report by GEOLABS Limited, Bucknalls Lane, Garston, Watford, Hertfordshire, WD25 9XX.

Authorised Signatories: [] J R Masters (Qual. Mgr) [] C F Wallace (Tech. Mgr) [] J J M Powell (Tech. Dir)

Client: Concept Engineering Consultants Limited, Unit 8, Warple Mews, Warple Way, London W3 0RF





Consolidated Anisotropically Undrained Triaxial Compression Test with Measurement of Base and Mid-plane Pore Water Pressure, Local Strain and Shearwave Velocities

	Base and N	viid-plane Pore W	Custom Procedure	, LOCAI Strain	and Shearwave velocit	ies
Borehole No:	PB01		Description:			
Sample Ref:	C31		·			
Depth (m):	42.25 - 42.55		Stiff brown mott	led blueish grey C	CLAY.	
2 opt.: ().						
	Initial Sp	ecimen Conditions		Initial		
		Location within sam	ple	50mm from top		
		Orientation		Vertical		
		Condition		Undisturbed		
		Diameter		99.5 mm		
		Height		200.9 mm	Fina	I
		Moisture content		15.0 %	14.6 9	%
		Bulk density		2.20 Mg/m ³	2.21 Mg	ŋ/m³
		Dry density		1.91 Mg/m ³	1.93 Mg	ŋ∕m³
	At End o	f Saturation		hasa	mid plana	
	AL ENU O			JUDE 1300	kPa	
		Pore pressure		1045 kPa	1051 kPa	
		R value		0 97	0 98	
		D value Method used		Constant moi	sture content	
		Method used		Constant mor	sidie content	
	At End o	f Isotropic Consolida	ation	base	mid-plane	
		Cell pressure		1400	kPa	
		Back pressure		710	kPa	
		Pore pressure		706 kPa	710 kPa	
	At End o	f Aniostronia Stago				
	At End O			1540	kPo	
		Cell pressure		711	kDa	
		Doviator strass		-141	kPa	
		Base pore pressure		704 kPa	707 kPo	
		Ko		1.20	1.20	
	Shearing	y Stage (compression Initial conditions:	n)	base	mid-plane	
		Cell pressure		1540	kPa	
		Pore pressure		704 kPa	707 kPa	
		Mean effective stress,	, p ₀ ', (σ ₁ '+2σ ₃ ')/3	789 kPa	785 kPa	
		Set rate of external	axial strain	0.20	%/hr	
Notes:	All shearing stage strength correction	e calculations include on. See calculations p	area correction. \ age at end for full	/alues indicated a details.	s 'corrected' also include filter	⁻ drain
Checked and	Project Number	· · · · · · · · · · · · · · · · · · ·				
Approved	. isjoor number.		GEO / 2	22150		
Initials	Project Namo					
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16/03/2015			Project Numb	ber 14/2669		
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	Consolidated Anisotropically Undrai Base and Mid-plane Pore Water Custor	Ined Triaxial Compress Pressure, Local Strain n Procedure Agreed By Client	sion Test with I and Shearwav	Measurement of Velocities	of
Borehole No:	PB01 Descri	ntion:			
Sample Ref:	C31	puon.			
Depth (m):	42.25 - 42.55	brown mottled blueish grey	CLAY.		
	Stiffne	sses From Shear Stag	e		
			External	Local	
	Secant Modulus, Eu, at 0.01% axial strain	n	409.6 MPa	1048.1 MPa	
	- normalized with respect to mean effective	ve stress, p'o	522	1334	
	Secant Modulus Eu at 0.1% axial strain		262.5 MPa	320.5 MPa	
	- normalized with respect to mean effective	ve stress, p'o	340	412	
	·				
	Degree of Non-Linearity, L		0.65	0.31	
	Loc	al Axial Creep Rates			
		-			
	Immediately prior to shearing		-0.0004 %/hr		
	Immediately prior to unloading		-0.0020 %/hr		
	Immediately prior to reloading		0.0000 %/hr		
	Conditions at fa	ilure (with filter drain streng	th correction)		
	Conditions at fai	ilure (with filter drain streng	th correction) base	mid-plane	
	Conditions at fai	ilure (with filter drain streng	th correction) base Maximum de	mid-plane eviator stress	
	Conditions at fai Failure criteria External axial strain	ilure (with filter drain streng	oth correction) base Maximum de 2.0	mid-plane eviator stress 1 %	
	Conditions at fai Failure criteria External axial strain Local axial strain	ilure (with filter drain streng	th correction) base Maximum de 2.0 outside	mid-plane eviator stress 1 % e range 5 kPo	
	Conditions at fai Failure criteria External axial strain Local axial strain Deviator stress Filter drain strength correction to deviator	ilure (with filter drain streng	th correction) base Maximum de 2.0 outside 1523. 3.4	mid-plane eviator stress 1 % e range 5 kPa kPa	
	Conditions at fai Failure criteria External axial strain Local axial strain Deviator stress Filter drain strength correction to deviator Undrained shear strength	ilure (with filter drain streng	th correction) base Maximum de 2.0 outside 1523. 3.4 761	mid-plane eviator stress 1 % e range 5 kPa kPa 7 kPa	
	Conditions at fai Failure criteria External axial strain Local axial strain Deviator stress Filter drain strength correction to deviator Undrained shear strength Pore pressure	ilure (with filter drain streng	th correction) base Maximum de 2.0 outside 1523. 3.4 761.7 907.0 kPa	mid-plane eviator stress 1 % e range 5 kPa kPa 7 kPa 887.7 kPa	
	Conditions at fai Failure criteria External axial strain Local axial strain Deviator stress Filter drain strength correction to deviator Undrained shear strength Pore pressure Axial effective stress, σ_{v} '	ilure (with filter drain streng	th correction) base Maximum de 2.0 outside 1523. 3.4 761.7 907.0 kPa 2157.5 kPa	mid-plane eviator stress 1 % e range 5 kPa kPa 7 kPa 887.7 kPa 2176.8 kPa	
	Conditions at failFailure criteriaExternal axial strainLocal axial strainDeviator stressFilter drain strength correction to deviatorUndrained shear strengthPore pressureAxial effective stress, σ_v' Radial effective stress, σ_h'	ilure (with filter drain streng	th correction) base Maximum de 2.0 outside 1523. 3.4 761.7 907.0 kPa 2157.5 kPa 634.0 kPa	mid-plane eviator stress 1 % 5 kPa kPa 7 kPa 887.7 kPa 2176.8 kPa 653.3 kPa	
	Conditions at failFailure criteriaExternal axial strainLocal axial strainDeviator stressFilter drain strength correction to deviatorUndrained shear strengthPore pressureAxial effective stress, σ_v' Radial effective stress, σ_h' s' $[(\sigma_1'+\sigma_3')/2]$	ilure (with filter drain streng	th correction) base Maximum de 2.0 outside 1523. 3.4 761.1 907.0 kPa 2157.5 kPa 634.0 kPa 1395.7 kPa	mid-plane eviator stress 1 % 5 kPa kPa 7 kPa 887.7 kPa 2176.8 kPa 653.3 kPa 1415.0 kPa	
	Conditions at failFailure criteriaExternal axial strainLocal axial strainDeviator stressFilter drain strength correction to deviatorUndrained shear strengthPore pressureAxial effective stress, σ_v' Radial effective stress, σ_h' s' [$(\sigma_1'+\sigma_3')/2$]t< [$(\sigma_1-\sigma_3)/2$]	ilure (with filter drain streng	th correction) base Maximum de 2.0 outside 1523. 3.4 761.7 907.0 kPa 2157.5 kPa 634.0 kPa 1395.7 kPa 761.7	mid-plane eviator stress 1 % 5 kPa kPa 7 kPa 887.7 kPa 2176.8 kPa 653.3 kPa 1415.0 kPa 7 kPa	
	Conditions at failFailure criteriaExternal axial strainLocal axial strainDeviator stressFilter drain strength correction to deviatorUndrained shear strengthPore pressureAxial effective stress, σ_v' Radial effective stress, σ_h' s' [$(\sigma_1'+\sigma_3)/2$]t [$(\sigma_1-\sigma_3)/2$]Pore pressure parameter A, $(u - u_o)/(\sigma_v)$	i lure (with filter drain streng r stress	th correction) base Maximum de 2.0 outside 1523. 3.4 761.7 907.0 kPa 2157.5 kPa 634.0 kPa 1395.7 kPa 761.7 0.12	mid-plane eviator stress 1 % 5 kPa kPa 7 kPa 887.7 kPa 2176.8 kPa 653.3 kPa 1415.0 kPa 7 kPa 0.11	
	Conditions at fai Failure criteria External axial strain Local axial strain Deviator stress Filter drain strength correction to deviator Undrained shear strength Pore pressure Axial effective stress, σ_v ' Radial effective stress, σ_h ' s' [$(\sigma_1'+\sigma_3')/2$] t [$(\sigma_1-\sigma_3)/2$] Pore pressure parameter A, $(u - u_o)/(\sigma_v)$ Principal stress ratio	i lure (with filter drain streng r stress	th correction) base Maximum de 2.0 outside 1523. 3.4 761.7 907.0 kPa 2157.5 kPa 634.0 kPa 1395.7 kPa 761.7 0.12 3.40	mid-plane eviator stress 1 % 2 range 5 kPa kPa 7 kPa 887.7 kPa 2176.8 kPa 653.3 kPa 1415.0 kPa 7 kPa 0.11 3.33	
	Conditions at fai Failure criteria External axial strain Local axial strain Deviator stress Filter drain strength correction to deviator Undrained shear strength Pore pressure Axial effective stress, σ_v' Radial effective stress, σ_h' s' $[(\sigma_1'+\sigma_3)/2]$ t $[(\sigma_1-\sigma_3)/2]$ Pore pressure parameter A, $(u - u_o)/(\sigma_v)$ Principal stress ratio	i lure (with filter drain streng r stress	th correction) base Maximum de 2.0 outside 1523. 3.4 761.7 907.0 kPa 2157.5 kPa 634.0 kPa 1395.7 kPa 761.7 0.12 3.40	mid-plane eviator stress 1 % 5 kPa 5 kPa 7 kPa 887.7 kPa 2176.8 kPa 653.3 kPa 1415.0 kPa 7 kPa 0.11 3.33	
Notes:	Conditions at failFailure criteriaExternal axial strainLocal axial strainDeviator stressFilter drain strength correction to deviatorUndrained shear strengthPore pressureAxial effective stress, σ_v' Radial effective stress, σ_h' s' [$(\sigma_1'+\sigma_3)/2$]t< [$(\sigma_1-\sigma_3)/2$]Pore pressure parameter A, $(u - u_o)/(\sigma_v)$ Principal stress ratio	ilure (with filter drain streng r stress $\sigma - \sigma_{Vo}$) orrection. Values indicated a end for full details.	th correction) base Maximum de 2.0 outside 1523. 3.4 761.7 907.0 kPa 2157.5 kPa 634.0 kPa 1395.7 kPa 761.7 0.12 3.40	mid-plane eviator stress 1 % 5 kPa 5 kPa 7 kPa 887.7 kPa 2176.8 kPa 653.3 kPa 1415.0 kPa 7 kPa 0.11 3.33	
Notes:	Conditions at fail Failure criteria External axial strain Local axial strain Deviator stress Filter drain strength correction to deviator Undrained shear strength Pore pressure Axial effective stress, σ_v' Radial effective stress, σ_v' Radial effective stress, σ_h' s' [$(\sigma_1'+\sigma_3)/2$] t [$(\sigma_1-\sigma_3)/2$] Pore pressure parameter A, $(u - u_o)/(\sigma_v)$ Principal stress ratio All shearing stage calculations include area c strength correction. See calculations page at Project Number:	ilure (with filter drain streng r stress $(1 - \sigma_{V_0})$ orrection. Values indicated a end for full details.	th correction) base Maximum de 2.0 outside 1523. 3.4 761.7 907.0 kPa 2157.5 kPa 634.0 kPa 1395.7 kPa 761.7 0.12 3.40	mid-plane eviator stress 1 % 2 range 5 kPa kPa 7 kPa 887.7 kPa 2176.8 kPa 653.3 kPa 1415.0 kPa 7 kPa 0.11 3.33	
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Notes: Checked and Approved itials	Conditions at fail Failure criteria External axial strain Local axial strain Deviator stress Filter drain strength correction to deviator Undrained shear strength Pore pressure Axial effective stress, σ_v' Radial effective stress, σ_v' Radial effective stress, σ_h' s' [$(\sigma_1'+\sigma_3')/2$] t [$(\sigma_1-\sigma_3)/2$] Pore pressure parameter A, $(u - u_o)/(\sigma_v)$ Principal stress ratio All shearing stage calculations include area c strength correction. See calculations page at Project Number: Project Name:	ilure (with filter drain streng r stress $(r - \sigma_{Vo})$ orrection. Values indicated a end for full details. GEO / 22150	th correction) base Maximum de 2.0 outside 1523. 3.4 761.7 907.0 kPa 2157.5 kPa 634.0 kPa 1395.7 kPa 761.7 0.12 3.40	mid-plane eviator stress 1 % 5 kPa 5 kPa 7 kPa 887.7 kPa 2176.8 kPa 653.3 kPa 1415.0 kPa 0.11 3.33	GEOLABS
Notes: Checked and Approved itials	Conditions at fail Failure criteria External axial strain Local axial strain Deviator stress Filter drain strength correction to deviator Undrained shear strength Pore pressure Axial effective stress, σ_v' Radial effective stress, σ_v' Radial effective stress, σ_h' s' [$(\sigma_1'+\sigma_3)/2$] t [$(\sigma_1-\sigma_3)/2$] Pore pressure parameter A, $(u - u_o)/(\sigma_v)$ Principal stress ratio All shearing stage calculations include area c strength correction. See calculations page at Project Number: Project Name:	i lure (with filter drain streng r stress , - σ _{vo}) orrection. Values indicated a end for full details. GEO / 22150 ST GILES CIRCUS	th correction) base Maximum de 2.0 outside 1523. 3.4 761.7 907.0 kPa 2157.5 kPa 634.0 kPa 1395.7 kPa 761.7 0.12 3.40	mid-plane eviator stress 1 % 2 range 5 kPa kPa 7 kPa 887.7 kPa 2176.8 kPa 653.3 kPa 1415.0 kPa 7 kPa 0.11 3.33	GEOLABS