

Lendlease Pty Ltd

Geotechnical Investigation for Cessnock Correctional Centre

Partner:

Geotechnical Factual Report

23 May 2018



Experience comes to life when it is powered by expertise This page has been left intentionally blank

Geotechnical Investigation for Cessnock Correctional Centre

Prepared for Lendlease Contractors Level 14, Tower 3, International Towers, Barangaroo Avenue, Barangaroo, NSW 2000

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23 May 2018

Document authorisation

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For and on behalf of Coffey

Nima Salimi Geotechnical Engineer

Quality information

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∨0	Geotechnical Factual Report	16/05/2018	NS	JD	NS
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1. Introduction

Coffey Services Australia Pty Ltd (Coffey) has been commissioned by Lendlease Pty Ltd (client) to undertake geotechnical site investigation for the proposed development at Cessnock Correctional Centre at 75 Lindsay St, Cessnock NSW. It is understood that geotechnical investigation is required to confirm presence of shallow rock on site at the proposed location of the new buildings and the proposed new fence line. In addition, assessment of the existing subgrade is also required for construction of a new car park and pavement design of the proposed internal access roads. This factual report summarises the results of our field observations to assist with the geotechnical design of the proposed development.

For the purpose of this report, the client provided a PDF site plan (ref. AR-AA-100), indicating the layout of the proposed development.

2. Fieldwork

Field investigation was completed on 3 and 4 May 2018 that comprised drilling of nineteen boreholes to a maximum depth of 3m (BH-11) below existing ground level. The majority of the drilled boreholes were refused on rock at a depth of around 1.5m. The boreholes were drilled by a track mounted drilling rig, using 300mm auger with an attached V bit. The proposed locations of the boreholes were set up by client after service clearance was completed by a professional service locating company on 2 May 2018. Standard penetration Tests SPT tests were performed with 1m intervals, where possible, to assess the consistency of the existing residual soils. Small and bulk disturbed samples were collected and carried to Coffey's laboratory for NATA accredited testings.

All fieldworks were completed by a Coffey geotechnical engineer who logged the boreholes and collected the soil samples for the required lab testings. The approximate coordinates of the boreholes were picked up by a hand-held GPS and are shown on the site plan, presented in Appendix A. The engineering borehole logs are attached in Appendix B. Laboratory testing was undertaken on recovered bulk samples. The results of lab tests are attached in Appendix C.

2.1. Borehole drilling

Prior to commencing the site works, Coffey prepared Health and Safety plans and Safe Work Method Statements specific to the fieldwork to be undertaken which were approved by Lendlease and used as a guide to undertake the works safely.

3. Site Description

The site is approximately 25000m² in size, located at the south-eastern section of the Cessnock Correctional Centre. The site is bounded by Alunga Avenue to the south, Lindsay Street to the east, centre's internal road to the north and some scattered trees to the west. There are a number of single story buildings to the south of proposed new development. Topographically, the site is situated within moderately undulating terrains with gentle slopes towards south in the order of 2° to 3°. The ground across the site is relatively flat with a large mound, running through the centre of the site in an east-west direction. The drainage across the site is expected to be via a combination of infiltration and surface run-off, following natural slopes. The site surface was covered by short grass at the time of the fieldwork with some trees up to 5m tall at some areas of the site.

Borehole #	Approximate Easting	Approximate Northing	Top Soil, Silt depth (m) from ∼to	Residual CLAY depth (m) from ~ to	Depth to weathered rock (m)	Borehole termination depth (m)
BH-01	344704	6367534	(0.0 ~0.1m)	(0.1 ~0.9m)	0.9	1.1
BH-02	344721	6367567	(0.0 ~0.1m)	(0.1 ~1.0m)	1.0	1.35
BH-03	344730	6367629	(0.0 ~0.1m)	(0.1 ~0.5m)	0.5	1.85
BH-04	344665	6367606	(0.0 ~0.3m)	(0.3 ~1.0m)	1.0	1.3
BH-05	44654	6367519	(0.0 ~0.2m)	(0.2 ~0.9m)	0.9	1.4
BH-06	344590	6367460	(0.0 ~0.15m)	(0.15 ~1.0m)	1.0	1.3
BH-07	344590	6367506	(0.0 ~0.15m)	(0.15 ~1.0m)	1.0	1.5
BH-08	344571	6367542	(0.0 ~0.2m)	(0.2 ~0.8m)	0.8	1.0
BH-09	344525	6367543	(0.0 ~0.05m)	(0.05 ~1.1m)	1.1	1.45
BH-10	344532	6367535	NE	(0.0 ~0.5m)	0.5	1.5
BH-11	344536	6367477	(0.0 ~0.2m)	Fill, (0.2 ~1.9m) Residual CLAY (1.9 ~2.5m)	2.5	3.0
BH-12	344469	6367524	(0.0 ~0.1m)	(0.1 ~1.0m)	1.0	1.5
BH-13	344489	6367437	(0.0 ~0.1m)	(0.1 ~0.4m)	0.4	0.5
BH-14	344410	6367515	(0.0 ~0.1m)	NE	0.1	0.3
BH-15	344422	6367471	(0.0 ~0.15m)	(0.15 ~0.5m)	0.5	1.5
BH-16	344432	6367452	(0.0 ~0.1m)	(0.1 ~0.9m)	0.9	1.0
BH-17	344405	6367427	(0.0 ~0.15m)	(0.15 ~0.6m)	0.6	0.95
BH-18	344354	6367447	(0.0 ~0.25m)	(0.25 ~0.9m)	0.9	2.4
BH-19	344469	6367447	(0.0 ~0.1m)	(0.1 ~0.5m)	0.5	0.95

Table 1: Summary of the encountered subsurface materials

3.1. Subsurface Conditions

The Newcastle Coalfield Regional Geology (Scale 1:100,000), Geological Series Sheet 9231 and part of 9131, 9132 and 9232 Edition 1 published in 1995, indicates that the site is underlain by Dalwood Group Rutherford Formation, consisting of Siltstone, marl and minor Sandstone rock types.

A summary of the of the subsurface materials, encountered on site are presented in Table 1 that in general, consists of a thin layer of silty top soil, overlying very stiff medium plasticity residual clay, overlying weathered rock. Deep clayey fill was encountered at the location of BH-11. The depth to weathered rock was found between 0.1m to 2.5m at the location of BH-14 and BH-11, respectively. The details of the materials encountered in the boreholes are presented in the attached engineering logs.

4. Laboratory Testing

Samples obtained during the field investigations were returned to Coffey's Newcastle laboratory for NATA accredited testing. The testing comprised of four California Bearing Ratio CBR tests to assess the subgrade strength for the pavement design of the proposed internal roads and the new carpark. The results of the CBR tests are presented in Appendix C and are summarised in Table 2.

Test ID	Depth (m) BGL	Material	Maximum Dry Density (t/m3)	Optimum Moisture Content (%)	CBR (%)	Swell (%)
BH01	0.5 - 1.0	CLAY	1.64	22.4	3.5	1.0
BH03	0.5 - 1.0	CLAY	1.61	23.5	5.0	1.0
BH10	0.5 - 1.0	Silty CLAY	1.78	16.3	4.0	1.0
BH15	0.5 - 1.0	CLAY	1.68	17.5	3.5	1.5

Table 2: Summary of CBR test results

5. Closure

Further advice on the uses and limitations of this report is presented in the attached document, *Important Information about your Coffey Report*, which forms a part of this report.



Important information about your Coffey Report

As a client of Coffey you should know that site subsurface conditions cause more construction problems than any other factor. These notes have been prepared by Coffey to help you interpret and understand the limitations of your report.

Your report is based on project specific criteria

Your report has been developed on the basis of your unique project specific requirements as understood by Coffey and applies only to the site investigated. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the client. Your report should not be used if there are any changes to the project without first asking Coffey to assess how factors that changed subsequent to the date of the report affect the report's recommendations. Coffey cannot accept responsibility for problems that may occur due to changed factors if they are not consulted.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Coffey to be advised how time may have impacted on the project.

Interpretation of factual data

Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from literature and external data source review, sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how gualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, owners should retain the services of Coffey through the development stage, to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

Coffey Corporate Services Pty Ltd ABN 55 139 460 521 Issued: 11 August 2016

Your report will only give preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Coffey cannot be held responsible for such misinterpretation.

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.

Interpretation by other design professionals

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey to work with other project design professionals who are affected by the report. Have Coffey explain the report implications to design professionals affected by them and then review plans and specifications produced to see how they incorporate the report findings.

Data should not be separated from the report*

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These logs etc. should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Geoenvironmental concerns are not at issue

Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment. Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact Coffey for information relating to geoenvironmental issues.

Rely on Coffey for additional assistance

Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As the project progresses through design towards construction, speak with Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

Responsibility

Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Coffey to other parties but are included to identify where Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Coffey closely and do not hesitate to ask any questions you may have.

^{*} For further information on this aspect reference should be made to "Guidelines for the Provision of Geotechnical information in Construction Contracts" published by the Institution of Engineers Australia, National headquarters, Canberra, 1987.

Appendix A – Site plans and approximate borehole locations

		EXISTING PARKING BH-02 BH-01 BH-01 BH-04 Lottine street menny BH-04 Lottine street menny BH-04 Lottine street menny BH-04 Lottine street Restine interest EXISTING NOUSTREE BH-01 EXISTING NOUSTREE BH-01 EXISTING NOUSTREE BH-01 EXISTING NOUSTREE BH-01 EXISTING NOUSTREE BH-01 EXISTING NOUSTREE BH-01 EXISTING NOUSTREE CONTS	BH-03
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drawn approved date	NS JD 14/05/18	coffey	client: Lendlease Pty Ltd project: Geotechnical investigation Cessnock Correctional Centre
drawn approved date scale	NS JD 14/05/18 N/A	coffey	client: Lendlease Pty Ltd project: Geotechnical investigation Cessnock Correctional Centre title: Site plan and approximate test locations

Appendix B – Borehole logs



Soil Description Explanation Sheet (1 of 2)

DEFINITION:

In engineering terms soil includes every type of uncemented or partially cemented inorganic or organic material found in the ground. In practice, if the material can be remoulded or disintegrated by hand in its field condition or in water it is described as a soil. Other materials are described using rock description terms.

CLASSIFICATION SYMBOL & SOIL NAME

Soils are described in accordance with the Unified Soil Classification (UCS) as shown in the table on Sheet 2.

PARTICLE SIZE DESCRIPTIVE TERMS

NAME	SUBDIVISION	SIZE
Boulders Cobbles		>200 mm 63 mm to 200 mm
Gravel	coarse medium fine	20 mm to 63 mm 6 mm to 20 mm 2.36 mm to 6 mm
Sand	coarse medium fine	600 μm to 2.36 mm 200 μm to 600 μm 75 μm to 200 μm

MOISTURE CONDITION

- Dry Looks and feels dry. Cohesive and cemented soils are hard, friable or powdery. Uncemented granular soils run freely through hands.
- **Moist** Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere.
- Wet As for moist but with free water forming on hands when handled.

CONSISTENCY OF COHESIVE SOILS

TERM	UNDRAINED STRENGTH su (kPa)	FIELD GUIDE	
Very Soft	<12	A finger can be pushed well into the soil with little effort.	
Soft	12 – 25	A finger can be pushed into the soil to about 25mm depth.	
Firm	25 – 50	The soil can be indented about 5mm wi h the thumb, but not penetrated.	
Stiff	50 – 100	The surface of the soil can be indented wi h the thumb, but not penetrated.	
Very Stiff	100 – 200	The surface of the soil can be marked, but not indented with thumb pressure.	
Hard	>200	The surface of the soil can be marked only with the thumbnail.	
Friable	-	Crumbles or powders when scraped by thumbnail.	

DENSITY OF GRANULAR SOILS

TERM	DENSITY INDEX (%)
Very loose	Less than 15
Loose	15 – 35
Medium Dense	35 – 65
Dense	65 – 85
Very Dense	Greater than 85

MINOR COMPONENTS

TERM	ASSESSMENT GUIDE	PROPORTION OF MINOR COMPONENT IN:
Trace of	Presence just detectable by feel or eye, but soil properties little or no different to general properties of primary component.	Coarse grained soils: <5% Fine grained soils: <15%
With some	Presence easily detected by feel or eye, soil proper ies little different to general properties of primary component.	Coarse grained soils: 5 - 12% Fine grained soils: 15 - 30%

SOIL STRUCTURE

ZONING		CE	MENTING
Layers	Continuous across exposure or sample.	Weakly cemented	Easily broken up by hand in air or water.
Lenses	Discontinuous shape.	Moderately cemented	Effort is required to break up the soil by hand in air or water.
Pockets	Irregular inclusions of different material.		

GEOLOGICAL ORIGIN WEATHERED IN PLACE SOILS

Extremely weathered material	Structure and fabric of parent rock visible.
Residual soil	Structure and fabric of parent rock not visible.
TRANSPORTED	SOILS
Aeolian soil	Deposited by wind.
Alluvial soil	Deposited by streams and rivers.
Colluvial soil	Deposited on slopes (transported downslope by gravity).
Fill	Man-made deposit. Fill may be significantly more variable between tested locations than naturally occurring soils.
Lacustrine soil	Deposited by lakes.
Marine soil	Deposited in ocean basins, bays, beaches and estuaries.



Soil Description Explanation Sheet (2 of 2)

SOIL CLASSIFICATION INCLUDING IDENTIFICATION AND DESCRIPTION

		(Excluding p	FIELD IDENT articles larger that	1 FIC n 60 i	ATION PROCEDURES USC mm and basing fractions on estimated	mass)	USC	PRIMARY NAME
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of materia		/ELS alf of coa jer than	CLE GRA (Little fine	Prec	dominantly one size or a range of sizes mediate sizes missing.	with more	GP	GRAVEL
ม 50% ด	ed eye)	GRA\ e than ha on is lar m	/ELS FH ES ciable nt of ss)	Non	-plastic fines (for identification procedu	res see ML below)	GM	SILTY GRAVEL
More tha	o the nak	More	GRAV WIT FIN Appred amou	Plas	tic fines (for identification procedures s	see CL below)	GC	CLAYEY GRAVEL
) SOILS mm is la	visible to	2.36	AN IDS or no ss)	Wid inter	e range in grain sizes and substantial a mediate sizes	amounts of all	SW	SAND
RAIINED than 63	particle	IDS alf of coa iller than n	CLE SAN (Little fine	Prec inter	dominantly one size or a range of sizes mediate sizes missing.	with some	SP	SAND
ARSE G less	smallest	SAN e than ha on is sma m	IDS TH ES eciabl unt of ss)	Non	-plastic fines (for identification procedu	res see ML below).	SM	SILTY SAND
00	bout the	Mor fractic	SAN WI FIN (Appre e amo	Plas	tic fines (for identification procedures s	see CL below).	SC	CLAYEY SAND
c.s	e is a		IDENT	IFIC	ATION PROCEDURES ON FRACTION	NS <0.2 mm		
e tha	articl	0	DRY STRENG	тн	DILATANCY	TOUGHNESS		
: Mor an 63 5 mn	un p	S & VS I limit an 5	None to Low		Quick to slow	None	ML	SILT
OILS s tha 0.07	075 1	SILT CLA Sthic ss th	Medium to High	None	Medium	CL	CLAY	
ED S ial les than	(A 0.	<u>e</u> –	Low to medium		Slow to very slow	Low	CL	ORGANIC SILT
RAIN		a i i i i i	Low to medium		Slow to very slow	Low to medium	MH	SILT
of r sm		High	СН	CLAY				
FIN 50%		N C P P F	Medium to High		None	Low to medium	ОН	ORGANIC CLAY
HIGHLY C	DRG	ANIC SOILS	tly by fibrous texture.	PT	PEAT			

Low plasticity – Liquid Limit w_L less than 35%.
 Medium plasticity – w_L between 35% and 50%.
 High plasticity – w_L greater than 50%.

COMMON DEFECTS IN SOIL

	-	•			
TERM	DEFINITION	DIAGRAM	TERM	DEFINITION	DIAGRAM
PARTING	A surface or crack across which the soil has little or no tensile strength. Parallel or sub parallel to layering (eg bedding). May be open or closed.		SOFTENED ZONE	A zone in clayey soil, usually adjacent to a defect in which the soil has a higher moisture content than elsewhere.	AND DECEMBER
JOINT	A surface or crack across which the soil has little or no tensile strength but which is not parallel or sub parallel to layering. May be open or closed. The term 'fissure' may be used for irregular joints <0.2 m in length		TUBE	Tubular cavity. May occur singly or as one of a large number of separate or inter-connected tubes. Walls often coated with clay or strengthened by denser packing of grains. May contain organic matter.	A
SHEARED ZONE	Zone in clayey soil with roughly parallel near planar, curved or undulating boundaries containing closely spaced, smooth or slickensided, curved intersec ing joints which divide the mass into lenticular or wedge shaped blocks.	Ø	TUBE CAST	Roughly cylindrical elongated body of soil different from the soil mass in which it occurs. In some cases the soil which makes up the tube cast is cemented.	
SHEARED SURFACE	A near planar curved or undulating, smooth, polished or slickensided surface in clayey soil. The polished or slickensided surface indicates hat movement (in many cases very little) has occurred along the defect.		INFILLED SEAM	Sheet or wall like body of soil substance or mass with roughly planar to irregular near parallel boundaries which cuts through a soil mass. Formed by infilling of open joints.	



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locat	ion:	75	Lindsa	y St,	, Ces	ssno	ck, N	ISW, 2333			check	ked	by:		NS	
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e.g. В т	AD/T blank I	bit			wat	ei on dat ter inflow	e snown	VS vane shear; peak/remouded (kPa) R refusal	Wİİlqı	uid lim	nit				MD medium dense D dense	
V	V bit			-	- wat	ter outflo	w	HB hammer bouncing							VD very dense	



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positio	on: F	34472	21· N· 6367	567 (N	/GA94)		surface elevation: Not Specified	angle	from ho	orizontal:	90°
drill m	odel: F	G101	, Truck mo	ounted		,		drilling fluid:	hole of	diameter	: 300 mm	1
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∞ŏ	ation		samples &		Ê	boj	ation	material description	nΞ	ncy / lensity	hand penetro-	structure and additional observations
ethod upport	penetr	ater	field tests	L (m)	epth (r	aphic	assific /mbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	oisture	insister lative d	meter (kPa)	
E ळ A	- N M	>		2	ð	5	ರೂ ML	SILT: low liquid limit, brown, some cobble	E 8 <wp< td=""><td>ଞ St</td><td>40 200</td><td>TOPSOIL</td></wp<>	ଞ St	40 200	TOPSOIL
				1	-		CL-CI	inclusions at surface.	r.	St to		RESIDUAL SOIL
			SPT		-			brown, with some fine grained sand.		vst		
		p	N*=11		-							HP 450 KPa -
		ountere		-	05-							-
- V/QA		ot Enco			-	V///						
9:24		Ž			-							-
2018 0					- 10-							-
08/05					-			becomes red, brown and grey				EXTREMELY WEATHERED
File>					-							-
Jrawing		-			-	<i>[////</i>		Borehole BH02 terminated at 1 35 m				
₹ 2					15			Target depth				_
TRE.G					-							-
L CEN												-
TIONA					-							-
RREC					20-							_
5 S												-
SNO					-							-
					-							-
N COF					25-							-
9 iii					-							-
REHO					-							-
OF BC					30-	1						-
Log C					-	-						-
rev:AR					-	1						-
Y.GLB					-	1						-
IBRAR					35-							-
<u>- 06 L</u>					-	1						-
0_0_0												-
ŭ					-							-
meth	od			sup	port	L	1	samples & field tests Cl	assificat	tion sym	bol &	consistency / relative density
AD AS	auger auger	drilling screwir	ng*	M r C c	mud casing	N	nil	B bulk disturbed sample D disturbed sample	based	on Unifie	n d	VS very soft S soft
W	washb	ore		pen	etration	1 -		E environmental sample	Jassifica	auun Sys	ieini	F firm St stiff VSt von ot∺f
						no res rangin refusa	sistance ig to il	HP hand penetrometer (kPa)	dry moist			H hard Fb friable
*	bit sho	wn by:	suffix	wat	er V_ . ¹⁰⁻	Oct-12 w	ater	N* SPT - sample recovered W Nc SPT with solid cone WD	wet plastic li	mit		VL very loose
e.g. B T	AD/T blank l	bit			leve	ei on date er inflow	: SNOWN	VS vane shear; peak/remouded (kPa) WI R refusal	liquid lin	nit		MD medium dense D dense
V	V bit			-	- wat	er outflov	v	HB hammer bouncing				VD very dense



ATET	RA TECH	COMF	PANY							Bore	hole ID.	RH03
_							_			shee	t:	1 of 1
E	ngi	ne	erin	g l	-0(g -	Bo	rehole		proie	ect no.	754-NTLGE218006
clie	nt:	Le	ndlease	; 		_				date	started:	03 May 2018
nrin	ncinal.	Gl	en O'Co	nno	r					date	complete	ed 03 May 2018
prin	iont:	Co	ssnock		roct	iona	l Con	tra Gaatachnical Investigation		logg	od by:	MC
proj	jeci.		33110CA		neci	iuna				iogge	eu by.	
loca	ation:	75	Linasa	y St,	Ces	ssno	ск, п	SW, 2333		chec	ked by:	NS
posit drill r	tion: E: model:F	34473 G101	30; N: 6367 Truck mo	629 (N ounted	1GA94)		surface elevation: Not Specified	ang	e diamete	orizontal: 9 er · 300 mm	90°
dril	lling info	ormati	ion			mate	erial sub	stance				·
~	tion		samples &		(Бс	ation	material description		cy / ensity	hand	structure and additional observations
method a	2 penetra	water	field tests	RL (m)	depth (m	graphic I	classifice symbol	SOIL TYPE : plasticity or particle characteristic, colour, secondary and minor components	moisture	consisten relative de	meter (kPa)	
1					-		ML	SILT: low liquid limit, brown.	<w< th=""><th>o St</th><th></th><th>TOPSOIL</th></w<>	o St		TOPSOIL
< <drawingfile>> 08/05/2018 09:24 </drawingfile>		Not Encountered	B: CBR				CL-CI	CLAY: low to medium plasticity, brown and orange. becomes red and grey		St to VSt		RESIDUAL SOIL
CDF_0_0_06_LIBRARY.GLB rev.AR_Log_COF BOREHOLE: NON CORED_CESSNOCK CORRECTIONAL CENTRE.GPJ					15			Borehole BH03 terminated at 1.85 m Target depth	classifi			
met AD AS HA W * e.g. B T V	thod auger auger hand a washb bit sho AD/T blank TC bit V bit	drilling screwi auger oore own by bit	* ng* suffix	sup M r C c pen wate	port nud casing etration etratio	no ree rangir refuse Oct-12 w el on date ter inflow ter outflov	nil sistance ig to il ater e shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	moisture D dry M moist W wet Wp plasti Wi liquid	c limit	on ed stem	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense



,	TETRA	TECH		ANY							Bore	hole ID	RH01
				_	_			_			sheet	h.	1 of 1
	En	gi	ne	erin	g l	_00	g -	Bo	rehole		nroie	ct no	754-NTI GE218006
•	client		Lei	ndlease	<u>,</u>						date	started [.]	03 May 2018
	princi	nal·			nno	r					dato		• 03 May 2018
	princi	pai.	0.0								uale		. US May 2010
	projec	CT:	Ce	SSNOCK	Cor	rect	iona	i Cen	tre Geotecnnical Investigation		logge	ed by:	MC
	locati	on:	75	Lindsa	y St,	Ces	ssno	ck, N	SW, 2333		chec	ked by:	NS
	positio	n: E:3	34466 2101	5; N: 6367	606 (N	1GA94)		surface elevation: Not Specified	angle	e from he	orizontal: 90 r : 300 mm)°
	drillin	g info	rmati	on	Junica		mate	erial sub	stance	noic	diamete	1.000 mm	
		tion		samples &			b	tion	material description		sy / nsity	hand	structure and
	method 8 support	2 penetra	water	field tests	RL (m)	depth (m	graphic lo	classifica symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistenc relative de	meter (kPa) 6 8 8 6	
	1					-		ML	SILT: low liquid limit, brown, with some fine grain, subrounded gravel.	<wp< th=""><th>St</th><th> </th><th>ropsoil -</th></wp<>	St	 	ropsoil -
			ered	SPT	_	-		CL	CLAY: low plasticity, orange and brown, with some fine grain, subrounded gravel.		VSt	 F F	RESIDUAL SOIL
09:24			Not Encount	5, 7, 9 N*=16									HP 600 kPa - -
gFile>> 08/05/2018						- 10 			becomes grey			 	EXTREMELY WEATHERED
J < <drawin< th=""><th></th><th></th><th></th><th></th><th></th><th>- 15—</th><th></th><th></th><th>Borehole BH04 terminated at 1.3 m Target depth</th><th></th><th></th><th></th><th>-</th></drawin<>						- 15—			Borehole BH04 terminated at 1.3 m Target depth				-
CTIONAL CENTRE.GI						-							- - -
CESSNOCK CORRE						20							
HOLE: NON CORED						25							-
Log COF BORE						- 30— -	-						-
ARY.GLB rev:AR						-	-						-
9_06_LIBRA						35							-
CDF_0_						-							-
	metho AD AS HA W * e.g. B T	thod auger drilling* auger screwing* hand auger washbore bit shown by suffix AD/T blank bit TC bit V bit				port mud casing etration er er lev wat	N no ree rangir refusa Oct-12 w el on date ter inflow	i nil sistance ig to ater e shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered VS vane shear; peak/remouded (kPa) R refusal	classifica soil d based Classific classific dry moist wet p plastic l liquid lin	lion sym lescriptio d on Unifie action Sys	bol & n ed tem	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense



A	TETRA	TECH		ANY							Borel	nole ID.	
	_										sheet	t:	1 of 1
	En	gii	ne	erin	g l	-0(g -	Bo	rehole		proje	ct no.	754-NTLGE218006
	client		Lei	ndlease	;						date	started:	03 May 2018
	orinci	pal:	Gle	en O'Co	onno	r					date	complete	ed: 03 May 2018
	orojeo	ct:	Ce	ssnock	Cor	rect	iona	l Cen	tre Geotechnical Investigation		logge	ed by:	MC
	ocati	n.	75	l indsa	v St	Ces	ssno	ck N	SW 2333		check	ked hv:	NS
Γ		n: F:3	4465	54· N· 6367	519 (N	1GA94)	01, 11	surface elevation: Not Specified	angle	from he	orizontal:	90°
	drill mo	del: F	G101	, Truck mo	ounted		,		drilling fluid:	hole	diamete	r : 300 mm	1
F	drillin	g info	rmati	on			mate	erial sub	ostance				
	s S	ration		samples &		Ê	bol :	cation	material description	e c	ancy / density	hand penetro-	structure and additional observations
	uppor	penet	/ater	neiù tests	(m)	epth (raphic	lassifi	SUL TYPE: plasticity or particle characteristic, colour, secondary and minor components	onditic	onsiste	(kPa)	
┢	E ∽	<u>9 6 7</u>	\$		Ľ.	σ		ML	SILT: low liquid limit, brown, with traces of fine	< 0	St	40 30 10	TOPSOIL
						-			grain, subangular gravel.	_			
						-		CL-CI	low to medium plasticity, red and brown.		VSt		RESIDUAL SOIL
			pe			-							-
			ountere]	- 05			becomes red and grey				-
	NUN		lot Enc	SPT 5, 8, 9		-							-
3 09:24				N*=17		-							
15/2018						10-							EXTREMELY WEATHERED
>> 08/						-							-
ingFile:		iii Iii				-							-
< <draw< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th><i>[////</i></th><th>1</th><th>Borehole BH05 terminated at 1.4 m</th><th></th><th></th><th></th><th></th></draw<>							<i>[////</i>	1	Borehole BH05 terminated at 1.4 m				
GPJ •						15-			Target depth				_
ENTRE						-							-
NAL C						-							-
RECTIO		iii				20-							_
CORF													-
SNOC						-							-
O CES						-							-
COREI						25-							_
NON						-							-
EHOLE						-							-
F BOR						-							-
og CO						30-							-
v:AR L						-							-
.GLB re						-							-
3RARY						35-							_
06_LIE						-	-						-
F_0_9						-							
CD						-	-						-
┢	metho	d			sup	port	I		samples & field tests	classifica	tion sym	bol &	consistency / relative density
	AD AS	auger o auger s	rilling crewi	* ng*	Mi	mud casing	Ν	l nil	B bulk disturbed sample D disturbed sample	based	on Unifie	ed Home	VS very soft S soft
	W	washbo	uger ore		pen	etration	ı -		E environmental sample SS split spoon sample		ation Sys	siem	F firm St stiff
							− no res rangir refusa	sistance ng to al	UH## UNUSTURDED SAMPLE ###MM diameter HP hand penetrometer (kPa) N standard penetration test (SPT)	D dry M moiet			H hard Fb friable
	*	bit show	vn by	suffix	wate	er 10-	Oct-12 w	ater	N* SPT - sample recovered Nc SPT with solid cone	W wet Wp plastic	imit		VL very loose L loose
	e.g. B T	AD/ I blank b TC bit	it			wat	er on date	≂ SHUWN	VS vane shear; peak/remouded (kPa) R refusal	WI liquid lin	nit		MD medium dense D dense
L	v	V bit			-	wat	er outflo	N	HB hammer bouncing				VD very dense



А	TETRA	TECH (COMP	ANY						-	Boreh	nole	ID.	E	BH06	
I	Ē	~:-	~~	orin	~ I	~	~	D~	rabala		sheet			1	of 1	
_	c n	gil	ie	erin	y L	-0(y -	D 0	TEIIOIE		proje	ct no	-	7	54-NTLGE21	8006
(client	:	Lei	ndlease	;						date s	starte	ed:	0	3 May 2018	
I	orinci	pal:	Gle	en O'Co	nno	r					date o	comp	olete	ed: 0	3 May 2018	
I	orojeo	ct:	Ce	ssnock	Cor	rect	iona	l Cen	tre Geotechnical Investigation		logge	d by	:	N	//C	
I	ocati	on:	75	Lindsa	y St,	Ces	ssno	ck, N	/SW, 2333		check	ked b	oy:	Ν	IS	
F	oositio	n: E:3	4459	90; N: 6367	460 (N	1GA94)		surface elevation: Not Specified a	angle	from ho	orizon	tal: 9	90°		
4	drill mo	odel: F(G101	, Truck mo	ounted				drilling fluid:	hole d	iametei	r : 300) mm	ı		
┢	drillin	ig info ⊊	rmati	on			mate	erial sut ⊆	pstance material description		ţ,	ha	nd		structure and	
	od &	etratio		samples & field tests	(E)	ic log	ficatio	SOIL TYPE: plasticity or particle characteristic,	tion	tency /	pene	etro- ter	а	additional observation	IS
1	suppo	3 ben	water		RL (n	depth	graph	classi symb	colour, secondary and minor components	condi	consis relativ	(kP € 8	°a) ⊗ 6			
ſ						-		ML	SILT: low liquid limit, brown, with traces of fine < grain, subrounded gravel.	<wp< td=""><td>St</td><td></td><td></td><td>TOPSO</td><td>IL</td><td></td></wp<>	St			TOPSO	IL	
						-		CL-CI	CLAY: low to medium plasticity, brown and orange		VSt			RESIDU	JAL SOIL	
						-										
			untered		_	05-	$\langle / / /$		becomes red with traces of fine grain round gravel					become	s red wih traces of	fine –
			ot Enco	SPT		-								grain, ro	ound gravel	
24			ž	5, 8, 9 N*=17		-	$\mathbb{V}//$									
2018 09						-							 >>>	<	LD-	
08/05/2	-			SPT		10	V///							EXTRE	KPa MELY WEATHERED	-
gFile>>				11, 25 N*=R		-	$\langle / / /$							MATER	IAL	
Drawinç						_		1	Borehole BH06 terminated at 1.3 m							
5PJ <<						15—										_
NTRE.G						-										
IAL CEI						-										
ECTION						-										
CORRE						20	1									-
NOCK						-										
CESS						-										•
CORED		İİİ				25-	-						i i			_
NON						-										
EHOLE						-										
F BOR						-	-									
og CO						30-	1									-
v:AR L						-										
.GLB re																
BRARY						35-	-									-
06_LIE						-										
0_0						-										
5						-										
ľ	metho	d auger d	rillina	*	sup	port	· .	 	samples & field tests class	sificati soil de	ion sym	bol & n		consi	istency / relative dens	ity
	AS HA	auger s hand au	crewii uger	ng*	M r C c	nud asing	N	i nii	B buik disturbed sample b D disturbed sample b E environmental sample Cla	based of assifica	on Unifie	ed tem		VS S F	very soft soft firm	
	W	washbo	re		pene	etration	n T– nore∘	sistance	SS split spon sample U## undisturbed sample ##mm diameter moistur	ire	.,-			St VSt	stiff very stiff	
					wate	ा <u>.</u> ər	rangir refusa	ng to al	HP hand penetrometer (kPa) D dr N standard penetration test (SPT) M mo	y oist				H Fb	hard friable	
	* bit shown by suffix e.g. AD/T water U-Oct-12 w level on dat							ater e shown	N° SP1 - sample recovered W we Nc SPT with solid cone Wp pla VS vane shear: neak/remounded (kPa) Wi lig	ει astic lir juid lim	mit iit				very loose loose medium doo	se
	В T V	blank bi TC bit V bit	t			wat	ter inflow ter outflow	N	R refusal HB hammer bouncing					D VD	dense very dense	



A TETRA	A TECH	COMP	ANY							-	Boreh	ole II	D.	BH07
Γ.				~	-			rahala			sheet	:		1 of 1
EL	ıgı	ne	erin	<u>g</u> I	-0(g -	BO	renole			projec	ct no.		754-NTLGE218006
client	t:	Lei	ndlease	;							date s	starte	d:	03 May 2018
princ	ipal:	Gle	en O'Co	onno	r						date o	compl	letec	i: 03 May 2018
proje	ect:	Ce	ssnock	Cor	rect	iona	l Cen	tre Geotechnical Investigation			logge	d by:		MC
locati	ion [.]	75	Lindsa	v St	Ces	ssno	ck. N	ISW. 2333			check	ed by	<i>.</i> .	NS
positio	on: E:	34459	0; N: 6367	506 (N	1GA94)		surface elevation: Not Specified	a	ngle f	from ho	rizonta	,. al: 90)°
drill m	odel: F	G101	, Truck mo	ounted		,		drilling fluid:	h	ole di	ameter	: 300	mm	
drilli	ng info	rmati	on			mate	erial sul	bstance						
thod & port	enetration	er	samples & field tests	(E	th (m)	phic log	ssification	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	sture	dition	sistency / tive density	hane penet mete	d ro- er	structure and additional observations
∎ sup		wat		RL	deb	dia dia	sym		moi	co	ons relat	3 2 9	4 6 6	
					-				``	/vp	3	iii	i L	
					-	$\mathbb{V}//$	CL-CI	CLAY: low to medium plasticity, red.			VSt			RESIDUAL SOIL
					-	$\langle / / /$								
		ered			05-	$\langle / / /$								-
		ncounte	SPT		-	$\mathbb{V}//$								-
9:24 — AD/		Not E	N*=19		-	$\langle / / /$		becomes mottled red and grey						
2018 0					-								>>×	-
08/05/			SPT		- 10	V///		with some fine grain sand						EXTREMELY WEATHERED
JFile>>			7, 25 N*=R		-	$\langle / / /$								MATERIAL .
Drawing					-									-
~ •					15-	<i>[]]]]</i>								
TRE.GF					-	-		Borehole BH07 terminated at 1.5 m Target depth						
L CEN					-									
TIONA					-	-								
DRREC					20-									-
Х Х					-									
ESSNC					-	-								
RED C					-									
ON CO					25-									-
DLE: NO					-	-								
OREHC					-									-
COFB					30-	-								-
R Log					-									-
3 rev:A					-	1								
RY.GLF					-	-								
LIBRA					35-	1								-
9 06					-									
CDF_0					-	-								
Ū					-									-
metho AD AS HA W	nethod D auger drilling* S auger screwing* A hand auger V washbore bit shown by suffix g. AD/T bit show bt					no rei rangii refusa	I nil sistance ng to al	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone	classi ba Class moisture D dry M mo W wet Wp plas	ification oil des ased of ssification e fist t stic lin	on syml scription on Unifie tion Syst	bol & n d æm		consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose
e.g. B T	blank t TC bit	oit			wat	ter inflow	N	VS vane shear; peak/remouded (kPa) R refusal	WI liqu	ud limi	it			MD medium dense D dense
V	V bit							HB hammer bouncing						VD very dense



ATE	TRA T	ECH C	OMP	ANY							Borel	nole ID.	BH08
-	- -	~ .		orin	~		~	De	rahala		sheet	t:	1 of 1
E	:nę	gir	1e	erin	g I	-0	g -	BO	renole		proje	ct no.	754-NTLGE218006
cli	ent:		Ler	ndlease	;						date	started:	03 May 2018
pri	ncip	al:	Gle	en O'Co	onno	or					date	complete	ed: 03 May 2018
pro	oject	:	Ce	ssnock	Col	rrect	iona	l Cen	ntre Geotechnical Investigation		logge	ed by:	MC
Ior	atio	n.	75	Lindsa	v St	Ces	ssna	ck. N	ISW. 2333		checl	ed by:	NS
	sition:	E: 3	1457	'1: N: 6367	542 (N	/GA94)	,	surface elevation: Not Specified	an	ale from h	orizontal:	90°
dril	l mod	lel: FC	101	, Truck mc	ounted		,		drilling fluid:	ho	e diamete	r : 300 mn	n
dr	rilling	infor	mati	on	1		mat	erial sul	bstance			1	
∞		ration		samples &		Ê	bol	cation	material description	U	n ncy / density	hand penetro-	structure and additional observations
lethod	hoddu	penet	ater	neid tests	(m)	epth (i	raphic	assific	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	noistur	onditio	(kPa)	
_ E	<u>s</u> -	3.6	\$		œ	σ	5 	ML	SILT: low liquid limit, brown.	<u>ء</u> ۷>	p St	6 0 0 0	TOPSOIL
						-							
			tered			-	$\mathbb{V}//$	CL-CI	CLAY : low to medium plasticity, orange and brown, wi h traces of fine grain, subangular gravel.		VSt to H		RESIDUAL SOIL
2	Ì	ii	ncount			-	\mathbb{V}/\mathbb{V}						
- AD	ļį	iil	Not E	ODT	1	05-							-
				4, 12, 25 N*=R		-	\mathbb{V}						
09:24						-	\mathbb{V}/\mathbb{I}		becomes grey and orange				EXTREMELY WEATHERED
5/2018						10-	¥////					>>>;	HP 600 kPa
> 08/0	ļ	ii				-			Target depth				-
ngFile>		iil											
: <draw< th=""><td></td><td></td><td></td><td></td><td></td><td>- </td><td>-</td><td></td><td></td><td></td><td></td><td></td><td></td></draw<>						-	-						
GPJ <						15-	1						-
INTRE						-							-
NAL CE	ļ	ii				-							
ECTIO	ļį	iil				20							-
CORR						- 20							
NOCK						-	-						-
0 CESS						-	1						
COREC						25-	-						-
NON	ļ	ii				-							-
EHOLE						-							
- BORE						-							
g COF						30-							-
AR Lo						-							
GLB rev						-	1						
RARY.(35-	1						
06_LIB						-	-						
0 6 0						-	1						
CDF						-							-
—	ethod				eur	nort	I		samples & field tests	classif	cation sym	bol &	consistency / relative doneity
AE	D au D au	uger di uger so	illing* rewir	ng*	M C (mud casing	1	N nil	B bulk disturbed sample D disturbed sample	so i bas	I description	n ed	VS very soft S soft
HA W	A ha	and au ashboi	ger e		pen	etration	ı		E environmental sample SS split spoon sample	Class	ification Sys	tem	F firm St stiff
						3 5	no re rangi	sistance ng to	U## undisturbed sample ##mm diameter n HP hand penetrometer (kPa)	moisture D dry			VSt very stiff H hard
*	bi	it show	nbys	suffix	wat	er ▼ 10-	Oct-12 v	vater	N standard penetration test (SPT) N N* SPT - sample recovered V	M mois W wet	t ic limit		Fb friable VL very loose
e.g B	g. A bl	D/T lank bi	, .			leve wat	el on dat ter inflow	e shown	NC SPT with solid cone V VS vane shear; peak/remouded (kPa) V P refue?	WI liquid	l limit		L loose MD medium dense
T V	T(V	C bit bit			-	- 🗸 wat	ter outflo	w	HB hammer bouncing				VD very dense



ATE	ETRA	TECH (PANY							Boreh	nole ID.	BH09
_	-							D -			sheet	:	1 of 1
E	:n	gii	1e	erin	gι	-0(g -	BO	renole		projec	ct no.	754-NTLGE218006
cli	ient:		Le	ndlease	;						date s	started:	03 May 2018
pr	rincij	oal:	Gle	en O'Co	onno	or					date d	complete	d: 03 May 2018
pr	rojec	:t:	Ce	ssnock	Cor	rrect	iona	l Cen	tre Geotechnical Investigation		logge	d by:	MC
Io	catio	on.	75	Lindsa	v St	Ces	ssno	ck. N	SW. 2333		check	ed by:	NS
po	osition	n: E:3	4452	25; N: 6367	543 (N	/GA94)	,	surface elevation: Not Specified	angle	from ho	prizontal: 9	0°
dri	ill mo	del: F	G101	, Truck mo	ounted				drilling fluid:	hole of	diameter	r : 300 mm	
d	Irillin	g info	rmati	ion			mate	erial sub	stance				
8	Ŧ	tration		samples &		Ê	bol :	cation	material description	e u	ency / density	hand penetro-	structure and additional observations
nethoo	uppor	penet	vater		SL (m)	lepth (Iraphic	lassifi	colour, secondary and minor components	noistu	onsiste	(kPa)	
Ť	0,	<u>9 6 7</u>	>					ML	SILT: low liquid limit, brown.	</th <th>St</th> <th></th> <th>TOPSOIL</th>	St		TOPSOIL
							V///	CL-CI	CLAY : low to medium plasticity, red and grey, wi h traces of fine grain, subangular gravel.		VSt to H		RESIDUAL SOIL
						-	$\langle / / /$						-
			p			05-							-
			ountere	ODT		-	$\langle / / /$		becomes orange, brown and grey				-
4 - ADV			lot Enc	3, 6, 8 N*=14		-							-
18 09:2			2			-	\mathbb{V}/\mathbb{V}						-
3/05/20					-	10-	$\langle / / /$						
e>> 00				SPT		-	V///						MATERIAL
awingFil				N*=38		-	$\langle / / /$						-
₽ ₽						-	<i>¥////</i>		Perchalo PHO0 terminated at 1.45 m				
KE.GPJ						- 15			Target depth				-
CENTF						-	-						-
IONAL						-							-
RECT						20-	-						-
00 X						-							-
SSNO						-							-
ED CE		iii.				-							-
N COR						25-							-
NO EE: NO						-	-						-
REHO						-							-
COF BC						30-	1						-
k Log (-							-
s rev:AF							1						-
ξΥ.GLB						-	-						-
LIBRA						35-	1						-
9 06						-							-
CDF_0						-							-
Ľ						-							-
n A	netho	d auger d	rilling	*	sup M	port mud	Ν	l nil	samples & field tests C B bulk disturbed sample	lassifica soil d	tion symlescription	bol & n	consistency / relative density VS very soft
A H	IA IA	auger s hand au	crewi Iger	ng*	Co	casing etration	'n		D disturbed sample E environmental sample	based Classific	on Unifie ation Sys	d tem	S soft F firm
	v	wasiido	ie.		, si	- 0 0	no re	sistance	SS spit spoon sample U## undisturbed sample ##mm diameter HP band populations (/Po)	sture			St stiff VSt very stiff
					wat	er	rangii	ເບ ຟ	N standard penetration test (SPT) M N* SPT - sample recovered W	ary moist wet			Fb friable VL verv loose
e. P	.g.	oit shov AD/T blank b	vn by t	suttix		Lev	Oct-12 w el on date	ater e shown	Nc SPT with solid cone Wp VS vane shear; peak/remouded (kPa) WI	plastic li liquid lin	imit nit		L loose MD medium dense
T	,	TC bit				wat	ter outflow	N	R refusal HB hammer bouncing				D dense VD very dense



V bit

-		-										
A TETR/	A TECH	COMP	ANY							Borel	nole ID.	BH10
Er	nai	no	orin	a I	~	N _	Ro	rahala		sheet	t	1 of 1
	iyi		enn	y ı	-0(<u>J</u> -	БU	Tenole		proje	ct no.	754-NTLGE218006
clien	t:	Lei	ndlease	;						date	started:	04 May 2018
princ	ipal:	Gle	en O'Co	nno	r					date	completed	t: 04 May 2018
proje	ect:	Ce	ssnock	Cor	rect	ional	Cen	tre Geotechnical Investigation		logge	ed by:	МС
locat	ion:	75	Lindsa	y St,	Ces	sno	ck, N	SW, 2333		check	ked by:	NS
positio	on: E:	34453	32; N: 6367	535 (N	1GA94)		surface elevation: Not Specified	angle	from ho	orizontal: 90)°
drill m	odel: F	G101	, Truck mo	ounted				drilling fluid:	hole of	diamete	r : 300 mm	
ariii		mat	on			mate		material description		sity	hand	structure and
method & support	2 penetrati	water	samples & field tests	RL (m)	depth (m)	graphic log	classificati symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency relative den:	penetro- meter (kPa)	additional observations
		Not Encountered	B: CBR				CL	Silty CLAY: low plas icity, brown, wi h some fine to medium grain, subangular gravel.	<wp< th=""><th>VSt</th><th></th><th>RESIDUAL SOIL</th></wp<>	VSt		RESIDUAL SOIL
meth AD AS HA W * e.g.	od auger hand a washb	drilling screwin uger ore wn by	* ng* suffix	sup M r C c pen wat	3 5	N no res rangin ◄ refusa Oct-12 wa el on date	nil g to ater shown	samples & field tests o B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered W Wp VS vane shear; peak/remouded (kPa)	classificat soil d based Classific isture dry moist wet plastic liquid lin	tion sym escriptio on Unific ation Sys mit	bol & n tem	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense



A TEI	FRA T	ECH C	OMP	ANY							-	Boreh	nole	D.		BH1	1
F	'n	air	20	orin	а I		n	R~	roholo			sheet	t:			1 of 1	
	11	yıı	ie	GIII	y I	-0	y -	DU	IEIIOIE			proje	ct n	0.		754-N	TLGE218006
clie	ent:		Lei	ndlease	9							date	star	ted:	:	04 Ma	y 2018
prir	ncip	al:	Gle	en O'Co	onnc	or						date	com	nple	te	d: 04 Ma	y 2018
pro	ject	:	Ce	ssnock	Col	rrect	iona	l Cen	tre Geotechnical Investigation			logge	ed b	y:		МС	
loc	atio	n:	75	Lindsa	y St	, Ces	ssno	ck, N	SW, 2333			check	ked	by:		NS	
pos	ition	E: 3	4453	86; N: 6367	477 (N	/IGA94)		surface elevation: Not Specified	a	ngle	from ho	orizo	ntal:	: 9	0°	
drill	mod	info	G101	, Truck mo	ounted		mat	erial sub	drilling fluid:	h	ole d	liamete	r : 30	00 m	۱m		
		5							material description			sity	h	and		stru	icture and
method &	lindqus	² penetrat	water	samples & field tests	RL (m)	depth (m)	graphic lo	classificat symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture	condition	consistency relative den	per m 00 00 00 00 00	netro ieter kPa)	-	addition	al observations
						-	0 0 0 0	ML	Gravelly SILT : low liquid limit, brown, fine to medium grain, subangular gravel.	<\	Nр	F				TOPSOIL	
						-		CL-CI	Silty CLAY: low to medium plasticity, brown, wi h							FILL	
									some nne grann, subangular graver.								
						05-											-
				SPT 2, 4, 4													
09:24				N*=8		-											
5/2018		İİ				10-							İ		×	HP 450 kPa	-
> 08/0						-							ļ				
ngFile>			be			-							ļ				
			counter			-											
- ADA			Not En			15-											-
ENTRE				SPT 4 2 4													
DNAL C				N*=6		-											
RECTIO						20-	V///	CL-CI	CLAY: low to medium plasticity, orange, brown and red.			St to VSt		>	ŀ¥	RESIDUAL SO	IL –
X COR		ii Ii							becomes red and grey				İ				
SSNOC						-							į				
ED CE						-	$\langle / / /$						ļ				
Z CORE						25-	$\mathbb{V}//$									EXTREMELY	VEATHERED
NO I				SPT 4, 11, 15			\mathbb{V}/\mathbb{V}									MATERIAL	
REHO				N*=26		-	V///										
N R					-	30-	¥///							_{>}	片	HP 600 kPa	
R Log (.	-		Borehole BH11 terminated at 3.0 m Target depth								
3 rev:AF							1						İ				
RY.GLE						.	-										
LIBRA						35-	1										-
<u> </u>						.	-										
CDF_0						-	1										
						-											
Me AD	thod	uger d	rilling	*	sup M	port mud	Ν	l nil	samples & field tests B bulk disturbed sample	classi so	oil de	ion sym	n n	\$		consistency / VS	very soft
AS HA W	h h	uger s and au ashbo	crewir Iger re	ıg-	C pen	casing etratior	ı		D disturbed sample E environmental sample	Clas	ased (ssifica	ation Sys	tem			S F St	soft firm stiff
	vv					- N M	no re rancii	sistance	U## undisturbed sample ##mm diameter m HP hand penetrometer (kPa)	moistur	e					VSt H	very stiff hard
	h	t show	n by	suffix	wat	er	oct 12	aĺ	N standard penetration test (SPT) M N* SPT - sample recovered V	M mo W wet	ist t					Fb VL	friable very loose
e.g B	I. A	D/T ank bi	ty	Junia		lev wai	el on date	e shown	Nc SPT with solid cone V VS vane shear; peak/remouded (kPa) V	wp pla: Wl liqu	stic lir Jid lim	mit iit				L MD	loose medium dense
T V	T V	C bit bit			-	- d wat	ter outflo	N	R retusal HB hammer bouncing							D VD	aense very dense



ATETR	A TECH	COMF	PANY								Boreh	nole	ID.		BH12	
Er	nai	nc	orin	a I			Ro	rabala			sheet	:			1 of 1	
	iyi		enn	<u>y</u> ı	-0	y -	BU	Tenole			projec	ct no	Э.		754-NTLGE218	006
clien	t:	Le	ndlease	;							date s	start	ted:		04 May 2018	
princ	ipal:	Gle	en O'Co	onno	or						date o	com	plet	ed:	04 May 2018	
proje	ect:	Се	ssnock	Col	rrect	iona	l Cen	tre Geotechnical Investigation			logge	d by	y:		МС	
locat	ion:	75	Lindsa	y St	, Ces	ssno	ck, N	SW, 2333			check	ked	by:		NS	
positio	on: E:	3444	69; N: 6367	524 (N	/IGA94)		surface elevation: Not Specified	а	ingle	from hc	orizoi	ntal:	90°		
drill m	odel: F	G101	, Truck mo	ounted		mat	orial cut	drilling fluid:	h	ole d	iameter	r : 30	0 mr	n		
	5	Inat				mat		material description			/ sity	ha	and		structure and	
method & support	2 penetrati	water	samples & field tests	RL (m)	depth (m)	graphic lo	classificati symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture	condition	consistency relative den	pen me (k	etro- eter Pa)		additional observations	
1							ML	SILT: low liquid limit, brown, with some fine grain,	<	Wp	St			то	PSOIL	
					-	\mathbb{V}	CL-CI	CLAY: low to medium plasticity, brown and			St to VSt		İİ	RE	SIDUAL SOIL	
					-			orange.								
		g			05-	\mathbb{V}/\mathbb{V}		becomes grow and red								_
		counter	SPT		-			becomes grey and reu								
- ADN		Vot Enc	5, 7, 8 N=15		-	$\mathbb{V}//$										
018 09					-	$\langle / / /$								×		
08/05/2				1	10-			becomes orange						EX.	550 kPa TREMELY WEATHERED	
File>			SPT 9, 12, 22		-	$\langle / / /$								MA	TERIAL	
Drawing			N=34		-								İİ			
∛					15-	<i>[]]]</i>		Perchala PH12 terminated at 1.5 m					>>	K HP	600 kPa	
ITRE.G					-	-		Target depth								
AL CEN					-											
CTION					-	-										
ORRE					20-	1										-
VOCK 0					-											
CESS					-								İİ			
ORED					25-											-
NON					-											
HOLE					-											
F BORE						-										
00 60					30-	1										-
w.AR L					.	-										
GLBre					-	1										
BRARY					35-	4										-
06_LI					-	1										
0F_0_9						1										
Ċ					-	-										
meth AD AS HA W	od auger auger hand a washb	drilling screwi iuger ore	* ng*	sup M C (pen	port mud casing etratior	N N no re rancii	I nil sistance	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa)	class s bi Clas moistur	sificati soil de ased o ssifica	on syml scription on Unifie tion Syst	bol & n ed tem	•		consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard	
*	bit sho	wn hv	suffix	wat	er	oct-12.	al	N standard penetration test (SPT) N* SPT - sample recovered	M mc W we	bist t					Fb friable VL very loose	
e.g. B	AD/T blank l	oit			lev wat	el on dat	e shown	Nc SPT with solid cone VS vane shear; peak/remouded (kPa)	vvp pla WI liqu	astic lir uid lim	nit it				L loose MD medium dense	
T V	TC bit V bit			-	- d wa	ter outflo	N	HB hammer bouncing							VD very dense	



ATETR	A TECH	COMP	ANY										Boreł	nole ID.		BH13
_													sheet			1 of 1
Er	Igi	ne	erin	gι	-0(g -	R0	renol	е				proje	ct no.		754-NTLGE218006
clien	t:	Lei	ndlease										date	started:		04 May 2018
princ	ipal:	Gle	en O'Co	nno	r								date	complet	ed:	04 May 2018
proie	ct:	Ce	ssnock	Cor	rect	iona	l Cen	tre Geot	echnical In	vestigation			loaae	d bv:		MC
locat	ion:	75	l indea	/ St	Cos	seno	ck N	SM/ 233	3				check			NS
nositio	011.	34448	20. N. 63674	137 (M		<u>,</u>	<i></i> , 	surface e	levation: Not Sr	ecified		andle	from ho	vrizontal:	۹۵°	<u></u>
drill m	odel: F	G101	, Truck mo	unted		,		drilling flu	id:			hole c	liamete	r : 300 mi	m	
drilli	ng info	ormati	on			mate	rial sub	stance						1		
method & support	¹ 2 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	SOIL cold	material de TYPE: plasticity or our, secondary and	scription particle characteristic, minor components	,	moisture condition	consistency / relative density	hand penetro- meter (kPa) 0 0 0 0 0		structure and additional observations
1		ntered			-		ML	SILT: low lie	quid limit, brown	, with some fine to	_	<wp< th=""><th>St</th><th></th><th>TOP</th><th>SOIL</th></wp<>	St		TOP	SOIL
2		Encour			-	$\langle / / /$	CL-CI	CLAY: low	to medium plast	icity, brown, with so	ome		VSt	liii	RES	IDUAL SOIL
AL		Not I			-			tine to med	ium grain, subro	unded gravel.						
					-05	<i>[////</i>										REMELY WEATHERED
					-			Borehole B Target dep	H13 terminated	at 0.5 m						
					-											
					-											
					10-											
					-											
0					-											
					-									liii		
					15-											-
					_											
					-											
					20-									liii		
					- 20											
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					25-									liii		
					-											
					-											
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					30-											
					-											
					-											
					-											
I					35- -											-
1					-									liii		
1					-											
			r		-]										
AD	od auger	drilling		supp M n	nud	N	nil	sample B	es & field tests bulk disturbed sa	ample	cla	soil de	scriptio	n n		S very soft
AS HA	hand a	screwir Iuger	ng^	С с	asing	1		D E	disturbed sample environmental s	e ample	c	based Classifica	on Unifie ation Sys	tem	S F	soft firm
vv	washb	ure				no res	istance	SS U##	split spoon samp undisturbed sam	ple ##mm diameter	moist	ture			St VS	St very stiff
				wate	or Pr	rangin refusa	y to I		standard penetrome	ation test (SPT)		ary moist wet			Ft V	nard o friable
* e.g.	bit sho AD/T	wn by	suffix		10- lev	Oct-12 wa	ater shown	Nc VS	SPT with solid co	breieu bne k/remouded (kPa)	Wp i Wi i	plastic li liquid lim	mit nit			- very rouse loose D medium dense
Т Ч	Diank t TC bit V bit	DIT			wat	er inflow er outflov	/	R HB	refusal hammer bouncir	ng					D	dense D very dense

CDF 0 9 06 LIBRARY.GLB rev.AR Log COF BOREHOLE: NON CORED CESSNOCK CORRECTIONAL CENTRE.GPJ <<DrawingFile>> 08/05/2018 09:24



AT	ETRA	TECH	COMP	ANY											Boreh	nole	ID.		BH1	4	
		~:-			~ I	-			ro h o						sheet	t:			1 of 1		
Ľ	:n	gi	ne	erin	<u>g</u> L	-0(g -	BO	reno	le					proje	ct nc).		754-1	TLGE21	8006
cl	ient:		Lei	ndlease	;										date :	start	ed:		04 Ma	ay 2018	
рі	incip	oal:	Gle	en O'Co	nno	r									date	com	plet	ed:	04 Ma	ay 2018	
рі	ojec	:t:	Ce	ssnock	Cor	rect	iona	l Cen	tre Geo	technic	al Investiga	ntion			logge	ed by	<i>r</i> :		МС		
lo	catio	on:	75	Lindsa	v St,	Ces	ssno	ck, N	SW, 233	33	-				check	ked l	oy:		NS		
po	sitior	n: E:3	34441	I0; N: 6367	515 (N	1GA94)	-	surface	elevation:	Not Specified			angle	from ho	orizor	ntal:	90°			
dr	ill mo	del: F	G101	, Truck mo	unted				drilling fl	luid:				hole o	diamete	r : 30	0 mr	n			
-	rillin	g info	rmati	on			mate	erial sul	ostance						≥						
& bot	ort	retration		samples & field tests	Ê	(E) 4	hic log	sification	SOIL	mate	rial description	acteristic,		ture	stency / ve densit	pen me	etro- eter		str additior	ructure and nal observation	5
meth	ddns	2 per	wate		RL (i	dept	grapl	class symt	CC	biour, seconda	ary and minor compo	onents		mois cond	consi relativ	200 2010 2010	Pa) 88 99				
<pre>A</pre>			Intered			-		ML	SILT: low medium g	liquid limit, l Irain, suban	prown, with some gular gravel.	fine to	7	<wp< td=""><td>St</td><td>- </td><td></td><td>TOP</td><td>SOIL</td><td></td><td></td></wp<>	St	-		TOP	SOIL		
AD.			f Encor			-		CL-CI	CLAY: lov	v to medium	plasticity, red and	d brown.			vst			MAT	ERIAL	WEATHERED	
			ž			_			Borehole Target de	BH14 termi	nated at 0.3 m										
						05-				F											-
						-										Li i	İİ				
9:24						-															
/2018 0						- 10-															_
. 08/05						-															
gFile>>						-															
Drawin						-															
GPJ ≪						15															-
NTRE						-															
NAL CE						-										Li i	ii				
RECTIO						20-										Li i	İİ				_
CORF						-															
SNOCK						-															
D CES						-															
CORE						25-															-
NON E						-															
REHOL						-															
OF BO						30-	1														-
Log C						-											İİ				
rev:AR						-										li i	İİ				
KY.GLB						-															
LIBRAF						35-															-
- 00 ⁻						-	1														
CDF_0						-															
Ľ						-															
n A H V	nethod D a S a IA I V v	d auger of auger s nand a washbo bit show AD/T blank b	Irilling crewi uger ore vn by it	* ng* suffix	sup M r C c pend wate	port mud casing etration	no re: rangii refusa Oct-12 w el on date	l nil sistance og to al ater e shown	samp B D E SS U## HP N N N N C VS	les & field te bulk distu disturbed environm split spoo undisturb hand pen standard SPT - sar SPT with vane she	sts rbed sample ental sample ental sample ed sample ##mm dia etrometer (kPa) penetration test (SP nple recovered solid cone ar; peak/remouded (ameter T) kPa)	cia mois D M W Wp WI	assificat soil de based Classifica dlassifica sture dry moist wet plastic li liquid lin	tion sym escriptio on Unifie ation Sys	bol & n ed tem		C S F S V H FI V L	nsistency 3 : St 5 L	/ relative densitivery soft soft firm stiff very stiff hard friable very loose loose medium densitient	ty
T V	, ,	TC bit √ bit	-			-d wat	er outflow	N	R HB	refusal hammer l	oouncing							D V	D	dense very dense	



,	A TETRA	TECH	COMF	PANY							Boreh	nole	e ID).	BH15	
	En	ai	20	orin	a I	~	2	B A	rabala		sheet	t:			1 of 1	
-		iyi	IE	enn	y ı	-0(y -	DU	Tenole		projec	ct n	0.		754-N	TLGE218006
	client		Le	ndlease	;						date s	star	ted	1:	04 Ma	y 2018
	princ	ipal:	Gle	en O'Co	onno	r					date o	con	nple	ete	d: 04 Ma	y 2018
	proje	ct:	Се	ssnock	Cor	rect	iona	l Cen	tre Geotechnical Investigation		logge	ed b	y:		МС	
	locati	on:	75	Lindsa	y St,	, Ces	ssno	ck, N	ISW, 2333		check	ked	by	:	NS	
	positic	n: E::	34442	22; N: 6367	471 (N	1GA94)	-	surface elevation: Not Specified	angle	e from ho	orizo	onta	I: 9	90°	
	drill m	odel: F	G101	, Truck mo	ounted				drilling fluid:	hole	diameter	r : 3(00 r	nm	I	
	drilliı	ng info	rmat	ion			mate	erial sub	bstance meterial description		L2	h	and		otru	turo and
	od &	etratio		samples & field tests	2	Ē	ic log	ficatio	SOIL TYPE: plasticity or particle characteristic,	ion	tency /	pei	netro	0- r	additiona	lobservations
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	AS HA	auger s hand a	crewi uger	ng*	Co	casing etration	ı		D disturbed sample E environmental sample	based Classific	on Unifie ation Syst	ed tem			S F	soft firm
	vV	washbo	ле		- Feil	- N M		sistance	SS split spoon sample U## undisturbed sample ##mm diameter	moisture					St VSt	stiff very stiff bard
					wate	er	rangir refusa	ng tu al	N standard penetration test (SPT) N* SPT - sample recovered	M moist W wet					Fb VL	friable very loose
	× e.g. ₽	bit show	vn by it	suttix		10- lev	Oct-12 w el on date	ater e shown	Nc SPT with solid cone VS vane shear; peak/remouded (kPa)	Wp plastic WI liquid lin	limit nit				L MD	loose medium dense
	T V	TC bit			 ^	wat	ter outflow	N	R refusal HB hammer bouncing						D VD	dense very dense



ATE	ETRA	TECH	COMF	ANY							Borel	hole	e ID		BH16	5
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		gi	ne	erin	<u>g</u> I	-0(<u>g -</u>	в0	prenole		proje	ct n	0.		754-N	TLGE218006
cli	ient		Le	ndlease	;						date	star	ted	:	04 Ma	y 2018
pr	inci	pal:	Gle	en O'Co	onno	r					date	con	nple	ete	d: 04 Ma	y 2018
pr	ojec	ct:	Ce	ssnock	Col	rrect	iona	l Cen	ntre Geotechnical Investigation		logge	ed b	y:		МС	
lo	catio	on:	75	Lindsa	y St	, Ces	ssno	ck, N	ISW, 2333		checl	ked	by:		NS	
ро	sitio	n: E:3	4443	32; N: 6367	452 (N	/IGA94)	-	surface elevation: Not Specified	angle	e from ho	orizc	ontal	: 9	00°	
dri	ill mo	del: F	G101	, Truck mo	ounted				drilling fluid:	hole	diamete	r : 3	00 m	nm		
d	Irillin	g info	rmati	ion	1		mate	erial sul	bstance		~					
ø	t	tratior		samples & field tests		E)	c log	ication	material description	e u	ency / densit	pe	nand netro)-	stru additiona	icture and al observations
metho	oddns	pene	water		RL (m	depth	graphi	classif symbo	colour, secondary and minor components	moistu conditi	consist	(kPa) 8 8 8	8		
ſ		<u>- 0 0</u>				-		ML	SILT: low liquid limit, brown, with some fine to	<wp< td=""><td>St</td><td></td><td></td><td>4</td><td>TOPSOIL</td><td></td></wp<>	St			4	TOPSOIL	
			5			-	$\langle / / /$	CL-CI	CLAY: low to medium plasticity, orange, brown		VSt	li.	ii		RESIDUAL SO	IL
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\vdash	hothe	4		<u> </u>		nort			samples & field toots	classifica	tion sym	hol a	 8.		consistence	relative density
A	D S	auger o auger s	rilling crewi	* ng*	M C	mud casing	Ν	I nil	B bulk disturbed sample D disturbed sample	soil d	escriptio	on ed			VS S	very soft
H W	IA V	hand a washbo	uger ore		pen	etration	ı		E environmental sample SS split spoon sample	Classific	ation Sys	stem			F St	firm stiff
						- N P	no re rangi	sistance ng to	U## undisturbed sample ##mm diameter m HP hand penetrometer (kPa) D	oisture dry					VSt H	very stiff hard
*		bit shov	vn bv	suffix	wat	er 110-	Oct-12 w	ai vater	N standard penetration test (SPT) M N* SPT - sample recovered W	moist wet	limit				Fb VL	friable very loose
e B	.g.	AD/T blank b	it			leve wat	el on dat ter inflow	e shown	Nc SPT with solid cone W VS vane shear; peak/remouded (kPa) W	p plastic l I liquid lii	mit					loose medium dense
T V	,	TC bit V bit				- wat	ter outflo	w	R retusal HB hammer bouncing						VD	aense very dense



ATET	RA TECH	COMF	PANY							Borel	nole ID.	BH17
_										sheet	t:	1 of 1
E	ngı	ne	erin	g I	-0(g -	Bo	rehole		proje	ct no.	754-NTLGE218006
clie	nt:	Le	ndlease	;						date	started:	04 May 2018
prir	ncipal:	Gle	en O'Co	onno	r					date	complete	ed: 04 May 2018
, pro	iect:	Ce	ssnock	Cor	rrect	iona	l Cen	tre Geotechnical Investigation		logae	d by:	MC
loc	ntion:	75	l indea	v St	Cos	seno	ck N	SW/ 2333		chool	kod by:	NS
nosi		34440	15: N: 6367	y 31,		<u>,</u>	ск, п	surface elevation: Not Specified	anc	le from b	orizontal:	an°
drill	model: I	-G101	, Truck mo	ounted	10/10-1	,		drilling fluid:	hole	e diamete	r : 300 mm	1
dri	lling inf	ormati	ion			mat	erial sub	ostance			1	
ø	ation		samples &		Ê	Bo	ation	material description	0.5	ncy / lensity	hand penetro-	structure and additional observations
method	2 penetr	water	field tests	RL (m)	depth (r	graphic	classific symbol	SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture	consister relative d	meter (kPa) 00 00 00 00	
					-		ML	SILT : low liquid limit, brown, with some fine to medium grain, subangular gravel.	<wp< td=""><td>o St</td><td></td><td>TOPSOIL</td></wp<>	o St		TOPSOIL
AD/V		Not Encountered	SPT		- - - 05 -		CL-CI	CLAY: low to medium plasticity, red and grey.		VSt to H		RESIDUAL SOIL
18 09:24			N*=31		-							
CDF_0_9_06_LIBRARY.GLB.rev.AR_Log_COF_BOREHOLE: NON CORED_CESSNOCK_CORRECTIONAL_CENTRE.GPJ_< <drawingfile>>_08/05/20</drawingfile>								Borehole BH17 terminated at 0.95 m Target depth				
mee AD AS HA W * e.g. B T V	thod auger auger hand : washt bit sho bit sho blank TC bit V bit	drilling screwi auger pore	* ng* suffix	sup M C C pen wat	port mud casing etration ∞ er er lev wat wat	no re rangii refusi Oct-12 w el on dati ter inflow ter outflov	I nil sistance ng to al vater e shown w	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS van shear; peak/remouded (kPa) R refusal HB hammer bouncing	classific soil base Classif Classif D dry M moist W wet Wp plasti Wi liquid	cation sym descriptio ed on Unifie ication Sys	I I I I bol & n ed tem	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense



ATETR	A TECH (COMF	ANY								Boreh	ole	ID.		BH18	3	
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	igi			<u>y</u> .	-0	<u>y</u> -					projec	ct no).		754-N	TLGE21800)6
clien	t:	Lei	ndlease	•							date s	starte	ed:		04 Ma	y 2018	
princ	ipal:	Gle	en O'Co	nno	r						date o	com	plete	ed:	04 Ma	y 2018	
proje	ect:	Се	ssnock	Cor	rect	iona	l Cen	tre Geotechnical Investigation			logge	d by	<u>/:</u>		МС		
locat	ion:	75	Lindsa	∕ St,	, Ces	ssno	ck, N	SW, 2333			check	ed b	oy:		NS		
positio	on: E:3	34435	54; N: 63674	147 (N	1GA94)		surface elevation: Not Specified		angle	from ho	rizon	ntal:	90°			
drill m	na info	G101 rmati	, Truck mo	unted		mat	erial sub			nole	liameter	: 300	0 mn	n			
	tion					ŋ	tion	material description			y / nsity	ha	ind		stru	cture and	
method & support	2 penetrat	water	field tests	RL (m)	depth (m)	graphic lo	classificat symbol	SOIL TYPE: plasticity or particle characteristic colour, secondary and minor components	3	moisture condition	consistenc relative de	pene me (kF	etro- eter Pa)		additiona		
					-		ML	SILT : low liquid limit, brown, with some fine to medium grain, subangular gravel.		<wp< th=""><th>St</th><th></th><th></th><th>TOPS</th><th>SOIL</th><th></th><th></th></wp<>	St			TOPS	SOIL		
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					-			fine to medium grain, suangular gravel.			н						
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			SPT 5, 10, 15		-	$\langle / / /$											
19.00			N^=25		-												
		tered		-	10-	$\langle / / /$		becomes grey					>>; 	KEXTF MATI	REMELY V Erial	VEATHERED	-
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IN IN IN IN I		Not	16, 16, 16 N*=32		-	$\langle / / /$											
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					25-			Borehole BH18 terminated at 2.4 m Target depth									_
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W	washbo	ore		pen	- 0 0 - 0		sistance	SS split spoon sample U## undisturbed sample ##mm diameter	mois	sture				St VS	it	stiff very stiff	
				wate	er	rangi refus	ng to al	N standard penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered	D M W	dry moist wet				H Fb		nara friable verv loose	
e.g.	bit show	vn by it	suffix		▼ 10- lev	Oct-12 w el on dat	ater e shown	Nc SPT with solid cone VS vane shear; peak/remouded (kPa)	Ŵp Wi	plastic li liquid lin	imit nit)	loose medium dense	
T V	TC bit				wat	ter outflo	w	R refusal HB hammer bouncing						D VD)	dense very dense	

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	۲'n			orin	~ '		~	P~	robolo				sheet	:		1 of 1		
	۲N	iyi l	ie	erin	y I	<u> </u>	y -	D 0	renoie				projec	ct no		754-1	NTLGE2180	06
	client	:	Le	ndlease	9								date s	starte	ed:	04 M	ay 2018	
	princi	pal:	Gle	en O'Co	onno	or							date o	comp	olete	ed: 04 M	ay 2018	
	proje	ct:	Се	ssnock	Col	rrect	iona	l Cen	tre Geotechnical Investi	gation			logge	d by	:	МС		
	locati	on:	75	Lindsa	y St	, Ces	ssno	ck, N	SW, 2333				check	ed b	y:	NS		
1	positio	n: E: 3	34446	69; N: 6367	447 (N	/IGA94)		surface elevation: Not Specified			angle	from ho	rizon	tal: 9	90°		
	drill mo	odel: F	G101	, Truck mo	ounted				drilling fluid:			hole o	liameter	: 300) mm	1		
	ariiiir		rmat	lon			mat		material description				/ iity	hai	nd	st	ructure and	
	nethod & support	penetratio	vater	samples & field tests	3L (m)	depth (m)	graphic log	classificatic	SOIL TYPE: plasticity or particle ch colour, secondary and minor co	naracteristic, mponents		moisture condition	consistency elative dens	pene me (kP 8 8	etro- ter 'a) 8 8	additio	nal observations	
	1	- <u>- 0</u>	-			-		ML	SILT: low liquid limit, brown, with sor	ne fine to		<wp< td=""><td>St</td><td>5 - 1</td><td></td><td>TOPSOIL</td><td></td><td></td></wp<>	St	5 - 1		TOPSOIL		
09:24	- ADV		Not Encountered	SPT 7, 15, 25 N*=40		05-		CL-CI	∼medium grain, subangular gravel. CLAY: low to medium plasticity, red	and grey.			VSt to H			RESIDUAL S EXTREMELY MATERIAL	OIL WEATHERED	
5/2018	*	+++				10-	<i>\////</i>	1	Borehole BH19 terminated at 0.95 r	n				++				
-> 08/0						-	-		Target depth					İİ	ii			-
ingFile:						-									ii			-
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	metho AD AS HA W * e.g. B T V	bit show AD/T blank b TC bit	drilling screwi uger ore wn by	* ng* suffix	sup M C C pen wat	Port mud casing etration - ∾ ∞ er er - 10- lev wat - wat	no re rangii refus Oct-12 w el on dati ter inflow ter outflo	I nil sistance ng to al vater e shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample #mmn HP hand penetrometer (kPa) N standard penetration test N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoud R refusal HB hammer bouncing	ı diameter (SPT) ed (kPa)	Cla cla D M W Wp WI WI	assificat soil de based Classifica ture dry moist wet plastic li liquid lin	ion symt escription on Unifie ation Syst mit mit	n d		consistence VS S F VSt H Fb VL L MD D VD	y / relative density very soft soft firm stiff very stiff hard friable very loose loose medium dense dense very dense	

Appendix C Laboratory test results

Newcastle Laboratory

Coffey Services Australia Pty Ltd ABN 55 139 460 521 19 Warabrook Boulevard Warabrook NSW 2304

Phone: +61 2 4016 2300 Fax: +61 2 4016 2380

Califorr	nia Bearing Ratio	Test Report	Issue No:
Client: Principal: Project No.: Project Name: Lot No.: -	Coffey Services Australia Pty Ltd 19 Warabrook Boulevard Newcastle NSW 2304 754-NEWC00493AA 754-NTLGE218006 - 754-CESSNOCK C TRN:	(Newcastle)	nce with ISO/ EC 17025 - , calibrations and/or d in this document are tracea tandards. hris Blackford ratory Number:431 D18
Sample Def Sample ID: Date Sampled: Date Submitted Date Tested: Project Locatio	tails NEWC18S-05278 10/05/2018 1: 10/05/2018 21/05/2018 on: Cessnock, NSW	Sampling Method:Submitted by clientMaterial:Existing GroundSource:On-SiteSpecification:No Specification	
Sample Locatio	on: BH01 - 0.5 - 1.0m netration	Test Results	-
20 1.8 1.6 1.4 1.4 1.2 1.2 1.2 0.8 0.6 0.4		CBR At 2.5mm (%): Maximum Dry Density (t/m³): Optimum Moisture Content (%): Dry Density before Soaking (t/m³): Density Ratio before Soaking (%): Moisture Content before Soaking (%) Dry Density after Soaking (t/m³): Density Ratio after Soaking (%): Swell (%): Moisture Content of Top 30mm (% Moisture Content of Top 30mm (% Moisture Content of Remaining De Compactive Effort: Surcharge Mass (kg): Period of Soaking (Days): Oversize Material (%): —Moisture Content— Field Moisture Content (%): Curing Time (Hrs): Plasticity Level Method:	5 1.61 23.5 1.62 100 %): 23.1 98 1.61 100 1.0 1.0 26.7 pth (%): 23.8 Standard 4.50 4 0.0 23.5 20.0

Comments

A TETRA TECH Califo

Client:	Coffey Services Australia Pty Ltd (Newcastle) 19 Warabrook Boulevard
1.000	Newcastle NSW 2304
Principal:	
Project No.:	754-NEWC00493AA
Project Name:	754-NTLGE218006 - 754-CESSNOCK CORRECTIONAL CNT
Lot No.: -	TRN:

Newcastle Laboratory

Coffey Services Australia Pty Ltd ABN 55 139 460 521 19 Warabrook Boulevard Warabrook NSW 2304

coffe A TETRA TECH COMP Californ	ia Bearing Ratio T	Coffey Services Australia Pty Ltd ABN 55 139 460 521 19 Warabrook Boulevard Warabrook NSW 2304 Phone: +61 2 4016 2300 Fax: +61 2 4016 2380 Report No: CBR:NEW	C18S-0527 Issue No:
Client: Principal: Project No.: Project Name: Lot No.: -	Coffey Services Australia Pty Ltd (New 19 Warabrook Boulevard Newcastle NSW 2304 754-NEWC00493AA 754-NTLGE218006 - 754-CESSNOCK CORR TRN:	Accredited for compliance with IS Testing. The results of the tests, calibration measurements included in this du to Australian/national standards. Approved Signatory: Chris Black (Geotechnician) NATA Accredited Laboratory Nur Date of Issue: 23/05/2018	SO/ EC 17025 - ons and/or ocument are tracea ford mber:431
Sample Deta Sample ID: Date Sampled: Date Submitted Date Tested: Project Location Sample Location	ails NEWC18S-05279 10/05/2018 : 10/05/2018 21/05/2018 n: Cessnock, NSW n: BH3 - 0.5 - 1.0m	Sampling Method: Submitted by client Material: Existing Ground Source: On-Site Specification: No Specification	
Load vs Per	netration	Test Results	
	0 20 30 40 50 60 7.0 80 S Fenetration (mm)	CBR At 5.0mm (%): Maximum Dry Density (t/m³): Optimum Moisture Content (%): Dry Density before Soaking (%): Density Ratio before Soaking (%): Moisture Content before Soaking (%): Moisture Ratio before Soaking (%): Dry Density after Soaking (t/m³): Density Ratio after Soaking (%): Swell (%): Moisture Content of Top 30mm (%): Moisture Content of Top 30mm (%): Moisture Content of Remaining Depth (%): Compactive Effort: Surcharge Mass (kg): Period of Soaking (Days): Oversize Material (%): —Moisture Content— Field Moisture Content (%): Curing Time (Hrs): Plasticity Level Method:	3.5 1.64 22.4 1.65 101 21.9 98 1.63 100 1.0 29.3 23.6 Standard 4.50 4 0.0 21.5 23.3 Visual

Sample Sample ID:

Comments

Coffey ATETRA TECH COMPANY California Bearing Ratio Test Report

Newcastle Laboratory

Coffey Services Australia Pty Ltd ABN 55 139 460 521 19 Warabrook Boulevard Warabrook NSW 2304

Report No: CBR:NEWC18S-05280

Phone: +61 2 4016 2300 Fax: +61 2 4016 2380

Princinal:	Coffey Services Australia Pty Ltd (Newcastle) 19 Warabrook Boulevard Newcastle NSW 2304		Accredited for compliance with ISO/ EC 17025 - Testing. The results of the tests, calibrations and/or measurements included in this document are tra to Australian/national standards.		
Principal: Project No.: 754-NEWC00493AA Project No.: 754-NEWC00493AA			Approved Signatory: Chris Blackford		
Sample Detai		Compling M	athad. Cubwitted by client		
	NEWC185-05280	Sampling Me	Sampling Method: Submitted by client Material: Existing Ground Source: On-Site		
Date Sampled:	10/05/2018	Materiai:			
Date Submitted:		Source:			
Jate Tested: 21/05/2018 Specificati			on: No Specification		
Project Location: Sample Location:	Cessnock, NSW BH10 - 0.5 - 1.0m				
Load vs Pene	etration		Test Results		
20			Maximum Dry Density (t/m ³): Optimum Moisture Content (%): Dry Density before Soaking (t/m ³): Density Ratio before Soaking (%): Moisture Content before Soaking (%): Moisture Ratio before Soaking (%): Dry Density after Soaking (t/m ³): Density Ratio after Soaking (%): Swell (%): Moisture Content of Top 30mm (%): Moisture Content of Remaining Depth (%): Compactive Effort: Surcharge Mass (kg): Period of Soaking (Days): Oversize Material: Oversize Material (%): —Moisture Content— Field Moisture Content (%): Curing Time (Hrs):	1.78 1.78 16.3 1.79 101 16.0 98 1.77 100 1.0 20.3 18.7 Standard 4.50 4 Excluded 0.2 12.6 21.8	

Coffey ATETRA TECH COMPANY California Bearing Ratio Test Report

Newcastle Laboratory

Coffey Services Australia Pty Ltd ABN 55 139 460 521 19 Warabrook Boulevard Warabrook NSW 2304

Report No: CBR:NEWC18S-05281

Phone: +61 2 4016 2300 Fax: +61 2 4016 2380

Client: Principal: Project No.: Project Name: Lot No.: -	nt: Coffey Services Australia Pty Ltd (Newcastle) 19 Warabrook Boulevard Newcastle NSW 2304 sipal: ect No.: 754-NEWC00493AA ct Name: 754-NTLGE218006 - 754-CESSNOCK CORRECTIONAL CNTR No.: - TRN:		Accredited for compliance with ISO/ EC 17025 - Testing. The results of the tests, calibrations and/or measurements included in this document are tract to Australian/national standards. WORLD RECOGNISED ACCREDITATION ACCREDITATION ACCREDITATION	
Sample Deta	ails			
Sample ID:	NEWC18S-05281	Sampling N	Method: Submitted by client	
Date Sampled:	10/05/2018	Material:	Existing Ground	
Date Submitted:	10/05/2018	Source:	On-Site	
Date Tested:	21/05/2018	Specificatio	n: No Specification	
Project Location	: Cessnock, NSW			
Sample Location	1: BH15 - 0.5 - 1.0m		Test Beaults	_
Loau vs Fell	etration		AS 1289 6 1 1	
1.6		frequenting and the	CBR At 5.0mm (%):	3.5
1.5			Maximum Dry Density (t/m3):	1.68
-	a : a : a :/		Optimum Moisture Content (%):	17.5
1.4	adaa in Gaain aa gaayaa		Dry Density before Soaking (t/m3):	1.68
1.3		A	Density Ratio before Soaking (%):	100
1			Moisture Content before Soaking (%):	17.5
1.2	·····/····/····/····/····/····/····/····		Moisture Ratio before Soaking (%):	100
1.1-		in in in in in ingeni	Dry Density after Soaking (t/m3):	1.66
9			Density Ratio after Soaking (%):	98
₹ 1.0			Swell (%):	1.5
§ 0.9		·····	Moisture Content of Top 30mm (%):	23.5
Å of	2. 1. 4/ 1. 0. 1		Moisture Content of Remaining Depth (%):	20.5
8 40			Compactive Effort:	Standard
8 0.7	u si se si se fi se si se se se se se se se se se se se se se	$\mathcal{L}_{n} = \left\{ \left\{ x_{1}^{n}, x_{2}^{n}, x_{2}^{n}, x_{3}^{n}, x_{4}^{n}, x_{5}^{n}, x_{$	Surcharge Mass (kg):	4.50
9		Second second second	Period of Soaking (Days):	4
- :			Oversize Material (%):	0.0
0.5		$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		
0.4		çççç	-Moisture Content-	
0.2			Field Moisture Content (%):	13.0
0.3			Curing Time (Hrs):	24.0
0.2			Plasticity Level Method:	Visual
0.1		· · · · · · · ·		
0.0	+ + + + + + + + + + + + + + + + + + + +			
0.0 1.0	20 3.0 4.0 5.0 6.0 7.0	8.0 9.0 10.0 11.0 12.0 13.0		

Comments

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