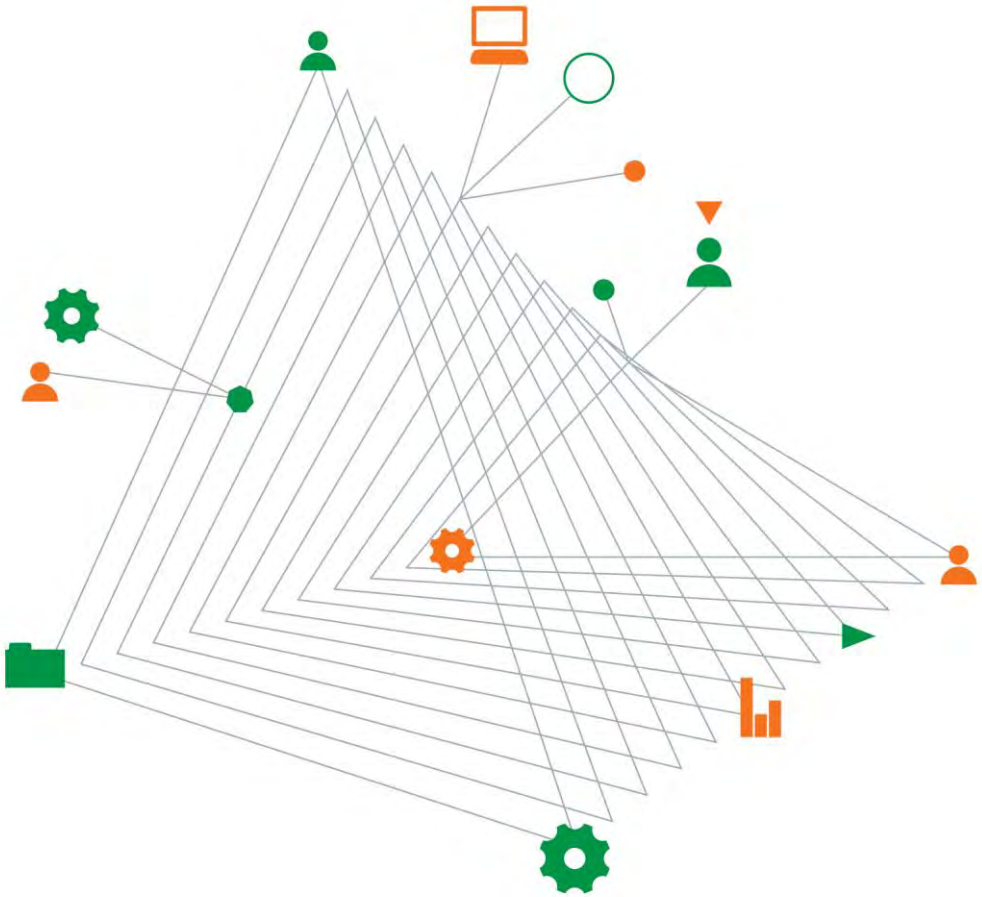
Lendlease Pty Ltd

Geotechnical Investigation for Cessnock Correctional Centre

Partner:

Geotechnical Factual Report

23 May 2018



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Geotechnical Investigation for Cessnock Correctional Centre

Prepared for
Lendlease Contractors
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Barangaroo Avenue, Barangaroo, NSW 2000

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23 May 2018

Document authorisation

Our ref: 754-NTLGE218006-AB-Rev.1

For and on behalf of Coffey

Nima Salimi
Geotechnical Engineer

Quality information

Revision history

Revision	Description	Date	Author	Reviewer	Signatory
V0	Geotechnical Factual Report	16/05/2018	NS	JD	NS
V1	Geotechnical Factual Report + CBR test results	23/01/2018	NS	JD	NS

Distribution

Report Status	No. of copies	Format	Distributed to	Date
V1	1	PDF	**Glen O'Connor**	23/05/2018

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Appendices

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 25000m^2 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.

Table 1: Summary of the encountered subsurface materials

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

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.

Table 2: Summary of CBR test results

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

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 qualified, 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.

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

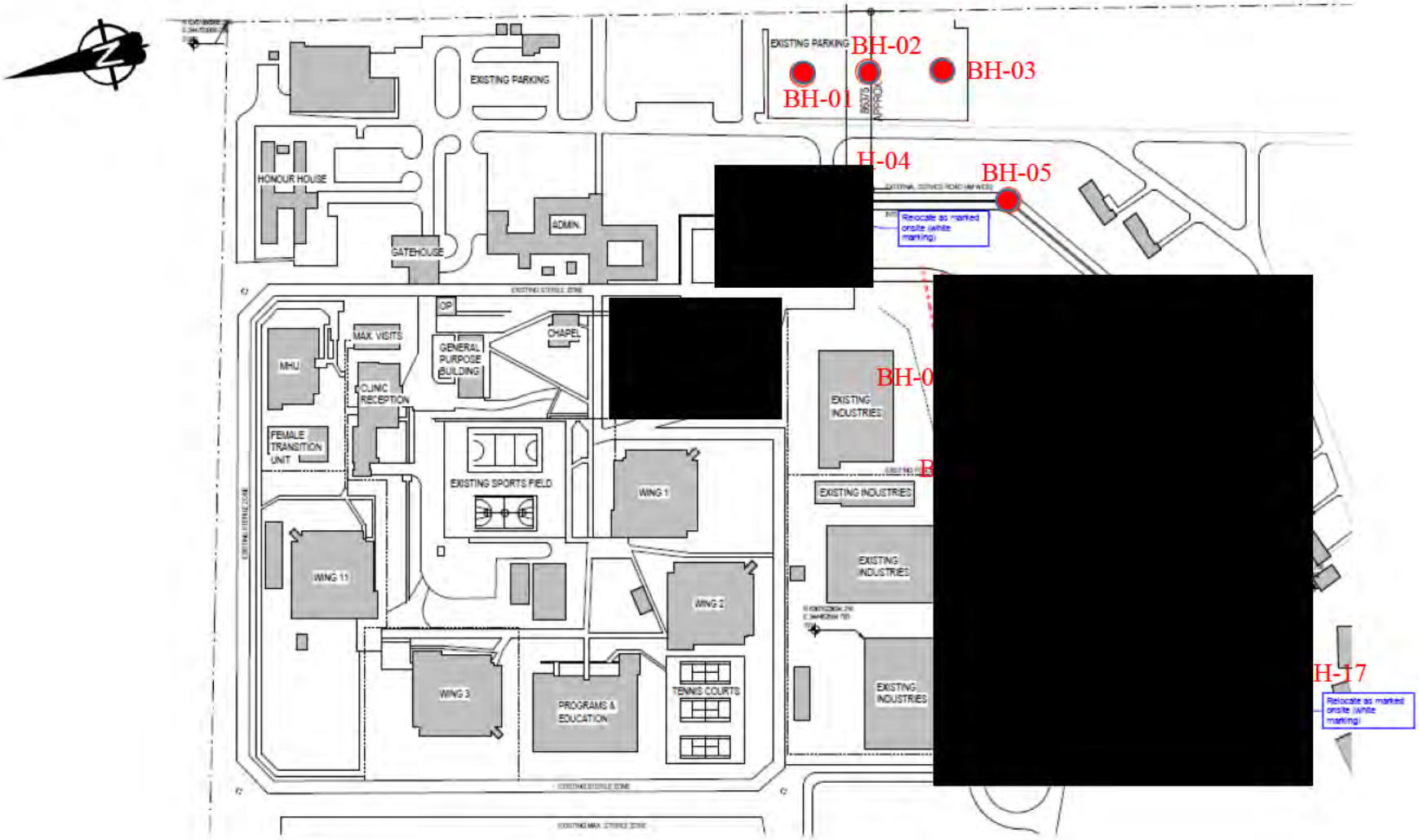
Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As 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



drawn	NS	coffey	client:	Lendlease Pty Ltd
approved	JD		project:	Geotechnical investigation Cessnock Correctional Centre
date	14/05/18		title:	Site plan and approximate test locations
scale	N/A		project no: 754-NTLGE218006AB	figure no: DRAWING1
original size	A4			

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		>200 mm
Cobbles		63 mm to 200 mm
Gravel	coarse	20 mm to 63 mm
	medium	6 mm to 20 mm
	fine	2.36 mm to 6 mm
Sand	coarse	600 µm to 2.36 mm
	medium	200 µm to 600 µm
	fine	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 s_u (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		CEMENTING	
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

FIELD IDENTIFICATION PROCEDURES USC (Excluding particles larger than 60 mm and basing fractions on estimated mass)						USC	PRIMARY NAME
COARSE GRAINED SOILS More than 50% of materials less than 63 mm is larger than 0.075 mm	(A 0.075 mm particle is about the smallest particle visible to the naked eye)	GRAVELS More than half of coarse fraction is larger than 2.36 mm	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes		GW	GRAVEL
				Predominantly one size or a range of sizes with more intermediate sizes missing.		GP	GRAVEL
			GRAVELS WITH FINES Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below)		GM	SILTY GRAVEL
				Plastic fines (for identification procedures see CL below)		GC	CLAYEY GRAVEL
		SANDS More than half of coarse fraction is smaller than 2.36 mm	CLEAN SANDS (Little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate sizes		SW	SAND
				Predominantly one size or a range of sizes with some intermediate sizes missing.		SP	SAND
			SANDS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).		SM	SILTY SAND
				Plastic fines (for identification procedures see CL below).		SC	CLAYEY SAND
FINE GRAINED SOILS More than 50% of material less than 63 mm is smaller than 0.075 mm			IDENTIFICATION PROCEDURES ON FRACTIONS <0.2 mm				
		SILTS & CLAYS Liquid limit less than 50	**DRY STRENGTH**	**DILATANCY**	**TOUGHNESS**		
			None to Low	Quick to slow	None	ML	SILT
			Medium to High	None	Medium	CL	CLAY
			Low to medium	Slow to very slow	Low	CL	ORGANIC SILT
		SILTS & CLAYS Liquid limit greater than 50	Low to medium	Slow to very slow	Low to medium	MH	SILT
			High	None	High	CH	CLAY
			Medium to High	None	Low to medium	OH	ORGANIC CLAY
HIGHLY ORGANIC SOILS			Readily identified by colour, odour, spongy feel and frequently 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.	
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.	
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.		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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Engineering Log - Borehole

Borehole ID.	**BH01**
sheet:	1 of 1
project no.	**754-NTLGE218006**
client:	**Lendlease**
date started:	**03 May 2018**
principal:	**Glen O'Connor**
date completed:	**03 May 2018**
project:	**Cessnock Correctional Centre Geotechnical Investigation**
logged by:	**MC**
location:	**75 Lindsay St, Cessnock, NSW, 2333**
checked by:	**NS**

position: E: 344704; N: 6367534 (MGA94) | surface elevation: Not Specified | angle from horizontal: 90°

drill model: FG101, Truck mounted | drilling fluid: | hole diameter : 300 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description **SOIL TYPE**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/V		Not Encountered	B: CBR SPT 3, 5, 10 N*=15		0.5		ML	**SILT**: low liquid limit, brown, traces of fine grain, subangular gravel.	<Wp	St		**TOPSOIL**
							CL-CI	**CLAY**: low to medium plasticity, brown and orange, traces of fine grain sand red and brown.		St to VSt		**RESIDUAL SOIL**
											× HP 500 kPa	
					1.0			with traces of fine grained, subangular gravel				**EXTREMELY WEATHERED MATERIAL**
								Borehole BH01 terminated at 1.1 m Target depth				
					1.5							
					2.0							
					2.5							
					3.0							
					3.5							

CDF_0_9_06_LIBRARY.GLB rev:AR Log COF BOREHOLE: NON CORED CESSNOCK CORRECTIONAL CENTRE.GPJ <<DrawingFile>> 08/05/2018 09:24

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
10-Oct-12 water level on date shown
water inflow
water outflow

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

classification symbol & soil description
based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

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

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Engineering Log - Borehole

Borehole ID.	**BH02**
sheet:	1 of 1
project no.	**754-NTLGE218006**
client:	**Lendlease**
date started:	**03 May 2018**
principal:	**Glen O'Connor**
date completed:	**03 May 2018**
project:	**Cessnock Correctional Centre Geotechnical Investigation**
logged by:	**MC**
location:	**75 Lindsay St, Cessnock, NSW, 2333**
checked by:	**NS**

position: E: 344721; N: 6367567 (MGA94) | surface elevation: Not Specified | angle from horizontal: 90°

drill model: FG101, Truck mounted | drilling fluid: | hole diameter : 300 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/V		Not Encountered	SPT 3, 5, 6 N*=11		0.5		ML	**SILT**: low liquid limit, brown, some cobble inclusions at surface.	<Wp	St		**TOPSOIL**
							CL-CI	**CLAY**: low to medium plasticity, grey, orange and brown, wi h some fine grained sand.		St to VSt	× HP 450 kPa	**RESIDUAL SOIL**
					1.0			becomes red, brown and grey				**EXTREMELY WEATHERED MATERIAL**
								Borehole BH02 terminated at 1.35 m Target depth				
					1.5							
					2.0							
					2.5							
					3.0							
					3.5							

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method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- * bit shown by suffix
- e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

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

classification symbol & soil description
based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

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

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Engineering Log - Borehole

Borehole ID.	**BH03**
sheet:	1 of 1
project no.	**754-NTLGE218006**
client:	**Lendlease**
date started:	**03 May 2018**
principal:	**Glen O'Connor**
date completed:	**03 May 2018**
project:	**Cessnock Correctional Centre Geotechnical Investigation**
logged by:	**MC**
location:	**75 Lindsay St, Cessnock, NSW, 2333**
checked by:	**NS**

position: E: 344730; N: 6367629 (MGA94) | surface elevation: Not Specified | angle from horizontal: 90°

drill model: FG101, Truck mounted | drilling fluid: | hole diameter : 300 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description **SOIL TYPE**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/V		Not Encountered	B: CBR		0 5		ML	**SILT**: low liquid limit, brown.	<Wp	St		**TOPSOIL**
							CL-CI	**CLAY**: low to medium plasticity, brown and orange.		St to VSt		**RESIDUAL SOIL**
								becomes red and grey				**EXTREMELY WEATHERED MATERIAL**
					10 15							
					20 25 30 35			Borehole BH03 terminated at 1.85 m Target depth				

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method
AD auger drilling*
AS auger screwing*
HA hand auger
W washbore

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nil

penetration
1 2 3 no resistance ranging to refusal

water
10-Oct-12 water level on date shown
water inflow
water outflow

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

classification symbol & soil description
based on Unified Classification System

moisture
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

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

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Engineering Log - Borehole

Borehole ID.	**BH04**
sheet:	1 of 1
project no.	**754-NTLGE218006**
client:	**Lendlease**
date started:	**03 May 2018**
principal:	**Glen O'Connor**
date completed:	**03 May 2018**
project:	**Cessnock Correctional Centre Geotechnical Investigation**
logged by:	**MC**
location:	**75 Lindsay St, Cessnock, NSW, 2333**
checked by:	**NS**

position: E: 344665; N: 6367606 (MGA94) | surface elevation: Not Specified | angle from horizontal: 90°

drill model: FG101, Truck mounted | drilling fluid: | hole diameter : 300 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description **SOIL TYPE**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/V		Not Encountered			0		ML	**SILT**: low liquid limit, brown, with some fine grain, subrounded gravel.	<Wp	St		**TOPSOIL**
			SPT 5, 7, 9 N*=16		0.5		CL	**CLAY**: low plasticity, orange and brown, with some fine grain, subrounded gravel.		VSt	>>X	**RESIDUAL SOIL** HP 600 kPa
					1.0			becomes grey				**EXTREMELY WEATHERED MATERIAL**
								Borehole BH04 terminated at 1.3 m Target depth				
					1.5							
					2.0							
					2.5							
					3.0							
					3.5							

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method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
10-Oct-12 water level on date shown
water inflow
water outflow

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/remoulded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description
based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

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

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Engineering Log - Borehole

Borehole ID.	**BH05**
sheet:	1 of 1
project no.	**754-NTLGE218006**
client:	**Lendlease**
date started:	**03 May 2018**
principal:	**Glen O'Connor**
date completed:	**03 May 2018**
project:	**Cessnock Correctional Centre Geotechnical Investigation**
logged by:	**MC**
location:	**75 Lindsay St, Cessnock, NSW, 2333**
checked by:	**NS**

position: E: 344654; N: 6367519 (MGA94) | surface elevation: Not Specified | angle from horizontal: 90°

drill model: FG101, Truck mounted | drilling fluid: | hole diameter : 300 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/V		Not Encountered			0		ML	**SILT**: low liquid limit, brown, with traces of fine grain, subangular gravel.	<Wp	St		**TOPSOIL**
							CL-CI	low to medium plasticity, red and brown.		VSt		**RESIDUAL SOIL**
			SPT 5, 8, 9 N*=17		0.5			becomes red and grey				
					1.0							**EXTREMELY WEATHERED MATERIAL**
					1.5			Borehole BH05 terminated at 1.4 m Target depth				
					2.0							
					2.5							
					3.0							
					3.5							

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method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 no resistance ranging to refusal

water
10-Oct-12 water level on date shown
water inflow
water outflow

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

classification symbol & soil description
based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

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

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Engineering Log - Borehole

Borehole ID.	**BH06**
sheet:	1 of 1
project no.	**754-NTLGE218006**
client:	**Lendlease**
date started:	**03 May 2018**
principal:	**Glen O'Connor**
date completed:	**03 May 2018**
project:	**Cessnock Correctional Centre Geotechnical Investigation**
logged by:	**MC**
location:	**75 Lindsay St, Cessnock, NSW, 2333**
checked by:	**NS**

position: E: 344590; N: 6367460 (MGA94) | surface elevation: Not Specified | angle from horizontal: 90°

drill model: FG101, Truck mounted | drilling fluid: | hole diameter : 300 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/V		Not Encountered			0		ML	**SILT**: low liquid limit, brown, with traces of fine grain, subrounded gravel.	<Wp	St		**TOPSOIL**
							CL-CI	**CLAY**: low to medium plasticity, brown and orange.		VSt		**RESIDUAL SOIL**
			SPT 5, 8, 9 N*=17		0.5			becomes red with traces of fine grain, round gravel				becomes red wi h traces of fine grain, round gravel
			SPT 11, 25 N*=R		1.0						>>X	HP 600 kPa
												EXTREMELY WEATHERED MATERIAL
								Borehole BH06 terminated at 1.3 m Target depth				
					1.5							
					2.0							
					2.5							
					3.0							
					3.5							

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method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

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/remoulded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

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

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Engineering Log - Borehole

Borehole ID.	**BH07**
sheet:	1 of 1
project no.	**754-NTLGE218006**
client:	**Lendlease**
date started:	**03 May 2018**
principal:	**Glen O'Connor**
date completed:	**03 May 2018**
project:	**Cessnock Correctional Centre Geotechnical Investigation**
logged by:	**MC**
location:	**75 Lindsay St, Cessnock, NSW, 2333**
checked by:	**NS**

position: E: 344590; N: 6367506 (MGA94) | surface elevation: Not Specified | angle from horizontal: 90°

drill model: FG101, Truck mounted | drilling fluid: | hole diameter : 300 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/V		Not Encountered			0		ML	**SILT**: low liquid limit, brown.	<Wp	S		**TOPSOIL**
							CL-CI	**CLAY**: low to medium plasticity, red.		VSt		**RESIDUAL SOIL**
			SPT 6, 9, 10 N*=19		0.5			becomes mottled red and grey				
			SPT 7, 25 N*=R		1.0			with some fine grain sand			>>X	HP 600 kPa **EXTREMELY WEATHERED MATERIAL**
					1.5			Borehole BH07 terminated at 1.5 m Target depth				
					2.0							
					2.5							
					3.0							
					3.5							

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method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

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/remoulded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

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

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Engineering Log - Borehole

Borehole ID.	**BH08**
sheet:	1 of 1
project no.	**754-NTLGE218006**
client:	**Lendlease**
date started:	**03 May 2018**
principal:	**Glen O'Connor**
date completed:	**03 May 2018**
project:	**Cessnock Correctional Centre Geotechnical Investigation**
logged by:	**MC**
location:	**75 Lindsay St, Cessnock, NSW, 2333**
checked by:	**NS**

position: E: 344571; N: 6367542 (MGA94) | surface elevation: Not Specified | angle from horizontal: 90°

drill model: FG101, Truck mounted | drilling fluid: | hole diameter : 300 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description **SOIL TYPE**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/V		Not Encountered			0		ML	**SILT**: low liquid limit, brown.	<Wp	St		**TOPSOIL**
							CL-CI	**CLAY**: low to medium plasticity, orange and brown, wi h traces of fine grain, subangular gravel.		VSt to H		**RESIDUAL SOIL**
			SPT 4, 12, 25 N*=R		0.5			becomes grey and orange				**EXTREMELY WEATHERED MATERIAL**
					1.0			Borehole BH08 terminated at 1.0 m Target depth			>>X	HP 600 kPa
					1.5							
					2.0							
					2.5							
					3.0							
					3.5							

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method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
- no resistance
- ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

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

classification symbol & soil description
based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

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

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Engineering Log - Borehole

Borehole ID.	**BH09**
sheet:	1 of 1
project no.	**754-NTLGE218006**
client:	**Lendlease**
date started:	**03 May 2018**
principal:	**Glen O'Connor**
date completed:	**03 May 2018**
project:	**Cessnock Correctional Centre Geotechnical Investigation**
logged by:	**MC**
location:	**75 Lindsay St, Cessnock, NSW, 2333**
checked by:	**NS**

position: E: 344525; N: 6367543 (MGA94) | surface elevation: Not Specified | angle from horizontal: 90°

drill model: FG101, Truck mounted | drilling fluid: | hole diameter : 300 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/V		Not Encountered	SPT 3, 6, 8 N*=14		0.5		ML	**SILT**: low liquid limit, brown.	<Wp	St		**TOPSOIL**
							CL-CI	**CLAY**: low to medium plasticity, red and grey, wi h traces of fine grain, subangular gravel.		VSt to H		**RESIDUAL SOIL**
								becomes orange, brown and grey				
			SPT 13, 18, 20 N*=38		1.0						>>X	HP 600 kPa
												EXTREMELY WEATHERED MATERIAL
					1.5			Borehole BH09 terminated at 1.45 m Target depth				
					2.0							
					2.5							
					3.0							
					3.5							

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method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
- 1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

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

classification symbol & soil description based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

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

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Engineering Log - Borehole

Borehole ID.	**BH10**
sheet:	1 of 1
project no.	**754-NTLGE218006**
client:	**Lendlease**
date started:	**04 May 2018**
principal:	**Glen O'Connor**
date completed:	**04 May 2018**
project:	**Cessnock Correctional Centre Geotechnical Investigation**
logged by:	**MC**
location:	**75 Lindsay St, Cessnock, NSW, 2333**
checked by:	**NS**

position: E: 344532; N: 6367535 (MGA94) | surface elevation: Not Specified | angle from horizontal: 90°

drill model: FG101, Truck mounted | drilling fluid: | hole diameter : 300 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description **SOIL TYPE**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/V		Not Encountered	B: CBR		0.5		CL	**Silty CLAY**: low plas icity, brown, wi h some fine to medium grain, subangular gravel.	<Wp	St		**RESIDUAL SOIL**
										VSt		**EXTREMELY WEATHERED MATERIAL**
					1.0							
					1.5			Borehole BH10 terminated at 1.5 m Target depth				
					2.0							
					2.5							
					3.0							
					3.5							

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method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

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

classification symbol & soil description
based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

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

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Engineering Log - Borehole

Borehole ID.	**BH11**
sheet:	1 of 1
project no.	**754-NTLGE218006**
client:	**Lendlease**
date started:	**04 May 2018**
principal:	**Glen O'Connor**
date completed:	**04 May 2018**
project:	**Cessnock Correctional Centre Geotechnical Investigation**
logged by:	**MC**
location:	**75 Lindsay St, Cessnock, NSW, 2333**
checked by:	**NS**

position: E: 344536; N: 6367477 (MGA94) | surface elevation: Not Specified | angle from horizontal: 90°

drill model: FG101, Truck mounted | drilling fluid: | hole diameter : 300 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description **SOIL TYPE**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/V		Not Encountered			0		ML	**Gravelly SILT**: low liquid limit, brown, fine to medium grain, subangular gravel.	<Wp	F		**TOPSOIL**
							CL-CI	**Silty CLAY**: low to medium plasticity, brown, wi h some fine grain, subangular gravel.				**FILL**
			SPT 2, 4, 4 N*=8		0.5							
					1.0							HP 450 kPa
			SPT 4, 2, 4 N*=6		1.5							
					2.0		CL-CI	**CLAY**: low to medium plasticity, orange, brown and red. becomes red and grey		St to VSt	>>	**RESIDUAL SOIL** HP 550 kPa
			SPT 4, 11, 15 N*=26		2.5							**EXTREMELY WEATHERED MATERIAL**
					3.0						>>	HP 600 kPa
								Borehole BH11 terminated at 3.0 m Target depth				
					3.5							

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method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

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

classification symbol & soil description
based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

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

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Engineering Log - Borehole

Borehole ID.	**BH12**
sheet:	1 of 1
project no.	**754-NTLGE218006**
client:	**Lendlease**
date started:	**04 May 2018**
principal:	**Glen O'Connor**
date completed:	**04 May 2018**
project:	**Cessnock Correctional Centre Geotechnical Investigation**
logged by:	**MC**
location:	**75 Lindsay St, Cessnock, NSW, 2333**
checked by:	**NS**

position: E: 344469; N: 6367524 (MGA94) | surface elevation: Not Specified | angle from horizontal: 90°

drill model: FG101, Truck mounted | drilling fluid: | hole diameter : 300 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/V		Not Encountered	SPT 5, 7, 8 N=15		0.5		ML	**SILT**: low liquid limit, brown, with some fine grain, subangular gravel.	<Wp	St		**TOPSOIL**
							CL-CI	**CLAY**: low to medium plasticity, brown and orange.		St to VSt		**RESIDUAL SOIL**
								becomes grey and red				
			SPT 9, 12, 22 N=34		1.0			becomes orange			>>	HP 550 kPa
												EXTREMELY WEATHERED MATERIAL
					1.5			Borehole BH12 terminated at 1.5 m Target depth			>>	HP 600 kPa
					2.0							
					2.5							
					3.0							
					3.5							

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method
AD auger drilling*
AS auger screwing*
HA hand auger
W washbore
* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nil

penetration
1 2 3 no resistance ranging to refusal

water
10-Oct-12 water level on date shown
water inflow
water outflow

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

classification symbol & soil description
based on Unified Classification System

moisture
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

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

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Engineering Log - Borehole

Borehole ID.	**BH13**
sheet:	1 of 1
project no.	**754-NTLGE218006**
date started:	**04 May 2018**
date completed:	**04 May 2018**
logged by:	**MC**
checked by:	**NS**

client: **Lendlease**

principal: **Glen O'Connor**

project: **Cessnock Correctional Centre Geotechnical Investigation**

location: **75 Lindsay St, Cessnock, NSW, 2333**

position: E: 344489; N: 6367437 (MGA94) | surface elevation: Not Specified | angle from horizontal: 90°

drill model: FG101, Truck mounted | drilling fluid: | hole diameter : 300 mm

drilling information | **material substance**

method & support	penetration (1 2 3)	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/V		Not Encountered			0.5		ML	**SILT**: low liquid limit, brown, with some fine to medium grain, subrounded gravel.	<Wp	St		**TOPSOIL**
							CL-CI	**CLAY**: low to medium plasticity, brown, with some fine to medium grain, subrounded gravel.		VSt		**RESIDUAL SOIL**
								Borehole BH13 terminated at 0.5 m Target depth				**EXTREMELY WEATHERED MATERIAL**

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method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

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

classification symbol & soil description based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

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

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Engineering Log - Borehole

Borehole ID.	**BH14**
sheet:	1 of 1
project no.	**754-NTLGE218006**
client:	**Lendlease**
date started:	**04 May 2018**
principal:	**Glen O'Connor**
date completed:	**04 May 2018**
project:	**Cessnock Correctional Centre Geotechnical Investigation**
logged by:	**MC**
location:	**75 Lindsay St, Cessnock, NSW, 2333**
checked by:	**NS**

position: E: 344410; N: 6367515 (MGA94) | surface elevation: Not Specified | angle from horizontal: 90°

drill model: FG101, Truck mounted | drilling fluid: | hole diameter : 300 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/V		Not Encountered					ML	**SILT**: low liquid limit, brown, with some fine to medium grain, subangular gravel.	<Wp	St		**TOPSOIL**
							CL-CI	**CLAY**: low to medium plasticity, red and brown.		VSt		**EXTREMELY WEATHERED MATERIAL**
					0.5			Borehole BH14 terminated at 0.3 m Target depth				
					1.0							
					1.5							
					2.0							
					2.5							
					3.0							
					3.5							

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 no resistance ranging to refusal

water
10-Oct-12 water level on date shown
water inflow
water outflow

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

classification symbol & soil description based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

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

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Engineering Log - Borehole

Borehole ID.	**BH15**
sheet:	1 of 1
project no.	**754-NTLGE218006**
client:	**Lendlease**
date started:	**04 May 2018**
principal:	**Glen O'Connor**
date completed:	**04 May 2018**
project:	**Cessnock Correctional Centre Geotechnical Investigation**
logged by:	**MC**
location:	**75 Lindsay St, Cessnock, NSW, 2333**
checked by:	**NS**

position: E: 344422; N: 6367471 (MGA94) | surface elevation: Not Specified | angle from horizontal: 90°

drill model: FG101, Truck mounted | drilling fluid: | hole diameter : 300 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description **SOIL TYPE**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/V		Not Encountered	B: CBR		0.5		ML	**SILT**: low liquid limit, brown, with some fine to medium grain, subangular gravel.	<Wp	St		**TOPSOIL**
			SPT 10, 10, 11 N*=21				CL-CI	**CLAY**: low to medium plasticity, orange, brown and red.		VSt to H		**RESIDUAL SOIL**
			SPT 10, 15, 20 N*=35		1.0			becomes grey and red				**EXTREMELY WEATHERED MATERIAL**
					1.5			Borehole BH15 terminated at 1.5 m Target depth				
					2.0							
					2.5							
					3.0							
					3.5							

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method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- * bit shown by suffix
- e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

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

classification symbol & soil description
based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

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

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Engineering Log - Borehole

Borehole ID.	**BH16**
sheet:	1 of 1
project no.	**754-NTLGE218006**
date started:	**04 May 2018**
date completed:	**04 May 2018**
logged by:	**MC**
checked by:	**NS**

client: ***Lendlease***

principal: ***Glen O'Connor***

project: ***Cessnock Correctional Centre Geotechnical Investigation***

location: ***75 Lindsay St, Cessnock, NSW, 2333***

position: E: 344432; N: 6367452 (MGA94) | surface elevation: Not Specified | angle from horizontal: 90°

drill model: FG101, Truck mounted | drilling fluid: | hole diameter : 300 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/V		Not Encountered	SPT 3, 8, 8 N*=16		0.5		ML	**SILT**: low liquid limit, brown, with some fine to medium grain, subangular gravel.	<Wp	St		**TOPSOIL**
							CL-CI	**CLAY**: low to medium plasticity, orange, brown and red.		VSt		**RESIDUAL SOIL**
					1.0			Borehole BH16 terminated at 0.95 m Target depth				**EXTREMELY WEATHERED MATERIAL**
					1.5							
					2.0							
					2.5							
					3.0							
					3.5							

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method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

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

classification symbol & soil description based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

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

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Engineering Log - Borehole

Borehole ID.	**BH17**
sheet:	1 of 1
project no.	**754-NTLGE218006**
client:	**Lendlease**
date started:	**04 May 2018**
principal:	**Glen O'Connor**
date completed:	**04 May 2018**
project:	**Cessnock Correctional Centre Geotechnical Investigation**
logged by:	**MC**
location:	**75 Lindsay St, Cessnock, NSW, 2333**
checked by:	**NS**

position: E: 344405; N: 6367427 (MGA94) | surface elevation: Not Specified | angle from horizontal: 90°

drill model: FG101, Truck mounted | drilling fluid: | hole diameter : 300 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description **SOIL TYPE**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/V		Not Encountered			0		ML	**SILT**: low liquid limit, brown, with some fine to medium grain, subangular gravel.	<Wp	St		**TOPSOIL**
							CL-CI	**CLAY**: low to medium plasticity, red and grey.		VSt to H		**RESIDUAL SOIL**
			SPT 11, 14, 17 N*=31		0.5							**EXTREMELY WEATHERED MATERIAL**
					1.0			Borehole BH17 terminated at 0.95 m Target depth				
					1.5							
					2.0							
					2.5							
					3.0							
					3.5							

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method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* bit shown by suffix
e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
1 2 3 — no resistance ranging to refusal

water
10-Oct-12 water level on date shown
water inflow
water outflow

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/remoulded (kPa)
- R refusal
- HB hammer bouncing

classification symbol & soil description
based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

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

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Engineering Log - Borehole

Borehole ID.	**BH18**
sheet:	1 of 1
project no.	**754-NTLGE218006**
client:	**Lendlease**
date started:	**04 May 2018**
principal:	**Glen O'Connor**
date completed:	**04 May 2018**
project:	**Cessnock Correctional Centre Geotechnical Investigation**
logged by:	**MC**
location:	**75 Lindsay St, Cessnock, NSW, 2333**
checked by:	**NS**

position: E: 344354; N: 6367447 (MGA94) | surface elevation: Not Specified | angle from horizontal: 90°

drill model: FG101, Truck mounted | drilling fluid: | hole diameter : 300 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description (SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components)	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/V		Not Encountered			0		ML	**SILT**: low liquid limit, brown, with some fine to medium grain, subangular gravel.	<Wp	St		**TOPSOIL**
							CL-CI	**CLAY**: low to medium plasticity, brown, with some fine to medium grain, suangular gravel.		VSt to H		**RESIDUAL SOIL**
			SPT 5, 10, 15 N*=25		5							
					10			becomes grey			>>>	**EXTREMELY WEATHERED MATERIAL** HP 600 kPa
			SPT 16, 16, 16 N*=32		15							
					20			becomes grey and red				
					25			Borehole BH18 terminated at 2.4 m Target depth				
					30							
					35							

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method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore
- * bit shown by suffix
- e.g. AD/T
- B blank bit
- T TC bit
- V V bit

support
- M mud
- C casing
- N nil

penetration
- 1 2 3 no resistance ranging to refusal

water
- 10-Oct-12 water level on date shown
- water inflow
- water outflow

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

classification symbol & soil description based on Unified Classification System

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- Wl liquid limit

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

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Engineering Log - Borehole

Borehole ID.	**BH19**
sheet:	1 of 1
project no.	**754-NTLGE218006**
client:	**Lendlease**
date started:	**04 May 2018**
principal:	**Glen O'Connor**
date completed:	**04 May 2018**
project:	**Cessnock Correctional Centre Geotechnical Investigation**
logged by:	**MC**
location:	**75 Lindsay St, Cessnock, NSW, 2333**
checked by:	**NS**

position: E: 344469; N: 6367447 (MGA94) | surface elevation: Not Specified | angle from horizontal: 90°

drill model: FG101, Truck mounted | drilling fluid: | hole diameter : 300 mm

drilling information | **material substance**

method & support	penetration 1 2 3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description **SOIL TYPE**: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD/V		Not Encountered	SPT 7, 15, 25 N*=40		0.5		ML	**SILT**: low liquid limit, brown, with some fine to medium grain, subangular gravel.	<Wp	St		**TOPSOIL**
							CL-CI	**CLAY**: low to medium plasticity, red and grey.		VSt to H		**RESIDUAL SOIL**
												EXTREMELY WEATHERED MATERIAL
					1.0			Borehole BH19 terminated at 0.95 m Target depth				
					1.5							
					2.0							
					2.5							
					3.0							
					3.5							

method
AD auger drilling*
AS auger screwing*
HA hand auger
W washbore

* bit shown by suffix
e.g. AD/T
B blank bit
T TC bit
V V bit

support
M mud
C casing
N nil

penetration
1 2 3 no resistance ranging to refusal

water
10-Oct-12 water level on date shown
water inflow
water outflow

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

classification symbol & soil description
based on Unified Classification System

moisture
D dry
M moist
W wet
Wp plastic limit
Wl liquid limit

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

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

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California Bearing Ratio Test Report

Report No: CBR:NEWC18S-05278
Issue No: 1

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

Accredited for compliance with ISO/ EC 17025 - Testing.

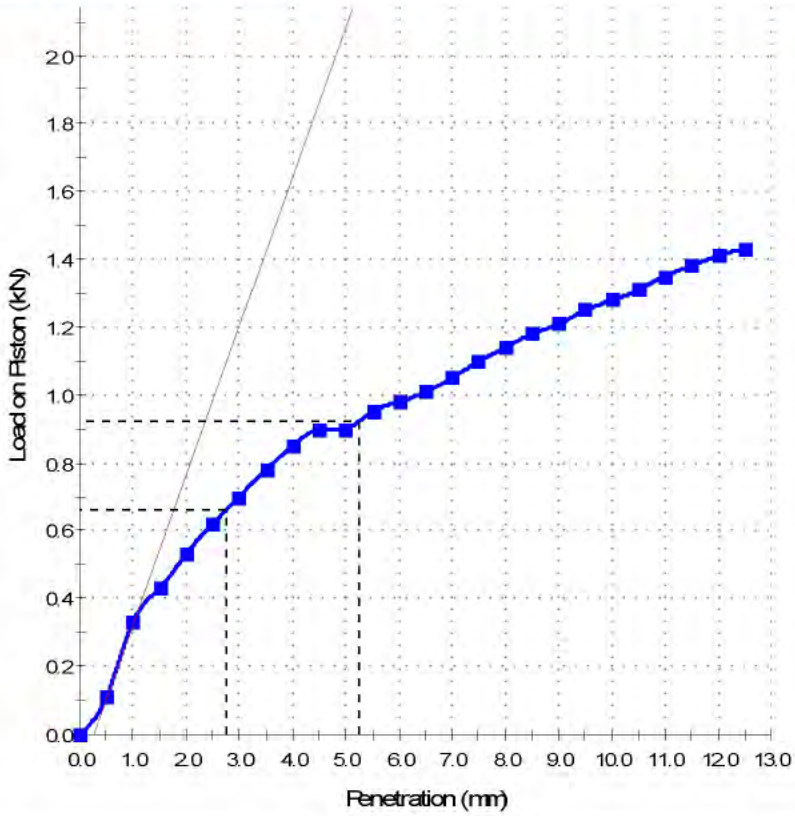
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Chris Blackford (Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 23/05/2018

Sample Details

Sample ID:	NEWC18S-05278	**Sampling 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	**Specification:**	No Specification
Project Location:	Cessnock, NSW		
Sample Location:	BH01 - 0.5 - 1.0m		

Load vs Penetration



Test Results

AS 1289.6.1.1

CBR At 2.5mm (%):	**5**
Maximum Dry Density (t/m³):	1.61
Optimum Moisture Content (%):	23.5
Dry Density before Soaking (t/m³):	1.62
Density Ratio before Soaking (%):	100
Moisture Content before Soaking (%):	23.1
Moisture Ratio before Soaking (%):	98
Dry Density after Soaking (t/m³):	1.61
Density Ratio after Soaking (%):	100
Swell (%):	1.0
Moisture Content of Top 30mm (%):	26.7
Moisture Content of Remaining Depth (%):	23.8
Compactive Effort:	Standard
Surcharge Mass (kg):	4.50
Period of Soaking (Days):	4
Oversize Material (%):	0.0
—Moisture Content—	
Field Moisture Content (%):	23.5
Curing Time (Hrs):	20.0
Plasticity Level Method:	Visual

Comments

Newcastle Laboratory

Coffey Services Australia Pty Ltd
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California Bearing Ratio Test Report

Report No: CBR:NEWC18S-05279
Issue No: 1

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

Accredited for compliance with ISO/ EC 17025 - Testing.

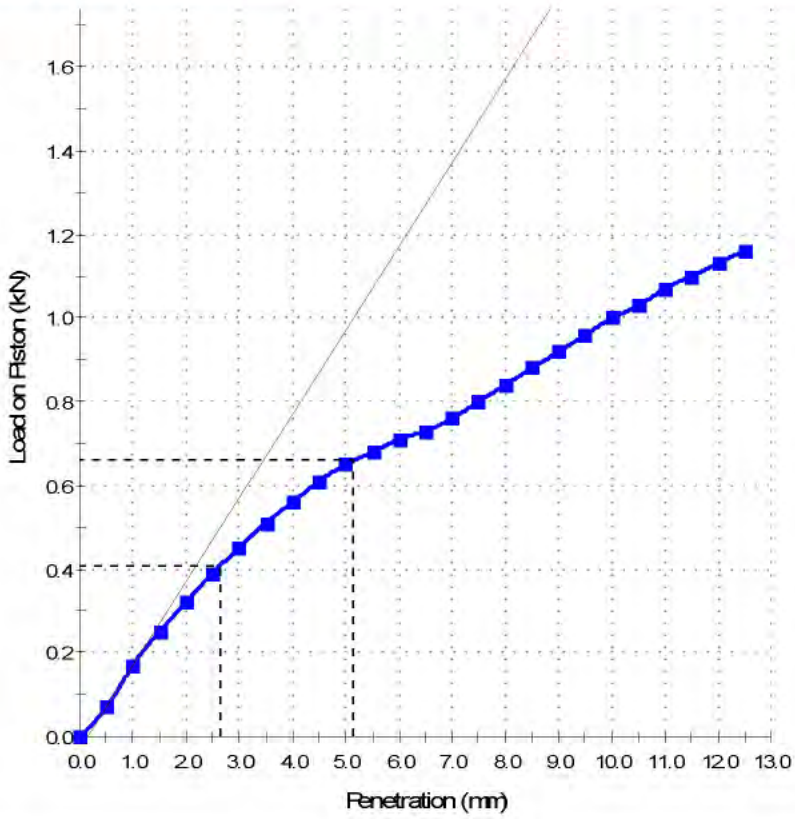
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Approved Signatory: Chris Blackford (Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 23/05/2018

Sample Details

Sample ID:	NEWC18S-05279	**Sampling 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	**Specification:**	No Specification
Project Location:	Cessnock, NSW		
Sample Location:	BH3 - 0.5 - 1.0m		

Load vs Penetration



Test Results

AS 1289.6.1.1

CBR At 5.0mm (%):	**3.5**
Maximum Dry Density (t/m³):	1.64
Optimum Moisture Content (%):	22.4
Dry Density before Soaking (t/m³):	1.65
Density Ratio before Soaking (%):	101
Moisture Content before Soaking (%):	21.9
Moisture Ratio before Soaking (%):	98
Dry Density after Soaking (t/m³):	1.63
Density Ratio after Soaking (%):	100
Swell (%):	1.0
Moisture Content of Top 30mm (%):	29.3
Moisture Content of Remaining Depth (%):	23.6
Compactive Effort:	Standard
Surcharge Mass (kg):	4.50
Period of Soaking (Days):	4
Oversize Material (%):	0.0
—Moisture Content—	
Field Moisture Content (%):	21.5
Curing Time (Hrs):	23.3
Plasticity Level Method:	Visual

Comments

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A TETRA TECH COMPANY

California Bearing Ratio Test Report

Report No: CBR:NEWC18S-05280
Issue No: 1

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

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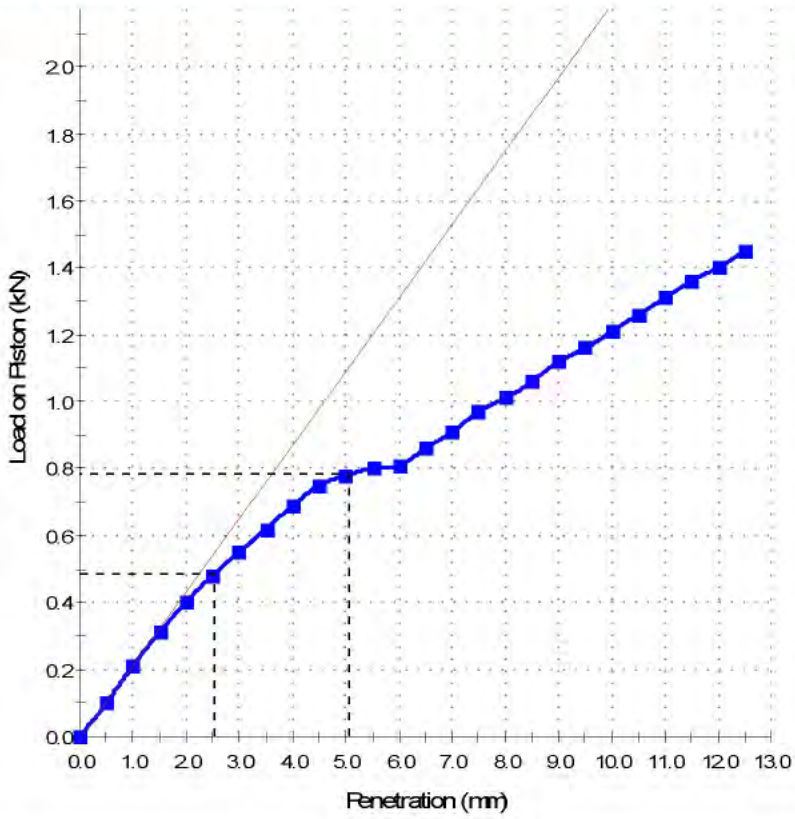
Approved Signatory: Chris Blackford (Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 23/05/2018

Sample Details

Sample ID:	NEWC18S-05280	**Sampling 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	**Specification:**	No Specification
Project Location:	Cessnock, NSW		
Sample Location:	BH10 - 0.5 - 1.0m		

Load vs Penetration



Test Results

AS 1289.6.1.1

CBR At 5.0mm (%):	**4.0**
Maximum Dry Density (t/m³):	1.78
Optimum Moisture Content (%):	16.3
Dry Density before Soaking (t/m³):	1.79
Density Ratio before Soaking (%):	101
Moisture Content before Soaking (%):	16.0
Moisture Ratio before Soaking (%):	98
Dry Density after Soaking (t/m³):	1.77
Density Ratio after Soaking (%):	100
Swell (%):	1.0
Moisture Content of Top 30mm (%):	20.3
Moisture Content of Remaining Depth (%):	18.7
Compactive Effort:	Standard
Surcharge Mass (kg):	4.50
Period of Soaking (Days):	4
Oversize Material:	Excluded
Oversize Material (%):	0.2
—Moisture Content—	
Field Moisture Content (%):	12.6
Curing Time (Hrs):	21.8
Plasticity Level Method:	Visual

Comments

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A TETRA TECH COMPANY

California Bearing Ratio Test Report

Report No: CBR:NEWC18S-05281
Issue No: 1

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

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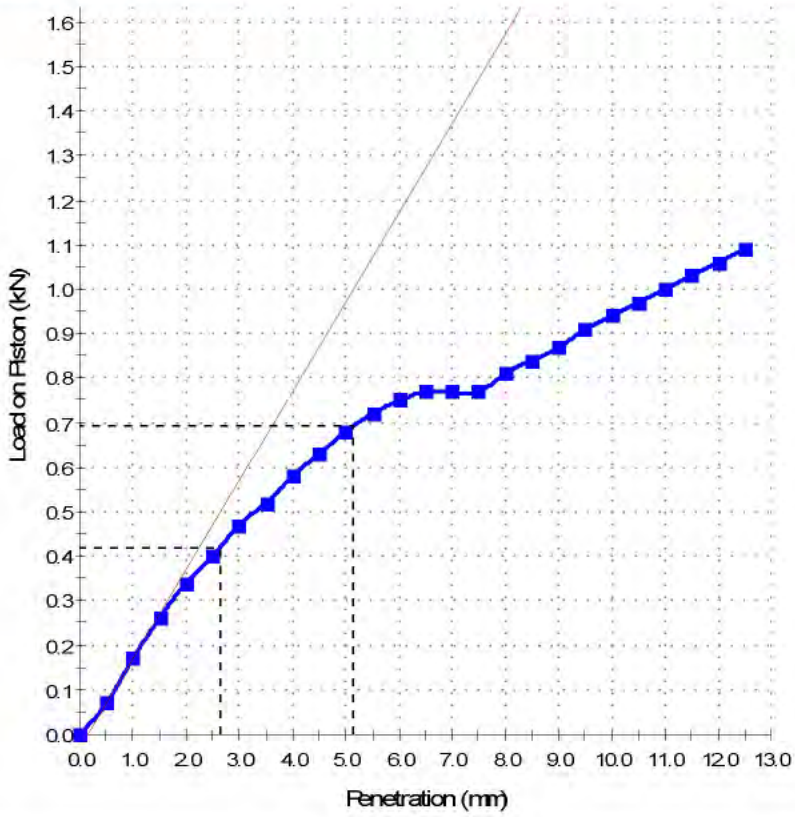
Approved Signatory: Chris Blackford (Geotechnician)
NATA Accredited Laboratory Number:431
Date of Issue: 23/05/2018

Sample Details

Sample ID:	NEWC18S-05281	**Sampling 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	**Specification:**	No Specification
Project Location:	Cessnock, NSW		
Sample Location:	BH15 - 0.5 - 1.0m		

Load vs Penetration



Test Results

AS 1289.6.1.1

CBR At 5.0mm (%):	**3.5**
Maximum Dry Density (t/m³):	1.68
Optimum Moisture Content (%):	17.5
Dry Density before Soaking (t/m³):	1.68
Density Ratio before Soaking (%):	100
Moisture Content before Soaking (%):	17.5
Moisture Ratio before Soaking (%):	100
Dry Density after Soaking (t/m³):	1.66
Density Ratio after Soaking (%):	98
Swell (%):	1.5
Moisture Content of Top 30mm (%):	23.5
Moisture Content of Remaining Depth (%):	20.5
Compactive Effort:	Standard
Surcharge Mass (kg):	4.50
Period of Soaking (Days):	4
Oversize Material (%):	0.0
—Moisture Content—	
Field Moisture Content (%):	13.0
Curing Time (Hrs):	24.0
Plasticity Level Method:	Visual

Comments

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