GEOTECHNIQUE® PTY LTD

ABN 64 002 841 063

Job No: 14682/1
Our Ref: 14682/1-AA-R1
25 June 2020

[redacted]

Dear Sirs

re **Proposed Pub**
Lot 3989 in DP1190132 – Lakeside Parade, Jordan Springs
Report on Geotechnical Investigation

This revised report presents the results of a geotechnical investigation at the above site. The investigation was carried out as per our fee proposal Q9057, dated 25 February 2020 and was approved in a contract agreement dated 13 May 2020.

Proposed Development
We understand that the proposed development at the above site includes construction of a two-storey pub building, associated car parking and driveway. In this regard, a geotechnical investigation was required to assess subsurface conditions across the site and provide geotechnical recommendations necessary for the design of the proposed structures.

Field Work
Field work for the investigation was conducted on 2 June 2020 and the following was completed:

- Reviewing available geological information relevant to the site.
- OH&S and walkover survey to assess existing site conditions.
- Reviewing services plans obtained from "Dial Before You Dig" to determine locations of services across the site.
- Scanning borehole locations for underground services to ensure that services were not damaged during field work. We engaged a specialist services locator for this purpose.
- Drilling six (6) boreholes (BH1 to BH6) to depths ranging from 1m to 6.5m, using a utility mounted drilling rig. Engineering logs and borehole locations plan (Drawing No 14682/1-AA1) are attached to the report.
- Conducting Standard Penetration Test (SPT) in the boreholes to assess strength characteristics of sub-surface soils.
- Recovering representative soil samples for visual assessment and laboratory tests (CBR).
- Measuring depths to groundwater level or seepage in the boreholes at completion of drilling.

Field work was supervised by a Field Engineer from this company who was responsible for nominating the borehole locations, supervision of in-situ tests, sampling and preparation of field logs.

Regional Geology

The Geological Map of Penrith (Geological Series Sheet 9030, Scale 1:100,000, Edition 1, 1991) published by the Department of Minerals and Energy indicates that the site is underlain by Bringelly Shale comprising shale, carbonaceous claystone, laminite, fine to medium grained lithic sandstone and rare coal.

The Soil Landscape Map of Penrith (Soil Landscape Series Sheet 9030, Scale 1:100,000, 1989), prepared by the Soil Conservation Service of NSW, indicates that the site is located within the Luddenham Group, which is characterised by undulating to rolling low hills on Wianamatta Group Shale, often associated with Minchinbury sandstone, with local relief of 50m to 80m, ground surface slopes 5% to 20%, narrow ridges, hillcrests and valley. Soils in this group are likely to be up to 1.5m deep, high plasticity, moderately reactive, locally impermeable and susceptible to high erosion hazards.

Site Conditions

The following site observations were made at the time of field work:

- The site irregular in shape and measures about 5030m^2 in plan.
- Western portion of the site was occupied as part of a construction site. Gravel and scaffolding were observed on the ground surface within the area.
- Central portion of the site consisted of sparse vegetation and clear area.
- Eastern portion of the site was heavily vegetated area.
- There is a gravel path on the southern boundary of the site.
- The topography of the site is generally flat.

Subsurface Conditions

Subsurface conditions encountered in the boreholes are detailed in the attached engineering logs and summarised below in Table 1.

Table 1 : Subsurface Conditions

BH	Top RL (AHD)*	Terminated Depth (m)	Fill (m)	Natural (m)	Possible Bedrock (m)
BH1	≈35.7	6.2	0.0 – 1.7	1.7 – 6.2	=>6.2
BH2	≈35.6	5.8	0.0 – 2.0	2.0 – 5.8	=>5.8
BH3	≈36.0	6.45	0.0 – 2.5	2.5 –> 6.45	NE
BH4	≈36.1	5.95	0.0 – 1.8	1.8 –> 5.95	NE
BH5	≈36.0	1.0	0.0 –> 1.0	NE	NE
BH6	≈36.3	1.0	0.0 –> 1.0	NE	NE

** Estimated from survey drawing; NE : Not encountered up to terminated depth*

Fill	Silty Clay, low to high plasticity, brown, with grass roots
Natural	Silty CLAY, medium to high plasticity, grey, brown, orange, with ironstone gravel Shaley CLAY, low plasticity, grey, brown Silty Sandy CLAY, medium plasticity, brown, orange, grey with gravel
Possible Bedrock	SHALE, very low strength

Standard Penetration Tests conducted in the boreholes indicated the fill to be moderately to well compacted and natural clay to be stiff to very stiff in consistency.

Groundwater Conditions

Groundwater/seepage was encountered in BH1 and BH4 at depths of 4.5m and 5.5m respectively. The remaining boreholes (BH2, 3, 5 and 6) were dry up to the terminated depths. It should be noted that groundwater levels generally vary due to changes in rainfall, temperature and other factors not evident during drilling.

Laboratory Testing

California Bearing Ratio

Two (2) subgrade samples were collected from the boreholes at the proposed car park area, to conduct 4-day soaked California Bearing Ratio (CBR) tests. The tests were conducted on samples compacted to 100% standard dry density at moisture content close to optimum moisture content, in the NATA accredited laboratory of Geotech Testing Pty Ltd. The results are summarised below (Table 2) and detailed in the attached certificate.

Table 2 : CBR Test Results

BH	Sample Depth (m)	Soil Description	MDD (t/m^3)	OMC (%)	FMC (%)	Variation From OMC (%)	CBR (%)
5	0.5 – 0.8	FILL: Silty Clay, medium plasticity, red-brown, trace of gravel	1.86	15.4	15.9	0.5 Wet	3.5
6	0.7 – 1.0	FILL: Silty Clay, medium to high plasticity, red-brown, trace of gravel	1.76	18.8	20.4	1.6 Wet	3.0

MDD: Maximum Dry Density, FMC: Field Moisture Content, OMC: Optimum Moisture Content, CBR: California Bearing Ratio

The above results indicate that the field moisture content is generally close to OMC. Depending on the time of construction, moisture conditioning may be required during pavement construction to bring the subgrade moisture close to OMC.

Aggressivity Testing

Representative soil samples recovered from the boreholes were tested in the NATA accredited laboratory of SGS Environmental Services, in accordance with relevant Standards, to determine chemical properties like Electrical Conductivity (EC), pH, sulphate, chloride and resistivity. Detailed laboratory test results are attached, and a summary is presented below in Table 3:

Table 3 : Chemical Tests Results

Borehole No	Depth (m)	EC (µS/cm)	pH	Sulphate (mg/kg)	Chloride (mg/kg)	Resistivity ohm-cm
BH1	0.5 – 0.95	1000	5.3	38	830	970
BH1	1.5 – 1.95	650	5.2	110	370	1500
BH2	1.0 – 1.45	1200	5.2	180	910	810
BH2	2.5 – 2.95	1200	4.6	170	850	870
BH3	1.5 – 1.95	1200	5.4	200	930	850
BH3	3.0 – 3.45	350	5.8	150	170	2800
BH4	1.0 – 1.45	1800	5.9	94	1500	550
BH4	2.5 – 2.95	1300	4.7	170	970	800

DISCUSSION AND RECOMMENDATIONS

Nature of Fill

SPT 'N' values of the fill material ranged from 5 blows/300mm to 16 blows/300mm indicating the fill to be moderately to well compacted. Although visual inspection and SPT results indicated the fill to be moderately to well compacted, we recommend that further inspection and testing, as deemed necessary by a geotechnical engineer, should be conducted to ensure that the fill is well compacted and suitable for supporting structural loads.

Excavation Conditions

Fill material and natural clayey soils encountered at the site can be removed using conventional earthmoving equipment such as excavators and dozers.

Selection of excavation equipment should be based on site access, strength of sub-surface materials and the likely impact of vibration to structures in the vicinity of the excavation. We anticipate that existing structures in the vicinity of the site can tolerate ground vibration of more than 10mm/s. This will have to be ascertained by a Structural Engineer after a dilapidation survey, if deemed necessary.

Groundwater/seepage was encountered in BH1 and BH4 at depths of 4.5m to 5.5m respectively. The remaining boreholes were generally dry. Considering the existing groundwater conditions we do not expect groundwater related issues if shallow excavation is carried out at the site. Groundwater inflow during excavation, if any, could be adequately managed using a conventional pump and sump system. However, trafficability problems might arise locally during wet weather or if water is allowed to pond at the site. A layer of recycled gravel can be used to provide a good working platform.

Batter Slopes

Cut and fill slopes should be battered as recommended below:

Temporary condition : 1V:1H
Permanent condition : 1V:2.5H

The above batter slopes are recommended, providing:

- Cut and fill slopes are at sufficient distance from structures in the vicinity of the site.
- Adequate surface and sub-surface drainage is provided.
- Appropriate erosion protection in the form of vegetation is provided.

Retaining Structures

If battered slopes steeper than those recommended above are required then excavation faces would need to be retained by engineered retaining structures. Appropriate retaining structures for the proposed development would include gravity walls or soldier pier walls etc.

Retaining structures can be designed for the following recommended earth pressure parameters:

Table 4 : Earth Pressure Parameters

Founding Material	Depth Range (m)	Unit Weight, γ (kN/m^3)	Coefficient of At Rest Pressure, K_0	Coefficient of Active Pressure, K_a	Coefficient of Passive Pressure, K_p
Fill	0.0 – 2.5	18	0.5	0.35	2.5
Natural Clays	2.5 – 6.0	19	0.46	0.3	3.0
Shale Bedrock	=>6.0	22	0.4	0.25	350kPa

Footings

Considering that the fill encountered across the site is moderately to well compacted and its thickness varies, footings supported on the fill may be subjected to detrimental differential settlement. In this regard we recommend that the proposed structures are supported on deep footings (bored piers) founded either in stiff natural clays or shale bedrock. Deep footings founded at least 4m below existing ground levels in stiff natural clays can be designed for an allowable end bearing pressure of 350kPa and shaft adhesion of 10kPa. Deep footings founded in shale bedrock (depths below 6m) can be designed for an allowable end bearing pressure of 700kPa and shaft adhesion of 50kPa.

Deep footings founded in stiff natural clays are expected to settle about 10mm to 15mm. Deep footings founded in shale bedrock are expected to settle about 1% of pier diameter. Differential settlement of the footings is expected to be 50% of the total settlement.

It is important that all footings are inspected and tested as deemed necessary by an experienced geotechnical engineer to ensure that footings are founded on appropriate material to achieve the design bearing pressure values. Under no circumstances should footings be founded on soft/loose, wet or undesirable materials. If such materials are encountered then they should be removed to firm material and replaced with mass concrete.

Floor Slabs

Floor slabs for the proposed structures could either be supported on ground or suspended on footings. Ground floor supported slabs (well compacted fill or stiff clays) can be designed for a modulus of subgrade reaction of 20kPa/mm.

Pavement Design

The two CBR tests conducted on the samples recovered from the site showed CBR values of 3% to 3.5%. Considering the existing subsurface conditions, we recommend that a design CBR of 3% is adopted for pavement thickness design.

No information regarding the design traffic loading was available. For the purposes of pavement thickness design we have assumed a design traffic loading of $8x10^4$ Equivalent Standard Axles.

The pavement design is based on the *Guide to Pavement Technology, Part 2: Pavement Structural Design* (Austroads 2017). Based on the above design CBR and traffic loading values, we recommend the following pavement compositions.

Table 5 : Recommended Flexible Pavement

Design Traffic Loading (ESA)	Design CBR (%)	AC10 (mm)*	Base Course (mm)	Sub-base (mm)	Total (mm)
$8x10^4$	3	40	125	200	365

** Over single coat flush seal*

Table 6 : Recommended Rigid Pavement

Design Traffic Loading (HVAG)	Design CBR (%)	Concrete Base (mm)	Sub-base (mm)	Total (mm)
$1.3x10^5$	3	180	100	280

The following are assumed in the design of the above recommended pavement:

- Compressive strength of concrete base : 32MPa
- Sub-base material : Granular (crushed rock)
- Shrinkage reinforcement and dowels shall be provided as per structural engineers design.

The pavement depths are only valid if the subgrade and pavement materials are compacted to the following Minimum Dry Density Ratios (AS1289 5.4.1) as per Penrith City Council Specifications.

Base Course	98% Modified
Sub-base	95% Modified
Subgrade	100% Standard

The pavement design assumes provision of adequate surface and sub-surface drainage of the pavement and adjacent areas. It is recommended that a sub-surface drainage system is installed, as directed by Council Engineers.

Subgrade Preparation and Placement of Controlled Fill
We recommend the following procedures for subgrade preparation and placement of controlled fill:

- Strip existing topsoil (if present) and stockpile for possible future use in landscaping.
- In areas where grade raise fill will be provided the exposed material after removal of topsoil shall be proof rolled (using an 8 to 10 tonnes roller) to detect potentially weak spots (ground heave). Excavate areas of localised heaving to depth of about 300mm and replace with granular material or low plasticity clay and compact as recommended below.
- Repeat proof rolling of soft spots backfilled with granular material or low plasticity clay. If the backfilled area shows movement during proof rolling, this office should be contacted for further recommendations.
- Place suitable fill materials on proof rolled surface in horizontal layers of 250mm to 300mm loose thickness (depending on the size of equipment) and compact to achieve a minimum density ratio of at least 98% Standard, at moisture content within 2% of Optimum Moisture Content (OMC). Suitable fill materials may comprise granular or low plasticity clay. The top 300mm of the fill forming pavement subgrade shall be compacted to a minimum density ratio of at least 100% Standard, at moisture content within 2% of Optimum Moisture Content (OMC).
- In cut areas the top 300mm of the pavement subgrade shall be scarified and compacted to a minimum density ratio of at least 100% Standard, at moisture content within 2% of Optimum Moisture Content (OMC).
- Fill placement should be supervised to ensure that material quality, layer thickness, testing frequency and compaction criteria conform to the specifications. We recommend "Level 1" supervision, in accordance with AS3798-2007.

Aggressivity Assessment

Based on Australian Standard AS2159-2009 (Piling – Design and Installation) aggressive classifications for subsurface materials are shown below.

Table 7 : Aggressivity Classification

Iron & Steel			
pH	Chloride (ppm)	Resistivity ohm.cm	Low Permeability Soil
>5.0	<5,000	>5,000	Non-aggressive
4.0-5.0	5,000-20,000	2,000 – 5,000	Non-aggressive
3.0-4.0	20,000 – 50,000	1,000 – 2,000	Mild
<3.0	>50,000	<1,000	Moderate

Concrete		
pH	Sulphate (ppm)	Low Permeability Soil
>5.5	<5,000	Non-aggressive
4.5-5.5	5,000-10,000	Mild
4.0-4.5	10,000 – 20,000	Moderate
<4.0	>20,000	Severe

1ppm=1mg/kg

Based on the results shown in Table 3 and the above classification, the soils at the site are assessed as non-aggressive to mildly aggressive to concrete and non-aggressive to moderately aggressive to iron/steel. Concrete strength and cover for reinforcement of structures in contact with the existing soils at the site shall be based on the above assessment.

General

Assessment and recommendations presented in this report are based on site observation and information from six (6) boreholes. Although we believe that the sub-surface profile presented in this report is indicative of the general conditions across the site, it is possible that the sub-surface conditions including depth to groundwater level could differ from that encountered in the boreholes. We recommend that this company is contacted for further advice if subsurface materials and groundwater conditions encountered during the construction stage differ from those presented in this report.

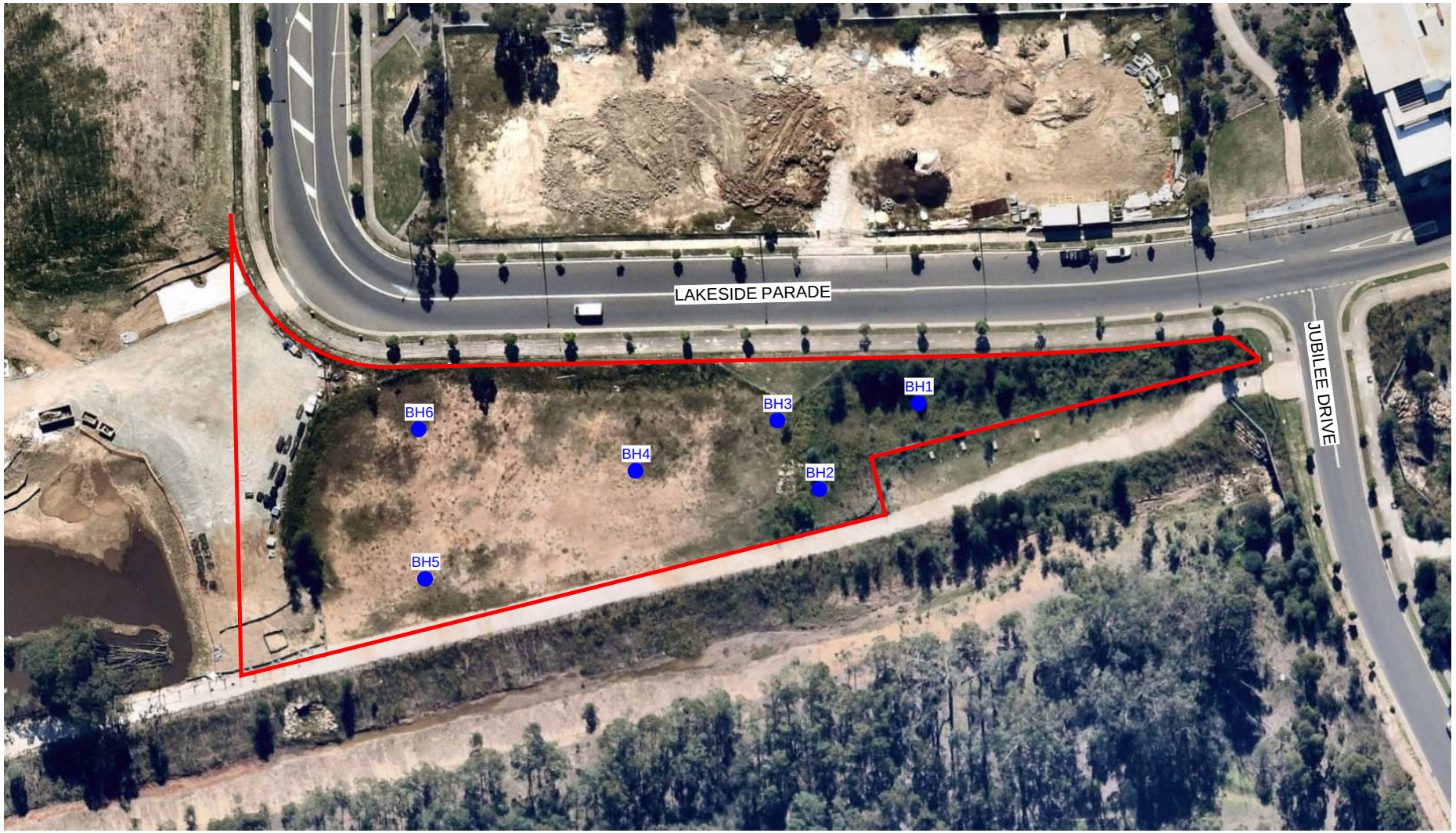
If you have any questions, please do not hesitate to contact the undersigned.

Yours faithfully
GEOTECHNIQUE PTY LTD

[redacted]

ZIAUDDIN AHMED
Senior Associate

Attached Drawing No 14682/1-AA1 Borehole Location Plan
Engineering Borehole Logs, Explanatory Notes
CBR Tests Results
Chemical Tests Results



Imagery ©2020 NearMap.com

LEGEND

● Borehole

0 10 20 30 40 50m

Scale 1:1000

GEOTECHNIQUE® PTY LTD

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NOTES

1. Site features are indicative and are not to scale.
2. This drawing has been produced using a base plan provided by others to which additional information e.g test pits, borehole locations or notes have been added. Some or all of the plan may not be relevant at the time of producing this drawing

FDC Construction (NSW) Pty Ltd
Proposed Pub
Lot 3989 in DP1190132
Lakeside Parade, Jordan Springs

Borehole Locations

Drawing No: 14682/1-AA1
Job No: 14682/1
Drawn By: MH
Date: 2 June 2020
Checked By: MT

File No: 14682-1
Layers: 0, AA1

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engineering log - borehole

Client : FDC Construction (NSW) Pty Ltd
Project : Proposed Pub
Location : Lot 3989 DP1190132
Lakeside Parade, Jordan Springs

Job No. : 14682/1
Borehole No. : BH1
Date : 02.06.2020
Logged/Checked by: NK/MT

drill model and mounting : Commachio MCT200 **slope :** **deg.** **R.L. surface :** ≅35.7

hole diameter : 100 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
TC Bit	▼					0			FILL: Silty Clay, low to medium plasticity, brown, with grass roots				Well Compacted
				DS	N=16 4,6,10	0.5			FILL: Silty Clay, medium plasticity, brown	M<OMC			
				DS	N=7 2,3,4	1 1.5							Moderatley Compacted
						2		CI-CH	Silty CLAY, medium to high plasticity, grey and brown	M<PL	St		
				DS	N=15 7,8,7	2.5 3		CH	Silty CLAY, high plasticity, grey and brown, with ironstone gravel	M≤PL	St-VSt		
						3.5 4							
						4.5		CH	Silty CLAY, high plasticity, brown-orange, and grey	M>PL	St-VSt		Groundwater

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engineering log - borehole

Client : FDC Construction (NSW) Pty Ltd
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Location : Lot 3989 DP1190132
Lakeside Parade, Jordan Springs

Job No. : 14682/1
Borehole No. : BH1
Date : 02.06.2020
Logged/Checked by: NK/MT

drill model and mounting : Commachio MCT200 **slope :** **deg.** **R.L. surface :** ≅35.7

hole diameter : 100 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
				DS	N=28 9,15,13	5							
						5.5		CL	Silty Shaley CLAY, low plasticity, grey and brown	M<PL	VSt-H		
				DS	N=R 24/50	6							
									Borehole No 1 terminated at 6.2m				
						6.5							
						7							
						7.5							
						8							
						8.5							
						9							

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engineering log - borehole

Client : FDC Construction (NSW) Pty Ltd
Project : Proposed Pub
Location : Lot 3989 DP1190132
Lakeside Parade, Jordan Springs

Job No. : 14682/1
Borehole No. : BH2
Date : 02.06.2020
Logged/Checked by: NK/MT

drill model and mounting : Commachio MCT200 **slope :** **deg.** **R.L. surface :** ≅35.6

hole diameter : 100 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
TC Bit						0			FILL: Silty Clay, low to medium plasticity, brown, with grass roots	M<OMC			Well Compacted
						0.5			FILL: Silty Clay, medium to high plasticity, brown and grey, with ironstone gravel	M<OMC			
				DS	N=12 3,6,6	1							
						1.5							
						2		CI	Silty CLAY, medium plasticity, brown-orange, and grey	M<PL	St		
				DS	N=10 2,4,6	2.5							
						3							
						3.5		CI-CH	Silty CLAY, medium to high plasticity, brown and grey, with ironstone gravel	M<PL	St-VSt		
				DS	N=15 4,8,7	4							
						4.5							

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engineering log - borehole

Client : FDC Construction (NSW) Pty Ltd
Project : Proposed Pub
Location : Lot 3989 DP1190132
Lakeside Parade, Jordan Springs

Job No. : 14682/1
Borehole No. : BH2
Date : 02.06.2020
Logged/Checked by: NK/MT

drill model and mounting : Commachio MCT200 **slope :** **deg.** **R.L. surface :** ≅35.6

hole diameter : 100 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						5							
	Dry			DS	N=R 6,10/5	5.5		CL	Silty Shaley CLAY, low plasticity	M<PL	VSt-H		
									Borehole No 2 terminated at 5.8m				
						6							
						6.5							
						7							
						7.5							
						8							
						8.5							
						9							

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Client : FDC Construction (NSW) Pty Ltd
Project : Proposed Pub
Location : Lot 3989 DP1190132
Lakeside Parade, Jordan Springs

Job No. : 14682/1
Borehole No. : BH3
Date : 02.06.2020
Logged/Checked by: NK/MT

drill model and mounting : Commachio MCT200 **slope :** **deg.** **R.L. surface :** ≅36

hole diameter : 100 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						0			FILL: Silty Clay, low to medium plasticity, brown	M<OMC			Moderately Compacted
									FILL: Silty Clay, medium plasticity, red-brown, and grey, with gravels	M<OMC			
				DS	N=5 1,2,3	0.5							
						1							
				DS	N=6 2,3,3	1.5							
						2							
						2.5		CI-CH	Silty CLAY, medium to high plasticity, red-brown and grey	M<PL	St		
				DS	N=11 3,3,8	3		CI	Silty Sandy CLAY, medium plasticity, brown-orange and grey, with gravel	M<PL	St		
						3.5							
						4		CI-CH	Silty CLAY, medium to high plasticity, grey-brown	M<PL	VSt-H		
						4.5							

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engineering log - borehole

Client : FDC Construction (NSW) Pty Ltd
Project : Proposed Pub
Location : Lot 3989 DP1190132
Lakeside Parade, Jordan Springs

Job No. : 14682/1
Borehole No. : BH3
Date : 02.06.2020
Logged/Checked by: NK/MT

drill model and mounting : Commachio MCT200 **slope :** **deg.** **R.L. surface :** ≅36

hole diameter : 100 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
	Dry			DS	N=20 3,8,12	5							
				DS	N=27 9,12,15	5.5 6							
						6.5			Borehole No 3 terminated at 6.45m				
						7 7.5 8 8.5 9							

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engineering log - borehole

Client : FDC Construction (NSW) Pty Ltd
Project : Proposed Pub
Location : Lot 3989 DP1190132
Lakeside Parade, Jordan Springs

Job No. : 14682/1
Borehole No. : BH4
Date : 02.06.2020
Logged/Checked by: NK/MT

drill model and mounting : Commachio MCT200 **slope :** **deg.** **R.L. surface :** ≅36.1

hole diameter : 100 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
TC Bit						0			FILL: Silty Clay, low to medium plasticity, brown, with grass roots	M<OMC			Well Compacted
									FILL: Silty Clay, medium plasticity, brown, with gravel	M<OMC			
				DS	N=9 2,5,4	1							
						1.5		CI	Silty CLAY, medium plasticity, brown	M<PL	St		
				DS	N=10 2,5,5	2.5							
						3							
				DS	N=10 4,5,5	3.5		CI-CH	Silty CLAY, medium to high plasticity, brown and grey, with ironstone gravel	M<PL	VSt		
						4							
						4.5							

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engineering log - borehole

Client : FDC Construction (NSW) Pty Ltd
Project : Proposed Pub
Location : Lot 3989 DP1190132
Lakeside Parade, Jordan Springs

Job No. : 14682/1
Borehole No. : BH4
Date : 02.06.2020
Logged/Checked by: NK/MT

drill model and mounting : Commachio MCT200 **slope :** **deg.** **R.L. surface :** ≅36.1

hole diameter : 100 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
						5							
								CI-CH	Silty CLAY, medium to high plasticity, grey	M<PL	St-VSt		
	▶					5.5							Seepage at 5.5m
				DS	N=27 11,16,11								
						6			Borehole No 4 terminated at 5.95m				
						6.5							
						7							
						7.5							
						8							
						8.5							
						9							

form no. 002 version 04 - 05/11

GEOTECHNIQUE
PTY LTD

engineering log - borehole

Client : FDC Construction (NSW) Pty Ltd
Project : Proposed Pub
Location : Lot 3989 DP1190132
Lakeside Parade, Jordan Springs

Job No. : 14682/1
Borehole No. : BH5
Date : 02.06.2020
Logged/Checked by: NK/MT

drill model and mounting : Commachio MCT200 **slope :** **deg.** **R.L. surface :** ≅36.0

hole diameter : 200 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
TC Bit	Dry			DB		0 0.5 1			FILL: Silty Clay, low to medium plasticity, brown, red, with ironstone gravel	M<OMC			Well compacted
						1 1.5 2 2.5 3 3.5 4 4.5			Borehole No 5 terminated at 1.0m				

form no. 002 version 04 - 05/11

GEOTECHNIQUE
PTY LTD

engineering log - borehole

Client : FDC Construction (NSW) Pty Ltd
Project : Proposed Pub
Location : Lot 3989 DP1190132
Lakeside Parade, Jordan Springs

Job No. : 14682/1
Borehole No. : BH6
Date : 02.06.2020
Logged/Checked by: NK/MT

drill model and mounting : Commachio MCT200 **slope :** **deg.** **R.L. surface :** ≅36.3

hole diameter : 200 **mm** **bearing :** **deg.** **datum :** AHD

method	groundwater	env samples	PID reading (ppm)	geo samples	field test	depth or R.L. in meters	graphic log	classification symbol	MATERIAL DESCRIPTION soil type, plasticity or particle characteristic, colour, secondary and minor components.	moisture condition	consistency density index	hand penetrometer kPa	Remarks and additional observations
TC Bit	Dry			DB		0 0.5 1			FILL: Silty Clay, medium plasticity, red-brown, with ironstone gravel	M<OMC			Well Compacted
						1 1.5 2 2.5 3 3.5 4 4.5			Borehole No 6 terminated at 1.0m				

Log Symbols & Abbreviations (Non-cored Borehole Log)

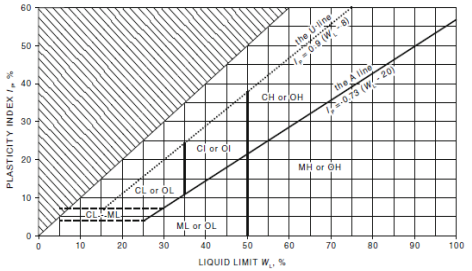
Log Column	Symbol/Value	Description
Drilling Method	V-bit TC-bit RR DB BB	Hardened steel 'V' shaped bit attached to auger Tungsten Carbide bit attached to auger Tricone (Rock Roller) bit Drag bit Blade bit
Groundwater	Dry  	Groundwater not encountered to the drilled or auger refusal depth Groundwater level at depths shown on log Groundwater seepage at depths shown on log
Environment Sample	GP G P	Glass bottle and plastic bag sample over depths shown on log Glass bottle sample over depths shown on log Plastic bag sample over depths shown on log
PID Reading	100	PID reading in ppm
Geotechnical Sample	DS DB U_{50}	Disturbed Small bag sample over depths shown on log Disturbed Bulk sample over depths shown on log Undisturbed 50mm tube sample over depths shown on log
Field Test	N=10 3,5,5 N=R 10,15/100	Standard Penetration Test (SPT) 'N' value. Individual numbers indicate blows per 150mm penetration. 'R' represents refusal to penetration in hard/very dense soils or in cobbles or boulders. The first number represents10 blows for 150mm penetration whereas the second number represents 15 blows for 100mm penetration where SPT met refusal
	DCP/PSP: 5 6 R/10	Dynamic Cone Penetration (DCP) or Perth Sand Penetrometer (PSP). Each number represents blows per 100mm penetration. 'R/10' represents refusal after 10mm penetration in hard/very dense soils or in gravels or boulders.
Classification	GP GW GM GC SP SW SM SC ML MI MH CL CI CH	Poorly Graded GRAVEL Well graded GRAVEL Silty GRAVEL Clayey GRAVEL Poorly graded SAND Well graded SAND Silty SAND Clayey SAND SILT / Sandy SILT / clayey SILT, low plasticity SILT / Sandy SILT / clayey SILT, medium plasticity SILT / Sandy SILT / clayey SILT, high plasticity CLAY / Silty CLAY / Sandy CLAY / Gravelly CLAY, low plasticity CLAY / Silty CLAY / Sandy CLAY / Gravelly CLAY, medium plasticity CLAY / Silty CLAY / Sandy CLAY / Gravelly CLAY, high plasticity
Moisture Condition Cohesive soils Cohesionless soils	 M<PL M=PL M>PL D M W	 Moisture content less than Plastic Limit Moisture content equal to Plastic Limit Moisture content to be greater than Plastic Limit Dry - Runs freely through hand Moist - Tends to cohere Wet - Tends to cohere
Consistency Cohesive soils	 VS S F St VSt H	**Term** / **Undrained shear strength, C_u (kPa)** / **Hand Penetrometer (Qu)** Very Soft / ≤12 / <25 Soft / >12 & ≤25 / 25 – 50 Firm / >25 & ≤50 / 50 – 100 Stiff / >50 & ≤100 / 100 – 200 Very Stiff / >100 & ≤200 / 200 – 400 Hard / >200 / >400
Density Index Cohesionless soils	 VL L M D VD	**Term** / **Density Index, I_D (%)** / **SPT 'N' (blows/300mm)** Very Loose / ≤15 / ≤5 Loose / >15 & ≤35 / >5 & ≤10 Medium Dense / >35 & ≤65 / >10 & ≤30 Dense / >65 & ≤85 / >30 & ≤50 Very Dense / >85 / >50
Hand Penetrometer	100 200	Unconfined compressive strength (q_u) in kPa determined using pocket penetrometer, at depths shown on log
Remarks	 Residual Alluvium Colluvial Aeolian Marine	Geological origin of soils Residual soils above bedrock River deposited Alluvial soils Gravity deposited Colluvial soils Wind deposited Aeolian soils Marine Soils

GEOTECHNIQUE PTY LTD

AS1726 : 2017– Unified Soil Classification System

Major Divisions		Particle size (mm)	Group Symbol	Typical Names	Field Identifications Sand and Gravels			Laboratory classification				
OVERSIZE	BOULDERS	>200						% Fines (2)	Plasticity of Fine Fraction	$C_u = D_{60}/D_{10}$	$C_c = (D_{30})^2/(D_{10}D_{60})$	Notes
	COBBLES	63										
COARSE GRAINED SOIL (more than 65% of soil excluding oversize fraction is greater than 0.075mm)	GRAVEL (more than half of coarse fraction is larger than 2.36mm)	Coarse 19	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength			≤5	-	>4	between 1 and 3	1. Identify lines by the method given for fine grained soils 2. Borderline classifications occur when the percentage of fines (fraction smaller than 0.075mm size) is greater than 5% and less than 12%. Borderline classifications require the use of dual symbols e.g. SP-SM, GW-GC
		Medium 6.7	GP	Poorly graded gravels, gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength			≤5	-	Fails to comply with above		
			GM	Silty gravels, gravel-sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength			≥12	Below 'A' line or I_p<4	-	-	
		Fine 2.36	GC	Clayey gravels, gravel-sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength			≥12	Above 'A' line or I_p>7	-	-	
	SAND (more than half of coarse fraction is smaller than 2.36mm)	Coarse 0.6	SW	Well-graded sands, gravelly sands, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength			≤5	-	>6	between 1 and 3	
		Medium 0.21	SP	Poorly graded sands and gravelly sands; little or no fines, uniform sands	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength			≤5	-	Fails to comply with above		
			SM	Silty sands, sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength			≥12	Below 'A' line or I_p<4	-	-	
		Fine 0.075	SC	Clayey sand, sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength			≥12	Above 'A' line of I_p>7	-	-	
FINE GRAINED SOIL (more than 35% of soil excluding oversize fraction is less than 0.075mm)	SILT (0.075mm to 0.002mm) & CLAY (<0.002mm) Liquid Limit<50%		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	**Dry Strength**	**Dilatancy**	**Toughness**	More than 35% passing 0.075mm	Below 'A' line			
					None to low	Slow to rapid	Low					
			CL, CI	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	Medium to high	None to very slow	Medium		Above 'A' line			
			OL	Organic silts and organic silty clays of low plasticity	Low to medium	Slow	Low		Below 'A' line			
	SILT (0.075mm to 0.002mm) & CLAY (<0.002mm) Liquid Limit>50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	Low to medium	None to slow	Low to medium		Below 'A' line			
			CH	Inorganic clays of medium to high plasticity, fat clays	High to very high	None	High		Above 'A' line			
			OH (1)	Organic clays of medium to high plasticity, organic silts	Medium to high	None to very slow	Low to medium		Below 'A' line			
	HIGHLY ORGANIC SOILS		Pt (1)	Peat and highly organic soils	Identified by colour, odour, spongy feel and generally by fibrous texture			Effervesces with H_2O_2				

Use the gradation of material passing 63mm for classification of fractions according to the criteria given in 'Major Divisions'



Log Symbols & Abbreviations (Cored Borehole Log)

Log Column	Symbol / Abbreviation	Description	
Core Size		Nominal Core Size (mm)	
	NQ	47	
	NMLC	52	
	HQ	63	
Water Loss	◀	Complete water loss	
	◁	Partial water loss	
Weathering (AS1726:2017)	RS	Residual Soil	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported
	XW	Extremely Weathered	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible
	HW	Highly Weathered	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognizable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
	MW	Moderately Weathered	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognizable, but shows little or no change of strength from fresh rock
	SW	Slightly Weathered	Rock is partially discoloured with staining or bleaching along joints but shows little or no change in strength from fresh rock
	FR	Fresh	Rock shows no sign of decomposition of individual minerals or colour changes
		Note : Where it is not possible to distinguish between HW and MW rock the term Distinctly Weathered (DW) may be used. DW is defined as 'Rock strength usually changed by weathering. The rock may be highly discoloured, usually by ironstaining. Porosity may be increased by leaching, or may be decreased by deposition of weathering products in pores'	
Strength (AS1726:2017)		**Term**	**Point Load Strength Index (I_{s50}, MPa)**
	VL	Very Low	≥0.03 ≤0.1
	L	Low	>0.1 ≤0.3
	M	Medium	>0.3 ≤1
	H	High	>1 ≤3
	VH	Very High	>3 ≤10
	EH	Extremely High	>10
Defect Spacing		**Description**	**Spacing (mm)**
		Extremely closely spaced	<20
		Very closely spaced	20 to 60
		Closely spaced	60 to 200
		Medium spaced	200 to 600
		Widely spaced	600 to 2000
		Very widely spaced	2000 to 6000
		Extremely widely spaced	>6000
Defect Description (AS1726:2017) Type			
	Pt	Parting	
	Jo	Joint	
	Sh	Sheared Surface	
	Sz	Sheared Zone	
	Ss	Sheared Seam	
	Cs	Crushed Seam	
	Is	Infilled Seam	
	Ews	Extremely Weathered Seam	
Macro-surface geometry	St	Stepped	
	Cu	Curved	
	Un	Undulating	
	Ir	Irregular	
	Pl	Planar	
Micro-surface geometry	Vro	Very Rough	
	Ro	Rough	
	Sm	Smooth	
	Po	Polished	
	Sl	Slickensided	
Coating or infilling	cn	clean	
	sn	stained	
	vn	veneer	
	cg	coating	

AS1726 – Identification of Sedimentary Rocks for Engineering Purposes

Grain Size mm		Bedded rocks (mostly sedimentary)								
More than 20	20	Grain Size Description				At least 50% of grains are of carbonate			At least 50% of grains are of fine-grained volcanic rock	
	6	RUDACEOUS		CONGLOMERATE Rounded boulders, cobbles and gravel cemented in a finer matrix		LIMESTONE and DOLOMITE (undifferentiated)	Calcirudite		Fragments of volcanic ejecta in a finer matrix	SALINE ROCKS
	2			Breccia Irregular rock fragments in a finer matrix					Rounded grains AGGLOMERATE Angular grains VOLCANIC BRECCIA	Halite Anhydrite
	0.6	ARENACEOUS	Coarse	SANDSTONE Angular or rounded grains, commonly cemented by clay, calcite or iron minerals			Calcarenite		Cemented volcanic ash	Gypsum
	0.2		Medium	Quartzite Quartz grains and siliceous cement					TUFF	
	0.06		Fine	Arkose Many feldspar grains Greywacke Many rock chips						
	0.002	ARGILLACEOUS		MUDSTONE	SILTSTONE Mostly silt	Calcareous Mudstone	Calcisiltite	CHALK	Fine-grained TUFF	
	Less than 0.002			SHALE Fissile	CLAYSTONE Mostly clay		Calcilutite		Very fine-grained TUFF	
Amorphous or crypto-crystalline				Flint: occurs as hands of nodules in the chalk Chert: occurs as nodules and beds in limestone and calcareous sandstone						COAL LIGNITE
				Granular cemented – except amorphous rocks						
				SILICEOUS		CALCAREOUS			SILICEOUS	CARBONACEOUS
				SEDIMENTARY ROCKS Granular cemented rocks vary greatly in strength, some sandstones are stronger than many Igneous rocks. Bedding may not show in hand specimens and is best seen in outcrop. Only sedimentary rocks, and some metamorphic rocks derived from them, contain fossils Calcareous rocks contain calcite (calcium carbonate) which effervesces with dilute hydrochloric acid						

AS1726 – Identification of Metamorphic and Igneous Rocks for Engineering Purposes

Obviously foliated rocks (mostly metamorphic)			Rocks with massive structure and crystalline texture (mostly igneous)					Grain size (mm)
Grain size description			Grain size description	Pegmatite			Pyrosenite	More than 20
		MARBLE						20
COARSE	GNEISS Well developed but often widely spaced foliation sometimes with schistose bands	QUARTZITE	COARSE	GRANITE	Diorite	GABBRO	Peridorite	6
	Migmatite Irregularly foliated: mixed schists and gneisses	Granulite HORNFELS		These rocks are sometimes phorphyritic and are then described, for example, as porphyritic granite				2
MEDIUM	SCHIST Well developed undulose foliation; generally much mica	Amphibolite	MEDIUM	Micorgranite	Microdiorite	Dolerite		0.6
		Serpentine		These rocks are sometimes phorphyritic and are then described as porphyries				0.2
								0.06
FINE	PHYLLITE Slightly undulose foliation; sometimes 'spotted'		FINE	RHYOLITE	ANDESITE	BASALT		0.002
	SLATE Well developed plane cleavage (foliation)			These rocks are sometimes phorphyritic and are then described as porphyries				Less than 0.002
	Mylonite Found in fault zones, mainly in igneous and metamorphic areas			Obsidian	Volcanic glass			Amorphous or cryptocrystalline
CRYSTALLINE				Pale<----------->Dark				
SILICEOUS		Mainly SILICEOUS		ACID Much quartz	INTERMEDIATE Some quartz	BASIC Little or no quartz	ULTRA BASIC	
METAMORPHIC ROCKS Most metamorphic rocks are distinguished by foliation which may impart fissility. Foliation in gneisses is best observed in outcrop. Non-foliated metamorphics are difficult to recognize except by association. Any rock baked by contact metamorphism is described as 'hornfels' and is generally somewhat stronger than the parent rock Most fresh metamorphic rocks are strong although perhaps fissile			IGNEOUS ROCKS Composed of closely interlocking mineral grains. Strong when fresh; not porous Mode of occurrence : 1 Batholith; 2 Laccoliths; 3 Sills; 4 Dykes; 5 Lava Flows; 6 Veins					

GEOTECH TESTING PTY LTD®
ABN 71 076 676 321

FDC CONSTRUCTION (NSW) PTY LTD
22-24 JUNCTION STREET
FOREST LODGE NSW 2037

GEOTECHNICAL INVESTIGATION
PROPOSED PUB, LOT3989 DP1190132, LAKESIDE PARADE, JORDAN SPRINGS

CALIFORNIA BEARING RATIO TEST REPORT

CBR Test Procedure	Laboratory Compaction Method	Sampling Method	Date of Test
AS1289 6.1.1	AS1289 5.1.1	AS1289 1.2.1 Clause 6.5.3	09/06/2020
Job No: 14682/1	Tested By: MT	Checked By: AK	Lab Penrith

Laboratory Number		14682/1-1	14682/1-2		
Drawing No		Borehole 5 14682/1-AA1	Borehole 6 14682/1-AA1		
Sample No		1	2		
Depth (m)		0.5 - 0.8	0.7 - 1.0		
Date Sampled		03/06/2020	03/06/2020		
Sample Description		FILL: Silty Clay, medium plasticity, red-brown, trace of fine to medium gravel	FILL: Silty Clay, medium to high plasticity, red-brown, trace of fine to medium gravel		
Maximum Dry Density	t/m3	1.86	1.76		
Optimum Moisture Content	%	15.4	18.8		
Field Moisture Content	%	15.9	20.4		
% Retained 19mm		1.6	1.1		
Excluded (Yes / No / Not Applicable)		Yes	Yes		
CBR TEST RESULTS					
Dry Density t/m^3	Before soaking	1.83	1.76		
	After soaking	1.80	1.74		
Density Ratio %	Before soaking	98.5	100		
Moisture Content %	Before soaking	15.9	19.4		
	After soaking	17.2	20.7		
Moisture Ratio %	Before soaking	103	103		
Number of Days Soaked		4	4		
Surcharge	kg	9	9		
Moisture Content after test %	Top 30mm	24.0	22.0		
	Whole Sample	16.9	20.5		
Swell after soaking	%	2.0	1.0		
Penetration	mm	2.5	2.5		
CBR VALUE	**%**	**3.5**	**3**		

Form No R003 Version 04 06/13 - issued by ER

A Kench 10/06/2020
Approved Signatory

NATA
Nata Accreditation Number 2734
Corporate Site Number 2727

Accredited for compliance with ISO/IEC 17025 - Testing.

34 Borec Road, Penrith NSW 2750
Telephone: (02) 4722 2744
Unit 4, 18-20 Whyalla Place, Prestons NSW 2170
Telephone: (02) 9607 6111
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ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Mrigesh Tamang
Client	Geotechnique
Address	P.O. Box 880 NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	mrigesh@geotech.com.au
Project	**14682/1 Lakeside Parade Jordan Springs**
Order Number	(Not specified)
Samples	8

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE207339 R0**
Date Received	5/6/2020
Date Reported	16/6/2020

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

[redacted]

Shane MCDERMOTT
Inorganic/Metals Chemist

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography [AN245] Tested: 16/6/2020

PARAMETER	UOM	LOR	BH1 SOIL 0.5-0.9 4/6/2020 SE207339.001	BH1 SOIL 1.5-1.95 4/6/2020 SE207339.002	BH2 SOIL 1.0-1.45 4/6/2020 SE207339.003	BH2 SOIL 2.5-2.95 4/6/2020 SE207339.004	BH3 SOIL 1.5-1.95 4/6/2020 SE207339.005
Chloride	mg/kg	0.25	830	370	910	850	930
Sulfate	mg/kg	0.5	38	110	180	170	200

PARAMETER	UOM	LOR	BH3 SOIL 3.0-3.45 4/6/2020 SE207339.006	BH4 SOIL 1.0-1.45 4/6/2020 SE207339.007	BH4 SOIL 2.5-2.95 4/6/2020 SE207339.008
Chloride	mg/kg	0.25	170	1500	970
Sulfate	mg/kg	0.5	150	94	170

pH in soil (1:2) [AN101] Tested: 15/6/2020

PARAMETER	UOM	LOR	BH1 SOIL 0.5-0.9 4/6/2020 SE207339.001	BH1 SOIL 1.5-1.95 4/6/2020 SE207339.002	BH2 SOIL 1.0-1.45 4/6/2020 SE207339.003	BH2 SOIL 2.5-2.95 4/6/2020 SE207339.004	BH3 SOIL 1.5-1.95 4/6/2020 SE207339.005
pH (1:2)	pH Units	-	**5.3**	**5.2**	**5.2**	**4.6**	**5.4**

PARAMETER	UOM	LOR	BH3 SOIL 3.0-3.45 4/6/2020 SE207339.006	BH4 SOIL 1.0-1.45 4/6/2020 SE207339.007	BH4 SOIL 2.5-2.95 4/6/2020 SE207339.008
pH (1:2)	pH Units	-	**5.8**	**5.9**	**4.7**

Conductivity (1:2) in soil [AN106] Tested: 15/6/2020

PARAMETER	UOM	LOR	BH1 SOIL 0.5-0.9 4/6/2020 SE207339.001	BH1 SOIL 1.5-1.95 4/6/2020 SE207339.002	BH2 SOIL 1.0-1.45 4/6/2020 SE207339.003	BH2 SOIL 2.5-2.95 4/6/2020 SE207339.004	BH3 SOIL 1.5-1.95 4/6/2020 SE207339.005
Conductivity (1:2) @25 C*	µS/cm	1	1000	650	1200	1200	1200
Resistivity (1:2)*	ohm cm	-	970	1500	810	870	850

PARAMETER	UOM	LOR	BH3 SOIL 3.0-3.45 4/6/2020 SE207339.006	BH4 SOIL 1.0-1.45 4/6/2020 SE207339.007	BH4 SOIL 2.5-2.95 4/6/2020 SE207339.008
Conductivity (1:2) @25 C*	µS/cm	1	350	1800	1300
Resistivity (1:2)*	ohm cm	-	2800	550	800

Moisture Content [AN002] Tested: 12/6/2020

PARAMETER	UOM	LOR	BH1 SOIL 0.5-0.9 4/6/2020 SE207339.001	BH1 SOIL 1.5-1.95 4/6/2020 SE207339.002	BH2 SOIL 1.0-1.45 4/6/2020 SE207339.003	BH2 SOIL 2.5-2.95 4/6/2020 SE207339.004	BH3 SOIL 1.5-1.95 4/6/2020 SE207339.005
% Moisture	%w/w	1	13.2	14.9	16.2	14.1	21.8

PARAMETER	UOM	LOR	BH3 SOIL 3.0-3.45 4/6/2020 SE207339.006	BH4 SOIL 1.0-1.45 4/6/2020 SE207339.007	BH4 SOIL 2.5-2.95 4/6/2020 SE207339.008
% Moisture	%w/w	1	18.1	21.7	14.0

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN101	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode and is calibrated against 3 buffers purchased commercially. For soils, an extract with water is made at a ratio of 1:2 and the pH determined and reported on the extract after 1 hour extraction (pH 1:2) or after 1 hour extraction and overnight aging (pH (1:2) aged). Reference APHA 4500-H+.
AN106	Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as µmhos /cm or µS/cm @ 25°C. For soils, an extract of as received sample with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Salinity can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. Reference APHA 2510 B.
AN106	Resistivity of the extract is reported on the extract basis and is the reciprocal of conductivity. Salinity and TDS can be calculated from the extract conductivity and is reported back to the soil basis.
AN245	Anions by Ion Chromatography: A water sample or extract is injected into an eluent stream that passes through the ion chromatographic system where the anions of interest ie Br, Cl, NO2, NO3 and SO4 are separated on their relative affinities for the active sites on the column packing material. Changes to the conductivity and the UV-visible absorbance of the eluent enable identification and quantitation of the anions based on their retention time and peak height or area. APHA 4110 B

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
		NVL	Not validated.	LOR	Limit of Reporting.
**	Indicative data, theoretical holding time exceeded.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

This document is issued by the Company under its General Conditions of Service accessible at www.sgs.com/en/Terms-and-Conditions.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

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STATEMENT OF QA/QC PERFORMANCE

SE207339 R0

CLIENT DETAILS

Contact	Mrigesh Tamang
Client	Geotechnique
Address	P.O. Box 880 NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	mrigesh@geotech.com.au
Project	**14682/1 Lakeside Parade Jordan Springs**
Order Number	(Not specified)
Samples	8

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE207339 R0**
Date Received	05 Jun 2020
Date Reported	16 Jun 2020

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Extraction Date	Conductivity (1:2) in soil	8 items
	pH in soil (1:2)	8 items
	Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography	8 items
Analysis Date	Conductivity (1:2) in soil	8 items

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	None
Samples received in correct containers	Yes	Sample counts by matrix	8 Soil
Date documentation received	9/6/2020@4:34pm	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	N/A
Sample temperature upon receipt	17°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

HOLDING TIME SUMMARY

SE207339 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Conductivity (1:2) in soil

Method: ME-(AU)-[ENV]AN106

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1	SE207339.001	LB201919	04 Jun 2020	05 Jun 2020	11 Jun 2020	15 Jun 2020†	11 Jun 2020	16 Jun 2020†
BH1	SE207339.002	LB201919	04 Jun 2020	05 Jun 2020	11 Jun 2020	15 Jun 2020†	11 Jun 2020	16 Jun 2020†
BH2	SE207339.003	LB201919	04 Jun 2020	05 Jun 2020	11 Jun 2020	15 Jun 2020†	11 Jun 2020	16 Jun 2020†
BH2	SE207339.004	LB201919	04 Jun 2020	05 Jun 2020	11 Jun 2020	15 Jun 2020†	11 Jun 2020	16 Jun 2020†
BH3	SE207339.005	LB201919	04 Jun 2020	05 Jun 2020	11 Jun 2020	15 Jun 2020†	11 Jun 2020	16 Jun 2020†
BH3	SE207339.006	LB201919	04 Jun 2020	05 Jun 2020	11 Jun 2020	15 Jun 2020†	11 Jun 2020	16 Jun 2020†
BH4	SE207339.007	LB201919	04 Jun 2020	05 Jun 2020	11 Jun 2020	15 Jun 2020†	11 Jun 2020	16 Jun 2020†
BH4	SE207339.008	LB201919	04 Jun 2020	05 Jun 2020	11 Jun 2020	15 Jun 2020†	11 Jun 2020	16 Jun 2020†

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1	SE207339.001	LB201780	04 Jun 2020	05 Jun 2020	18 Jun 2020	12 Jun 2020	17 Jun 2020	16 Jun 2020
BH1	SE207339.002	LB201780	04 Jun 2020	05 Jun 2020	18 Jun 2020	12 Jun 2020	17 Jun 2020	16 Jun 2020
BH2	SE207339.003	LB201780	04 Jun 2020	05 Jun 2020	18 Jun 2020	12 Jun 2020	17 Jun 2020	16 Jun 2020
BH2	SE207339.004	LB201780	04 Jun 2020	05 Jun 2020	18 Jun 2020	12 Jun 2020	17 Jun 2020	16 Jun 2020
BH3	SE207339.005	LB201780	04 Jun 2020	05 Jun 2020	18 Jun 2020	12 Jun 2020	17 Jun 2020	16 Jun 2020
BH3	SE207339.006	LB201780	04 Jun 2020	05 Jun 2020	18 Jun 2020	12 Jun 2020	17 Jun 2020	16 Jun 2020
BH4	SE207339.007	LB201780	04 Jun 2020	05 Jun 2020	18 Jun 2020	12 Jun 2020	17 Jun 2020	16 Jun 2020
BH4	SE207339.008	LB201780	04 Jun 2020	05 Jun 2020	18 Jun 2020	12 Jun 2020	17 Jun 2020	16 Jun 2020

pH in soil (1:2)

Method: ME-(AU)-[ENV]AN101

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1	SE207339.001	LB201919	04 Jun 2020	05 Jun 2020	11 Jun 2020	15 Jun 2020†	16 Jun 2020	16 Jun 2020
BH1	SE207339.002	LB201919	04 Jun 2020	05 Jun 2020	11 Jun 2020	15 Jun 2020†	16 Jun 2020	16 Jun 2020
BH2	SE207339.003	LB201919	04 Jun 2020	05 Jun 2020	11 Jun 2020	15 Jun 2020†	16 Jun 2020	16 Jun 2020
BH2	SE207339.004	LB201919	04 Jun 2020	05 Jun 2020	11 Jun 2020	15 Jun 2020†	16 Jun 2020	16 Jun 2020
BH3	SE207339.005	LB201919	04 Jun 2020	05 Jun 2020	11 Jun 2020	15 Jun 2020†	16 Jun 2020	16 Jun 2020
BH3	SE207339.006	LB201919	04 Jun 2020	05 Jun 2020	11 Jun 2020	15 Jun 2020†	16 Jun 2020	16 Jun 2020
BH4	SE207339.007	LB201919	04 Jun 2020	05 Jun 2020	11 Jun 2020	15 Jun 2020†	16 Jun 2020	16 Jun 2020
BH4	SE207339.008	LB201919	04 Jun 2020	05 Jun 2020	11 Jun 2020	15 Jun 2020†	16 Jun 2020	16 Jun 2020

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography

Method: ME-(AU)-[ENV]AN245

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1	SE207339.001	LB202032	04 Jun 2020	05 Jun 2020	11 Jun 2020	16 Jun 2020†	14 Jul 2020	16 Jun 2020
BH1	SE207339.002	LB202032	04 Jun 2020	05 Jun 2020	11 Jun 2020	16 Jun 2020†	14 Jul 2020	16 Jun 2020
BH2	SE207339.003	LB202032	04 Jun 2020	05 Jun 2020	11 Jun 2020	16 Jun 2020†	14 Jul 2020	16 Jun 2020
BH2	SE207339.004	LB202032	04 Jun 2020	05 Jun 2020	11 Jun 2020	16 Jun 2020†	14 Jul 2020	16 Jun 2020
BH3	SE207339.005	LB202032	04 Jun 2020	05 Jun 2020	11 Jun 2020	16 Jun 2020†	14 Jul 2020	16 Jun 2020
BH3	SE207339.006	LB202032	04 Jun 2020	05 Jun 2020	11 Jun 2020	16 Jun 2020†	14 Jul 2020	16 Jun 2020
BH4	SE207339.007	LB202032	04 Jun 2020	05 Jun 2020	11 Jun 2020	16 Jun 2020†	14 Jul 2020	16 Jun 2020
BH4	SE207339.008	LB202032	04 Jun 2020	05 Jun 2020	11 Jun 2020	16 Jun 2020†	14 Jul 2020	16 Jun 2020

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No surrogates were required for this job.

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Conductivity (1:2) in soil — Method: ME-(AU)-[ENV]AN106

Sample Number	Parameter	Units	LOR	Result
LB201919.001	Conductivity (1:2) @25 C*	µS/cm	1	<1

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography — Method: ME-(AU)-[ENV]AN245

Sample Number	Parameter	Units	LOR	Result
LB202032.001	Chloride	mg/kg	0.25	<0.25
	Sulfate	mg/kg	0.5	<0.5

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Conductivity (1:2) in soil

Method: ME-(AU)-[ENV]AN106

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE207339.008	LB201919.012	Conductivity (1:2) @25 C*	µS/cm	1	1300	1400	30	14
		Resistivity (1:2)*	ohm cm	-	800	690	31	14

pH in soil (1:2)

Method: ME-(AU)-[ENV]AN101

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE207339.008	LB201919.012	pH (1:2)	pH Units	-	4.7	4.5	32	4

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography

Method: ME-(AU)-[ENV]AN245

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE207339.008	LB202032.012	Chloride	mg/kg	0.25	970	1100	30	12
		Sulfate	mg/kg	0.5	170	210	31	18

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Conductivity (1:2) in soil

Method: ME-(AU)-[ENV]AN106

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB201919.002	Conductivity (1:2) @25 C*	µS/cm	1	300	303	70 - 130	99

pH in soil (1:2)

Method: ME-(AU)-[ENV]AN101

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB201919.003	pH (1:2)	pH Units	-	7.4	7.415	98 - 102	99

Soluble Anions in Soil from 1:2 DI Extract by Ion Chromatography

Method: ME-(AU)-[ENV]AN245

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB202032.002	Chloride	mg/kg	0.25	40	40	70 - 130	101
	Sulfate	mg/kg	0.5	39	40	70 - 130	97

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spikes were required for this job.

MATRIX SPIKE DUPLICATES

SE207339 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: https://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover the performance of this service.
**	Indicative data, theoretical holding time exceeded.
-	Sample not analysed for this analyte.
IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to relevant report comments for further information.

E-MAILED
9/6/20 @ 4.3PM

GEOTECHNIQUE PTY LTD

Laboratory Test Request / Chain of Custody Record

Lemko Place
PENRITH NSW 2750
P O Box 880
PENRITH NSW 2751
Tel: (02) 4722 2700
Fax: (02) 4722 6161
email: info@geotech.com.au

TO:	**SGS ENVIRONMENTAL SERVICES** **UNIT 16** **33 MADDOX STREET** **ALEXANDRIA NSW**	**Sampling Date:**	4/06/2020	**Job No:**	14682/1
		Sampled By:	MT	**Project:**	Proposed Pub
PH:	**8594 0400** **FAX:** **8594 0499**	**Project Manager:**	MT	**Location:**	Lakeside Parade , Jordan Springs
ATTN:	Emily YIN				

	Sampling details		Sample type		Results required by:								
	Location	Depth (m)	Soil	Water	EC (1:5)	Aggressivity	Note						KEEP SAMPLE
1	BH1	0.5-0.9			✓	✓	Aggressivity test includes						YES
2	BH1	1.5-1.95			✓	✓	pH, Chloride, Sulphate and Resisitvity						YES
3	BH2	1.0-1.45			✓	✓							YES
4	BH2	2.5-2.95			✓	✓							YES
5	BH3	1.5-1.95			✓	✓							YES
6	BH3	3.0-3.45			✓	✓							YES
7	BH4	1.0-1.45			✓	✓							YES
8	BH4	2.5-2.95			✓	✓							YES

SGS EHS Sydney COC
SE207339

Name	Signature	Date	[redacted] Name	Signature	Date
MT	MT	4/06/2020		/	5/6 3:30pm

Legend:

WG	Water sample, glass bottle	USG	Undisturbed soil sample (gla	DSP	Disturbed soil sample (small plastic bag)
WP	Water sample, plastic bottle	DSG	Disturbed soil sample (glass j	✓	Test required

* Purge & Trap @ mole H^+/tonne
# Geotechnique Screen

Form No 4.7F3-10 SGS

SAMPLE RECEIPT ADVICE

SE207339

CLIENT DETAILS

Contact	Mrigesh Tamang
Client	Geotechnique
Address	P.O. Box 880 NSW 2751
Telephone	02 4722 2700
Facsimile	02 4722 6161
Email	mrigesh@geotech.com.au
Project	**14682/1 Lakeside Parade Jordan Springs**
Order Number	(Not specified)
Samples	8

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Fri 5/6/2020
Report Due	Tue 16/6/2020
SGS Reference	**SE207339**

SUBMISSION DETAILS

This is to confirm that 8 samples were received on Friday 5/6/2020. Results are expected to be ready by COB Tuesday 16/6/2020. Please quote SGS reference SE207339 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	None
Samples received in correct containers	Yes	Sample counts by matrix	8 Soil
Date documentation received	9/6/2020@4:34pm	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	N/A
Sample temperature upon receipt	17°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

SAMPLE RECEIPT ADVICE

SE207339

CLIENT DETAILS

Client Geotechnique

Project 14682/1 Lakeside Parade Jordan Springs

SUMMARY OF ANALYSIS

No.	Sample ID	Conductivity (1:2) in soil	Moisture Content	pH in soil (1:2)	Soluble Anions in Soil from 1:2 DI Extract by Ion
001	BH1 0.5-0.9	2	1	1	2
002	BH1 1.5-1.95	2	1	1	2
003	BH2 1.0-1.45	2	1	1	2
004	BH2 2.5-2.95	2	1	1	2
005	BH3 1.5-1.95	2	1	1	2
006	BH3 3.0-3.45	2	1	1	2
007	BH4 1.0-1.45	2	1	1	2
008	BH4 2.5-2.95	2	1	1	2

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .