



Brou Landfill Post Bushfire Expansion

Geotechnical Investigation Report

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This report must be read in the context of the full report and the attached limitations, titled *Important Information about* your Tetra Tech Coffey Report.

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ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
AHD	Australian Height Datum
ASS	Acid Sulfate Soils
bgl	below ground level
Coffey	Tetra Tech Coffey Pty Ltd
DCP	Dynamic Cone Penetrometer
ESC	Eurobodalla Shire Council
NATA	National Association of Testing Authorities
NSW EPA	NSW Environment Protection Authority
PASS	Potential Acid Sulfate Soils
PSD	Particle Size Distribution
Public Works	NSW Public Works
RAP	Registered Aboriginal Party

1. INTRODUCTION

This report presents the results of a geotechnical investigation carried out by Tetra Tech Coffey Pty Ltd (Coffey) for proposed developments at Brou Lake Road, Bodalla NSW 2545. The investigation was commissioned by NSW Public Works (Public Works), on behalf of Eurobodalla Shire Council (ESC), to inform preliminary design for proposed expansion works at the existing Brou Landfill.

The proposed expansion works include the construction of a new landfill cell and associated ponds to the west of the current landfill footprint, along with a new transfer station and administration centre to the south east. A site locality plan and site layout plan for the proposed development areas (herein referred to as "the site") are presented in Appendix A, Figures 1 and 2 respectively.

The investigation was undertaken in August 2022, in accordance with Coffey's tender submission for the project (ref: 754-CBRGE301336-P01, dated 27 April 2022).

1.1 BACKGROUND

ESC's Waste Management Facilities were put under considerable strain during the 2019/20 bushfire season, suffering direct damage and then having service interrupted while the landfills received debris and waste from fire impacted properties.

ESC applied to NSW EPA for funding to upgrade the Brou and Surf Beach waste facilities to enhance the ability to meet demands and increase capacity to deal with natural disasters.

Accordingly, ESC are planning expansion works to the Brou Landfill following impacts from the 2019/2020 bushfire season. The proposed upgrades are summarised in table 1.1, below.

Table 1.1 – Summary o	f proposed developments
-----------------------	-------------------------

Development phase	Summary of Proposed Developments
Phase 1 – West of existing landfill facilities	 Construction of a new landfill cell Relocation of existing water services Construction of a new sediment pond and treatment plant
Phase 2 – South-west of existing landfill facilities	• Construction of a new transfer station, resource recovery hub, weighbridge, commercial operational area, amenities and office facilities.

Coffey have not been provided with any design drawings or further design information. The concept design for the above developments is expected to be based on various factors including cultural and heritage constraints, groundwater, topography, and the findings of the geotechnical investigation.

It is noted that the final site boundaries may also be modified (potentially extending over larger areas than those shown in Appendix A, Figure 2), dependent on the outcomes of the ongoing cultural heritage and ecological surveys at the site. However, at the time of this geotechnical investigation, site access approvals were limited to the approximate extent shown in Appendix A, Figure 2. Areas under further assessment by ESC are shown in Appendix A, Figure 6, however these locations had not been cleared for cultural and environmental heritage at the time of this investigation and, as such, were not assessed as part of this geotechnical investigation.

1.2 OBJECTIVES

The purpose of this geotechnical investigation was to obtain information on ground conditions for the proposed development areas, and to provide recommendations on:

- Excavation conditions for the proposed cell expansion.
- Dispersive nature / erodibility of soils.
- Occurrence or risk of acid sulfate soils at the site.
- Groundwater conditions.
- Suitability of clay soils for use as a clay liner or capping material.
- Site classification to AS 2870 and in-situ bearing capacity for soils in the Phase 2 Development Area for the proposed administration facility.
- Foundation conditions and geotechnical design parameters for shallow footings.

1.3 SCOPE OF WORK

Coffey conducted the following scope of work:

- Desktop review of geological maps, acid sulfate risk maps and other publicly available information.
- Site walkover with a Registered Aboriginal Party (RAP engaged independently by ESC), along with ESC and Public Works Representatives.
- Service location to clear boreholes of underground services.
- Ground investigation, comprising a client-nominated scope of work of:
 - 12 boreholes in the proposed Phase 1 cell expansion area, up to V-bit refusal in bedrock or encountering groundwater (whichever occurred first)
 - 8 test pits in the proposed Phase 2 development area, up to 2 m below ground level (bgl) or prior refusal in bedrock.
- Sampling and laboratory testing.
- Preparation of this Geotechnical Investigation Report, with data from the field investigation, laboratory test results, and geotechnical recommendations.

2. INVESTIGATION METHODOLOGY

2.1 DESKTOP STUDY

Prior to mobilisation to site, Coffey conducted a preliminary desktop study to review:

- Local geology, hydrogeology, topography and acid sulfate risk maps.
- Registered groundwater bore information in the public register held by Bureau of Meteorology.

2.2 SITE WALKOVER

Prior to the commencement of drilling works, a Coffey representative attended the site on 15 August 2022 to complete a site walkover with a RAP, representatives from ESC and Public Works, and an accredited underground service locator from Coastal Cable Locators.

The site walkover was undertaken with all parties to:

- Observe features of geotechnical significance.
- Select borehole locations and identify cultural and environmental "no-go" areas
- Clear the proposed borehole locations of underground services

The site walkover was undertaken across both Phase 1 and Phase 2 development areas. Selected site photographs taken during the walkover are presented in Appendix B. Site observations are summarised in section 3.5 of this report.

2.3 GROUND INVESTIGATION

Ground investigations at both sites were undertaken between 16-18 August 2022, as described below. Ground investigations were undertaken at accessible locations (agreed with ESC, Public Works and the RAP) to avoid the disturbance of protected flora onsite. RAP, ESC and Public Works representatives attended the site on various occasions during the fieldworks to monitor works progress and assess the sites for features of cultural or environmental heritage.

2.3.1 Boreholes – Phase 1 Development Area

Ground investigations at the Phase 1 Development Area (for the proposed cell expansion) were undertaken between 16 and 18 August 2022, and comprised the excavation of 12 auger boreholes across the area at the locations shown in Appendix A, Figure 3.

A drilling contractor (GE Drilling Pty Ltd) was engaged to mobilise a *Hanjin D&B 8D* track-mounted drilling rig to the site to excavate all boreholes using solid stem auger attachments. Boreholes were advanced to depths ranging between 7.1 m and 15.0 m below ground level, terminated on refusal in rock or encountering groundwater¹ (whichever occurred first).

A Coffey project engineer was onsite for the duration of the drilling works to observe borehole excavation, log the boreholes, monitor field testing and collect samples for laboratory testing. Soils were logged in accordance with Australian Standard *AS1726:2017 – Geotechnical Site*

¹ Boreholes BH08-BH12 were terminated upon encountering groundwater to reduce the potential for cross-contamination of groundwater. It is noted that boreholes BH08-BH12 were positioned downgradient from the existing landfill cell. This precautionary approach was agreed with ESC and NSW Public Works during fieldworks.

Investigations, shown on borehole logs included in Appendix C. A summary of the encountered ground conditions is presented in Section 4.

On completion of drilling, all boreholes were backfilled with remaining soil cuttings with excess cuttings left at the surface (some potential settlement might be experienced at these locations). Borehole BH12 was left open for ESC to arrange groundwater sampling at this location to be undertaken prior to backfilling (as agreed with ESC).

2.3.2 Test Pits – Phase 2 Development Area

Ground investigations at the Phase 2 Development Area (for the proposed administration, resource recovery and transfer facilities) were undertaken on 16 August 2022, and comprised the excavation of 8 test pits across the Phase 2 area at the locations shown in Appendix A, Figure 3. Dynamic Cone Penetrometer (DCP) tests were also undertaken at all test pit locations to provide an indication on soil consistency for design purposes.

An earthmoving contractor (PK Excavations Pty Ltd) was engaged to mobilise a *Sumitomo* 8-tonne excavator to the site to excavate all boreholes using a narrow 350 mm-wide bucket attachment. Test pits were advanced to depths ranging between 1.7 m and 2.2 m bgl, with all test pits terminated on refusal in rock.

A Coffey project scientist was onsite for the duration of the test pit excavation works to observe test pit excavation, log the encountered ground conditions, undertake field DCP testing and collect samples for laboratory testing. Soils were logged in accordance with *AS1726:2017*, shown on borehole logs included in Appendix C, with DCP test results included on the logs and in Appendix D. A summary of the encountered ground conditions is presented in Section 4.

On completion of test pit excavation, all test pits were backfilled with excavated spoil and trackrolled at the surface (some potential settlement might be experienced at these locations).

2.4 LABORATORY TESTING

Selected samples were dispatched to NATA-accredited laboratories for a range of geotechnical and acid sulfate soil testing, as summarised in Table 2.1, below.

Test / Method	Number of Tests
Emerson Tests (Dispersivity)	10
Particle Size Distribution	2
Atterberg Limits	2
Acid Sulfate Soils – Field pH Screen ⁽¹⁾	24
Acid Sulfate Soils – Chromium Reducible Sulfur ⁽¹⁾	4

Table 2.1 – Summary of geotechnical and acid sulfate soils laboratory testing undertaken

Notes: 1) Field pH screening is used as a preliminary indicator for the presence of acid sulfate soils or potential acid sulfate soils. Chromium Reducible Sulfur testing is then used for confirmation in accordance with the *Acid Sulfate Soils Manual 1999*.

3. DESK STUDY AND SITE OBSERVATIONS

A desktop review of publicly available information was undertaken before mobilisation to the site. The below sections summarise the findings of the desktop review and site walkover.

3.1 GEOLOGY AND SOILS

The *Narooma 1:100,000 Geological Sheet Series 8925* (Chalker and Bembrick, 1975) indicates that the site is underlain the Ordovician Bogolo Formation, comprising pelite with minor quartz arenite and thin chert beds. The map also indicates that adjacent areas to the north east and south west of the site are also underlain by undifferentiated Tertiary quartz sandstone with minor pebble and cobble conglomerate.

Conversely, publicly available information provided in the Geoscience Australia *MinView* portal indicates that the site is predominantly underlain by the Adaminaby Formation, comprising Tertiary pebble and cobble conglomerate, quartz sandstone poorly cemented in part, buff and grey claystone and sand. The *MinView* portal also indicates that Quaternary alluvial fan deposits may be present in the north-eastern portion of the Phase 1 Development Area.

Based on the above, the Tertiary and Quaternary units are expected to overlie the Ordovician Bogolo Formation.

3.2 TOPOGRAPHY

The Phase 1 development area is located at elevations ranging between 17 m above Australian Height Datum (AHD) in the central-eastern portion to approximately 30 m AHD in the south-western portion. A drainage line runs through the centre of the Phase 1 area in a north-south direction. Land to the west comprises a hill with an easterly aspect, and land to the east comprises a built-up landfill embankment sloping towards the north. The phase 1 development area is expected to drain towards an unnamed tributary and dam to the north, gradually flowing into Whittakers Creek and Lake Brou approximately 1km to the north east.

The Phase 2 development area is situated at generally higher elevations ranging between 24 to 30 m AHD, on the upper slopes of a hillside with an easterly gradient. The southern portion of the Phase 2 development area slopes towards the south-east. The Phase 2 development area is expected to predominantly drain towards an unnamed tributary to the south and eventually into Mummaga Lake, approximately 900 m to the south.

3.3 REGIONAL HYDROGEOLOGY

The 1:5,000,000 Hydrogeology Map of Australia (Jacobson & Lau, 1987), indicates that the site is underlain by fractured or fissured, extensive aquifers of low to moderate productivity. A search of publicly available groundwater records held by the Bureau of Meteorology did not reveal any groundwater monitoring bores within a 2km radius of the site.

It is considered that groundwater levels at the site would fluctuate in response to seasonal variations and would generally flow towards Lake Brou to the north, or Mummaga Lake to the south.

3.4 ACID SULFATE SOILS

Acid Sulfate Soil risk maps available on NSW Government's ESPADE viewer indicates that the site has not been assessed for the probability of acid sulfate soils (ASS) or potential acid sulfate soils (PASS). Land approximately 500m to the north (around Whittakers Creek) and 700m to the south (around Mummaga Lake) are mapped as having a high probability of occurrence of ASS / PASS.

It is considered that ASS / PASS may potentially occur in alluvial sediments in undrained areas at the site (if present), although alluvial sediment was not encountered during the geotechnical investigation.

3.5 SURFACE CONDITIONS – SITE WALKOVER

A site walkover was undertaken on 15 August 2022, with selected site photographs included in Appendix B. Key site observations are summarised below:

- The Phase 1 development area lies partially within the existing Brou Landfill operational area, with surface conditions summarised as follows:
 - The eastern portion is within the Brou Landfill operational area and comprises cleared land occupied by an access road, hardstand / laydown area and unsealed open drains. The eastern portion of the site generally slopes towards the north.
 - The western portion comprises undeveloped, dense bushland and generally slopes towards the east and north-east.
- The Phase 2 development area lies on the upper slopes of a hill, to the south west of the Brou Landfill. The Phase 2 development area slopes towards the east and south-east, and is occupied by dense bushland.
- An access road bounds the western edge of the Phase 1 development area, which appears to have been cut into the surrounding hillside using cut / fill earthworks. Weathered sandstone was visible in small portions of the road cutting.
- Surface conditions across both sites generally comprised silt topsoil with dense vegetation cover (except for cleared areas in the eastern portion of the Phase 1 development area). No rock outcrops or ponded water were observed at the ground surface during the site investigation.

4. RESULTS OF INVESTIGATION

4.1 SUBSURFACE CONDITIONS AND GEOTECHNICAL MODEL

Table 4.1 provides a summary of inferred geotechnical units encountered at the site. The depth range of each unit is summarised in Table 4.2. Further details are provided in the Engineering Borehole Logs and accompanying explanation sheets, included as Appendix C. Interpretive geological cross-sections are provided in Figures 4 and 5, Appendix A.

Ground conditions typically comprised shallow topsoil, underlain by residual soil (ranging from granular sandy silt to cohesive clays), extremely weathered material and weathered rock. Basement rock comprised variable sandstone / siltstone, which was generally considered to be interbedded. NMLC rock coring would be required to further assess bedrock geology at the site, and was outside the scope of this investigation. The Phase 1 development area typically showed deeper soil and rock weathering profiles compared to the Phase 2 development area.

Fill material was encountered to considerable depth in boreholes BH08, BH07, BH10 and BH12 (ranging between 1-2m), inferred to be fill used in embankment construction around the existing landfill access track. The fill material was visually assessed to be similar to the underlying residual soil units, and is considered likely to be site-won material (potentially excavated out during construction of the existing landfill cells).

Fill was encountered in borehole BH03 to greater depth (3.2m), inferred to be placed during cut and fill earthworks as part of the construction of Brou Lake Road. It is considered that the lower portion of the identified fill in BH03 could also be colluvial soil or slopewash.

Table 4.1 – Summary of inferred geotechnical units encountered
--

Unit	Material	Description
1	Topsoil	Sandy SILT to silty SAND, sand is typically fine to medium grained, silt is typically low plasticity, pale grey to dark brown, with rootlets and organic fines.
2	Fill	Variable fill, typically comprising sandy SILT to silty SAND, low plasticity, fine to medium grained sand, brown to dark brown.
3a	Residual Soil (cohesive)	Sandy SILT to sandy CLAY, low to medium plasticity, pale brown to red-brown, sand is typically fine to medium, traces of extremely weathered material.
3b	Residual Soil (granular)	Silty SAND to clayey SAND, fine to medium grained, pale grey-brown to dark brown, trace fine to medium grained gravel.
4	Extremely Weathered Material	Variable sandstone / siltstone, extremely weathered, very low strength, typically crumbles under hand pressure to silty sand or sandy silt.
5	Weathered Rock	Variable sandstone / siltstone, typically interbedded, generally highly weathered and low strength, grading to moderately weathered, medium strength with increasing depth.

Locatio	on	Surface elevation	Depth to base of unit (m bgl) ⁽¹⁾					
		(m AHD)	1	2	3a	3b	4	5
	BH01	30.5	0.2	NE	1.8	NE	3.5	>12.1
	BH02	24.5	0.3	NE	2.3	NE	3.6	>11.1
ea	BH03	25.5	0.3	3.2(2)	NE	4.0	6.2	>14.4
Phase 1 Development Area	BH04	25	0.2	NE	0.8	NE	3.5	>7.1
nen	BH05	24	0.2	NE	2.0	NE	3.0	>7.2
Idol	BH06	25.5	0.2	NE	1.0	NE	2.5	>11.4
eve	BH07	22.5	0.2	1.8	1.8	2.5	4.7	>12.1
D	BH08	23	NE	2.0	2.5	NE	5.8	>15.0
lase	BH09	20	0.2	NE	0.8	NE	3.2	>14.10
Ч	BH10	17.2	NE	1.0	3.1	NE	7.6	>12.12
	BH11	19.3	0.2	NE	3.2	0.8 (3)	4.5	>14.5
	BH12	17	0.2	1.8	3.5	NE	4.5	>15.0
ea	TP01	23.5	0.15	NE	NE	0.75	1.4	>1.8
t Ar	TP02	28.5	0.1	NE	0.6	NE	1.45	>2.2
nen	TP03	29.5	0.15	NE	NE	0.4	NE	>1.7
lopr	TP04	24.5	0.1	NE	0.5	NE	1.2	>1.7
Phase 2 Development Area	TP05	24.5	0.15	NE	0.55	NE	1.2	>2.0
	TP06	23.5	0.15	NE	0.7	NE	1.2	>1.9
lase	TP07	27.5	0.2	NE	NE	0.5	NE	>1.7
đ	TP08	25.5	0.1	NE	0.45	NE	1.2	>1.9

Table 4.2 – Summary of depths to inferred geotechnical units

Notes: 1) NE = Not encountered

2) Unit 2 considered as possible colluvial soil in borehole BH03

3) Unit 3b overlies unit 3a in borehole BH11

4.2 GROUNDWATER

Groundwater was encountered in 5 boreholes (BH08-BH12) in the eastern portion of the Phase 1 development area, as summarised in table 4.3 below. Groundwater was not encountered in the southern or western portions of the Phase 1 development area (boreholes BH01-BH07), or in the Phase 2 development area (test pits TP01-TP08).

Table 4.3 – Summary of groundwater le	evels encountered
---------------------------------------	-------------------

Location	Approximate Groundwater Level Encountered						
	Depth (m bgl)	Elevation (m AHD)					
BH08	14.8	8.2					
BH09	13.6	6.4					
BH10	10.5	6.7					
BH11	14	5.3					
BH12	9.5	7.5					

4.3 DYNAMIC CONE PENETROMETER TEST RESULTS

DCP testing undertaken in the Phase 2 Development Area indicated blow counts typically greater than 5 blows per 100 mm penetration in the upper 0.5 m (unit 1 and upper portions of units 3a/3b). DCP results at greater depths in units 3a/b and unit 4 were typically greater than 7 blows per 100 mm penetration. DCP test results are shown on the borehole logs in Appendix C, with raw results also provided in Appendix D.

4.4 LABORATORY TEST RESULTS

The following sections summarise laboratory test results. Laboratory reports are provided in Appendix E.

4.4.1 Atterberg Limits

Laboratory results for Atterberg Limits testing are summarised in Table 4.4.

Location	Sample Depth (m)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)
BH10	1.5-1.95 (unit 3a)	48	24	24	7.0
TP08	0.3-0.4 (unit 3a)	35	23	12	4.5

4.4.2 Particle Size Distribution

Particle Size Distribution (PSD) testing results are summarised in Table 4.5.

Location	Sample Depth (m bgl)	Material	Sieve (mm)	Passing (%)
BH07	0.5-1.0 (unit 3a)	Sandy SILT, low plasticity,	4.75	93
		with medium to coarse sand and traces of fine gravel	2.36	86
			0.425	69
			0.15	58
			0.075	53
TP04	P04 0.4-0.5 (unit 3a) Sandy CLAY, medium		4.75	99
		plasticity, sand is fine to medium	2.36	98
			0.425	92
			0.15	76
			0.075	63

4.4.3 Emerson Class – Dispersivity

Results of Emerson Class testing are summarised in Table 4.6, below.

Table 4.6 – Summary of Emerson Class test results

Location	Depth range (m)	Unit	Material Description	Emerson Class
BH06	1.5-2.0	4	Sandy SILT (extremely weathered material)	5
BH07	0.5-1.0	3a	Residual sandy SILT	5
BH10	1.5-1.95	3a	Residual sandy CLAY	6
BH11	0.5-1.0	3b	Residual silty SAND	5
BH12	2.0-2.5	4	Sandy SILT (extremely weathered material)	6
TP02	0.4-0.5	3a	Residual sandy CLAY	5
TP04	0.2-0.3	3a	Residual sandy CLAY	5
TP04	0.4-0.5	4	Sandy CLAY (extremely weathered material)	5
TP05	0.9-1.0	4	Sandy CLAY (extremely weathered material)	6
TP08	0.3-0.4	3b	Residual clayey SAND	5

4.4.4 Acid Sulfate Soils

Acid sulfate soil test results are summarised in table 4.7, below. No visual or olfactory indicators of ASS / PASS were observed during fieldworks (such as blue-grey staining, waterlogged soils or sulfide odours). It is noted that the encountered soil units were considered to be of either residual origins or imported fill material. Alluvial or lacustrine deposits, which typically have a greater risk of ASS / PASS formation, were not encountered in the investigation.

Location	Depth (m)	рН-F ⁽¹⁾	pH-FOX ⁽²⁾	Reaction rating ⁽³⁾	Moisture content (%)	Chromium Reducible Sulfur (%S)	Net Acid Soluble Sulfur (%S)
BH01	0.5-0.8	5.7	4	3	-	-	-
BH02	0.5-0.8	5.3	3.8	3	-	-	-
BH03	1.5-2	5.8	2.7	3	17	<0.005	<0.02
BH03	3-3.5	5.7	3.6	4	11	<0.005	-
BH04	1.5-2	5.1	4.5	4	-	-	-
BH05	0.5-0.8	6	3.9	4	13	<0.005	-
BH06	2.5-2.8	4.7	4	3	-	-	-
BH07	2-2.3	5.1	4.2	4	-	-	-
BH08	2-2.3	5.4	4	4	-	-	-
BH09	13.5-13.8	5.6	4.8	4	-	-	-

Location	Depth (m)	рН-F ⁽¹⁾	pH-FOX ⁽²⁾	Reaction rating ⁽³⁾	Moisture content (%)	Chromium Reducible Sulfur (%S)	Net Acid Soluble Sulfur (%S)
BH10	2-2.5	6.1	4.5	4	-	-	-
BH10	4-4.3	5.4	4.2	4	-	-	-
BH10	9.5-9.8	5.4	4.7	4	-	-	-
BH11	2.5-2.8	4.6	4	4	-	-	-
BH12	5-5.5	5.3	4	3	-	-	-
BH12	9.5-10	5.9	6.3	4	-	-	-
TP01	0.9-1	5.9	4.5	2	-	-	-
TP02	0.4-0.5	5.9	4.2	3	-	-	-
TP03	0.2-0.3	5.8	4.5	3	-	-	-
TP04	0.4-0.5	6	4.7	3	-	-	-
TP05	0.2-0.3	6	3.1	4	7.6	<0.005	<0.02
TP06	1.4-1.5	6.3	4.8	3	-	-	-
TP07	0.2-0.3	5.5	4.3	3	-	-	-
TP08	0.4-0.5	5.8	4.9	3	-	-	-

Notes: 1) pH field value (before oxidation with peroxide)

2) pH field value (following oxidation with peroxide)

3) Field Screen uses the following reaction ratings to classify the rate the samples reacted to the peroxide: 1.0; No reaction to slight. 2.0; Moderate reaction. 3.0; Strong reaction with persistent froth. 4.0; Extreme reaction.

Acid sulfate field screening indicated reaction ratings of "Strong" to "Extreme" in all cases, with four samples showing a moderate drop in pH values during field screening. Follow-up chromium reducible sulfur testing on these samples indicated sulfur and acid soluble sulfur below the laboratory limit of reporting and below the action criteria in the ASSMAC acid sulfate soils manual, indicating a low likelihood for the presence of ASS or PASS. The high reaction ratings could be attributed to organic matter or other chemicals present in the soil samples.

5. DISCUSSION AND RECOMMENDATIONS

5.1 GENERAL

The geotechnical interpretation presented in this report was prepared based on the interpreted subsurface conditions, in-situ and laboratory test results, and information gathered by Coffey.

Foundation design, earthworks and construction should be undertaken in accordance with the applicable standards and industry guidance. Earthworks should be carried out in accordance with the principles set out in AS3798-2007 Guidelines on Earthworks for Commercial and Residential Developments.

Landfill cell design should be undertaken in accordance with the relevant NSW EPA and national guidance, including the NSW EPA *Environmental Guidelines: Solid Waste Landfills, Second Edition* (NSW EPA, 2016).

5.2 EARTHWORKS

5.2.1 General

Extensive earthworks may be required for the proposed cell expansion in the Phase 1 development area. This includes the potential for excavation into the hillside to the west of the existing landfill cell, however the extent and depth of the new cell footprint are yet to be finalised. Based on preliminary discussions with ESC we understand the vertical extent of excavation is intended to be limited to the upper 2-3m.

Excavations in the Phase 2 development area are expected to be shallower, generally limited to levelling / landform modifications, footing excavations and underground service excavations.

In any case, bulk excavations are expected to extend into Unit 4 (extremely weathered material) across both development areas, extending into the upper portions of unit 5 (weathered rock) in some areas, particularly in the Phase 1 development area.

Excavated material is intended to be reused and recompacted onsite during construction works. Residual clay material (within Unit 3a) is intended to be reused in capping material and potentially in clay liners (if deemed suitable from a geotechnical perspective).

5.2.2 Excavatability

Based on the ground conditions interpreted from the boreholes, it is expected that Units 1, 2, 3a/3b and the upper portions of Unit 4 could be excavated using conventional earthmoving equipment (such as an excavator with bucket attachment). Deeper excavations into Unit 4 and Unit 5 may require more specialised equipment, such as larger excavators (with ripper attachments) or bulldozers. Harder material may be encountered in some areas, which may require the use of rock hammers.

5.2.3 Reuse of Site-Won Material – Capping Layers

Emerson testing indicated that the residual soil units (unit 3a/3b) and extremely weathered material (unit 4) showed a tendency for slaking, however did not show dispersion under testing. It is considered that these units may be reused onsite, however ground cover should be maintained in the long term where possible with vegetation, pavements or similar cover to minimise erosion.

Residual clay material could be potentially reused in liner construction, subject to permeability testing to evaluate the suitability of the material as an aquitard or confining layer. Permeability testing was outside the scope of this investigation.

Clay soils were observed to be more prevalent in the Phase 2 development area (proposed admin / transfer station) compared to the Phase 1 development area (proposed cell expansion area). Clay material was observed to be present generally in thin layers and often grading to silt and sandy material.

In any case, the quantity of clay required for landfill capping and lining would depend on the landfill cell design and the practicality of separating residual clay from the surrounding soil / extremely weathered material units. It may be necessary to import clay material from offsite areas where the recovered volumes do not meet the design requirements.

The use of geofabric liners should also be considered, in accordance with the relevant NSW EPA and national guidance.

5.3 SHALLOW FOOTINGS

Shallow footings are expected to be required in the Phase 2 Development Area for the proposed administration buildings, weighbridge, transfer station and other structures. The below sections provide general recommendations for shallow footings, based on DCP and laboratory test results.

5.3.1 Site Classification

The site classification for the Phase 2 Development Area has been assessed in accordance with *AS2870-2011 Residential Slabs and Footings*. This provides an indication on potential characteristic ground surface movements to be considered in structural design.

Laboratory results for Atterberg Limits testing indicated Unit 3A cohesive soil to be low to medium plasticity, with linear shrinkage from laboratory results in the range of 4.5-7.0%. It is noted that no groundwater was observed in the Phase 2 development area, and residual soils were generally shallow (<1m). Weathered rock was encountered above the inferred typical zone of seasonal moisture variation within the Phase 2 Development Area, however the potential for moisture variation within the residual soil units has been considered as a precautionary measure.

Preliminary calculations assuming a shrink-swell index of 2.5%² and a depth of soil moisture variation of 1.5 m indicate potential characteristic ground surface movements in the range of 20-40mm. Consequently, it would be prudent to adopt a footing system appropriate for Class M (Moderately Reactive Sites) site conditions.

Where structures are proposed within the Brou Landfill site (in the Phase 1 Development Area), deeper soil and fill material may be encountered. In this case, the site classification should be assessed on a case-by-case basis. The presence of extensive fill material may require footings to be sized based on a Class P classification.

5.4 BEARING CAPACITY FOR SHALLOW FOOTINGS

Shallow footing systems founded at least 0.3 m into Units 3a / 3b (or to the minimum depth requirement in AS2870-2011, whichever is greater) in the Phase 2 Development Area could achieve an allowable bearing pressure of 150 kPa. Footings constructed in Unit 4 (extremely weathered material) could be sized for an allowable bearing pressure of 200 kPa. Unit 5 (weathered rock) was encountered at greater depths, and it is not expected to be encountered in shallow footing construction.

The recommended bearing pressures are contingent upon inspection by a geotechnical engineer to confirm that a suitable founding stratum has been reached and foundation conditions are suitable for the design parameters. All footings for a single structure should be founded in strata with similar bearing and reactivity characteristics to reduce the potential for differential movements across material transitions.

Construction of footings within Unit 1 (topsoil) and Unit 2 (fill) is not recommended. These units would require removal prior to construction of shallow footings or pavements onsite. Alternatively, further investigation and settlement analysis should be undertaken where footings are proposed to be constructed in fill material.

 $^{^{2}}$ The adopted shrink-swell value was based on typical correlations for Australian reactive soils, published in Cameron, (1989) and Fityus *et a*l (2005)

5.5 ACID SULFATE SOILS

Acid sulfate soil risk maps and laboratory testing indicated a low probability of ASS / PASS being present at the site. It is considered that the risk of encountering ASS / PASS as part of the proposed developments is therefore *low*, for the areas assessed as part of this geotechnical investigation.

5.6 GROUNDWATER

Groundwater was encountered in five boreholes (BH08 to BH12) in the eastern portion of the Phase 1 Development Area, at depths ranging between 9.5m bgl (BH12) and 14.8m bgl (BH08). This correlates to elevations of approximately 5-8 m AHD.

Fluctuations are expected in response to seasonal factors, which should be considered in landfill cell design. Sea level rise may also contribute to long-term rising groundwater levels. Specific design guidance is provided in the NSW EPA (2016) *Environmental Guidelines: Solid Waste Landfills*. A detailed groundwater assessment was outside the scope of this investigation, but may be required where extensive cut is required in landfill design.

6. CLOSING

The descriptions of subsurface conditions described in this report are based on a limited number of test locations. Ground conditions can change over relatively short distances (and time); as such, the recommendations outlined in this report should be confirmed during construction by appropriate input from an experienced Geotechnical Engineer.

In addition to our comments and recommendations, Safety in Design considerations in accordance with Workplace Health and Safety legislation must be considered and included in the design of project elements.

The attached limitations sheet (titled "Important Information About Your Tetra Tech Coffey Report") provides additional information on the uses and limitations of this report and should be read in conjunction with the recommendations in this report.

7. REFERENCES

Ahern C R, Stone, Y, and Blunden B (1998), *Acid Sulfate Soils Assessment Guidelines*, NSW Acid Sulfate Soils Management Advisory Committee (ASSMAC, 1999) Wollongbar NSW.

AS 2870-2011 Residential slabs and footings. Council of Australian Standards Australia, 2010.

AS 3798-2007 Guidelines on Earthworks for Commercial and Residential Developments. Council of Australian Standards Australia, 2007.

AS1726-2017 Geotechnical Site Investigations. Council of Australian Standards Australia, 2007.

Cameron, D. (1989), *Tests for Reactivity and Prediction of Ground Movement*, Civil Engineering Transactions, I.E. Aust., Vol. 3, pp. 121–132.

Chalker, L. and Bembrick, C (1975), *Narooma 1:100 000 Geological Sheet 8925, 1st edition,* Geological Survey of New South Wales, Sydney.

Fityus, S, Cameron, D., and Walsh, P. (2005), *The Shrink Swell Test,* Geotechnical Testing Journal, Vol. 28, No. 1

Jacobson, G. and Lau, J. (1947), *Hydrogeology of Australia 1:5,000,000 Map*, Bureau of Mineral Resources, Canberra.

NSW EPA (2016), Environmental Guidelines – Solid waste landfills (Second edition), NSW EPA, Sydney

NSW government, Geological Survey of NSW (2022), *MinView*, available online: https://minview.geoscience.nsw.gov.au/



IMPORTANT INFORMATION ABOUT YOUR TETRA TECH COFFEY REPORT

As a client of Tetra Tech Coffey you should know that site subsurface conditions cause more construction problems than any other factor. These notes have been prepared by Tetra Tech 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 Tetra Tech 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 Tetra Tech Coffey to assess how factors that changed subsequent to the date of the report affect the report's recommendations. Tetra Tech 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 Tetra Tech 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 Tetra Tech 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 Tetra Tech 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 Tetra Tech 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 Tetra Tech 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 Tetra Tech Coffey to work with other project design professionals who are affected by the report. Have Tetra Tech 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 Tetra Tech Coffey for information relating to geoenvironmental issues.

Rely on Tetra Tech Coffey for additional assistance

Tetra Tech 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 Tetra Tech 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 Tetra Tech Coffey to other parties but are included to identify where Tetra Tech Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Tetra Tech Coffey closely and do not hesitate to ask any questions you may have.

APPENDIX A: FIGURES







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APPENDIX B: SELECTED SITE PHOTOGRAPHS



APPENDIX B: SELECTED SITE PHOTOGRAPHS



Photo 1: View of the Phase 1 development area near BH02. Photo 2: View of the Phase 1 development area with dense vegetation near BH03.



 Photo 3: Hanjin D&B 8D drilling rig setup in the Phase 1
 Photo 4: Groundwater encountered in the Phase 1

 1 development area at BH11.
 development area at BH12.



Photo 5: Hanjin D&B 8D drilling rig used for borehole drilling in the Phase 1 development area. Photo 6: Drilling rig setup at BH10.



Photo 7: Sumitomo 8-tonne excavator used for test pit Photo 8: Test pit TP02 following excavation. excavation in the Phase 2 development area.



Photo 11: View of dense vegetation, test pit TP07 and access trail in the Phase 2 development area.

APPENDIX C: GEOTECHNICAL LOGS



CONTEN										Borehole ID.			BH01		
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_	position: E: 238,617; N: 5,996,145 (MGA94 Zone 56) surface elevation: 31 m (AHD) angle from horizontal: 90														
Ľ	drill model: Hanjin D&B, Track mounted drilling fluid: None hole diameter : 125 mm														
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client:	Eu	robodal	lla S	Shire	Cou	ncil			date	start	ed:	18 Aug 2022
principal:	NS	W Publ	іс И	Vorks	s Ad	visor	/		date	com	pleteo	d: 18 Aug 2022
project:	Bro	ou Land	fill	CL02	22, G	eoteo	chnical Investigation		logge	ed by	/:	ТХ
location:	1 E	Brou Lal	ke R	Road,	Dal	meny	NSW 2546		chec	ked	by:	10
position: E:	238,6	10; N: 5,996	6,180	(MGA9	4 Zone	e 56)	surface elevation: 25 m (AHD)	ang	le from h	orizoi	ntal: 9	0°
drill model: I	-		k mou	Inted	i		drilling fluid: None	hole	e diamete	er : 12	5 mm	
drilling inf	ormati	on			mate	erial sub	stance material description		≥	h	and	
method & support	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	moisture	consistency / relative density	pen me (k	etro- eter Pa)	soil origin, structure and additional observations
		D: BH02 / 8.0-8.5		_			SILTSTONE: yellow brown, interbedded sandstone, highly weathered to moderately	D				WEATHERED ROCK
			-16	-	· · ·		weathered, low to medium strength. (continued)			1i		-
				-	<u> </u>							-
			Ļ	9.0-		İ						-
	Encountered			-								-
P P P	Encou		-15	-	· ·							-
	Not			-		-				1ii	ii	-
		D: BH02 / 10.0-10.5	+	10.0 —	· ·	-						-
		10.0-10.5		-	· ·	-						
			-14	-	· ·							
				- 11.0 —								1
	8			-			Borehole BH02 terminated at 11.10 m			+++	+++	
			-13	-			Refusal				iil	-
				-								
			-	12.0 —								-
				-								1
			-12	_								-
				-								-
			F	13.0						1 i i		
			-11	-						l i i	i i	-
			[''	-								-
			Ļ	- 14.0								-
				-								-
			-10	-								-
				-								1
			-	15.0 —								-
				_								-
			-9	-								
				-							İİ	-
method DT diatub	e			port mud	N	Inil	samples & field tests B bulk disturbed sample		oup symb			consistency / relative density VS very soft
AS auger	drilling screwi		C	casing			D disturbed sample E environmental sample		n AS 1726			S soft F firm
HA hand a W washt	oore		pen Rei	etration - ∾ ∞	no res	sistance	SS split spoon sample U## undisturbed sample ##mm diameter	moisture o	ondition			St stiff VSt very stiff
RR rock r			wat	er	rangir ◀ refusa	ng to	HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered	D dry M moist W wet				H hard Fb friable VL verv loose
e.g. AD/T	own by	suffix		✓ 10-0 leve	Oct-12 w el on date	e shown	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa)	Wp plasti WI liquid				VL very loose L loose MD medium dense
B blank T TC bit V V bit			 		er inflow er outflov		R refusal HB hammer bouncing					D dense VD very dense

CDF_0_10_0.3_LIBRARY.GLB rev.CDF_0_10_00.3 2020-08-25 Log COF BOREHOLE: NON CORED 754-CBRGE301356-R01.GPJ << Partnerse 14/10/2022 13:57



		-			1					Borel	nole	ID.	BH03
⊆nc	vir	` ^	orin	~ I	0	<u>~</u> _	Ro	rahala		sheet	t:		1 of 2
<u>=119</u>								rehole		proje	ct n	0.	754-CBRGE3013
client:	E	Ξur	robodal	lla S	hire	Cou	ncil			date	star	ted:	18 Aug 2022
vrincipa	al: /	VSI	W Publ	lic N	/orks	s Ad	visor	У		date	com	nplet	ted: 18 Aug 2022
oroject:	I	Зrc	ou Lanc	dfill (CL02	22, G	eoter	chnical Investigation		logge	d b	y:	ТХ
ocation:	1: ′	1 B	rou La	ke R	load,	. Dal	meny	/ NSW 2546		checl	ked	by:	10
			87; N: 5,996				-	surface elevation: 26 m (AHD)	angle	from ho		,	
			D&B, Trac		-			drilling fluid: None		diamete			
drilling i		natio	on	 		mate	erial sub						
	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	material description SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	moisture condition	consistency / relative density	per m (ł	and netro- neter kPa)	soil origin, structure and additional observations
	3 5	3		<u>~</u>	ð		് ര്	TOPSOIL: Gravelly Sandy SILT: low liquid limit,	E X <wp< td=""><td>8₽ F</td><td></td><td></td><td>TOPSOIL</td></wp<>	8₽ F			TOPSOIL
					1	┨ ╷╷╷╷	<u> </u> !	brown, sand is fine to medium, gravel is fine to coarse, with rootlets and organic fines.	D	L to			FILL
				-25			!	FILL: SILTY SAND: fine grained, brown.		MD			
					-		!						
		ľ	D: BH03 / 1.0-1.5	† '	1.0-		!				ļ	İİ.	
]	V///)		Sandy CLAY: low to medium plasticity, dark brown, sand is fine to medium grained.	<wp< td=""><td>S to F</td><td></td><td></td><td>COLLUVIUM / FILL</td></wp<>	S to F			COLLUVIUM / FILL
		[E: BH03 / 1.5-2.0	-24	4	<i>\///)</i>							
					- 2.0	V////	1 1						
			D: BH03 / 2.0-2.5	† '	2.0-	V////	1						
			I	-23	_!	<i>\///</i>	1 1					 	
	1 I			T ² ~	+	<i>\///</i>	1						
				⊥ '	- 3.0			Sandy CLAYEY GRAVEL: medium to coarse grained, sub-angular, brown, clay is low	D	MD			
	E: BH03/ 3.0-3.5 3.0-2 3.0-2 3.0-2 3.0-2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2									D			RESIDUAL SOIL
	4 i	-	<u> </u>	-22	-	\mathbb{N}	!	CLAYEY SAND: fine to medium grained, brown, clay is low plasticity, some fine sized sub-angular	D				RESIDUAL SUIL
		untered			1	$\sum_{i=1}^{n}$		gravel.					
z		Not Encountered			4.0		<u> </u>	the set of the set of	14/2				
		Not			4	!	'	SILTSTONE: orange brown, extremely weathered, very low strength, remoulds as SILT, low plasticity, stiff consistency.	<wp< td=""><td>St</td><td></td><td></td><td>EXTREMELY WEATHERED</td></wp<>	St			EXTREMELY WEATHERED
	4 i	ŀ	D: BH03 /	-21	1	!	'	stiff consistency.					
	\$		4.5-5.0]	!							
	\$	ł		+ '	5.0 —	!	<u> </u> '						
	Ø				-	!					ļ		
	\$			-20]		ļ !						
]		'						
	\$ <u></u>			+ '	6.0 —	·	'				l i i		
]	·		SILTSTONE: orange brown, interbedded with sandstone, highly weathered, low strength.	D		i i	i i i	WEATHERED ROCK
				-19]	·	'	Sandstone, mynny wedarorod, for oachgan					
					_	·							
				-	7.0-	·	'				ļ		
]	<u>-</u> -	'				l i i	İİİ	
		[D: BH03 / 7.5-8.0	-18	4		{ '				İ		
							<u>ا</u> ا						
nethod T diat	atube			supp M r	port mud	N	l nil	samples & field tests B bulk disturbed sample	soil grou				consistency / relative density VS very soft
D aug	iger dri iger sci			Co	casing		116		material based on A			7	S soft F firm
lA han V was	and aug ashbore	ger e		. –	etration - ∾ ∞		eletance	SS split spoon sample	isture cor	odition			St stiff VSt very stiff
	ck rolle					rangin	sistance ng to al	HP hand penetration test (SPT) M	dry moist	101000			H hard Fb friable
	t shown	۱ by s	suffix	wate	▼ 10-0	-Oct-12 wa		N* SPT - sample recovered W Nc SPT with solid cone Wp	wet plastic lii				VL very loose L loose
3 blar	D/ I ank bit C bit				- wate	ter inflow		VS vane shear; peak/remouded (kPa) WI R refusal	liquid lim	nit			MD medium dense D dense
/ Vb			J	1 -	- watr	ter outflow	v	HB hammer bouncing					VD very dense



	-		LOFF	E						Boreł	nole ID.	BH03
с.	aai	n 0	orin	~	~	~	D۵	rahala		sheet		2 of 2
	igi	ne	enn	<u>y I</u>	<u>-0(</u>	<u>J -</u>	DU	rehole		proje	ct no.	754-CBRGE301356
clier	nt:	Eu	robodal	la S	hire	Cou	ncil			date	started:	18 Aug 2022
prine	cipal:	NS	W Publ	іс И	/orks	s Ad	visor	y		date	complete	ed: 18 Aug 2022
proje	ect:	Bro	ou Land	fill (CL02	22, G	eoteo	chnical Investigation		logge	d by:	TX
loca	tion:	1 B	rou La	ke R	load,	Dal	meny	v NSW 2546		checł	ked by:	10
posit	ion: E: 2	238,5	87; N: 5,996	6,191	(MGA9	angle	from ho	orizontal:	90°			
drill n	nodel: H	lanjin	D&B, Tracl	k mou	inted	hole o	liamete	r : 125 mm	1			
drill	ing info	ormati	on			mate	erial sub	stance				
method & support	1 2 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	material description SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetro- meter (kPa)	soil origin, structure and additional observations
				-17	- - - 9.0		-	SILTSTONE: orange brown, interbedded with sandstone, highly weathered, low strength. (continued)	D			WEATHERED ROCK

methoo	support	1 2 peneti	water	field tests	RL (m)	depth (r	graphic	soil groi symbol	SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components
						-			SILTSTONE: orange brown, interbedded with D HILL WEATHERED ROCK sandstone, highly weathered, low strength.
					-17	-			(continued)
						-	<u> </u>		
						-	<u> </u>		
21					-	9.0	1		
22 13						-	·		
14/10/2022 13:57					-16		· ·		
						-	· ·		
< <drawingfile>></drawingfile>					F	10.0 —	· ·		
Irawin						-			
					-15	-	<u> </u>		
1.GP			-			-	<u> </u>		
56-R0			ntere			-	1		
754-CBRGE301356-R01.GPJ ————————————————————————————————————	<u> </u>		Not Encountered		F	11.0	1 · .		
BRGE3	z 		Not E				<u> </u>		
754-C					-14	-	· ·		
						-	· ·		
					F	12.0 —			
Š.						-	<u> </u>		
E P					-13	-			
00.3 2020-08-25 Log COF BOREHOLE: NON CORED				D: BH03 / 12.5-13		-			SHALE: yellow brown to pale brown, highly weathered to moderately weathered, low to medium
ЧĊ						-	<u> </u>		strength.
Log					t	13.0 —			
38-25						_	<u> </u>		
2020-					-12	-			
00.3						-	<u> </u>		
0					-	14.0 —	<u> </u>		
						-			
л 1					-11		<u> </u>		Borehole BH03 terminated at 14.4 m
						-	1		Refusal
BKA		liii			L	- 15.0			
0.3						-			
						-			
CDF					-10	-			
0		i i i i				-	1		
	neth			ſ	sun	port	I	I	samples & field tests soil group symbol & consistency / relative density
Ë	DT AD	nod diatube auger di	rillina*		Mi	mud casing	N	nil	B bulk disturbed sample material description VS very soft
A	AS HA	auger so hand au	crewir	ng*		etration	1		E environmental sample F firm
v	Ν	washbo	re			- ~ ~	1 − no res	istance	SS split spoon sample St stiff U## undisturbed sample ##mm diameter moisture condition VSt very stiff
	R	rock roll	er			<u></u>	rangir refusa	ig to il	HP hand penetrometer (kPa) D dry H hard N standard penetration test (SPT) M moist Fb friable
*		bit show	n by s	suffix	wat	10-1	Oct-12 w	ater	N* SPT - sample recovered W wet VL very loose Nc SPT with solid cone Wp plastic limit L loose
В		AD/T blank bi	t			- lieve	el on date er inflow		VS vane shear; peak/remouded (kPa) WI liquid limit MD medium dense R refusal D dense
T		TC bit V bit				- wat	er outflow	v	R refusal D dense HB hammer bouncing VD very dense



		COI	I Lo						Boreł	hole	∍ ID.	BH04
Ena	in	oorin			a -	Ro	rehole		sheet	t:		1 of 1
<u>_ny</u>			<u> </u>		<u> </u>				proje	ct n	10.	754-CBRGE3013
lient:		uroboda							dates	star	rted:	
rincipal:	NS	SW Pub	lic V	Vork:	s Ad	visor	У		date	con	nplet	ted: 18 Aug 2022
roject:	Br	ou Lan	dfill	CL0:	22, G	ieote	chnical Investigation		logge	∋d b	y:	ТХ
cation:	1	Brou La	ike F	₹oad	l, Dal	meny	/ NSW 2546		check	ked	by:	10
		,591; N: 5,99		-	94 Zone	e 56)	surface elevation: 25 m (AHD)	•	e from ho			
ill model: rilling inf	-	n D&B, Trad	ck mou	untea	mat	erial sub	drilling fluid: None bstance	hole a	diamete	r:1.	25 mr	m
							material description		y/ nsity		hand	
support 1 2 penetration		samples & field tests		depth (m)	graphic log	soil group symbol	SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	moisture condition	consistency / relative density	n (8	enetro- neter (kPa) 8 8 8	additional observations
			20		\prod		TOPSOIL: SILT: brown, trace of fine sized sub-angular gravel, trace of rootlets.	<wp< td=""><td></td><td></td><td></td><td>TOPSOIL</td></wp<>				TOPSOIL
			Ļ	.			SILT: brown to yellow brown.	<wp< td=""><td> L</td><td></td><td></td><td>RESIDUAL SOIL</td></wp<>	L			RESIDUAL SOIL
	i				Щ							
			-24	1.0-		.]	SILTSTONE: yellow-brown, extremely weathered, very low strength. Recovered as SILT, low plasticity, with extremely weathered gravel	<wp< td=""><td>VSt</td><td></td><td></td><td>EXTREMELY WEATHERED</td></wp<>	VSt			EXTREMELY WEATHERED
				-]	.]	with extremely weathered gravel.	'				
		BH04 / 1.5-2.0	+]	-		!				
	!		-23	2.0-	1	+		!				
			T~~	2.0	1	-		'				
			Ļ	.		-		'				
					1	-						
	- 		-22	3.0		-		!				
	Not Encountered			-	<u> </u>			!		li.		
 z	Vot Enc	;	F]		SILTSTONE: yellow-brown, some interbedded	D		Ξį.	i i i	WEATHERED ROCK
	-		21	- 10-	<u> </u>	-	sandstone, occasional purple laminations, highly weathered.	'				
			-21	4.0-	1	-		!				
			Ļ			-		'				
				-	1	-		'				
			-20	5.0-	<u> </u>	-		'		Ì		
				-]	-						
			F]			!		li.		
			-19	6.0-	<u> </u>							
			1 5	0.0]	. -		'				
			+			-	becoming highly to moderately weathered low to					
					1	-	becoming highly to moderately weathered, low to medium strength					
	<u> </u>		-18	7.0-	<u> </u>	-		<u> </u> '	 	-		
			-				Borehole BH04 terminated at 7.10 m Refusal					
					-							
S auge A hand / wash	ube er drillin er screw d auger hbore t roller	wing*	M C o pen	pport mud casing netratior	n	N nil esistance ing to sal	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)	isture cor dry moist	AS 1726	otion		consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable
bit sh .g. AD/T blank TC bi	ık bit oit	y suffix	- I	■ 10- lev wat)-Oct-12 w vel on date ater inflow ater outflov	te shown v	N* SPT - sample recovered W Nc SPT with solid cone Wp VS vane shear; peak/remouded (kPa) WI R refusal HB hammer bouncing					VL very loose L loose MD medium dense D dense VD very dense



				Ann						Borel	nole ID.	BH05
Fn	ai	ne	erin	αI		a -	Bo	rehole		sheet	t:	1 of 1
	<u> </u>			<u> </u>						proje		754-CBRGE30135
client			roboda							date	started:	18 Aug 2022
princi	pal:	NS	W Publ	ic V	Vork	s Ad	lvisor	V		date	complete	ed: 18 Aug 2022
projec	ct:	Bro	ou Lanc	dfill	CL02	22, (Geote	chnical Investigation		logge	ed by:	TX
locatio	on:	1 E	rou La	ke R	Road	, Da	Imeny	NSW 2546		checl	ked by:	ΙΟ
positio	n: E:2	238,5	84; N: 5,99	6,339	(MGA9	94 Zor	ie 56)	surface elevation: 24 m (AHD)	ang	le from he	orizontal:	90°
		-	D&B, Trac	k mou	Inted		erial sub	drilling fluid: None	hole	e diamete	r : 125 mn	n
ariiin	ig info ⊱	rmati	on					material description		ity	hand	
method & support	 penetration 	water	samples & field tests	ZRL (m)	depth (m)	graphic log	soil group symbol	SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	moisture condition	consistency / relative density	penetro- meter (kPa) 8 8 8 8	soil origin, structure and additional observations
				24				TOPSOIL: SILT: brown to dark brown, trace \organic matter.	D	L		TOPSOIL
					-			SILT: brown, with some fine sub-angular gravel.	/ D	F / St		RESIDUAL SOIL
			BH05 / 0.5-0.8		-							
				-23	1.0-							
					-			1.2 m: becoming grey brown				
				-	-	1		· · · · · · · · · · · · · · · · · · ·				
						$\left \left \right \right $						
				-22	2.0	┨╧╝	-	SILTSTONE: extremely weathered, brown,	D	VSt - H		EXTREMELY WEATHERED
					-	·	. -	remoulded as: Clayey Silt with trace gravel.				MATERIAL
				F	-	<u> </u>						
					-		-					
		ed		-21	3.0-	1-		SILTSTONE: grey brown, some interbedded				WEATHERED ROCK
		Not Encountered			-	 	-	sandstone, highly weathered, low to medium strength.				
		lot Enc			-							
		2		-20	4.0-]]	-					
				20		 	-					
					-		-					
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				-19	5.0-							
					-		.]					
				F		1-						
					-	·						
				-18	6.0-	1	.					
]	. -					
				t	-	<u> </u>	. -					
				47	-	1	. 					
↓ ↓				-17	7.0-	1	-					
				L	-	{		Borehole BH05 terminated at 7.2 m Refusal				
					-	1						
AD	diatube auger o auger s	Irilling		M C (port mud casing		N nil	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample	materi	oup symb al descrip n AS 1726	ol & tion	consistency / relative density VS very soft S soft F firm
HA W RR	hand ar washbc rock rol bit show AD/T	uger ore ler	-	wat	V 10-	no rang		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	moisture c D dry M moist W wet Wp plastic WI liquid	: limit		St stiff VSt very stiff H hard Fb friable VL very loose L loose
В Т	blank b TC bit V bit	it				ter inflov ter outflo		VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	WI liquid			MD medium dense D dense VD very dense



			COF	-F	Y					Boroh		
											ole ID.	BH06
E.	nai	no	orin	а I		n _	Ro	rehole		sheet		1 of 2
	IIYI	IE	enn	<u>y I</u>	ΓΟί	<u>J -</u>	DU	renoie		projec	t no.	754-CBRGE301356
clier	nt:	Eu	roboda	lla S	Shire	Cοι	ıncil			date s	started:	17 Aug 2022
nrin	cipal:	NS	W Publ	ic V	Vorks	s Ad	visor	1		date c	complet	
							-					-
proj	ect:	Bro	ou Lanc		CL02	22, 6	ieote	chnical Investigation		logge	d by:	TX
loca	ition:	1 B	rou La	ke R	Road,	Dal	meny	NSW 2546		check	ed by:	10
posit	ion: E: 2	238,6	57; N: 5,99	6,152	(MGA9	4 Zon	e 56)	surface elevation: 26 m (AHD)	angle	from ho	rizontal:	90°
drill n	nodel: H	anjin	D&B, Trac	k mou	inted			drilling fluid: None	hole o	liameter	: 125 mr	n
drill	ling info	rmati	on			mat	erial sub	stance				
	tion		samples &			Ð		material description		y / nsity	hand	
method & support	penetration	water	field tests	RL (m)	depth (m)	graphic log	soil group symbol	SOIL NAME : plasticity or particle characteristics, colour, secondary and minor components	moisture condition	consistency / relative density	penetro- meter (kPa) § 8 8 8	soil origin, structure and additional observations
	3 5 7			-	0		0,0	TOPSOIL: SILT: brown, trace of fine sized	D	L	<u> </u>	TOPSOIL -
					-			sub-angular gravel.	_/ D	F - St		RESIDUAL SOIL -
				-25				SILT : brown, trace of fine sized sub-angular gravel.			i i i i	
												-
				_	1.0-							
					-			SILTSTONE: brown, extremely weathered, very low strength. Remoulded as: Silt, low plasticity,	D	St - VSt		EXTREMELY WEATHERED - MATERIAL -
				-24	-			brown.				-
			D: BH06 / 1.5-2.0	24	-		-					-
					-	·	-					-
				t	2.0-	<u> </u>						-
						· ·	-					
			E: BH06 /	-23		· ·	·	SILTSTONE: pale brown, some interbedded	D			WEATHERED ROCK
			2.5-2.8		_	·		sandstone, moderately weathered, very low to medium strength.				
				-	3.0	· —		medium suengui.				
					-							-
				-22	-						<u>iii</u>	
		tered	D: BH06 / 3.5-4.0	22	-		1					
- DA - N		Encountered			-	 	-				İİİİ	
q z		Not E		Ť	4.0-	<u> </u>	-					
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				-	5.0 -							-
					-	<u> </u>	.1					
				-20	-	<u> </u>						-
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meti DT	hod diatube				port mud		l nil	samples & field tests B bulk disturbed sample		ip symbo		consistency / relative density VS very soft
AD AS	auger auger s	Irilling'			mud casing	r	N 1111	D disturbed sample	based on a	descripti AS 1726:2		S soft
HA	hand a	uger	ਾਬ	pen	etration	I		E environmental sample SS split spoon sample				F firm St stiff
W RR	washbo rock ro					− no re rangi < refus	sistance ng to	HP hand penetrometer (kPa)	moisture co i D dry	ndition		VSt very stiff H hard
*	L.14 . 1			wat		-		N standard penetration test (SPT) N	M moist W wet			Fb friable VL very loose
e.g.	bit sho AD/T		suπix	-	- leve		e shown	Nc SPT with solid cone V	Wp plastic li WI liquid lin			L loose MD medium dense
B T	blank b TC bit	it			-	er inflow er outflo		R refusal	1			D dense
V	V bit					Junio		HB hammer bouncing				VD very dense

CDF_0_10_0.3_LIBRARY.GLB rev.CDF_0_10_00.3 2020-08-25 Log COF BOREHOLE: NON CORED 754-CBRGE301356-R01.GPJ << Participation 21/10/2022 13:57



	-		LOFI	FE.	Ţ						Boreł	nole	ID.	BH06
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	igi							rehole			proje	ct no).	754-CBRGE301356
clier	it:	Eu	roboda	lla S	Shire	Cou	ncil				date s	start	ed:	17 Aug 2022
prine	cipal:	NS	W Publ	ic V	Vork	s Ad	visor	y			date o	com	pleteo	d: 17 Aug 2022
proje	ect:	Br	ou Lanc	lfill	CL02	22, G	eote	chnical Investigation			logge	d by	<i>'</i> :	ТХ
loca	tion:	1 E	Brou La	ke F	Road,	, Dal	meny	NSW 2546			check	ked l	oy:	10
posit	on: E:	238,6	57; N: 5,99	6,152	(MGA9	94 Zone	e 56)	surface elevation: 26 m (AHD)		angle	from ho	orizor	ntal: 90	0°
	nodel: H	,	D&B, Trac	k mou	inted	mate	erial sub	drilling fluid: None		hole d	iametei	r:12	5 mm	
	<u> </u>							material description			sity	ha	ind	
method & support	1 2 penetration 3	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	,	moisture condition	consistency / relative density	me (kl		soil origin, structure and additional observations
			D: BH06 / 8.0-8.5		-	· _ ·		SILTSTONE: pale brown, some interbedded sandstone, moderately weathered, very low to medium strength. (continued)		D				WEATHERED ROCK
				-17	-		-							
				L	- 9.0									
		pa			9.0									
		Not Encountered	E: BH06 /	-16	-]						ii	
- AD		Not End	9.5-9.8	-	-]	-							
			D: BH06 / 10.0-10.5	ŧ	10.0 —									
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				-15	-		-							
				Ļ	- 11.0 —	 								
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		3		-14	-		•	Borehole BH06 terminated at 11.4 m Refusal						
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meti DT AD AS HA W RR	diatube auger hand a washb rock ro	drilling screwi uger ore ller	ng*	M C pen	v 10-	no res rangir refusa	al ater	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	mi base moistu D di M m W w Wp pl	aterial ed on A ure con ry noist et lastic lin	nit	ion		consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose
e.g. B T	AD/T blank t TC bit	oit			- lev	el on date ter inflow		VS vane shear; peak/remouded (kPa) R refusal		quid lim				MD medium dense D dense
V	V bit			-	- wat	ter outflov	N	HB hammer bouncing						VD very dense



	_		COFF	-E	T					Boret	nole ID)	BH07
										sheet			BTU/ 1 of 2
E	nai	ne	erin	q l		a -	Bo	rehole					
				<u> </u>						proje			754-CBRGE301356
clie			robodal								starteo		17 Aug 2022
prin	cipal:	NS	W Publ	іс И	Vorks	s Ad	visor	V		date o	compl	eted	: 17 Aug 2022
proj	ect:	Bro	ou Land	lfill (CL02	22, G	eote	chnical Investigation		logge	d by:		ТХ
loca	ation:	1 B	rou Lal	ke R	Road,	, Dal	meny	NSW 2546		check	ked by	<i>'</i> :	10
posi	tion: E: 2	238,65	58; N: 5,996	6,178	(MGA9	94 Zone	e 56)	surface elevation: 23 m (AHD)	angle	from ho	orizonta	al: 90	0
drill	model: H	anjin	D&B, Trac	k mou	Inted			drilling fluid: None	hole o	diametei	r : 125	mm	
dri	ling info	rmati	on		1	mate	erial sul			~			
method & support	penetration	ter	samples & field tests	(m	depth (m)	graphic log	soil group symbol	material description SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetr mete (kPa)	ro- r	soil origin, structure and additional observations
me	- ~ ~ ~	water		Ъ	deb	gra	soil				3 3 <u>3</u> 3	400	
Î					-	\parallel		TOPSOIL: SILT: low liquid limit, brown, with rootlets and organic fines, trace of fine sized	<wp <wp< td=""><td>F</td><td></td><td></td><td>OPSOIL RESIDUAL SOIL</td></wp<></wp 	F			OPSOIL RESIDUAL SOIL
			D: BH7 / 0.5-1.0	-22		-		sub-angular gravel. SILT: low liquid limit, brown, with trace of fine sized sub-angular gravel.	ννp	F			-
				-21	-			1.3 m: becoming yellow brown, trace of fine grained sand					-
			E: BH07 / 2.0-2.3	-	2.0-		•	SILTY SAND : fine grained, yellow brown, with some gravel (extremely weathered sandstone).	D	L to MD			-
				-20	-			SANDSTONE: yellow brown, extremely weathered, very low strength, remoulds to sandy SILT, LP, very stiff consistency.	D			- N	XTREMELY WEATHERED
			D: BH07 / 3.0-3.5	-19	3.0-								-
	z	Not Encountered		_	4.0-								-
				-18	-			SANDSTONE: fine to medium grained, yellow				 v	-
				-	5.0			brown, interbedded siltstone, highly weathered to moderately weathered, low to medium strength.					-
				-17	-								-
				F	6.0-								-
			D: BH07 / 6.5-7.0	-16	-								
				-15	7.0-								-
met DT AD AS HA W RR & e.g. B	thod diatube auger s hand a washbu rock ro bit shor AD/T blank b	drilling* screwin uger ore ller wn by s	ıg*	M i C d	▼ 10-	ı	ater e shown	B bulk disturbed sample D disturbed sample b E environmental sample SS split spoon sample	material ased on a sture con dry moist wet	imit	tion		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

CDF_0_10_00.3_LIBRARY.GLB rev:CDF_0_10_00.3 2020-08-25 Leg COF BOREHOLE: NON CORED 754-CBRGE301356-R01.GPJ <<DrawingFile>> 14/10/2022 13:57



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C	In	ai	20	orin	a		2	B A	rabala		sheet		2 of 2
_		<u> </u>			<u> </u>				rehole		proje	ct no.	754-CBRGE301356
cl	ient	:	Eu	roboda	lla S	Shire	Cou	ncil			dates	started:	17 Aug 2022
р	rinci	pal:	NS	W Pub	lic V	Vork	s Ad	visor	/		date	complete	d: 17 Aug 2022
р	roje	ct:	Bre	ou Land	dfill	CL02	22, G	eoteo	chnical Investigation		logge	d by:	ТХ
lo	cati	on:	1 E	Brou La	ke F	Road	, Dal	meny	NSW 2546		check	ked by:	10
- T				58; N: 5,99		•	94 Zone	e 56)	surface elevation: 23 m (AHD)	•		orizontal: 9	
		ng info	-	D&B, Trac	ck moi	unted	mate	rial sub	drilling fluid: None stance	hole	diamete	r : 125 mm	I
		-		samples &			D		material description		y / nsity	hand	
method &	support	1 2 penetration	water	field tests	RL (m)	depth (m)	graphic log	soil group symbol	SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	moisture condition	consistency / relative density	penetro- meter (kPa) 8 8 8 8 8	soil origin, structure and additional observations
					-14	- - - 9.0			SANDSTONE: fine to medium grained, yellow brown, interbedded siltstone, highly weathered to moderately weathered, low to medium strength. (continued)	D			WEATHERED ROCK
CDF_0_10_00.3_LIBRARY.GLB rev.CDF_0_10_00.3.2020-08-25 Log_COF BOREHOLE: NON CORED 754-CBRGE301356-R01.GFJ < <drawningfile>> 14/10/2022 13:57</drawningfile>	N		Not Encountered	E: BH07 /	-13	- - - 10.0 —							
Drawin			Not	10.0-10.3	_	-							-
01356-R01.GPJ <<					-12	- - 11.0-			10.6 m: becoming highly to moderately weathered, low to medium strength				
CORED 754-CBRGE					-11	- - - 12.0 —							
ZON L	_					-			Borehole BH07 terminated at 12.10 m Refusal				
REHOL					-10	-			, could				-
38-25 Log COF BOI					-	- 13.0 — -							
0_00.3 2020-					-9								-
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A H V F	ND NS NA V RR	diatube auger d auger s hand au washbo rock roll bit show AD/T blank bi	rilling crewi iger re er <i>r</i> n by	ng*	M C per	▼ ¹⁰⁻ lev	no res rangir refusa Oct-12 w el on date	ater	HP hand penetrometer (kPa) D N standard penetration test (SPT) M N* SPT - sample recovered W Nc SPT with solid cone W VS vane shear; peak/remouded (kPa) W	material based on noisture co dry 1 moist	ndition	tion	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
E T V		TC bit V bit	ı				ter inflow ter outflow	v	R refusal HB hammer bouncing				D dense VD very dense



-				Anny						Borel	hole ID.	BH08
	nai	na	orin	a I		a -	Ro	rehole		sheet	t:	1 of 2
	iigi			<u> </u>		<u> </u>				proje	ct no.	754-CBRGE301356
clie	nt:	Eu	robodal	lla S	shire	: Cou	ıncil			date	started:	17 Aug 2022
prin	cipal:	NS	W Publ	іс И	<i>lork</i> :	s Ad	visor	У		date	complete	ed: 17 Aug 2022
proj	ject:	Bro	ou Lanc	lfill	CL0:	22, G	eote	chnical Investigation		logge	ed by:	ТХ
loca	ation:	1 E	Brou La	ke F	₹oad	l, Dal	meny	/ NSW 2546		chec	ked by:	10
posi	tion: E::		41; N: 5,996					surface elevation: 23 m (AHD)	angle	from h	orizontal: 9	90°
			D&B, Trac	k mou	unted	<u> </u>		drilling fluid: None	hole c	diamete	er : 125 mm	I
dril	lling info	ormati	ion	T	Τ	mate	erial sub			≥	·	
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	material description SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetro- meter (kPa) § 8 8 8	soil origin, structure and additional observations
		-		23			X	FILL: Gravelly SILTY SAND: fine to medium grained, brown to dark brown.	D	-		FILL
							k	Medium graineu, brown to dark brown.				_
				F	-		, k					-
				-22	1.0-		, X					
					1.0		Ś					-
				F	-		k					-
					-	\mathbb{X}	k					-
			E: BH08 /	-21	2.0-	X	1	CII T- Investigated limit, orango brown, with traco fina		L		
			2.0_2.3		-	$\left \left \right \right $		SILT: low liquid limit, orange brown, with trace fine grained sand, trace low plasticity clay, trace fine sized gravel.	<wp< td=""><td> L</td><td></td><td>RESIDUAL SOIL</td></wp<>	L		RESIDUAL SOIL
			D: BH08 /	ł	-	<u> </u>	<u></u>	SILTSTONE: extremely weathered, very low	D			EXTREMELY WEATHERED -
			2.5-3.0					strength, remoulds to sandy SILT, low plasticity, fine to medium sand.	-		iiii	MATERIAL
				-20	3.0 —	<u> </u>	-					-
					-]						-
			E: BH08 / 3.5-3.8	t]		3.5 m: becoming yellow brown				-
			0.0-0.0	-			-					-
QA	: 			-19	4.0-							-
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				F			-					
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			D: DU09 /	Ļ			-					-
			D: BH08 / 5.5-6.0		-]					i i i i	
				-17	6.0-]	-	SANDSTONE: interbedded siltstone, highly weathered, very low to low strength.				WEATHERED ROCK
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				F	-] ;	-					-
]					iiii	-
				-16	7.0-		-					-
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	thod		<u> </u>		oport	<u> </u>		samples & field tests	soil grou		ol &	consistency / relative density
DT AD AS	diatube auger o auger s	drilling			mud casing	N	N nil		material based on a			VS very soft S soft F firm
HA W		auger	g		netration ⊢∾∞			SS split spoon sample				St stiff
RR						no res rangin	esistance ing to al	HP hand penetrometer (kPa) D N standard penetration test (SPT) M	oisture cor dry moist	ndition		VSt very stiff H hard Fb friable
*	bit sho	wn by	suffix	wat	v 10-)-Oct-12 wa		N* SPT - sample recovered W Nc SPT with solid cone WF	wet p plastic li			VL very loose L loose
e.g. B T	. AD/T blank b TC bit				- wat	ater inflow	/	VS vane shear; peak/remouded (kPa) WI R refusal	I liquid lin	nit		MD medium dense D dense
U.				_ -	- wa'	ater outflov	N	HB hammer bouncing				VD very dense

CDF_0_10_00.3_LIBRARY.GLB rev.CDF_0_10_00.3 2020-08-25 Log COF BOREHOLE: NON CORED 754-CBRGE301356-R01.GPJ <<DrawingFile>> 14/10/2022 13:57



Hent: Eurobodalla Shire Council date stanted: 17 Aug 2022 Annopat: NSW Public Works Advisory date completed: 17 Aug 2022 Nopet: Brou Landfill CL022, Geotechnical Investigation logged by: TX concent: 1 Brou Landfill CL022, Geotechnical Investigation concent: 1 O concent: 1 Brou Lake Road, Dalmeny NSW 2546 checked by: IO and major information and the concent of the concent o		-										nole ID.	BH08
ilen: Euroboddilla Shiro Council innega: NSW Public Works Advisory mojet: Brou Landfill CL022, Geotechnical Investigation toged by: TX upgedby: TX concent: I Brou Landfill CL022, Geotechnical Investigation innega: Advisory	с.	adi		orin	a		2	B۵	rabala		sheet		2 of 2
minigan KMP UBUR WORKS Advisory: minigan KMP UBUR WORKS Advisory: tradient K BOAL Land MIL Los 2, Geotechnical Investigation: tradient K BOAL Have Road, Dammery SWP 254 tradient K BOAL Have Road, Dammery SWP 254 tradient K BOAL Have Road, Dammery SWP 254 tradient K BOAL Have Road, Dammery SWP 254 tradient K BOAL Have Road, Dammery SWP 254 tradient K BOAL Have Road, Dammery SWP 254 tradient K BOAL Have Road Dammery SWP 254 tradient K BOAL Have Road Dammery SWP 254 tradient K BOAL Have Road Dammery SWP 254 tradient K BOAL Have Road Dammery SWP 254 tradient K BOAL HAVE Road Dammer SWP 254 tradient K BOAL HAVE ROAD DAMP 255		igi			<u> </u>				renoie		proje	ct no.	754-CBRGE30135
Image: Explosition: Description: Total Lake Road, Dalatineary NSW 2546 Description: Total Control 1000000000000000000000000000000000000	clier	nt:	Eu	roboda	lla S	Shire	Cou	ncil			date	started:	17 Aug 2022
	prine	cipal:	NS	W Publ	lic V	Vork	s Ad	visor	/		date	complete	ed: 17 Aug 2022
adden E 238,641 N 5.990,179 (MGA94 Zone 50) surface elevation: 23 m (MHD) angle from hotocontal: 90° hold diamoter: 128 mm diffing fulct. None hold diam	proje	ect:	Br	ou Land	dfill	CL02	22, G	eote	chnical Investigation		logge	d by:	ТХ
Alling fusit: None Note diameter: 125 mm diffing fusit: None Note diameter: 125 mm diffing fusit: None Material substance material substance material substance get in the statute of	loca	tion:	1 E	Brou La	ke F	Road	, Dal	meny	NSW 2546		check	ked by:	10
defiling information generation in material aubotance material aubotance material aubotance material aubotance material aubotance material aubotance material aubotance SOIL MARE: justicity or prible of anademicinity SOIL MARE: justicity or prible of anademicinity SOIL MARE: justicity or prible of anademicinity SOIL MARE: justicity or prible of anademicinity SOIL MARE: justicity or prible of anademicinity SOIL MARE: justicity or prible of anademicinity SOIL MARE: justicity or prible of anademicinity SOIL MARE: justicity or prible of anademicinity SOIL MARE: justicity or prible of anademicinity setting to the setting of anademicinity of anademicinity of anademicinity and anademicinity of anadem	positi	ion: E::	238,6	41; N: 5,99	6,179	(MGAS	94 Zone	e 56)	surface elevation: 23 m (AHD)	angle	from ho	orizontal:	90°
group group	drill n	nodel: H	anjin	D&B, Trac	ck mou	unted			drilling fluid: None	hole o	diamete	r : 125 mm	1
P. BH00 P. BH00	drill		rmat	ion			mate	erial sub			>		
10 0.8455 0 0.8455 0 0 111 WEATHERED ROCK -14 90 -14 90 -14 90 0 0 111 WEATHERED ROCK -14 90 -14 90 -14 90 -14 90 0 0 111 WEATHERED ROCK -14 90 -14 90 -14 90 -14 90 -14 90 -14 90 -14 90 -14 90 -14 90 -14 90 -14 90 -14 90 -14 90 -14 12.1 m: becoming moderately weathered, low to medium strength M -14	method & support		vater	samples & field tests		depth (m)	graphic log	soil group symbol	SOIL NAME: plasticity or particle characteristics,	noisture condition	consistency / elative densit	penetro- meter (kPa)	
Image: Second Processing and second Processing	ŤŤ	3 6 -7	>		15					D	02	40	WEATHERED ROCK
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The second state of the second state o													
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2 2 -11 12.0 -11 12.1 m: becoming moderately weathered, low to medium strength 11.11 -10 13.0 -10 13.0 -11 12.1 m: becoming moderately weathered, low to medium strength 11.11 -10 13.0 -10 13.0 -11 11.0 11.11 -10 13.0 -11 12.0 -11 11.11 11.11 -10 13.0 -11 -11 11.0 -11.11 11.11 -11 -12 -11 -11.11 -11.11 -11.11 -11.11 -11 -11 -11 -11.11 -11.11 -11.11 -11.11 -11 -11 -11.11 -11.11 -11.11 -11.11 -11.11 -11 -11 -11.11 -11.11 -11.11 -11.11 -11.11 -11 -11.11 -11.11 -11.11 -11.11 -11.11 -11.11 -11 -11.11 -11.11 -11.11 -11.11 -11.11 -11.11 -11 -11.11 -11.11 -11.11 -11.11 -11.11 <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						-	-						
2 2 -11 12.0 -11 12.1 m: becoming moderately weathered, low to medium strength 11.11 -10 13.0 -10 13.0 -11 12.1 m: becoming moderately weathered, low to medium strength 11.11 -10 13.0 -10 13.0 -11 11.0 11.11 -10 13.0 -11 12.0 -11 11.11 11.11 -10 13.0 -11 -11 11.0 -11.11 11.11 -11 -12 -11 -11.11 -11.11 -11.11 -11.11 -11 -11 -11 -11.11 -11.11 -11.11 -11.11 -11 -11 -11.11 -11.11 -11.11 -11.11 -11.11 -11 -11 -11.11 -11.11 -11.11 -11.11 -11.11 -11 -11.11 -11.11 -11.11 -11.11 -11.11 -11.11 -11 -11.11 -11.11 -11.11 -11.11 -11.11 -11.11 -11 -11.11 -11.11 -11.11 -11.11 -11.11 <td></td> <td></td> <td></td> <td></td> <td>-</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>					-	-							
2 2 -11 12.0 -11 12.1 m: becoming moderately weathered, low to medium strength 11.1 m: becoming moderately weathered, low to 11.1 m: becoming moderately weathered, low to -10 13.0 -10 13.0 -11 12.1 m: becoming moderately weathered, low to 11.1 m: becoming moderately weathered, low to -10 13.0 -10 13.0 -11 12.1 m: becoming moderately weathered, low to 11.1 m: becoming moderately weathered, low to -11 -10 13.0 -11 -11 -11 -11 -11 -11 -10 13.0 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -12 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11 -11							— 						
Image: state of the state o					-12	11.0 -	· · · · · ·						
return -11 12.1 m: becoming moderately weathered, low to medium strength 12.1 m: becoming moderately weathered, low to medium strength 11.1 m: becoming moderately weathered, low to medium strength 0 13.5-14.0 9 14.0 m: becoming moderately weathered, low to medium strength M 11.1 m: becoming moderately weathered, low to medium strength 11.1 13.5-14.0 9 14.0 m: becoming molerately weathered, low to medium strength M 11.1 m: low to medium strength 11.1 13.5-14.0 9 14.0 m: becoming molerately weathered, low to medium strength M 11.1 m: low to medium strength M 11.1 11.1 11.1 11.1 m: low to medium strength 14.7 m: becoming wet W M 11.1 11.1 11.1 m: low to medium strength 14.7 m: becoming wet W M 11.1 11.1 11.1 m: low to medium strength 11.1 m: low to medium strength 11.1 m: low to medium strength 11.1 11.1 m: low to medium strength 14.7 m: becoming wet W M 11.1 m: low to medium strength 11.1 11.1 m: low to medium strength 14.7 m: becoming wet W M 11.1 m: low to medium strength 11.1 11.1 m: low to medium strength 11.1 m: low to medium strength 11.1 m: low to medium strength 11.1 m: low to medium strength						-		-					
Image: distribution of the second	9 ż 				-	-							
Image: distribution of the second						-		-					
method barb D: BH08/1 13.5-14.0					-11	12.0-			12.1 m: becoming moderately weathered, low to				
method bar bar bar bar bar bar bar bar bar bar						-		-	medium strength				
method bit shown by suffix eg. d. ADT support morestance method c. a langer more training* bit shown by suffix eg. d. ADT 14.0 m: becoming moist M 11111 1111 1111 1111 1111 1111 1111 1													
method ND D: BH08/ 13.5-14.0 9 14.0 m: becoming moist M 111111111111111111111111111111111111					-10	13.0 -]— —	- -					
method I I I I I I I I I I I I I I I I I I I						-							
method I I I I I I I I I I I I I I I I I I I				D: BH08 /	+	-							
method DT i diatube AD a uger drilling* AS auger screwing* HA hand auger water e.g. AD/T B support M mud AD samples & field tests B method DT i diatube C casing samples & field tests B method C casing samples & field tests B method DT i diatube C casing samples & field tests B method DT i diatube C casing samples & field tests B method DD i diatube C casing samples & field tests B method DD i diatube C casing samples & field tests B method DD i diatube C casing samples & field tests B method DD i diatubed sample B method DD i distubed sample C casing samples & field tests B method DD i distubed sample C casing soil group symbol & material description based on AS 1726:2017 consistency / relative density VS very soft S S soft F firm St standard penetration test (SPT) N S SPT with soil cone VS VS VS VS VS VS VS VS VS VS VS VS VS				13.5-14.0		-	-	-					
method support samples & field tests soil group symbol & consistency / relative density DT diatube M N nil B bulk disturbed sample soil group symbol & VS very soft AS auger drilling* C casing D disturbed sample disturbed sample bulk disturbed sample bulk disturbed sample bulk disturbed sample Soil group symbol & VS very soft R rock roller no resistance no resistance refusal U## undisturbed sample bulk disturb					-9	14.0 -			14.0 m: becoming moist	M	-		
method support samples & field tests soil group symbol & consistency / relative density DT diatube M N nil B bulk disturbed sample soil group symbol & VS very soft AS auger drilling* C casing D disturbed sample disturbed sample bulk disturbed sample bulk disturbed sample bulk disturbed sample Soil group symbol & VS very soft R rock roller no resistance no resistance refusal U## undisturbed sample bulk disturb							[
method support samples & field tests soil group symbol & consistency / relative density DT diatube M N nil C diatube AD auger drilling* Samples & field tests B bulk disturbed sample material description VS very soft R cock roller moresistance no resistance soil group symbol & VS very soft * bit shown by suffix no resistance refusal U## undisturbed sample D disturbed sample Washbore R rock roller no resistance refusal N standard penetration test (SPT) N* ST standard penetration test (SPT) VSt very stiff * bit shown by suffix e.g. AD/T 10-Oct-12 water N' SPT sample recovered N' Vy plastic limit V VL very tiffs B blank bit T TC bit water outflow R refusal R refusal VD dense R refusal N R refusal VD den					-	-							
method support samples & field tests soil group symbol & consistency / relative density DT diatube M N nil B bulk disturbed sample soil group symbol & VS very soft AS auger drilling* C casing D disturbed sample disturbed sample bulk disturbed sample bulk disturbed sample bulk disturbed sample Soil group symbol & VS very soft R rock roller no resistance no resistance refusal U## undisturbed sample bulk disturb								-	14.7 m: becoming wet	W	-		
method support samples & field tests soil group symbol & consistency / relative density M M N nil B bulk disturbed sample material description b b AD auger screwing* M M N nil C casing C casing S soil group symbol & consistency / relative density W washbore M model D disturbed sample E environmental sample S soil group symbol & VS very soft W washbore material description S soil group symbol & S soil group symbol & VS very soft W washbore material addition M N N standard penetrometer (kPa) N Sta stiff VS very soft St stiff * bit shown by suffix material des shown Water N'* SPT - sample recovered N N N Noil cone VS VS very soft % SPT with solid cone VS vare shear; peak/remouded (kPa) N <td></td> <td></td> <td>17/08/</td> <td></td> <td>-8</td> <td>15.0</td> <td></td> <td></td> <td>Borehole BH08 terminated at 15.0 m</td> <td></td> <td></td> <td></td> <td></td>			17/08/		-8	15.0			Borehole BH08 terminated at 15.0 m				
support samples & field tests soil group symbol & consistency / relative density M M N nil C casing Soil group symbol & VS very soft AD auger drilling* C casing D distubed sample bulk disturbed sample bulk disturbed sample Soil group symbol & VS very soft Y mathod auger penetration F firm Ss soil group symbol & VS very soft R rock roller moresistance ranging to analysis no resistance resistance ranging to analysis no resistance resistance ranging to analysis N standard penetration test (SPT) N* ST - sample recovered VS very stiff V vaster 10-Oct-12 water level on date shown water inflow N ST - sample recovered NC SPT with solid cone VS vare shear; peak/remouded (kPa) B blank bit T T TC bit H hard H loose VD water outflow R refusal R refusal VD very dense R refusal VD		111			L	-	-						
method DT support diatube AD support auger drilling* AS support auger drilling* AS samples & field tests B soil group symbol & material description based on AS 1726:2017 consistency / relative density W W mud N nil C casing B bulk disturbed sample D bulk disturbed sample B bulk disturbed sample based on AS 1726:2017 S soft W washbore RR rock roller no resistance ranging to refusal no resistance refusal no resistance refusal U## undisturbed sample moisture condition VSt very soft * bit shown by suffix e.g. AD/T 10-Oct-12 water level on date shown N* SPT - sample recovered Nc N* SPT with solid cone W W W W W U L loose T TC bit water outflow R refusal R refusal W W Ilquid limit WD medium dense		111				-	1						
AD auger drilling* C casing D disturbed sample based on AS 1726:2017 S soft AS auger screwing* HA hand auger moresistance S split spoon sample based on AS 1726:2017 F firm W washbore moresistance split spoon sample U## undisturbed sample ##mm diameter More VSt very stiff W washbore moresistance refusal N standard penetrometer (kPa) D dry H hard * bit shown by suffix e.g. AD/T N* SPT - sample recovered W W W VL very loose B blank bit motesit inflow R refusal R refusal MD medium dense T TC bit Water outflow R refusal VD vert dense VD vert dense		liii											 T
AS auger screwing* HA hand auger W washbore RR rock roller * bit shown by suffix e.g. AD/T B blank bit T T C bit W to the function of				*	M	mud	N	l nil	B bulk disturbed sample	material	descript	tion	VS very soft
W washbore RR rock roller rotisal U## undisturbed sample moisture condition VSt very stiff * bit shown by suffix water In-Oct-12 water N* SPT - sample recovered W W W VL very lose * bit shown by suffix In-Oct-12 water N* SPT - sample recovered W W W VL very lose B blank bit water inflow R refusal VS vane shear; peak/remouded (kPa) WI Iquid limit MD medium dense T TC bit VD very durge VD very durge VD very durge	AS	augers	crewi			•	ı		E environmental sample	based on	AS 1726:	2017	F firm
* bit shown by suffix e.g. AD/T B blank bit T T C bit ★ totate ★ bit shown by suffix B blank bit T T C bit ★ bit shown by suffix B blank bit T T C bit ★ bit shown by suffix B blank bit T T C bit ★ bit shown by suffix B blank bit T T C bit ★ bit shown by suffix B blank bit T T C bit ★ bit shown by suffix B blank bit T T C bit ★ bit shown by suffix B blank bit T T C bit ★ bit shown by suffix B blank bit T T C bit ★ bit shown by suffix B blank bit T T C bit ★ bit shown by suffix B blank bit T T C bit ★ bit shown by suffix B blank bit T T C bit ★ bit shown by suffix B blank bit B blank bit T T C bit ★ bit shown by suffix B blank bit B blank bit B blank bit T T C bit ★ blank bit B	W	washb	ore				no res	sistance	U## undisturbed sample ##mm diameter me		ndition		VSt very stiff
bit shown by suffix Image: 10-Oct-12 water Nc SPT with solid cone Wp plastic limit L loose e.g. AD/T Isolank bit VS vane shear; peak/remouded (kPa) Will liquid limit MD medium dense B blank bit R refusal D dense D dense T TC bit Image: blank bit VD vane shear; peak/remouded (kPa) VD vane shear; peak/remouded (kPa)				ouffin			-		N standard penetration test (SPT) M N* SPT - sample recovered W	moist wet			Fb friable
T TC bit R refusal D dense UD was dense	e.g.	AD/T		SUIIIX		- lev	el on date	e shown	Nc SPT with solid cone W VS vane shear; peak/remouded (kPa) W	p plastic li			L loose MD medium dense
	Б Т V												



E	nai	ne	erin		۲ LOI	a -	Bo	rehole	·	Boreh sheet	:		BH09 1 of 2
			roboda	<u> </u>						projec			754-CBRGE30135
clier										date s			16 Aug 2022
			W Publ							date o			0
	ect:							chnical Investigation		logge	-		TX
	tion:							NSW 2546		check		-	10
			40; N: 5,99 D&B, Trac			94 Zone	956)	surface elevation: 20 m (AHD) drilling fluid: None	-	from ho liameter)°
	ing info	-				mate	rial sul	stance					
× ×	penetration		samples & field tests		Ê	bol	dno _	material description	e u	consistency / relative density	har pene	tro-	soil origin, structure and
support	benet	water		RL (m)	depth (m)	graphic log	soil group symbol	SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	moisture condition	consiste relative	met (kP: 을 없 용	a)	additional observations
-	3 5 7	-		20				TOPSOIL: SILT: dark brown, trace of fine	<wp< td=""><td>F to St</td><td></td><td>1</td><td>TOPSOIL</td></wp<>	F to St		1	TOPSOIL
								SILT: brown.				F	RESIDUAL SOIL
								0.5 m: becoming orange brown					
				-19	1.0-			SILTSTONE: yellow brown, extremely weathered, very low strength, remoulded as SILT, low plasticity,	D	Fb		N	EXTREMELY WEATHERED
								very low strength.					
			BH09 / 1.5-1.8	Ť		[
				-18	2.0-								
				-				2.5 m: trace of medium plasticity clay					
				-17	3.0-								
				Ļ				SILTSTONE: grey brown, some interbedded sandstone, highly weathered to moderately					VEATHERED ROCK
								weathered, low to medium strength.				1 1 1	
z				-16	4.0-			4.0 m: becoming pale brown					
				Γ				4.5 m: trace of medium plasticity clay (clay seam?)					
				-15	5.0-							i i	
				F									
				-14	6.0-								
				F	·	[6.5 m: becoming yellow brown					
						[3 ,					
				-13	7.0-	[
				Ļ	.	<u> </u>							
meti DT AD AS HA	diatube auger auger hand a	drilling* screwir uger		M i C d	port mud casing etratior		nil	E environmental sample SS split spoon sample	soil grou material based on /	descript	ol & ion		consistency / relative density VS very soft S soft F firm St stiff
W RR e.g. B T V	washb rock ro bit sho AD/T blank b TC bit V bit	ller wn by s	suffix	wat	■	-Oct-12 ware on date ter inflow	ater shown		dry moist wet plastic lii liquid lim	mit			VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense



COFFEY		Borehole ID.	DUAA
		sheet:	BH09 2 of 2
Engineering Lo	a - Borehole		
client: Eurobodalla Shir		project no.	754-CBRGE301356
		date started:	16 Aug 2022
principal: NSW Public Worl	-	date completed:	16 Aug 2022
project: Brou Landfill CLC	022, Geotechnical Investigation	logged by:	ТХ
location: 1 Brou Lake Road	d, Dalmeny NSW 2546	checked by:	ΙΟ
position: E: 238,640; N: 5,996,204 (MG/	A94 Zone 56) surface elevation: 20 m (AHD)	angle from horizontal: 90°	
drill model: Hanjin D&B, Track mounted	· ·	hole diameter : 125 mm	
drilling information	material substance	≥ hard	
method & support	Bit material description Divertised Divertised Divertised	istics, ts ts	soil origin, structure and additional observations
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	SILTSTONE: grey brown, some interbedde sandstone, highly weathered to moderately weathered, low to medium strength. (conti 	ed D WE.	ATHERED ROCK

method DT diatube AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller	support M mud N nil C casing penetration metration ranging to refusal	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)	soil group symbol & material description based on AS 1726:2017 moisture condition D dry M moist	consistency / relative density VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable
* bit shown by suffix e.g. AD/T B blank bit T TC bit	water I0-Oct-12 water level on date shown water inflow water outflow	N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	W wet Wp plastic limit WI liquid limit	VL very loose L loose MD medium dense D dense VD very dense



			COF	FE	Y					Boreh	nole ID).	BH10
_	-			-			-			sheet	:		1 of 2
E	ngi	ne	erin	g l	ΓΟĆ	J -	Bo	rehole		projec			754-CBRGE301356
clier	nt:	Eu	roboda	lla S	hire	Cou	ncil				started	:	16 Aug 2022
	cipal:		W Publ					/			comple		16 Aug 2022
•	•						-					licu.	•
proj								chnical Investigation		logge	-		TX
loca	ition:	1 B	rou La	ke R	Road,	Dalı	meny	NSW 2546		check	ed by:		10
· ·			55; N: 5,99		-	4 Zone	56)	surface elevation: 17 m (AHD)		from ho			
	nodel: F	,	D&B, Trac	к то	Inted	mate	rial sub	drilling fluid: None	nole c	liameter	125 r	nm	
								material description		sity	hand		
method & support	2 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	moisture condition	consistency / relative density	penetro meter (kPa) 8 8 8		soil origin, structure and additional observations
				-17	_	\otimes		FILL: Clayey SILTY GRAVEL: fine grained, low	D	MD		_	PSOIL
- GA			D: BH10 / 1.0-1.5	- 16	- - - 1.0	0 0 0 0 0	ML	Iiquid limit, grey brown. FILL: Sandy SILT: fine to medium grained, brown, with some yellow brown fine to medium sized gravel. Gravelly SILT: fine to medium grained, orange brown, fine to medium sub-angular gravel.	<wp< td=""><td>F to St</td><td></td><td> FIL RES</td><td>L SIDUAL SOIL</td></wp<>	F to St		FIL RES	L SIDUAL SOIL
			SPT 2, 4, 7 N*=11 E: BH10/ 2.0-2.3 D: BH10/	- 15	- - 2.0 -		CI	Sandy CLAY: fine grained, medium plasticity, orange brown, with some fine to medium sized sub-angular gravel.	~Wp				
			2.0-2.5 SPT 8, 13, 15	- - -14			CL-CI	CLAY: low to medium plasticity, pale brown. 2.7 m: some fine to medium sub-angular gravel SILTSTONE: pale brown, extremely weathered,	<wp< td=""><td></td><td></td><td></td><td>REMELY WEATHERED</td></wp<>				REMELY WEATHERED
- AD			N*=28	-				low to very low strength, some black laminations, remoulds to sandy SILT, very low strength.					TERIAL
			E: BH10 / 4.0-4.3 D: BH10 / 4.0-4.5 SPT 20, 16, 17 N*=33	-13				4.0 m: becoming yellow brown					
			D: BH10/	-12				5.0 m: some purple laminations				 	
			6.0-6.5 SPT 15, 15, 15, 18 N*=33	-11 	6.0			6.5 m: becoming pale brown					· · · · · ·
			SPT 16, 15, 18 N*=33	-10 - -	-							 	ATHERED ROCK
meti DT AD AS HA W RR R e.g. B T V	hod diatube auger hand a washb rock ro bit sho AD/T blank t TC bit V bit	drilling [*] screwir iuger ore oller wn by s	ng*	M C d	■ 10- leve	I	ater shown	B bulk disturbed sample D disturbed sample b E environmental sample SS split spoon sample	soil grou material ased on <i>i</i> sture cor dry moist wet plastic li liquid lin	descript AS 1726: ndition	ion	F 5 F 1 F 1 F 1 L L	firm St stiff /St very stiff H hard b friable /L very loose loose MD medium dense

CDF_0_10_00.3_LIBRARY.GLB rev:CDF_0_10_00.3 2020-08-25 Log COF BOREHOLE: NON CORED 754-CBRGE301356-R01.GPJ <<DrawingFile>> 14/10/2022 13:57



-										Boreł	nole II	Э.	BH10	
En	ai	~~	orin	~		~	Pa	rahala			sheet	:		2 of 2
	igi	ne	erin	g	LO	<u>g -</u>	БО	rehole			proje	ct no.		754-CBRGE301356
client	t:	Eu	roboda	lla S	Shire	Cou	ncil				date	starte	d:	16 Aug 2022
princi	ipal:	NS	W Publ	lic V	Vork	s Ad	visor	/			date	comp	eted:	16 Aug 2022
proje	ct:	Bro	ou Land	dfill	CL02	22, G	eoteo	chnical Investigation			logge	d by:		ТХ
locati	ion:	1 E	Brou La	ke F	Road	, Dal	meny	NSW 2546			checł	ed by	/:	10
positio	on: E:2		55; N: 5,99					surface elevation: 17 m (AHD)		angle	from ho	-		
drill mo	odel: H	anjin	D&B, Trac	ck moi	unted			drilling fluid: None		hole c	liamete	r : 125	mm	
drillir	ng info	rmati	on			mate	erial sub				~			
method & support	2 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	material description SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	3	moisture condition	consistency / relative density	han penet mete (kPa	ro- er)	soil origin, structure and additional observations
			D: BH10 / 8-8.5	-9	-			SILTSTONE: yellow brown, some interbedded sandstone, highly weathered, low strength. (continued)		D			w	EATHERED ROCK
				-		· ·	1	(00/1/1/1000)				111	į –	
				-		·	-							
			SPT		9.0-	·	-	9.0 m: becoming moist	-	М				
			15, 15, 18 N*=33	-8										
			E: BH10 / 9.5-9.8	1	-	 								
					- 10.0]]	-					111		
- AD				-7			-							
		<u></u>	SPT	_	-		-							
		16/08/22	19 HB N*=R /	/-	-	 	1	10.5 m: becoming saturated		W				
		۴ ۴			11.0	<u> </u>	1					i i i	j 🗌	
				-6	-		ļ							
					-			SANDSTONE: yellow brown, interbedded siltstone, highly weathered to moderately						
				-	-			weathered, low to medium strength.						
• •			SPT 20/120mm	1 5	12.0 -								_	
			HB N*=R	1				Borehole BH10 terminated at 12.12 m Refusal						
				_	-	-						111	Ì.	
					- 13.0 —									
				-4										
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				-								111	Ì.	
					14.0 -	-							L	
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				-2	15.0	1							i –	
				2									İ.	
				L	-	1							1	
					-	1								
	diatube				port mud	N	l nil	samples & field tests B bulk disturbed sample			ip symbo descript			consistency / relative density VS very soft
AS	auger o auger s	crewi		С	casing netratior			D disturbed sample E environmental sample			AS 1726:			S soft F firm
W	hand a washbo rock rol	ore				- no res	sistance	SS split spoon sample U## undisturbed sample ##mm diameter			ndition			St stiff VSt very stiff
				wat		rangir refus		HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered	M m	ry noist /et				H hard Fb friable VL very loose
	bit show AD/T		suffix		▼ ¹⁰⁻ lev	Oct-12 w el on date	e shown	Nc SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa)	Wp p	lastic li quid lin				L loose MD medium dense
Т	blank b TC bit V bit	IL				ter inflow ter outflov		R refusal HB hammer bouncing						D dense VD very dense



-		00.								Boreh	ıole	≠ID.		BH11
Fna	in	eering Log - Borehole								sheet	:			1 of 2
					<u> </u>					projec				754-CBRGE30135
client:		urobod								date s				17 Aug 2022
principal:							-			date c			ted:	17 Aug 2022
project:								chnical Investigation		logge		-		ТХ
location:							-	v NSW 2546		check		,		10
		,629; N: 5,9 in D&B, Tr				ne 56)		surface elevation: 19 m (AHD) drilling fluid: None	•	e from ho diameter				
drill model: drilling in	-		30x	Junea	1	aterial	sut			Jiamere.		20	ľti –	
ation		samples		T	T g	, ₄		material description		⊃y / ensity		nand netro-		
method & support 1 2 penetration		field tes		depth (m)	graphic log	soil group	symbol	SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	moisture condition	consistency / relative density	۳ (ا 29	neter (kPa) 8 8 8 8		soil origin, structure and additional observations
			-19) ∵. SN		TOPSOIL: SILT: brown, with trace of low plasticity clay, trace of rootlets.	<wp M</wp 	F L to	1			PSOIL SIDUAL SOIL
		D: BH11 0.5-1.0	1/			····	"	SILTY SAND: medium to coarse grained, brown, with some fine to medium sized sub-angular gravel.	lvi	L to MD	l i			
		0.0	,			MI	<u> </u>	Sandy SILT: fine to medium grained, brown, with	<wp< td=""><td>F</td><td>łį.</td><td></td><td></td><td></td></wp<>	F	łį.			
				1.0			ļ	trace of fine sized sub-angular gravel.			ļ¦			
			-18		╂	<u>. </u>		SILT: brown, trace of fine sized sub-angular	M	F to St	1	İİİ		
			Ļ		1		ļ	gravel, trace of fine grained sand, trace of low plasticity clay.						
				2.0	, - 		ļ	I			Ľ			
			-17	,	1		ļ	I						
		E: BH11 2.5-2.8			-		ļ	I						
	i 		, 	3	-		ļ	I						
			16	3.0	1	Щ_			<u> </u>					
			-16				ļ	SILTSTONE: orange brown, extremely weathered, very low strength, remoulds as SILT, low plasticity, very low strength.	D	H - Fb				TREMELY WEATHERED TERIAL
			Ļ		1	 · -	ļ	Very low suchgun.			ļ¦.			
 z		D: BH11		4.0	,- :	- · · -	ļ	I			ļ¦			
		4.0-4.5	5 -15	i		- · -	ļ	I			ļ¦.			
			\neg				+	SILTSTONE: orange brown, trace of fine grained	D	+	1		WE	ATHERED ROCK
			F	5.0		·	ļ	sand, highly weathered, low strength.						
			4]	·	ļ	I						
			-14				ļ	I			ļį.			
			Ļ]	 	ļ	I			ļį.			
				6.0	′− <u> `−</u>	- · · -		I			ļ			
			-13	,		- · 		I			ļ¦	$\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $		
								I						
			F	7.0	_ <u>_</u>	. 		I						
			-12			· - - ·		I						
					1	_]		I						
			F]			I						
method			<mark>−∣</mark> s	upport	<u> </u>			samples & field tests	soil grov	up symbo	ĺ.	i i i	⊥ ⊤,	consistency / relative density
DT diatu AD auge	ger drillin		м	1 mud casing	g	N nil		Bbulk disturbed sampleDdisturbed sampleb	material	AS 1726:2	tion			VS very soft S soft
HA hand	ger screv nd auger shbore		p p	enetrati	m			E environmental sample SS split spoon sample					- 5	F firm St stiff
	k roller				rar	o resistance nging to fusal	э	U## undisturbed sample ##mm diameter moi HP hand penetrometer (kPa) D N standard penetration test (SPT) M	dry dry moist	ndition			_ ⊦	VSt very stiff H hard Fb friable
	shown by	y suffix	W		10-Oct-12		· m	N* SPT - sample recovered W Nc SPT with solid cone Wp	wet plastic li	limit				FD TRIADle VL very loose L loose
	nk bit			► v	water inflo	low	'n	VS vane shear; peak/remouded (kPa) WI R refusal	liquid lin	nit			N	MD medium dense D dense
V V bit					water out	flow		HB hammer bouncing					1	VD very dense



		I L				Bore	hole ID.	BH11		
Engi	ineerir	na I	0	N _	Ro	rahala		shee	t:	2 of 2
Liigi		-		_		enole		proje	ect no.	754-CBRGE301356
client:	Euroboda							date	started:	17 Aug 2022
principal:	NSW Pub	lic V	/orks	s Ad	visory	,		date	complete	d: 17 Aug 2022
project:	Brou Lan	dfill	CL02	22, G	eotec	hnical Investigation		logge	ed by:	ТХ
location:	1 Brou La	ake R	load,	Dal	meny	NSW 2546		chec	ked by:	10
position: E:	238,629; N: 5,9	96,227	(MGA9	94 Zone	e 56)	surface elevation: 19 m (AHD)	ang	le from h	orizontal: 9	00°
	Hanjin D&B, Tra	ick mou	inted	mate		drilling fluid: None	hol	e diamete	er : 125 mm	
drilling inf ਨ					erial sub	material description		sity	hand	
method & support 1 2 penetration	samples a field tests		depth (m)	graphic log	soil group symbol	SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	moisture	consistency / relative density	penetro- meter (kPa) 8 8 8 8	soil origin, structure and additional observations
		; 				SILTSTONE: orange brown, trace of fine grained sand, highly weathered, low strength. <i>(continued</i> SILTSTONE: yellow brown, interbedded sandstone, moderately weathered, medium strength. 12.5 m: becoming grey brown 14.0 m: groundwater encountered Borehole BH11 terminated at 14.5 m	d D			WEATHERED ROCK
AS auger HA hand W washt RR rock r	pe r drilling* r screwing* auger bore oller own by suffix bit	M C pen	Leve	1	ater e shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS van e shear; peak/remouded (kPa) R refusal HB hammer bouncing	mater	c limit	otion	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

CDF_0_10_0.3_LIBRARY.GLB rev.CDF_0_10_00.3_2020-08-25 Log COF BOREHOLE: NON CORED 754-CBRGE30136-R01.GPJ <<Dr>



			CON						Boreh	ole	ID.	BH12	
C			arin	~		~ 1	Po	rahala		sheet	:		1 of 2
	ngi	ne	erin	<u>g</u> 1	<u>_O</u> į	<u>g -</u>	DU	rehole		projec	ct nc).	754-CBRGE301356
clie	nt:	Eu	robodal	lla S	hire	: Οοι	ıncil			date s	starte	ed:	16 Aug 2022
prin	icipal:	NS	W Publ	іс И	/ork	s Ad	visor	У		date c	com	plete	ed: 16 Aug 2022
proj	ject:	Bre	ou Lanc	lfill (CL0:	22, G	Jeote	chnical Investigation		logge	d by	/:	ТХ
loca	ation:	1 E	Brou La	ke F	?oad	l, Dal	lmeny	/ NSW 2546		check	ed ł	by:	ΙΟ
posi	tion: E:		641; N: 5,996		-	-		surface elevation: 17 m (AHD)	angle	from ho			
drill r	model: H	lanjin	D&B, Trac	k mou	inted	<u> </u>		drilling fluid: None	hole d	diameter	: 12	5 mm	1
dril	lling info	ormati	ion			mat	terial sub			2	<u> </u>		
& ∾ P ±	penetration		samples & field tests		(E	c log	dnc	material description SOIL NAME: plasticity or particle characteristics,	e u	ency / densit	pene	and etro- eter	soil origin, structure and
method a support		water	1010 10	RL (m)	depth (m)	graphic log	soil group symbol	colour, secondary and minor components	moisture condition	consistency / relative density	(kF	Pa)	additional observations
		+-		17		$\frac{1}{2}$	ML	TOPSOIL: SILT: low liquid limit, brown, trace	<wp< td=""><td>F to St</td><td>TT</td><td></td><td>TOPSOIL -</td></wp<>	F to St	TT		TOPSOIL -
					,		ML	rootlets and fine to medium gravel. FILL: SILT: low liquid limit, brown, trace fine to					FILL
				F	.	$\left \right $	·.	medium gravel.					
				16	-								
				-16	1.0-		•						-
			E: BH12 / 1.5-1.8	Γ	-		·						-
			5.5140/		2.0-		ML	SILT: low liquid limit, orange-brown.				ii	RESIDUAL SOIL
			D: BH12 / 2.0-2.5		2.0			1.8 m: becoming orange brown			1 1		-
				Ļ		$\left\{ \left \left \right \right\}$							-
					-	1							-
				-14	3.0-	1							-
					.								
				-	-	╢╢				1000			
					-		.]	SILTSTONE: orange-brown, extremely weathered, very low strength, remoulds to sandy SILT, low plotting conditions from the medium very low strength	D	VSt to H			EXTREMELY WEATHERED
- dA - A	z		D: BH12 /	-13	4.0-			plasticity, sand is fine to medium, very low strength.					-
			4.0-4.5		-								-
				÷	-]	·	SILTSTONE: yellow-brown, interbedded					WEATHERED ROCK
					.] 		sandstone, highly weathered, low strength.					-
0			E: BH12 /	-12	5.0 -	<u> </u>							-
			5.0-5.3	-	-	-							-
				-		1							-
						 							-
				-11	6.0-	-							-
]					i i	ii	-
				-] 							
					.	 							-
1				-10	7.0-	- ·		7.0 m: becoming orange brown					-
						1. — ·							-
				F	.	 	· -						
					-								
met DT	thod diatube	<u> </u>	<u> </u>		port	·				up symbo			consistency / relative density
AD AS		drilling			mud casing	r	N nil			descripti AS 1726:2			VS very soft S soft F firm
HAW	hand a washb	auger	.9	pen	etration ∾_∞			SS split spoon sample					St stiff VSt very stiff
RR						no re rangii ⊠	esistance jing to sal	HP hand penetrometer (kPa) D	dry moist	idition			H hard Fb friable
*		own by	suffix	wate	▼ 10-	-Oct-12 w		N* SPT - sample recovered W	wet	mit			VL very loose L loose
e.g. B T	blank b				- wat	vel on date ater inflow	N		liquid lim				MD medium dense D dense
T V	TC bit V bit			, -	- wa'	ater outflo	w	HB hammer bouncing					VD very dense

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	-		LOF	E	I.		Boreh	ole ID.	BH12				
ç	nai	20	orin	~		~	B۵	rahala			sheet	:	2 of 2
<u> </u>	ngi							rehole			projec	t no.	754-CBRGE301356
clie	nt:	Eu	robodal	la S	hire	Cou	ncil				date s	started:	16 Aug 2022
prir	ncipal:	NS	W Publ	іс И	/orks	s Adı	visory	/			date o	complete	d: 16 Aug 2022
pro	ject:	Bro	ou Land	lfill (CL02	22, G	eotec	chnical Investigation			logge	d by:	ТХ
loca	ation:	1 E	Brou Lal	ke R	load,	, Dalı	meny	NSW 2546			check	ed by:	10
· ·			41; N: 5,996		-	}4 Zone	ə 56)	surface elevation: 17 m (AHD)		angle	from ho	rizontal: 9	10°
		-	D&B, Tracl	k mou	inted	T mate	erial sub	drilling fluid: None		hole d	iameter	: 125 mm	
un	lling info ଚ							stance material description			/ sity	hand	
method &	2 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	SOIL NAME: plasticity or particle characteristic colour, secondary and minor components	:s ,	moisture condition	consistency / relative density	penetro- meter (kPa) § 8 8 8	soil origin, structure and additional observations
			D: BH12 / 8.0-8.5	-	-			SILTSTONE: yellow-brown, interbedded sandstone, highly weathered, low strength. (continued)		D			WEATHERED ROCK
				-8	9.0-			9.0 m: becoming brown					
>		17/08/22	E: BH12 / 9.5-10 D: BH12 / 9.5-10.0	-7	- - 10.0 — -			9.5 m: becoming saturated		W			
				-6	- - - 11.0 -			10.5 m: becoming moist		М			
- P				-5	- - 12.0 — - -			12.0 m: becoming saturated		w			
				-4	- - 13.0 — - -								
				-3	- 14.0 — - - -		- -						
				-2	- - - -			Borehole BH12 terminated at 15.0 m					
me DT AD AS HA W RR * e.g. B T V	auger hand a washb rock ro bit sho	drilling screwin auger oore oller own by bit	ng*	pen wat	¥_ 10- leve wat	ı	ater e shown	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remouded (kPa) R refusal HB hammer bouncing	maistu D di M m W w Wp pi	aterial	mit	ion	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

CDF 0 10 00.3 LIBRARY.GLB rev:CDF 0 10 00.3 2020-08-25 Log COF BOREHOLE: NON CORED 754-CBRGE301356-R01.GPJ <<DrawingFile>> 14/10/2022 13:57



	-	-		OF	E	I					E	kcavatio	on ID.	TP01
	с.	hai	noo	rin	a I	~	2		cavation		sh	neet:		1 of 1
_		iyi					_		cavation		pr	oject no	D.	754-CBRGE301356
	clier	nt:	Euro	boda	lla S	hire	Cou	ncil			da	ate exca	avated:	16 Aug 2022
I	orin	cipal:	NSW	Publ	ic W	/orks	s Ad	visor	V		da	ate com	pleted:	16 Aug 2022
I	oroj	ect:	Brou	Land	lfill (CL02	22, G	eote	chnical Investigation		lo	gged by	y:	PP
I	oca	tion:	1 Bro	ou Lal	ke R	load,	Dal	meny	NSW 2546		cł	necked	by:	10
	oosit	ion: E:	238,708;	N: 5,99	5,906	(MGA9	94 Zone	e 56)	surface elevation: 24 m (AHD)	I	pit orienta	ation:		DCP id.: FYSH-DCP-
ŀ		-	pe: Sumi informat		Exca	vator		erial sub	excavation method: 350mm Bucket		excavatio	on dimen	sions: 2.5	m long 0.5 m wide
ł	EAC	1							material description		/ sity	hand	DCP	
	support	2 penetration	sa fie kater	mples & eld tests	RL (m)	depth (m)	graphic log	soil group symbol	SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	moisture condition	consistency / relative density	penetro- meter (kPa) $\stackrel{0}{\in} \underset{\otimes}{\otimes} \underset{\otimes}{\otimes} \underset{\otimes}{\otimes}$	(blows/ 100 mm) ∾ + ∞ ∞ ♀	soil origin, structure and additional observations
ſ						-		ML	TOPSOIL: Sandy SILT: low liquid limit, dark grey-brown, fine to medium grained sand with	D	L			TOPSOIL
14:03				TP01/).4-0.5	-23.0	- - 0.5-		SC	Tootlets and organic fines. CLAYEY SAND: fine to medium grained, pale grey, low plasticity clay, trace rootlets and fine grained gravel (highly weathered siltstone/sandstone).	<wp< td=""><td>VSt - H</td><td></td><td></td><td>RESIDUAL SOIL HP 225 - 350 kPa</td></wp<>	VSt - H			RESIDUAL SOIL HP 225 - 350 kPa
< <drawingfile>></drawingfile>				TP01 / 0.9-1.0	22.5	- - - 1.0-			SILTSTONE: extremely weathered, very low strength. Remoulds to: sandy SILT: low plasticity, pale grey-brown, fine to medium grained sand, trace highly weathered siltstone.	D	Н			EXTREMELY WEATHERED MATERIAL
XCAVATION + PSP/DCP 754-CBRGE301356-R01.GPJ	V V				-22.0			-	SILTSTONE: pale grey, low strength, indistinct bedding, minor sand lenses, interbedded sandstone. Test pit TP01 terminated at 1.8 m Target depth	_				WEATHERED ROCK
00.3_LIBRARY.GLB rev:CDF_0_10_00.3 2020-08-25 Log COF EXC/					-21.0	- 2.5 - - - - 3.0								
CDF_0_10_00.3_LIBRARY.GLB rev:CDF					-20.0	- - - 3.5 - - - -								
	N BH B R E HT	existin backho	ools	on	water	n 10-Oc level c	no resis ranging refusal t-12 wat n date s inflow outflow	to er	samples & field tests D disturbed sample B bulk disturbed sample E environmental sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) VS vane shear peak/remouded (kPa)	ma base moistu D dr M m W we Wp pl	ioist	cription 726:2017		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



	-	COFFET											on ID.	TP02
	=,	a	20	orir			~	Ev	ovation		s	heet:		1 of 1
_		iyi							cavation		р	roject n	0.	754-CBRGE301356
С	lier	it:	Eu	robod	alla S	Shire	Cou	ncil			d	ate exc	avated:	16 Aug 2022
р	rino	cipal:	NS	W Pul	blic V	Vork	s Ad	visor	V		d	ate com	pleted:	16 Aug 2022
р	roje	ect:	Bro	ou Lar	ndfill	CL0	22, G	eote	chnical Investigation		lc	ogged b	y:	PP
lc	oca	tion:	1 E	Brou L	ake R	Road	, Dal	meny	NSW 2546		С	hecked	by:	10
р	ositi	on: E:2	238,7	03; N: 5,9	95,972	(MGA	94 Zon	e 56)	surface elevation: 29 m (AHD)	1	pit orient	ation:		DCP id.: FYSH-DCP-
-	<u> </u>	,	·	umitomo	8t Exca	vator	<u> </u>		excavation method: 350mm Bucket		excavati	on dimer	isions: 2.5	m long 0.5 m wide
ŀ	exca	avation	infor	mation			mat	erial su	estance material description		Þ	hand	DCP	
method	support	penetration	water	samples field test		depth (m)	graphic log	soil group symbol	SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	moisture condition	consistency / relative density	penetro- meter (kPa)	(blows/ 100 mm)	soil origin, structure and additional observations
	N							SM	TOPSOIL: SILTY SAND : fine to http://wedium.grained, dark grey, with rootlets and //	D	L			TOPSOIL
								CL	organic fines.	<wp< td=""><td>VSt</td><td></td><td></td><td>RESIDUAL SOIL</td></wp<>	VSt			RESIDUAL SOIL
							\mathbb{V}		Sandy CLAY: low plasticity, pale grey-brown, fine to medium grained sand, trace rootlets and fine grained gravel (highly weathered					HP 175 kPa
				TP01/ 0.4-0.5		0.5-	VIII		fine grained gravel (highly weathered sandstone).					-
8							¥ <u>////</u>		SILTSTONE: extremely weathered, very low	D	Н			EXTREMELY WEATHERED
77071								-	strength. Recovered as: Sandy SILT: fine to medium grained, pale grey-brown, low plasticity					MATERIAL
			red	TD04/]	-	clay.					
AL IO			Not Encountered	TP01/ 0.9-1.0	27.5	1.0-	·	-						HP 350 kPa DCP Refusal
			Not En					-						
]·	-						
								-						
					-27.0	1.5-			SILTSTONE: pale grey-brown, highly	1				WEATHERED ROCK
]	-	weathered to extremely weathered, low to very low strength, sand lenses.					
1-401							<u> </u>	-						
					-26.5	2.0-		1						_
					20.0	2.0		1						
	<u> </u>								Test pit TP02 terminated at 2.2 m					
Š							1		Target depth					
8					-26.0	2.5-	-							-
							1							
n-0707		liii.										iiii	liiii	
200							-							
					-25.5	3.0-								-
							-							
							-							
		i i i			-25.0	3.5-	1					iiii		-
00.0							-							
							1							
3							1							
\mathbf{F}				 					samples & field tests		il aroun s	symbol &	<u> </u>	consistency / relative density
	Ν	hod natural			penetra				D disturbed sample B bulk disturbed sample	ma	aterial de	scription 1726:2017	۱ I	/S very soft S soft
	X BH B	existing backho bulldoz	e buc	ket			no resi ranging		E environmental sample U## undisturbed sample				F	= firm St stiff
	R	ripper		ue	water		- refusal		HP hand penetrometer (kPa) VS vane shear peak/remouded (kPa)	D dr	re condit y	tion	H	/St very stiff H hard
	E HT	excava hand to					ct-12 wat on date :			W w	oist et astic limit		· · ·	Fb friable /L very loose
	sup N	port none				- water	inflow outflow				uid limit		N 1	_ loose MD medium dense D dense
	s	shoring				-	241101							/D dense /D very dense



	-	-	Excava									xcavatio	on ID.	TP03
	F	nai	nc	orin	а I		n _	Ev	cavation		S	heet:		1 of 1
-					<u> </u>				cavation		р	roject no	D.	754-CBRGE301356
		nt:		roboda							d	ate exca	avated:	16 Aug 2022
I	orir	icipal:	NS	W Publ	ic N	/orks	s Ad	visor	/		d	ate com	pleted:	16 Aug 2022
I	oro	ject:	Br	ou Land	dfill	CL02	22, G	eote	chnical Investigation		lc	ogged by	/:	PP
	00	ation:	1 E	Brou La	ke R	Road,	, Dal	meny	NSW 2546		С	hecked	by:	10
- T.				97; N: 5,99		`	94 Zone	e 56)	surface elevation: 30 m (AHD)		pit orient			DCP id.: FYSH-DCP-
H	<u> </u>	avation		Sumitomo 8 mation	(Exca	vator	mate	erial sub	excavation method: 350mm Bucket	(excavati	on dimen	sions: 2.5	m long 0.5 m wide
ſ		tion		samples &			8 o material description				y / nsity	hand	DCP	
•	memoa	support 1 2 penetration 3	water	field tests	RL (m)	depth (m)	graphic log	soil group symbol	SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	moisture condition	consistency / relative density	penetro- meter (kPa) 8 8 8 8	(blows/ 100 mm) ∾ ∗ ∞ ∞ ♀	soil origin, structure and additional observations
CDF_0_10_00.3_LIBRARY.GLB rev.CDF_0_10_00.3_2020-08-25 Log COF EXCAVATION + PSPIDCP 754-CBRGE501356-R01.GPJ <			Not Encountered	TP03/ 0.2-0.3	-29.0 -28.5 -28.0 -27.5 -27.0 -26.5 -26.0	- - - 2.5 - - - - - -		SM	TOPSOIL: SILTY SAND: fine to medium grained, dark grey, trace low plasticity clay, with cobbles and organic fines, trace tree roots. CLAYEY SAND: fine to medium grained, pale brown, low plasticity clay, trace fine to medium grained gravel (highly to moderately weathered sandstone). SANDSTONE: pale brown, highly to extremely weathered, very low strength, trace iron staining. Test pit TP03 terminated at 1.7 m Target depth	D				TOPSOIL HP 75 kPa RESIDUAL SOIL WEATHERED ROCK
	method penetration N natural exposure X existing excavation BH backhoe bucket B buildozer blade R ripper E excavator HT hand tools support method			 10-Oc level c water	no resis ranging refusal t-12 wat on date s inflow outflow	to er	samples & field tests D disturbed sample B bulk disturbed sample E environmental sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) VS vane shear peak/remouded (kPa)	ma base moistu D dr M m W we Wp pla	aterial de ed on AS re condit y oist			consistency / relative density //S very soft S soft - firm St stiff //St very stiff - hard - hard - finable //L very loose - loose MD medium dense - o dense //D very dense		



L				COF	E	r					E	xcavatio	on ID.	TP04
C	'	~1		arin	~	~	~-				S	heet:		1 of 1
	.n	igi	ne	erin	<u>g r</u>	<u>-0(</u>	<u>J -</u>		cavation		р	roject no	Э.	754-CBRGE301356
clie	ent	:	Eu	robodal	lla S	hire	Сои	ıncil			d	ate exca	avated:	16 Aug 2022
pri	nci	pal:	NS	W Publ	ic W	/orks	s Ad	visor	/		d	ate com	pleted:	16 Aug 2022
pro	oje	ct:	Bre	ou Land	lfill (CL02	22, G	eote	chnical Investigation		lc	gged by	/:	PP
location: 1 Brou Lake Road, Dalmeny NSW 2546 checked by: I								10						
pos	sitio	n: E:2	238,7	′56; N: 5,995	5,948 ((MGA9	94 Zon	e 56)	surface elevation: 25 m (AHD)		pit orient	ation:	-	DCP id.: FYSH-DCP-
eqı	uipr	nent ty	pe: S	Sumitomo 8t	Excav	vator			excavation method: 350mm Bucket		excavati	on dimen	sions: 2.5 ı	m long 0.5 m wide
ex	cav		infor	mation			mate	erial sub			<u> </u>			
method	support	 penetration 	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	material description SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetro- meter (kPa) © 8 8 8	DCP (blows/ 100 mm)	soil origin, structure and additional observations
	N 					_		ML	TOPSOIL: Sandy SILT: low liquid limit, pale	<wp< td=""><td>F</td><td></td><td></td><td>TOPSOIL \HP 45 kPa</td></wp<>	F			TOPSOIL \HP 45 kPa
						-		CL	medium grained sand, trace fine grained gravel, fine to medium grained angular to		St - VSI			
				TP04 /	-	-			sub-angular sandstone. Sandy CLAY: low plasticity, pale grey-brown,			k 		HP 175 kPa
				0.4-0.5	-24.0	0.5 -	///// ``	1	fine to medium grained sand, trace fine grained gravel (highly weathered siltstone).	D	н			EXTREMELY WEATHERED
			ntered			-			SILTSTONE: extremely weathered, very low strength. Recovered as: Sandy SILT: low					MATERIAL
 			Encountered			-		 	plasticity, pale grey-brown, fine to medium grained sand, trace highly weathered siltstone fragments.					
			Not	TP04 /	-23.5	- 1.0-		-	nagments.					
					23.5	-		-						
						-			SILTSTONE: pale grey-brown, highly	-				WEATHERED ROCK
						-			weathered, very low strength, minor sand lenses.					
					-23.0	1.5		.]						-
	V					-								
	Ť	- 				-			Test pit TP04 terminated at 1.7 m Target depth					
						-			vr					
					-22.5	2.0-								-
						-								
						-								
					-22.0	- 2.5								-
					22.0	2.5								-
						-								
						-						++++		
					-21.5	3.0								-
						-								
						-	1							
						-						++++		
					-21.0	3.5 —	1							-

CDF_0_10_31				
method N natural exposure X existing excavation BH backhoe bucket B bulldozer blade R ripper E excavator HT hand tools support N N none S shoring	penetration ranging to refusal water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests D disturbed sample B bulk disturbed sample E environmental sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) VS vane shear peak/remouded (kPa)	soil group symbol & material description based on AS 1726:2017 moisture condition D dry M moist W wet Wp plastic limit WI 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



	COFFET							Excavation ID.			TP05
Ena	inoo	rina		a -	Ev	cavation		sheet:			1 of 1
				<u> </u>		Javalion		р	oroject no	0.	754-CBRGE301356
client:	Eurob	odalla	Shire	e Cou	incil			d	ate exca	avated:	16 Aug 2022
principal	: NSW	Public	Work	s Ad	visor	/	date completed:				16 Aug 2022
project:	Brou	Landfil	I CLO	22, G	eote	chnical Investigation		lo	ogged by	y:	PP
location:	1 Brou	u Lake	Road	l, Dal	meny	NSW 2546		с	hecked	by:	ΙΟ
	E: 238,785; N		-	94 Zone	e 56)	surface elevation: 25 m (AHD)		pit orien			DCP id.: FYSH-DCP-
	t type: Sumite		avator	mate	erial sul	excavation method: 350mm Bucket		excavat	ion dimen	sions: 2.5	m long 0.5 m wide
					material description			// sity	hand	DCP	
method support	san fiel ,	itests	depth (m)	graphic log	soil group symbol	SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	moisture condition	consistency / relative densit	penetro- meter (kPa) 8 8 8 8	(blows/ 100 mm)	soil origin, structure and additional observations
N + PPDGP 754-CBRGE-01368-R01.GPJ < <ur> A E Z Z </ur>	.0.	-24 -24 -23 -23 -23 -23 -23	.5 1.0-		. SM . ML	TOPSOIL: SILTY SAND: fine to medium grained, pale grey, with rootlets and organic fines. Sandy SILT: low liquid limit, pale grey-brown, fine to medium grained sand, trace tree roots and fine grained gravel (fine to medium grained angular to sub-angular, highly weathered siltstone). SILTSTONE: pale grey-brown, highly weathered, very low strength. Remoulds to: Sandy CLAY: low plasticity, fine to medium grained, trace highly weathered siltstone. SILTSTONE: pale grey-brown, to pink-grey, highly weathered, low to very low strength, minor sandstone lenses, trace quartz. Test pit TP05 terminated at 2.0 m Target depth	D <wp< td=""><td>L St H</td><td></td><td></td><td>TOPSOIL RESIDUAL SOIL HP 150 kPa EXTREMELY WEATHERED MATERIAL DCP Refusal WEATHERED ROCK</td></wp<>	L St H			TOPSOIL RESIDUAL SOIL HP 150 kPa EXTREMELY WEATHERED MATERIAL DCP Refusal WEATHERED ROCK
CDF_0_10_00.3_LIBYARY.GLB rev:CDF_0_10_00.3 2020-08-25 Log COF EXCAVATION		-22 -21 -21	.5 3.0-								
X exis BH bac B bulk R ripp E exc HT han support N non	natural exposure existing excavation backhoe bucket bulldozer blade ripper excavator hand tools port		- no resis ranging - refusal ct-12 wat on date r inflow	to ter	samples & field testsDdisturbed sampleBbulk disturbed sampleEenvironmental sampleU##undisturbed sample ##mm diameterHPhand penetrometer (KPa)VSvane shear peak/remouded (kPa)	m bas moistr D d M n W w Wp p	aterial de	1726:2017	, , , , , , , , , , , , , , , , , , ,	Consistency / relative density /S very soft S soft F firm St stiff /St very stiff H hard Fb friable /L very loose L loose MD medium dense O dense /D very loose	

0 505 55 754 PSP/DCP TION EXCAV/ ЦĊС 5 S 9 C LE O CDF 0 10 00.3 LIBRARY.GLB rev



L				LOF	FE	T		Excavation	n ID.	TP06		
	=.	- ~i	~ ~	orio			~		varian	sheet:		1 of 1
_		igi			<u> </u>				cavation	project no		754-CBRGE301356
С	lier	nt:	Eu	roboda	alla S	Shire	Cou	ncil		date exca	vated:	16 Aug 2022
р	rin	cipal:	NS	W Pub	lic V	Vork	s Ad	visor	ry	date comp	oleted:	16 Aug 2022
р	roj	ect:	Bre	ou Lan	dfill	CL02	22, G	eote	echnical Investigation	logged by	:	PP
lo	oca	tion:	1 E	Brou La	ke F	Road,	, Dal	meny	y NSW 2546	checked b	oy:	10
р	osit	ion: E:	238,7	73; N: 5,99	96,016	(MGA9	94 Zone	e 56)	surface elevation: 24 m (AHD)	pit orientation:	-	DCP id.: FYSH-DCP-
е	qui	oment ty	/pe: S	umitomo 8	8t Exca	vator			excavation method: 350mm Bucket	excavation dimens	ions: 2.5	m long 0.5 m wide
ŀ								erial sub	Ibstance	>		
method	support	penetration	er	samples & field tests		depth (m)	graphic log	soil group symbol	material description SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components <u>a</u> <u>c</u> <u>c</u> <u>c</u> <u>c</u> <u>c</u> <u>c</u> <u>c</u> <u>c</u> <u>c</u> <u>c</u>	tent for the second sec	DCP (blows/ 100 mm)	soil origin, structure and additional observations
, me	-	- N 0	water		Я	dep	gra				9 4 9 8 9	
11	· N					-		SM	TOPSOIL: SILTY SAND: fine to D medium grained, pale grey, with rootlet sand			TOPSOIL
00:11 33			P	TP06 / 0.4-0.5	23.0	0.5-		ML	organic fines. <wp< td=""> Sandy SILT: low liquid limit, pale red-brown, fine to medium grained sand, trace tree roots and fine to medium grained gravel (highly weathered sandstone).</wp<>	VSt		HP 175 kPa
	I		S Not Encountered		-22.5	- - 1.0			SANDSTONE: fine to medium grained, pale grey, Recovered as: Clayey SAND: fine to medium grained, minor silt laminations.	H		EXTREMELY WEATHERED MATERIAL
				TP06 / 1.4-1.5	22.0	- - 1.5 - -			SANDSTONE: fine to medium grained, pale grey, highly weathered, very low strength.			WEATHERED ROCK DCP Refusal
	me	tthod	3		-21.5 -21.0 -20.5 -20.0	2.5-			Test pit TP06 terminated at 1.9 m Target depth samples & field tests	I I I I I I		
support				- 10-Oc level c	no resis ranging refusal t-12 wat on date s inflow outflow	to	D disturbed sample m B bulk disturbed sample bas E environmental sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) moist VS vane shear peak/remouded (kPa) 0 c M r W v	bil group symbol & aterial description ed on AS 1726:2017 ure condition ny noist vet lastic limit quid limit	F S F F S V F F V L L L L	VS very soft soft firm St stiff VSt very stiff h hard b friable VL very loose loose MD medium dense		

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			COLL	and here of	1																						
L			COFI	-E	Y					E	Excavatio	on ID.	TP07														
-	•			~	-	-				s	heet:		1 of 1														
	:ng	Ine	erin	<u>g</u> I	-0(g -	EX	cavation		р	oroject no).	754-CBRGE301356														
cli	ent:	Eu	roboda	lla S	hire	Cou	ıncil			d	late exca	vated:	16 Aug 2022														
pr	incipal:	NS	W Publ	ic N	/ork	s Ad	visor	У	date completed: 16 Aug 202				16 Aug 2022														
pr	oject:	Br	ou Lanc	lfill (CL0	22. G	eote	chnical Investigation		lo	ogged by	<i>/</i> :	PP														
										10																	
	Iocation: 1 Brou Lake Road, Dalmeny NSW 2546 checked by: position: E: 238,727; N: 5,995,994 (MGA94 Zone 56) surface elevation: 28 m (AHD) pit orientation:								DCP id.: FYSH-DCP-																		
· ·			Sumitomo 8t		•	54 2016	5 50)	excavation method: 350mm Bucket				sions: 2.5	m long 0.5 m wide														
e	cavatio	n infor	mation			mate	erial su	bstance																			
method	support 1 2 penetration	s water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	material description SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetro- meter (kPa) § 8 8 8	DCP (blows/ 100 mm)	soil origin, structure and additional observations														
	N						SM	TOPSOIL: SILTY SAND: fine to medium grained, dark grey, with rootlets,	D	L	X		TOPSOIL \HP 70 kPa														
		i	TP07 /	_	-		SM SC	organic fines and charcoal.	r -	MD D																	
				-	-			SILTY SAND: fine to medium grained, pale grey, with rootlets, organic fines and charcoal.					RESIDUAL SOIL														
				27.0	0.5			CLAYEY SAND : fine to medium grained, pale brown, low plasticity clay, trace fine to		VD			HP 250 kPa 														
	8								3	p	pa	p	p	p	3		-27.0		-27.0 0.5 -		· · · · · · · · · · · · · · · · · · ·	medium grained gravel (highly weathered sandstone), with tree roots.	7]!!!!		WEATHERED ROCK
E		Not Encountered		-26.5	- - - 1.0- - - -			SANDSTONE: fine to medium grained, pale grey-brown, highly to extremely weathered, very low strength, some interbedded silt.					- DCP Refusal														
V	Y		TP07 / 1.8-1.9	-26.0	1.5								-														
				-25.5 -25.0	-	-		Test pit TP07 terminated at 1.7 m Target depth					-														
				-24.5	3.0-								-														

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	-24.5 3.0			
	-24.0 3.5			
method N natural exposure X existing excavation BH backhoe bucket	penetration	samples & field tests D disturbed sample B bulk disturbed sample E environmental sample	soil group symbol & material description based on AS 1726:2017	consistency / relative density VS very soft S soft F firm
B buildozer blade R ripper E excavator HT hand tools support N none S shoring	vater v	U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) VS vane shear peak/remouded (kPa)	moisture condition D dry M moist W wet Wp plastic limit WI liquid limit	St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense



				LOFI	E	r		_		Excavation ID.				TP08 1 of 1	
E	Ξ	ngi	ne	erin	g l	-0(J -	Ex	cavation		r	oroject n	0.		754-CBRGE301356
cl	lier	nt:	Eu	roboda	lla S	hire	Cou	ncil				late exc		d:	16 Aug 2022
р	rin	cipal:	NS	W Publ	ic W	/orks	s Adı	visor	y		c	late con	npleted	d:	16 Aug 2022
р	roj	ect:	Bro	ou Land	ifill (CL02	22, G	eoteo	chnical Investigation		le	ogged b	y:		PP
lo	oca	ition:	1 E	Brou La	ke R	oad,	Dalı	meny	7 NSW 2546		c	hecked	by:		10
р	osit	ion: E:	238,7	33; N: 5,99	6,044	(MGA9	4 Zone	e 56)	surface elevation: 26 m (AHD)		pit orien	tation:			DCP id.: FYSH-DCP-
⊢	<u> </u>		t type: Sumitomo 8t Excavator on information				excavation method: 350mm Bucket material substance				excavat	ion dime	nsions: 2	2.5 ı	m long 0.5 m wide
method		ation	water	samples & field tests	RL (m)	depth (m)	graphic log	soil group symbol	material description SOIL NAME: plasticity or particle characteristics, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetro meter (kPa) § 8 8 8	100 m	/s/ im)	soil origin, structure and additional observations
	N	100						SM	TOPSOIL: SILTY SAND : fine to medium grained, pale brown, trace rootlets.	D	MD	X	111	1.1.1.1.1.1.1.1	TOPSOIL
						-		ML	Sandy SILT: low liquid limit, pale grey-brown, fine to coarse grained sand, trace rootlets.	/ <wp< td=""><td>Н</td><td></td><td></td><td></td><td>RESIDUAL SOIL HP 150 kPa</td></wp<>	Н				RESIDUAL SOIL HP 150 kPa
			ntered	TP08 / 0.4-0.5	-25.0	0.5			SANDSTONE : extremely weathered, very low strength, crumbles under hand pressure to Clayey Sand: medium to coarse grained, pale grey-brown, some highly weathered sandstone.	D	VD				EXTREMELY WEATHERED - MATERIAL
ш Ш			Not Encountered		-24.5	- 1.0								 	DCP Refusal
V		,		TP08 / 	-24.0	- - 1.5 — - -			SANDSTONE: medium to coarse grained, pale grey-brown, highly weathered, low strength, occasional silt laminations.		н				WEATHERED ROCK
					-23.5	2.0			Test pit TP08 terminated at 1.9 m Target depth						-
					-23.0	- 2.5 — -									-
					-22.5	- 3.0 — -									-
					-22.0	- 3.5 — - -									-

samples & field tests soil group symbol & consistency / relative density penetration method very soft soft material description VS natural exposure existing excavation D B disturbed sample Ν - N 0 S F St based on AS 1726:2017 bulk disturbed sample Х - no resistance ranging to buik disturbed sample environmental sample undisturbed sample ##mm diameter hand penetrometer (kPa) vane shear peak/remouded (kPa) E U## firm stiff BH backhoe bucket bulldozer blade в - refusal VSt H Fb very stiff hard HP VS moisture condition D dry M moist W wet R ripper excavator D dry M moist W wet Wp plastic limit WI liquid limit water E friable 10-Oct-12 water level on date shown ΗT hand tools VL very loose L MD loose **support** N non S sho water inflow medium dense none water outflow D VD dense very dense shoring



SOIL DESCRIPTION EXPLANATION SHEET

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 disaggregated 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 AS 1726:2017 as shown in the table on Sheet 2. PARTICLE SIZE DEFINITIONS

Components	Subdivision

Components	Subdivision	Size (mm)
Boulders Cobbles		>200 63 - 200
Gravel	Coarse Medium Fine	19 - 63 6.7 - 19 2.36 - 6.7
Sand	Coarse Medium Fine	0.6 - 2.36 0.210 - 0.6 0.075 - 0.21
Silt Clay		0.002 - 0.075 < 0.002

MOISTURE CONDITION

Coarse Grained Soil

Dry (D)	Non-cohesive and free-running
Moist (M)	Soil feels cool, darked in colour. Soil tends to stick together.
Wet (W)	As for moist, with free water forming when handled.
Fine Grained Soil	

Moist, dry of plastic limit (w <w<sub>P)</w<sub>	Hard and friable or powdery
Moist, near plastic limit (w≈W _P)	Can be moulded at a moisture content approximately equal to the plastic limit.
Moist, wet of plastic limit (w>W _P)	Soils usually weakened and free water forms on hands when handling.
Wet, near liquid limit (w≈WL)	Near liquid limit.
Wet, wet of liquid limit (w>WL)	Wet of liquid limit.

CONSISTENCY OF COHESIVE SOILS

Term (Abbreviation) Abbreviation Abbrevia Abbrevia Abbrevia Abbrevia Abbrevia Abbrevia Abbrevia Abbrevia Abbrevia Abbrevia Abbrevia Abbre		Field guide
Very Soft (VS)	<12	Soil exudes between fingers when squeezed in hand.
Soft (S)	12 - 25	Soil can be moulded by light finger pressure.
Firm (F)	25 - 50	Soil can be moulded by strong finger pressure.
Stiff (St)	50 - 100	Soil cannot be moulded by fingers.
Very Stiff (VSt)	100 - 200	Soil can be indented by thumb nail.
Hard (H)	>200	Soil can be indented with difficulty by thumb nail.
Friable (Fb)	-	Soil can be easily crumbled or broken into small pieces by hand.

RELATIVE DENSITY OF NON-COHESIVE SOILS

Term (Abbreviation)	Density index (%)			
Very Loose (VL)	Less than 15			
Loose (L)	15 - 35			
Medium Dense (MD)	35 - 65			
Dense (D)	65 - 85			
Very Dense (VD)	Greater than 85			

MINOR COMPONENTS

Term	Assessment Guide	Proportion of minor component in:
Trace	Presence just detectable by feel or eye, but soil properties little or no different to general properties of primary component.	Coarse grained soils: Fines - <5%, Accessory coarse fraction - <15% Fine grained soils: sand/gravel <15%
With	Presence easily detected by feel or eye, soil properties little different to general properties of primary component.	Coarse grained soils: Fines - 5 to 12%, Accessory coarse fraction – 15 to 30% Fine grained soils: sand/gravel 15 to 30%

SOIL STRUCTURE AND CEMENTATION

	Zoning	Cementation			
Layer	Zone is continuous across exposure or sample.	Weakly cemented	Easily disaggregated by hand in air or water.		
Lense	Discontinuous layer of different material, with lenticular shape.	Moderately cemented	Effort is required to disaggregate the soil by hand in air or water.		
Pocket	Irregular inclusion of different material.				

GEOLOGICAL ORIGIN

Residual soil	Structure and fabric of parent rock not visible.
Extremely weathered material	Structure and/or fabric of parent rock is visible.
Alluvial soil	Deposited by streams and rivers.
Estuarine soil	Deposited in coastal estuaries, including sediments carried by inflowing rivers and streams, or tidal currents.
Marine soil	Deposited in a marine environment
Lacustrine soil	Deposited in freshwater lakes
Aeolian soil	Carried and deposited by wind
Colluvial soil	Deposited on slopes (transported downslope by gravity, with or without assistance of water).
Topsoil	Mantle of surface or near surface material, often defined by high levels of organic material.
Fill	Any material which has been placed by anthropogenic processes. Fill may be significantly more variable between tested locations than naturally occurring soils.

SOIL CLASSIFICATION INCLUDING IDENTIFICATION AND DESCRIPTION

			(E	xcluding			ION PROCEDURES nd basing fractions on estimated	d mass)	GROUP SYMBOL	SOIL NAME
75	75 mm			action n	AN VEL tess 5%)	Wide range in grain size and substantial amounts of all intermediate particle sizes, not enough fines to bind coarse grains, no dry strength.			GW	GRAVEL
-00	- than 0.07	e)	VEL	^c coarse fra n 2.36 mn	CLEAN GRAVEL (Fines less than 5%)		antly one size or a range of size sing, not enough fines to bind co		GP	GRAVEL
SOIL	n is larger	ıaked ey	GRAVEL	More than half of coarse fraction is larger than 2.36 mm	VEL INES jreater (2%)		terials with excess of non-plastic es see ML below).	fines (for identification	GM	Silty GRAVEL
	han 63 mi	e to the r		More th is	GRAVEL with FINES (Fines greater than 12%)		terials with excess of plastic fine es see CL below).	s (for identification	GC	Clayey GRAVEL
COARSE GRAIINED SOIL	ials less t	de visible		rse 2.36	AN VD 5%)		ge in grain sizes and substantial enough fines to bind coarse gra	SW	SAND	
COARSE GRAINED SOIL More than 65% of materials less than 63 mm is larger than 0.075 mm about the smallest particle visible to the naked eye)	est partic	SAND	More than half of coarse fraction is smaller than 2.36	CLEAN SAND (Fines less than 5%)	Predominantly one size or a range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength.			SP	SAND	
	ne small	7S	ore than I stion is sm	SAND with FINES (Fines greater than 12%r)	'Dirty' materials with excess of non-plastic fines (for identification procedures see ML below).			SM	Silty SAND	
- CAN	More frac SA SA FIN FIN		SA Sare Green Sare Sare Sare Sare Sare Sare Sare Sare	'Dirty' materials with excess of plastic fines (for identification procedures see CL below).			SC	Clayey SAND		
63		<u>.</u>			IDEN	ITIFICATIO	ON PROCEDURES ON FRACTI	ONS <0.2 mm		
- than	E	Inticl		s	DRY STREN	GTH	DILATANCY	TOUGHNESS		
	075 n	n pa	øð	ji les	None to lo	w	Slow to rapid	Low	ML	SILT
terial	an 0.(0.075 mm particle	SILT &	CLAY Liquid limit less	Medium to h	nigh	None to slow	Medium	CL, CI	CLAY
RAIN of ma	ller th			Liqu	Low to med	ium	Slow	Low	OL	Organic SILT
FINE GRAINED SOIL nan 35% of material less t	mm is smaller than 0.075 mm	A)		it	Low to med	ium	None to slow	Low to medium	MH	SILT
FINE GRAINED SOIL More than 35% of material less than 63	FIN e than mm is	SILT &	CLAY Liquid limit	High to very	high	None	High	СН	CLAY	
Mor			S	Liq C	Medium to h	nigh	None to very slow	Low to medium	ОН	Organic CLAY
HIGHLY	ORC	GANI	IC SC	DILS	Readily identi	fied by cold	our, odour, spongy feel and frequ	uently by fibrous texture.	PT	Peat
• Lov	w pla	sticit	y – Li	quid Lin	nit W∟less than 35%	. • Mediu	um plasticity –W⊾ between 35% a	and 50%. ● High plasticity –	W _L greater that	an 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 (e g. 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	MINISTERNAL STREET
Fissure	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. May include desiccation cracks.		Tube	Tubular cavity. May occur singly or as one of a large number of separate or interconnected tubes. Walls often coated with clay or strengthened by denser packing of grains. May contain organic matter. Origins include root holes, animal burrows, tunnel erosion.	
Sheared Seam	Zone in clayey soil with roughly parallel near planar, curved or undulating boundaries containing closely spaced, smooth or slickensided, curved intersecting joints which divide the mass into lenticular or wedge shaped blocks.	Ø	Tube cast	An infilled tube. The infill may be uncemented or weakly cemented soil or have rock properties.	
Sheared Surface	A near planar curved or undulating, smooth, polished or slickensided surface in clayey soil. The polished or slickensided surface indicates that 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 defects.	



ROCK DESCRIPTION EXPLANATION SHEET

DEFINITIONS:	Rock mater	ial, defect, structure and rock mass are defined as follow	s:							
Rock material	air or water	In engineering terms rock material is any naturally occurring aggregate of minerals and/or organic materials that cannot be disaggregated by hand in air or water without prior soaking. Rock material is intact rock that is bounded by defects. Material which can be disaggregated or remoulded should be described as a soil.								
Defect Structure Rock mass	Discontinui Nature and	ty, fracture, break or void in the material or materials acro configuration of the different defects within the rock mas irety of the system formed by all of the rock material and								
MATERIAL DES	SCRIPTIVE	TERMS:	ROCK MATER	AL STRENGT	HTERMS					
Rock name	Simple r classifica	ock names are used rather than precise geological ation.	Term (Abbreviation)	Gu Point Load	Guide to Strength Load Field Assessment					
Particle size	Grain siz	e terms for sandstone are:		Strength						
Coarse grained	Mainly 0	.6mm to 2mm		Index, I _{s(50)} (MPa)						
Medium grained	Mainly 0	.2mm to 0.6mm	Very Low	0.03 - 0.1	Material crumbles under					
Fine grained	Mainly 0	.06mm (just visible) to 0.2mm	(VL)		firm blows with sharp end					
Fabric	a layerin rocks, ai terms us				of pick; can be peeled with a knife; too hard to cut a triaxial sample by hand; pieces up to 30mm thick can be broken by finger					
Massive		ing or penetrative fabric.	Low (L)	0.1 - 0.3	pressure.					
Indistinct Distinct	propertie	or fabric just visible. Little effect on strength s. or fabric is easily visible. Rock may break more			Easily scored with a knife; indentations 1mm to 3mm show with firm bows of a					
	easily pa	TERIAL WEATHERING			pick point; has a dull sound under hammer. A piece of core 150mm long by 50mm diameter may be					
Term Ab	breviation Definition				broken by hand. Sharp edges of core may be					
Residual Soil	RS	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. Soil	Medium	0.3 to 1.0	friable and break during handling. Readily scored with a					
Extremely Weathered	xw	has not been significantly transported. Material is weathered to such an extent that it has soil properties, i.e. it either disaggregates or can be remoulded in water. Mass structure and material texture and fabric of original rock are still visible.	(M)	0.0 10 1.0	knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.					
Highly Weathered ¹	HW	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 recognisable. 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 the deposition of	High (H)	1 to 3	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.					
		weathering products in pores.	Very High	3 to 10	Hand specimen breaks					
Moderately Weathered ¹	MW	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 no longer recognisable.	(VH) Extremely High	More than 10	after more than one blow; rock rings under hammer. Specimen requires many					
Slightly Weathered	sw	Little or no change of strength from fresh rock. Rock is partially discoloured with staining or bleaching adjacent to defects, but shows little or no change of strength from fresh rock.	(EH)		blows with geological pick to break through intact material; rock rings under hammer.					
Fresh	FR	Rock shows no sign of decomposition of individual minerals or colour changes.	Notes on Rock N	aterial Strength:						
Notes on Weathe	-	herad' (DW) may be used where it is not practicable (or	soil characte	eristics.	n 'Very Low' should be described using					
it is judged th between 'Hig is defined as	nat there is n hly Weather follows: 'Ro	hered' (DW) may be used where it is not practicable (or o advantage in making such a distinction) to distinguish ed' and 'Moderately Weathered'. 'Distinctly Weathered' ck strength usually changed by weathering. The rock d usually by iron staining. Porresity may be increased	4133.4.2. 3. The rock str	ength should be d	$I_{S(50)} \text{ should be in accordance with AS}$ letermined perpendicular to any trength anisotropic rocks may readily					

- The rock strength should be determined perpendicular to any anisotropy in the rock. High strength anisotropic rocks may readily break parallel to the planar anisotropy.
 Although AS1726:2017 provides a basis for rock strength terms based
- 4. Although AS1726:2017 provides a basis for rock strength terms based on Unconfined Compressive Strength (UCS), the ratio between UCS and I_{S(50)} may vary from less than 10 to over 30 depending on the rock type and overall strength. The UCS/I_{S(50)} strength ratio should be determined for each rock material.
- The rock strength classification using I_{S(50)} above should be considered indicative only. The rock strength classified in accordance with AS1726:2017 may be higher or lower if UCS results are available.

pores'.

2.

may be highly discourse, used ally by iron staining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in

Where physical and chemical changes of the rock material are caused by hot gases or liquids at depth (process called alteration) the term 'altered' may be substituted for 'weathering' to give the abbreviations XA, HA, MA, SA and DA.

Term	Definition	Diagram	Map Symbol	Graphic Log (Note 1)
Parting	A surface or crack across which the rock has little or no tensile strength. Parallel or sub-parallel to layering (e.g. bedding) or a planar anisotropy in the rock material (e.g. cleavage). May be open or closed.		20 Bedding 20 Cleavage	(Note 2)
Joint	A surface or crack with no apparent shear displacement and across which the rock has little or no tensile strength, but which is not parallel or sub-parallel to layering or to planar anisotropy in the rock material. May be open or closed.		¥ ⁶⁰	(Note 2)
Sheared Zone/Seam (Note 3)	Zone of rock material with roughly parallel near planar, curved or undulating boundaries cut by closely spaced joints, sheared surfaces or other defects. Some of the defects are usually curved and intersect to divide the mass into lenticular or wedge shaped blocks.	A.	35	11224
Sheared Surface (Note 3)	A near planar, curved or undulating surface which is usually smooth, polished or slickensided and which shows evidence of shear displacement.	N. S. S. S. S. S. S. S. S. S. S. S. S. S.	40	10.20
Crushed Seam (Note 3)	Seam of soil material with roughly parallel almost planar boundaries, composed of disoriented, usually angular fragments of the host rock material which may be more weathered than the host rock. The seam has soil properties.			1. J. A. C. L.
Infilled Seam	Seam of soil material usually with distinct roughly parallel boundaries formed by the migration of soil into an open cavity or joint, infilled seams up to 1mm thick may be described as veneer or coating on a joint surface.		TAN SS	ALL REAL
Extremely Weathered Seam	Seam of soil material, often with gradational boundaries. Formed by weathering of the rock material in place.	Seam	and and a state of the state of	and the

1. Usually borehole logs show the true dip of defects, and face sketches and sections show the apparent dip.

2. Partings and joints are not usually shown on the graphic log unless considered significant.

3. Sheared zones/seams, sheared surfaces and crushed seams are generally faults in geological terms.

DEFECT SHAPE TERMS

Planar	The defect does not vary in orientation
Curved	The defect has a gradual change in orientation
Undulating	The defect has a wavy surface
Stepped	The defect has one or more well defined steps
Irregular	The defect has many sharp changes of orientation
	essment of defect shape is partly

influenced by the scale of the observation.

DEFECT ROUGHNESS TERMS

Very Rou	gh	Many large surface irregularities (amplitude generally more than 1mm). Feels like, or coarser than very coarse sand paper.
Rough		Many small surface irregularities (amplitude generally less than 1mm). Feels like fine to coarse sand paper.
Smooth		Smooth to touch. Few or no surface irregularities.
Polished		Shiny smooth surface.
Slickensided		Grooved or striated surface, usually polished.
DEFECT	COA	TING TERMS
Clean	No vis	ible coating.
Stained		ible coating but surfaces scoloured.
Veneer	A visit	ble coating of soil or

a visible coating of solit of mineral, too thin to measure; may be patchy.Coating A visible coating up to 1mm

thick. Thicker soil material should be described using appropriate defect terms (e g. infilled seam). Thicker rock strength material should be described as a vein.

DIMENSION OF DEFECTS

Spacing, length, openness and thickness

The spacing, length, aperture (openness), and seam thickness should generally be described directly in millimetres or metres.

Block Shape

Where it is considered significant, block shape (e.g. tabular, prismatic, columnar) should be described using the terms in Table 23 of AS 1726:2017.

APPENDIX D: DYNAMIC CONE PENETROMETER RESULTS



lient:	Eurobodalla Shi	ire Council	Eurobodalla Shire Council							
rincipal:	NSW Public Wo	rks				Date Tested:	16/08/2022			
roject:	Brou Landfill Ex	pansion, Geote	chnical Investiga	ation		By:	P. Pfitzner			
est Location:	Phase 2 Develo	•	-			-	I. Ortega			
Test Method	AS 1289.6.3.2-1997(AS 1289.6.3.3-1997((R2013)	TA Test Method T161	_	S 4402.6.5.2 (1988)			
Test No:	Test No: DCP01 Test No: DCP02 Test No: DCP03			Test No:	DCP04					
Test Location:			Test Location:							
Starting Depth (m):	0	Starting Depth (m):	0	Starting Depth (m)	0	Starting Depth (m):	0			
Depth (m)	Blows	Depth (m)	Blows	Depth (m)	Blows	Depth (m)	Blows			
0.10	5	0.10	3	0.10	11	0.10	5			
0.20	6	0.20	3	0.20	7	0.20	6			
0.30	14	0.30	5	0.30	5	0.30	11			
0.40	18	0.40	5	0.40	5	0.40	9			
0.50	10	0.50	5	0.50	10	0.50	9			
0.60	9	0.60	8	0.60	11	0.60	8			
0.70	3	0.70	9	0.70	120	0.70	7			
0.80	8	0.80	13	0.80	12	0.80	9			
0.90	7	0.90	11	0.90	17	0.90	16			
1.00	4	1.00	6	1.00	10	1.00	13			
1.10	19	1.10	23	1.10	Refusal at	1.10	11			
1.20	20	1.20	Refusal at 1.05m	1.20	Hammer bounce	1.20	11			
1.30	Refusal at 1.18m	1.30		1.30		1.30	11			
1.40	Hammer bounce	1.40		1.40		1.40	12			
1.50		1.50		1.50		1.50	12			
1.60		1.60		1.60		1.60	12			
1.70		1.70		1.70		1.70	11			
1.80		1.80		1.80		1.80	Refusal at 1.65			
1.90		1.90		1.90		1.90	Hammer bounc			
2.00		2.00		2.00		2.00				
2.10		2.10		2.10		2.10				
2.20		2.20		2.20		2.20				
2.30		2.30		2.30		2.30				
2.40		2.40		2.40		2.40				
2.50		2.50		2.50		2.50				
2.60		2.60		2.60		2.60				
2.70		2.70 2.80		2.70		2.70 2.80				
2.80		2.80		2.80 2.90		2.80				
3.00		3.00		3.00		3.00				
3.00		5.00		5.00		5.00				
	Test N 88) Determinaton of th			Drop Weight	Drop Height	Cone/Blunt tip	DCP Id FYSH-DCP01			

754-CBRGE301356

Job No:

Note 3. Perth penetrometer testing should stop if the blow count exceeds 30 blows per 300mm to avoid damage to equipment.



Principal: Project: Test Location:		orke						
est Location:		NSW Public Works					16/08/2022	
	oject: Brou Landfill Expansion, Geotechnical Investigation						P. Pfitzner	
	Phase 2 Development Area - Refer to Site Plan					Checked: I. Ortega		
Test Method AS 1289.6.3.2-1997(R2013) 🗸 AS 1289.6.3.3-1997(R2013) 🗌 RTA Test					A Test Method T161	NZS 4	402.6.5.2 (1988)	Γ
Test No:	DCP05	Test No:	DCP06	Test No:	DCP07	Test No:	DCP08	-
Test Location:	: TP05	Test Location:	TP06	Test Location:	TP07	Test Location:	TP08	
Starting Depth (m):	: 0	Starting Depth (m):	0	Starting Depth (m):	0	Starting Depth (m):	0	
Depth (m)	Blows	Depth (m)	Blows	Depth (m)	Blows	Depth (m)	Blows	
0.10	9	0.10	1	0.10	17	0.10	13	
0.20	5	0.20	10	0.20	11	0.20	14	
0.30	6	0.30	10	0.30	8	0.30	12	
0.40	7	0.40	10	0.40	8	0.40	12	
0.50	12	0.50	12	0.50	9	0.50	8	
0.60	13	0.60	11	0.60	8	0.60	10	
0.70	13	0.70	10	0.70	10	0.70	13	
0.80	8	0.80	8	0.80	12	0.80	10	
0.90	8	0.90	12	0.90	10	0.90	12	
1.00	20	1.00	16	1.00	15	1.00	28	
1.10	Refusal at	1.10	17	1.10	16	1.10	Refusal at 0.9	8
1.20		1.20	20	1.20	5	1.20		
1.30		1.30	15	1.30	Refusal at 1.12m	1.30		
1.40		1.40	Refusal at 1.25m	1.40	Hammer bounce	1.40		
1.50		1.50	Hammer bounce	1.50		1.50		
1.60		1.60		1.60		1.60		
1.70		1.70		1.70		1.70		
1.80		1.80		1.80		1.80		
1.90		1.90		1.90		1.90		
2.00		2.00		2.00		2.00		
2.10		2.10		2.10		2.10		
2.20		2.20		2.20		2.20	ļ	
2.30		2.30		2.30		2.30		
2.40		2.40		2.40		2.40		
2.50		2.50		2.50		2.50	ļ	
2.60		2.60		2.60		2.60	ļ	
2.70		2.70		2.70		2.70	ļ	
2.80		2.80		2.80		2.80		
2.90		2.90		2.90		2.90		
3.00		3.00		3.00		3.00		
Test Method NZS 4402.6.5.2 (1988) Determinaton of the penetration resistance of a soil				Drop Weight 9 kg	Drop Height 510 mm	Cone/Blunt tip Cone	DCP Id FYSH-DCP0	1

754-CBRGE301356

Job No:

Note 3. Perth penetrometer testing should stop if the blow count exceeds 30 blows per 300mm to avoid damage to equipment.

APPENDIX E: LABORATORY RESULTS


Coffey Testing Pty Ltd ABN 92 114 364 046 16 Mildura Street Fyshwick ACT 2609

Phone: +61 2 8876 0550

TESTING	rest R	eport				F	-	M:CANB22W01570 Issue No: 1
16	etra Tech Co 6 Mildura Str yshwick AC ⁻		(Canberra)			NATA	Testing. NATA is a si Recognition Arranger the equivalence of test inspection and profici reports.	ance with ISO/IEC 17025 - gnatory to the ILAC Mutual ment for the mutual recognition of sting, medical testing, calibration, ency testing scheme providers
Principal:						annun annun annun	HALL CONTRACT	
	ESTCANBOC	-				ilac-MRA	Approved Signatory:	
Project Name: 30 Lot No.:	J1356 - Bron	Landfill G.I.	TRN:			The Contraction	(Laboratory Manager NATA Accredited Lab	ooratory Number:431
201110][. Malahan	Date of Issue: 16/09/	2022
Material Detai	ils							
Location Source Description Sampling Method	Bron Lal Insitu Subgrad I Submitte			Sample Specifi	ed From cation	AS Grad	ling -19mm	
Sample Detail	s							
Sample ID Field Sample ID Date Sampled Date Submitted: Sample Location:			CANB22S-04044 00001 17/08/2022 7/09/2022 BH06 1.5 - 2.0m	CANB22S-04045 00002 17/08/2022 7/09/2022 BH07 0.5 -1.0m	CANB22S-04046 00003 16/08/2022 7/09/2022 BH10 1.5 - 1.95m	CANB22S-04047 00004 17/08/2022 7/09/2022 BH11 0.5 - 1.0m	CANB22S-04048 00005 16/08/2022 7/09/2022 BH12 2.0 - 2.5m	
Particle Size I	Distributi	on						
Method: AS 1289.3.6.1 Description: Determination of the Size Distribution of a Standard Method of Drying by: Washed: Sample Washed	a Soil - f Analysis by	Sieve Size 19.0mm 13.2mm 9.5mm 6.7mm 4.75mm 2.36mm 1.18mm 600µm 425µm 300µm 150µm 75µm		100 98 95 93 86 78 71 69 64 58 53	% P	assing		Limits
Other Test Re					_	-		
Description Emerson Class Num Soil Description Type of Water Temperature of Wate Date Tested	nber	Method AS 1289.3.8.1	5 Subgrade Potable 17 14/09/2022	5 Subgrade Potable 17 14/09/2022	Res 6 Subgrade Potable 17 14/09/2022	ults 5 Subgrade Potable 17 14/09/2022	6 Subgrade Potable 17 14/09/2022	Limits
Comments *Results relate only to	o the items tes	ted or sampled	d.					



Coffey Testing Pty Ltd ABN 92 114 364 046 16 Mildura Street Fyshwick ACT 2609

Phone: +61 2 8876 0550

TESTING Material	- Test Report				F	Report No: AS	M:CANB22W01570 Issue No: 1
1	Tetra Tech Coffey Pty Ltd (16 Mildura Street Fyshwick ACT 2609	Canberra)			NATA	Testing. NATA is a s Recognition Arrange the equivalence of te	liance with ISO/IEC 17025 - signatory to the ILAC Mutual ement for the mutual recognition of esting, medical testing, calibration, cali
	TESTCANB00418AA 301356 - Bron Landfill G.I.	TRN:			Hac-MRA	Approved Signatory: (Laboratory Manage NATA Accredited La Date of Issue: 16/09	r) aboratory Number:431
Material Deta	ails						
Location Source Description Sampling Metho				ed From ication	AS Grac	ling -19mm	
Sample Deta	lils						
Sample ID Field Sample ID Date Sampled Date Submitted: Sample Location	:	CANB22S-04044 00001 17/08/2022 7/09/2022 BH06 1.5 - 2.0m	CANB22S-04045 00002 17/08/2022 7/09/2022 BH07 0.5 -1.0m	00003 16/08/2022 7/09/2022	CANB22S-04047 00004 17/08/2022 7/09/2022 BH11 0.5 - 1.0m	CANB22S-04048 00005 16/08/2022 7/09/2022 BH12 2.0 - 2.5m	
Other Test R	lesults						
Description	Method			Res	ults		Limits
Sample History Preparation Linear Shrinkage (⁶ Mould Length (mm Crumbling Curling Cracking Liquid Limit (%)				Oven-dried Dry Sieved 7.0 254 No No No 48			
Plastic Limit (%) Plasticity Index (%) Date Tested	AS 1289.3.2.1 a) AS 1289.3.3.1			24 24 14/09/2022			
Comments							

*Results relate only to the items tested or sampled.



Coffey Testing Pty Ltd ABN 92 114 364 046 16 Mildura Street Fyshwick ACT 2609

Phone: +61 2 8876 0550

TESTING Material		eport			[F	Report No: A	ASM:CANB	22W01571 Issue No: 1
Client:	Tetra Tech Co 16 Mildura Str Fyshwick AC	eet	(Canberra)			NATA	Testing. NATA is Recognition Arra the equivalence	ompliance with ISO/ s a signatory to the l angement for the mu of testing, medical t roficiency testing so	LAC Mutual itual recognition of esting, calibration,
Principal: Project No.: Project Name: Lot No.:	TESTCANB00 301356 - Bron		TRN:			AC-MRA	(Laboratory Mar	tory: Jason McGurg lager) d Laboratory Numbe	
Material Det	ails								
Location Source Description Sampling Meth	Bron La Insitu Subgrac	ke, NSW le ed by client*		Sample Specifi	ed From cation	AS Grad	ling -9.5mm		
Sample Deta Sample ID Field Sample ID Date Sampled Date Submitted Sample Locatio) I:		CANB22S-04049 00006 16/08/2022 7/09/2022 TP02 0.4 - 0.5m	CANB22S-04050 00007 16/08/2022 7/09/2022 TP04 0.2 - 0.3m	CANB22S-04051 00008 16/08/2022 7/09/2022 TP04 0.4 - 0.5m	CANB22S-04052 00009 16/08/2022 7/09/2022 TP05 0.9 - 1.0m	CANB22S-04053 00010 16/08/2022 7/09/2022 TP08 0.3 - 0.4m		
Particle Size	e Distributi	ON Sieve Size			0/ D	assing			Limits
AS 1289.3.6.1		9.5mm			% P 3	assing			LIMITS
Description: Determination of Size Distribution Standard Method Drying by: Oven	of a Soil -	6.7mm 4.75mm 2.36mm 1.18mm 600µm 425µm			99 99 98 97 94 92				
Washed: Sample Washed		300µm 150µm 75µm			87 76 63				
Other Test F	Results								
Description Emerson Class N Soil Description Type of Water Temperature of W Date Tested	umber	Method AS 1289.3.8.1	5 Subgrade Potable 17 14/09/2022	5 Subgrade Potable 17 14/09/2022	Res 5 Subgrade Potable 17 14/09/2022	ults 6 Subgrade Potable 17 14/09/2022	5 Subgrade Potable 17 14/09/2022		Limits
Comments									

*Results relate only to the items tested or sampled.



Coffey Testing Pty Ltd ABN 92 114 364 046 16 Mildura Street Fyshwick ACT 2609

Phone: +61 2 8876 0550

Coffey Pty Ltd (Canberr Street ACT 2609 B00418AA ron Landfill G.I. TRN:	a)		Accredited for compliance w Testing. NATA is a signatory Recognition Arrangement for the equivalence of testing, n inspection and proficiency te reports. Approved Signatory: Jason (Laboratory Manager)	y to the ILAC Mutual r the mutual recognition o nedical testing, calibration, ssting scheme providers
ron Landfill G.I.		Iac MRA	Approved Signatory: Jason	McGurgan
		Fill and and and and and and and and and and	NATA Accredited Laborator Date of Issue: 16/09/2022	-
Lake, NSW J grade nitted by client*			ng -9.5mm	
000 16/08/20 7/09/20 TF	006 00007 022 16/08/2022 16/08 022 7/09/2022 7/09 02 TP04	00008 00009 3/2022 16/08/2022 9/2022 7/09/2022 TP04 TP05	00010	
Method		Results		Limits
AS 1289.1.1 AS 1289.3.4.1			Dry Sieved 4.5 254 No No Yes	
AS 1289.3.1.2 AS 1289.3.2.1 AS 1289.3.3.1			35 23 12 14/09/2022	
ر ا	A grade nitted by client* CANB22S-04 000 16/08/20 7/09/20 TF 0.4 - 0. Method AS 1289.1.1 AS 1289.3.4.1 AS 1289.3.4.1 AS 1289.3.1.2 AS 1289.3.2.1	Method Sampled From Specification Method CANB22S-04049 CANB22S-04050 CANB22 00006 00007 16/08/2022 16/08/2022 16/08 7/09/2022 7/09/2022 7/09/2022 7/09 TP02 TP04 0.4 - 0.5m 0.2 - 0.3m 0.4 Method AS 1289.1.1 AS 1289.3.4.1 AS 1289.3.4.1	Mark Sampled From Specification AS Gradi Inited by client* CANB22S-04049 CANB22S-04050 CANB22S-04051 CANB22S-04052 CANB22S-04049 CANB22S-04050 CANB22S-04051 CANB22S-04052 00006 00007 00008 00009 16/08/2022 16/08/2022 16/08/2022 16/08/2022 7/09/2022 7/09/2022 7/09/2022 7/09/2022 TP02 TP04 TP04 TP05 0.4 - 0.5m 0.2 - 0.3m 0.4 - 0.5m 0.9 - 1.0m	March Sampled From Specification AS Grading -9.5mm Mathematical by client* CANE22S-04049 CANE22S-04050 CANE22S-04051 CANE22S-04052 CANE22S-04053 CANE22S-04053 CANE22S-04053 CANE22S-04052 CANE22S-04053 CANE22S-04052 CANE22S-04053 CANE22S-04052 CANE22S-04053 CANE22S-04052 CANE22S-04053 CANE22S-04053 CANE22S-04052 CANE22S-04053 CANE22S-04052 CANE22S-04052 CANE22S-04052 CANE22S-04052 CANE22S-04052 CANE22S-04052 CANE22S-04052 CANE22S-04052 CANE2S-04052 CANE2S-04052 CANE2S-04053 CANE2S-04052 CANE2S-04052 CANE2S-04052 CANE2S-04052 CANE2S-04052 CANE2S-04052 CANE2S-04053 CANE2S-04052 CANE2S-04052 CANE2S-04053 CANE2S-04051 CANE2S-04051 CANE2S-04051 CANE2S-04051 CANE2S-04051 CANE2S-04051 CANE3 CA

Comments

*Results relate only to the items tested or sampled.

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			Consigning Office	ire.	Canherra. ACT					
			Report Results to:	to:	Peter Pfitzner		Mobile:	0429 958 271	Email:	Peter.Pfitzner@Tetratech.com
	OFFEY		Invoices to:		Michael Carbone	ē	Phone:	0422 350 209	Email:	michael.carbone@tetratech.com
Project No:	754-CBRGE301356	Task No:						Analy	Analysis Request Section	ection
Project Name:	Brou Lake Expansion GI	Laboratory:	Eurofins							
Sampler's Name:		Project Manager:			Michael Carbone					
Quote number (Quote number (if different to current quoted prices):									
Special Instructions:	ons:									
Lab Batch Ref	Sample ID	Sample Date	Time	Matrix (Soiletc)	Container Type & Preservative*	T-A-T (specify)				NOTES
	TP04_0.4-0.5	16/08/2022		SOIL	BAG	STD				
	TP04_0.9-1.0	16/08/2022		SOIL	BAG	STD			-	
	TP08_0.4-0.5	16/08/2022		SOIL	BAG	STD				
	TP06_1.4-1.5	16/08/2022		SOIL	BAG	STD				
	TP06_0.4-0.5	16/08/2022		SOIL	BAG	STD				
	TP07_1.8-1.9	16/08/2022		SOIL	BAG	STD				
	TP08_1.4-1.5	16/08/2022		SOIL	BAG	STD				
	TP07_0.2-0.3	16/08/2022		SOIL	BAG	STD		d		
	TP05_0.2-0.3	16/08/2022		SOIL	BAG	STD				
	TP05_0.8-0.9	16/08/2022		SOIL	BAG	STD				
	TP03_0.2-0.3	16/08/2022		SOIL	BAG	STD			-	
	TP03_0.9-1.0	16/08/2022		SOIL	BAG	STD				
	TP02_0.9-1.0	16/08/2022		SOIL	BAG	STD				
	TP02_0.4-0.5	16/08/2022		SOIL	BAG	STD				
	TP01_0.9-1.0	16/08/2022		SOIL	BAG	STD				
	TP01_0.4-0.5	16/08/2022		SOIL	BAG	STD				
	RELINQUISHED BY					RECEIN	RECEIVED BY		Sample Receip	Sample Receipt Advice: (Lab Use Only)
Name:	Date:	<u>.</u>		Name: A	Beach E	Ř	Date: 23/8/2	R	All Samples Re	All Samples Recieved in Good Condition
Coffey	Time:	ē		Company:	webas	ACT	Time: 10:00	DAM	All Documenta	All Documentation is in Proper Order
Name:	Date:	e:	+	Name:			Date:		Samples Receiv	Samples Received Properly Chilled
Company:	Time:	ē		Company:			Time:		Lab. Ref/Batch No.	No. 016665
*Container Type	*Container Type & Preservation Codes: P - Plastic, G- Glass Bottle, J - Glass Jar, V- Vial, Z - Ziplock bag, N - Nitric Acid Preserved, C - Hydrochloric	lass Bottle, J - Glass Jar,	V- Viał, Z - Zip	lock bag, N - N	itric Acid Preserved, C -	Hydrochloric A	Acid Preserved, S - Sulphuric Acid Preserved, I - Ice,	Acid Preserved, I - Ice,		22000
si - soqium i nic	SI - Sodium Thiosulfate, INF - No Preservative									

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Report Results to: **Consigning Office:**

Canberra, ACT

Peter.Pfitzner@Tetratech.com

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1	COFFEY		Report Results to:	to:	Michael Carbone	e Phone:	ne:	0422 350 209	Email:	michael.carbone@tetratech.com
miert No:	754-CBRGE301356	Task No:	IIIVOILES to:					Analy	Analysis Request Section	ection
roject Name:	Brou Lake Expansion GI	Laboratory:	Eurofins							
ampler's Name: p p	d d :	Project Manager:			Michael Carbone					
luote number	Quote number (if different to current quoted prices):	prices):								
pecial Instructions:	ons:									
Lab Batch Ref	Sample ID	Sample Date	Time	Matrix (Soiletc)	Container Type & Preservative*	T-A-T (specify)				NOTES
	BH09 13.5-13.8	16/08/2022		SOIL	BAG	STD				
	BH10_2.0-2.5	16/08/2022		SOIL	BAG	STD				
	BH12_9.5-10.0	16/08/2022		SOIL	BAG	STD				
	BH10_9.5-9.8	16/08/2022		SOIL	BAG	STD				
	BH09_1.5-1.8	16/08/2022		SOIL	BAG	STD				
	BH10_4.0-4.3	16/08/2022		SOIL	BAG	STD				
	BH12_1.5-1.8	16/08/2022		SOIL	BAG	STD				
	BH12_5.0-5.5	16/08/2022		SOIL	BAG	STD				
	BH11_2.5-2.8	17/08/2022		SOIL	BAG	STD				
	BH7_2.0-2.3	17/08/2022		SOIL	BAG	STD				
	BH7_10-10.3	17/08/2022		SOIL	BAG	STD				
	BH8_3.5-3.8	17/08/2022		SOIL	BAG	STD				
	BH8_2.0-2.3	17/08/2022		SOIL	BAG	STD				
	BH6_2.5-2.8	17/08/2022		SOIL	BAG	STD				
	BH6_9.5-9.8	17/08/2022		SOIL	BAG	STD				
	BH2_0,5-0.8	18/08/2022		SOIL	BAG	STD				
		RELINQUISHED BY				RECEIVED BY	2		Sample Recei	
Vame:		Date:		Name: A.	Beach, of	()	18/50 is	e e s	All Samples R	All Samples Recieved in Good Condition
Coffey		Time:		Company:	Europhin	SHUL Time:	10: 111-L	CHHO I		9
Vame:		Date:	4	Name:		Date:	ie:		Samples Kece	Proper
Company:		Time:		Company:		Time:			Lab. Ref/Batch No.	nno. 91666511.107
Container Typ	e & Preservation Codes: P - F	*Container Type & Preservation Codes: P - Plastic, G- Glass Bottle, J - Glass Jar, V- Vial, Z - Ziplock bag, N - Nitric Acid Preserved, C - Hydrocnionic Acid Preserved, S - Suphimic Acid	r, V- Vial, Z - Zip	lock bag, N - N	tric Acid Preserved, C	- Hydrochioric Acid Pre	serveu, o - ouipinu	The field in teach year, in they		
ST - Sodium Thi	CT _ Condium Thingulfate NP - No Preservative	,							Ī	
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Chain of custody Issued: 5 April 2022 UNCONTROLLED WHEN PRINTED

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		Consigning Office:	fice:	Canberra, ACT					
TE TETRA TECH		Report Results to:	; to:	Peter Pfitzner		Mobile:	0429 958 271	Email:	Peter.Pfitzner@Tetratech.com
COFFE		Invoices to:		Michael Carbone	ne	Phone:	0422 350 209	Email:	michael.carbone@tetratech.com
Project No: 754-CBRGE301356	Task No:						Analy	Analysis Request Section	ection
Project Name: Brou Lake Expansion GI	Laboratory:	Eurofins					_	_	
Sampler's Name: p p	Project Manager:			Michael Carbone	-				
Quote number (if different to current quoted prices):									
Special Instructions:									
Lab Batch Ref Sample ID	Sample Date	Time	Matrix	Container Type &	T-A-T				NOTES
BH1 0.5-0.8	18/08/2022		SO	BAG	STD				
BH3_1.5-2.0	18/08/2022		SOIL	BAG	STD				
BH3_3.0-3.5	18/08/2022		SOIL	BAG	STD				
BH4_1.5-2.0	18/08/2022		SOIL	BAG	STD				
BH5_0.5-0.8	18/08/2022		SOIL	BAG	STD				
BH11_14.0-14.3	17/08/2022		SOIL	BAG	STD				
RELINQUISHED BY					RECEIVED BY	DBY		Sample Receip	Sample Receipt Advice: (Lab Use Only)
Name: Date:			Name: 🔎	Buch O	đ	Date: 23/8/2	CC CC	All Samples Re	All Samples Recieved in Good Condition
Coffey Time:	ί¢.		Company:	Enopen	ACT	Time: 10:004	OAN	All Documenta	All Documentation is in Proper Order
Name: Date:	14	¥	Name:			Date:		Samples Recei	Samples Received Properly Chilled
Company: Time:		V Vi-1 7 7:-	Company:			Time:		Lab. Ref/Batch No.	1NO. 011665 11 100
*Container Type & Preservation Codes: P - Plastic, G- Glass Bottle, J - Glass Jar, V- Vial, Z - Ziplock bag, N - Nitric Acid Preserved, C - Hydrochloric. ST - Sodium Thiosulfate NP - No Preservative	ass Bottle, J - Glass Jar,	V- Vial, Z - Zip	lock bag, N - Ni	tric Acid Preserved, C -	 Hydrochloric Acia 	Acid Preserved, S - Sulphuric Acid Preserved, I - Ice,	c Acid Preserved, I - Ice,)././ Caagil



Company: Time: Time: Company: Time: Company: Time: Company: Time: Company: Time:
Date:
Date: 6/0/22
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Mobile:



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			Report Results to:	to:	Peter Pfitzner		Mobile:	0429 958 271	Email:	Peter.Pfitzner@Tetratech.com
			Invoices to:		Michael Carbone	Гē	Phone:	0422 350 209	Email:	michael.carbone@tetratech.com
Project No:	754-CBRGE301356	Task No:						Analys	Analysis Request Section	ection
Project Name:	Brou Lake Expansion GI	Laboratory:	Eurofins							
Sampler's Name: Terry Xu	ıe: Теггү Хи	Project Manager:			Michael Carbone		f and Soils			
Quote number	Quote number (if different to current quoted prices):						(pH lfate		_	
Special Instructions:	tions:						reen id su			
							ld Sc - Aci			
Lab Batch Ref	f Sample ID	Sample Date	Time	Matrix (Soiletc)	Container Type & Preservative*	Т-А-Т (specify)	pH Fiel pHfox)			NOTES
	BH09_13.5-13.8	16/08/2022		SOIL	BAG	STD	×			
	BH10_2.0-2.5	16/08/2022		SOIL	BAG	STD	×			
	BH12_9.5-10.0	16/08/2022		SOIL	BAG	STD	×			
	BH10_9.5-9.8	16/08/2022		SOIL	BAG	STD	×			
	BH09_1.5-1.8	16/08/2022		SOIL	BAG	STD				
	BH10_4.0-4.3	16/08/2022		SOIL	BAG	STD	×			
	BH12_1.5-1.8	16/08/2022		SOIL	BAG	STD				
	BH12_5.0-5.5	16/08/2022		SOIL	BAG	STD	×			
	BH11_2.5-2.8	17/08/2022		SOIL	BAG	STD	×			
	BH7_2.0-2.3	17/08/2022		SOIL	BAG	STD	×			
	BH7_10-10.3	17/08/2022		SOIL	BAG	STD				
	BH8_3.5-3.8	17/08/2022		SOIL	BAG	STD				
	BH8_2.0-2.3	17/08/2022		SOIL	BAG	STD	×			
	BH6_2.5-2.8	17/08/2022		SOIL	BAG	STD	×			
	BH6_9.5-9.8	17/08/2022		SOIL	BAG	STD				
	BH2_0.5-0.8	18/08/2022		SOIL	BAG	STD	×			
	RELINQUISHED BY	BY				RECEIVED BY	IED BY		Sample Receip	Sample Receipt Advice: (Lab Use Only)
Name:		Date:		Name: A (Beach		Date: 6/9/22		All Samples Re	All Samples Recieved in Good Condition
Coffey		Time:		Company:	Enopris	ALT	Time: 2:00P	14	All Documenta	All Documentation is in Proper Order
Name:		Date:	+	Name:			Date:		Samples Recei	Samples Received Properly Chilled
Company:		Time:		Company:			Time:		Lab. Ref/Batch No.	No. OIKKKT



			Consigning Office:	fice:	Canberra, ACT					
			Report Results to:	to:	Peter Pfitzner		Mobile:	0429 958 271	Email:	Peter.Pfitzner@Tetratech.com
			Invoices to:		Michael Carbone	ne	Phone:	0422 350 209	Email:	michael.carbone@tetratech.con
Project No:	754-CBRGE301356	Task No:						Analy	Analysis Request Section	ection
ne:	Brou Lake Expansion GI	Γ γ	Eurofins							
ie	Terry Xu	Project Manager:			Michael Carbone		f and Soils			
Quote number (if	Quote number (if different to current quoted prices):						fate		_	
Special Instructions:	ins:						l Screen Acid su			
Lab Batch Ref	Sample ID	Sample Date	Time	Matrix (Soiletc)	Container Type & Preservative*	T-A-T (specify)	pH Fiel pHfox) -			NOTES
	BH1_0.5-0.8	18/08/2022		SOIL	BAG	STD	X			
	BH3_1.5-2.0	18/08/2022		SOIL	BAG	STD	×			
	ВН3_3.0-3.5	18/08/2022		SOIL	BAG	STD	×			
	BH4_1.5-2.0	18/08/2022		SOIL	BAG	STD	×			
	BH5_0.5-0.8	18/08/2022		SOIL	BAG	STD	×			
	BH11_14.0-14.3	17/08/2022		SOIL	BAG	STD				
	RELINQUISHED BY	ВҮ				RECEIV	RECEIVED BY		Sample Recei	
Name:		Date:		1	Beach	4	Date: 6/0/20	100 10	All Samples R	All Samples Recieved in Good Condition
Name:		Date:	*	Name:					Samples Rece	Samples Received Properly Chilled
Company:	Company: Time: Company: Time:	Time:		Company:			Time:		Lab. Ref/Batch No.	h No. allahr



Eurofins Environment Testing Australia Pty Ltd

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Dandenong South	Grovedale	Girraween
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ABN: 91 05 0159 898 Perth 46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370

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Eurofins ARL Pty Ltd Eurofins Environment Testing NZ Ltd NZBN: 9429046024954 Auckland 35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 45 51

IANZ# 1327

EnviroSales@eurofins.com

Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Tel: 0800 856 450 IANZ# 1290

Sample Receipt Advice

Company name:	Tetra Tech Coffey Environment Pty Ltd ACT
Contact name:	Michael Carbone
Project name:	BROU LAKE EXPANSION GI
Project ID:	754-CBRGE301356
Turnaround time:	5 Day
Date/Time received	Sep 6, 2022 2:00 PM
Eurofins reference	916665

Sample Information

- A detailed list of analytes logged into our LIMS, is included in the attached summary table. /
- Sample Temperature of chilled sample on the batch as recorded by Eurofins Sample Receipt : 11.1 degrees Celsius.
- All samples have been received as described on the above COC.
- COC has been completed correctly.
- Attempt to chill was evident.
- Appropriately preserved sample containers have been used.
- All samples were received in good condition.
- Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- 1 Appropriate sample containers have been used.
- N/A Sample containers for volatile analysis received with zero headspace.
- X Split sample sent to requested external lab.
- X Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Samples TP-1_0.4-0.5, TP07_1.8-1.9, TP06_0.4-0.5 were missing, so analyses were cancelled for these samples. TP05_0.8-0.9 (as listed on COC) was labelled as TP05_0.9-1.0, in accordance with the bag. Samples were logged for analysis according to the COC received on the 06/09/22. In addition, no sample was received for BH12_1.5-1.8 upon original receipt, however, was missed in original logging. Therefore, this sample was logged and analysis cancelled in retrospect.

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Asim Khan on phone : or by email: AsimKhan@eurofins.com

Results will be delivered electronically via email to Michael Carbone - Michael.Carbone@coffey.com.

Note: A copy of these results will also be delivered to the general Tetra Tech Coffey Environment Pty Ltd ACT email address.

Global Leader - Results you can trust

•		C :	Eurofins Envi ABN: 50 005 085		g Australia Pty	Ltd						Eurofins ARL Pty Ltd ABN: 91 05 0159 898	Eurofins Environm NZBN: 9429046024954	-
web: w	www.eurofins.com.au EnviroSales@eurofins		Melbourne 6 Monterey Road Dandenong Sout VIC 3175 Tel: +61 3 8564 9	Geelong 19/8 Lewa h Grovedale VIC 3216 5000 Tel: +61 3	alan Street 17 e Giu NS	ydney 79 Magowa irraween SW 2145 el: +61 2 99 ATA# 1261	900 840	L N P 00 T	Canberra Jnit 1,2 Dacre Street Mitchell ACT 2911 Fel: +61 2 6113 8091	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 2079	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Tel: +61 2 4968 8448 44 NATA# 1261 Site# 25079	Perth 46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 45 51 IANZ# 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Tel: 0800 856 450 IANZ# 1290
	ompany Name: ddress:	Tetra Tech (16 Mildura S Fyshwick ACT 2609		nment Pty Ltd	ACT				ne: +61	665 2 6124 5600 2 6260 7211		Received: Due: Priority: Contact Name:	Sep 6, 2022 2:00 F Sep 13, 2022 5 Day Michael Carbone	PM
	oject Name: oject ID:	BROU LAKE 754-CBRGE	EXPANSIO 301356	N GI								Eurofins Analytical S	Services Manager :	Asim Khan
		Sa	mple Detail					0	Acid Sulfate Soils Field pH Test					
	ney Laboratory						x	х						
Bris	bane Laborator	y - NATA # 126	1 Site # 2079	4					x					
	ernal Laboratory	/												
No	Sample ID	Sample Date	Sampling	Matrix	LAB ID	,								
No	•	Sample Date	Sampling Time	Matrix										
1	TP04_0.4-0.5	Aug 16, 2022	Time	Soil	R22-Au0051	1769			x					
2	TP04_0.4-0.5 TP04_0.9-1.0	Aug 16, 2022 Aug 16, 2022	Time	Soil Soil	R22-Au0051 R22-Au0051	1769 1770		Х						
1 2 3	TP04_0.4-0.5 TP04_0.9-1.0 TP08_0.4-0.5	Aug 16, 2022 Aug 16, 2022 Aug 16, 2022	Time	Soil Soil Soil	R22-Au0051 R22-Au0051 R22-Au0051	1769 1770 1771		х	x					
1 2 3 4	TP04_0.4-0.5 TP04_0.9-1.0 TP08_0.4-0.5 TP06_1.4-1.5	Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022	Time	Soil Soil Soil Soil	R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051	1769 1770 1771 1772		х						
1 2 3 4 5	TP04_0.4-0.5 TP04_0.9-1.0 TP08_0.4-0.5 TP06_1.4-1.5 TP06_0.4-0.5	Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022	Time	Soil Soil Soil Soil Soil	R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051	1769 1770 1771 1772 1773	x	х	x					
1 2 3 4 5 6	TP04_0.4-0.5 TP04_0.9-1.0 TP08_0.4-0.5 TP06_1.4-1.5 TP06_0.4-0.5 TP07_1.8-1.9	Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022	Time	Soil Soil Soil Soil Soil Soil	R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051	1769 1770 1771 1772 1773 1774	X X	X	x					
1 2 3 4 5 6 7	TP04_0.4-0.5 TP04_0.9-1.0 TP08_0.4-0.5 TP06_1.4-1.5 TP06_0.4-0.5 TP07_1.8-1.9 TP08_1.4-1.5	Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022	Time	Soil Soil Soil Soil Soil Soil Soil	R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051	1769 1770 1771 1772 1773 1774 1775	X X	X X	x x					
1 2 3 4 5 6 7 8	TP04_0.4-0.5 TP04_0.9-1.0 TP08_0.4-0.5 TP06_1.4-1.5 TP06_0.4-0.5 TP07_1.8-1.9 TP08_1.4-1.5 TP07_0.2-0.3	Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022	Time	Soil Soil Soil Soil Soil Soil Soil Soil	R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051	1769 1770 1771 1772 1773 1774 1775 1776	X X	X X	x x x					
1 2 3 4 5 6 7 8 9	TP04_0.4-0.5 TP04_0.9-1.0 TP08_0.4-0.5 TP06_1.4-1.5 TP06_0.4-0.5 TP07_1.8-1.9 TP08_1.4-1.5 TP07_0.2-0.3 TP05_0.2-0.3	Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022	Time	Soil Soil Soil Soil Soil Soil Soil Soil	R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051	1769 1770 1771 1772 1773 1774 1775 1776 1777	x x	X X	x x					
No 1 2 3 4 5 6 7 8 9 10 11	TP04_0.4-0.5 TP04_0.9-1.0 TP08_0.4-0.5 TP06_1.4-1.5 TP06_0.4-0.5 TP07_1.8-1.9 TP08_1.4-1.5 TP07_0.2-0.3 TP05_0.9-1.0	Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022	Time	Soil Soil Soil Soil Soil Soil Soil Soil	R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051 R22-Au0051	1769 1770 1771 1772 1773 1774 1775 1776 1777 1778	x x	X X X X	x x x					

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web: www.eurofins.com.au email: EnviroSales@eurofins.c		Melbourne 6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000	Geelong 19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 NATA# 1261 Site# 1254	Sydney 179 Magow Girraween NSW 2145 Tel: +61 2 9 NATA# 120	9900 84	400	Canberra Unit 1,2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 2079	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Tel: +61 2 4968 8448 94 NATA# 1261 Site# 25079	Perth 46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 45 51 IANZ# 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Tel: 0800 856 450 IANZ# 1290
Company Name: Address:	Tetra Tech 16 Mildura S Fyshwick ACT 2609	Coffey Environmen Street	t Pty Ltd ACT			Re	ione: +61	6665 1 2 6124 5600 1 2 6260 7211		Received: Due: Priority: Contact Name:	Sep 6, 2022 2:00 F Sep 13, 2022 5 Day Michael Carbone	PM
Project Name: Project ID:	BROU LAK 754-CBRGI	E EXPANSION GI E301356								Eurofins Analytical S	Services Manager :	Asim Khan
	S	ample Detail			CANCELLED	HOLD	Acid Sulfate Soils Field pH Test					
Sydney Laboratory -	NATA # 1261	Site # 18217			Х	Х						
Brisbane Laboratory							Х					
13 TP02_0.9-1.0		Soil	R22-Au0			Х						
14 TP02_0.4-0.5		Soil	R22-Au0				x					
	Aug 16, 2022	Soil	R22-Au0				x					
	Aug 16, 2022	Soil	R22-Au0		Х							
17 BH09_13.5- 13.8	Aug 16, 2022	Soil	R22-Au0	051785			x					
18 BH10_2.0-2.5	Aug 16, 2022	Soil	R22-Au0	051786			X					
		Soil	R22-Au0	051787			X					
20 BH10_9.5-9.8		Soil	R22-Au0				Х					
	Aug 16, 2022	Soil	R22-Au0	051789		Х						
21 BH09_1.5-1.8	Aug 10, 2022						х					
	<u> </u>	Soil	R22-Au0	051790								
22 BH10_4.0-4.3	Aug 16, 2022	Soil Soil	R22-Au0 R22-Au0				X					
22 BH10_4.0-4.3 23 BH12_5.0-5.5	Aug 16, 2022 Aug 16, 2022			051792			X X					
22 BH10_4.0-4.3 23 BH12_5.0-5.5 24 BH11_2.5-2.8	Aug 16, 2022 Aug 16, 2022	Soil Soil	R22-Au0	051792 051793								

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web: www.eurofins.com.au email: EnviroSales@eurofins.c		Melbourne 6 Monterey Road Dandenong South VIC 3175 Tel: +61 3 8564 5000 NATA# 1261 Site# 125	Geelong 19/8 Lewalan Street Grovedale VIC 3216 Tel: +61 3 8564 5000 /4 NATA# 1261 Site# 1254	Sydney 179 Magor Girraween NSW 2145 Tel: +61 2 NATA# 12	5 9900 8	400	Canberra Unit 1,2 Dacre 5 Mitchell ACT 2911 Tel: +61 2 6113 7	Mura QLD 8091 Tel: +	Smallwood Place rrie 4172 61 7 3902 4600	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Tel: +61 2 4968 8448 4 NATA# 1261 Site# 25079	Perth 46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 45 51 IANZ# 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Tel: 0800 856 450 IANZ# 1290
Company Name: Address:	Tetra Tech 16 Mildura Fyshwick ACT 2609	Coffey Environmer Street	nt Pty Ltd ACT			Re	rder No.: eport #: none: ix:	916665 +61 2 61 +61 2 62			Received: Due: Priority: Contact Name:	Sep 6, 2022 2:00 F Sep 13, 2022 5 Day Michael Carbone	M
Project Name: Project ID:	BROU LAK 754-CBRGI	E EXPANSION GI E301356									Eurofins Analytical S	Services Manager -	Asim Khan
	s	ample Detail			CANCELLED	HOLD	Acid Sulfate Soils Field pH Test						
Sydney Laboratory -	NATA # 1261	Site # 18217			х	Х							
Brisbane Laboratory	- NATA # 126	61 Site # 20794					Х						
27 BH8_3.5-3.8	Aug 16, 2022	Soil	R22-Au0	051796		Х							
8 BH8_2.0-2.3	Aug 16, 2022	Soil	R22-Au0	051797			х						
29 BH6_2.5-2.8	Aug 16, 2022	Soil	R22-Au0	051798			х						
	Aug 16, 2022	Soil	R22-Au0			х							
31 BH2_0.5-0.8	Aug 16, 2022	Soil	R22-Au0	051800			х						
32 BH1_0.5-0.8	Aug 16, 2022	Soil	R22-Au0	051801			х						
33 BH3_1.5-2.0	Aug 16, 2022	Soil	R22-Au0	051802			х						
34 BH3_3.0-3.5	Aug 16, 2022	Soil	R22-Au0	051803			х						
	Aug 16, 2022	Soil	R22-Au0	051804			х						
	Aug 16, 2022	Soil	R22-Au0	051805			х						
	Aug 16, 2022	Soil	R22-Au0	0051806		х							
		1 1					1 1						
38 BH12_1.5-1.8	Aug 16, 2022	Soil	R22-Se0	010071	Х								



Tetra Tech Coffey Environment Pty Ltd ACT 16 Mildura Street Fyshwick ACT 2609

Attention:	Michael Carbone
Attention:	wiichael Carbone

Report	916665-S
Project name	BROU LAKE EXPANSION GI
Project ID	754-CBRGE301356
Received Date	Sep 06, 2022

Client Sample ID			TP04_0.4-0.5	TP08_0.4-0.5	TP06_1.4-1.5	TP07_0.2-0.3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			R22- Au0051769	R22- Au0051771	R22- Au0051772	R22- Au0051776
Date Sampled			Aug 16, 2022	Aug 16, 2022	Aug 16, 2022	Aug 16, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.0	5.8	6.3	5.5
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.7	4.9	4.8	4.3
Reaction Ratings*505	0	-	3.0	3.0	3.0	3.0

Client Sample ID			TP05_0.2-0.3	TP03_0.2-0.3	TP02_0.4-0.5	TP01_0.9-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			R22- Au0051777	R22- Au0051779	R22- Au0051782	R22- Au0051783
Date Sampled			Aug 16, 2022	Aug 16, 2022	Aug 16, 2022	Aug 16, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.0	5.8	5.9	5.9
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	3.1	4.5	4.2	4.5
Reaction Ratings* ⁵⁰⁵	0	-	4.0	3.0	3.0	2.0

Client Sample ID			BH09_13.5- 13.8	BH10_2.0-2.5	BH12_9.5-10.0	BH10_9.5-9.8
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			R22- Au0051785	R22- Au0051786	R22- Au0051787	R22- Au0051788
Date Sampled			Aug 16, 2022	Aug 16, 2022	Aug 16, 2022	Aug 16, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.6	6.1	5.9	5.4
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.8	4.5	6.3	4.7
Reaction Ratings* ^{S05}	0	-	4.0	4.0	4.0	4.0



Client Sample ID Sample Matrix Eurofins Sample No.			BH10_4.0-4.3 Soil R22- Au0051790	BH12_5.0-5.5 Soil R22- Au0051792	BH11_2.5-2.8 Soil R22- Au0051793	BH7_2.0-2.3 Soil R22- Au0051794
Date Sampled			Aug 16, 2022	Aug 16, 2022	Aug 16, 2022	Aug 16, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.4	5.3	4.6	5.1
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.2	4.0	4.0	4.2
Reaction Ratings*505	0	-	4.0	3.0	4.0	4.0

Client Sample ID			BH8_2.0-2.3	BH6_2.5-2.8	BH2_0.5-0.8	BH1_0.5-0.8
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			R22- Au0051797	R22- Au0051798	R22- Au0051800	R22- Au0051801
Date Sampled			Aug 16, 2022	Aug 16, 2022	Aug 16, 2022	Aug 16, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.4	4.7	5.3	5.7
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.0	4.0	3.8	4.0
Reaction Ratings* ^{S05}	0	-	4.0	3.0	3.0	3.0

Client Sample ID			BH3_1.5-2.0	BH3_3.0-3.5	BH4_1.5-2.0	BH5_0.5-0.8
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			R22- Au0051802	R22- Au0051803	R22- Au0051804	R22- Au0051805
Date Sampled			Aug 16, 2022	Aug 16, 2022	Aug 16, 2022	Aug 16, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.8	5.7	5.1	6.0
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	2.7	3.6	4.5	3.9
Reaction Ratings*505	0	-	3.0	4.0	4.0	4.0



Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	ļ
Acid Sulfate Soils Field pH Test	Brisbane	Sep 07, 2022	-
- Method: LTM-GEN-7060 Determination of field pH (pHF) and field pH peroxide (pHFOX) tests			

Date Reported: Sep 08, 2022

Holding Time 7 Days

•	Eurofins Environment Testing Australia Pty Ltd ABN: 50 005 085 521					a Pty Ltd						Eurofins ARL Pty Ltd ABN: 91 05 0159 898	Eurofins Environm NZBN: 9429046024954	
veb: w	6 Monterey Road 19/8 Lewalan Street 179 Ma Dandenong South Grovedale Girrawe VIC 3175 VIC 3216 NSW 2			Girrawee NSW 214 Tel: +61 2	lagowar Road Unit 1,2 Dacre Street 1/21 Smallwood Place 4/52 Industrial Drive veen Mitchell Murarrie Mayfield East NSW 2304 2145 ACT 2911 QLD 4172 PO Box 60 Wickham 2293 61 2 9900 8400 Tel: +61 2 6113 8091 Tel: +61 7 3902 4600 Tel: +61 2 4968 8448				Perth 46-48 Banksia Road Welshpool 3 WA 6106 Tel: +61 8 6253 4444	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 45 51 IANZ# 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Tel: 0800 856 450 IANZ# 1290			
	mpany Name: Idress:	Tetra Tech (16 Mildura S Fyshwick ACT 2609	Coffey Enviro Street	nment	Pty Ltd ACT			Re Př	der N port a none: ix:	916665 +61 2 6124 5600 +61 2 6260 7211		Received: Due: Priority: Contact Name:	Sep 6, 2022 2:00 F Sep 13, 2022 5 Day Michael Carbone	M
	oject Name: oject ID:	BROU LAKE 754-CBRGE	E EXPANSIO 301356	N GI								Eurofins Analytical	Services Manager :	Asim Khan
		Sa	ample Detail				CANCELLED	НОГД	Acid Sulfate Soils Field pH Test					
Sydı	ney Laboratory	- NATA # 1261	Site # 18217	,			х	х						
-	bane Laborator								х					
	rnal Laboratory													
No	Sample ID	Sample Date	Sampling Time	Ma	atrix LA	B ID								
1	TP04_0.4-0.5	Aug 16, 2022		Soil		0051769			Х					
2	TP04_0.9-1.0	Aug 16, 2022		Soil		0051770		X						
3		Aug 16, 2022		Soil		0051771			Х					
1	TP06_1.4-1.5	Aug 16, 2022		Soil		0051772			Х					
5		Aug 16, 2022		Soil		0051773	Х							
6		Aug 16, 2022		Soil		0051774	Х							
7		Aug 16, 2022		Soil		0051775		Х						
8	TP07_0.2-0.3	Aug 16, 2022		Soil		0051776			X					
9		Aug 16, 2022		Soil		0051777			Х					
10		Aug 16, 2022		Soil		0051778		X						
11		Aug 16, 2022		Soil		0051779			Х					
12	TP03 0.9-1.0	Aug 16, 2022		Soil	R22-Au	0051780		X						

••	Eurofins Environment Testing Australia Pty Lto ABN: 50 005 085 521									Eurofins ARL Pty Ltd ABN: 91 05 0159 898	Eurofins Environm NZBN: 9429046024954	
veb: www.eurofins.com.au email: EnviroSales@eurofins.com		Melbourne Geelong Sydney 6 Monterey Road 19/8 Lewalan Street 179 Mago Dandenong South Grovedale Girraweer VIC 3175 VIC 3216 NSW 2143		179 Magow Girraween NSW 2145 Tel: +61 2 9	Magowar Road aween / 2145 +61 2 9900 8400		Mitchell ACT 29 Tel: +6	acre Street 1/21 Smallwood Place Murarrie QLD 4172 16113 8091 Tel: +61 7 3902 4600	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Tel: +61 2 4968 8448 '94 NATA# 1261 Site# 25079	Perth 46-48 Banksia Road Welshpool	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 45 51 IANZ# 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Tel: 0800 856 450 IANZ# 1290
Company Name: Address:	Tetra Tech 16 Mildura S Fyshwick ACT 2609	Coffey Environment Street	t Pty Ltd ACT			Re	der No port # one: x:	916665 +61 2 6124 5600 +61 2 6260 7211		Received: Due: Priority: Contact Name:	Sep 6, 2022 2:00 F Sep 13, 2022 5 Day Michael Carbone	M
Project Name: Project ID:	BROU LAKI 754-CBRGE	E EXPANSION GI E301356								Eurofins Analytical S	Services Manager :	Asim Khan
	Sá	ample Detail			CANCELLED	HOLD	Acid Sulfate Soils Field pH Test					
Sydney Laboratory -	NATA # 1261	Site # 18217			X	X						
					X	x	X					
Brisbane Laboratory13TP02_0.9-1.0	- NATA # 126 Aug 16, 2022	1 Site # 20794 Soil	R22-Au00	051781		X X X	x					
Brisbane Laboratory3TP02_0.9-1.0	- NATA # 126	1 Site # 20794 Soil Soil	R22-Au00 R22-Au00	1			x					
Brisbane Laboratory 13 TP02_0.9-1.0 / 14 TP02_0.4-0.5 / 15 TP01_0.9-1.0 /	• - NATA # 126 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022	1 Site # 20794 Soil		51782								
Brisbane Laboratory 13 TP02_0.9-1.0 / 14 TP02_0.4-0.5 / 15 TP01_0.9-1.0 / 16 TP01_0.4-0.5 /	• - NATA # 126 Aug 16, 2022 Aug 16, 2022	Site # 20794 Soil Soil Soil Soil Soil	R22-Au00 R22-Au00 R22-Au00)51782)51783)51784			x					
Brisbane Laboratory 13 TP02_0.9-1.0 / 14 TP02_0.4-0.5 / 15 TP01_0.9-1.0 / 16 TP01_0.4-0.5 /	• - NATA # 126 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022	Site # 20794 Soil Soil Soil	R22-Au00 R22-Au00)51782)51783)51784			x					
Brisbane Laboratory 13 TP02_0.9-1.0 / 14 TP02_0.4-0.5 / 15 TP01_0.9-1.0 / 16 TP01_0.4-0.5 / 17 BH09_13.5- / 13.8 /	- NATA # 126 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022	Site # 20794 Soil Soil Soil Soil Soil	R22-Au00 R22-Au00 R22-Au00)51782)51783)51784)51785			X X					
Brisbane Laboratory 13 TP02_0.9-1.0 / 14 TP02_0.4-0.5 / 15 TP01_0.9-1.0 / 16 TP01_0.4-0.5 / 17 BH09_13.5- 13.8 / 18 BH10_2.0-2.5 /	- NATA # 126 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022	Site # 20794 Soil Soil Soil Soil Soil Soil Soil Soil	R22-Au00 R22-Au00 R22-Au00 R22-Au00	051782 051783 051784 051785 051786			x x x					
Brisbane Laboratory 13 TP02_0.9-1.0 / 14 TP02_0.4-0.5 / 15 TP01_0.9-1.0 / 16 TP01_0.4-0.5 / 17 BH09_13.5- 13.8 / 18 BH10_2.0-2.5 / 19 BH12_9.5-10.0 /	- NATA # 126 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022	Site # 20794 Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil	R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00	051782 051783 051784 051785 051786 051787			x x x x x					
Brisbane Laboratory 13 TP02_0.9-1.0 / 14 TP02_0.4-0.5 / 15 TP01_0.9-1.0 / 16 TP01_0.4-0.5 / 17 BH09_13.5- / 18 BH10_2.0-2.5 / 19 BH12_9.5-10.0 / 20 BH10_9.5-9.8 /	- NATA # 126 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022	Site # 20794 Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil	R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00	051782 051783 051784 051785 051786 051787 051788	X		X X X X X X					
Brisbane Laboratory 13 TP02_0.9-1.0 / 14 TP02_0.4-0.5 / 15 TP01_0.9-1.0 / 16 TP01_0.4-0.5 / 17 BH09_13.5- / 18 BH10_2.0-2.5 / 19 BH12_9.5-10.0 / 20 BH10_9.1.5-1.8 /	- NATA # 126 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022	Site # 20794 Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil	R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00	51782 51783 51784 51785 51786 51787 51788 51788 51788	X	X	X X X X X X					
Brisbane Laboratory 13 TP02_0.9-1.0 / 14 TP02_0.4-0.5 / 15 TP01_0.9-1.0 / 16 TP01_0.4-0.5 / 17 BH09_13.5- / 18 BH10_2.0-2.5 / 19 BH12_9.5-10.0 / 20 BH10_9.1.5-1.8 / 21 BH09_1.5-1.8 / 22 BH10_4.0-4.3 /	- NATA # 126 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022	Site # 20794 Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil	R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00	51782 51783 51784 51785 51786 51787 51788 51788 51789 51789	X	X	x x x x x x x					
Brisbane Laboratory 13 TP02_0.9-1.0 / 14 TP02_0.4-0.5 / 15 TP01_0.9-1.0 / 16 TP01_0.4-0.5 / 17 BH09_13.5- / 18 BH10_2.0-2.5 / 19 BH12_9.5-10.0 / 20 BH10_9.1.5-1.8 / 21 BH09_1.5-1.8 / 22 BH10_4.0-4.3 / 23 BH12_5.0-5.5 /	- NATA # 126 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022	Site # 20794 Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil	R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00	51782 51783 51784 51784 51785 51786 51787 51788 51789 51790 51792	X	X	x x x x x x x x x					
Brisbane Laboratory 13 TP02_0.9-1.0 / 14 TP02_0.4-0.5 / 15 TP01_0.9-1.0 / 16 TP01_0.4-0.5 / 17 BH09_13.5- / 18 BH10_2.0-2.5 / 19 BH12_9.5-10.0 / 20 BH10_9.1.5-1.8 / 21 BH09_1.5-1.8 / 22 BH10_4.0-4.3 / 23 BH12_5.0-5.5 / 24 BH11_2.5-2.8 /	- NATA # 126 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022 Aug 16, 2022	Site # 20794 Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil Soil	R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00 R22-Au00	051782 051783 051784 051785 051786 051787 051788 051789 051789 051790 051793	X	X	X X X X X X X X X X					

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web: www.e	6 Monterey Road 19/8 Lewalan Street 179 Ma Dandenong South Grovedale Girrawe VIC 3175 VIC 3216 NSW 2			Girraweer NSW 214 Tel: +61 2	79 Magowar Road irraween SW 2145 el: +61 2 9900 8400			,2 Dacre Street 1/21 Smallwood Place ell Murarrie 2911 QLD 4172	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Tel: +61 2 4968 8448 NATA# 1261 Site# 25079	Perth 46-48 Banksia Road Welshpool	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 45 51 IANZ# 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Tel: 0800 856 450 IANZ# 1290	
Compa Addres	any Name: ess:	Tetra Tech 16 Mildura Fyshwick ACT 2609	Coffey Environme Street	nt Pty Ltd ACT			Re Ph	rder N eport none: ax:	#: 916665		Received: Due: Priority: Contact Name:	Sep 6, 2022 2:00 F Sep 13, 2022 5 Day Michael Carbone	Μ
Projec Projec	ct Name: ct ID:	BROU LAK 754-CBRG	E EXPANSION GI E301356								Eurofins Analytical S	Services Manager :	Asim Khan
		S	ample Detail			CANCELLED	HOLD	Acid Sulfate Soils Field pH Test					
Sydney	Laboratory -	NATA # 1261	Site # 18217			х	х						
Brisban	e Laboratory	/ - NATA # 120	61 Site # 20794					Х					
27 BH	18_3.5-3.8	Aug 16, 2022	Soil	R22-Au0	051796		Х						
28 BH	18_2.0-2.3	Aug 16, 2022	Soil	R22-Au0	051797			х					
29 BH	16_2.5-2.8	Aug 16, 2022	Soil	R22-Au0	051798			Х					
30 BH	16_9.5-9.8	Aug 16, 2022	Soil	R22-Au0	051799		х						
31 BH	12_0.5-0.8	Aug 16, 2022	Soil	R22-Au0	051800			Х					
32 BH	11_0.5-0.8	Aug 16, 2022		R22-Au0	051801			х					
33 BH	13_1.5-2.0	Aug 16, 2022	Soil	R22-Au0	051802			х					
34 BH	13_3.0-3.5	Aug 16, 2022	Soil	R22-Au0	051803			х					
35 BH	14_1.5-2.0	Aug 16, 2022	Soil	R22-Au0	051804			х					
36 BH	15_0.5-0.8	Aug 16, 2022	Soil	R22-Au0	051805			Х					
37 BH 14.	H11_14.0- .3	Aug 16, 2022		R22-Au0	051806		х						
38 BH	112_1.5-1.8	Aug 16, 2022	Soil	R22-Se0	010071	х							
	ounts					4	10	24					



Internal Quality Control Review and Glossary

General

- 1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- 2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- 3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- 4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- 5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- 6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
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- 8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- 9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA. If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

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For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

U IIII S		
mg/kg: milligrams per kilogram	mg/L: milligrams per litre	μg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
COC	Chain of Custody
СР	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
ТВТО	Tributyltin oxide (bis-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

- 1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- 2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- 3. pH and Free Chlorine analysed in the laboratory Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- 4. Recovery Data (Spikes & Surrogates) where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- 5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- 6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.



Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	R22-Au0051785	CP	pH Units	5.6	5.6	pass	20%	Pass	
Duplicate								_	
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	R22-Au0051790	CP	pH Units	5.4	5.5	pass	20%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	R22-Au0051804	CP	pH Units	5.1	5.1	pass	20%	Pass	



Comments

Sample Integrity	
Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	N/A
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code

Description

Field Screen uses the following fizz rating to classify the rate the samples reacted to the peroxide: 1.0; No reaction to slight. 2.0; Moderate reaction. 3.0; Strong reaction with persistent froth. 4.0; Extreme reaction. S05

Authorised by:

Asim Khan

Analytical Services Manager



Glenn Jackson General Manager

Final Report - this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

Do not click on links or open attachments unless you recognise the sender and are certain that the content is safe.

Hi Asim

Please can we have additional testing for the following four samples (see table below) from the attached batch of results.

Please analyse the four samples for chromium reducible sulphur (CRS) analysis.

Sample ID	TP05_0.2-0.3	BH3_1.5-2.0	BH3_3.0-3.5	BH5_0.5-0.8	Contraction of the
Sample code	R22- Au0051777	R22- Au0051802	R22- Au0051803	R22- Au0051805	922482
f you have any question	BSSE127 OHOID S please let me know	BSSEIZE DHSEDIO	BSSEIZ6 DHOID	BSSE126 DHOID.	

Regards,

Michael Carbone, BAppSc (Hons) | Senior Associate | ACT Practice Lead Direct +61 2 6124 5621 | Business +61 2 6124 5600 | Mobile +61 422 350 209 | michael.carbone@tetratech.com

Tetra Tech Coffey | Leading with Science*

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TETRA TECH

This message, including any attachments, may include privileged, confidential and/or inside information. Any distribution or use of this communication by anyone other than the intended recipient is strictly prohibited and may be unlawful. If you are not the intended recipient, please notify the sender by replying to this message and then delete it from your system.



Please consider the environment before printing. Read more



I acknowledge the Ngunnawal and Ngambri peoples on whose country I live and work. I pay my respects to their Elders past, present, emerging and future. Tetra Tech Coffey recognises Aboriginal and Torres Strait Islanders as the first peoples of Australia, and we respect their cultural heritage, traditional knowledge and customs associated with their ancestral lands and waters. Through this acknowledgement we commit to ongoing learning and understanding on our journey to reconciliation. Artist: Chloe Little

From: AsimKhan@eurofins.com <AsimKhan@eurofins.com> Sent: Thursday, 8 September 2022 11:20 AM To: Carbone, Michael <<u>Michael.Carbone@tetratech.com</u>> Cc: Pfitzner, Peter <<u>Peter.Pfitzner@tetratech.com</u>> Subject: Eurofins Test Results, Invoice - Report 916665 : Site BROU LAKE EXPANSION GI (754-CBRGE301356)

A CAUTION: This email originated from an external sender. Verify the source before opening links or attachments.

Please find attached results and invoice for your project in the subject header.

Kind regards,



Eurofins Environment Testing Australia Pty Ltd

ABN: 50 005 085 521									
Melbourne	Geelong	Sydney							
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road							
Dandenong South	Grovedale	Girraween							
VIC 3175	VIC 3216	NSW 2145							
Tel: +61 3 8564 5000	Tel: +61 3 8564 5000	Tel: +61 2 9900 8400							
NATA# 1261 Site# 1254	NATA# 1261 Site# 1254	NATA# 1261 Site# 18217							

Canberra Brisbane Unit 1.2 Dacre Street 1/21 Smallwood Place Mitchell Murarrie ACT 2911 QLD 4172 Tel: +61 2 6113 8091 Tel: +61 7 3902 4600

Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Tel: +61 2 4968 8448 NATA# 1261 Site# 20794 NATA# 1261 Site# 25079

www.eurofins.com.au

Eurofins ARL Pty Ltd Eurofins Environment Testing NZ Ltd ABN: 91 05 0159 898 Perth 46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370

NZBN: 9429046024954 Auckland 35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 45 51

IANZ# 1327

EnviroSales@eurofins.com

Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Tel: 0800 856 450 IANZ# 1290

Sample Receipt Advice

Company name:	Tetra Tech Coffey Environment Pty Ltd ACT
Contact name:	Michael Carbone
Project name:	BROU LAKE EXPANSION GI
Project ID:	754-CBRGE301356
Turnaround time:	5 Day
Date/Time received	Sep 12, 2022 11:27 AM
Eurofins reference	922482

Sample Information

- A detailed list of analytes logged into our LIMS, is included in the attached summary table. 1
- Sample Temperature of chilled sample on the batch as recorded by Eurofins Sample Receipt : 11.1 degrees Celsius.
- All samples have been received as described on the above COC.
- COC has been completed correctly.
- Attempt to chill was evident.
- Appropriately preserved sample containers have been used.
- All samples were received in good condition.
- Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- Appropriate sample containers have been used.
- Sample containers for volatile analysis received with zero headspace.
- X Split sample sent to requested external lab.
- X Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Asim Khan on phone : or by email: AsimKhan@eurofins.com

Results will be delivered electronically via email to Michael Carbone - Michael.Carbone@coffey.com.

Note: A copy of these results will also be delivered to the general Tetra Tech Coffey Environment Pty Ltd ACT email address.

Global Leader - Results you can trust

Eurofins Environment Testing Australia Pty Ltd ABN: 50 005 085 521										Eurofins ARL Pty Ltd ABN: 91 05 0159 898	Eurofins Environment Testing NZ Ltd NZBN: 9429046024954		
Melbourne Geelong Sydn 6 Monterey Road 19/8 Lewalan Street 179 M Dandenong South Crovedale Girra VIC 3175 VIC 3216 NSW Tel: +61 3 8564 5000 Tel: +61 3 8564 5000 Tel: -81 38564 5000			Girraweer NSW 214 Tel: +61 2	Magowar Road Unit 1,2 Dacre Street 1/21 Smallwood Place 4/52 Industrial Drive ween Mitchell Murarrie Mayfield East NSW 2: 2145 ACT 2911 QLD 4172 PO Box 60 Wickham		4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Tel: +61 2 4968 8448	Perth 46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 45 51 IANZ# 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Tel: 0800 856 450 IANZ# 1290				
	mpany Name: dress:	Tetra Tech 16 Mildura Fyshwick ACT 2609		nent Pty Ltd ACT			Re	h one: +6'	2482 2 6124 5600 2 6260 7211		Received: Due: Priority: Contact Name:	Sep 12, 2022 11:2 Sep 19, 2022 5 Day Michael Carbone	7 AM
	oject Name:		E EXPANSION	GI									
Pro	oject ID:	754-CBRG	E301356				-				Eurofins Analytical	Services Manager :	Asim Khan
			ample Detail			Chromium Reducible Sulfur Suite	Moisture Set						
		•	61 Site # 20794			Х	X	-					
No	rnal Laboratory Sample ID	Sample Date	e Sampling Time	Matrix LA	AB ID			-					
1	TP05_0.2-0.3	Aug 16, 2022		oil R22-Se	0023674	Х	х	-					
	BH3_1.5-2.0	Aug 16, 2022			0023675	Х	х	1					
3	BH3_3.0-3.5	Aug 16, 2022			0023676	Х	Х]					
1	BH5_0.5-0.8	Aug 16, 2022		oil R22-Se	0023677	Х	Х						
[est	Counts					4	4						

Tetra Tech Coffey Environment Pty Ltd ACT 16 Mildura Street Fyshwick ACT 2609

🛟 eurofins



NATA Accredited Accreditation Number 1261 Site Number 20794

Accredited for compliance with ISO/IEC 17025 – Testing NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention:

Michael Carbone

Report Project name Project ID Received Date 922482-S BROU LAKE EXPANSION GI 754-CBRGE301356 Sep 12, 2022

Client Sample ID			TP05_0.2-0.3	BH3_1.5-2.0	BH3_3.0-3.5	BH5_0.5-0.8
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			R22- Se0023674	R22- Se0023675	R22- Se0023676	R22- Se0023677
Date Sampled			Aug 16, 2022	Aug 16, 2022	Aug 16, 2022	Aug 16, 2022
Test/Reference	LOR	Unit				
Chromium Suite						
pH-KCL (NLM-3.1)	0.1	pH Units	4.4	4.5	4.6	4.8
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	37	52	39	35
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.060	0.084	0.062	0.057
Chromium Reducible Sulfur (s-SCr) (NLM-2.1) ^{S04}	0.005	% S	< 0.005	< 0.005	< 0.005	< 0.005
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	3	mol H+/t	< 3	< 3	< 3	< 3
Sulfur - KCI Extractable	0.005	% S	< 0.005	< 0.005	N/A	N/A
HCI Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
HCI Extractable Sulfur	0.005	% S	< 0.005	< 0.005	N/A	N/A
Net Acid soluble sulfur (SNAS) NLM-4.1	0.02	% S	< 0.02	< 0.02	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	10	mol H+/t	< 10	< 10	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.02	% S	< 0.02	< 0.02	N/A	N/A
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	0.01	% CaCO3	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)	2	mol H+/t	N/A	N/A	N/A	N/A
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2) ^{S03}	0.02	% S	N/A	N/A	N/A	N/A
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
CRS Suite - Net Acidity - NASSG (Including ANC)	0.02	% S	0.06	0.08	0.06	0.06
CRS Suite - Net Acidity - NASSG (Including ANC)	10	mol H+/t	37	52	39	35
CRS Suite - Liming Rate - NASSG (Including ANC) ^{S01}	1	kg CaCO3/t	2.8	3.9	2.9	2.7
Extraneous Material						
<2mm Fraction	0.005	g	62	60	45	33
>2mm Fraction	0.005	g	3.3	7.8	22	6.0
Analysed Material	0.1	%	95	88	67	85
Extraneous Material	0.1	%	5.0	12	33	15
% Moisture	1	%	7.6	17	11	13



Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Chromium Reducible Sulfur Suite			
Chromium Suite	Brisbane	Sep 14, 2022	6 Week
- Method: LTM-GEN-7070 Chromium Reducible Sulfur Suite			
Extraneous Material	Brisbane	Sep 12, 2022	6 Week
- Method: LTM-GEN-7050/7070			
% Moisture	Brisbane	Sep 12, 2022	14 Days
- Method: LTM-GEN-7080 Moisture			

Eurofins Eurofins Eurofins Eurofins Eurofins Eurofins ABN: 50 005 085 521 Melbourne Geelong Sydney									Eurofins ARL Pty Ltd ABN: 91 05 0159 898	Eurofins Environment Testing NZ Ltd NZBN: 9429046024954				
web: w	ww.eurofins.com.au		Melbourne 6 Monterey Road Dandenong Sout VIC 3175 Tel: +61 3 8564 5 NATA# 1261 Site	h Groved VIC 32 5000 Tel: +6	ewalan Street dale	Sydney 179 Mago Girraweer NSW 214 Tel: +61 2 NATA# 12	i 5 9900 8	400	Canberra Unit 1,2 Dacre Street Mitchell ACT 2911 Tel: +61 2 6113 8091 17	Brisbane 1/21 Smallwood Place Murarrie QLD 4172 Tel: +61 7 3902 4600 NATA# 1261 Site# 2079	Newcastle 4/52 Industrial Drive Mayfield East NSW 2304 PO Box 60 Wickham 2293 Tel: +61 2 4968 8448 4 NATA# 1261 Site# 25079	Perth 46-48 Banksia Road Welshpool WA 6106 Tel: +61 8 6253 4444 NATA# 2377 Site# 2370	Auckland 35 O'Rorke Road Penrose, Auckland 1061 Tel: +64 9 526 45 51 IANZ# 1327	Christchurch 43 Detroit Drive Rolleston, Christchurch 7675 Tel: 0800 856 450 IANZ# 1290
	mpany Name: dress:	Tetra Tech 16 Mildura Fyshwick ACT 2609	Coffey Enviror Street	nment Pty L	td ACT			R P	hone: +6 ⁻	2482 1 2 6124 5600 1 2 6260 7211		Received: Due: Priority: Contact Name:	Sep 12, 2022 11:2 Sep 19, 2022 5 Day Michael Carbone	7 AM
	oject Name: oject ID:	BROU LAK 754-CBRG	E EXPANSIOI E301356	N GI								Eurofins Analytical S	Services Manager :	Asim Khan
			ample Detail				Chromium Reducible Sulfur Suite	Moisture Set						
Brisbane Laboratory - NATA # 1261 Site # 20794 External Laboratory						Х	Х	_						
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB	ID			-					
1	TP05_0.2-0.3	Aug 16, 2022	-	Soil	R22-Se00)23674	Х	Х						
2	BH3_1.5-2.0	Aug 16, 2022		Soil	R22-Se00		Х	Х	1					
3	 BH3_3.0-3.5	Aug 16, 2022		Soil	R22-Se00		Х	Х						
4	BH5_0.5-0.8	Aug 16, 2022		Soil	R22-Se00	23677	Х	Х						
Test	Counts						4	4						



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org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres

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APHA	American Public Health Association
COC	Chain of Custody
СР	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
твто	Tributyltin oxide (bis-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

- 1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- 2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- 3. pH and Free Chlorine analysed in the laboratory Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- 4. Recovery Data (Spikes & Surrogates) where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- 5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- 6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.



Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery									
Chromium Suite									
pH-KCL (NLM-3.1)			%	96			80-120	Pass	
Titratable Actual Acidity (NLM-3.2)			%	100			80-120	Pass	
Chromium Reducible Sulfur (s-SCr)	(NLM-2.1)		%	98			80-120	Pass	
HCI Extractable Sulfur			%	101			80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate					· · · · ·			r	
Chromium Suite				Result 1	Result 2	RPD			
pH-KCL (NLM-3.1)	S22-Se0019876	NCP	pH Units	6.3	6.4	<1	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	S22-Se0019876	NCP	mol H+/t	< 2	< 2	<1	20%	Pass	
Titratable Actual Acidity (NLM-3.2)	S22-Se0019876	NCP	% pyrite S	< 0.003	< 0.003	<1	30%	Pass	
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)	S22-Se0019876	NCP	% S	< 0.005	< 0.005	<1	20%	Pass	
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	S22-Se0019876	NCP	mol H+/t	< 3	< 3	<1	30%	Pass	
Sulfur - KCI Extractable	S22-Se0019876	NCP	% S	N/A	N/A	N/A	30%	Pass	
HCI Extractable Sulfur	S22-Se0019876	NCP	% S	N/A	N/A	N/A	20%	Pass	
Net Acid soluble sulfur (SNAS) NLM-4.1	S22-Se0019876	NCP	% S	N/A	N/A	N/A	30%	Pass	
Net Acid soluble sulfur (a-SNAS) NLM-4.1	S22-Se0019876	NCP	mol H+/t	N/A	N/A	N/A	30%	Pass	
Net Acid soluble sulfur (s-SNAS) NLM-4.1	S22-Se0019876	NCP	% S	N/A	N/A	N/A	30%	Pass	
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	S22-Se0019876	NCP	% CaCO3	N/A	N/A	N/A	20%	Pass	
Acid Neutralising Capacity - (s- ANCbt) (NLM-5.2)	S22-Se0019876	NCP	% S	N/A	N/A	N/A	30%	Pass	
ANC Fineness Factor	S22-Se0019876	NCP	factor	1.5	1.5	<1	30%	Pass	
CRS Suite - Net Acidity - NASSG (Including ANC)	S22-Se0019876	NCP	% S	< 0.02	< 0.02	<1	30%	Pass	
CRS Suite - Net Acidity - NASSG (Including ANC)	S22-Se0019876	NCP	mol H+/t	< 10	< 10	<1	30%	Pass	
CRS Suite - Liming Rate - NASSG (Including ANC)	S22-Se0019876	NCP	kg CaCO3/t	< 1	< 1	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	B22-Se0023454	NCP	%	50	48	3.6	30%	Pass	



Comments

Sample Integrity	
Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

 Code
 Description

 S01
 Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/' dry weight' to 'kg/m3 in-situ soil' multiply 'reported results' x 'wet bulk density of soil in t/m3'

 S02
 Retained Acidity is Reported when the pHKCl is less than pH 4.5

 S03
 Acid Neutralising Capacity is only required if the pHKCl if greater than or equal to pH 6.5

 S04
 Acid Sulfate Soil Samples have a 24 hour holding time unless frozen or dried within that period

Authorised by:

Asim Khan Jonathon Angell Analytical Services Manager Senior Analyst-Sample Properties



Glenn Jackson General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here

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