Acid Sulfate Soils Investigation

15 Mona Street
Mona Vale NSW

Prepared for
Sydney Water

22 April 2022
Report No: 14803-ER-1-1

alliance
geotechnical & environmental solutions

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DOCUMENT CONTROL

Revision Status	Date	Author	Reviewer	Comments
Rev 0	22 April 2022	S. Jones	N. Foster	First Issue

Author Signature		**Reviewer Signature**	
Name	Sam Jones		Nathan Foster
Title	Environmental Consultant		Principal Environmental Consultant

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1. INTRODUCTION

1.1. Background

Alliance Geotechnical Pty Ltd (Alliance) was commissioned by Sydney Water (the client), to undertake an Acid Sulfate Soils (ASS) Investigation at 15 Mona Street, Mona Vale NSW (refer to **Figure 1, Appendix A**).

The objective of this assessment was to assess the soil materials within the area proposed for development (refer to **Appendix F**).

This assessment is considered to be limited to factual observations regarding the condition of the site (in the context of acid sulfate soils content). It is not intended to provide as assessment of potential unacceptable human or environmental health exposure risks, or the suitability of the site for any particular contamination land use setting.

1.2. Proposed Development

Based on information supplied to Alliance by the client, Alliance understands that the client is proposing to have the site rezoned to R2 - Low Density Residential from its current zoning classification of SP2 - Special Purpose Zone. It is understood that rezoning of the site is required prior to commencement a development proposal which will result in the residential sub-division of the site to create four (4) separate residential lots (refer to **Appendix F**).

1.3. Objectives

The objectives of this project were to:

- Provide an assessment of acid sulfate soil conditions present at the site; and
- Provide recommendations for further assessment or management (if warranted).

1.4. Scope of Work

Alliance undertook the following scope of works to address the project objective:

- A desktop review of relevant acid sulfate soils risk planning maps and other relevant information relating to the site;
- A site walkover to understand current site conditions;
- An intrusive site investigation to establish ground conditions and to facilitate the collection of representative soil samples;
- Laboratory analysis of selected samples collected during the field investigations; and
- Report the findings in accordance with the *Acid Sulfate Soils Manual 1998* (Stone et al, 1998) and the *National Acid Sulfate Soil Guidance* (Australian Government, 2018) and identify potential ASS risks within the areas assessed.

2. SITE IDENTIFICATION

Site identification details and associated information is present in **Table 2.1**. The locality of the site is presented in **Figure 1, Appendix A**.

Table 2.1 – Site Identification Information

Site Address	15 Mona Street, Mona Vale NSW
Cadastral Identification	Lot 100 in DP1273408
Geographical Coordinates	-33.669501, 151.303887 (Nearmap)
Site Area	Approximately 3,000 m²
Zoning	SP2: Infrastructure (Pittwater Local Environmental Plan 2014)
Current Land Use	Vacant / public recreation
Proposed Land Use	Residential
Local Government Agency	Northern Beaches Council

3. SITE CONDITIONS AND SURROUNDING ENVIRONMENT

3.1. Geology and Soils

Reference to the Sydney 1:100,000 Geological Sheet indicates that Quaternary estuarine sediments underly the site. Quaternary estuarine sediments typically comprise of silty to peaty quartz sand, silt, and clay. Ferruginous and humic cementation also occurs in places, with common shell layers.

A review of the NSW Department of Planning, Industry and Environment eSpade tool (https://www.environment.nsw.gov.au/eSpade2WebApp) indicated that the site is mapped as disturbed terrain, potentially containing artificial fill, dredged estuarine sand and mud, demolition rubble, and industrial and household waste. Also includes rocks and local soil materials.

3.2. Topography

The site and surrounding area is relatively flat, with elevation ranging from 3.5 mAHD to 5.5 mAHD. A Low gradient, downward trending slope towards the north-west is also present at the site.

3.3. Hydrology

Based on the site's local topography and distance to the nearest surface water bodies, it is inferred that groundwater flows to the west toward Cahill Creek.

3.4. Acid Sulfate Soils

A review of the NSW Department of Planning, Industry and Environment eSpade tool (https://www.environment.nsw.gov.au/eSpade2WebApp) indicated that the site lies within an area mapped as *H1: High probability* (<1 m below ground surface).

Mapping indicates that land management activities may therefore be affected by acid sulfate soil materials, and further assessment of acid sulfate soils is warranted.

3.5. Previous Environmental Investigations

At the time of completing this investigation, no reports relating to previous environmental investigation were provided to Alliance by the client.

4. SAMPLING AND ANALYTICAL PLAN

A minimum of four (4) sample locations were chosen in accordance with the Assessment Guidelines presented in the Acid Sulfate Soils Manual 1998 (Stone et al, 1998).

Four (4) boreholes will be advanced using a ute mounted auger rig. Soil samples will be collected at approximate 0.5 m intervals, or at changes in stratigraphy at each sampling location, to 1.0 m below the depth of proposed excavation (which is expected to be 2 m for the purposes of this investigation), or rock, whichever occurs first.

Soil samples will be subject to preliminary field screening by the contracted analytical laboratory to screen for the presence of actual acid sulfate soils (AASS) and potential acid sulfate soils (PASS).

A selection of samples will then be selected for Chromium Reducible Sulfur (CRS) analysis by a NATA accredited laboratory. The criteria in Table 2.3 and Appendix 1 of the Assessment Guidelines in Acid Sulfate Soils Manual 1998 (Stone et al, 1998) will be utilised for interpreting the results of field screen testing and the subsequent selection of samples for CRS analysis.

5. FIELDWORK

5.1. Soil Sampling

Soil sampling was undertaken by Alliance on 1 April 2022. A total of four (4) sample locations (BH1 to BH4) were drilled at the site using a ute mountedhydrualic drilling rig, fitted with solid-flight augers. Samples were collected from the near surface, at 0.5 m intervals within the soil profile or with change of strata. Each soil sample was collected using a new clean pair of nitrile gloves and placed in the zip-lock sampling bags provided by the analytical laboratory.

5.2. Sample Handling Procedure

Soil samples were collected directly from the auger and placed in zip-lock plastic bags. Upon sealing, the sample was immediately stored in an insulated chest containing ice, and transportated to the designated NATA-accredited laboratory—Eurofins Environment Testing—using Chain-of-Custody (COC) procedures.

A copy of the completed COC certificate is presented in **Appendix C.**

5.3. Laboratory Analysis

A total of twenty-eight (28) soil samples were collected for acid sulfate soil field screening.

Following field screen testing, eight (8) samples were selected for quantitative laboratory analysis by Chromium Reducible Sulfur Suite, as per the methodology described in AS4969–2008 *Analysis of Acid Sulfate Soil*. All laboratory analyses were conducted on discrete samples using NATA-registered methods.

Laboratory analytical certificates provided in **Appendix C**.

5.4. Verification Criteria

Analytical results obtained from quantitative analysis were interpreted against net acidity action criteria for ‘sands to loamy sands’ where >1,000 tonnes of soils are to be disturbed, as presented in Table 4.4 of Sullivan et al (2018).

5.5. Site Geology

Typical observations of soils encountered during sampling work, as well as observations relating to actual acid sulfate soils (AASS) (e.g., jarosite, mottling and sulfur odour), were recorded. These observations are presented in **Table 5.5** below and Site Photgraphs in **Appendix B,** with soil logs presented in **Appendix E**.

Table 5.5 Summary of Soil Observations

Depth (bgl)	Soil Description	Additional Observations
0.0-1.0 m	FILL: Silty SAND with minor gravels, fine to medium grained, sub-angular, dark brown, low plasticity	No visual or olfactory indicators of AASS
1.0-2.7 m	NATURAL: Silty SAND, fine to coarse with trace clay and shells, sub-angular brown to grey	Shell fragments present

Depth (bgl)	Soil Description	Additional Observations
2.7-3.2 m	NATURAL: Sandy CLAY, high plasticity, dark brown	No visual or olfactory indicatos of AASS

6. RESULTS AND DISCUSSION

6.1. Acid sulfate soils assessment

The indicators of ASS and the assessment criteria are provided in the NSW Acid Sulfate Soil Management Advisory Committee Acid Sulfate Soil Management Guidelines (Stone et al, 1998). Soil pH can provide an indication of the likelihood of ASS as well as the efficacy of treatment of ASS. Field screening pH (pHf) provides a measure of the likelihood of AASS. To provide an indication of the likelihood of PASS, peroxide is added to the soil and the pH measured (pHfox). A summary of these values and the associated management measures are outlined in **Table 6.1**.

Table 6.1 – pH_F and pH_{FOX} Indicators of ASS

pH_F Value	pH_{FOX} Value	pH Change	Effervescence	Management
Greater than 5.5	Greater than 4.5	Less than 2	Nil to mild	AASS and PASS unlikely. No action required.
Greater than 5.6	less than 3	Greater than 2	Mild - extreme	PASS suitable for burial below the water table within 16 hours.
Greater than 4.5 but less than 6	Greater than 3.5	Less than 1	Nil to mild	AASS and PASS unlikely. No action required.
Greater than 4 but less than 5.6	less than 3	Greater than 1	Mild - strong	Some AASS possible and PASS may exist. Material requires treatment.
Less than or equal to 4	Less than 4	Less than 1	Non to mild	AASS are likely. Material requires treatment.
Less than or equal to 4	less than 3	Greater than 2	Mild - strong	AASS and PASS likely. Material requires treatment.

6.2. Field Peroxide Testing

Twenty-eight (28) soil samples were subjected to preliminary field screen assessment at the laboratory to assess the likelihood for acid sulfate soils. This preliminary assessment comprised:

- (pHf) - assessing the pH of the soil as it would likely be in the natural environment; and,
- (pHfox) - assessing the pH of the soil following the addition of hydrogen peroxide to oxidise sulfides in the soil matrix.

Twenty-eight (28) soil samples were analysed for pHf to determine if the pH was less than the preliminary ‘actual acid sulfate soil’ (AASS) screening criterion of <pH 4. The reported pHf values were pH 8.1 or greater, indicating that actual acid sulfate soils are unlikely to be present on-site from ground surface to 3 mbgl.

The soil samples were then subjected to hydrogen peroxide oxidation by the laboratory, with the pH of the oxidised soil (pHfox) then measured. One (1) of the samples analysed reported a pHfox result less than the preliminary screening criterion of <pH 3.5, found in BH02 3.0-3.2, with a pHfox of pH 3.3. Twenty-five (25) of the soil samples analysed reported a pH change (difference between pHf and pHfox) greater than 1.0 pH unit, with the greatest difference found in BH02 3.0-3.2 (3.3 pH unit

reduction). Additionally, twenty-four (24) samples reported an ‘extreme’ reaction to the addition of hydrogen peroxide, indicating that PASS may be present.

6.3. Chromium Reducible Sulfur Analysis

A total of eight (8) soil samples were subjected to CRS laboratory analysis.

The CRS laboratory analytical results were compared with the action criteria adopted that would trigger a need for an acid sulfate soils management plan (ASSMP). As per Table 4.4 of ASSMAC (Stone et al, 1998), Alliance has compared the results with the appropriate criteria for the texture of each soil profile analysed, and assumes that >1,000 tonnes of soil would be disturbed as part of the proposed works at the site.

The potential acidity analytical results, by way of the reported CRS (%S), reported concentrations of reduced inorganic sulfur (RIS) above the adopted action criteria (0.03 %S) within analysed soil samples collected at each borehole location, with a maximum CRS (%S) value of 0.47 %S reported. These findings confirm that PASS are present within the soil profile across the subject investigation area.

The acid trail analytical results, by way of the reported Net Acidity (mol H+/tonne) results of analysed samples, reported Net Acidity concentrations of <10 mol H+/tonne (which is at level of laboratory limit of reporting) in each of the eight (8) samples analysed. Net Acidity results demonstrate that there is sufficient neutralising capacity present in soils within the soil profile at the site to neutralise acidity that may generated by the oxidation of the PASS present.

In light of the these results, an ASSMP is not required for management of ASS evaluated during this investigation.

8. CONCLUSION & RECOMMENDATIONS

Based on the laboratory results and observations compiled during this investigation, actual acid sulfate soils (AASS) are not likely to be present within the subject area assessed. Laboratory results indicated that potential acid sulfate soils (PASS) are present within the soil profile at the site, to a depth of 3.2 mbgl, however soils at the site contain sufficient neutralising capacity to neutralise any acid that may be generated by oxidation of RIS, as noted by Net Acidity results.

Based on the above, Alliance does not consider an acid sulfate soils management plan to be warranted.

Should further work be anticipated within the site, but outside of the subject area investigated as part of this report (both laterally and vertically), further assessment would be required.

9. STATEMENT OF LIMITATIONS

The findings presented in this report are based on specific searches of relevant, government historical databases and anecdotal information that were made available during the course of this investigation. To the best of our knowledge, these observations represent a reasonable interpretation of the general condition of the site at the time of report completion.

This report has been prepared solely for the use of the client to whom it is addressed and no other party is entitled to rely on its findings.

No warranties are made as to the information provided in this report. All conclusions and recommendations made in this report are of the professional opinions of personnel involved with the project and while normal checking of the accuracy of data has been conducted, any circumstances outside the scope of this report or which are not made known to personnel and which may impact on those opinions is not the responsibility of Alliance Geotechnical Pty Ltd. Should information become available regarding conditions at the site including previously unknown sources of contamination, Alliance Geotechnical Pty Ltd reserves the right to review the report in the context of the additional information.

This report must be reviewed in its entirety and in conjunction with the objectives, scope and terms applicable to Alliance Geotechnical Pty Ltd ‘s engagement. The report must not be used for any purpose other than the purpose specified at the time Alliance Geotechnical Pty Ltd was engaged to prepare the report.

Logs, figures, and drawings are generated for this report based on individual Alliance Geotechnical Pty Ltd consultant interpretations of nominated data, as well as observations made at the time site walkover/s were completed.

Data and/or information presented in this report must not be redrawn for its inclusion in other reports, plans or documents, nor should that data and/or information be separated from this report in any way.

Should additional information that may impact on the findings of this report be encountered or site conditions change, Alliance Geotechnical Pty Ltd reserves the right to review and amend this report.

10. REFERENCES

Stone Y, Ahern C R, and Blunden B 1998, 'Acid Sulfate Soils Manual 1998', Acid Sulfate Soil Management Advisory Committee, Wollongbar, NSW Australia.

Sullivan L, Ward N, Toppler N and Lancaster G, 2018 'National Acid Sulfate Soils Guidance: National acid sulfate identification and laboratory methods manual". Department of Agriculture and Water Resources, Canberra ACT.

Australian Standard 2008, AS 4969 Analysis of acid sulfate soil, 2008, Joint Standards Australia/Standards New Zealand Committee, Sampling and Analysis of Soil and Biota, Working Group EV-009-02-01.

WA DER 2015, Identification and investigation of acid sulfate soils and acidic landscapes, Western Australian Department of Environment Regulation, DER2015001427, June 2015.

APPENDIX A

FIGURES

Site Locality and Site Layout

alliance	Client Name:	Sydney Water	Figure Number:	1
	Project Name:	Acid Sulfate Soils Investigation	Figure Date:	01/04/2022
	Project Location:	15 Mona Street, Mona Vale NSW	Report Number:	14803-ER-1-1

APPENDIX B
SITE PHOTPGRAGHS

Photograph 1: General view of site looking north-east at BH01 location as observed 01/04/22.

Photograph 2: Location of BH04, facing south-east, as observed 01/04/2022.

Photograph 3: View over the site from the north-east boundary, facing, south-west, as observed 01/04/2022.

Photograph 4: Soil material encountered within BH03, as observed 01/04/2022.

APPENDIX C

LABORATORY DOCUMENTATION

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☑ Sydney Laboratory — Unit F3 Bld.F 16 Mars Rd, Lane Cove West, NSW 2066 — 02 9900 8400 — EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory — Unit 1, 21 Smallwood Pl., Murarrie, QLD 4172 — 07 3902 4600 — EnviroSampleQLD@eurofins.com

☐ Perth Laboratory — Unit 2, 91 Leach Highway, Kewdale WA 6105 — 08 9251 9600 — EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory — 2 Kingston Town Close, Oakleigh, VIC 3166 — 03 8564 5000 — EnviroSampleVic@eurofins.com

Company	ALLIANCE GEOTECHNICAL
Address	10 WELDER ROAD, SEVEN HILLS NSW
Contact Name	
Phone №	
Special Directions	
Purchase Order	
Quote ID №	
Project №	14803
Project Name	MONA ST
Project Manager	NATHAN. F
EDD Format (ESdat, EQuIS, Custom)	
Sampler(s)	SJ
Handed over by	SJ
Email for Invoice	admin@allgeo.com.au
Email for Results	enviro@allgeo.com.au; SAM JONES & [illegible]

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Turnaround Time (TAT) Requirements (Default will be 5 days if not ticked): ☐ Overnight (9am)* ☐ 1 Day* ☐ 2 Day* ☐ 3 Day* ☒ 5 Day ☐ Other ( ) * Surcharges apply

Containers: 1L Plastic; 250mL Plastic; 125mL Plastic; 200mL Amber Glass; 40mL VOA vial; 500mL PFAS Bottle; Jar (Glass or HDPE); Other (Asbestos AS4964, WA Guidelines)

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid (S) Water (W))	Analyses: pH FIELD SCREEN	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	BH01 0.0-0.2	1/4/22	S	X	X	
2	BH01 0.5-0.7	↓	↓	↓	↓	
3	BH01 1.0-1.2	↓	↓	↓	↓	
4	BH01 1.5-1.7	↓	↓	↓	↓	
5	BH01 2.0-2.2	↓	↓	↓	↓	
6	BH01 2.5-2.7	↓	↓	↓	↓	
7	BH01 3.0-3.2	↓	↓	↓	↓	
8	BH02 0.0-0.2	↓	↓	↓	↓	
9	BH02 0.5-0.7	↓	↓	↓	↓	
10	BH02 1.0-1.2	↓	↓	↓	↓	
11	BH02 1.5-1.7	↓	↓	↓	↓	
12	BH02 2.0-2.2	↓	↓	↓	↓	
13	BH02 2.5-2.7	↓	↓	↓	↓	
14	BH02 3.0-3.2	↓	↓	↓	↓	
15	BH03 0.0-0.2	↓	↓	↓	↓	
16	BH03 0.5-0.7	↓	↓	↓	↓	
17	BH03 1.0-1.2	↓	↓	↓	↓	
18	BH03 1.5-1.7	↓	↓	↓	↓	
19	BH03 2.0-2.2	↓	↓	↓	↓	
20	BH03 2.5-2.7	↓	↓	↓	↓	
21	BH03 3.0-3.2	↓	↓	↓	↓	
22	BH04 0.0-0.2					
	Total Counts			22	22	

Method of Shipment	☐ Courier (#) ☒ Hand Delivered ☐ Postal	Name	SAM.T	Signature	[signature]	Date	1/4/22	Time 12:40PM
Eurofins | mgt Laboratory Use Only — Received By	E.K — SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature	[signature]	Date	1.4.2022	Time	12:48	Temperature 8.9
Received By	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	__/__/__	Time	__:__	Report № 876524

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☑ Sydney Laboratory — Unit F3 Bld F, 16 Mars Rd, Lane Cove West, NSW 2066 — 02 9900 8400 — EnviroSampleNSW@eurofins.com

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Company	ALLIANCE GEOTECHNICAL	Project №	14803	Project Manager	NATHAN. F
Address	10 WELDER ROAD, SEVEN HILLS NSW	Project Name	MONA ST	EDD Format (ESdat, EQuIS, Custom)	
Contact Name		Analyses (Note: Where metals are requested, please specify "Total" or "Filtered". SUITE code must be used to attract SUITE pricing)	PH FIELD SCREEN	Sampler(s)	SJ
Phone №				Handed over by	SJ
Special Directions				Email for Invoice	admin@allgeo.com.au
Purchase Order				Email for Results	SAMJONES@ALLGEO.COM.AU; enviro@allgeo.com.au
Quote ID №					

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№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid (S) Water (W))	Containers: 1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964: WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	BH04 0.5-0.7	1/4/22	S					X			X	
2	BH04 1.0-1.2	↓	↓								↓	
3	BH04 1.5-1.7											
4	BH04 2.0-2.2											
5	BH04 2.5-2.7											
6	BH04 3.0-3.2											
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20												
21												
22												
	Total Counts			6							6	

Turnaround Time (TAT) Requirements (Default will be 5 days if not ticked)

☐ Overnight (9am)*
☐ 1 Day* ☐ 2 Day*
☐ 3 Day* ☑ 5 Day
* Surcharges apply
☐ Other ( )

Method of Shipment	☒ Courier (#)	☑ Hand Delivered	☐ Postal	Name	SAM J	Signature		Date	1/4/22	Time	12:40PM
Eurofins | mgt Laboratory Use Only	Received By	E.R	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	1/4/2022	Time	12:48	Temperature	8.9
	Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	__/__/__	Time	__:__	Report №	87452

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Sample Receipt Advice

Company name:	Alliance Geotechnical
Contact name:	Nathan Foster
Project name:	MONA ST
Project ID:	14803
Turnaround time:	5 Day
Date/Time received	Apr 1, 2022 12:48 PM
Eurofins reference	876524

Sample Information

✓	A detailed list of analytes logged into our LIMS, is included in the attached summary table.
✓	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:

Andrew Black on phone : (+61) 2 9900 8490 or by email: AndrewBlack@eurofins.com

Results will be delivered electronically via email to Nathan Foster - nathan@allgeo.com.au.

Note: A copy of these results will also be delivered to the general Alliance Geotechnical email address.

Alliance Geotechnical
10 Welder Road
Seven Hills
NSW 2147

Attention: **Nathan Foster**

Report **876524-S**
Project name MONA ST
Project ID 14803
Received Date Apr 01, 2022

Client Sample ID			**BH01-0-0.2**	**BH01-0.5-0.7**	**BH01-1.0-1.2**	**BH01-1.5-1.7**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S22-Ap0001584**	**S22-Ap0001585**	**S22-Ap0001586**	**S22-Ap0001587**
Date Sampled			**Apr 01, 2022**	**Apr 01, 2022**	**Apr 01, 2022**	**Apr 01, 2022**
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	8.7	8.7	8.3	9.0
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	6.1	6.3	6.1	7.3
Reaction Ratings*[S05]	0	-	2.0	4.0	4.0	3.0

Client Sample ID			**BH01-2.0-2.2**	**BH01-2.5-2.7**	**BH01-3-3.2**	**BH02-0-0.2**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S22-Ap0001588**	**S22-Ap0001589**	**S22-Ap0001590**	**S22-Ap0001591**
Date Sampled			**Apr 01, 2022**	**Apr 01, 2022**	**Apr 01, 2022**	**Apr 01, 2022**
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	9.0	8.7	8.4	8.8
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	7.7	7.3	7.1	7.7
Reaction Ratings*[S05]	0	-	4.0	4.0	4.0	4.0

Client Sample ID			**BH02-0.5-0.7**	**BH02-1-1.2**	**BH02-1.5-1.7**	**BH02-2-2.2**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S22-Ap0001592**	**S22-Ap0001593**	**S22-Ap0001594**	**S22-Ap0001595**
Date Sampled			**Apr 01, 2022**	**Apr 01, 2022**	**Apr 01, 2022**	**Apr 01, 2022**
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	9.0	8.7	9.4	8.8
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	7.7	6.9	8.6	8.1
Reaction Ratings*[S05]	0	-	4.0	4.0	4.0	4.0

Client Sample ID			BH02-2.5-2.7	BH02-3-3.2	BH03-0-0.2	BH03-0.5-0.7
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ap0001596	S22-Ap0001597	S22-Ap0001598	S22-Ap0001599
Date Sampled			Apr 01, 2022	Apr 01, 2022	Apr 01, 2022	Apr 01, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	8.2	8.1	8.9	8.9
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	5.2	3.3	7.4	7.2
Reaction Ratings*[S05]	0	-	4.0	4.0	4.0	4.0

Client Sample ID			BH03-1-1.2	BH03-1.5-1.7	BH03-2.0-2.2	BH03-2.5-2.7
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ap0001600	S22-Ap0001601	S22-Ap0001602	S22-Ap0001603
Date Sampled			Apr 01, 2022	Apr 01, 2022	Apr 01, 2022	Apr 01, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	9.0	8.7	8.7	8.7
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	7.2	8.2	7.2	6.8
Reaction Ratings*[S05]	0	-	4.0	4.0	4.0	4.0

Client Sample ID			BH03-3.0-3.2	BH04-0-0.2	BH04-0.5-0.7	BH04-1-1.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ap0001604	S22-Ap0001605	S22-Ap0001606	S22-Ap0001607
Date Sampled			Apr 01, 2022	Apr 01, 2022	Apr 01, 2022	Apr 01, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	8.5	8.7	8.2	8.9
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	6.9	6.9	6.1	6.7
Reaction Ratings*[S05]	0	-	4.0	4.0	4.0	3.0

Client Sample ID			BH04-1.5-1.7	BH04-2-2.2	BH04-2.5-2.7	BH04-3-3.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ap0001608	S22-Ap0001609	S22-Ap0001610	S22-Ap0001611
Date Sampled			Apr 01, 2022	Apr 01, 2022	Apr 01, 2022	Apr 01, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	8.7	8.6	8.6	8.7
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	7.1	7.1	6.9	7.1
Reaction Ratings*[S05]	0	-	2.0	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	Holding Time
Acid Sulfate Soils Field pH Test	Brisbane	Apr 08, 2022	7 Days

- Method: LTM-GEN-7060 Determination of field pH (pHF) and field pH peroxide (pHFOX) tests

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Company Name: Alliance Geotechnical
Address: 10 Welder Road
Seven Hills
NSW 2147

Project Name: MONA ST
Project ID: 14803

Order No.:
Report #: 876524
Phone: 1800 288 188
Fax: 02 9675 1888

Received: Apr 1, 2022 12:48 PM
Due: Apr 8, 2022
Priority: 5 Day
Contact Name: Nathan Foster

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Acid Sulfate Soils Field pH Test
Melbourne Laboratory - NATA # 1261 Site # 1254						
Sydney Laboratory - NATA # 1261 Site # 18217						
Brisbane Laboratory - NATA # 1261 Site # 20794						X
Mayfield Laboratory - NATA # 1261 Site # 25079						
Perth Laboratory - NATA # 2377 Site # 2370						
External Laboratory						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**	
1	BH01-0-0.2	Apr 01, 2022		Soil	S22-Ap0001584	X
2	BH01-0.5-0.7	Apr 01, 2022		Soil	S22-Ap0001585	X
3	BH01-1.0-1.2	Apr 01, 2022		Soil	S22-Ap0001586	X
4	BH01-1.5-1.7	Apr 01, 2022		Soil	S22-Ap0001587	X
5	BH01-2.0-2.2	Apr 01, 2022		Soil	S22-Ap0001588	X
6	BH01-2.5-2.7	Apr 01, 2022		Soil	S22-	X

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Brisbane Laboratory - NATA # 1261 Site # 20794						X
Mayfield Laboratory - NATA # 1261 Site # 25079						
Perth Laboratory - NATA # 2377 Site # 2370						
External Laboratory						
					Ap0001589	
7	BH01-3-3.2	Apr 01, 2022		Soil	S22-Ap0001590	X
8	BH02-0-0.2	Apr 01, 2022		Soil	S22-Ap0001591	X
9	BH02-0.5-0.7	Apr 01, 2022		Soil	S22-Ap0001592	X
10	BH02-1-1.2	Apr 01, 2022		Soil	S22-Ap0001593	X
11	BH02-1.5-1.7	Apr 01, 2022		Soil	S22-Ap0001594	X
12	BH02-2-2.2	Apr 01, 2022		Soil	S22-Ap0001595	X

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Sydney Laboratory - NATA # 1261 Site # 18217						
Brisbane Laboratory - NATA # 1261 Site # 20794						X
Mayfield Laboratory - NATA # 1261 Site # 25079						
Perth Laboratory - NATA # 2377 Site # 2370						
External Laboratory						
13	BH02-2.5-2.7	Apr 01, 2022		Soil	S22-Ap0001596	X
14	BH02-3-3.2	Apr 01, 2022		Soil	S22-Ap0001597	X
15	BH03-0-0.2	Apr 01, 2022		Soil	S22-Ap0001598	X
16	BH03-0.5-0.7	Apr 01, 2022		Soil	S22-Ap0001599	X
17	BH03-1-1.2	Apr 01, 2022		Soil	S22-Ap0001600	X
18	BH03-1.5-1.7	Apr 01, 2022		Soil	S22-Ap0001601	X
19	BH03-2.0-2.2	Apr 01, 2022		Soil	S22-	X

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Sydney Laboratory - NATA # 1261 Site # 18217						
Brisbane Laboratory - NATA # 1261 Site # 20794						X
Mayfield Laboratory - NATA # 1261 Site # 25079						
Perth Laboratory - NATA # 2377 Site # 2370						
External Laboratory						
					Ap0001602	
20	BH03-2.5-2.7	Apr 01, 2022		Soil	S22-Ap0001603	X
21	BH03-3.0-3.2	Apr 01, 2022		Soil	S22-Ap0001604	X
22	BH04-0-0.2	Apr 01, 2022		Soil	S22-Ap0001605	X
23	BH04-0.5-0.7	Apr 01, 2022		Soil	S22-Ap0001606	X
24	BH04-1-1.2	Apr 01, 2022		Soil	S22-Ap0001607	X
25	BH04-1.5-1.7	Apr 01, 2022		Soil	S22-Ap0001608	X

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Sydney Laboratory - NATA # 1261 Site # 18217						
Brisbane Laboratory - NATA # 1261 Site # 20794						X
Mayfield Laboratory - NATA # 1261 Site # 25079						
Perth Laboratory - NATA # 2377 Site # 2370						
External Laboratory						
26	BH04-2-2.2	Apr 01, 2022		Soil	S22-Ap0001609	X
27	BH04-2.5-2.7	Apr 01, 2022		Soil	S22-Ap0001610	X
28	BH04-3-3.2	Apr 01, 2022		Soil	S22-Ap0001611	X
Test Counts						28

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.
7. Samples were analysed on an 'as received' basis.
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.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

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

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
CP	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.
TBTO	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)*	S22-Ap0001593	CP	pH Units	8.7	8.7	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	S22-Ap0001598	CP	pH Units	8.9	8.9	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	S22-Ap0001609	CP	pH Units	8.6	8.7	pass	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
S05	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.

Authorised by:

Hannah Mawbey	Analytical Services Manager
Jonathon Angell	Senior Analyst (NSW)

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.

For sample receipt enquiries (eg. SRAs, changes to analysis) please contact EnvirosampleNSW@eurofins.com or 02 9900 8421 (7am – 9pm).
For despatch enquiries (eg. courier bookings, bottle orders) please contact AU04_Despatch_SYD@eurofins.com or 0488 400 929 (8am – 4pm).

From: Sam Jones <SamJones@allgeo.com.au>
Sent: Monday, 11 April 2022 1:09 PM
To: Hannah Mawbey <HannahMawbey@eurofins.com>; Nathan Foster <Nathan@allgeo.com.au>; Andrew Black <AndrewBlack@eurofins.com>
Subject: RE: Eurofins Test Results - Report 876524 : Site MONA ST (14803)

Hi guys,

Please run the following samples for the chromium reducible suite on standard TAT:

- S22-Ap0001584 (BH01 0.0-0.2)
- S22-Ap0001590 (BH01 1.5-1.7)
- S22-Ap0001593 (BH02 1.0-1.2)
- S22-Ap0001597 (BH02 3.0-3.2)
- S22-Ap0001600 (BH03 1.0-1.2)
- S22-Ap0001603 (BH03 3.0-3.2)
- S22-Ap0001607 (BH04 1.0-1.2)
- S22-Ap0001610 (BH04 2.5-2.7)

Thank you.

Regards,
Sam Jones
Environmental Consultant
Mobile: 0430 214 402 | **Email:** SamJones@allgeo.com.au

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geotechnical & environmental solutions

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Admin Email: admin@allgeo.com.au
Website: allgeo.com.au
Office & Lab: 8-10 Welder Road, Seven Hills NSW 2147
Postal Address: PO Box 275, Seven Hills NSW 1730

From: HannahMawbey@eurofins.com <HannahMawbey@eurofins.com>
Sent: Friday, 8 April 2022 6:48 PM
To: Nathan Foster <nathan@allgeo.com.au>
Cc: enviro <enviro@allgeo.com.au>; Sam Jones <samjones@allgeo.com.au>
Subject: Eurofins Test Results - Report 876524 : Site MONA ST (14803)

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Phone : 0800 856 450
IANZ # 1290

Sample Receipt Advice

Company name:	Alliance Geotechnical
Contact name:	Nathan Foster
Project name:	ADDITIONAL - MONA ST
Project ID:	14803
Turnaround time:	5 Day
Date/Time received	Apr 11, 2022 1:09 PM
Eurofins reference	879697

Sample Information

✓	A detailed list of analytes logged into our LIMS, is included in the attached summary table.
✓	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.
✗	Split sample sent to requested external lab.
✗	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:

Andrew Black on phone : (+61) 2 9900 8490 or by email: AndrewBlack@eurofins.com

Results will be delivered electronically via email to Nathan Foster - nathan@allgeo.com.au.

Note: A copy of these results will also be delivered to the general Alliance Geotechnical email address.

Global Leader - Results you can trust

Alliance Geotechnical
10 Welder Road
Seven Hills
NSW 2147

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: **Nathan Foster**

Report **879697-S**
Project name ADDITIONAL - MONA ST
Project ID 14803
Received Date Apr 11, 2022

Client Sample ID			**BH01 0.0-0.2**	**BH01 1.5-1.7**	**BH02 1.0-1.2**	**BH02 3.0-3.2**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**B22-Ap0027158**	**B22-Ap0027159**	**B22-Ap0027160**	**B22-Ap0027161**
Date Sampled			**Apr 01, 2022**	**Apr 01, 2022**	**Apr 01, 2022**	**Apr 01, 2022**
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	8.6	9.0	9.2	8.9
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	< 0.003	< 0.003	< 0.003	< 0.003
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	< 2	< 2	< 2	< 2
Potential Acidity - Chromium Reducible Sulfur						
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)[S04]	0.005	% S	< 0.005	0.070	0.012	0.39
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	3	mol H+/t	< 3	44	7.3	240
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	N/A	N/A	N/A	N/A
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.02	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.02	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	10	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Acid Neutralising Capacity (ANCbt)						
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	0.01	% CaCO3	4.4	2.5	9.4	2.2
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)[S03]	0.02	% S	1.4	0.81	3.0	0.70
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)	2	mol H+/t	890	510	1900	430
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
CRS Suite - Net Acidity - NASSG (Including ANC)	0.02	% S	< 0.02	< 0.02	< 0.02	< 0.02
CRS Suite - Net Acidity - NASSG (Including ANC)	10	mol H+/t	< 10	< 10	< 10	< 10
CRS Suite - Liming Rate - NASSG (Including ANC)[S01]	1	kg CaCO3/t	< 1	< 1	< 1	< 1
Extraneous Material						
<2mm Fraction	0.005	g	48	59	59	36
>2mm Fraction	0.005	g	6.9	< 0.005	< 0.005	11
Analysed Material	0.1	%	88	100	100	76
Extraneous Material	0.1	%	12	< 0.1	< 0.1	24

Client Sample ID			BH03 1.0-1.2	BH03 0-3.2	BH04 1.0-1.2	BH04 2.5-2.7
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			B22-Ap0027162	B22-Ap0027163	B22-Ap0027164	B22-Ap0027165
Date Sampled			Apr 01, 2022	Apr 01, 2022	Apr 01, 2022	Apr 01, 2022
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	9.3	9.0	9.1	8.9
Titratable Actual Acidity (NLM-3.2)	0.003	% pyrite S	< 0.003	< 0.003	< 0.003	< 0.003
Titratable Actual Acidity (NLM-3.2)	2	mol H+/t	< 2	< 2	< 2	< 2
Potential Acidity - Chromium Reducible Sulfur						
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)[S04]	0.005	% S	0.008	0.47	0.009	0.18
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	3	mol H+/t	4.8	290	5.9	110
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	N/A	N/A	N/A	N/A
HCl Extractable Sulfur	0.005	% S	N/A	N/A	N/A	N/A
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.02	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1[S02]	0.02	% S	N/A	N/A	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	10	mol H+/t	N/A	N/A	N/A	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0	2.0	2.0	2.0
Acid Neutralising Capacity (ANCbt)						
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	0.01	% CaCO3	1.4	23	2.3	3.6
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)[S03]	0.02	% S	0.46	7.4	0.73	1.2
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)	2	mol H+/t	280	4600	460	710
ANC Fineness Factor		factor	1.5	1.5	1.5	1.5
Net Acidity (Including ANC)						
CRS Suite - Net Acidity - NASSG (Including ANC)	0.02	% S	< 0.02	< 0.02	< 0.02	< 0.02
CRS Suite - Net Acidity - NASSG (Including ANC)	10	mol H+/t	< 10	< 10	< 10	< 10
CRS Suite - Liming Rate - NASSG (Including ANC)[S01]	1	kg CaCO3/t	< 1	< 1	< 1	< 1
Extraneous Material						
<2mm Fraction	0.005	g	70	36	58	68
>2mm Fraction	0.005	g	< 0.005	< 0.005	< 0.005	4.1
Analysed Material	0.1	%	100	100	100	94
Extraneous Material	0.1	%	< 0.1	< 0.1	< 0.1	5.7

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	Apr 20, 2022	6 Week
- Method: LTM-GEN-7070 Chromium Reducible Sulfur Suite			
Extraneous Material	Brisbane	Apr 13, 2022	6 Week
- Method: LTM-GEN-7050/7070			

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NATA # 1261 Site # 18217

Brisbane
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Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

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Mayfield East NSW 2304
PO Box 60 Wickham 2293
Phone : +61 2 4968 8448
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Company Name: Alliance Geotechnical
Address: 10 Welder Road
Seven Hills
NSW 2147

Project Name: ADDITIONAL - MONA ST
Project ID: 14803

Order No.:
Report #: 879697
Phone: 1800 288 188
Fax: 02 9675 1888

Received: Apr 11, 2022 1:09 PM
Due: Apr 20, 2022
Priority: 5 Day
Contact Name: Nathan Foster

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Chromium Reducible Sulfur Suite	Moisture Set
Melbourne Laboratory - NATA # 1261 Site # 1254							
Sydney Laboratory - NATA # 1261 Site # 18217							
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X
Mayfield Laboratory - NATA # 1261 Site # 25079							
Perth Laboratory - NATA # 2377 Site # 2370							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	BH01 0.0-0.2	Apr 01, 2022		Soil	B22-Ap0027158	X	X
2	BH01 1.5-1.7	Apr 01, 2022		Soil	B22-Ap0027159	X	X
3	BH02 1.0-1.2	Apr 01, 2022		Soil	B22-Ap0027160	X	X
4	BH02 3.0-3.2	Apr 01, 2022		Soil	B22-Ap0027161	X	X
5	BH03 1.0-1.2	Apr 01, 2022		Soil	B22-Ap0027162	X	X
6	BH03 0-3.2	Apr 01, 2022		Soil	B22-	X	X

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Received: Apr 11, 2022 1:09 PM
Due: Apr 20, 2022
Priority: 5 Day
Contact Name: Nathan Foster

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Chromium Reducible Sulfur Suite	Moisture Set
Melbourne Laboratory - NATA # 1261 Site # 1254							
Sydney Laboratory - NATA # 1261 Site # 18217							
Brisbane Laboratory - NATA # 1261 Site # 20794						X	X
Mayfield Laboratory - NATA # 1261 Site # 25079							
Perth Laboratory - NATA # 2377 Site # 2370							
External Laboratory							
					Ap0027163		
7	BH04 1.0-1.2	Apr 01, 2022		Soil	B22-Ap0027164	X	X
8	BH04 2.5-2.7	Apr 01, 2022		Soil	B22-Ap0027165	X	X
Test Counts						8	8

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.
7. Samples were analysed on an 'as received' basis.
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.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

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

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
CP	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.
TBTO	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							
Actual Acidity (NLM-3.2)							
pH-KCL (NLM-3.1)	%	97			80-120	Pass	
Titratable Actual Acidity (NLM-3.2)	%	96			80-120	Pass	
LCS - % Recovery							
Potential Acidity - Chromium Reducible Sulfur							
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)	%	90			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Actual Acidity (NLM-3.2)				Result 1	Result 2	RPD			
pH-KCL (NLM-3.1)	B22-Ap0027158	CP	pH Units	8.6	8.6	<1	30%	Pass	
Titratable Actual Acidity (NLM-3.2)	B22-Ap0027158	CP	% pyrite S	< 0.003	< 0.003	<1	30%	Pass	
Titratable Actual Acidity (NLM-3.2)	B22-Ap0027158	CP	mol H+/t	< 2	< 2	<1	30%	Pass	
Duplicate									
Potential Acidity - Chromium Reducible Sulfur				Result 1	Result 2	RPD			
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)	B22-Ap0027158	CP	% S	< 0.005	< 0.005	<1	30%	Pass	
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	B22-Ap0027158	CP	mol H+/t	< 3	< 3	<1	30%	Pass	
Duplicate									
Extractable Sulfur				Result 1	Result 2	RPD			
Sulfur - KCl Extractable	B22-Ap0027158	CP	% S	N/A	N/A	N/A	30%	Pass	
HCl Extractable Sulfur	B22-Ap0027158	CP	% S	N/A	N/A	N/A	30%	Pass	
Duplicate									
Retained Acidity (S-NAS)				Result 1	Result 2	RPD			
Net Acid soluble sulfur (SNAS) NLM-4.1	B22-Ap0027158	CP	% S	N/A	N/A	N/A	30%	Pass	
Net Acid soluble sulfur (s-SNAS) NLM-4.1	B22-Ap0027158	CP	% S	N/A	N/A	N/A	30%	Pass	
Net Acid soluble sulfur (a-SNAS) NLM-4.1	B22-Ap0027158	CP	mol H+/t	N/A	N/A	N/A	30%	Pass	
Duplicate									
Acid Neutralising Capacity (ANCbt)				Result 1	Result 2	RPD			
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	B22-Ap0027158	CP	% CaCO3	4.4	4.6	3.0	30%	Pass	
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)	B22-Ap0027158	CP	% S	1.4	1.5	3.0	30%	Pass	
ANC Fineness Factor	B22-Ap0027158	CP	factor	1.5	1.5	<1	30%	Pass	
Duplicate									
Net Acidity (Including ANC)				Result 1	Result 2	RPD			
CRS Suite - Net Acidity - NASSG (Including ANC)	B22-Ap0027158	CP	% S	< 0.02	< 0.02	<1	30%	Pass	
CRS Suite - Net Acidity - NASSG (Including ANC)	B22-Ap0027158	CP	mol H+/t	< 10	< 10	<1	30%	Pass	
CRS Suite - Liming Rate - NASSG (Including ANC)	B22-Ap0027158	CP	kg CaCO3/t	< 1	< 1	<1	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/t 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:

Andrew Black	Analytical Services Manager
Myles Clark	Senior Analyst (NSW)

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.

APPENDIX D

LABORATORY SUMMARY TABLE

14803-ER-1-1
Acid Sulfate Soils Results
Mona St, Mona Vale NSW

								Reference	BH01-0-0.2	BH01-0.5-0.7	BH01-1.0-1.2	BH01-1.5-1.7	BH01-2.0-2.2	BH01-2.5-2.7	BH01-3-3.2	BH02-0-0.2	BH02-0.5-0.7	BH02-1-1.2	BH02-1.5-1.7	BH02-2-2.2	BH02-2.5-2.7	BH02-3-3.2
								Sample ID	S22-Ap0001584	S22-Ap0001585	S22-Ap0001586	S22-Ap0001587	S22-Ap0001588	S22-Ap0001589	S22-Ap0001590	S22-Ap0001591	S22-Ap0001592	S22-Ap0001593	S22-Ap0001594	S22-Ap0001595	S22-Ap0001596	S22-Ap0001597
								Texture	Coarse			Medium						Medium				Fine
Group	**Analyte**	**Units**	**PQL**	**ASSMAC (1998)**	**DATASET AVERAGE**	**DATASET MINIMUM**	**DATASET MAXIMUM**															
Field Screen	phf	pH Units	0	<4	**8.7**	**8.1**	**9.4**	8.7	8.7	8.3	9.0	9.0	8.7	8.4	8.8	9	8.7	9.4	8.8	8.2	8.1
	pHfox	pH Units	0	<3.5	**6.8**	**3.3**	**8.6**	6.1	6.3	6.1	7.3	7.7	7.3	7.1	7.7	7.7	6.9	8.6	8.1	5.2	3.3
	Difference between pHF & pHFox	pH Units	0	1	**1.9**	**0.7**	**4.8**	2.6	2.4	2.2	1.7	1.3	1.4	1.3	1.1	1.3	1.8	0.8	0.7	3.0	4.8
	Reaction Rating	pH Units	0	XX	**3.8**	**2.0**	**4.0**	2	4	4	3	4	4	4	4	4	4	4	4	4	4
Chromium Reducible	CRS Suite - Net Acidity (Sulphur Units)	% S	0.02	≥ 0.03	**<0.02**	**0.0**	**0.0**	<0.02	-	-	<0.02	-	-	-	-	-	<0.02	-	-	-	<0.02
	CRS Suite - Net Acidity (Acidity Units)	mol H+/tonne	10	≥ 18	**<10**	**0.0**	**0.0**	<10	-	-	<10	-	-	-	-	-	<10	-	-	-	<10

								Reference	BH03-0-0.2	BH03-0.5-0.7	BH03-1-1.2	BH03-1.5-1.7	BH03-2.0-2.2	BH03-2.5-2.7	BH03-3.0-3.2	BH04-0-0.2	BH04-0.5-0.7	BH04-1-1.2	BH04-1.5-1.7	BH04-2-2.2	BH04-2.5-2.7	BH04-3-3.2
								Sample ID	S22-Ap0001598	S22-Ap0001599	S22-Ap0001600	S22-Ap0001601	S22-Ap0001602	S22-Ap0001603	S22-Ap0001604	S22-Ap0001605	S22-Ap0001606	S22-Ap0001607	S22-Ap0001608	S22-Ap0001609	S22-Ap0001610	S22-Ap0001611
								Texture			Medium				Fine			Medium			Medium	
Group	**Analyte**	**Units**	**PQL**	**ASSMAC (1998)**	**DATASET AVERAGE**	**DATASET MINIMUM**	**DATASET MAXIMUM**															
Field Screen	phf	pH Units	0	<4	**8.7**	**8.2**	**9.0**	8.9	8.9	9.0	8.7	8.7	8.7	8.5	8.7	8.2	8.9	8.7	8.6	8.6	8.7
	pHfox	pH Units	0	<3.5	**7.1**	**6.1**	**8.2**	7.4	7.2	7.2	8.2	7.2	6.8	6.9	6.9	6.1	6.7	7.1	7.1	6.9	7.1
	Difference between pHF & pHFox	pH Units	0	1	**1.6**	**0.5**	**2.2**	1.5	1.7	1.8	0.5	1.5	1.9	1.6	1.8	2.1	2.2	1.6	1.5	1.7	1.6
	Reaction Rating	pH Units	0	XX	**3.8**	**2.0**	**4.0**	4	4	4	4	4	4	4	4	4	3	2	4	4	4
Chromium Reducible	CRS Suite - Net Acidity (Sulphur Units)	% S	0.02	≥ 0.03	**<0.02**	**0.0**	**0.0**	-	-	<0.02	-	-	-	<0.02	-	-	<0.02	-	-	<0.02	-
	CRS Suite - Net Acidity (Acidity Units)	mol H+/tonne	10	≥ 18	**<10**	**0.0**	**0.0**	-	-	<10	-	-	-	<10	-	-	<10	-	-	<10	-

* **No currently available criterion**
\- **No sample analysed**

APPENDIX E

LOGS

alliance **Test Pit** BH01

PROJECT NUMBER 14803
PROJECT NAME Acid Sulfate Soil Investigation
CLIENT Sydney Water
ADDRESS 15-17 Mona Street, Mona Vale NSW

DATE 01/11/2022
DRILLING COMPANY Alliance Geotechnical
Excavator Ute mounted drill rig TDLR690

COMMENTS:

Depth (m)	PID	Samples	Graphic Log	USCS	Material Description	Moisture	Additional Observations
0		BH01 0.0-0.2		SM	Silty SAND with minor gravels, fine to medium grained, sub-angular, dark brown, low plasticity	M	Fill
0.5		BH01 0.5-0.7					
1		BH01 1.0-1.2			Silty SAND, fine to coarse with trace clay and shells, sub-angular brown to grey	W	Natural
1.5		BH01 1.5-1.7					
2		BH01 2.0-2.2					
2.5		BH01 2.5-2.7					
				SC	Sandy CLAY, high plasticity, dark brown		
3		BH01 3.0-3.2					
					Terminated at scope - 3.2 m		

Disclaimer: Not for geotechnical purposes. M: moist. SM: Slight moisture. D: Dry. W: Wet.

alliance **Test Pit** BH02

PROJECT NUMBER 14803
PROJECT NAME Acid Sulfate Soil Investigation
CLIENT Sydney Water
ADDRESS 15-17 Mona Street, Mona Vale NSW

DATE 01/11/2022
DRILLING COMPANY Alliance Geotechnical
Excavator Ute mounted drill rig TDLR690

COMMENTS:

Depth (m)	PID	Samples	Graphic Log	USCS	Material Description	Moisture	Additional Observations
0		BH02 0.0-0.2		SM	Silty SAND with minor gravels, fine to medium grained, sub-angular, dark brown, low plasticity	M	Fill
0.5		BH02 0.5-0.7					
1		BH02 1.0-1.2			Silty SAND, fine to coarse with trace clay and shells, sub-angular brown to grey	W	Natural
1.5		BH02 1.5-1.7					
2		BH02 2.0-2.2					
2.5		BH02 2.5-2.7					
				SC	Sandy CLAY, high plasticity, dark brown		
3		BH02 3.0-3.2					
					Terminated at scope - 3.2 m		

Disclaimer: Not for geotechnical purposes. M: moist. SM: Slight moisture. D: Dry. W: Wet.

alliance **Test Pit** BH03

PROJECT NUMBER 14803
PROJECT NAME Acid Sulfate Soil Investigation
CLIENT Sydney Water
ADDRESS 15-17 Mona Street, Mona Vale NSW

DATE 01/11/2022
DRILLING COMPANY Alliance Geotechnical
Excavator Ute mounted drill rig TDLR690

COMMENTS:

Depth (m)	PID	Samples	Graphic Log	USCS	Material Description	Moisture	Additional Observations
0		BH03 0.0-0.2		SM	Silty SAND with minor gravels, fine to medium grained, sub-angular, dark brown, low plasticity	M	Fill
0.5		BH03 0.5-0.7					
1		BH03 1.0-1.2			Silty SAND, fine to coarse with trace clay and shells, sub-angular brown to grey	W	Natural
1.5		BH03 1.5-1.7					
2		BH03 2.0-2.2					
2.5		BH03 2.5-2.7					
				SC	Sandy CLAY, high plasticity, dark brown		
3		BH03 3.0-3.2					
					Terminated at scope - 3.2 m		

Disclaimer: Not for geotechnical purposes. M: moist. SM: Slight moisture. D: Dry. W: Wet.

alliance **Test Pit** BH04

PROJECT NUMBER 14803
PROJECT NAME Acid Sulfate Soil Investigation
CLIENT Sydney Water
ADDRESS 15-17 Mona Street, Mona Vale NSW

DATE 01/11/2022
DRILLING COMPANY Alliance Geotechnical
Excavator Ute mounted drill rig TDLR690

COMMENTS:

Depth (m)	PID	Samples	Graphic Log	USCS	Material Description	Moisture	Additional Observations
		BH04 0.0-0.2		SM	Silty SAND with minor gravels, fine to medium grained, sub-angular, dark brown, low plasticity	M	Fill
0.5		BH04 0.5-0.7					
1					Silty SAND, fine to coarse with trace clay and shells, sub-angular brown to grey	W	Natural
		BH04 1.0-1.2					
1.5		BH04 1.5-1.7					
2		BH04 2.0-2.2					
2.5		BH04 2.5-2.7					
				SC	Sandy CLAY, high plasticity, dark brown		
3		BH04 3.0-3.2					
					Terminated at scope - 3.2 m		

Disclaimer: Not for geotechnical purposes. M: moist. SM: Slight moisture. D: Dry. W: Wet.

APPENDIX F

DEVELOPMENT PLAN

TWO STOREY DETACHED HOUSING x 4
Scale 1:400 (A3)

15-17_MONA_STREET
MONAVALE
OPTION_H

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