



Report Type:
Acid Sulfate Soils Assessment

Project Address:
351-353 Barrenjoey Road, Newport NSW

Client Name:
Atlen Construction Pty Ltd

28 January 2022
Report No: 14429-ER-1-1



alliance
geotechnical & environmental solutions

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Document Control

Revision	Report Date	Author	Reviewer	Commissioned by	Comment
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Name	Jacob Walker	Name	Mehran Asadabadi
Title	Environmental Consultant	Title	Senior Environmental Consultant

Executive Summary

Alliance Geotechnical Pty Ltd (Alliance) was engaged by Atlen Construction Pty Ltd (the client) to undertake an Acid Sulfate Soils Assessment (ASSA) at 351-353 Barrenjoey Road, Newport NSW.

It is understood that a current development proposal for construction of a multi-storey mixed use building comprising retails on the ground level, with residential above and two basement car park levels. The site is approximately 800 m². Alliance understands that an acid sulfate soils assessment of the site is required by the client to address acid sulfate concerns for the site in relation to proposed excavation relating to the construction of the residential building.

The objectives of this project were to:

- Provide an assessment of acid sulfate soils on the site with the proposed construction footprint; and
- Provide recommendations on further assessment, management of remediation of acid sulfate soils (if identified).

The following scope of works was utilised to address the project objectives:

- A desktop review of relevant acid sulfate soils risk planning maps, previous investigation reports and other relevant information relating to the site;
- Conduct an intrusive site investigation to a maximum depth of 6 m below ground level (as nominated by the client) 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 Acid Sulfate Soils Manual 1998 (ASSMAC 1998) and the National Acid Sulfate Soil Guidance (Australian Government 2018) ASS and potential ASS risk across the project footprint.

Based on the desktop review data, fieldwork observations, and the laboratory analytical results, Alliance concludes that:

- Potential ASS were identified by preliminary laboratory analysis in thirteen (13) of the forty-eight (48) soil samples collected across the site, indicating that the soil materials which were encountered at depths between 1.5m and 6.0m bgl are potentially impacted by ASS;
- A further nine (9) soil samples were submitted for CRS analysis and returned results indicating the presence of AASS and PASS collected from boreholes BH03, indicating the presence of AASS and PASS from site surface to depths excavation across the site;
- The liming rate required for remediation of the AASS and PASS across the site is between 1.3 to 3.0 kgCaCO₃/tonne; and
- The identified potential ASS at the site are likely to be disturbed by the construction phase of the works.

Based on these conclusions, and in accordance with ASSMAC (1998), Alliance makes the following recommendations:

- An acid sulfate soils management plan (ASSMP) should be developed for the site to:

- Document the procedures and standards to be followed to manage the risks posed by potential ASS identified during construction;
- Outline the management measures to be implemented to minimise the potential for adverse environmental impacts resulting from the disturbance of ASS; and
- Manage the offsite disposal of excavated materials aligned to the NSW EPA Waste Classification Guidelines Part 1: Classifying Waste, November 2014 (NSW EPA, 2014a) and Waste Classification Guidelines Part 4: Acid Sulfate Soils (NSW EPA, 2014b).

This report, including its conclusions and recommendations, must be read in conjunction with the statement of limitations presented in **Section 7**.

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1. Introduction

1.1. Background

Alliance Geotechnical Pty Ltd (Alliance) was engaged by Atlen Construction Pty Ltd (the client) to undertake an Acid Sulfate Soils Assessment (ASSA) at 351-353 Barrenjoey Road, Newport NSW.

It is understood that a current development proposal for construction of a multi-storey mixed use building comprising retail on the ground level, with residential above and two basement car park levels. The site is approximately 800 m². Alliance understands that an acid sulfate soils assessment of the site is required by the client to address acid sulfate concerns for the site in relation to proposed excavation relating to the construction of the residential building.

1.2. Objectives

The objectives of this project were to:

- Evaluate the site with regard to presence of acid sulfate soils (ASS) associated with the proposed mixed-use multi-storey building development; and
- Provide recommendations on further assessment, management of remediation of acid sulfate soils (if identified).

1.3. Scope of Work

The following scope of works was utilised to address the project objectives:

- A desktop review of relevant acid sulfate soils risk planning maps, previous investigation reports and other relevant information relating to the site;
- Conduct an intrusive site investigation to a maximum depth of 6.0 m below ground level (as nominated by the client) 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 Acid Sulfate Soils Manual 1998 (ASSMAC 1998) and the National Acid Sulfate Soil Guidance (Australian Government 2018) ASS and potential ASS risk across the project footprint.

2. Site Setting

2.1. Site Identification

Site identification details and associated information is present in **Table 2-1**. The locality of the site is presented in **Figure 1**, with the general layout and site boundaries depicted in **Figure 2**.

Table 2-1 Site Identification Information

Site Address	351-353 Barrenjoey Road, Newport NSW
Cadastral Identification	Lot 64 in DP1090224 & Lot 65, Section 5 in DP6248
Geographical Coordinates	Central portion of site: <ul style="list-style-type: none"> ▪ 33°39'17" S ▪ 151°19'13" E (Source: Google Earth)
Site Area	800 m ² (Source: https://maps.six.nsw.gov.au/)
Zoning	B2 – Local Centre (Canada Bay Development Control Plan 2017)
Current Land Use	Residential
Proposed Land Use	Residential
Local Government Agency	Pittwater Local Environment Plan 2014

2.2. Ground Conditions and Surrounding Environment

A summary of available site and local data identifying topography, geology, soils, and hydrology is provided in **Table 2-2**.

Table 2-2 Summary of Ground Conditions and Surrounding Environment

Geology	The Department of Mineral Resources Geological Survey of NSW Sydney 1:250,000 Geological Series Sheet 9130 (Edition 3) 1966, indicated that the site is likely to be underlain by Quaternary (Qa) alluvium, gravel, sand, silt and clay.
Topography and Site Elevation	The site topography is generally flat (RL 10 mAHD) with minor slopes to the east and south-east.
Acid Sulfate Soil Risk	Review of the Department of Land and Water Conservation NSW Acid Sulfate Soil Risk Map for Mona Vale (1:25,000 scale) indicates that the site lies within an area mapped as: <ul style="list-style-type: none"> ▪ Disturbed Terrain - which may include filled areas, which often occur during reclamation of low-lying swamps for urban development. Other disturbed terrain includes areas which have been mined or dredged, or have undergone heavy ground disturbance through general urban development or construction of dams or levees. Soil investigations are required to assess these areas for acid sulfate potential.
Potential Depth of Site Filling	<2.0 m

Site Drainage	Drainage in hardstand areas is likely to be collected and discharged to the municipal stormwater system. Drainage in unsealed areas is likely to consist of direct soil infiltration and overland flow.
Nearest Surface Waterbody	Newport Beach is located approximately 300m to the east.

2.3. Hydrogeology and Groundwater

No available hydrogeological data and records of groundwater use were present for the site.

3. Desktop Assessment

Observations compiled during the site inspection, and via aerial photography interpretation, were compared against various geomorphic and site characteristics outlined in Stone et al (1998) indicating likely ASS occurrence. A comparison of site specific and geomorphic features with those indicative of potential ASS presence are presented in **Table 3-1**.

Table 3-1 ASS Desktop Assessment

Characteristic	Feature	Comment
Sediment Characteristics	Sediments of recent geological age (Holocene)	Yes Expected to underlie modern fill soils
	Marine or estuarine sediments	Yes Expected to underlie modern fill soils
	Areas identified in geological descriptions or in maps as bearing sulfide minerals, coal deposits or former marine shales/sediments	No
	Deep estuarine sediments greater than 10 m below ground surface (Holocene or Pleistocene age).	Unknown
Landscape Characteristics	Presence of ASS risk classes 1 to 5	Class 2
	Soil horizons less than 5 mAHD	No
	Waterlogged or scalded areas	Not identified
	Tidal lakes, coastal wetlands, or back swamp areas	No
	Interdune swales or coastal sand dunes	Not identified
Vegetation Characteristics	Areas where dominant vegetation is mangroves, reeds, rushes and other vegetation associated with areas of shallow watertables such as paperbarks (<i>Melaleuca spp.</i>) and casuarinas (<i>Casuarina spp.</i>), and some <i>Eucalytus spp.</i>	No

Based on the review of ASS characteristics features relating to the site, a number of indicators of ASS were identified that indicate potentially ASS presence onsite.

4. Acid Sulfate Soils Assessment

The criteria in Table 2.3 and Section 4 of the *Acid Sulfate Soils Manual 1998* (ASSMAC 1998) was adopted for making a preliminary assessment of whether acid sulfate soils may be present on the site, and for the purposes of selecting potential samples for chromium reducible sulfur analysis.

The action-based criteria set out in Table 4.4 of the Assessment Guidelines in *Acid Sulfate Soils Manual 1998* (ASSMAC 1998) was then adopted for the assessing the need for an acid sulfate soils management plan (ASSMP).

4.1. Sampling and Analytical Plan

Table 4.1 of the Assessment Guidelines in *Acid Sulfate Soils Manual 1998* (ASSMAC 1998), proposes a minimum of four sampling points on sites up to 10,000 m² in size. Given the approximate size of the construction footprint (800 m²), Alliance consider a judgemental frequency of four (4) borehole locations is consistent with the criteria outlined in Table 4.1 of the Assessment Guidelines in *Acid Sulfate Soils Manual 1998* (ASSMAC 1998).

Soil samples will be collected at approximate 0.5 m intervals to a maximum depth of 6.0m below ground level (bgl). Alliance understands that the proposed excavation depth is no more than 5.0m bgl.

Soil samples will be subject to preliminary screening for acid sulfate soils (pH_f and pH_{ox} analysis). A selection of samples will then be submitted for field peroxide testing and chromium reducible sulfur 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* (ASSMAC 1998) will be adopted for selecting potential samples for chromium reducible sulfur analysis.

4.2. Fieldwork

4.2.1. Soil Sampling

Soil sampling was undertaken by Alliance on the 17 January 2022.

A total of four (4) sample locations were drilled across the site using ute mounted drill rig equipment fitted with augers. Samples for potential analysis were collected at 0.5 m intervals within the soil profile. The location of each borehole (BH01 to BH04) is presented in **Figure 3**. Soil samples were collected at approximate 0.5m intervals. A total of forty-four (44) soil samples were collected as part of this project.

Each soil sample was placed in a leak proof plastic bag and wrapped tightly with duct tape to minimise contact with air and avoid moisture loss from the sample. The samples were then placed in an insulated container with ice, and transported immediately (following fieldwork) to the analytical laboratory under chain of custody protocols.

4.2.2. Site Geology

The soil types encountered during drilling work were logged with observations relating to acid sulfate soils (jarosite, mottling, sulfur odour etc) also recorded, if applicable.

Observations were made of soils encountered during sampling work. These observations were recorded on borehole logs. A copy of these logs is presented in **Borehole Logs, Appendix A**.

Inferred natural material was encountered at all borehole locations.

4.3. Laboratory Analysis

The samples collected were transported to the analytical laboratory (Eurofins | Mgt), using chain of custody (COC) protocols. The soil samples were scheduled for analysis for field screening of acid sulfate soils at the laboratory.

Laboratory analytical results are summarised within this report and the analytical laboratory certificates of analysis are presented in **Appendix B**.

5. Results and Site Characterisation

5.1. Soil Observations

The subsurface conditions encountered during the borehole drilling were observed to generally comprise:

- 0.0–0.5 m bgl – (FILL) Sandy CLAY, firm, brown, moist;
- 0.5– 4.5 m bgl – (NAT) Sandy CLAY, very stiff, pale brown/red, moist;
- 4.5– 6.0 m bgl – (NAT) Sandy CLAY / CLAY, grey, very wet / saturated; and

During sample collection, visual indicators of actual acid sulfate soils (AASS) (i.e. soils containing pale yellow deposits / coatings of jarosite) were not observed. Indicators of potential acid sulfate soils (PASS), including shell fragments and waterlogged sands, were not observed in soils examined.

5.2. Field Peroxide Testing

Forty-eight (48) soil samples were subjected to preliminary field screen assessment at the laboratory to assess the likelihood for acid sulfate soils. This preliminary assessment is comprised of

- (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.

The forty-eight (48) soil samples were analysed for pHf to determine if the pH was less than the preliminary 'actual acid sulfate soil' screening criterion of $\text{pH} < 4$. All samples analysed reported pHf values greater than $\text{pH} 5.0$. These findings indicate that actual acid sulfate soils (AASS) are unlikely to be present in soils onsite between the surface and 6.0 m below ground level (bgl).

The soil samples were then subjected to hydrogen peroxide oxidation by the laboratory with the pH of the oxidised soil (pHfox) measured. All samples analysed reported a pHfox result greater than the preliminary screening criterion of $\text{pH} < 3.5$. A total of three (3) soil samples reported an extreme reaction to the addition of hydrogen peroxide. Thirteen (13) samples analysed returned a pH difference between pHf and pHfox values greater than 1.0. The results indicated potential acid sulfate soils (PASS) are likely to be present on the site between surface and 6.0 m bgl at the entire site.

5.3. Chromium Reducible Sulfur

A total of nine (9) soil samples were subjected to chromium reducible sulfur suite laboratory analysis.

The chromium reducible sulfur laboratory analytical results were compared with the action criteria adopted that would trigger a need for an acid sulfate soils management plan (ASSMP). Although the final design is yet to be finalised, for the purpose of selecting site specific action criteria, as per Table 4.4 of ASSMAC 1998, Alliance has assumed that the soil type present on site is '*sandy loams to light clay*' and that more than 1,000 tonnes of soil would be disturbed as part of the proposed works.

The sulfur trail and acid trail analytical results for the soil samples analysed did not trigger the adopted action criteria (0.03 % S oxidisable and 18 mol H^+ / tonne, respectively), with the exception of soil samples BH03-4.0 & BH03-6.0 recorded sulfur trail of 0.06 % S & 0.04 % S oxidisable and acid trail 40 mol H^+ / tonne & 22 mol H^+ / tonne, which exceed the action criteria adopted.

The laboratory results are summarised in the table below and laboratory documentation is attached in **Appendix B**.

The following soil samples exceeded the adopted action criteria, triggering the requirement for treatment:

Sample ID/Depth (m)	Net Acidity – Acidity Units (mol H ⁺ /tonne)	Net Acidity – Sulfur Units (%S)	Liming Rate (Kg CaCO ₃ /T)
BH03-4.0	40	0.06	3
BH03-6.0	22	0.04	1.7

6. Conclusions and Recommendations

Based on the desktop review data, fieldwork observations, and the laboratory analytical results, Alliance concludes that:

- Potential ASS were identified by preliminary laboratory analysis in thirteen (13) of the forty-eight (48) soil samples collected across the site, indicating that the soil materials which were encountered at depths between 1.5m and 6.0m bgl are potentially impacted by ASS;
- A further nine (9) soil samples were submitted for CRS analysis and returned results indicating the presence of AASS and PASS collected from boreholes BH03, indicating the presence of AASS and PASS from site surface to depths excavation across the site;
- The liming rate required for remediation of the AASS and PASS across the site is between 1.3 to 3.0 kgCaCO₃/tonne; and
- The identified potential ASS at the site are likely to be disturbed by the construction phase of the works.

Based on these conclusions, and in accordance with ASSMAC (1998), Alliance makes the following recommendations:

- An acid sulfate soils management plan (ASSMP) should be developed for the site to:
 - Document the procedures and standards to be followed to manage the risks posed by potential ASS identified during construction;
 - Outline the management measures to be implemented to minimise the potential for adverse environmental impacts resulting from the disturbance of ASS; and
 - Manage the offsite disposal of excavated materials aligned to the NSW EPA Waste Classification Guidelines Part 1: Classifying Waste, November 2014 (NSW EPA, 2014a) and Waste Classification Guidelines Part 4: Acid Sulfate Soils (NSW EPA, 2014b).

This report, including its conclusions and recommendations, must be read in conjunction with the statement of limitations presented in **Section 7**.

7. 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 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's engagement. The report must not be used for any purpose other than the purpose specified at the time Alliance was engaged to prepare the report.

Logs, figures, and drawings are generated for this report based on individual Alliance 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 reserves the right to review and amend this report.

8. References

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

DLWC 1997, Acid Sulfate Soil Risk Mapping Series

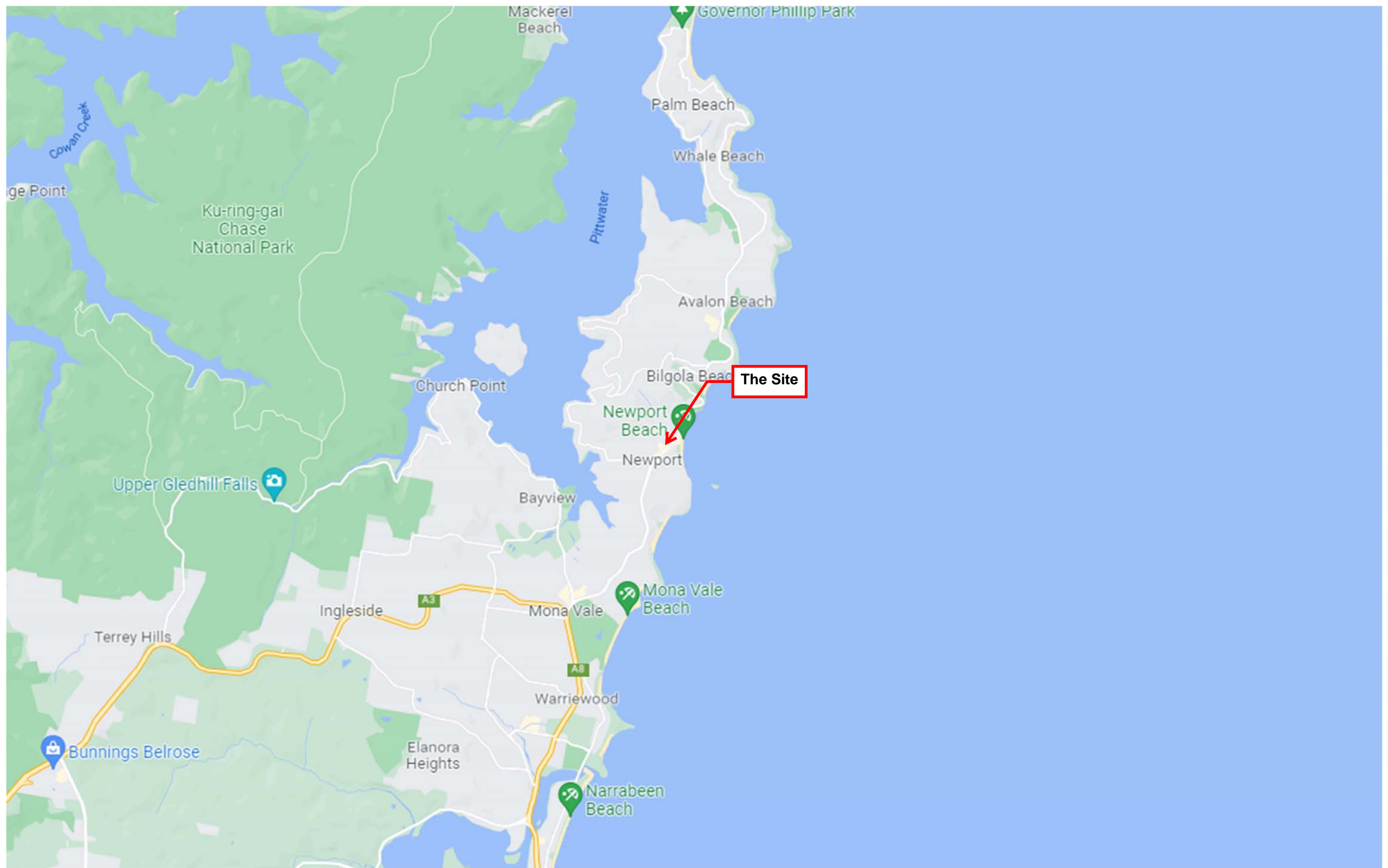
Sullivan 2018, Sullivan L, Ward N, Toppler N and Lancaster G, 2018 '*National Acid Sulfate Soils Guidance: National acid sulfate identification and laboratory methods manual*' Department of Agriculture and Water Resources, Canberra ACT

9. Abbreviations



ABC	Ambient Background Concentration
ACL	Added Contaminant Limit
ACM	Asbestos Containing Material
AEC	Areas of Environmental Concern
AF	Asbestos Fines
AS	Australian Standard
ASS	Acid Sulfate Soils
B(α)P	Benzo(α)pyrene
BTEXN	Benzene, Toluene, Ethylbenzene, Xylene, Naphthalene
CEC	Cation Exchange Capacity
COC	Chain of Custody
COPC	Contaminants of Potential Concern
CSM	Conceptual Site Model
CRC CARE	Cooperative Research Centre for Contamination Assessment and Remediation of the Environment
DA	Development Application
DCP	Development Control Plan
DNAPL	Dense Non-aqueous Phase Liquid
DO	Dissolved Oxygen
DP	Deposited Plan
DQI	Data Quality Indicators
DQO	Data Quality Objectives
DSI	Detailed Site Investigation
EIL	Ecological Investigation Level
ESL	Ecological Screening Level
F1	TRH C ₆ -C ₁₀
F2	TRH >C ₁₀ -C ₁₆
F3	TRH >C ₁₆ -C ₃₄
F4	TRH >C ₃₄ -C ₄₀
FA	Friable Asbestos
HIL	Health Investigation Levels
HSL	Health Screening Levels
LEP	Local Environmental Plan

LOR	Limit of Reporting
mAHD	Metres Australian Height Datum
mBGL	Metres Below Ground Level
µg/L	Micrograms per litre
mg/kg	Milligrams per kilogram
mg/L	Milligrams per litre
NATA	National Association of Testing Authorities
NEMP	National Environmental Management Plan
NEPC	National Environmental Protection Council
NEPM	National Environmental Protection Measure
NL	Not Limiting
NSW DEC	New South Wales Department of Environment and Conservation
NSW OEH	New South Wales Office of Environment and Heritage
NSW EPA	New South Wales Environmental Protection Authority
OCP	Organochlorine Pesticides
OPP	Organophosphorus Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PFAS	Polyfluorinated Alkyl Sulfonate
ppm	Parts per million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance / Quality Control
RAP	Remedial Action Plan
SAQP	Sampling, Analysis, and Quality Plan
SEPP	State Environmental Protection Plan
SRA	Sample Receipt Advice
TEQ	Toxicity Equivalent Quotient
TPH	Total Petroleum Hydrocarbon
TRH	Total Recoverable Hydrocarbons
UCL	Upper Confidence Limit
VOC	Volatile Organic Compounds
WA DOH	Western Australian Department of Health

FIGURES




Site Locality

	Client Name:	Atlen Construction Pty Ltd	Figure Number:	1	
	Project Name:	Acid Sulfate Soils Assessment	Figure Date:	12 January 2022	
	Project Location:	351-353 Barrenjoey Road, Newport	Report Number:	14429-ER-1-1	



Site Boundary & Proposed Borehole Location (for service locator to clear-additional BH's marked)

	Client Name:	Atlen Construction Pty Ltd	Figure Number:	2	
	Project Name:	Acid Sulfate Soils Assessment	Figure Date:	12 January 2022	
	Project Location:	351-353 Barrenjoey Road, Newport	Report Number:	14429-ER-1-1	

TABLES

Table 2
351-353 Barrenjoey Rd, Newport
Acid Sulfate Soils Results

14429		Sample ID		Sample ID																																			
Analyte		Units	POL	ASSMAC (1998)	DATASET MINIMUM	DATASET MAXIMUM	DATASET MAXIMUM	SZ2-JA13948	SZ2-JA13949	SZ2-JA13950	SZ2-JA13951	SZ2-JA13952	SZ2-JA13953	SZ2-JA13954	SZ2-JA13955	SZ2-JA13956	SZ2-JA13957	SZ2-JA13958	SZ2-JA13959	SZ2-JA13960	SZ2-JA13961	SZ2-JA13962	SZ2-JA13963	SZ2-JA13964	SZ2-JA13965	SZ2-JA13966	SZ2-JA13967	SZ2-JA13968	SZ2-JA13969	SZ2-JA13970	SZ2-JA13971	SZ2-JA13972	SZ2-JA13973	SZ2-JA13974	SZ2-JA13975	SZ2-JA13976	SZ2-JA13977		
Field Screen	pH	pH Units	0	NA	6.4	5.0	8.6	8.0	7.6	7.3	7.1	5.4	5.2	5.0	5.2	5.1	5.4	5.4	5.3	6.6	7.1	7.0	7.4	7.0	7.1	6.8	7.1	6.9	6.4	6.2	6.5	8.6	7.5	7.2	6.6	5.9	5.9		
	pHmin	pH Units	0	15.1	5.3	4.2	7.2	5.8	6.3	6.3	5.8	4.5	4.3	4.3	4.2	4.2	4.5	4.5	4.5	6.2	6.1	6.7	6.8	6.1	6.6	5.5	6.2	6.3	5.5	5.4	5.6	6.7	5.9	5.9	5.6	4.5	4.8		
	Difference between pHmin & pHmax	pH Units	0	1	9.8	4	2.2	0.2	0.3	0.5	0.5	0.7	1.0	0.5	0.5	0.5	0.5	0.5	0.5	0.4	1.0	0.3	0.6	0.9	0.5	0.3	0.9	0.6	0.9	0.5	0.3	0.9	0.6	0.9	0.5	0.3	0.9	0.6	0.9
	Reaction Rating	pH Units	0	NA	2.2	2	4	4	1	1	1	1	1	1	1	1	1	1	1	1	4	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Chromium Reducible	CRS Suite - Net Acidity (Sulphur Units)	% S	0.02	> 0.02	-	< 0.02	0.06	< 0.02	-	-	-	< 0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.02	-	-	-	-	-	< 0.02	-	0.03	-	-	
	CRS Suite - Net Acidity (Acidity Units)	mg/kg	20	> 18	-	< 18	40	< 18	-	-	-	< 18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 18	-	-	-	-	-	< 18	-	17	-	-
	Leaching Rate	kg CaCO3/T	1.0	-	< 1	3	< 1	-	-	-	-	< 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* = No currently available criterion
- = No sample analysed

Table 2
351-353 Barrenjoey Rd, Newport
Acid Sulfate Soils Results

















					Reference		BH03.3.5	BH03.4.0	BH03.4.5	BH03.5.0	BH03.5.5	BH03.6.0	BH04.0.5	BH04.1.0	BH04.1.5	BH04.2.0	BH04.2.5	BH04.3.0	BH04.3.5	BH04.4.0	BH04.4.5	BH04.5.0	BH04.5.5	BH04.6.0
14429					Sample ID		S22-Ja13978	S22-Ja13979	S22-Ja13980	S22-Ja13981	S22-Ja13982	S22-Ja13983	S22-Ja13984	S22-Ja13985	S22-Ja13986	S22-Ja13987	S22-Ja13988	S22-Ja13989	S22-Ja13990	S22-Ja13991	S22-Ja13992	S22-Ja13993	S22-Ja13994	S22-Ja13995
Group	Analyte	Units	POL	ASSMAC (1998)	DATASET MINIMUM	DATASET MAXIMUM	DATASET MINIMUM	DATASET MAXIMUM	DATASET MINIMUM	DATASET MAXIMUM	DATASET MINIMUM	DATASET MAXIMUM	DATASET MINIMUM	DATASET MAXIMUM	DATASET MINIMUM	DATASET MAXIMUM	DATASET MINIMUM	DATASET MAXIMUM	DATASET MINIMUM	DATASET MAXIMUM	DATASET MINIMUM	DATASET MAXIMUM	DATASET MINIMUM	DATASET MAXIMUM
Field Screen	pH	pH Units	0	NA	6.4	9.0	6.6	9.3	6.2	9.2	6.4	9.4	6.6	9.2	7.0	6.9	6.8	6.6	6.1	6.3	7.4	6.4	6.6	6.3
	pHlow	pH Units	0	15.1	5.5	4.2	7.2	4.2	4.2	4.3	4.6	4.6	4.3	6.7	5.9	5.9	6.1	5.9	5.7	5.3	7.2	5.3	5.8	6.3
	Difference between pHlow & pHlow	pH Units	0	1	9.5	4	2.2	1.1	1.0	0.5	0.5	0.5	1.1	0.5	1.1	1.0	0.7	0.7	0.4	1.0	0.7	1.1	0.5	0.5
	Reaction Buffering	pH Units	0	NA	2.2	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Chromium Reducible	CPS Sulfate - Net Acidity (Sulphur Units)	% S	0.02	> 0.03	-	< 0.02	0.06	-	-	0.06	-	-	-	0.04	-	< 0.02	-	-	-	-	-	0.03	-	-
	CPS Sulfate - Net Acidity (Sulphur Units)	mg/kg	20	> 150	-	< 20	40	-	-	40	-	-	-	20	-	< 20	-	-	-	-	-	20	-	-
	Leaching Rate	kg CaCO ₃ /t	1.0	-	< 1	3	-	-	3	-	-	-	-	1.5	-	< 1	-	-	-	-	-	1.4	-	-

* = No currently available criterion
- = No sample analysed

APPENDIX A

BOREHOLE LOGS

Test Pit Log

Client: Alten Construction Pty Ltd						Started: 17/01/2022				
Project: Acid Sulfate Soils Assessment						Finished: 17/01/2022				
Location: 351-353 Barrenjoey Road, Newport NSW						Hole Location: Refer to Figure 2		Test Pit Size: 0.1 m		
Rig Type: Solid Flight Auger			Hole Coordinates E, N			Driller:		Logged: JW		
RL Surface: m			Contractor: Alliance			Bearing: ---		Checked: MA		
Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
CC						CONCRETE				Visual indicators of acid sulfate soils (i.e. soils containing pale yellow deposits / coatings of jarosite, shell fragments and waterlogged sands) were not observed. Visual indicators of acid sulfate soils (i.e. soils containing pale yellow deposits / coatings of jarosite, shell fragments and waterlogged sands) were not observed. Visual indicators of acid sulfate soils (i.e. soils containing pale yellow deposits / coatings of jarosite, shell fragments and waterlogged sands) were not observed.
SFA						FILL: Sandy CLAY with trace gravels, brown, stiff, moist.				
					CLS	Sandy CLAY, orange, stiff, moist.	 0.5m			
			1				 1.0m			
							 1.5m			
					SW-SC	Clayey SAND, grey, loose, moist to wet with depth.				
			2				 2.0m			
							 2.5m			
			3				 3.0m			
							 3.5m			
			4				 4.0m			
							 4.5m			
			5				 5.0m			
							 5.5m			
			6			Test Pit BH01 terminated at 6m	 6.0m			
			7							

Test Pit Log

Client: Alten Construction Pty Ltd										Started: 17/01/2022									
Project: Acid Sulfate Soils Assessment										Finished: 17/01/2022									
Location: 351-353 Barrenjoey Road, Newport NSW										Hole Location: Refer to Figure 2									
Rig Type: Solid Flight Auger										Hole Coordinates: E, N									
RL Surface: m										Contractor: Alliance									
Driller:										Logged: JW									
Bearing: ---										Checked: MA									

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
CC						CONCRETE				
SFA						FILL: Sandy CLAY with trace gravels, brown, stiff, moist.				Visual indicators of acid sulfate soils (i.e. soils containing pale yellow deposits / coatings of jarosite, shell fragments and waterlogged sands) were not observed.
			1		CLS	Sandy CLAY, orange, stiff, moist.	0.5m			
			2				1.0m			
							1.5m			Visual indicators of acid sulfate soils (i.e. soils containing pale yellow deposits / coatings of jarosite, shell fragments and waterlogged sands) were not observed.
							2.0m			
							2.5m			
			3		SW-SC	Clayey SAND, grey, loose, moist to wet with depth.	3.0m			Visual indicators of acid sulfate soils (i.e. soils containing pale yellow deposits / coatings of jarosite, shell fragments) were not observed, with the exception of waterlogged soils at depth.
							3.5m			
							4.0m			
			4				4.5m			
							5.0m			
							5.5m			
			5				6.0m			
			6			Test Pit BH02 terminated at 6m				
			7							

Test Pit Log

Client: Alten Construction Pty Ltd						Started: 17/01/2022		
Project: Acid Sulfate Soils Assessment						Finished: 17/01/2022		
Location: 351-353 Barrenjoey Road, Newport NSW						Hole Location: Refer to Figure 2		
Test Pit Size: 0.1 m								
Rig Type: Solid Flight Auger			Hole Coordinates E, N			Driller:		Logged: JW
RL Surface: m			Contractor: Alliance			Bearing: ---		Checked: MA

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
SFA						FILL: Sandy CLAY, dark brown, soft, moist.				Visual indicators of acid sulfate soils (i.e. soils containing pale yellow deposits / coatings of jarosite, shell fragments and waterlogged sands) were not observed.
			1				0.5m			
							1.0m			
							1.5m			
			2		CLS	Sandy CLAY, brown/orange becoming grey with depth, very stiff, moist.				Visual indicators of acid sulfate soils (i.e. soils containing pale yellow deposits / coatings of jarosite, shell fragments and waterlogged sands) were not observed.
							2.0m			
							2.5m			
			3				3.0m			
							3.5m			
			4				4.0m			
							4.5m			
			5				5.0m			
							5.5m			
			6			Test Pit BH03 terminated at 6m	6.0m			
			7							

Test Pit Log

Client: Alten Construction Pty Ltd						Started: 17/01/2022		
Project: Acid Sulfate Soils Assessment						Finished: 17/01/2022		
Location: 351-353 Barrenjoey Road, Newport NSW				Hole Location: Refer to Figure 2		Test Pit Size: 0.1 m		
Rig Type: Solid Flight Auger			Hole Coordinates E, N			Driller:		Logged: JW
RL Surface: m			Contractor: Alliance			Bearing: ---		Checked: MA

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition Consistency/Density Index	Additional Observations
SFA						FILL: Sandy CLAY, dark brown, soft, moist.			<p>Visual indicators of acid sulfate soils (i.e. soils containing pale yellow deposits / coatings of jarosite, shell fragments and waterlogged sands) were not observed.</p> <p>Visual indicators of acid sulfate soils (i.e. soils containing pale yellow deposits / coatings of jarosite, shell fragments and waterlogged sands) were not observed.</p>
					CLS	Sandy CLAY, brown/orange becoming grey with depth, very stiff, moist.	0.5m		
			1				1.0m		
							1.5m		
			2				2.0m		
							2.5m		
			3				3.0m		
							3.5m		
			4				4.0m		
							4.5m		
			5				5.0m		
							5.5m		
			6			Test Pit BH04 terminated at 6m	6.0m		
			7						

APPENDIX B

SITE PHOTOGRAPHS



Image 1 View of borehole BH02



Image 2 View of soil from BH04



Image 3 View of retrieved soils from borehole BH04 (left) & BH01 (right).

APPENDIX C

LABORATORY CERTIFICATE

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

Project Name: NEWPORT ASSA
Project ID: 14429

Order No.:
Report #: 855906
Phone: 1800 288 188
Fax: 02 9675 1888

Received: Jan 17, 2022 6:00 PM
Due: Jan 18, 2022
Priority: 1 Day
Contact Name: Mehran Asadabadi

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						X
Brisbane Laboratory - NATA # 1261 Site # 20794						
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	BH01-0.5	Jan 17, 2022		Soil	S22-Ja13948	X
2	BH01-1.0	Jan 17, 2022		Soil	S22-Ja13949	X
3	BH01-1.5	Jan 17, 2022		Soil	S22-Ja13950	X
4	BH01-2.0	Jan 17, 2022		Soil	S22-Ja13951	X
5	BH01-2.5	Jan 17, 2022		Soil	S22-Ja13952	X
6	BH01-3.0	Jan 17, 2022		Soil	S22-Ja13953	X
7	BH01-3.5	Jan 17, 2022		Soil	S22-Ja13954	X
8	BH01-4.0	Jan 17, 2022		Soil	S22-Ja13955	X
9	BH01-4.5	Jan 17, 2022		Soil	S22-Ja13956	X



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Brisbane
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NATA # 1261 Site # 20794

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Sydney Laboratory - NATA # 1261 Site # 18217

Brisbane Laboratory - NATA # 1261 Site # 20794

Mayfield Laboratory - NATA # 1261 Site # 25079

Perth Laboratory - NATA # 2377 Site # 2370

External Laboratory

10	BH01-5.0	Jan 17, 2022		Soil	S22-Ja13957	X
11	BH01-5.5	Jan 17, 2022		Soil	S22-Ja13958	X
12	BH01-6.0	Jan 17, 2022		Soil	S22-Ja13959	X
13	BH02-0.5	Jan 17, 2022		Soil	S22-Ja13960	X
14	BH02-1.0	Jan 17, 2022		Soil	S22-Ja13961	X
15	BH02-1.5	Jan 17, 2022		Soil	S22-Ja13962	X
16	BH02-2.0	Jan 17, 2022		Soil	S22-Ja13963	X
17	BH02-2.5	Jan 17, 2022		Soil	S22-Ja13964	X
18	BH02-3.0	Jan 17, 2022		Soil	S22-Ja13965	X
19	BH02-3.5	Jan 17, 2022		Soil	S22-Ja13966	X
20	BH02-4.0	Jan 17, 2022		Soil	S22-Ja13967	X



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Sample Detail

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Brisbane Laboratory - NATA # 1261 Site # 20794

Mayfield Laboratory - NATA # 1261 Site # 25079

Perth Laboratory - NATA # 2377 Site # 2370

External Laboratory

21	BH02-4.5	Jan 17, 2022		Soil	S22-Ja13968	X
22	BH02-5.0	Jan 17, 2022		Soil	S22-Ja13969	X
23	BH02-5.5	Jan 17, 2022		Soil	S22-Ja13970	X
24	BH02-6.0	Jan 17, 2022		Soil	S22-Ja13971	X
25	BH03-0.5	Jan 17, 2022		Soil	S22-Ja13972	X
26	BH03-1.0	Jan 17, 2022		Soil	S22-Ja13973	X
27	BH03-1.5	Jan 17, 2022		Soil	S22-Ja13974	X
28	BH03-2.0	Jan 17, 2022		Soil	S22-Ja13975	X
29	BH03-2.5	Jan 17, 2022		Soil	S22-Ja13976	X
30	BH03-3.0	Jan 17, 2022		Soil	S22-Ja13977	X
31	BH03-3.5	Jan 17, 2022		Soil	S22-Ja13978	X



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Sample Detail

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Brisbane Laboratory - NATA # 1261 Site # 20794

Mayfield Laboratory - NATA # 1261 Site # 25079

Perth Laboratory - NATA # 2377 Site # 2370

External Laboratory

32	BH03-4.0	Jan 17, 2022		Soil	S22-Ja13979	X
33	BH03-4.5	Jan 17, 2022		Soil	S22-Ja13980	X
34	BH03-5.0	Jan 17, 2022		Soil	S22-Ja13981	X
35	BH03-5.5	Jan 17, 2022		Soil	S22-Ja13982	X
36	BH03-6.0	Jan 17, 2022		Soil	S22-Ja13983	X
37	BH04-0.5	Jan 17, 2022		Soil	S22-Ja13984	X
38	BH04-1.0	Jan 17, 2022		Soil	S22-Ja13985	X
39	BH04-1.5	Jan 17, 2022		Soil	S22-Ja13986	X
40	BH04-2.0	Jan 17, 2022		Soil	S22-Ja13987	X
41	BH04-2.5	Jan 17, 2022		Soil	S22-Ja13988	X
42	BH04-3.0	Jan 17, 2022		Soil	S22-Ja13989	X



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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

Mayfield Laboratory - NATA # 1261 Site # 25079

Perth Laboratory - NATA # 2377 Site # 2370

External Laboratory

43	BH04-3.5	Jan 17, 2022		Soil	S22-Ja13990	X
44	BH04-4.0	Jan 17, 2022		Soil	S22-Ja13991	X
45	BH04-4.5	Jan 17, 2022		Soil	S22-Ja13992	X
46	BH04-5.0	Jan 17, 2022		Soil	S22-Ja13993	X
47	BH04-5.5	Jan 17, 2022		Soil	S22-Ja13994	X
48	BH04-6.0	Jan 17, 2022		Soil	S22-Ja13995	X

Test Counts

48

[illegible]

Alliance Geotechnical
10 Welder Road
Seven Hills
NSW 2147



NATA Accredited
Accreditation Number 1261
Site Number 18217

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: **Mehran Asadabadi**

Report **855906-S**
Project name **NEWPORT ASSA**
Project ID **14429**
Received Date **Jan 17, 2022**

Client Sample ID			BH01-0.5	BH01-1.0	BH01-1.5	BH01-2.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ja13948	S22-Ja13949	S22-Ja13950	S22-Ja13951
Date Sampled			Jan 17, 2022	Jan 17, 2022	Jan 17, 2022	Jan 17, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	8.0	7.6	7.3	7.1
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	5.8	6.3	6.3	5.8
Reaction Ratings* ^{S05}	0	-	4.0	1.0	1.0	1.0

Client Sample ID			BH01-2.5	BH01-3.0	BH01-3.5	BH01-4.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ja13952	S22-Ja13953	S22-Ja13954	S22-Ja13955
Date Sampled			Jan 17, 2022	Jan 17, 2022	Jan 17, 2022	Jan 17, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.4	5.2	5.0	5.2
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.5	4.3	4.3	4.2
Reaction Ratings* ^{S05}	0	-	1.0	1.0	1.0	1.0

Client Sample ID			BH01-4.5	BH01-5.0	BH01-5.5	BH01-6.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ja13956	S22-Ja13957	S22-Ja13958	S22-Ja13959
Date Sampled			Jan 17, 2022	Jan 17, 2022	Jan 17, 2022	Jan 17, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.1	5.4	5.4	5.3
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.2	4.5	4.5	4.5
Reaction Ratings* ^{S05}	0	-	1.0	1.0	1.0	1.0

Client Sample ID			BH02-0.5	BH02-1.0	BH02-1.5	BH02-2.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ja13960	S22-Ja13961	S22-Ja13962	S22-Ja13963
Date Sampled			Jan 17, 2022	Jan 17, 2022	Jan 17, 2022	Jan 17, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.6	7.1	7.0	7.4
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	6.2	6.1	6.7	6.8
Reaction Ratings* ^{S05}	0	-	4.0	4.0	1.0	1.0

Client Sample ID			BH02-2.5	BH02-3.0	BH02-3.5	BH02-4.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ja13964	S22-Ja13965	S22-Ja13966	S22-Ja13967
Date Sampled			Jan 17, 2022	Jan 17, 2022	Jan 17, 2022	Jan 17, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	7.0	7.1	6.8	7.1
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	6.1	6.6	5.5	6.2
Reaction Ratings* ^{S05}	0	-	1.0	1.0	1.0	1.0

Client Sample ID			BH02-4.5	BH02-5.0	BH02-5.5	BH02-6.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ja13968	S22-Ja13969	S22-Ja13970	S22-Ja13971
Date Sampled			Jan 17, 2022	Jan 17, 2022	Jan 17, 2022	Jan 17, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.9	6.4	6.2	6.5
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	6.3	5.5	5.4	5.6
Reaction Ratings* ^{S05}	0	-	1.0	1.0	1.0	1.0

Client Sample ID			BH03-0.5	BH03-1.0	BH03-1.5	BH03-2.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ja13972	S22-Ja13973	S22-Ja13974	S22-Ja13975
Date Sampled			Jan 17, 2022	Jan 17, 2022	Jan 17, 2022	Jan 17, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	8.6	7.5	7.2	6.6
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	6.7	5.9	5.9	5.6
Reaction Ratings* ^{S05}	0	-	3.0	1.0	1.0	1.0

Client Sample ID			BH03-2.5	BH03-3.0	BH03-3.5	BH03-4.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ja13976	S22-Ja13977	S22-Ja13978	S22-Ja13979
Date Sampled			Jan 17, 2022	Jan 17, 2022	Jan 17, 2022	Jan 17, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.9	5.9	5.3	5.2
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.5	4.8	4.2	4.2
Reaction Ratings* ^{S05}	0	-	1.0	1.0	1.0	1.0

Client Sample ID			BH03-4.5	BH03-5.0	BH03-5.5	BH03-6.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ja13980	S22-Ja13981	S22-Ja13982	S22-Ja13983
Date Sampled			Jan 17, 2022	Jan 17, 2022	Jan 17, 2022	Jan 17, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	5.2	5.4	5.4	5.6
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	4.3	4.6	4.6	4.5
Reaction Ratings* ^{S05}	0	-	1.0	1.0	1.0	1.0

Client Sample ID			BH04-0.5	BH04-1.0	BH04-1.5	BH04-2.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ja13984	S22-Ja13985	S22-Ja13986	S22-Ja13987
Date Sampled			Jan 17, 2022	Jan 17, 2022	Jan 17, 2022	Jan 17, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	7.2	7.0	6.9	6.8
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	6.7	5.9	5.9	6.1
Reaction Ratings* ^{S05}	0	-	1.0	1.0	1.0	1.0

Client Sample ID			BH04-2.5	BH04-3.0	BH04-3.5	BH04-4.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ja13988	S22-Ja13989	S22-Ja13990	S22-Ja13991
Date Sampled			Jan 17, 2022	Jan 17, 2022	Jan 17, 2022	Jan 17, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.6	6.1	6.3	7.4
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	5.9	5.7	5.3	7.2
Reaction Ratings* ^{S05}	0	-	1.0	1.0	1.0	1.0

Client Sample ID			BH04-4.5	BH04-5.0	BH04-5.5	BH04-6.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S22-Ja13992	S22-Ja13993	S22-Ja13994	S22-Ja13995
Date Sampled			Jan 17, 2022	Jan 17, 2022	Jan 17, 2022	Jan 17, 2022
Test/Reference	LOR	Unit				
Acid Sulfate Soils Field pH Test						
pH-F (Field pH test)*	0.1	pH Units	6.4	6.6	6.5	6.3
pH-FOX (Field pH Peroxide test)*	0.1	pH Units	5.3	5.8	6.0	6.3
Reaction Ratings* ^{S05}	0	-	1.0	1.0	1.0	1.0

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

Acid Sulfate Soils Field pH Test

Testing Site

Sydney

Extracted

Jan 18, 2022

Holding Time

7 Days

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

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

Project Name: NEWPORT ASSA
Project ID: 14429

Order No.:
Report #: 855906
Phone: 1800 288 188
Fax: 02 9675 1888

Received: Jan 17, 2022 6:00 PM
Due: Jan 18, 2022
Priority: 1 Day
Contact Name: Mehran Asadabadi

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						X
Brisbane Laboratory - NATA # 1261 Site # 20794						
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	BH01-0.5	Jan 17, 2022		Soil	S22-Ja13948	X
2	BH01-1.0	Jan 17, 2022		Soil	S22-Ja13949	X
3	BH01-1.5	Jan 17, 2022		Soil	S22-Ja13950	X
4	BH01-2.0	Jan 17, 2022		Soil	S22-Ja13951	X
5	BH01-2.5	Jan 17, 2022		Soil	S22-Ja13952	X
6	BH01-3.0	Jan 17, 2022		Soil	S22-Ja13953	X
7	BH01-3.5	Jan 17, 2022		Soil	S22-Ja13954	X
8	BH01-4.0	Jan 17, 2022		Soil	S22-Ja13955	X
9	BH01-4.5	Jan 17, 2022		Soil	S22-Ja13956	X

Company Name: Alliance Geotechnical
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Contact Name: Mehran Asadabadi

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						X
Brisbane Laboratory - NATA # 1261 Site # 20794						
Mayfield Laboratory - NATA # 1261 Site # 25079						
Perth Laboratory - NATA # 2377 Site # 2370						
External Laboratory						
10	BH01-5.0	Jan 17, 2022		Soil	S22-Ja13957	X
11	BH01-5.5	Jan 17, 2022		Soil	S22-Ja13958	X
12	BH01-6.0	Jan 17, 2022		Soil	S22-Ja13959	X
13	BH02-0.5	Jan 17, 2022		Soil	S22-Ja13960	X
14	BH02-1.0	Jan 17, 2022		Soil	S22-Ja13961	X
15	BH02-1.5	Jan 17, 2022		Soil	S22-Ja13962	X
16	BH02-2.0	Jan 17, 2022		Soil	S22-Ja13963	X
17	BH02-2.5	Jan 17, 2022		Soil	S22-Ja13964	X
18	BH02-3.0	Jan 17, 2022		Soil	S22-Ja13965	X
19	BH02-3.5	Jan 17, 2022		Soil	S22-Ja13966	X
20	BH02-4.0	Jan 17, 2022		Soil	S22-Ja13967	X

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Priority: 1 Day
Contact Name: Mehran Asadabadi

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						X
Brisbane Laboratory - NATA # 1261 Site # 20794						
Mayfield Laboratory - NATA # 1261 Site # 25079						
Perth Laboratory - NATA # 2377 Site # 2370						
External Laboratory						
21	BH02-4.5	Jan 17, 2022		Soil	S22-Ja13968	X
22	BH02-5.0	Jan 17, 2022		Soil	S22-Ja13969	X
23	BH02-5.5	Jan 17, 2022		Soil	S22-Ja13970	X
24	BH02-6.0	Jan 17, 2022		Soil	S22-Ja13971	X
25	BH03-0.5	Jan 17, 2022		Soil	S22-Ja13972	X
26	BH03-1.0	Jan 17, 2022		Soil	S22-Ja13973	X
27	BH03-1.5	Jan 17, 2022		Soil	S22-Ja13974	X
28	BH03-2.0	Jan 17, 2022		Soil	S22-Ja13975	X
29	BH03-2.5	Jan 17, 2022		Soil	S22-Ja13976	X
30	BH03-3.0	Jan 17, 2022		Soil	S22-Ja13977	X
31	BH03-3.5	Jan 17, 2022		Soil	S22-Ja13978	X

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

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Received: Jan 17, 2022 6:00 PM
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Priority: 1 Day
Contact Name: Mehran Asadabadi

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						X
Brisbane Laboratory - NATA # 1261 Site # 20794						
Mayfield Laboratory - NATA # 1261 Site # 25079						
Perth Laboratory - NATA # 2377 Site # 2370						
External Laboratory						
32	BH03-4.0	Jan 17, 2022		Soil	S22-Ja13979	X
33	BH03-4.5	Jan 17, 2022		Soil	S22-Ja13980	X
34	BH03-5.0	Jan 17, 2022		Soil	S22-Ja13981	X
35	BH03-5.5	Jan 17, 2022		Soil	S22-Ja13982	X
36	BH03-6.0	Jan 17, 2022		Soil	S22-Ja13983	X
37	BH04-0.5	Jan 17, 2022		Soil	S22-Ja13984	X
38	BH04-1.0	Jan 17, 2022		Soil	S22-Ja13985	X
39	BH04-1.5	Jan 17, 2022		Soil	S22-Ja13986	X
40	BH04-2.0	Jan 17, 2022		Soil	S22-Ja13987	X
41	BH04-2.5	Jan 17, 2022		Soil	S22-Ja13988	X
42	BH04-3.0	Jan 17, 2022		Soil	S22-Ja13989	X

Company Name:	Alliance Geotechnical	Order No.:		Received:	Jan 17, 2022 6:00 PM
Address:	10 Welder Road Seven Hills NSW 2147	Report #:	855906	Due:	Jan 18, 2022
Project Name:	NEWPORT ASSA	Phone:	1800 288 188	Priority:	1 Day
Project ID:	14429	Fax:	02 9675 1888	Contact Name:	Mehran Asadabadi

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						X
Brisbane Laboratory - NATA # 1261 Site # 20794						
Mayfield Laboratory - NATA # 1261 Site # 25079						
Perth Laboratory - NATA # 2377 Site # 2370						
External Laboratory						
43	BH04-3.5	Jan 17, 2022		Soil	S22-Ja13990	X
44	BH04-4.0	Jan 17, 2022		Soil	S22-Ja13991	X
45	BH04-4.5	Jan 17, 2022		Soil	S22-Ja13992	X
46	BH04-5.0	Jan 17, 2022		Soil	S22-Ja13993	X
47	BH04-5.5	Jan 17, 2022		Soil	S22-Ja13994	X
48	BH04-6.0	Jan 17, 2022		Soil	S22-Ja13995	X
Test Counts						48

Internal Quality Control Review and Glossary

General

- 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.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- 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/100mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - 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.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.4
CP	Client Parent - QC was performed on samples pertaining to this report
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.
TEQ	Toxic Equivalency Quotient
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

- 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.
- 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.
- 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.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- 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	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	S22-Ja13957	CP	pH Units	5.4	5.5	pass	30%	Pass	
pH-FOX (Field pH Peroxide test)*	S22-Ja13957	CP	pH Units	4.5	4.6	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	S22-Ja13967	CP	pH Units	7.1	7.2	pass	30%	Pass	
pH-FOX (Field pH Peroxide test)*	S22-Ja13967	CP	pH Units	6.2	6.2	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	S22-Ja13968	CP	pH Units	6.9	6.9	pass	30%	Pass	
pH-FOX (Field pH Peroxide test)*	S22-Ja13968	CP	pH Units	6.3	6.4	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	S22-Ja13978	CP	pH Units	5.3	5.3	pass	30%	Pass	
pH-FOX (Field pH Peroxide test)*	S22-Ja13978	CP	pH Units	4.2	4.2	pass	30%	Pass	
Duplicate									
Acid Sulfate Soils Field pH Test				Result 1	Result 2	RPD			
pH-F (Field pH test)*	S22-Ja13988	CP	pH Units	6.6	6.5	pass	30%	Pass	
pH-FOX (Field pH Peroxide test)*	S22-Ja13988	CP	pH Units	5.9	5.8	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:

Andrew Black

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](#).

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3 DAY TAT ADDITIONAL ANALYSIS: FW: Eurofins Test Results, Invoice - Report 855906 : Site NEWPORT ASSA (14429)**Andrew Black** <AndrewBlack@eurofins.com>

Wed 1/19/2022 10:36 AM

To: #AU03_EnviroSampleBris <EnviroSampleBris@eurofins.com>

Urgent 3 day TAT additional for Cr Suite thanks team

Andrew Black
Analytical Services Manager**Eurofins | Environment Testing**

Unit 7

7 Friesian Close

SANDGATE, NSW, 2304

AUSTRALIA

Phone: +61 2 9900 8490

Mobile: +61 410 220 750

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).

Email: AndrewBlack@eurofins.comWebsite: eurofins.com.au/environmental-testing**From:** Jacob Walker <jacob.walker@allgeo.com.au>**Sent:** Wednesday, 19 January 2022 10:31 AM**To:** Andrew Black <AndrewBlack@eurofins.com>; Mehran Asadabadi <mehran@allgeo.com.au>**Subject:** RE: Eurofins Test Results, Invoice - Report 855906 : Site NEWPORT ASSA (14429)**EXTERNAL EMAIL***

Hi Andrew,

Can I please get CRS analysis done on the following samples on an urgent tat:

- BH01-0.5 - S22-Ja13948;
- BH01-2.0 - S22-Ja13951;
- BH02-3.5 - S22-Ja13966;
- BH03-0.5 - S22-Ja13972;
- BH03-2.5 - S22-Ja13976;
- BH03-4.0 - S22-Ja13979;
- BH03-6.0 - S22-Ja13983;
- BH04-1.0 - S22-Ja13985; and
- BH04-4.5 - S22-Ja13992.

DHSs RCD 19/1
BG in Syd.

856341

Thanks!

Regards,

Jacob Walker

Environmental Consultant

Mobile: [0424 066 612](tel:0424066612) | Email: jacob.walker@allgeo.com.au

Office Phone: 1800 288 188

Admin Email: admin@allgeo.com.auWebsite: allgeo.com.au

Office & Lab: 8-10 Welder Road, Seven Hills NSW 2147

Postal Address: PO Box 275, Seven Hills NSW 1730

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From: AndrewBlack@eurofins.com <AndrewBlack@eurofins.com>**Sent:** Tuesday, 18 January 2022 9:11 PM**To:** Mehran Asadabadi <mehran@allgeo.com.au>**Cc:** enviro <enviro@allgeo.com.au>**Subject:** Eurofins Test Results, Invoice - Report 855906 : Site NEWPORT ASSA (14429)

Kindest Regards,

Andrew Black

Analytical Services Manager

Eurofins | Environment Testing

Unit 7

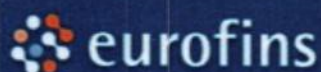
7 Friesian Close

SANDGATE NSW 2304

AUSTRALIA

Phone: +61 299 008 490

Mobile: +61 410 220 750

Email: AndrewBlack@eurofins.comWebsite: <http://environment.eurofins.com.au>[View our latest EnviroNotes](#)[How did we do? Provide your feedback here](#)How did we do? Provide your feedback **HERE**

* WARNING - EXTERNAL: This email originated from outside of Eurofins. Do not click any links or open any attachments unless you trust the sender and know that the content is safe!

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: **Jacob Walker**

Report **856341-S**
Project name **NEWPORT ASSA**
Project ID **14429**
Received Date **Jan 19, 2022**

Client Sample ID			BH01-0.5	BH01-2.0	BH02-3.5	BH03-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			B22-Ja16869	B22-Ja16870	B22-Ja16871	B22-Ja16872
Date Sampled			Jan 17, 2022	Jan 17, 2022	Jan 17, 2022	Jan 17, 2022
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	8.3	5.6	6.1	9.0
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	< 0.003	0.010	< 0.003	< 0.003
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	< 2	7.0	2.0	< 2
Potential Acidity - Chromium Reducible Sulfur						
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	< 3
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	0.41	N/A	N/A	1.4
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2) ^{S03}	0.02	% S	0.13	N/A	N/A	0.44
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)	2	mol H+/t	82	N/A	N/A	280
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	43	46	45	45
>2mm Fraction	0.005	g	< 0.005	< 0.005	< 0.005	< 0.005
Analysed Material	0.1	%	100	100	100	100
Extraneous Material	0.1	%	< 0.1	< 0.1	< 0.1	< 0.1
% Moisture	1	%	14	11	13	11

Client Sample ID			BH03-2.5	BH03-4.0	BH03-6.0	BH04-1.0
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			B22-Ja16873	B22-Ja16874	B22-Ja16875	B22-Ja16876
Date Sampled			Jan 17, 2022	Jan 17, 2022	Jan 17, 2022	Jan 17, 2022
Test/Reference	LOR	Unit				
Actual Acidity (NLM-3.2)						
pH-KCL (NLM-3.1)	0.1	pH Units	4.7	4.4	4.7	6.8
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.030	0.060	0.040	< 0.003
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	17	40	22	< 2
Potential Acidity - Chromium Reducible Sulfur						
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
Extractable Sulfur						
Sulfur - KCl Extractable	0.005	% S	N/A	< 0.005	N/A	N/A
HCl Extractable Sulfur	0.005	% S	N/A	< 0.005	N/A	N/A
Retained Acidity (S-NAS)						
Net Acid soluble sulfur (SNAS) NLM-4.1	0.02	% S	N/A	< 0.02	N/A	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.02	% S	N/A	< 0.02	N/A	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	10	mol H+/t	N/A	< 10	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	N/A	N/A	N/A	0.24
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2) ^{S03}	0.02	% S	N/A	N/A	N/A	0.08
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)	2	mol H+/t	N/A	N/A	N/A	47
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	0.03	0.06	0.04	< 0.02
CRS Suite - Net Acidity - NASSG (Including ANC)	10	mol H+/t	17	40	22	< 10
CRS Suite - Liming Rate - NASSG (Including ANC) ^{S01}	1	kg CaCO3/t	1.3	3.0	1.7	< 1
Extraneous Material						
<2mm Fraction	0.005	g	42	39	37	42
>2mm Fraction	0.005	g	< 0.005	< 0.005	< 0.005	< 0.005
Analysed Material	0.1	%	100	100	100	100
Extraneous Material	0.1	%	< 0.1	< 0.1	< 0.1	< 0.1
% Moisture	1	%	13	13	14	14

Client Sample ID			BH04-4.5
Sample Matrix			Soil
Eurofins Sample No.			B22-Ja16877
Date Sampled			Jan 17, 2022
Test/Reference	LOR	Unit	
Actual Acidity (NLM-3.2)			
pH-KCL (NLM-3.1)	0.1	pH Units	5.4
Titrateable Actual Acidity (NLM-3.2)	0.003	% pyrite S	0.030
Titrateable Actual Acidity (NLM-3.2)	2	mol H+/t	18
Potential Acidity - Chromium Reducible Sulfur			
Chromium Reducible Sulfur (s-SCr) (NLM-2.1) ^{S04}	0.005	% S	< 0.005
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	3	mol H+/t	< 3
Extractable Sulfur			
Sulfur - KCl Extractable	0.005	% S	N/A
HCl Extractable Sulfur	0.005	% S	N/A

Client Sample ID			BH04-4.5
Sample Matrix			Soil
Eurofins Sample No.			B22-Ja16877
Date Sampled			Jan 17, 2022
Test/Reference	LOR	Unit	
Retained Acidity (S-NAS)			
Net Acid soluble sulfur (SNAS) NLM-4.1	0.02	% S	N/A
Net Acid soluble sulfur (s-SNAS) NLM-4.1 ^{S02}	0.02	% S	N/A
Net Acid soluble sulfur (a-SNAS) NLM-4.1	10	mol H+/t	N/A
HCl Extractable Sulfur Correction Factor	1	factor	2.0
Acid Neutralising Capacity (ANCbt)			
Acid Neutralising Capacity - (ANCbt) (NLM-5.2)	0.01	% CaCO ₃	N/A
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2) ^{S03}	0.02	% S	N/A
Acid Neutralising Capacity - (a-ANCbt) (NLM-5.2)	2	mol H+/t	N/A
ANC Fineness Factor		factor	1.5
Net Acidity (Including ANC)			
CRS Suite - Net Acidity - NASSG (Including ANC)	0.02	% S	0.03
CRS Suite - Net Acidity - NASSG (Including ANC)	10	mol H+/t	18
CRS Suite - Liming Rate - NASSG (Including ANC) ^{S01}	1	kg CaCO ₃ /t	1.4
Extraneous Material			
<2mm Fraction	0.005	g	38
>2mm Fraction	0.005	g	< 0.005
Analysed Material	0.1	%	100
Extraneous Material	0.1	%	< 0.1
% Moisture	1	%	17

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	Jan 19, 2022	6 Week
- Method: LTM-GEN-7070 Chromium Reducible Sulfur Suite			
Extraneous Material	Brisbane	Jan 19, 2022	6 Week
- Method: LTM-GEN-7050/7070			
% Moisture	Sydney	Jan 19, 2022	14 Days
- Method: LTM-GEN-7080 Moisture			

Company Name:	Alliance Geotechnical	Order No.:		Received:	Jan 19, 2022 10:36 AM
Address:	10 Welder Road Seven Hills NSW 2147	Report #:	856341	Due:	Jan 24, 2022
Project Name:	NEWPORT ASSA	Phone:	1800 288 188	Priority:	3 Day
Project ID:	14429	Fax:	02 9675 1888	Contact Name:	Jacob Walker

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							X
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	BH01-0.5	Jan 17, 2022		Soil	B22-Ja16869	X	X
2	BH01-2.0	Jan 17, 2022		Soil	B22-Ja16870	X	X
3	BH02-3.5	Jan 17, 2022		Soil	B22-Ja16871	X	X
4	BH03-0.5	Jan 17, 2022		Soil	B22-Ja16872	X	X
5	BH03-2.5	Jan 17, 2022		Soil	B22-Ja16873	X	X
6	BH03-4.0	Jan 17, 2022		Soil	B22-Ja16874	X	X
7	BH03-6.0	Jan 17, 2022		Soil	B22-Ja16875	X	X
8	BH04-1.0	Jan 17, 2022		Soil	B22-Ja16876	X	X
9	BH04-4.5	Jan 17, 2022		Soil	B22-Ja16877	X	X

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

Project Name: NEWPORT ASSA
Project ID: 14429

Order No.:
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Received: Jan 19, 2022 10:36 AM
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Sample Detail		
	Chromium Reducible Sulfur Suite	Moisture Set
Melbourne Laboratory - NATA # 1261 Site # 1254		
Sydney Laboratory - NATA # 1261 Site # 18217		X
Brisbane Laboratory - NATA # 1261 Site # 20794	X	
Mayfield Laboratory - NATA # 1261 Site # 25079		
Perth Laboratory - NATA # 2377 Site # 2370		
External Laboratory		
Test Counts	9	9

Internal Quality Control Review and Glossary

General

- 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.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- 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/100mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - 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.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.4
CP	Client Parent - QC was performed on samples pertaining to this report
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.
TEQ	Toxic Equivalency Quotient
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

- 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.
- 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.
- 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.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- 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)				%	95			80-120	Pass	
Titratable Actual Acidity (NLM-3.2)				%	103			80-120	Pass	
LCS - % Recovery										
Potential Acidity - Chromium Reducible Sulfur										
Chromium Reducible Sulfur (s-SCr) (NLM-2.1)				%	97			80-120	Pass	
LCS - % Recovery										
Extractable Sulfur										
HCl Extractable Sulfur				%	105			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-Ja16869	CP	pH Units		8.3	8.2	<1	30%	Pass	
Titratable Actual Acidity (NLM-3.2)	B22-Ja16869	CP	% pyrite S		< 0.003	< 0.003	<1	30%	Pass	
Titratable Actual Acidity (NLM-3.2)	B22-Ja16869	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-Ja16869	CP	% S		0.005	0.005	<1	30%	Pass	
Chromium Reducible Sulfur (a-SCr) (NLM-2.1)	B22-Ja16869	CP	mol H+/t		3.3	3.3	<1	30%	Pass	
Duplicate										
Extractable Sulfur					Result 1	Result 2	RPD			
Sulfur - KCl Extractable	B22-Ja16869	CP	% S		N/A	N/A	N/A	30%	Pass	
HCl Extractable Sulfur	B22-Ja16869	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-Ja16869	CP	% S		N/A	N/A	N/A	30%	Pass	
Net Acid soluble sulfur (s-SNAS) NLM-4.1	B22-Ja16869	CP	% S		N/A	N/A	N/A	30%	Pass	
Net Acid soluble sulfur (a-SNAS) NLM-4.1	B22-Ja16869	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-Ja16869	CP	% CaCO3		0.41	0.45	9.0	30%	Pass	
Acid Neutralising Capacity - (s-ANCbt) (NLM-5.2)	B22-Ja16869	CP	% S		0.13	0.14	9.0	30%	Pass	
ANC Fineness Factor	B22-Ja16869	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-Ja16869	CP	% S		< 0.02	< 0.02	<1	30%	Pass	
CRS Suite - Net Acidity - NASSG (Including ANC)	B22-Ja16869	CP	mol H+/t		< 10	< 10	<1	30%	Pass	
CRS Suite - Liming Rate - NASSG (Including ANC)	B22-Ja16869	CP	kg CaCO3/t		< 1	< 1	<1	30%	Pass	
Duplicate										
					Result 1	Result 2	RPD			
% Moisture	B22-Ja16870	CP	%		11	12	10	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 (CaCO ₃) 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/m ³ in-situ soil' multiply 'reported results' x 'wet bulk density of soil in t/m ³ '
S02	Retained Acidity is Reported when the pHKCl is less than pH 4.5
S03	Acid Neutralising Capacity is only required if the pHKCl is 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:

Emma Beesley	Analytical Services Manager
Myles Clark	Senior Analyst-SPOCAS (QLD)



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

Project Name: NEWPORT ASSA
Project ID: 14429

Order No.:
Report #: 856341
Phone: 1800 288 188
Fax: 02 9675 1888

Received: Jan 19, 2022 10:36 AM
Due: Jan 24, 2022
Priority: 3 Day
Contact Name: Jacob Walker

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							X
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	BH01-0.5	Jan 17, 2022		Soil	B22-Ja16869	X	X
2	BH01-2.0	Jan 17, 2022		Soil	B22-Ja16870	X	X
3	BH02-3.5	Jan 17, 2022		Soil	B22-Ja16871	X	X
4	BH03-0.5	Jan 17, 2022		Soil	B22-Ja16872	X	X
5	BH03-2.5	Jan 17, 2022		Soil	B22-Ja16873	X	X
6	BH03-4.0	Jan 17, 2022		Soil	B22-Ja16874	X	X
7	BH03-6.0	Jan 17, 2022		Soil	B22-Ja16875	X	X
8	BH04-1.0	Jan 17, 2022		Soil	B22-Ja16876	X	X
9	BH04-4.5	Jan 17, 2022		Soil	B22-Ja16877	X	X



Environment Testing

Eurofins Environment Testing Australia Pty Ltd

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Melbourne

6 Monterey Road
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NATA # 1261 Site # 18217

Brisbane

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Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

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PO Box 60 Wickham 2293
Phone : +61 2 4968 8448
NATA # 1261 Site # 25079

Eurofins ARL Pty Ltd

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NATA # 2377 Site # 2370

Eurofins Environment Testing NZ Limited

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Chromium Reducible Sulfur Suite

Moisture Set

Melbourne Laboratory - NATA # 1261 Site # 1254

Sydney Laboratory - NATA # 1261 Site # 18217

Brisbane Laboratory - NATA # 1261 Site # 20794

Mayfield Laboratory - NATA # 1261 Site # 25079

Perth Laboratory - NATA # 2377 Site # 2370

External Laboratory

Test Counts

9

9