

**PRELIMINARY ACID SULPHATE SOIL ASSESSMENT**  
**(PASSA)**

**Property Address**  
67-75 Lords Road,  
Leichhardt NSW 2040

**Prepared for**  
Platino Properties Pty Ltd




**Date**  
July 2022

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## ABBREVIATIONS

AASS	Actual Acid Sulphate Soils
AHD	Above Height Datum
ANC	Acid Neutralising Capacity
ASS	Acid Sulphate Soils
ASSMAC	Acid Sulphate Soils Management Advisory Committee
ASSMP	Acid Sulphate Soils Management Plan
BGL	Below Ground Level
DNR&M	Department of Natural resources and Mines
DO	Dissolved Oxygen
EC	Electric Conductivity
EIL	Ecological Investigation Level
EPA	Environmental Protection Authority
HIL	Health-based Investigation Level
LOR	Limit of reporting
NV	Neutralising Value
PASS	Potential Acid Sulphate Soils
POCAS	Peroxide Oxidation Combined Acidity and Sulphate
PSI	Preliminary Site Investigation
QA/QC	Quality Assurance/Quality Control
QASSIT	Queensland Acid Sulphate Soils Investigation Team
SPOCAS	Suspended Peroxide Oxidation Combined Acidity and Sulphate
SPOS	Peroxide Oxidisable
TAA	Total Actual Acidity
TCLP	Toxicity Characteristic Leaching Procedure
TPA	Total Potential Acidity
TSA	Total Sulfidic Acidity
TSS	Total Suspended Solids
VENM	Virgin Excavated Natural Material

## 1.0 INTRODUCTION

Foundation Earth Sciences (FES) was appointed by Platino Properties Pty Ltd to prepare a Preliminary Acid Sulphate Soil Assessment (PASSA) for the property located at 67-75 Lords Road, Leichhardt NSW 2040 ("the site"). The site is located in the Inner West Council area.

The existing buildings form of the site consists of a series of brick warehouse style buildings with sheds and/or extensions and paved outdoor carpark and driveway. A smaller building is located on the south east corner of the site facing Lords Road and Davies Lane. The site is proposed to be rezoned & redeveloped into four mixed use buildings including single level basement, commercial and retail space, a total of two hundred and twenty apartments including one hundred and sixty affordable housing dwellings and sixty seniors independent living units and communal open space area.

An ASSA assessment is required as disturbances to Potential Acid Sulphate Soil (PASS) or Actual Acid Sulphate Soils, which may occur during construction and excavation works, can result in the formation of acid. The acid, once formed, could then damage infrastructure or harm ecological systems. The results of the field parameters from this assessment should only be used as a preliminary study to determine if further investigations are required. If results exceed the criteria, then further work, including an ASS Management Plan, may be required.

## 2.0 OBJECTIVES

The purpose of the ASS Assessment is to determine the presence or absence of ASS at the site. In the absence of ASS, it is essential to assess for the presence of Potential Acid Sulphate Soils (PASS). If the results do not meet criteria an Acid Sulphate Soil Management Plan will be required.

This assessment reviewed the presence of ASS / PASS in the portion of the site that may require excavation.

### **3.0 SCOPE OF WORKS**

The scope of works of the PASSA included:

- Review of previous environmental assessments;
- Site walkover;
- Targeted soil boring, sampling and testing for ASS at the site;
- Interpretation of field test analysis and findings;
- Reporting in accordance with relevant assessment guidelines / regulations

### **4.0 ASSESSMENT CRITERIA**

When assessing ASS at sites in NSW, the Acid Sulphate Soils Management Advisory Committee 'Acid Sulphate Soil Manual' apply. The following national guidelines issued in June 2018 are also applicable:

- Australian Government Department of Agriculture and Water Resources (2018), National Acid Sulfate Soils Guidance – National Acid Sulfate Soil Sampling and Identification Methods Manual, June 2018.

The purpose of this report is to determine whether there is a probable risk associated with ASS or PASS and to determine whether these types of soils actually exist on the site.

This report has been prepared in accordance with the Acid Sulphate Soil Manual (1998) & National Acid Sulfate Soil Sampling and identification methods manual (2018).

### Risk Map

A review of NSW Department of Land & Water Conservation (DLWC) Acid Sulphate Soil Risk Maps (Edition Two, December 1997, Scale 1:250,000) was undertaken. The risk maps do not detail the severity of the ASS, but only provide an indication that they may be present. The decision to classify certain areas as ASS is based on a number of geomorphic conditions and site criteria. The following points are used to determine if ASS is likely to exist (extracted from ASSMAC (1998) Acid Sulphate Soils Assessment Guidelines):

- Sediments of recent geological age (Holocene) ~ 10 000 yr.
- Soil horizons less than 5m AHD (Australian Height Datum).
- Marine or estuarine sediments and tidal lakes.
- In coastal wetlands or back swamp areas; waterlogged or scalded areas; interdune swales or coastal sand dunes.
- In areas where the dominant vegetation is mangroves, reeds, rushes and other swamp tolerant and marine vegetation.
- In areas identified in geological descriptions or in maps bearing sulphide minerals, coal deposits or former marine shales/sediments.
- Deeper older estuarine sediments >10m below the ground surface, Holocene or Pleistocene age.

Based on the above information in order to determine whether there is a potential for acid sulphate soils to be present within a site, reference was made to the NSW Department of Land & Water Conservation (DLWC) Acid Sulphate Soil Risk Maps (Edition Two, December 1997, Scale 1:250,000). A review of the "Botany Bay" map indicated that the site is located in "No known occurrences" of acid sulphate soil material within the soil profile. However, it is noted that the site is located in the vicinity of X2 -disturbed terrain area where acid sulphate materials are of "Low to high probability".



A review of the “Leichhardt Local Environmental Plan 2013, Acid Sulfate Soils Map Sheet ASS\_002”, the site is located in Class5 area of acid sulphate soil material within the soil profile. However, it is noted class3 areas is in the vicinity of the area to the west.

### Assessment Criteria

The following soil indicators are used to determine if AASS is actually present on a site:

- field pH  $\leq 4$  in soils
- presence of shell
- any jarosite horizons or substantial iron oxide mottling in auger holes, in surface encrustations or in any material dredged or excavated and left exposed. Jarosite is not always found, however, in actual acid sulphate soils.

The following soil indicators are used to determine if PASS is actually present on a site:

- waterlogged soils, unripe muds (soft, buttery, blue grey or dark greenish grey) or estuarine silty sands or sands (mid to dark grey) or bottom sediments of estuaries or tidal lakes (dark grey to black)
- presence of shell
- soil pH usually neutral but may be acid -positive Peroxide Test (see section 7.2 Field pH results).

## 5.0 SITE INFORMATION

### 5.1 Site Identification

The site is identified as follows:

**Table 1: Site Identification Review**

Site Identifier	Site Details	
Site Location	67-75 Lords Road, Leichhardt NSW	
Lot/DP	Lot 1 in DP940543 (67-73 Lords Road) Lot 1 in DP550608 (75 Lords Road)	
Site Coordinates #	NE Corner: Latitude -33.885088, Longitude: 151.146191	
Site Area	Approximate 10,691m <sup>2</sup>	
Local Government Area (LGA)	Inner West	
Zoning##	IN2 – Light Industrial	
Surrounding Land Uses	<i>North</i>	Lambert Park
	<i>South</i>	Lords Road then residential and commercial
	<i>East</i>	Laneway then residential
	<i>West</i>	Sydney Light Rail Corridor & Hawthorne Canal

Notes: # Six Maps

## refer to NSW Planning Portal

<https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address>

<https://www.planningportal.nsw.gov.au/find-a-property>

### 5.2 Topography

The topography viewed on NSW indicated the following for the Disturbed Terrain soil landscape:

Terrain disturbed by human activity. Local relief is usually <2 m, but occasionally up to 10 m. Most areas of disturbed ground have been levelled to slopes of <3%. In terraced cut and fill areas short rises may be steeper than 30%. Microtopography may be hummocky due to truck dumping of fill material.

Based on the site inspection it was determined that the site was sloping to the west at approximately 10-20°.

### **5.3 Local Geology & Surface Waters**

The Geological Map of Sydney (Geological Series Sheet 9130, Scale 1:100,000, 1983), published by the Department of Mineral Resources indicates the site is located in the vicinity of Mf, Qha & Rwa:

Mf indicates man-made fill, dredged estuarine sand and mud, demolition rubble, industrial and household waste.

Qha indicates the residual soils within the site to be underlain by Quaternary Age soils consisting of silty to peaty quartz sand, silt and clay. Ferruginous and humic cementation in places with common shell layers.

Rwa indicates the residual soils within the site to be underlain by Triassic Age Shale of the Wianamatta Group, comprising black to dark grey shale and laminite.

The nearest downgradient watercourse is Hawthorne Canal located approximate 60m west of the site.

### **5.4 Proposed Development**

The site is proposed to be rezoned & redeveloped into four mixed use buildings including single level basement, commercial and retail space, a total of two hundred and twenty apartments including one hundred and sixty affordable housing dwellings and sixty seniors independent living units and communal open space area.

Refer to **Appendix B** - Concept Development Plans.

## 6.0 SOIL BORING AND SAMPLING

A soil sampling and analysis program was used to consolidate the nature and degree of Acid Sulphate Soils present in the surface and subsurface geology. Samples were collected from four (4) boreholes within the site. The borehole locations are presented in **Figure 2** – Site Plan.

Field analysis was performed on the collected samples for  $\text{pH}_f$  and  $\text{pH}_{\text{fox}}$  in accordance with the required sampling techniques outlined in the Acid Sulfate Soil Manual (*ASSMAC 1998*). This included the Field pH and peroxide test protocol.

### 6.1 Quality Assurance/Quality Control (QA/QC)

Standard QA/QC procedures were followed. The decontamination of sampling equipment and the hand auger was achieved by washing with phosphate-free detergent and tap water, followed by final rinsing with distilled water. This was conducted after the collection of samples.

Standard sampling and analysing procedures are in accordance with and set out in the Acid Sulphate Soil Manual (1998) and Australian Government Department of Agriculture and Water Resources (2018), National Acid Sulfate Soils Guidance – National acid sulfate soil sampling and identification methods manual, June 2018.

## 7.0 FIELD RESULTS

### 7.1 Soil Observations

Based on information from all boreholes, the surface and sub-surface profile across the site is generalised as follows:

- Fill: Silty Gravelly Sand, Silty Gravelly Clay, Silty Sand,
- Natural: Sandy CLAY, Silty CLAY
- Bedrock: SANDSTONE

No unusual colouring or shells were detected in the soil suggesting the presence of pyrite (iron sulphide) or jarosite was unlikely.

Refer to **Appendix A** – Borehole Logs.

## 7.2 Field pH Results

The results of the field pH tests are presented in the table below:

**Table 2: Summary of field analysis results**

Sample	Depth (m)	pH		pH		Change in pH (pH <sub>f</sub> - pH <sub>fox</sub> )	Effervescence Reaction Rate
		H <sub>2</sub> O	Soil pH <sub>f</sub>	H <sub>2</sub> O <sub>2</sub>	Soil pH <sub>fox</sub>		
ASS1	0.1	-	7.4	-	8.2	-0.8	Volcanic reaction
ASS1	0.5	-	8.3	-	7.2	1.1	Volcanic reaction
ASS1	1	-	8.3	-	7.2	1.1	Medium reaction
ASS1	1.5	-	7.2	-	5.1	2.1	Medium reaction
ASS1	2	-	8	-	6.3	1.7	Low reaction
ASS1	2.5	-	8.1	-	6.1	2	Low reaction
ASS1	3	-	7.9	-	2.7	5.2	High reaction
ASS1	3.3	-	6.9	-	3.4	3.5	Low reaction
ASS2	0.1	-	9.3	-	9.1	0.2	Extreme reaction
ASS2	0.5	-	7.8	-	5.9	1.9	Medium reaction
ASS2	1	-	6.8	-	3.9	2.9	Low reaction
ASS2	1.5	-	6.5	-	3.7	2.8	Low reaction
ASS2	2	-	6.2	-	3.9	2.3	Low reaction
ASS2	2.5	-	4.9	-	3.7	1.2	Low reaction
ASS2	3	-	4.7	-	3.8	0.9	Low reaction
ASS3	0.1	-	8.8	-	8.5	0.3	Low reaction
ASS3	0.5	-	8.7	-	9.2	-0.5	Extreme reaction
ASS3	1	-	8.9	-	9	-0.1	Extreme reaction
ASS3	1.5	-	7.7	-	5.3	2.4	High reaction
ASS3	2	-	5.9	-	4.3	1.6	Low reaction
ASS3	2.5	-	5.3	-	4.3	1	Low reaction
ASS4	0.1	-	8.4	-	6.5	1.9	Medium reaction
ASS4	0.5	-	6.3	-	4.6	1.7	Medium reaction
ASS4	1	-	7.6	-	6.6	1	Low reaction
ASS4	1.5	-	7	-	4.3	2.7	Low reaction
ASS4	2	-	5.7	-	4.1	1.6	Low reaction
ASS4	2.5	-	5.5	-	4	1.5	Low reaction

**Notes:**

- $\text{pH}_f$  refers to pH field (soil and distilled  $\text{H}_2\text{O}$ ).
- $\text{pH}_{\text{fox}}$  refers to pH field oxidised (soil and peroxide).
- Change in pH refers to pH field minus pH field oxidised.
- **Highlighted** refers to detections.

To investigate the pH of the soils ( $\text{pH}_f$ ) water was added to the soil samples.  $\text{pH}_f$  of all the investigated samples were above the pH of 4. This indicates the soils from which the samples were collected did not contain actual ASS.

To investigate the presence of PASS, 30% peroxide ( $\text{H}_2\text{O}_2$ ) was added to soil samples and the resulting pH of the mixture was measured (field test protocols are presented in Appendix D of the ASSMAC (1998) Field pH and peroxide test protocol). The soil peroxide solution ( $\text{pH}_{\text{fox}}$ ) results indicated the pH did drop by more than two units in some samples and some reactions including high to extreme. Based on the field analysis limited further laboratory investigation was warranted.

## 8.0 SUSPENDED PEROXIDE OXIDATION COMBINED ACIDITY & SULPHATE (SPOCAS) RESULTS

Following the field tests undertaken by FES (administered Envirolab), four (4) soil samples from FES (collected from 15<sup>th</sup> June 2022) were submitted to the NATA certified laboratory of Envirolab for the SPOCAS test.

The soils were assessed against the guidelines set out in Acid Sulphate Soils Management Advisory Committee (ASSMAC) (1998) *Acid Sulphate Soils Assessment Guidelines*. The action criteria selected was based on excavation of more than 1,000 tonnes of soils disturbed within the site. The results are assessed against the available criteria, those being:

### Coarse to Fine Texture Soils

- Sulphur Trail ( $S_{pos}$ ) = 0.03%
- Acid Trail (TPA) = 18 mol H<sup>+</sup>/tonne

The laboratory analysis results are presented in the following table:



**Table 3: Laboratory Results - SPOCAS**

Sample	Profile	Depth (m)	S-POS (%) (sulphur trail)	TAA (mol H <sup>+</sup> /tonne)	TPA (mol H <sup>+</sup> /tonne) (acid trail)	TSA (mol H <sup>+</sup> /tonne) (acid trail)	Lime Calculation (kg CaCO <sub>3</sub> /t includes 1.5 safety factor).
<b>Sampling dated 15<sup>th</sup> June 2022</b>							
ASS1/ BH1	Silty Gravelly Sand	0.5	0.004	<5	<5	<5	2.1
ASS1 /BH1	Sandy CLAY	3.0	<b>0.30</b>	<5	<b>110</b>	<b>110</b>	<b>10</b>
ASS2 /BH2	Silty Gravelly Clay	0.1	0.02	<5	<5	<5	0.89
ASS2 /BH2	Silty CLAY	1.5	<0.005	13	16	<5	1.1
Coarse to Fine Texture Soils		-	<b>0.03</b>	-	<b>18</b>	<b>18</b>	-

## Notes:

- Guidelines follow the ASSMAC "Acid Sulphate Soils Assessment Guidelines 1998".
- Fine Texture Criteria based upon clay content of > or equal to 40%
- Medium Texture Criteria based upon clay content of 5-40%
- Criteria based upon more than 1000 tonnes disturbed
- **Bold values exceed ASSMAC guidelines**

When comparing the results summarised above in Table 3 to Table 4.4 (ASSMAC) for fine to coarse texture soils it can be determined that the percentage of oxidisable Sulphur (SPOS) & acid trail (TPA/TSA) in the samples were below the action criteria with the exception of ASS1/BH1 at 3.0m.

## 9.0 CHROMIUM REDUCIBLE SULPHUR RESULTS

Chromium Reducible sulphur method calculates the potential acidity from analysis of sulphide content. This method does not include sulphur from organics and sulphates (e.g. gypsum) and detects as low sulphide content and is therefore suitable to determine potential interferences caused by naturally occurring acidity within the soils. The laboratory results are presented in the following table:

**Table 4: Laboratory Results – Chromium Reducible Sulphur**

Sample	Depth	Chromium Reducible Sulphur (%)
<b>Sampling dated 15<sup>th</sup> June 2022</b>		
ASS1/ BH1	0.5	<b>0.05</b>
ASS1 /BH1	3	<b>0.26</b>
ASS2 /BH2	0.1	0.02
ASS2 /BH2	1.5	0.006
<b>SPOS Action Criteria</b>		<b>0.03</b>

The results from the Table 4 indicated the following:

- A lack of oxidisable sulphur compounds were detected within the borehole locations with the exception of BH1.

## 10.0 DISCUSSION & RECOMMENDATION

The assessment of acid sulphate material can be quite complex and can have a lot of interferences associated with the test methods and soil matrix.

Based on the laboratory results, it has been determined that the site ***impacted by Acid Sulphate Soils*** within the borehole location **BH1**.

### Recommendation

The following works are recommended to be completed prior to bulk excavation:

- A Detailed Acid Sulphate Soil Assessment is required to be completed during future site works to further assess the risk at depth and to target soil surrounding BH1. This is to be completed as part of the DA process and assessed against the DA approved plans for the site.
- Completion of an Acid Sulphate Soil Management plan (ASSMP) is required for the site.

### REFERENCES

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG) (2018).
- Australian Government Department of Agriculture and Water Resources (2018), National Acid Sulfate Soils Guidance – National Acid Sulfate Soil Sampling and Identification Methods Manual, June 2018.
- Stone Y, Ahern C.R and Blunden B (1998), 'Acid Sulphate Soil Manual 1998', Acid Sulphate Soils Management Advisory Committee, Wollongbar, NSW, Australia.

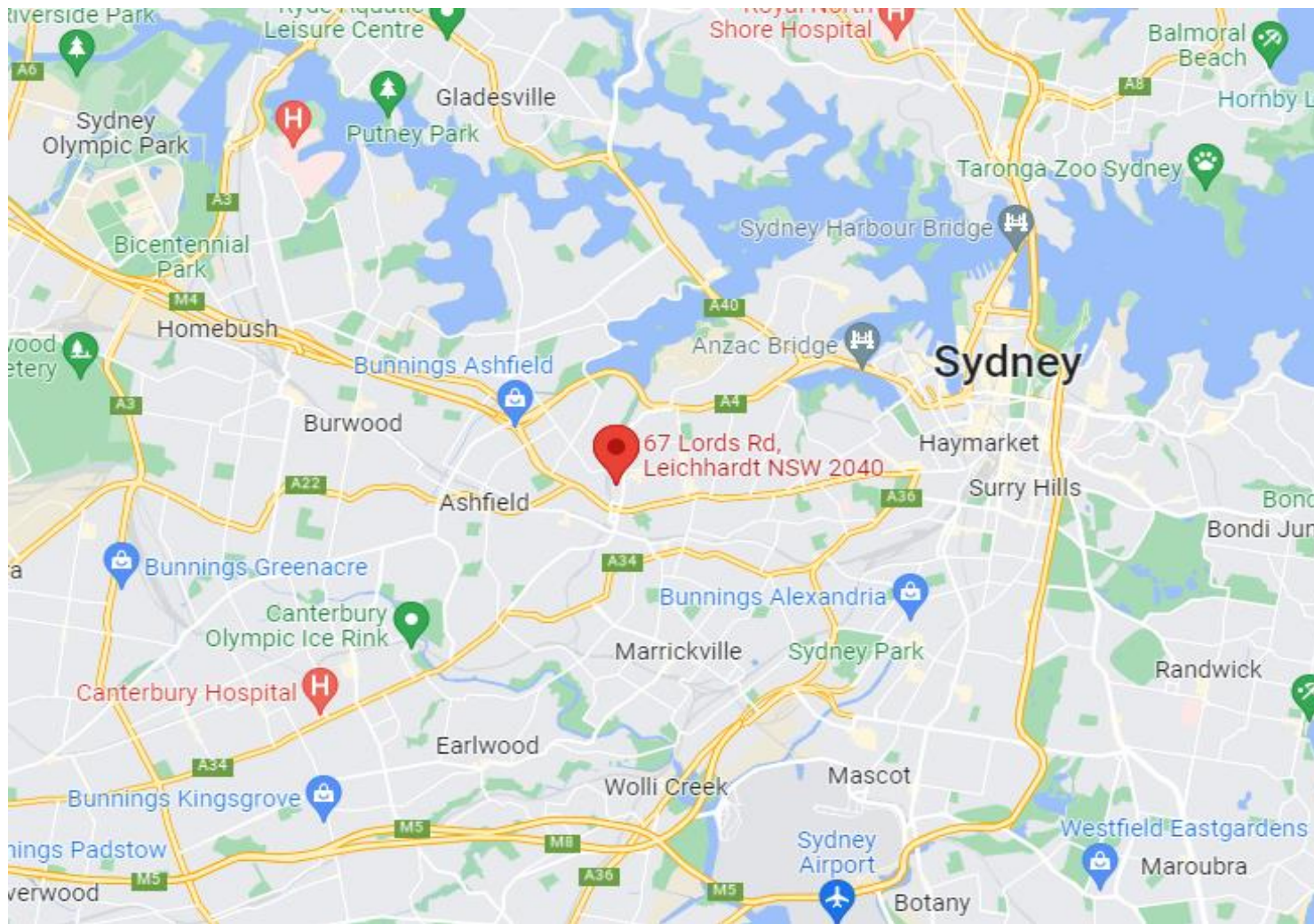
## LIMITATIONS



Whilst to the best of our knowledge, information contained in this report is accurate at the date of issue, although subsurface conditions, including groundwater levels and contaminant concentrations, can change in a limited time. This should be borne in mind if the report is used after a protracted delay. There is always some disparity in subsurface conditions across a site that cannot be fully defined by investigation. Hence it is unlikely that measurements and values obtained from sampling and testing during environmental works carried out at a site will characterise the extremes of conditions that exist within the site.

There is no investigation that is thorough enough to preclude the presence of material that presently or in the future, may be considered hazardous at the site. Since regulatory criteria are constantly changing, concentrations of contaminants presently considered low may, in the future, fall under different regulatory standards that require remediation.

Opinions are judgements that are based on our understanding and interpretation of current regulatory standards, and should not be construed as legal opinions. Although the information provided by an Acid Sulphate Soils Assessment and Management Plan can reduce exposure to risks, no assessment, however diligently carried out, can eliminate them. It must be noted that these findings are professional findings and have limitations. Even a rigorous professional assessment may fail to detect all ASS and/or PASS on a site. Sulphates may be present in areas that were not surveyed or sampled.

**FIGURE 1: LOCALITY MAP**



<b>Key</b>  Site Location 		<b>DRAWN</b> EY	<b>SITE LOCALITY</b>
		<b>FIGURE</b> 1	Platino Properties Pty Ltd
		<b>Job #</b>  E2843-2	67-73 Lords Road, Leichhardt NSW

**FIGURE 2: SITE FEATURES PLAN**



Feature No	Details
a	Residential House
b	Driveway
c	Car parks
d	Transmission tower

Key	
Site Location	
Testing Locations	



DRAWN	EY
Figure	2
Job #	E2843-2

Site Features Plan	
Platino Properties Pty Ltd	
67-73 Lords Road, Leichhardt NSW	



## **APPENDIX A: BOREHOLE LOGS**

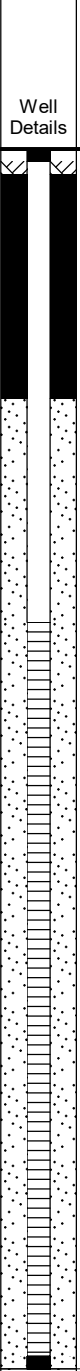


**CLIENT NAME:** Platino Properties Pty Ltd **JOB NUMBER:** E2843-2
**SITE ADDRESS:** 67-75 Lords Road, Leichhardt NSW 2040 **PROJECT:** Preliminary Acid Sulphate Soil Assessment
**Date Started :** 15/06/2022 **Completed :** 15/06/2022 **Logged By :** EY **Checked By :** MS
**Borehole Location :** Refer to Site Plan **Surface RL :** --- **Datum :** m AHD
**Equipment :** Drilling Rig **Borehole Size :** 100mm **Slope :** -90°

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Moisture	Consistence	Samples Tests Remarks	Additional Observations	Depth (m)
				0.20			Concrete Slab, approximately 200mm thick					
				0.5			FILL, silty gravelly sand, fine to medium grained, dark brown-dark grey, with gravels	M	L-MD	0.2	No HC smell, No Staining or No fibro fragments observed	
				1.0						0.5	No HC smell, No Staining or No fibro fragments observed	0.5
				1.20		CH	Sandy CLAY, medium to high plasticity, brown-grey, with orange mottling, trace of gravel	M-W	F-St	1	No HC smell, No Staining or No fibro fragments observed	1.0
				1.5						1.5	No HC smell, No Staining or No fibro fragments observed	1.5
				2.0						2	No HC smell, No Staining or No fibro fragments observed	2.0
				2.5						2.5	Seepage at 2.5m BGL No HC smell, No Staining or No fibro fragments observed	2.5
				3.0						3	No HC smell, No Staining or No fibro fragments observed	3.0
				3.30			SANDSTONE, fine to medium grained, extremely weathered, extremely low to low strength, brown-yellow	M		3.3	No HC smell, No Staining or No fibro fragments observed	3.5
				4.30			Borehole ASS1 terminated at 4.30m					4.5
				5.0								5.0

Comments:

D - Dry	VS - Very Soft	VL - Very Loose
M - Moist	S - Soft	L - Loose
W - Wet	F - Firm	MD - Medium Dense
	St - Stiff	D - Dense
	VSt - Very Stiff	VD - Very Dense
	H - Hard	

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**Borehole Location :** Refer to Site Plan **Surface RL :** --- **Datum :** m AHD
**Equipment :** Drilling Rig **Borehole Size :** 100mm **Slope :** -90°

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Moisture	Consistence	Samples Tests Remarks	Additional Observations	Depth (m)	
ADT			0.02	0.02			Ashphalt Concrete, approximately 20mm thick FILL, silty gravelly clay, low to medium plasticity, dark brown, with gravel	M	F	0.1	No HC smell, No Staining or No fibro fragments observed	0.02	
			0.5	0.5						0.5	No HC smell, No Staining or No fibro fragments observed	0.5	
			0.80	0.80		CH	Silty CLAY, medium to high plasticity, brown, trace of gravel	M	F-St	1	No HC smell, No Staining or No fibro fragments observed	0.80	
			1.20	1.20			becoming reddish brown, trace of gravel			1.5	No HC smell, No Staining or No fibro fragments observed	1.20	
			1.5	1.5						2	No HC smell, No Staining or No fibro fragments observed	1.5	
			2.0	2.0			becoming pale grey-yellow, trace of sand	M	VSt	2.5	No HC smell, No Staining or No fibro fragments observed	2.0	
			2.5	2.5						3	No HC smell, No Staining or No fibro fragments observed	2.5	
			3.0	3.0							3	Seepage found @ 3.0m BGL No HC smell, No Staining or No fibro fragments observed	3.0
			3.5	3.5									3.5
			4.0	4.0									4.0
			4.90	5.0			Borehole ASS2 terminated at 4.90m					5.0	
				5.5								5.5	

Comments:

D - Dry	VS - Very Soft	VL - Very Loose
M - Moist	S - Soft	L - Loose
W - Wet	F - Firm	MD - Medium Dense
	St - Stiff	D - Dense
	VSt - Very Stiff	VD - Very Dense
	H - Hard	

**CLIENT NAME:** Platino Properties Pty Ltd **JOB NUMBER:** E2843-2

**SITE ADDRESS:** 67-75 Lords Road, Leichhardt NSW 2040 **PROJECT:** Preliminary Acid Sulphate Soil Assessment

**Date Started :** 15/06/2022 **Completed :** 15/06/2022 **Logged By :** EY **Checked By :** MS

**Borehole Location :** Refer to Site Plan **Surface RL :** --- **Datum :** m AHD



**Equipment :** Drilling Rig **Borehole Size :** 100mm **Slope :** -90°

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Moisture	Consistence	Samples Tests Remarks	Additional Observations	Depth (m)
ADT				0.02			Asphalt Concrete, approximately 20mm thick	M	D	0.1	No HC smell, No Staining or No fibro fragments observed	
				0.5			FILL, silty sand, fine to medium grained, brown-yellow, with gravel			0.5	No HC smell, No Staining or No fibro fragments observed	0.5
				1.0						1	No HC smell, No Staining or No fibro fragments observed	1.0
				1.50			CH Sandy CLAY, medium to high plasticity, brown-light brown, with ironstaining rock band	M	VSt	1.5	No HC smell, No Staining or No fibro fragments observed	1.5
				2.0						2	No HC smell, No Staining or No fibro fragments observed	2.0
				2.30			becoming reddish brown			2.5	No HC smell, No Staining or No fibro fragments observed	2.5
			2.80				SANDSTONE, fine to medium grained, extremely weathered, extremely low to low strength, grey-brown-reddish brown	M				3.0
				3.0								3.5
				4.0								4.0
				4.5								4.5
				4.70			Borehole ASS3 terminated at 4.70m					5.0
				5.0								5.0

**Comments:**

D - Dry      VS - Very Soft      VL - Very Loose  
M - Moist    S - Soft              L - Loose  
W - Wet      F - Firm              MD - Medium Dense  
                    St - Stiff             D - Dense  
                    VSt - Very Stiff    VD - Very Dense  
                    H - Hard

**CLIENT NAME:** Platino Properties Pty Ltd **JOB NUMBER:** E2843-2
**SITE ADDRESS:** 67-75 Lords Road, Leichhardt NSW 2040 **PROJECT:** Preliminary Acid Sulphate Soil Assessment
**Date Started :** 15/06/2022 **Completed :** 15/06/2022 **Logged By :** EY **Checked By :** MS
**Borehole Location :** Refer to Site Plan **Surface RL :** --- **Datum :** m AHD
**Equipment :** Drilling Rig **Borehole Size :** 100mm **Slope :** -90°

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Moisture	Consistence	Samples Tests Remarks	Additional Observations	Depth (m)
ADT				0.02			Ashphalt Concrete, approximately 20mm thick FILL, silty sand, fine grained, dark brown, with gravel	M	MD	0.1	No HC smell, No Staining or No fibro fragments observed	
				0.50		CH	Silty CLAY, medium to high plasticity, brown-yellow	M	St	0.5	No HC smell, No Staining or No fibro fragments observed	0.5
				1.90			with ironstaining rock band			1	No HC smell, No Staining or No fibro fragments observed	1.0
				2.30			SANDSTONE, fine to medium grained, extremely weathered, extremely low strength to low strength, brown-grey, with ironstaining rock band			1.5	No HC smell, No Staining or No fibro fragments observed	1.5
				4.00			Borehole ASS4 terminated at 4.00m			2.0	No HC smell, No Staining or No fibro fragments observed	2.0
				2.50						2.5	No HC smell, No Staining or No fibro fragments observed	2.5
				3.00								3.0
				3.50								3.5
				4.00								4.0
				4.50								4.5
				5.00								5.0

**Comments:**

D - Dry	VS - Very Soft	VL - Very Loose
M - Moist	S - Soft	L - Loose
W - Wet	F - Firm	MD - Medium Dense
	St - Stiff	D - Dense
	VSt - Very Stiff	VD - Very Dense
	H - Hard	

## **APPENDIX B: CONCEPT DEVELOPMENT PLANS**

## 4 Scoping proposal

SJB Architects has been engaged to undertake a peer review the previous proposals and prepare a new urban design study for the site. This will be supported by new and updated technical studies as outlined in Section 8 of this report.

An indicative proposal has been prepared to support this scoping report which will be reviewed and refined through the SJB Urban Design Study. The proposal seeks to deliver residential uses consistent with the recommendation of PRCUTS including private apartments, seniors housing and affordable housing. Non-residential uses are also proposed to form part of the proposal to retain employment on the site, provide local urban services, and the provide street activation and vibrancy to the area.

The indicative land use mix is as follows:

- Residential apartments including affordable housing: 16,658sqm / 172 dwellings
- Seniors independent living units: 7,500sqm / 63 dwellings
- Non-residential: 1,500sqm
- **Total floor space: 25,658sqm**

The proposal seeks to directly align with the recommendations of PRCUTS and would seek to amend the Leichhardt LEP as follows:

- Rezone the site from IN2 Light Industrial to R3 Medium Density Residential
- Increase the maximum FSR from 1:1 to 2.4
- Apply a maximum height of buildings of 30m.

The PRCUTS did not envisage retention of employment use on this site, and to enable this to occur it is proposed that a site specific planning control be applied to the site which require a minimum 1,500sqm of non-residential floor space and allow a mix of non-residential uses including recreation facility (indoor), office premises, business premises, light industry, industrial retail outlet, and restaurant or café.

A site specific DCP would be prepared to outline more detailed controls to guide future development on the site.

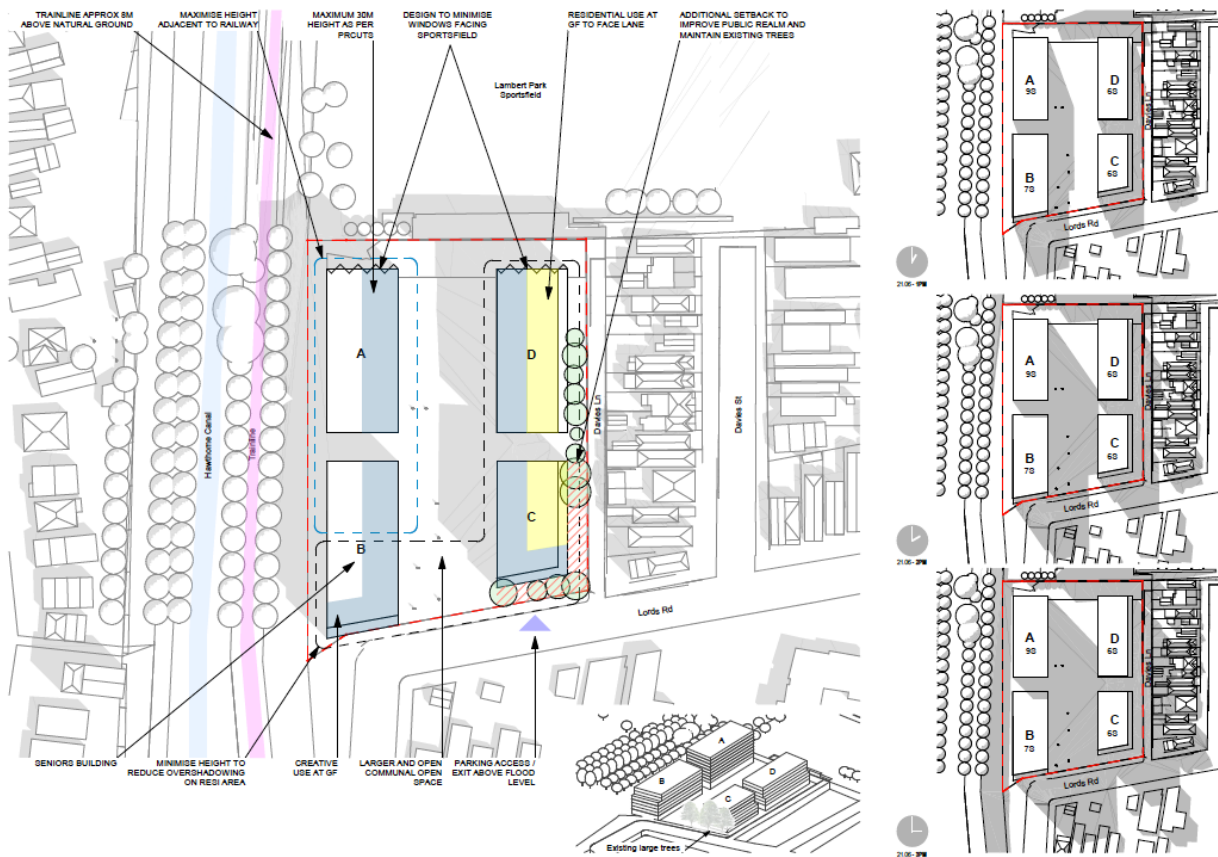


Figure 5: Indicative layout

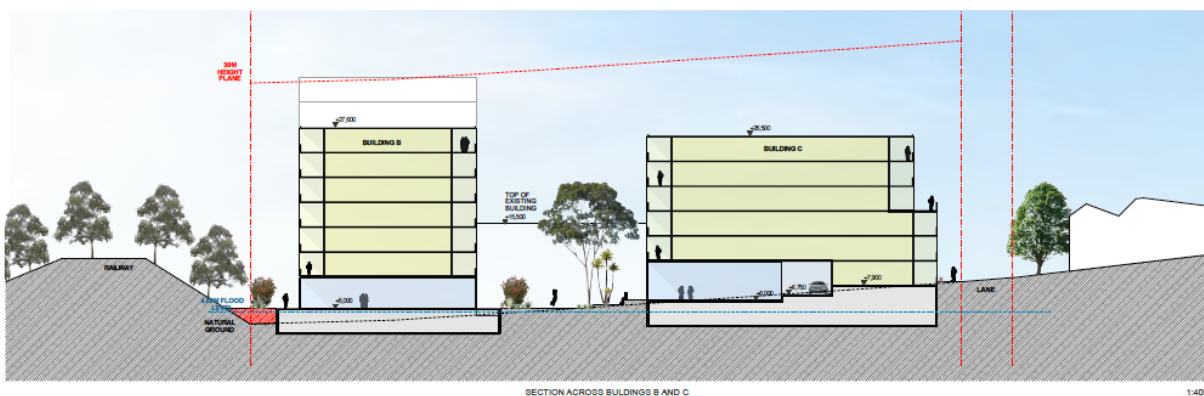
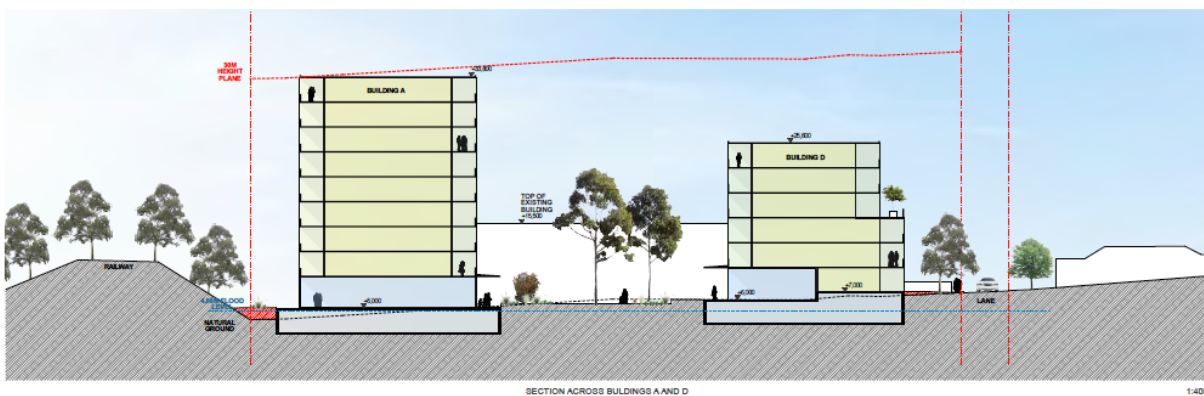


Figure 6: Indicative cross sections



## **APPENDIX C: NATA ACCREDITED LABORATORY CERTIFICATES**



Envirolab Services Pty Ltd

ABN 37 112 535 645

12 Ashley St Chatswood NSW 2067

ph 02 9910 6200 fax 02 9910 6201

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www.envirolab.com.au

## CERTIFICATE OF ANALYSIS 298144

### Client Details

<b>Client</b>	Foundation Earth Sciences Pty Ltd
<b>Attention</b>	Michael Silk
<b>Address</b>	PO Box 4405, East Gosford, NSW, 2250

### Sample Details

<b>Your Reference</b>	<u>E2843-2, Leichhardt</u>
<b>Number of Samples</b>	27 Soil
<b>Date samples received</b>	16/06/2022
<b>Date completed instructions received</b>	16/06/2022

### Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

### Report Details

**Date results requested by** 21/06/2022

**Date of Issue** 21/06/2022

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with \***

#### Results Approved By

Nick Sarlamis, Assistant Operation Manager

#### Authorised By

Nancy Zhang, Laboratory Manager

Client Reference: E2843-2, Leichhardt

sPOCAS field test						
Our Reference		298144-1	298144-2	298144-3	298144-4	298144-5
Your Reference	UNITS	ASS1	ASS1	ASS1	ASS1	ASS1
Depth		0.1	0.5	1	1.5	2
Date Sampled		15/06/2022	15/06/2022	15/06/2022	15/06/2022	15/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/06/2022	21/06/2022	21/06/2022	21/06/2022	21/06/2022
Date analysed	-	21/06/2022	21/06/2022	21/06/2022	21/06/2022	21/06/2022
pH <sub>F</sub> (field pH test)	pH Units	7.4	8.3	8.3	7.2	8.0
pH <sub>FOX</sub> (field peroxide test)	pH Units	8.2	7.2	7.2	5.1	6.3
Reaction Rate*	-	Volcanic reaction	Volcanic reaction	Medium reaction	Medium reaction	Low reaction

sPOCAS field test						
Our Reference		298144-6	298144-7	298144-8	298144-9	298144-10
Your Reference	UNITS	ASS1	ASS1	ASS1	ASS2	ASS2
Depth		2.5	3	3.3	0.1	0.5
Date Sampled		15/06/2022	15/06/2022	15/06/2022	15/06/2022	15/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/06/2022	21/06/2022	21/06/2022	21/06/2022	21/06/2022
Date analysed	-	21/06/2022	21/06/2022	21/06/2022	21/06/2022	21/06/2022
pH <sub>F</sub> (field pH test)	pH Units	8.1	7.9	6.9	9.3	7.8
pH <sub>FOX</sub> (field peroxide test)	pH Units	6.1	2.7	3.4	9.1	5.9
Reaction Rate*	-	Low reaction	High reaction	Low reaction	Extreme reaction	Medium reaction

sPOCAS field test						
Our Reference		298144-11	298144-12	298144-13	298144-14	298144-15
Your Reference	UNITS	ASS2	ASS2	ASS2	ASS2	ASS2
Depth		1	1.5	2	2.5	3
Date Sampled		15/06/2022	15/06/2022	15/06/2022	15/06/2022	15/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/06/2022	21/06/2022	21/06/2022	21/06/2022	21/06/2022
Date analysed	-	21/06/2022	21/06/2022	21/06/2022	21/06/2022	21/06/2022
pH <sub>F</sub> (field pH test)	pH Units	6.8	6.5	6.2	4.9	4.7
pH <sub>FOX</sub> (field peroxide test)	pH Units	3.9	3.7	3.9	3.7	3.8
Reaction Rate*	-	Low reaction	Low reaction	Low reaction	Low reaction	Low reaction

Client Reference: E2843-2, Leichhardt

sPOCAS field test						
Our Reference		298144-16	298144-17	298144-18	298144-19	298144-20
Your Reference	UNITS	ASS3	ASS3	ASS3	ASS3	ASS3
Depth		0.1	0.5	1	1.5	2
Date Sampled		15/06/2022	15/06/2022	15/06/2022	15/06/2022	15/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/06/2022	21/06/2022	21/06/2022	21/06/2022	21/06/2022
Date analysed	-	21/06/2022	21/06/2022	21/06/2022	21/06/2022	21/06/2022
pH <sub>F</sub> (field pH test)	pH Units	8.8	8.7	8.9	7.7	5.9
pH <sub>FOX</sub> (field peroxide test)	pH Units	8.5	9.2	9.0	5.3	4.3
Reaction Rate*	-	Low reaction	Extreme reaction	Extreme reaction	High reaction	Low reaction

sPOCAS field test						
Our Reference		298144-21	298144-22	298144-23	298144-24	298144-25
Your Reference	UNITS	ASS3	ASS4	ASS4	ASS4	ASS4
Depth		2.5	0.1	0.5	1	1.5
Date Sampled		15/06/2022	15/06/2022	15/06/2022	15/06/2022	15/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	21/06/2022	21/06/2022	21/06/2022	21/06/2022	21/06/2022
Date analysed	-	21/06/2022	21/06/2022	21/06/2022	21/06/2022	21/06/2022
pH <sub>F</sub> (field pH test)	pH Units	5.3	8.4	6.3	7.6	7.0
pH <sub>FOX</sub> (field peroxide test)	pH Units	4.3	6.5	4.6	6.6	4.3
Reaction Rate*	-	Low reaction	Medium reaction	Medium reaction	Low reaction	Low reaction

sPOCAS field test			
Our Reference		298144-26	298144-27
Your Reference	UNITS	ASS4	ASS4
Depth		2	2.5
Date Sampled		15/06/2022	15/06/2022
Type of sample		Soil	Soil
Date prepared	-	21/06/2022	21/06/2022
Date analysed	-	21/06/2022	21/06/2022
pH <sub>F</sub> (field pH test)	pH Units	5.7	5.5
pH <sub>FOX</sub> (field peroxide test)	pH Units	4.1	4.0
Reaction Rate*	-	Low reaction	Low reaction

Method ID	Methodology Summary
<b>Inorg-063</b>	pH- measured using pH meter and electrode. Soil is oxidised with Hydrogen Peroxide or extracted with water. Based on section H, Acid Sulfate Soils Laboratory Methods Guidelines, Version 2.1 - June 2004. To ensure accurate results these tests are recommended to be done in the field as pH may change with time thus these results may not be representative of true field conditions.

Client Reference: E2843-2, Leichhardt

QUALITY CONTROL: sPOCAS field test					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			21/06/2022	1	21/06/2022	21/06/2022		21/06/2022	[NT]
Date analysed	-			21/06/2022	1	21/06/2022	21/06/2022		21/06/2022	[NT]
pH <sub>F</sub> (field pH test)	pH Units		Inorg-063	[NT]	1	7.4	7.5	1	102	[NT]
pH <sub>FOX</sub> (field peroxide test)	pH Units		Inorg-063	[NT]	1	8.2	8.0	2	102	[NT]

QUALITY CONTROL: sPOCAS field test					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	21/06/2022	21/06/2022		[NT]	[NT]
Date analysed	-			[NT]	11	21/06/2022	21/06/2022		[NT]	[NT]
pH <sub>F</sub> (field pH test)	pH Units		Inorg-063	[NT]	11	6.8	6.4	6	[NT]	[NT]
pH <sub>FOX</sub> (field peroxide test)	pH Units		Inorg-063	[NT]	11	3.9	4.0	3	[NT]	[NT]

QUALITY CONTROL: sPOCAS field test					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	21	21/06/2022	21/06/2022		[NT]	[NT]
Date analysed	-			[NT]	21	21/06/2022	21/06/2022		[NT]	[NT]
pH <sub>F</sub> (field pH test)	pH Units		Inorg-063	[NT]	21	5.3	5.6	6	[NT]	[NT]
pH <sub>FOX</sub> (field peroxide test)	pH Units		Inorg-063	[NT]	21	4.3	4.4	2	[NT]	[NT]

**Result Definitions**

<b>NT</b>	Not tested
<b>NA</b>	Test not required
<b>INS</b>	Insufficient sample for this test
<b>PQL</b>	Practical Quantitation Limit
<b>&lt;</b>	Less than
<b>&gt;</b>	Greater than
<b>RPD</b>	Relative Percent Difference
<b>LCS</b>	Laboratory Control Sample
<b>NS</b>	Not specified
<b>NEPM</b>	National Environmental Protection Measure
<b>NR</b>	Not Reported

## Quality Control Definitions

<b>Blank</b>	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
<b>Duplicate</b>	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
<b>Matrix Spike</b>	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
<b>LCS (Laboratory Control Sample)</b>	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
<b>Surrogate Spike</b>	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

## Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.





# Chain of Custody Record

<b>Client Details:</b> Foundation Earth Sciences PO Box 4405, East Gosford NSW 2250 email: ben@foundations.com.au michael@foundations.com.au; ray@foundations.com.au ph: +61466 385 221	<b>Project Manager:</b> Michael Silk  <b>Sampled By:</b> EY  <b>Purchase Order #:</b> N/A  <b>Page #:</b> 1 of 1	<b>Project #:</b> E2843-2  <b>Project Name:</b> Leichhardt  <b>Quote #:</b>  <b>Turnaround:</b> 3day TAT
<b>Delivery Details:</b> Envirolab Pty Ltd 12 Ashley Street, Chatswood NSW 2067 email: ahie@envirolab.com.au ph: +612 9910 6200		

#	Sample ID	Depth	Date Sampled	Matrix	Analytes													Sample Comments	
					ph	CEC	%CLAY	ASS Field Test pH f & pH fox	TRH	BTEXN	PAH	OC	PCB	Asbestos ID	Asbestos %w/w (NEPM /WA)	TRH C6-C10 & BTEXN	Envirolab Suites		
1	ASS1	0.1	15.6.2022	Soil				x											Keep
2	ASS1	0.5	15.6.2022	Soil				x											Keep
3	ASS1	1	15.6.2022	Soil				x											Keep
4	ASS1	1.5	15.6.2022	Soil				x											Keep
5	ASS1	2	15.6.2022	Soil				x											Keep
6	ASS1	2.5	15.6.2022	Soil				x											Keep
7	ASS1	3	15.6.2022	Soil				x											Keep
8	ASS1	3.3	15.6.2022	Soil				x											Keep
9	ASS2	0.1	15.6.2022	Soil				x											Keep
10	ASS2	0.5	15.6.2022	Soil				x											Keep
11	ASS2	1	15.6.2022	Soil				x											Keep
12	ASS2	1.5	15.6.2022	Soil				x											Keep
13	ASS2	2	15.6.2022	Soil				x											Keep
14	ASS2	2.5	15.6.2022	Soil				x											Keep
15	ASS2	3	15.6.2022	Soil				x											Keep
16	ASS3	0.1	15.6.2022	Soil				x											Keep
17	ASS3	0.5	15.6.2022	Soil				x											Keep
18	ASS3	1	15.6.2022	Soil				x											Keep
19	ASS3	1.5	15.6.2022	Soil				x											Keep
20	ASS3	2	15.6.2022	Soil				x											Keep
21	ASS3	2.5	15.6.2022	Soil				x											Keep
22	ASS4	0.1	15.6.2022	Soil				x											Keep
23	ASS4	0.5	15.6.2022	Soil				x											Keep
24	ASS4	1	15.6.2022	Soil				x											Keep
25	ASS4	1.5	15.6.2022	Soil				x											Keep
26	ASS4	2	15.6.2022	Soil				x											Keep
27	ASS4	2.5	15.6.2022	Soil				x											Keep

Envirolab Science  
 12 Ashley Street  
 Chatswood NSW 2067  
 Ph: (02) 9910 6200  
 Job No: 298144  
 Date Received: 16/06/22  
 Time Received: 16:50  
 Received by: VC  
 Temp: Cool/Ambient  
 Cooling: Ice/Freezer  
 with Contact Protection

**Special Directions and Coments:** Kept in freezer within same day of sampling

Relinquished by	EY	Received By	Victoria Chan
Signature		Signature	
Date	16.6.2022	Date	16/06/22

## SAMPLE RECEIPT ADVICE

### Client Details

<b>Client</b>	Foundation Earth Sciences Pty Ltd
<b>Attention</b>	Michael Silk

### Sample Login Details

<b>Your reference</b>	E2843-2, Leichhardt
<b>Envirolab Reference</b>	298144
<b>Date Sample Received</b>	16/06/2022
<b>Date Instructions Received</b>	16/06/2022
<b>Date Results Expected to be Reported</b>	21/06/2022

### Sample Condition

<b>Samples received in appropriate condition for analysis</b>	Yes
<b>No. of Samples Provided</b>	27 Soil
<b>Turnaround Time Requested</b>	3 days
<b>Temperature on Receipt (°C)</b>	2
<b>Cooling Method</b>	Ice
<b>Sampling Date Provided</b>	YES

### Comments

Nil

Please direct any queries to:

#### Aileen Hie

**Phone:** 02 9910 6200  
**Fax:** 02 9910 6201  
**Email:** ahie@envirolab.com.au

#### Jacinta Hurst

**Phone:** 02 9910 6200  
**Fax:** 02 9910 6201  
**Email:** jhurst@envirolab.com.au

*Analysis Underway, details on the following page:*



**Envirolab Services Pty Ltd**

ABN 37 112 535 645

12 Ashley St Chatswood NSW 2067

ph 02 9910 6200 fax 02 9910 6201

customerservice@envirolab.com.au

www.envirolab.com.au

Sample ID	sPOCAS field test
ASS1-0.1	✓
ASS1-0.5	✓
ASS1-1	✓
ASS1-1.5	✓
ASS1-2	✓
ASS1-2.5	✓
ASS1-3	✓
ASS1-3.3	✓
ASS2-0.1	✓
ASS2-0.5	✓
ASS2-1	✓
ASS2-1.5	✓
ASS2-2	✓
ASS2-2.5	✓
ASS2-3	✓
ASS3-0.1	✓
ASS3-0.5	✓
ASS3-1	✓
ASS3-1.5	✓
ASS3-2	✓
ASS3-2.5	✓
ASS4-0.1	✓
ASS4-0.5	✓
ASS4-1	✓
ASS4-1.5	✓
ASS4-2	✓
ASS4-2.5	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**



**Envirolab Services Pty Ltd**

ABN 37 112 535 645

12 Ashley St Chatswood NSW 2067

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## Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

## CERTIFICATE OF ANALYSIS 298144-A

### Client Details

<b>Client</b>	Foundation Earth Sciences Pty Ltd
<b>Attention</b>	Michael Silk
<b>Address</b>	PO Box 4405, East Gosford, NSW, 2250

### Sample Details

<b>Your Reference</b>	<u>E2843-2, Leichhardt</u>
<b>Number of Samples</b>	additional analysis
<b>Date samples received</b>	16/06/2022
<b>Date completed instructions received</b>	21/06/2022

### Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.  
 Samples were analysed as received from the client. Results relate specifically to the samples as received.  
 Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

### Report Details

<b>Date results requested by</b>	28/06/2022
<b>Date of Issue</b>	28/06/2022
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. <b>Tests not covered by NATA are denoted with *</b>	

#### Results Approved By

Priya Samarawickrama, Senior Chemist

#### Authorised By



Nancy Zhang, Laboratory Manager

Client Reference: E2843-2, Leichhardt

sPOCAS + %S w/w					
Our Reference		298144-A-2	298144-A-7	298144-A-9	298144-A-12
Your Reference	UNITS	ASS1	ASS1	ASS2	ASS2
Depth		0.5	3	0.1	1.5
Date Sampled		15/06/2022	15/06/2022	15/06/2022	15/06/2022
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	28/06/2022	28/06/2022	28/06/2022	28/06/2022
Date analysed	-	28/06/2022	28/06/2022	28/06/2022	28/06/2022
pH <sub>kcl</sub>	pH units	8.2	6.5	8.8	5.1
TAA pH 6.5	moles H <sup>+</sup> /t	<5	<5	<5	13
s-TAA pH 6.5	%w/w S	<0.01	<0.01	<0.01	0.02
pH <sub>ox</sub>	pH units	7.8	2.4	8.9	4.4
TPA pH 6.5	moles H <sup>+</sup> /t	<5	110	<5	16
s-TPA pH 6.5	%w/w S	<0.01	0.18	<0.01	0.03
TSA pH 6.5	moles H <sup>+</sup> /t	<5	110	<5	<5
s-TSA pH 6.5	%w/w S	<0.01	0.18	<0.01	<0.01
ANC <sub>E</sub>	% CaCO <sub>3</sub>	0.75	[NT]	1.3	[NT]
a-ANC <sub>E</sub>	moles H <sup>+</sup> /t	150	[NT]	250	[NT]
s-ANC <sub>E</sub>	%w/w S	0.24	[NT]	0.40	[NT]
S <sub>KCl</sub>	%w/w S	0.05	0.05	0.009	0.02
S <sub>P</sub>	%w/w	0.1	0.35	0.03	0.03
S <sub>POS</sub>	%w/w	0.04	0.30	0.02	<0.005
a-S <sub>POS</sub>	moles H <sup>+</sup> /t	28	190	12	<5
Ca <sub>KCl</sub>	%w/w	0.41	0.21	0.22	0.13
Ca <sub>P</sub>	%w/w	0.51	0.15	0.50	0.07
Ca <sub>A</sub>	%w/w	0.10	<0.005	0.27	<0.005
Mg <sub>KCl</sub>	%w/w	0.11	0.013	0.031	0.016
Mg <sub>P</sub>	%w/w	0.16	0.016	0.073	<0.005
Mg <sub>A</sub>	%w/w	0.052	<0.005	0.042	<0.005
S <sub>HCl</sub>	%w/w S	[NT]	[NT]	[NT]	[NT]
S <sub>NAS</sub>	%w/w S	[NT]	[NT]	[NT]	[NT]
a-S <sub>NAS</sub>	moles H <sup>+</sup> /t	[NT]	[NT]	[NT]	[NT]
s-S <sub>NAS</sub>	%w/w S	[NT]	[NT]	[NT]	[NT]
Fineness Factor	-	1.5	1.5	1.5	1.5
a-Net Acidity	moles H <sup>+</sup> /t	<5	140	<5	15
s-Net Acidity	%w/w S	<0.01	0.22	<0.01	0.02
Liming rate	kg CaCO <sub>3</sub> /t	<0.75	10	<0.75	1.1
s-Net Acidity without -ANCE	%w/w S	0.04	0.22	0.02	0.02
a-Net Acidity without ANCE	moles H <sup>+</sup> /t	28	140	12	15
Liming rate without ANCE	kg CaCO <sub>3</sub> /t	2.1	10	0.89	1.1

SCr					
Our Reference		298144-A-2	298144-A-7	298144-A-9	298144-A-12
Your Reference	UNITS	ASS1	ASS1	ASS2	ASS2
Depth		0.5	3	0.1	1.5
Date Sampled		15/06/2022	15/06/2022	15/06/2022	15/06/2022
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	28/06/2022	28/06/2022	28/06/2022	28/06/2022
Date analysed	-	28/06/2022	28/06/2022	28/06/2022	28/06/2022
Chromium Reducible Sulfur	%w/w	0.05	0.26	0.02	0.006
a-Chromium Reducible Sulfur	moles H <sup>+</sup> / t	30	160	10	4

Method ID	Methodology Summary
<p><b>Inorg-064</b></p>	<p>sPOCAS determined using titrimetric and ICP-AES techniques.                      Based on National acid sulfate soils identification and laboratory methods manual June 2018.                      Ideally samples should be received in the laboratory at &lt;40C. Please refer to SRA for sample temperature on receipt.                      Net acidity including ANC has a safety factor of 1.5 applied.                      Neutralising value (NV) of 100% is assumed for liming rate                      The recommendation that the SHCL concentration be multiplied by a factor of 2 to ensure retained acidity is not underestimated, has not been applied in the SHCL results reported.</p>
<p><b>Inorg-068</b></p>	<p>Chromium Reducible Sulfur - Hydrogen Sulfide is quantified by iodometric titration after distillation to determine potential acidity.                      Net acidity including ANC has a safety factor of 1.5 applied.                      Neutralising value (NV) of 100% is assumed for liming rate.                      Based on National acid sulfate soils identification and laboratory methods manual June 2018.                      The recommendation that the SHCL concentration be multiplied by a factor of 2 to ensure retained acidity is not underestimated, has not been applied in the SHCL results reported.</p>



Client Reference: E2843-2, Leichhardt

QUALITY CONTROL: sPOCAS + %S w/w				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			28/06/2022	[NT]	[NT]	[NT]	[NT]	28/06/2022	[NT]
Date analysed	-			28/06/2022	[NT]	[NT]	[NT]	[NT]	28/06/2022	[NT]
pH <sub>KCl</sub>	pH units		Inorg-064	[NT]	[NT]	[NT]	[NT]	[NT]	105	[NT]
TAA pH 6.5	moles H <sup>+</sup> /t	5	Inorg-064	<5	[NT]	[NT]	[NT]	[NT]	89	[NT]
s-TAA pH 6.5	%w/w S	0.01	Inorg-064	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pH <sub>Ox</sub>	pH units		Inorg-064	[NT]	[NT]	[NT]	[NT]	[NT]	95	[NT]
TPA pH 6.5	moles H <sup>+</sup> /t	5	Inorg-064	<5	[NT]	[NT]	[NT]	[NT]	111	[NT]
s-TPA pH 6.5	%w/w S	0.01	Inorg-064	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
TSA pH 6.5	moles H <sup>+</sup> /t	5	Inorg-064	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
s-TSA pH 6.5	%w/w S	0.01	Inorg-064	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
ANC <sub>E</sub>	% CaCO <sub>3</sub>	0.05	Inorg-064	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
a-ANC <sub>E</sub>	moles H <sup>+</sup> /t	5	Inorg-064	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
s-ANC <sub>E</sub>	%w/w S	0.05	Inorg-064	<0.05	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
S <sub>KCl</sub>	%w/w S	0.005	Inorg-064	<0.005	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
S <sub>P</sub>	%w/w	0.005	Inorg-064	<0.005	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
S <sub>POS</sub>	%w/w	0.005	Inorg-064	<0.005	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
a-S <sub>POS</sub>	moles H <sup>+</sup> /t	5	Inorg-064	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ca <sub>KCl</sub>	%w/w	0.005	Inorg-064	<0.005	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ca <sub>P</sub>	%w/w	0.005	Inorg-064	<0.005	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ca <sub>A</sub>	%w/w	0.005	Inorg-064	<0.005	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Mg <sub>KCl</sub>	%w/w	0.005	Inorg-064	<0.005	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Mg <sub>P</sub>	%w/w	0.005	Inorg-064	<0.005	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Mg <sub>A</sub>	%w/w	0.005	Inorg-064	<0.005	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
S <sub>HCl</sub>	%w/w S	0.005	Inorg-064	<0.005	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
S <sub>NAS</sub>	%w/w S	0.005	Inorg-064	<0.005	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
a-S <sub>NAS</sub>	moles H <sup>+</sup> /t	5	Inorg-064	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
s-S <sub>NAS</sub>	%w/w S	0.01	Inorg-064	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fineness Factor	-	1.5	Inorg-064	<1.5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
a-Net Acidity	moles H <sup>+</sup> /t	5	Inorg-064	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
s-Net Acidity	%w/w S	0.01	Inorg-064	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Liming rate	kg CaCO <sub>3</sub> /t	0.75	Inorg-064	<0.75	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
s-Net Acidity without -ANCE	%w/w S	0.01	Inorg-064	<0.01	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

Client Reference: E2843-2, Leichhardt

QUALITY CONTROL: sPOCAS + %S w/w				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
a-Net Acidity without ANCE	moles H <sup>+</sup> /t	5	Inorg-064	<5	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Liming rate without ANCE	kg CaCO <sub>3</sub> /t	0.75	Inorg-064	<0.75	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

Client Reference: E2843-2, Leichhardt

QUALITY CONTROL: SCr				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			28/06/2022	[NT]	[NT]	[NT]	[NT]	28/06/2022	[NT]
Date analysed	-			28/06/2022	[NT]	[NT]	[NT]	[NT]	28/06/2022	[NT]
Chromium Reducible Sulfur	%w/w	0.005	Inorg-068	<0.005	[NT]	[NT]	[NT]	[NT]	99	[NT]
a-Chromium Reducible Sulfur	moles H <sup>+</sup> /t	3	Inorg-068	<3	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]

**Result Definitions**

<b>NT</b>	Not tested
<b>NA</b>	Test not required
<b>INS</b>	Insufficient sample for this test
<b>PQL</b>	Practical Quantitation Limit
<b>&lt;</b>	Less than
<b>&gt;</b>	Greater than
<b>RPD</b>	Relative Percent Difference
<b>LCS</b>	Laboratory Control Sample
<b>NS</b>	Not specified
<b>NEPM</b>	National Environmental Protection Measure
<b>NR</b>	Not Reported

## Quality Control Definitions

<b>Blank</b>	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
<b>Duplicate</b>	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
<b>Matrix Spike</b>	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
<b>LCS (Laboratory Control Sample)</b>	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
<b>Surrogate Spike</b>	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

## Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.



**FOUNDATION EARTH SCIENCES**

# Chain of Custody Record

**Client Details:**

Foundation Earth Sciences  
PO Box 4405, East Gosford NSW 2250  
email: ben@foundations.com.au  
michael@foundations.com.au; ray@foundations.com.au  
ph: +61466 385 221

**Project Manager:**

Michael Silk

Project #: E2843-2

**Sampled By:**

EY

Project Name: Gosford

**Delivery Details:**

Envirolab Pty Ltd  
12 Ashley Street, Chatswood NSW 2067  
email: ahie@envirolab.com.au  
ph: +612 9910 6200

**Purchase Order #:**

N/A

Quote #:

**Page #:**

1 of 1

Turnaround: Standard

**Analytes**

#	Sample ID	Depth	Date Sampled	Matrix	Analytes												Sample Comments		
					ph	CEC	%CLAY	ASS Field Test pH f & pH fox	TRH	BTEXN	PAH	OC	PCB	Asbestos ID	SPOCAS & Chromium Reducible	TRH C6-C10 & BTEXN		Envirolab Suites	
1	ASS1	0.5	15.6.2022	Soil															Keep
2	ASS1	3	15.6.2022	Soil															Keep
3	ASS2	0.1	15.6.2022	Soil															Keep
4	ASS2	1.5	15.6.2022	Soil															Keep
5																			
6																			
7																			
8																			

Special Directions and Comments: Refer to lab cert 298144

Relinquished by	EY	Received By	Ming Yan To.	298144A
Signature	<i>[Signature]</i>	Signature	MT	
Date	21.6.2022	Date	21/06/2022 15:03	

2  
①  
②  
③

## Ming To

---

**From:** Greta Petzold  
**Sent:** Tuesday, 21 June 2022 3:07 PM  
**To:** Samplereceipt  
**Subject:** FW: Results for Registration 298144 E2843-2, Leichhardt  
**Attachments:** E2843-2 ASS 21.6.2022 (SPOCAS).pdf

**Categories:** Additional

Ref: 2017144-A  
TAT: Standard  
Due: 28/06/2022  
MT.

A job please 😊

---

**From:** Emerson You <emerson@foundations.com.au>  
**Sent:** Tuesday, 21 June 2022 3:03 PM  
**To:** Greta Petzold <GPetzold@envirolab.com.au>  
**Cc:** ray@foundations.com.au; michael@foundations.com.au; ben@foundations.com.au  
**Subject:** Re: Results for Registration 298144 E2843-2, Leichhardt

**CAUTION:** This email originated from outside of the organisation. Do not act on instructions, click links or open attachments unless you recognise the sender and know the content is authentic and safe.

Hi Greta,

Can we please run further testing for the current lab cert

COC attached.

Thanks

Emerson YOU  
Foundation Earth Sciences  
Civil and Environmental Engineer

[emerson@foundations.com.au](mailto:emerson@foundations.com.au)  
0409784783



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Please consider the environment before printing this email.



Envirolab Services Pty Ltd

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## SAMPLE RECEIPT ADVICE

### Client Details

<b>Client</b>	Foundation Earth Sciences Pty Ltd
<b>Attention</b>	Michael Silk

### Sample Login Details

<b>Your reference</b>	E2843-2, Leichhardt
<b>Envirolab Reference</b>	298144-A
<b>Date Sample Received</b>	16/06/2022
<b>Date Instructions Received</b>	21/06/2022
<b>Date Results Expected to be Reported</b>	28/06/2022

### Sample Condition

<b>Samples received in appropriate condition for analysis</b>	Yes
<b>No. of Samples Provided</b>	additional analysis
<b>Turnaround Time Requested</b>	Standard
<b>Temperature on Receipt (°C)</b>	2
<b>Cooling Method</b>	Ice
<b>Sampling Date Provided</b>	YES

### Comments

Nil

Please direct any queries to:

<b>Aileen Hie</b>	<b>Jacinta Hurst</b>
<b>Phone: 02 9910 6200</b>	<b>Phone: 02 9910 6200</b>
<b>Fax: 02 9910 6201</b>	<b>Fax: 02 9910 6201</b>
<b>Email: ahie@envirolab.com.au</b>	<b>Email: jhurst@envirolab.com.au</b>

Analysis Underway, details on the following page:





**Envirolab Services Pty Ltd**

ABN 37 112 535 645

12 Ashley St Chatswood NSW 2067

ph 02 9910 6200 fax 02 9910 6201

customerservice@envirolab.com.au

www.envirolab.com.au

Sample ID	sPOCAS + %S w/w	SCr	On Hold
ASS1-0.1			✓
ASS1-0.5	✓	✓	
ASS1-1			✓
ASS1-1.5			✓
ASS1-2			✓
ASS1-2.5			✓
ASS1-3	✓	✓	
ASS1-3.3			✓
ASS2-0.1	✓	✓	
ASS2-0.5			✓
ASS2-1			✓
ASS2-1.5	✓	✓	
ASS2-2			✓
ASS2-2.5			✓
ASS2-3			✓
ASS3-0.1			✓
ASS3-0.5			✓
ASS3-1			✓
ASS3-1.5			✓
ASS3-2			✓
ASS3-2.5			✓
ASS4-0.1			✓
ASS4-0.5			✓
ASS4-1			✓
ASS4-1.5			✓
ASS4-2			✓
ASS4-2.5			✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**



**Envirolab Services Pty Ltd**

ABN 37 112 535 645

12 Ashley St Chatswood NSW 2067

ph 02 9910 6200 fax 02 9910 6201

customerservice@envirolab.com.au

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## Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.