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# Salinity & Aggressivity Assessment

Eileen O'Connor Catholic School  
84 Gavenlock Road, Mardi  
NSW, 2259

May 2024

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## DOCUMENT REVISIONS

Revision	Date	Created by	Short Description of Changes
1	15 <sup>th</sup> May 2024	Tiago Guedes	Final Version
2	19 <sup>th</sup> March 2025	Gonzalo Serna Diaz	Added State Significant and amended proposed development design
3	1st July 2025	Gonzalo Serna Diaz	Changed client name



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## 1 Introduction

### 1.1 Background

Raw Earth were engaged to conduct a Salinity and Aggressivity Assessment at the property located at 84 Gavenlock Road, Mardi, NSW 2259 ('the site'). The site is described as Lot 9 Section 4 DP 3368 and comprises an approximate total area of 133,500 m<sup>2</sup>. The investigation area is located on the north-west portion of the site and comprises an approximate total area of 10,000 m<sup>2</sup>.

The Site Location Plan is shown in Figure 1, in the **Appendix A**. The site is located approximately 15.5 km north-east of Gosford Central Business District (CBD), within the Local Government Area of Central Coast Council (CCC).

This report has been prepared to support a State Significant Development Application (SSDA) to CCC and for the purpose of enabling the developer to meet its obligations under the Contaminated Land Management Act 1997 (CLM Act) for the assessment and management of contaminated land.

Raw Earth understands that the proposed school development at the site includes the construction of an additional building with three (3) wings on the north-west portion of the site. Information provided to Raw Earth by the client indicates that as part of the project, bulk earthworks will consist of up to 2460 m<sup>3</sup> of in situ soils disturbed to a maximum depth of 1.8 m bgl.

### 1.2 Objectives

The objectives of this Salinity & Aggressivity Assessment were as follows:

- Assess the in-situ material for salinity and aggressivity; and,
- Document the findings in this Salinity & Aggressivity Report.



## 2 Scope of Works

To complete the Salinity & Aggressivity Assessment, Raw Earth undertook the following scope of works:

- Supervision of underground service locating.
- Advancement of 15 boreholes to a maximum depth of 2.0m below ground level (m bgl).
- The collection of soil samples at nominated depth intervals up to 1.5m bgl.
- Soil logging at each borehole and screening all soil samples for volatiles using a photoionisation detector (PID).
- Analysis of soil samples at a National Association of Testing Authorities (NATA), Australia accredited laboratory for salinity and aggressivity.
- Preparation of a Salinity and Aggressivity Report.



### 3 Regulatory Framework

This Salinity & Aggressivity Assessment was undertaken in accordance with the following regulatory framework and guidelines:

- Department of Urban Affairs and Planning, NSW Environmental Protection Authority, *Managing Land Contamination – Planning Guidelines – SEPP 55 – Remediation of Land*, 1998.
- National Environment Protection Measures (2013), *Schedule B1 – Guideline on Investigation Levels for Soil and Groundwater*.
- National Environment Protection Measures, *Schedule B2 – Guideline on Site Characterisation*, 2013.
- NSW Environmental Protection Authority, *Sampling Design Guidelines*, 2022.
- NSW Environmental Protection Authority, *Guidelines on the Duty to Report Contamination under Contaminated Land Management Act*, 1997.
- NSW Department of Environment and Conservation, *Guidelines for the Assessment and Management of Groundwater Contamination*, 2007.
- NSW Environmental Protection Authority, *Consultants reporting on contaminated Land: Contaminated land guidelines*, 2020.
- State Environment Protection Policy 55 (SEPP 55). *Remediation of Land Under the Environmental Planning and Assessment Act*.



## 4 Site Condition and Environmental Setting

### 4.1 Site Identification

A site location plan is shown in Figure 1, with a site layout plan shown in Figure 2, **Appendix A**. A summary of the Site Details is shown below in **Table 1**.

<i>Table 1: Site Details</i>	
<b>Site Address</b>	84 Gavenlock Road, Mardi, NSW 2259
<b>Lot Description</b>	Lot 9 Section 4 DP 3368
<b>Site Locality Map</b>	Figure 1, <b>Appendix A</b>
<b>Site Photographs</b>	<b>Appendix B</b>
<b>Area of Site (m<sup>2</sup>)</b>	133,500
<b>Site Investigation Area(m<sup>2</sup>)</b>	10,000
<b>Local Government Council</b>	Central Coast Council
<b>Current Land Use</b>	R2: Low Density Residential and C3: Environmental Management
<b>Surrounding Land Use</b>	R1: General Residential C2: Environmental Conservation and Management



## 4.2 Site Inspection

Raw Earth undertook a site inspection at the site on 22<sup>nd</sup> April 2024. Site photographs are shown in **Appendix B**. Key observations noted during the inspection are summarised in **Table 2** below.

<b>Table 2: Site Layout and Current Use</b>	
<b>Site Layout and Use</b>	<b>Details</b>
<b>Current use</b>	The site is a commercial property that is currently being used as a private school.
<b>Surface cover type and condition</b>	The site investigation area is predominantly covered by grass and vegetation. The centre of the investigation area is occupied by a surface water body with surrounding vegetation.
<b>Building construction</b>	There are 3 single-storey buildings (sheds) built on concrete slab, with steel frame structure and corrugated metal walls and roofing. There is also a joined veranda along one of the sheds.
<b>Water runoff flow direction and drain/pit location</b>	The site investigation area slopes downhill from southwest to northeast of the property, water runoff will follow this direction travelling across the site.
<b>Depth, size and flow of any water features which may include creeks, rivers, lakes, ponds and lagoons</b>	There is dam in the centre portion of the site, with an approximate area of 2000 m <sup>2</sup> .
<b>Presence and location of groundwater monitoring wells, soil bores</b>	No groundwater monitoring well, or bore was observed at the site. One (1) registered groundwater bore (GW54807) was identified 500m to the south of the south with a total depth of 11.50m and lithology composed of sand and clay.
<b>Waste/ rubble</b>	No waste/rubble was present on-site.
<b>Areas of restricted access</b>	No areas of restricted access.



## 5 Site Assessment

### 5.1 Sampling Methodology

Raw Earth conducted a site investigation on the 22<sup>nd</sup> April 2024, which included the advancement of fifteen (15) targeted boreholes across the site to a maximum depth of 2.0 m bgl using a drill rig and hand auger. A grid-based soil sampling was carried out as part of the site investigation.

According to information provided by the client, shallow excavation depths are expected to occur in most of the site investigation area and only the in the southwest portion of the site excavation works are expected to occur to a maximum depth of 1.8m bgl.

Soil samples were collected from the fifteen (15) borehole locations at nominated depth intervals, according to the expected excavation depths provided by the client, as described below in **Table 3**. A Sample Location Plan is presented in **Figure 3, Appendix A** of this Report.

<b>Boreholes (BH)</b>	<b>Sample ID_depth (m)</b>
BH01	S1_0.5 and S1A_1.5
BH02	S2_0.5
BH03	S3_0.5
BH04	S4_0.5
BH05	S5_0.4
BH06	S6_0.6
BH07	S7_0.6
BH08	S8_1.0
BH09	S9_0.5
BH10	S10_0.3
BH11	S11_0.6
BH12	S12_0.3
BH13	S13_0.4
BH14	S14_0.3
BH15	S15_0.5

Soil samples were collected directly from the auger, placed in laboratory prepared 250 mL soil jars, labelled, and placed on ice in an esky for transport under chain of custody (COC) to a NATA accredited laboratory for the analysis of the following parameters of interest for Salinity and Aggressivity Assessment: pH, Chloride (Cl<sup>-</sup>), Sulfate (SO<sub>4</sub><sup>-2</sup>), Electrical Conductivity (EC) and Electrical Conductivity Saturation Extract (ECe). The auger was decontaminated between each borehole location with Decon90.



## 5.2 Subsurface Conditions

The subsurface lithology was noted to be relevantly consistent across the site. Topsoil was present in all borehole locations from the surface to 0.10 m bgl and comprised of a gravelly clayey sand, dark grey and brown. From 0.10 m bgl to approximately 1.5m the subsurface soil can be described as sandy clay, moist/wet, firm density with fine to medium sediments. Soil log information for each borehole is presented in the **Appendix C** of this report.

A number of field observations were noted during the Salinity and Aggressivity Investigation as summarised in **Table 3** below.

<i>Table 4: Field Observations</i>	
	<b>Field Observations</b>
Surface cover	The surface cover of the investigation area comprised grass cover which showed no visible signs of distress.
Staining	No hydrocarbon staining was observed in any of the sampling locations during the investigation.
Odours	No hydrocarbon odours were observed in any of the sampling locations during the investigation.
PID readings	PID readings in soil samples collected ranged from 0.2 to 1.2 ppm during the investigation.
Waste/ rubble	No waste/rubble was present on-site.
Water Inflow	No groundwater intercepted during the soil drilling.



## 6 Assessment Criteria

Salinity Assessments are conducted to determine whether the salt in the soil could have an impact on a proposed development or asset. Salt can corrode concrete and steel and has impacts on plant growth if present in excessive quantities. Aggressiveness is a measure of the potential for corrosion to occur on concrete or steel structures. Soil aggressiveness is generally determined by analysing the pH, conductivity, and presence of chlorides and sulfates within soils.

National Dryland Salinity Program (1993 – 2004) was used a criterion for assessing soil salinity it is based on the electrical conductivity (EC) as an indicative of the salinity. The EC test conducted on a soil sample for salinity is generally made up of 1:5 soil water suspension, which is one part air dried soil to five parts distilled water. The determined EC is multiplied by a conversion factor (cf) based on the texture of the soil sample, to obtain Electrical Conductivity of a saturated soil extract designated as E<sub>ce</sub>. **Table 5** shows the conversion factor according to the soil texture. Once E<sub>ce</sub> is calculated, it is compared against the salinity criteria presented in **Table 6**. For this assessment, the soil texture was considered as “Light-medium clay” and its respective conversion factor (cf = 8) was used to calculate the E<sub>ce</sub>.

Soil Texture	Conversion factor
Sand	15
Sand Loam	12
Loam	10
Clay Loam	9
Light-medium Clay	8
Heavy Clay	6

Reference	Parameter	Criteria	
<b>Dryland Salinity 1993</b>	Electrical Conductivity Saturation Extract E <sub>ce</sub> (dS/m) value range, based on an introduction of a multiplication factor from Calculating electrical conductivity and Salinity (NSW Catchment Management Authority)	Non-Saline	<2
		Slightly Saline	2-4
		Moderately Saline	4-8
		Very Saline	8-16
		Highly Saline	>16



The soil aggressivity criteria applicable to concrete and steel/iron was assessed in accordance with Australian Standard AS 2159-2009 - *Piling – Design and Installation* criteria (**Table 7**). This criterion considers the soil aggressivity, in terms of pH (acidity), sulfates and chlorides which can cause corrosion to structures. Sulfates are analysed only against concrete and chlorides only against steel/iron.

**Table 7: Aggressivity Criteria**

Reference	Element Type	High Perm Soils below groundwater	Low Perm Soils below groundwater / All soils above groundwater	pH	Chloride (mg/kg)	Sulfate SO <sub>4</sub> (mg/kg)
AS 2159 2009	Concrete elements	Non	Non	>5.5	N/A	<5,000
		Mild	Mild	4.5-5.5		5,000-10,000
		Severe	Moderate	4.0-4.5		10,000-20,000
		Very severe	Severe	<4.0		<20,000
	Steel elements	Non	Non	>5.0	<5,000	N/A
		Mild	Non	4.0-5.0	5,000-20,000	
		Moderate	Mild	3.0-4.0	20,000-50,000	
		Severe	Moderate	<3.0	>50,000	

The AS 2159/2009 presents different criteria for high permeability soils below groundwater and low permeability soils below groundwater/all soils above groundwater. The soils encountered at the site comprise a mix of clay, sand and silt, with different clay content among the samples. Permeability tests were not performed for this assessment; although all samples were collected above groundwater level and the respective criterion was adopted for this assessment.



## 7 Salinity & Aggressivity Results

**Table 8** below summarises the salinity results and **Table 9** summarises the aggressivity results against the adopted screening levels. The NATA endorsed laboratory results and the chain of custody documentation are presented in **Appendix D**.

<i>Table 8: Salinity Results</i>																	
Analyte	Units	S1_	S1_	S2_	S3_	S4_	S5_	S6_	S7_	S8_	S9_	S10_	S11_	S12_	S13_	S14_	S15_
		0.5 m	1.5 m	0.5 m	0.5 m	0.5 m	0.4 m	0.6 m	0.6 m	1.0 m	0.5 m	0.3 m	0.6 m	0.3 m	0.4 m	0.3 m	0.5 m
Electrical Conductivity	uS/cm	28	61	17	11	82	34	59	7	14	16	23	15	49	100	29	28
	dS/m	0.028	0.061	0.017	0.011	0.082	0.034	0.059	0.007	0.014	0.016	0.023	0.015	0.049	0.1	0.029	0.028
Conversion factor	N/A	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Electrical Conductivity Saturation Extract (Light-medium clay)	uS/cm	224	488	136	88	656	272	472	56	112	128	184	120	392	800	232	224
	dS/m	0.22	0.49	0.14	0.09	0.66	0.27	0.47	0.06	0.11	0.13	0.18	0.12	0.39	0.80	0.23	0.22
Salinity	Light-medium clay	Non-Saline	Non-Saline	Non-Saline	Non-Saline	Non-Saline	Non-Saline	Non-Saline	Non-Saline	Non-Saline	Non-Saline	Non-Saline	Non-Saline	Non-Saline	Non-Saline	Non-Saline	Non-Saline



**Table 9: Aggressivity Results**

Analyte	Units	S1_	S1_	S2_	S3_	S4_	S5_	S6_	S7_	S8_	S9_	S10_	S11_	S12_	S13_	S14_	S15_
		0.5 m	1.5 m	0.5 m	0.5 m	0.5 m	0.4 m	0.6 m	0.6 m	1.0 m	0.5 m	0.3 m	0.6 m	0.3 m	0.4 m	0.3 m	0.5 m
<b>pH 1:5</b>	pH Units	4.3	4.6	4.2	4.4	3.7	3.9	4.8	4.6	4.3	5.6	4.1	5.1	4.6	4.7	5.7	5.0
<b>Chloride</b>	mg/kg	12	51	9.1	7.9	91	46	80	2.6	6.8	6.4	29	11	30	140	8.3	5.0
<b>Sulfate</b>	mg/kg	30	56	11	6.3	38	6.0	19	5.9	13	13	<5	9.4	52	22	<5	6.5
<b>Aggressivity</b>	Steel in soils above groundwater level	Non	Non	Non	Non	Mild	Mild	Non	Non	Non	Non	Non	Non	Non	Non	Non	Non
	Concrete in soils above groundwater level	Moderate	Mild	Moderate	Moderate	Severe	Severe	Mild	Mild	Moderate	Non	Moderate	Mild	Mild	Mild	Non	Mild



## 8 Discussion and Conclusion

Raw Earth were engaged by Stanton Architects to conduct a Salinity and Aggressivity Assessment at the property located at 84 Gavenlock Road, Mardi, NSW 2259. The site is described as Lot 9 Section 4 DP 3368 and comprises an approximate total area of 133,500 m<sup>2</sup>. The investigation area is located on the north-west portion of the site and comprises an approximate total area of 10,000 m<sup>2</sup>.

The soil analysis reported low values of  $E_c$ , ranging from 0.007 to 0.1 dS/m.  $E_{ce}$  was calculated using a conversion factor for light-medium clay soil texture ( $cf = 8$ ) and resulted in  $E_{ce} < 2$  dS/m for all sample results. As such and in accordance with the salinity assessment criteria (National Dryland Program 1993-2004) the site soil conditions are classified as **Non-saline**.

Analytical soil results reported concentrations of Sulfate ( $SO_4^{2-}$ ) and Chloride ( $Cl^-$ ) to be below of the aggressivity criterion of 5000 mg/kg for all soil samples analysed. However, analytical results for pH reported moderately acidic pH values in several samples. Therefore, the soil samples were assessed only against the pH criterion for aggressivity.

The aggressivity assessment indicates the following:

- Samples S4 and S5 presented the lowest pH values, 3.7 and 3.9 respectively.
- Local soils were found to be non-aggressive to mildly aggressive to steel.
- Local soils were found to be non-aggressive to severely aggressive to concrete.

It is recommended appropriate foundation design and construction should be further investigated by a Geotechnical Engineer and/or Structural Engineer prior to the construction stage of the proposed development to identify and confirm a foundation system compatible with the soil site conditions.



## 9 Limitations

Raw Earth Environmental Pty Ltd (Raw Earth) understands to the best of our knowledge, the information within this report is accurate at the date of issue. However, due to the irregularity and dynamic nature of subsurface conditions, soil and groundwater characteristics are capable of change over a short period of time. No warranties, expressed or implied, are made. The contents of this report must be read in full.

If the unexpected finds of materials suspected to be hazardous or toxic occur, all site works must cease, and Raw Earth must be immediately contacted for further instruction.

Raw Earth performed the services in a manner consistent with the normal level of care and expertise exercised by members of the environmental consulting profession. There is no investigation thorough enough to dismiss a particular material, which presently or in the future is considered hazardous at the site. Regulatory criteria are subject to change, where concentrations of a particular contaminant currently considered low, could be subject to review and fall under different regulatory standards and criteria and may require remediation in the future.

The results of this assessment are based on a desktop review of available information and regulatory criteria identified at the time of the site inspection. Raw Earth will not be liable to revise the report to account for any changes in site characteristics, regulatory requirements, assessment criteria or the availability of additional information, subsequent to the issue date of this report. The scope and period of Raw Earths' services are subject to restrictions and limitations. Raw Earth did not perform a complete assessment of all possible conditions that may exist at the site.

Raw Earth takes no responsibility or liability for errors in any data obtained from scientific laboratories, regulatory agencies, statements from sources outside of Raw Earth, or developments resulting from situations outside the scope of this project.

All conclusions and recommendations regarding the site are the opinion of Raw Earth. Opinions are judgements, which are based on our understanding and interpretation of current regulatory standards and should not be construed as legal opinions.

We trust the information contained within this document meets your requirements. Should you have any queries, please do not hesitate to contact the Raw Earth.



## 10 References

- Australian Standards, AS 2159 *Piling – Design and Installation*, 2009.
- Australian Government, National Dryland Salinity Program (1993-2004).
- Department of Urban Affairs and Planning, NSW Environmental Protection Authority, Managing Land Contamination – Planning Guidelines – SEPP 55 – Remediation of Land, 1998.
- Google Earth, <https://www.google.com/earth>.
- National Environment Protection (Assessment of Site Contamination) (NEPC) Measure as varied 2011, Schedule B1 – Guideline on Investigation Levels for Soil and Groundwater, 2013.
- National Environment Protection (Assessment of Site Contamination) (NEPC) Measure as varied 2011, Schedule B2 – Guideline on Site Characterisation, 2013.
- NSW Environmental Protection Authority, Contaminated Land Management, Guidelines for the NSW Site Auditor Scheme (3rd Edition), 2017.
- NSW Environmental Protection Authority, Guidelines on the Duty to Report Contamination under Contaminated Land Management Act, 1997.
- NSW Environmental Protection Authority, Sampling Design Guidelines, 1995.
- NSW Environmental Protection Authority, Waste Classification Guidelines Part 1: Classifying Waste, 2014.
- NSW Office of Environment & Heritage, Guidelines for Consultants Reporting on Contaminated Sites, 2011.
- Six Maps, <https://www.maps.six.nsw.gov.au>.
- State Environment Protection Policy 55 (SEPP 55). Remediation of Land Under the Environmental Planning and Assessment Act, 1998.
- WaterNSW, [waterNSW.com.au](http://waterNSW.com.au).
- Western Australia Department of Health, Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia, 2009.
- Western Australia Department of Primary Industries and Regional Development, *Measuring Soil Salinity*, 2022.
- Work Health and Safety Act, 2011.
- Work Health and Safety Regulation, 2017.



## 11 Abbreviations

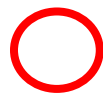
Abbreviation	Full Description
ASS	Acid Sulfate Soils
BGL	Below Ground Level
CCC	Central Coast Council
CLM	Contaminated Land Assessment
COC	Chain of Custody
CoPC	Contaminants of Potential Concern
DA	Development Application
DSI	Detailed Site Investigation
EC	Electrical Conductivity
ECe	Electrical Conductivity Saturation Extract
EPA	Environment Protection Agency
NATA	National Accredited Testing Authority
NSW CLR	New South Wales Contaminated Land Register
PASS	Potential Acid Sulfate Soil
PID	Photoionsation Detector



## Appendix A: Figures



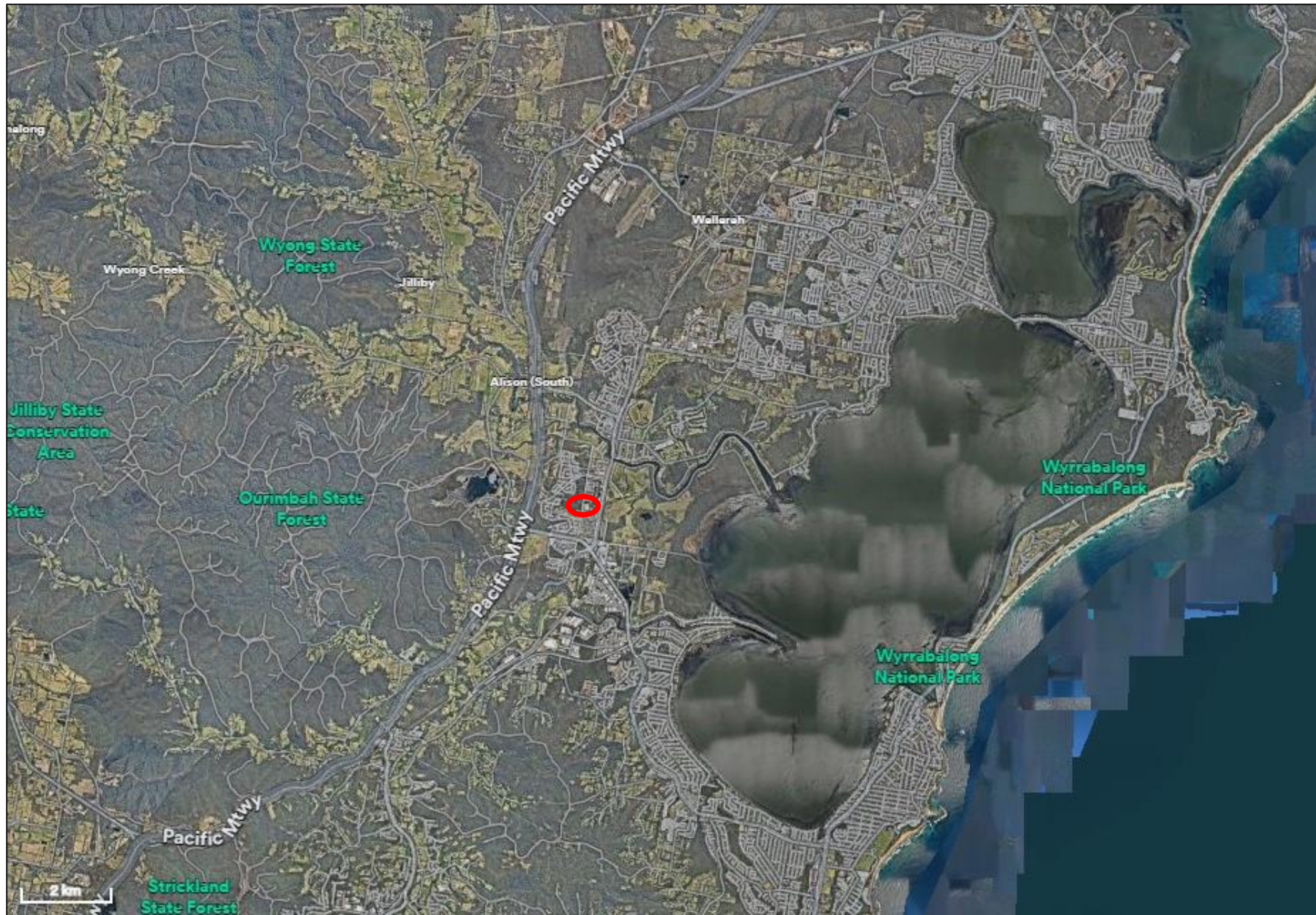
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Site location

**Figure 1:**  
Site Location Plan

**Project:**  
Salinity and Aggressivity  
Assessment.  
84 Gavenlock Road, Mardi,  
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Site Boundary



Site Investigation  
Area

**Figure 2:**  
Site Layout Plan


**Project:**  
Salinity and Aggressivity  
Assessment.  
84 Gavenlock Road, Mardi,  
NSW 2259.





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 Site Investigation  
Area

 Sample  
Location  
(approximate)

**Figure 3:**  
Sampling Plan

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Salinity and Aggressivity  
Assessment.  
84 Gavenlock Road, Mardi,  
NSW 2259.



# Hydrogeology - Groundwater Bore Map



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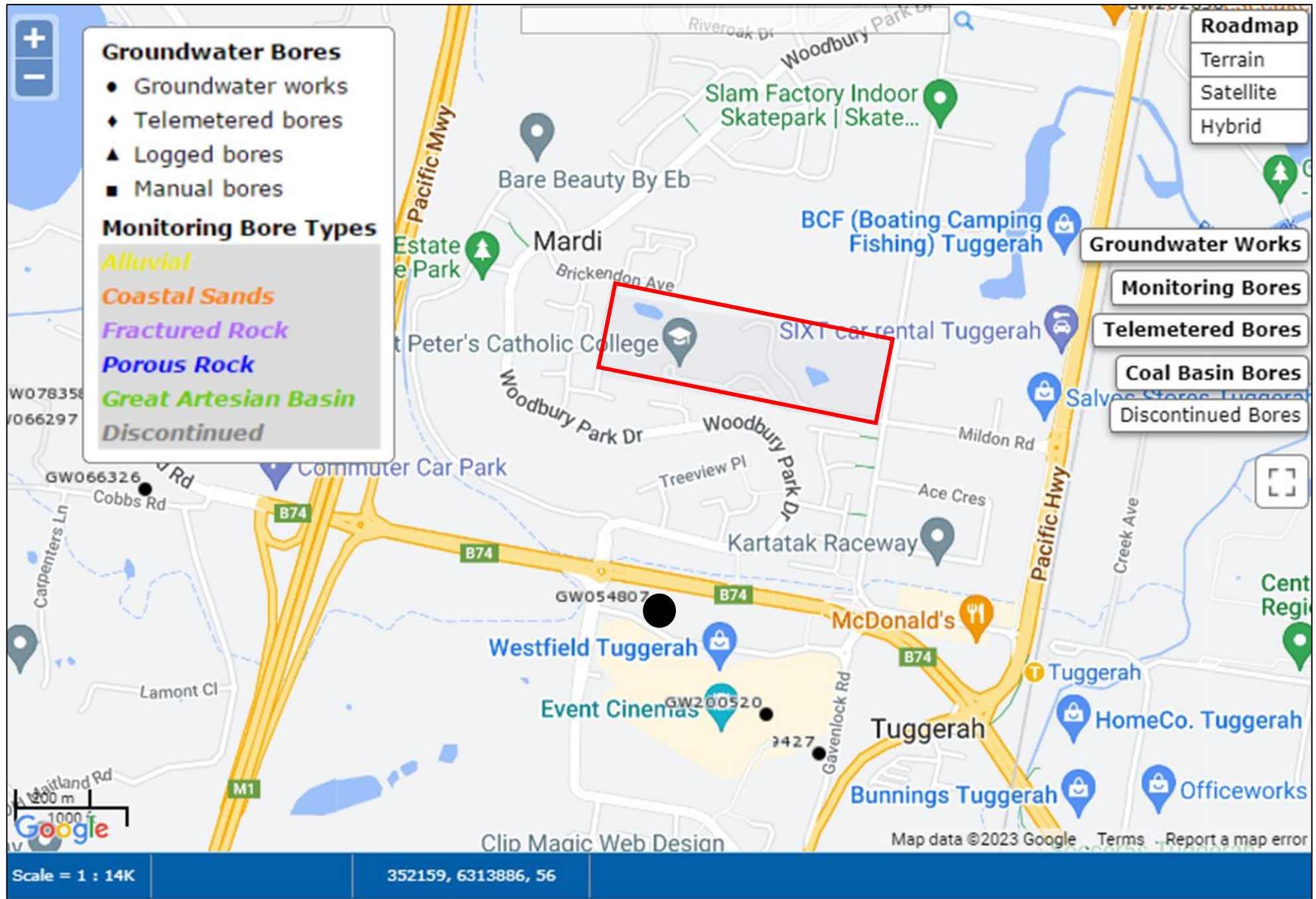
Site location



Groundwater Bore (GW)

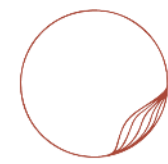
**Figure 4:**  
Groundwater Bore Map

**Project:**  
Salinity and Aggressivity Assessment.  
84 Gavenlock Road, Mardi,  
NSW 2259.





## Appendix B: Site Photographs



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Photo 1: Overview of the investigation area, looking north-east. Vegetation surrounding the surface water body and sheds in the background.



Photo 2: Overview of the investigation area, looking east.



Photo 3: Advancement of BH01. No stains or odours noted.



Photo 4: Sample S06\_0.6 next to the drill rig. No stains or odours noted.



Photo 5: BH03 being drilled using a hand auger. No stains or odours noted.



Photo 6: Sample S12\_0.3. No stains or odours noted.



## Appendix C: Soil Log

## Soil Log

### Salinity & Aggressivity Assessment

S00326 – 84 Gavenlock Road, Mardi, NSW 2259

S00326 - Soil Log				
Bore Hole ID	Sample ID	Depth (m)	Soil Description	Sample Coordinates
BH01		0.1	Topsoil: Gravely clayey sand, dark brown, organic debris, dry, loose density, fine to medium grained sand.	33°18'02"S;151°24'34"E
	S1_0.5	0.5	Sandy clay, creamy yellow/grey, organic debris, slightly moist, loose density, fine to medium grained sand.	
		1.0	Sandy clay, white cream, wet, firm density, fine to medium grained sand.	
	S1_1.5	1.5	Sandy clay, white cream, wet, firm density, fine to medium grained sand.	
BH02		0.1	Gravely clayey sand, dark brown, organic debris, dry, loose density, fine to medium grained sand.	33°18'02"S;151°24'34"E
	S2_0.5	0.5	Clayey sand, pale grey, moist, loose density, fine to medium grained sand.	
BH03		0.1	Gravely clayey sand, dark brown, organic debris, dry, loose density, fine to medium grained sand.	33°18'01"S;151°24'34"E
	S3_0.5	0.5	Natural, sand, pale grey, organic debris, slightly moist, loose density, fine to medium grained sand.	
BH04		0.1	Gravely clayey sand, dark brown, organic debris, dry, loose density, fine to medium grained sand.	33°18'00"S;151°24'34"E
	S4_0.5	0.5	Sandy clay, brown and dark/grey, moist, firm density, fine to medium grained.	

<b>S00326 - Soil Log</b>				
<b>Bore Hole ID</b>	<b>Sample ID</b>	<b>Depth (m)</b>	<b>Soil Description</b>	<b>Sample Coordinates</b>
<b>BH05</b>		0.1	Gravely clayey sand, dark brown, organic debris, dry, loose density, fine to medium grained sand.	33°18'00"S;151°24'35"E
	<b>S5_0.4</b>	0.4	Sandy clay, brown and dark/grey, moist, firm density, fine to medium grained.	
<b>BH06</b>		0.1	Gravely clayey sand, dark brown, organic debris, dry, loose density, fine to medium grained sand.	33°18'01"S;151°24'35"E
	<b>S6_0.6</b>	0.6	Sandy clay, brown and dark/grey, moist, firm density, fine to medium grained.	
<b>BH07</b>		0.1	Gravely clayey sand, dark brown, organic debris, dry, loose density, fine to medium grained sand.	33°18'02"S;151°24'35"E
	<b>S7_0.6</b>	0.6	Sandy clay, white cream, wet, firm density, fine to medium grained sand.	
<b>BH08</b>		0.1	Gravely clayey sand, dark brown, organic debris, dry, loose density, fine to medium grained sand.	33°18'02"S;151°24'35"E
		0.5	Sandy clay, white cream, wet, firm density, fine to medium grained sand	
	<b>S8_1.0</b>	1.0	Sandy clay, white cream, wet, firm density, fine to medium grained sand.	
<b>BH09</b>		0.1	Gravely clayey sand, dark brown, organic debris, moist, loose density, fine to medium grained sand.	33°18'02"S;151°24'36"E
	<b>S9_0.5</b>	0.5	Clayey sand, pale grey, wet, loose density, fine to medium grained sand.	

<b>S00326 - Soil Log</b>				
<b>Bore Hole ID</b>	<b>Sample ID</b>	<b>Depth (m)</b>	<b>Soil Description</b>	<b>Sample Coordinates</b>
<b>BH10</b>		0.1	Gravely clayey sand, dark brown, organic debris, moist, loose density, fine to medium grained sand.	33°18'00"S;151°24'36"E
	<b>S10_0.3</b>	0.3	Sandy clay, brown and dark/grey, moist, firm density, fine to medium sand grained.	
<b>BH11</b>		0.1	Gravely clayey sand, dark brown, organic debris, moist, loose density, fine to medium grained sand.	33°18'02"S;151°24'36"E
	<b>S11_0.6</b>	0.6	Clayey sand, pale grey, wet, loose density, fine to medium grained sand.	
<b>BH12</b>		0.1	Gravely clayey sand, dark brown, organic debris, moist, loose density, fine to medium grained sand.	33°18'01"S;151°24'37"E
	<b>S12_0.3</b>	0.3	Clayey sand, yellow/orange, wet, loose density, medium grained sand.	
<b>BH13</b>		0.1	Gravely clayey sand, dark brown, organic debris, moist, loose density, fine to medium grained sand.	33°18'01"S;151°24'38"E
	<b>S13_0.4</b>	0.4	Clayey sand, yellow/orange, wet, loose density, medium grained sand.	
<b>BH14</b>		0.1	Gravely clayey sand, dark brown, organic debris, moist, loose density, fine to medium grained sand.	33°18'01"S;151°24'40"E
	<b>S14_0.3</b>	0.3	Clayey sand, gravel inclusions, grey, humid, loose density, medium to coarse grained sand.	
<b>BH15</b>		0.1	Gravely clayey sand, dark brown, organic debris, moist, loose density, fine to medium grained sand.	33°18'02"S;151°24'38"E
	<b>S15_0.5</b>	0.5	Clayey sand, gravel inclusions, creamy grey, wet, loose density, medium to coarse grained sand.	



## **Appendix D: NATA Accredited Laboratory Analytical Results**





## SAMPLE RECEIPT ADVICE

SE264102

### CLIENT DETAILS

Contact Phillip Waters  
Client RAW EARTH ENVIRONMENTAL  
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BYRON BAY NSW 2481

Telephone (Not specified)  
Facsimile (Not specified)  
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Project **S00326 Stanton Dahl**  
Order Number **S00326**  
Samples 17

### LABORATORY DETAILS

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Alexandria NSW 2015

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Facsimile +61 2 8594 0499  
Email au.environmental.sydney@sgs.com

Samples Received Mon 22/4/2024  
Report Due Wed 1/5/2024  
SGS Reference **SE264102**

### SUBMISSION DETAILS

This is to confirm that 17 samples were received on Monday 22/4/2024. Results are expected to be ready by COB Wednesday 1/5/2024. Please quote SGS reference SE264102 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	16 Soil, 1 Water	Type of documentation received	COC
Date documentation received	22/04/2024	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	11.5°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

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

### COMMENTS

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# SAMPLE RECEIPT ADVICE

SE264102

## CLIENT DETAILS

Client RAW EARTH ENVIRONMENTAL

Project S00326 Stanton Dahl

## SUMMARY OF ANALYSIS

No.	Sample ID	Conductivity and TDS by Calculation - Soil	Mercury (dissolved) in Water	Moisture Content	pH in soil (1:5)	Soluble Anions (1:5) in Soil/Solids by Ion	Trace Metals (Dissolved) in Water by ICPMS	VOCs in Water
001	S1-0.5	2	-	1	1	2	-	-
002	S1-1.5	2	-	1	1	2	-	-
003	S2-0.5	2	-	1	1	2	-	-
004	S3-0.5	2	-	1	1	2	-	-
005	S4-0.5	2	-	1	1	2	-	-
006	S5-0.4	2	-	1	1	2	-	-
007	S6-0.6	2	-	1	1	2	-	-
008	S7-0.6	2	-	1	1	2	-	-
009	S8-1.0	2	-	1	1	2	-	-
010	S9-0.5	2	-	1	1	2	-	-
011	S10-0.3	2	-	1	1	2	-	-
012	S11-0.6	2	-	1	1	2	-	-
013	S12-0.3	2	-	1	1	2	-	-
014	S13-0.4	2	-	1	1	2	-	-
015	S14-0.3	2	-	1	1	2	-	-
016	S15-0.5	2	-	1	1	2	-	-
017	Rinsate	-	1	-	-	-	7	11

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

CLIENT DETAILS

LABORATORY DETAILS

Contact Phillip Waters  
 Client RAW EARTH ENVIRONMENTAL  
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 Byron Bay  
 BYRON BAY NSW 2481

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Project **S00326 Stanton Dahl**  
 Order Number **S00326**  
 Samples 17

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SGS Reference **SE264102 R0**  
 Date Received 22/4/2024  
 Date Reported 1/5/2024

COMMENTS

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

SIGNATORIES



**Dong LIANG**  
 Metals/Inorganics Team Leader



**Kamrul AHSAN**  
 Senior Chemist



**Ly Kim HA**  
 Organic Section Head



**Shane MCDERMOTT**  
 Inorganic/Metals Chemist



**Ying Ying ZHANG**  
 Laboratory Technician

pH in soil (1:5) [AN101] Tested: 30/4/2024

			S1-0.5	S1-1.5	S2-0.5	S3-0.5	S4-0.5
			SOIL	SOIL	SOIL	SOIL	SOIL
			-	-	-	-	-
			22/4/2024	22/4/2024	22/4/2024	22/4/2024	22/4/2024
PARAMETER	UOM	LOR	SE264102.001	SE264102.002	SE264102.003	SE264102.004	SE264102.005
pH	pH Units	0.1	<b>4.3</b>	<b>4.6</b>	<b>4.2</b>	<b>4.4</b>	<b>3.7</b>

			S5-0.4	S6-0.6	S7-0.6	S8-1.0	S9-0.5
			SOIL	SOIL	SOIL	SOIL	SOIL
			-	-	-	-	-
			22/4/2024	22/4/2024	22/4/2024	22/4/2024	22/4/2024
PARAMETER	UOM	LOR	SE264102.006	SE264102.007	SE264102.008	SE264102.009	SE264102.010
pH	pH Units	0.1	<b>3.9</b>	<b>4.8</b>	<b>4.6</b>	<b>4.3</b>	<b>5.6</b>

			S10-0.3	S11-0.6	S12-0.3	S13-0.4	S14-0.3
			SOIL	SOIL	SOIL	SOIL	SOIL
			-	-	-	-	-
			22/4/2024	22/4/2024	22/4/2024	22/4/2024	22/4/2024
PARAMETER	UOM	LOR	SE264102.011	SE264102.012	SE264102.013	SE264102.014	SE264102.015
pH	pH Units	0.1	<b>4.1</b>	<b>5.1</b>	<b>4.6</b>	<b>4.7</b>	<b>5.7</b>

			S15-0.5
			SOIL
			-
			22/4/2024
PARAMETER	UOM	LOR	SE264102.016
pH	pH Units	0.1	<b>5.0</b>

Conductivity and TDS by Calculation - Soil [AN106] Tested: 30/4/2024

PARAMETER	UOM	LOR	S1-0.5	S1-1.5	S2-0.5	S3-0.5	S4-0.5
			SOIL	SOIL	SOIL	SOIL	SOIL
			22/4/2024 SE264102.001	22/4/2024 SE264102.002	22/4/2024 SE264102.003	22/4/2024 SE264102.004	22/4/2024 SE264102.005
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	<b>28</b>	<b>61</b>	<b>17</b>	<b>11</b>	<b>82</b>
Saturated Conductivity (ECse)*	µS/cm	5	-	-	-	-	-

PARAMETER	UOM	LOR	S5-0.4	S6-0.6	S7-0.6	S8-1.0	S9-0.5
			SOIL	SOIL	SOIL	SOIL	SOIL
			22/4/2024 SE264102.006	22/4/2024 SE264102.007	22/4/2024 SE264102.008	22/4/2024 SE264102.009	22/4/2024 SE264102.010
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	<b>34</b>	<b>59</b>	<b>7</b>	<b>14</b>	<b>16</b>
Saturated Conductivity (ECse)*	µS/cm	5	-	-	-	-	-

PARAMETER	UOM	LOR	S10-0.3	S11-0.6	S12-0.3	S13-0.4	S14-0.3
			SOIL	SOIL	SOIL	SOIL	SOIL
			22/4/2024 SE264102.011	22/4/2024 SE264102.012	22/4/2024 SE264102.013	22/4/2024 SE264102.014	22/4/2024 SE264102.015
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	<b>23</b>	<b>15</b>	<b>49</b>	<b>100</b>	<b>29</b>
Saturated Conductivity (ECse)*	µS/cm	5	-	-	-	-	-

PARAMETER	UOM	LOR	S15-0.5
			SOIL
			22/4/2024 SE264102.016
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	<b>7</b>
Saturated Conductivity (ECse)*	µS/cm	5	-

Soluble Anions (1:5) in Soil/Solids by Ion Chromatography [AN245] Tested: 29/4/2024

PARAMETER	UOM	LOR	S1-0.5	S1-1.5	S2-0.5	S3-0.5	S4-0.5
			SOIL	SOIL	SOIL	SOIL	SOIL
			22/4/2024 SE264102.001	22/4/2024 SE264102.002	22/4/2024 SE264102.003	22/4/2024 SE264102.004	22/4/2024 SE264102.005
Chloride	mg/kg	0.25	<b>12</b>	<b>51</b>	<b>9.1</b>	<b>7.9</b>	<b>91</b>
Sulfate	mg/kg	5	<b>30</b>	<b>56</b>	<b>11</b>	<b>6.3</b>	<b>38</b>

PARAMETER	UOM	LOR	S5-0.4	S6-0.6	S7-0.6	S8-1.0	S9-0.5
			SOIL	SOIL	SOIL	SOIL	SOIL
			22/4/2024 SE264102.006	22/4/2024 SE264102.007	22/4/2024 SE264102.008	22/4/2024 SE264102.009	22/4/2024 SE264102.010
Chloride	mg/kg	0.25	<b>46</b>	<b>80</b>	<b>2.6</b>	<b>6.8</b>	<b>6.4</b>
Sulfate	mg/kg	5	<b>6.0</b>	<b>19</b>	<b>5.9</b>	<b>13</b>	<b>13</b>

PARAMETER	UOM	LOR	S10-0.3	S11-0.6	S12-0.3	S13-0.4	S14-0.3
			SOIL	SOIL	SOIL	SOIL	SOIL
			22/4/2024 SE264102.011	22/4/2024 SE264102.012	22/4/2024 SE264102.013	22/4/2024 SE264102.014	22/4/2024 SE264102.015
Chloride	mg/kg	0.25	<b>29</b>	<b>11</b>	<b>30</b>	<b>140</b>	<b>8.3</b>
Sulfate	mg/kg	5	<5.0	<b>9.4</b>	<b>52</b>	<b>22</b>	<5.0

PARAMETER	UOM	LOR	S15-0.5
			SOIL
			22/4/2024 SE264102.016
Chloride	mg/kg	0.25	<b>5.0</b>
Sulfate	mg/kg	5	<b>6.5</b>

Moisture Content [AN002] Tested: 24/4/2024

			S1-0.5	S1-1.5	S2-0.5	S3-0.5	S4-0.5
			SOIL	SOIL	SOIL	SOIL	SOIL
			-	-	-	-	-
			22/4/2024	22/4/2024	22/4/2024	22/4/2024	22/4/2024
PARAMETER	UOM	LOR	SE264102.001	SE264102.002	SE264102.003	SE264102.004	SE264102.005
% Moisture	%w/w	1	11.2	14.1	10.6	9.9	10.1

			S5-0.4	S6-0.6	S7-0.6	S8-1.0	S9-0.5
			SOIL	SOIL	SOIL	SOIL	SOIL
			-	-	-	-	-
			22/4/2024	22/4/2024	22/4/2024	22/4/2024	22/4/2024
PARAMETER	UOM	LOR	SE264102.006	SE264102.007	SE264102.008	SE264102.009	SE264102.010
% Moisture	%w/w	1	13.6	8.3	9.9	11.1	7.5

			S10-0.3	S11-0.6	S12-0.3	S13-0.4	S14-0.3
			SOIL	SOIL	SOIL	SOIL	SOIL
			-	-	-	-	-
			22/4/2024	22/4/2024	22/4/2024	22/4/2024	22/4/2024
PARAMETER	UOM	LOR	SE264102.011	SE264102.012	SE264102.013	SE264102.014	SE264102.015
% Moisture	%w/w	1	15.0	8.9	11.1	9.9	14.7

			S15-0.5
			SOIL
			-
			22/4/2024
PARAMETER	UOM	LOR	SE264102.016
% Moisture	%w/w	1	11.2

VOCs in Water [AN433] Tested: 26/4/2024

PARAMETER	UOM	LOR	Rinsate
			WATER - 22/4/2024 SE264102.017
Benzene	µg/L	0.5	<0.5
Toluene	µg/L	0.5	<b>1.4</b>
Ethylbenzene	µg/L	0.5	<0.5
m/p-xylene	µg/L	1	<1
o-xylene	µg/L	0.5	<0.5
Naphthalene (VOC)*	µg/L	0.5	<0.5
Total Xylenes	µg/L	1.5	<1.5
Total BTEX	µg/L	3	<3

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 24/4/2024

			Rinsate
			WATER
			-
			22/4/2024
PARAMETER	UOM	LOR	SE264102.017
Arsenic	µg/L	1	<1
Cadmium	µg/L	0.1	<b>0.1</b>
Copper	µg/L	1	<1
Chromium	µg/L	1	<1
Nickel	µg/L	1	<1
Lead	µg/L	1	<1
Zinc	µg/L	5	<5

Mercury (dissolved) in Water [AN311(Perth)/AN312] Tested: 23/4/2024

			Rinsate
			WATER
			-
			22/4/2024
PARAMETER	UOM	LOR	SE264102.017
Mercury	mg/L	0.0001	<0.0001

METHOD

METHODOLOGY SUMMARY

**AN002**

The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.

**AN020**

Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.

**AN101**

pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode and is calibrated against 3 buffers purchased commercially. For soils, sediments and sludges, an extract with water (or 0.01M CaCl<sub>2</sub>) is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+.

**AN106**

Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as µmhos/cm or µS/cm @ 25°C. For soils, an extract of as received sample with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Salinity can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. Reference APHA 2510 B.

**AN245**

Anions by Ion Chromatography: A water sample is injected into an eluent stream that passes through the ion chromatographic system where the anions of interest ie Br, Cl, NO<sub>2</sub>, NO<sub>3</sub> and SO<sub>4</sub> are separated on their relative affinities for the active sites on the column packing material. Changes to the conductivity and the UV-visible absorbance of the eluent enable identification and quantitation of the anions based on their retention time and peak height or area. APHA 4110 B

**AN311(Perth)/AN312**

Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.

**AN318**

Determination of elements at trace level in waters by ICP-MS technique,, referenced to USEPA 6020B and USEPA 200.8 (5.4).

**AN433**

VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC's are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

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

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

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

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

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

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

Note that in terms of units of radioactivity:

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

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

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

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

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client only. Any unauthorized alteration, forgery or



# STATEMENT OF QA/QC PERFORMANCE

SE264102 R0

## CLIENT DETAILS

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BYRON BAY NSW 2481  
  
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Facsimile (Not specified)  
Email philip@rawearthenvironmental.com.au  
  
Project **S00326 Stanton Dahl**  
Order Number **S00326**  
Samples 17

## LABORATORY DETAILS

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Email au.environmental.sydney@sgs.com  
  
SGS Reference **SE264102 R0**  
Date Received 22 Apr 2024  
Date Reported 01 May 2024

## COMMENTS

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

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

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

Extraction Date	Conductivity and TDS by Calculation - Soil	16 items
	pH in soil (1:5)	16 items
Analysis Date	Conductivity and TDS by Calculation - Soil	16 items

## SAMPLE SUMMARY

Sample counts by matrix	16 Soil, 1 Water	Type of documentation received	COC
Date documentation received	22/04/2024	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	11.5°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

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

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

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the

### Conductivity and TDS by Calculation - Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S1-0.5	SE264102.001	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	29 Apr 2024	01 May 2024†
S1-1.5	SE264102.002	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	29 Apr 2024	01 May 2024†
S2-0.5	SE264102.003	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	29 Apr 2024	01 May 2024†
S3-0.5	SE264102.004	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	29 Apr 2024	01 May 2024†
S4-0.5	SE264102.005	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	29 Apr 2024	01 May 2024†
S5-0.4	SE264102.006	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	29 Apr 2024	01 May 2024†
S6-0.6	SE264102.007	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	29 Apr 2024	01 May 2024†
S7-0.6	SE264102.008	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	29 Apr 2024	01 May 2024†
S8-1.0	SE264102.009	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	29 Apr 2024	01 May 2024†
S9-0.5	SE264102.010	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	29 Apr 2024	01 May 2024†
S10-0.3	SE264102.011	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	29 Apr 2024	01 May 2024†
S11-0.6	SE264102.012	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	29 Apr 2024	01 May 2024†
S12-0.3	SE264102.013	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	29 Apr 2024	01 May 2024†
S13-0.4	SE264102.014	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	29 Apr 2024	01 May 2024†
S14-0.3	SE264102.015	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	29 Apr 2024	01 May 2024†
S15-0.5	SE264102.016	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	29 Apr 2024	01 May 2024†

### Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate	SE264102.017	LB310428	22 Apr 2024	22 Apr 2024	20 May 2024	23 Apr 2024	20 May 2024	23 Apr 2024

### Moisture Content

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S1-0.5	SE264102.001	LB310683	22 Apr 2024	22 Apr 2024	06 May 2024	24 Apr 2024	29 Apr 2024	29 Apr 2024
S1-1.5	SE264102.002	LB310683	22 Apr 2024	22 Apr 2024	06 May 2024	24 Apr 2024	29 Apr 2024	29 Apr 2024
S2-0.5	SE264102.003	LB310683	22 Apr 2024	22 Apr 2024	06 May 2024	24 Apr 2024	29 Apr 2024	29 Apr 2024
S3-0.5	SE264102.004	LB310683	22 Apr 2024	22 Apr 2024	06 May 2024	24 Apr 2024	29 Apr 2024	29 Apr 2024
S4-0.5	SE264102.005	LB310683	22 Apr 2024	22 Apr 2024	06 May 2024	24 Apr 2024	29 Apr 2024	29 Apr 2024
S5-0.4	SE264102.006	LB310683	22 Apr 2024	22 Apr 2024	06 May 2024	24 Apr 2024	29 Apr 2024	29 Apr 2024
S6-0.6	SE264102.007	LB310683	22 Apr 2024	22 Apr 2024	06 May 2024	24 Apr 2024	29 Apr 2024	29 Apr 2024
S7-0.6	SE264102.008	LB310683	22 Apr 2024	22 Apr 2024	06 May 2024	24 Apr 2024	29 Apr 2024	29 Apr 2024
S8-1.0	SE264102.009	LB310683	22 Apr 2024	22 Apr 2024	06 May 2024	24 Apr 2024	29 Apr 2024	29 Apr 2024
S9-0.5	SE264102.010	LB310683	22 Apr 2024	22 Apr 2024	06 May 2024	24 Apr 2024	29 Apr 2024	29 Apr 2024
S10-0.3	SE264102.011	LB310683	22 Apr 2024	22 Apr 2024	06 May 2024	24 Apr 2024	29 Apr 2024	29 Apr 2024
S11-0.6	SE264102.012	LB310683	22 Apr 2024	22 Apr 2024	06 May 2024	24 Apr 2024	29 Apr 2024	29 Apr 2024
S12-0.3	SE264102.013	LB310683	22 Apr 2024	22 Apr 2024	06 May 2024	24 Apr 2024	29 Apr 2024	29 Apr 2024
S13-0.4	SE264102.014	LB310683	22 Apr 2024	22 Apr 2024	06 May 2024	24 Apr 2024	29 Apr 2024	29 Apr 2024
S14-0.3	SE264102.015	LB310683	22 Apr 2024	22 Apr 2024	06 May 2024	24 Apr 2024	29 Apr 2024	29 Apr 2024
S15-0.5	SE264102.016	LB310683	22 Apr 2024	22 Apr 2024	06 May 2024	24 Apr 2024	29 Apr 2024	29 Apr 2024

### pH in soil (1:5)

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S1-0.5	SE264102.001	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	01 May 2024	01 May 2024
S1-1.5	SE264102.002	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	01 May 2024	01 May 2024
S2-0.5	SE264102.003	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	01 May 2024	01 May 2024
S3-0.5	SE264102.004	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	01 May 2024	01 May 2024
S4-0.5	SE264102.005	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	01 May 2024	01 May 2024
S5-0.4	SE264102.006	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	01 May 2024	01 May 2024
S6-0.6	SE264102.007	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	01 May 2024	01 May 2024
S7-0.6	SE264102.008	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	01 May 2024	01 May 2024
S8-1.0	SE264102.009	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	01 May 2024	01 May 2024
S9-0.5	SE264102.010	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	01 May 2024	01 May 2024
S10-0.3	SE264102.011	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	01 May 2024	01 May 2024
S11-0.6	SE264102.012	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	01 May 2024	01 May 2024
S12-0.3	SE264102.013	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	01 May 2024	01 May 2024
S13-0.4	SE264102.014	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	01 May 2024	01 May 2024
S14-0.3	SE264102.015	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	01 May 2024	01 May 2024
S15-0.5	SE264102.016	LB311033	22 Apr 2024	22 Apr 2024	29 Apr 2024	30 Apr 2024†	01 May 2024	01 May 2024

### Soluble Anions (1:5) in Soil/Solids by Ion Chromatography

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

Sample Name	Sample No.	QC Ref
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SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

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

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the

**Soluble Anions (1:5) in Soil/Solids by Ion Chromatography (continued)**

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
S1-0.5	SE264102.001	LB310880	22 Apr 2024	22 Apr 2024	29 Apr 2024	29 Apr 2024	27 May 2024	01 May 2024
S1-1.5	SE264102.002	LB310880	22 Apr 2024	22 Apr 2024	29 Apr 2024	29 Apr 2024	27 May 2024	01 May 2024
S2-0.5	SE264102.003	LB310880	22 Apr 2024	22 Apr 2024	29 Apr 2024	29 Apr 2024	27 May 2024	01 May 2024
S3-0.5	SE264102.004	LB310880	22 Apr 2024	22 Apr 2024	29 Apr 2024	29 Apr 2024	27 May 2024	01 May 2024
S4-0.5	SE264102.005	LB310880	22 Apr 2024	22 Apr 2024	29 Apr 2024	29 Apr 2024	27 May 2024	01 May 2024
S5-0.4	SE264102.006	LB310880	22 Apr 2024	22 Apr 2024	29 Apr 2024	29 Apr 2024	27 May 2024	01 May 2024
S6-0.6	SE264102.007	LB310880	22 Apr 2024	22 Apr 2024	29 Apr 2024	29 Apr 2024	27 May 2024	01 May 2024
S7-0.6	SE264102.008	LB310880	22 Apr 2024	22 Apr 2024	29 Apr 2024	29 Apr 2024	27 May 2024	01 May 2024
S8-1.0	SE264102.009	LB310880	22 Apr 2024	22 Apr 2024	29 Apr 2024	29 Apr 2024	27 May 2024	01 May 2024
S9-0.5	SE264102.010	LB310880	22 Apr 2024	22 Apr 2024	29 Apr 2024	29 Apr 2024	27 May 2024	01 May 2024
S10-0.3	SE264102.011	LB310880	22 Apr 2024	22 Apr 2024	29 Apr 2024	29 Apr 2024	27 May 2024	01 May 2024
S11-0.6	SE264102.012	LB310880	22 Apr 2024	22 Apr 2024	29 Apr 2024	29 Apr 2024	27 May 2024	01 May 2024
S12-0.3	SE264102.013	LB310880	22 Apr 2024	22 Apr 2024	29 Apr 2024	29 Apr 2024	27 May 2024	01 May 2024
S13-0.4	SE264102.014	LB310880	22 Apr 2024	22 Apr 2024	29 Apr 2024	29 Apr 2024	27 May 2024	01 May 2024
S14-0.3	SE264102.015	LB310880	22 Apr 2024	22 Apr 2024	29 Apr 2024	29 Apr 2024	27 May 2024	01 May 2024
S15-0.5	SE264102.016	LB310880	22 Apr 2024	22 Apr 2024	29 Apr 2024	29 Apr 2024	27 May 2024	01 May 2024

**Trace Metals (Dissolved) in Water by ICPMS**

Method: ME-(AU)-[ENV]AN318

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate	SE264102.017	LB310569	22 Apr 2024	22 Apr 2024	19 Oct 2024	24 Apr 2024	19 Oct 2024	24 Apr 2024

**VOCs in Water**

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
Rinsate	SE264102.017	LB310820	22 Apr 2024	22 Apr 2024	06 May 2024	26 Apr 2024	06 May 2024	29 Apr 2024

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

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

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	Rinsate	SE264102.017	%	40 - 130%	83
d4-1,2-dichloroethane (Surrogate)	Rinsate	SE264102.017	%	40 - 130%	128
d8-toluene (Surrogate)	Rinsate	SE264102.017	%	40 - 130%	112

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

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

**Conductivity and TDS by Calculation - Soil**

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

Sample Number	Parameter	Units	LOR	Result
LB311033.001	Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	0.69

**Mercury (dissolved) in Water**

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Number	Parameter	Units	LOR	Result
LB310428.001	Mercury	mg/L	0.0001	<0.0001

**Soluble Anions (1:5) in Soil/Solids by Ion Chromatography**

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

Sample Number	Parameter	Units	LOR	Result
LB310880.001	Chloride	mg/kg	0.25	<0.25
	Sulfate	mg/kg	5	<5.0
LB310880.025	Chloride	mg/kg	0.25	<0.25
	Sulfate	mg/kg	5	<5.0

**Trace Metals (Dissolved) in Water by ICPMS**

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result
LB310569.001	Arsenic	µg/L	1	<1
	Cadmium	µg/L	0.1	<0.1
	Chromium	µg/L	1	<1
	Copper	µg/L	1	<1
	Lead	µg/L	1	<1
	Nickel	µg/L	1	<1
	Zinc	µg/L	5	<5
LB310569.025	Arsenic	µg/L	1	<1
	Cadmium	µg/L	0.1	<0.1
	Chromium	µg/L	1	<1
	Copper	µg/L	1	<1
	Lead	µg/L	1	<1
	Nickel	µg/L	1	<1
	Zinc	µg/L	5	<5

**VOCs in Water**

Method: ME-(AU)-[ENV]AN433

Sample Number	Parameter	Units	LOR	Result	
LB310820.001	Monocyclic Aromatic Hydrocarbons	Benzene	µg/L	0.5	<0.5
		Toluene	µg/L	0.5	<0.5
		Ethylbenzene	µg/L	0.5	<0.5
		m/p-xylene	µg/L	1	<1
	Polycyclic VOCs	o-xylene	µg/L	0.5	<0.5
		Naphthalene (VOC)*	µg/L	0.5	<0.5
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	98
d8-toluene (Surrogate)		%	-	89	
	Bromofluorobenzene (Surrogate)	%	-	81	

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

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

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

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

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

Conductivity and TDS by Calculation - Soil

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE264102.010	LB311033.014	Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	16	15.2582130872	43	2
SE264219.004	LB311033.025	Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	11.87368421092	3.945011783	35	1

Moisture Content

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE264102.010	LB310683.011	% Moisture	%w/w	1	7.5	7.6	43	2
SE264219.004	LB310683.022	% Moisture	%w/w	1	3.9969834087	3.9934800325	55	0

pH in soil (1:5)

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE264102.010	LB311033.014	pH	pH Units	0.1	5.6	5.8	32	3
SE264219.004	LB311033.025	pH	pH Units	0.1	8.77	8.73	31	0

Soluble Anions (1:5) in Soil/Solids by Ion Chromatography

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE264102.006	LB310880.014	Chloride	mg/kg	0.25	46	48	31	5
		Sulfate	mg/kg	5	6.0	5.5	117	9
SE264102.016	LB310880.027	Chloride	mg/kg	0.25	5.0	4.5	35	11
		Sulfate	mg/kg	5	6.5	7.4	102	13

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE264102.017	LB310569.028	Arsenic	µg/L	1	<1	<1	200	0
		Cadmium	µg/L	0.1	0.1	0.1	97	20
		Chromium	µg/L	1	<1	<1	200	0
		Copper	µg/L	1	<1	<1	200	0
		Lead	µg/L	1	<1	<1	200	0
		Nickel	µg/L	1	<1	<1	200	0
		Zinc	µg/L	5	<5	<5	200	0
SE264137.002	LB310569.033	Arsenic	µg/L	1	<1	<1	200	0
		Cadmium	µg/L	0.1	<0.1	<0.1	200	0
		Chromium	µg/L	1	<1	<1	200	0
		Copper	µg/L	1	12	12	24	1
		Lead	µg/L	1	<1	<1	200	0
		Nickel	µg/L	1	<1	<1	129	0
		Zinc	µg/L	5	28	27	33	2
SE264151.006	LB310569.014	Arsenic	µg/L	1	<1	<1	200	0
		Cadmium	µg/L	0.1	<0.1	<0.1	200	0
		Chromium	µg/L	1	<1	<1	200	0
		Copper	µg/L	1	<1	<1	200	0
		Lead	µg/L	1	<1	<1	200	0
		Nickel	µg/L	1	<1	<1	200	0
		Zinc	µg/L	5	<5	<5	200	0

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %	
SE264102.017	LB310820.025	Monocyclic Aromatic	Benzene	µg/L	0.5	<0.5	<0.5	200	0
			Toluene	µg/L	0.5	1.4	1.0	72	30
			Ethylbenzene	µg/L	0.5	<0.5	<0.5	200	0
			m/p-xylene	µg/L	1	<1	<1	200	0
			o-xylene	µg/L	0.5	<0.5	<0.5	200	0
		Polycyclic Surrogates	Naphthalene (VOC)*	µg/L	0.5	<0.5	<0.5	200	0
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	12.8	11.0	30	15
			d8-toluene (Surrogate)	µg/L	-	11.2	9.5	30	16
			Bromofluorobenzene (Surrogate)	µg/L	-	8.3	9.2	30	10
			Totals	Total BTEX	µg/L	3	<3	<3	200
SE264248.001	LB310820.024	Monocyclic Aromatic	Benzene	µg/L	0.5	<0.5	<0.5	200	0
			Toluene	µg/L	0.5	<0.5	<0.5	200	0
			Ethylbenzene	µg/L	0.5	<0.5	<0.5	200	0

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

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

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

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

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

VOCs in Water (continued)

Method: ME-(AU)-ENVJAN433

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %	
SE264248.001	LB310820.024	Monocyclic	m/p-xylene	µg/L	1	<1	<1	200	0
		Aromatic	o-xylene	µg/L	0.5	<0.5	<0.5	200	0
		Polycyclic	Naphthalene (VOC)*	µg/L	0.5	<0.5	<0.5	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	14	12	30	10
			d8-toluene (Surrogate)	µg/L	-	11	11	30	5
			Bromofluorobenzene (Surrogate)	µg/L	-	9.1	9.1	30	0
			Totals	Total BTEX	µg/L	3	<3	<3	200

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

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

Conductivity and TDS by Calculation - Soil

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB311033.002	Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	NA	303	85 - 115	98

pH in soil (1:5)

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB311033.003	pH	pH Units	0.1	7.4	7.415	98 - 102	99

Soluble Anions (1:5) in Soil/Solids by Ion Chromatography

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

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB310880.002	Chloride	mg/kg	0.25	98	100	70 - 130	98
	Sulfate	mg/kg	5	99	100	70 - 130	99
LB310880.026	Chloride	mg/kg	0.25	98	100	70 - 130	98
	Sulfate	mg/kg	5	100	100	70 - 130	100

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB310569.002	Arsenic	µg/L	1	20	20	80 - 120	101
	Cadmium	µg/L	0.1	21	20	80 - 120	104
	Chromium	µg/L	1	21	20	80 - 120	106
	Copper	µg/L	1	22	20	80 - 120	108
	Lead	µg/L	1	21	20	80 - 120	106
	Nickel	µg/L	1	21	20	80 - 120	104
	Zinc	µg/L	5	23	20	80 - 120	115
LB310569.026	Arsenic	µg/L	1	21	20	80 - 120	103
	Cadmium	µg/L	0.1	21	20	80 - 120	103
	Chromium	µg/L	1	21	20	80 - 120	105
	Copper	µg/L	1	21	20	80 - 120	107
	Lead	µg/L	1	21	20	80 - 120	104
	Nickel	µg/L	1	21	20	80 - 120	104
	Zinc	µg/L	5	22	20	80 - 120	110

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %	
LB310820.002	Monocyclic	Benzene	µg/L	0.5	53	45.45	60 - 140	116
		Aromatic	Toluene	µg/L	0.5	54	45.45	60 - 140
	Ethylbenzene		µg/L	0.5	54	45.45	60 - 140	118
	m/p-xylene		µg/L	1	110	90.9	60 - 140	118
	o-xylene		µg/L	0.5	54	45.45	60 - 140	119
	Surrogates		d4-1,2-dichloroethane (Surrogate)	µg/L	-	9.2	10	60 - 140
		d8-toluene (Surrogate)	µg/L	-	9.4	10	70 - 130	94
		Bromofluorobenzene (Surrogate)	µg/L	-	10.1	10	70 - 130	101

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

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

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Pørth)/AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE264053.007	LB310428.004	Mercury	mg/L	0.0001	0.0018	<0.0001	0.008	92

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE264129.013	LB310569.004	Arsenic	µg/L	1	21	<1	20	104
		Cadmium	µg/L	0.1	21	<0.1	20	106
		Chromium	µg/L	1	22	<1	20	107
		Copper	µg/L	1	22	<1	20	109
		Lead	µg/L	1	22	<1	20	109
		Nickel	µg/L	1	21	<1	20	106
		Zinc	µg/L	5	23	<5	20	113
SE264141.002	LB310569.030	Arsenic	µg/L	1	20	<1	20	102
		Cadmium	µg/L	0.1	21	<0.1	20	104
		Chromium	µg/L	1	21	<1	20	104
		Copper	µg/L	1	22	<1	20	108
		Lead	µg/L	1	21	<1	20	105
		Nickel	µg/L	1	21	<1	20	103
		Zinc	µg/L	5	23	<5	20	114

VOCs in Water

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number	Parameter	Units	LOR	Original	Spike	Recovery%	
SE264118.001	LB310820.022	Monocyclic	Benzene	µg/L	0.5	<0.5	45.45	109
			Aromatic	Toluene	µg/L	0.5	<0.5	45.45
		Ethylbenzene		µg/L	0.5	<0.5	45.45	104
		m/p-xylene		µg/L	1	<1	90.9	99
		o-xylene		µg/L	0.5	<0.5	45.45	102
		Polycyclic		Naphthalene (VOC)*	µg/L	0.5	<0.5	-
		Surrogates	d4-1,2-dichloroethane (Surrogate)	µg/L	-	14	-	116
			d8-toluene (Surrogate)	µg/L	-	11	-	105
			Bromofluorobenzene (Surrogate)	µg/L	-	8.8	-	101
		Totals	Total BTEX	µg/L	3	<3	-	-

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

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

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

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

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

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

- \* NATA accreditation does not cover the performance of this service .
- \*\* Indicative data, theoretical holding time exceeded.
- \*\*\* Indicates that both \* and \*\* apply.
- Sample not analysed for this analyte.
- IS Insufficient sample for analysis.
- LNR Sample listed, but not received.
- LOR Limit of reporting.
- QFH QC result is above the upper tolerance.
- QFL QC result is below the lower tolerance.
- ① At least 2 of 3 surrogates are within acceptance criteria.
- ② RPD failed acceptance criteria due to sample heterogeneity.
- ③ Results less than 5 times LOR preclude acceptance criteria for RPD.
- ④ Recovery failed acceptance criteria due to matrix interference.
- ⑤ Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
- ⑥ LOR was raised due to sample matrix interference.
- ⑦ LOR was raised due to dilution of significantly high concentration of analyte in sample.
- ⑧ Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
- ⑨ Recovery failed acceptance criteria due to sample heterogeneity.
- ⑩ LOR was raised due to high conductivity of the sample (required dilution).
- † Refer to relevant report comments for further information.

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