

CERTIFICATE OF ANALYSIS

Work Order : **EW2102188**
Client : **WOLLONGONG CITY COUNCIL**
Contact : DELLA KUTZNER
Address : 41 BURELLI STREET
 WOLLONGONG NSW, AUSTRALIA 2500

Telephone : +61 02 4227 7111
Project : Helensburgh Groundwater Quarterly
Order number : 1021509
C-O-C number : ----
Sampler : Robert DaLio
Site : ----
Quote number : WO/005/18 TENDER
No. of samples received : 8
No. of samples analysed : 8

Page : 1 of 4
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500
 4/13 Geary Pl, North Nowra 2541
 Australia NSW Australia

Telephone : 02 42253125
Date Samples Received : 17-May-2021 14:31
Date Analysis Commenced : 17-May-2021
Issue Date : 01-Jun-2021 10:27



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Aneta Prosaroski	Client Liaison Officer	Laboratory - Wollongong, NSW
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- **Analytical work for this work order will be conducted at ALS Sydney.**
- TDS by method EA-015 may bias high for various samples due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Sampling and groundwater depth measurements completed by ALS Wollongong via inhouse sampling method EN/67.11 Groundwater Sampling.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	BH1	BH4	BH5	BH6	LGMB1
				Sampling date / time	17-May-2021 09:30	17-May-2021 12:15	17-May-2021 09:45	17-May-2021 12:05	17-May-2021 10:05
Compound	CAS Number	LOR	Unit		EW2102188-001	EW2102188-002	EW2102188-003	EW2102188-004	EW2102188-005
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit		5.5	4.6	4.9	7.1	5.9
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	1	mg/L		460	354	106	266	146
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		15	<1	<1	210	44
Total Alkalinity as CaCO3	----	1	mg/L		15	<1	<1	210	44
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		105	94	24	22	54
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		190	129	39	20	18
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L		28	<1	4	46	13
Magnesium	7439-95-4	1	mg/L		25	5	5	25	9
Sodium	7440-23-5	1	mg/L		81	108	22	15	19
Potassium	7440-09-7	1	mg/L		<1	<1	2	3	<1
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		0.67	<0.01	0.01	<0.01	<0.01
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		<1	<1	<1	<1	<1
FWI-EN/001: Groundwater Sampling - Depth									
Depth	----	0.01	m		3.16	3.09	4.78	2.84	2.27



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID		LGMB2	LGMB3	LGMB4	----	----	
Sampling date / time		17-May-2021 09:15		17-May-2021 10:50		17-May-2021 11:10		----	----
Compound	CAS Number	LOR	Unit	EW2102188-006	EW2102188-007	EW2102188-008	-----	-----	
				Result	Result	Result	----	----	
EA005FD: Field pH									
pH	----	0.1	pH Unit	5.9	5.5	5.4	----	----	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	1	mg/L	217	71	102	----	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	----	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	----	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	34	12	6	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	34	12	6	----	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	29	15	28	----	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	30	20	16	----	----	
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L	16	6	7	----	----	
Magnesium	7439-95-4	1	mg/L	6	3	3	----	----	
Sodium	7440-23-5	1	mg/L	15	10	8	----	----	
Potassium	7440-09-7	1	mg/L	4	1	12	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.03	<0.01	<0.01	----	----	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	1	<1	2	----	----	
FWI-EN/001: Groundwater Sampling - Depth									
Depth	----	0.01	m	2.73	2.19	1.99	----	----	

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C

(WATER) EP005: Total Organic Carbon (TOC)

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) ED045G: Chloride by Discrete Analyser

(WATER) ED041G: Sulfate (Turbidimetric) as SO4 2- by DA

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) ED093T: Total Major Cations