ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EW2002286**	Page	: 1 of 4
Client	: **WOLLONGONG CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: DELLA KUTZNER	Contact	: Glenn Davies
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Telephone	: +61 02 4227 7111	Telephone	: 02 42253125
Project	: Helensburgh Groundwater Quarterly	Date Samples Received	: 12-May-2020 15:20
Order number	: 1011047	Date Analysis Commenced	: 12-May-2020
C-O-C number	: ----	Issue Date	: 20-May-2020 08:58
Sampler	: Robert DaLio		
Site	: ----		
Quote number	: WO/005/18 TENDER		
No. of samples received	: 8		
No. of samples analysed	: 8		

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. 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.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong, NSW
Ivan Taylor	Analyst	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 samples 6 and 8 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)			Client sample ID	BH1	BH4	BH5 GWMB5	BH6 GWMB6	LGMB1
			Client sampling date / time	12-May-2020 12:05	12-May-2020 11:35	12-May-2020 12:35	12-May-2020 11:10	12-May-2020 12:25
Compound	CAS Number	LOR	Unit	EW2002286-001	EW2002286-002	EW2002286-003	EW2002286-004	EW2002286-005
				Result	Result	Result	Result	Result
EA005FD: Field pH								
pH	----	0.1	pH Unit	5.1	4.7	4.8	7.0	5.3
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	1	mg/L	698	333	147	282	139
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	10	5	2	248	27
Total Alkalinity as CaCO3	----	1	mg/L	10	5	2	248	27
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	137	99	24	10	56
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	285	108	44	17	18
ED093T: Total Major Cations								
Calcium	7440-70-2	1	mg/L	46	1	4	36	7
Magnesium	7439-95-4	1	mg/L	41	6	5	26	6
Sodium	7440-23-5	1	mg/L	106	106	28	15	22
Potassium	7440-09-7	1	mg/L	<1	<1	1	2	<1
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.24	0.02	<0.01	<0.01	<0.01
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	4	3	1	10	2
FWI-EN/001: Groundwater Sampling - Depth								
Depth	----	0.01	m	3.28	2.52	4.35	0.98	2.30

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	LGMB2	LGMB3	LGMB4	----	----
			Client sampling date / time	12-May-2020 12:00	12-May-2020 10:05	12-May-2020 10:25	----	----
Compound	CAS Number	LOR	Unit	EW2002286-006	EW2002286-007	EW2002286-008	--------	--------
				Result	Result	Result	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	**5.7**	**5.5**	**5.3**	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	1	mg/L	**266**	**57**	**159**	----	----
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	**23**	**16**	**7**	----	----
Total Alkalinity as CaCO3	----	1	mg/L	**23**	**16**	**7**	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**45**	**14**	**26**	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	**40**	**11**	**14**	----	----
ED093T: Total Major Cations								
Calcium	7440-70-2	1	mg/L	**13**	**5**	**6**	----	----
Magnesium	7439-95-4	1	mg/L	**6**	**3**	**3**	----	----
Sodium	7440-23-5	1	mg/L	**26**	**7**	**8**	----	----
Potassium	7440-09-7	1	mg/L	**3**	**2**	**15**	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.02**	<0.01	<0.01	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**4**	**1**	**4**	----	----
FWI-EN/001: Groundwater Sampling - Depth								
Depth	----	0.01	m	**3.25**	**3.16**	**3.25**	----	----