

Environmental Division

## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>EW1202998</b></p> <p><b>Client</b> : <b>WOLLONGONG CITY COUNCIL</b></p> <p><b>Contact</b> : MR WAYDE PETERSON</p> <p><b>Address</b> : 41 BURELLI STREET WOLLONGONG NSW, AUSTRALIA 2500</p> <p><b>E-mail</b> : wpeterson@wollongong.nsw.gov.au</p> <p><b>Telephone</b> : +61 02 4227 7111</p> <p><b>Facsimile</b> : +61 02 4227 7277</p> <p><b>Project</b> : Helensburgh Groundwater Quarterly</p> <p><b>Order number</b> : ----</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : cwilson</p> <p><b>Site</b> : ----</p> <p><b>Quote number</b> : WL/001/11 Helensburgh Groundwater Quarterly</p>	<p><b>Page</b> : 1 of 4</p> <p><b>Laboratory</b> : Environmental Division NSW South Coast</p> <p><b>Contact</b> : Glenn Davies</p> <p><b>Address</b> : 99 Kenny Street, Wollongong 2500 Unit 4 / 13 Geary Place, PO Box 3105, North Nowra 2541 AUSTRALIA</p> <p><b>E-mail</b> : glenn.davies@alsglobal.com</p> <p><b>Telephone</b> : 02 4225 3125</p> <p><b>Facsimile</b> : 02 4225 3128</p> <p><b>QC Level</b> : NEPM 1999 Schedule B(3) and ALS QCS3 requirement</p> <p><b>Date Samples Received</b> : 02-NOV-2012</p> <p><b>Issue Date</b> : 12-NOV-2012</p> <p><b>No. of samples received</b> : 9</p> <p><b>No. of samples analysed</b> : 9</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



NATA Accredited Laboratory 825

Accredited for compliance with  
ISO/IEC 17025.

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong
Raymond Commodor	Instrument Chemist	Sydney Inorganics
Sarah Millington	Senior Inorganic Chemist	Sydney Inorganics



## General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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.

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

- **EA015: TDS by method EA-015 may bias high for sample ID LGMB1 due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.**



## Analytical Results

Sub-Matrix: WATER

Client sample ID  
 Client sampling date / time

				BH 1	BH 2	BH 4	BH 5	BH 6
				02-NOV-2012 08:05	02-NOV-2012 08:45	02-NOV-2012 08:55	02-NOV-2012 09:45	02-NOV-2012 09:15
Compound	CAS Number	LOR	Unit	EW1202998-001	EW1202998-002	EW1202998-003	EW1202998-004	EW1202998-005
<b>EA015: Total Dissolved Solids</b>								
Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	286	446	338	124	226
<b>ED037P: Alkalinity by PC Titrator</b>								
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	94	38	<1	2	<1
Total Alkalinity as CaCO3	----	1	mg/L	94	38	<1	2	<1
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	19	92	98	23	64
<b>ED045G: Chloride Discrete analyser</b>								
Chloride	16887-00-6	1	mg/L	105	158	113	59	52
<b>ED093T: Total Major Cations</b>								
Calcium	7440-70-2	1	mg/L	19	3	<1	4	<1
Magnesium	7439-95-4	1	mg/L	15	2	5	6	5
Sodium	7440-23-5	1	mg/L	56	154	101	26	48
Potassium	7440-09-7	1	mg/L	2	13	1	1	1
<b>EK055G: Ammonia as N by Discrete Analyser</b>								
Ammonia as N	7664-41-7	0.01	mg/L	4.87	5.58	0.02	<0.01	0.01
<b>EN67 PK: Field Tests</b>								
pH	----	0.1	pH Unit	6.2	5.6	4.5	5.1	4.8
Depth	----	0.01	m	4.44	2.86	5.55	7.36	3.81
<b>EP005: Total Organic Carbon (TOC)</b>								
Total Organic Carbon	----	1	mg/L	4	17	<1	<1	2



## Analytical Results

Sub-Matrix: WATER

				Client sample ID	LGMB1	LGMB2	LGMB3	LGMB4	----
				Client sampling date / time	02-NOV-2012 07:50	02-NOV-2012 08:15	02-NOV-2012 08:35	02-NOV-2012 08:25	----
Compound	CAS Number	LOR	Unit		EW1202998-006	EW1202998-007	EW1202998-008	EW1202998-009	----
<b>EA015: Total Dissolved Solids</b>									
Total Dissolved Solids @180°C	GIS-210-010	1	mg/L		400	218	137	178	----
<b>ED037P: Alkalinity by PC Titrator</b>									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		16	<1	13	8	----
Total Alkalinity as CaCO3	----	1	mg/L		16	<1	13	8	----
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		75	54	24	65	----
<b>ED045G: Chloride Discrete analyser</b>									
Chloride	16887-00-6	1	mg/L		21	68	42	12	----
<b>ED093T: Total Major Cations</b>									
Calcium	7440-70-2	1	mg/L		7	7	3	8	----
Magnesium	7439-95-4	1	mg/L		6	9	3	4	----
Sodium	7440-23-5	1	mg/L		34	40	22	11	----
Potassium	7440-09-7	1	mg/L		6	5	6	28	----
<b>EK055G: Ammonia as N by Discrete Analyser</b>									
Ammonia as N	7664-41-7	0.01	mg/L		0.01	0.03	2.63	0.03	----
<b>EN67 PK: Field Tests</b>									
pH	----	0.1	pH Unit		5.2	4.7	5.3	5.1	----
Depth	----	0.01	m		3.30	4.43	4.38	3.64	----
<b>EP005: Total Organic Carbon (TOC)</b>									
Total Organic Carbon	----	1	mg/L		<1	<1	<1	5	----