



## CERTIFICATE OF ANALYSIS

**Work Order** : **EW1512531**  
**Client** : **WOLLONGONG CITY COUNCIL**  
**Contact** : **MR WAYDE PETERSON**  
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**WOLLONGONG NSW, AUSTRALIA 2500**

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**Telephone** : **+61 02 4227 7111**  
**Facsimile** : **+61 02 4227 7277**  
**Project** : **Helensburgh Groundwater Quarterly**  
**Order number** : **3044522**  
**C-O-C number** : **----**  
**Sampler** : **Craig Wilson**  
**Site** : **----**

**Quote number** : **----**

**Page** : **1 of 4**  
**Laboratory** : **Environmental Division NSW South Coast**  
**Contact** : **Glenn Davies**  
**Address** : **1/19 Ralph Black Dr, North Wollongong 2500**  
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**Australia**  
**E-mail** : **glenn.davies@alsglobal.com**  
**Telephone** : **02 42253125**  
**Facsimile** : **W 02 42253128 N 02 44232083**  
**QC Level** : **NEPM 2013 B3 & ALS QC Standard**  
**Date Samples Received** : **11-Nov-2015 14:00**  
**Date Analysis Commenced** : **11-Nov-2015**  
**Issue Date** : **18-Nov-2015 16:32**

**No. of samples received** : **9**  
**No. of samples analysed** : **9**

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

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
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Dian Dao		Sydney Inorganics
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong



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## 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

∅ = ALS is not NATA accredited for these tests.

- Sampling and sample data supplied by ALS Wollongong.
  - Sampling completed as per FWI-EN001 Groundwater Sampling.
  - Field tests completed on day of sampling/receipt.
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## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH1	BH2	BH4	BH5	BH6
Client sampling date / time				11-Nov-2015 12:45	11-Nov-2015 11:55	11-Nov-2015 11:00	11-Nov-2015 12:55	11-Nov-2015 10:40	
Compound	CAS Number	LOR	Unit	EW1512531-001	EW1512531-002	EW1512531-003	EW1512531-004	EW1512531-005	
				Result	Result	Result	Result	Result	
<b>EA005FD: Field pH</b>									
pH	----	0.1	pH Unit	4.5	6.1	4.2	4.2	6.2	
<b>EA015: Total Dissolved Solids</b>									
Total Dissolved Solids @180°C	----	1	mg/L	323	490	349	128	209	
<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	<1	136	<1	<1	100	
Total Alkalinity as CaCO3	----	1	mg/L	<1	136	<1	<1	100	
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	137	65	89	23	22	
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L	51	128	113	37	19	
<b>ED093T: Total Major Cations</b>									
Calcium	7440-70-2	1	mg/L	29	11	<1	4	28	
Magnesium	7439-95-4	1	mg/L	12	6	5	5	13	
Sodium	7440-23-5	1	mg/L	33	143	106	24	20	
Potassium	7440-09-7	1	mg/L	6	21	1	<1	2	
<b>EK055G: Ammonia as N by Discrete Analyser</b>									
Ammonia as N	7664-41-7	0.01	mg/L	0.05	7.46	0.09	<0.01	0.03	
<b>EP005: Total Organic Carbon (TOC)</b>									
Total Organic Carbon	----	1	mg/L	5	26	4	<1	11	
<b>FWI-EN/001: Groundwater Sampling - Depth</b>									
Depth	----	0.01	m	3.17	2.30	3.64	5.48	2.93	



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	LGMB1	LGMB2	LGMB3	LGMB4	----
Client sampling date / time				11-Nov-2015 12:30	11-Nov-2015 12:35	11-Nov-2015 12:15	11-Nov-2015 12:05	----	
Compound	CAS Number	LOR	Unit	EW1512531-006	EW1512531-007	EW1512531-008	EW1512531-009	-----	
				Result	Result	Result	Result	Result	
<b>EA005FD: Field pH</b>									
pH	----	0.1	pH Unit	5.1	5.6	4.9	4.6	----	
<b>EA015: Total Dissolved Solids</b>									
Total Dissolved Solids @180°C	----	1	mg/L	214	134	84	141	----	
<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	44	27	12	6	----	
Total Alkalinity as CaCO3	----	1	mg/L	44	27	12	6	----	
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	80	16	14	39	----	
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L	16	12	18	15	----	
<b>ED093T: Total Major Cations</b>									
Calcium	7440-70-2	1	mg/L	22	10	6	7	----	
Magnesium	7439-95-4	1	mg/L	12	3	3	3	----	
Sodium	7440-23-5	1	mg/L	25	11	10	10	----	
Potassium	7440-09-7	1	mg/L	<1	2	3	20	----	
<b>EK055G: Ammonia as N by Discrete Analyser</b>									
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.22	<0.01	----	
<b>EP005: Total Organic Carbon (TOC)</b>									
Total Organic Carbon	----	1	mg/L	4	3	2	6	----	
<b>FWI-EN/001: Groundwater Sampling - Depth</b>									
Depth	----	0.01	m	2.63	2.85	2.54	2.88	----	