Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **EW1302411**	Page	: 1 of 4
Client	: **WOLLONGONG CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: MR WAYDE PETERSON	Contact	: Glenn Davies
Address	: 41 BURELLI STREET WOLLONGONG NSW, AUSTRALIA 2500	Address	: 99 Kenny Street, Wollongong 2500 Unit 4 / 13 Geary Place, PO Box 3105, North Nowra 2541 AUSTRALIA
E-mail	: wpeterson@wollongong.nsw.gov.au	E-mail	: glenn.davies@alsglobal.com
Telephone	: +61 02 4227 7111	Telephone	: 02 4225 3125
Facsimile	: +61 02 4227 7277	Facsimile	: 02 4225 3128
Project	: Helensburgh Groundwater Quarterly	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: 3015425		
C-O-C number	: ----	Date Samples Received	: 22-AUG-2013
Sampler	: Craig Wilson	Issue Date	: 28-AUG-2013
Site	: ----		
		No. of samples received	: 9
Quote number	: WL/001/11 Helensburgh Groundwater Quarterly	No. of samples analysed	: 9

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.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Ankit Joshi	Inorganic Chemist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong

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

- **EP002: NPOC analysis was carried out for sample ID (BH 4) due to high inorganic carbon content.**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH 1	BH 2	BH 4	BH 5	BH 6
				Client sampling date / time	22-AUG-2013 12:30	22-AUG-2013 14:10	22-AUG-2013 13:10	22-AUG-2013 12:45	22-AUG-2013 13:20
Compound	CAS Number	LOR	Unit		EW1302411-001	EW1302411-002	EW1302411-003	EW1302411-004	EW1302411-005
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	----	1	mg/L		286	409	362	135	198
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		<1	130	<1	<1	75
Total Alkalinity as CaCO3	----	1	mg/L		<1	130	<1	<1	75
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		106	62	91	21	43
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L		74	115	145	50	34
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L		20	12	<1	4	19
Magnesium	7439-95-4	1	mg/L		16	6	6	4	10
Sodium	7440-23-5	1	mg/L		42	121	119	28	41
Potassium	7440-09-7	1	mg/L		<1	24	1	<1	2
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		0.76	8.32	<0.01	<0.01	<0.01
EN67 PK: Field Tests									
pH	----	0.1	pH Unit		5.0	6.5	4.3	4.4	6.4
Depth	----	0.01	m		3.31	1.80	2.77	4.31	3.02
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		5	22	----	1	8
Nonpurgeable Organic Carbon	----	1	mg/L		----	----	3	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	LGMB1	LGMB2	LGMB3	LGMB4	----
				Client sampling date / time	22-AUG-2013 12:35	22-AUG-2013 12:20	22-AUG-2013 14:50	22-AUG-2013 14:30	----
Compound	CAS Number	LOR	Unit		EW1302411-006	EW1302411-007	EW1302411-008	EW1302411-009	----
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	----	1	mg/L		149	142	97	167	----
ED037P: Alkalinity by PC Titrator									
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		10	1	28	8	----
Total Alkalinity as CaCO3	----	1	mg/L		10	1	28	8	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		76	36	20	58	----
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L		14	51	21	20	----
ED093T: Total Major Cations									
Calcium	7440-70-2	1	mg/L		7	7	11	11	----
Magnesium	7439-95-4	1	mg/L		7	6	6	4	----
Sodium	7440-23-5	1	mg/L		30	32	11	12	----
Potassium	7440-09-7	1	mg/L		4	8	3	36	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		<0.01	0.03	0.02	0.04	----
EN67 PK: Field Tests									
pH	----	0.1	pH Unit		4.9	4.7	5.7	5.2	----
Depth	----	0.01	m		2.72	2.77	2.40	2.32	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		4	4	2	4	----