

CERTIFICATE OF ANALYSIS

<p>Work Order : EW1301500</p> <p>Client : WOLLONGONG CITY COUNCIL</p> <p>Contact : MR WAYDE PETERSON</p> <p>Address : 41 BURELLI STREET WOLLONGONG NSW, AUSTRALIA 2500</p> <p>E-mail : wpeterson@wollongong.nsw.gov.au</p> <p>Telephone : +61 02 4227 7111</p> <p>Facsimile : +61 02 4227 7277</p> <p>Project : Whytes Gully Stage 3 Bores & Surface Water Quarterly</p> <p>Order number : 3001821</p> <p>C-O-C number : ----</p> <p>Sampler : Craig Wilson</p> <p>Site : ----</p> <p>Quote number : WL/090/11 Stage 3</p>	<p>Page : 1 of 7</p> <p>Laboratory : Environmental Division NSW South Coast</p> <p>Contact : Glenn Davies</p> <p>Address : 99 Kenny Street, Wollongong 2500 Unit 4 / 13 Geary Place, PO Box 3105, North Nowra 2541 AUSTRALIA</p> <p>E-mail : glenn.davies@alsglobal.com</p> <p>Telephone : 02 4225 3125</p> <p>Facsimile : 02 4225 3128</p> <p>QC Level : NEPM 1999 Schedule B(3) and ALS QCS3 requirement</p> <p>Date Samples Received : 28-MAY-2013</p> <p>Issue Date : 05-JUN-2013</p> <p>No. of samples received : 23</p> <p>No. of samples analysed : 23</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
Hoa Nguyen	Senior Inorganic Chemist	Sydney Inorganics
Raymond Commodor	Instrument Chemist	Sydney Inorganics
Stephen Hislop	Senior Inorganic Chemist	Brisbane 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

- **EK055G: It has been noted that Ammonia is greater than TKN for sample ID:(Leachate), however this difference is within the limits of experimental variation.**
- **GMW102 & GMW106 - Dry at time of sampling.**
GABH01 - Destroyed at time of sampling.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)

Client sample ID

Client sampling date / time

				GMW102	GMW103	GMW104	GMW105	GMW108S
				28-MAY-2013 12:30	28-MAY-2013 12:55	28-MAY-2013 13:50	28-MAY-2013 13:10	28-MAY-2013 14:30
Compound	CAS Number	LOR	Unit	EW1301500-001	EW1301500-002	EW1301500-003	EW1301500-004	EW1301500-005
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	----	367	273	50	285
Total Alkalinity as CaCO3	----	1	mg/L	----	367	273	50	285
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	----	495	58	30	40
EG020T: Total Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	----	0.015	0.026	0.340	0.020
Iron	7439-89-6	0.05	mg/L	----	<0.05	0.27	7.18	2.34
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	----	<0.01	<0.01	<0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	<0.1	0.2	0.7	1.0
EN67 PK: Field Tests								
pH	----	0.1	pH Unit	----	7.0	7.0	5.7	7.2
Electrical Conductivity (Non Compensated)	----	1	µS/cm	----	2410	640	2620	773
Dissolved Oxygen	----	0.01	mg/L	----	2.12	7.43	3.06	4.21
Redox Potential	----	0.1	mV	----	206	125	222	125
Temperature	----	0.1	°C	----	19.3	18.4	18.2	17.7
Depth	----	0.01	m	----	7.82	7.28	11.0	2.78
Field Observations	----	0.01	--	DRY	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	<1	<1	<1	10



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)

Client sample ID

Client sampling date / time

				GMW108D	GMW109S	GMW109D	GMW110	GMW111
				28-MAY-2013 14:20	28-MAY-2013 11:10	28-MAY-2013 11:15	28-MAY-2013 11:40	28-MAY-2013 11:25
Compound	CAS Number	LOR	Unit	EW1301500-006	EW1301500-007	EW1301500-008	EW1301500-009	EW1301500-010
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	450	284	224	556	454
Total Alkalinity as CaCO3	----	1	mg/L	450	284	224	556	454
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	648	322	386	821	517
EG020T: Total Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	0.004	3.81	0.004	0.029	0.132
Iron	7439-89-6	0.05	mg/L	<0.05	12.3	<0.05	0.28	1.13
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1.58	<0.01	<0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	2.2	<0.1	<0.1	<0.1
EN67 PK: Field Tests								
pH	----	0.1	pH Unit	7.1	6.2	6.9	6.7	7.0
Electrical Conductivity (Non Compensated)	----	1	µS/cm	3170	1630	1670	3950	2560
Dissolved Oxygen	----	0.01	mg/L	5.99	1.73	3.12	2.16	2.22
Redox Potential	----	0.1	mV	107	-27.0	-14.0	124	95.0
Temperature	----	0.1	°C	17.2	19.3	19.4	18.8	18.8
Depth	----	0.01	m	2.38	3.04	2.99	4.18	6.25
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	<1	6	<1	<1	<1



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)

Client sample ID

Client sampling date / time

				GABH01	GABH02	GABH03	GABH06S	GABH06D
				28-MAY-2013 12:25	28-MAY-2013 12:15	28-MAY-2013 12:05	28-MAY-2013 14:00	28-MAY-2013 14:10
Compound	CAS Number	LOR	Unit	EW1301500-011	EW1301500-012	EW1301500-013	EW1301500-014	EW1301500-015
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	----	977	625	405	306
Total Alkalinity as CaCO3	----	1	mg/L	----	977	625	405	306
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	----	1120	1220	644	650
EG020T: Total Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	----	0.050	0.273	0.024	0.003
Iron	7439-89-6	0.05	mg/L	----	0.09	0.09	0.07	<0.05
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	----	<0.01	0.01	<0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	0.2	0.2	<0.1	0.1
EN67 PK: Field Tests								
pH	----	0.1	pH Unit	----	6.5	6.9	7.4	6.7
Electrical Conductivity (Non Compensated)	----	1	µS/cm	----	5260	5190	3170	2690
Dissolved Oxygen	----	0.01	mg/L	----	2.15	5.95	6.49	3.12
Redox Potential	----	0.1	mV	----	180	237	141	134
Temperature	----	0.1	°C	----	18.0	18.2	18.3	18.1
Depth	----	0.01	m	----	5.10	0.74	2.57	2.12
Field Observations	----	0.01	--	DESTROYED	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	75	32	<1	<1



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)

Client sample ID

Client sampling date / time

				BH6	Surface Water 1	Surface Water 2	Surface Water 3	Surface Water 4
				28-MAY-2013 11:50	28-MAY-2013 11:00	28-MAY-2013 10:50	28-MAY-2013 10:35	28-MAY-2013 10:20
Compound	CAS Number	LOR	Unit	EW1301500-016	EW1301500-017	EW1301500-018	EW1301500-019	EW1301500-020
EA025: Suspended Solids								
Suspended Solids (SS)	----	5	mg/L	----	7	20	<5	12
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	720	202	86	109	103
Total Alkalinity as CaCO3	----	1	mg/L	720	202	86	109	103
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	1030	113	43	53	53
EG020T: Total Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	1.48	0.087	0.049	0.139	0.099
Iron	7439-89-6	0.05	mg/L	0.71	0.72	1.62	0.80	1.43
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.11	<0.01	0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	2.0	0.7	0.3	0.6
EN67 PK: Field Tests								
pH	----	0.1	pH Unit	6.9	7.9	7.7	7.5	7.5
Electrical Conductivity (Non Compensated)	----	1	µS/cm	5000	841	369	448	421
Dissolved Oxygen	----	0.01	mg/L	2.29	8.37	7.87	7.99	8.22
Redox Potential	----	0.1	mV	275	124	31.0	49.0	12.0
Temperature	----	0.1	°C	20.4	15.6	16.6	15.3	16.4
Depth	----	0.01	m	1.63	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	49	18	8	4	10



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)

Client sample ID

				Surface Water 5	Surface Water 6	Leachate	----	----
				28-MAY-2013 10:10	28-MAY-2013 11:30	28-MAY-2013 13:25	----	----
				EW1301500-021	EW1301500-022	EW1301500-023	----	----
Compound	CAS Number	LOR	Unit					
EA025: Suspended Solids								
Suspended Solids (SS)	----	5	mg/L	15	12	55	----	----
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	102	112	5780	----	----
Total Alkalinity as CaCO3	----	1	mg/L	102	112	5780	----	----
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	54	46	1390	----	----
EG020T: Total Metals by ICP-MS								
Manganese	7439-96-5	0.001	mg/L	0.094	0.066	0.134	----	----
Iron	7439-89-6	0.05	mg/L	1.34	0.93	4.69	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	1140	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.6	0.5	1110	----	----
EN67 PK: Field Tests								
pH	----	0.1	pH Unit	7.6	7.7	8.4	----	----
Electrical Conductivity (Non Compensated)	----	1	µS/cm	437	450	14800	----	----
Dissolved Oxygen	----	0.01	mg/L	8.23	9.41	2.03	----	----
Redox Potential	----	0.1	mV	23.0	66.0	54.0	----	----
Temperature	----	0.1	°C	16.0	14.5	22.3	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	6	6	720	----	----