



CERTIFICATE OF ANALYSIS

Work Order : **EW1601877**
Client : **WOLLONGONG CITY COUNCIL**
Contact : **MR WAYDE PETERSON**
Address : **41 BURELLI STREET**
WOLLONGONG NSW, AUSTRALIA 2500

Telephone : **+61 02 4227 7111**
Project : **Whytes Gully Stage 3 Bores Quarterly**
Order number : **3044522**
C-O-C number : **----**
Sampler : **Craig Wilson**
Site : **----**
Quote number : **----**
No. of samples received : **17**
No. of samples analysed : **17**

Page : **1 of 6**
Laboratory : **Environmental Division NSW South Coast**
Contact : **Glenn Davies**
Address : **1/19 Ralph Black Dr, North Wollongong 2500**
4/13 Geary Pl, North Nowra 2541
Australia
Telephone : **02 42253125**
Date Samples Received : **16-May-2016 14:00**
Date Analysis Commenced : **16-May-2016**
Issue Date : **26-May-2016 11:20**



NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.

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

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ashesh Patel	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
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.

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
∅ = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Field tests completed on day of sampling/receipt.
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Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GMW102 (Point 9)	GMW103 (Point 10)	GMW104 (Point 11)	GMW105 (Point 12)	GMW106 (Point 13)
Client sampling date / time				16-May-2016 11:30	16-May-2016 11:45	16-May-2016 11:20	16-May-2016 11:55	16-May-2016 12:00	
Compound	CAS Number	LOR	Unit	EW1601877-001	EW1601877-002	EW1601877-003	EW1601877-004	EW1601877-005	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.1	6.9	7.2	6.1	----	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	699	2240	1340	268	----	
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	----	10	mg/L	524	1550	748	192	----	
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	327	433	499	44	----	
Total Alkalinity as CaCO3	----	1	mg/L	327	433	499	44	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	17	126	65	12	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	20	443	101	37	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	67	196	56	8	----	
Magnesium	7439-95-4	1	mg/L	24	68	36	4	----	
Sodium	7440-23-5	1	mg/L	36	194	199	34	----	
Potassium	7440-09-7	1	mg/L	<1	<1	<1	<1	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.04	<0.01	<0.01	----	
EN67 PK: Field Tests									
Field Observations	----	0.01	--	----	----	----	----	DRY	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	2	1	1	1	----	
FWI-EN/001: Groundwater Sampling - Depth									
Depth	----	0.01	m	12.2	7.68	7.93	11.5	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GMW108S (Point 14)	GMW108D (Point 15)	GMW109S (Point 16)	GMW109D (Point 19)	GMW110 (Point 17)
Client sampling date / time				16-May-2016 12:30	16-May-2016 12:35	16-May-2016 09:55	16-May-2016 10:00	16-May-2016 10:25	
Compound	CAS Number	LOR	Unit	EW1601877-006	EW1601877-007	EW1601877-008	EW1601877-009	EW1601877-010	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	6.8	7.1	6.2	7.0	6.7	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	3720	3080	2280	1760	4080	
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	----	10	mg/L	2060	1810	812	1010	2540	
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	583	465	272	231	600	
Total Alkalinity as CaCO3	----	1	mg/L	583	465	272	231	600	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	211	179	56	23	292	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	676	610	265	401	818	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	137	113	72	89	180	
Magnesium	7439-95-4	1	mg/L	108	83	39	46	146	
Sodium	7440-23-5	1	mg/L	484	444	174	200	476	
Potassium	7440-09-7	1	mg/L	<1	<1	2	<1	<1	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.02	0.77	<0.01	<0.01	
EN67 PK: Field Tests									
Field Observations	----	0.01	--	----	----	----	----	----	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	2	3	4	<1	2	
FWI-EN/001: Groundwater Sampling - Depth									
Depth	----	0.01	m	2.82	2.28	3.50	3.11	4.28	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GMW111 (Point 18)	GABH01 (Point 2)	GABH02 (Point 5)	GABH03 (Point 6)	GABH06S (Point 7)
Client sampling date / time				16-May-2016 10:25	16-May-2016 11:00	16-May-2016 11:15	16-May-2016 10:50	16-May-2016 12:18	
Compound	CAS Number	LOR	Unit	EW1601877-011	EW1601877-012	EW1601877-013	EW1601877-014	EW1601877-015	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	6.8	----	6.6	6.6	6.9	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	3300	----	5320	5420	2960	
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	----	10	mg/L	1930	----	3450	3650	1710	
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	517	----	1060	742	431	
Total Alkalinity as CaCO3	----	1	mg/L	517	----	1060	742	431	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	205	----	166	196	197	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	627	----	1080	1240	568	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	122	----	290	354	75	
Magnesium	7439-95-4	1	mg/L	98	----	185	208	73	
Sodium	7440-23-5	1	mg/L	455	----	639	533	506	
Potassium	7440-09-7	1	mg/L	<1	----	2	1	<1	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	----	0.03	0.01	0.01	
EN67 PK: Field Tests									
Field Observations	----	0.01	--	----	DESTROYED	----	----	----	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	<1	----	9	4	1	
FWI-EN/001: Groundwater Sampling - Depth									
Depth	----	0.01	m	6.39	----	5.09	0.69	2.40	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			GABH06D (Point 8)	BH6 (Point 20)	----	----	----
Client sampling date / time					16-May-2016 12:13	16-May-2016 10:40	----	----	----
Compound	CAS Number	LOR	Unit	EW1601877-016	EW1601877-017	-----	-----	-----	
				Result	Result	----	----	----	
EA005FD: Field pH									
pH	----	0.1	pH Unit	6.8	6.6	----	----	----	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	2780	5040	----	----	----	
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	----	10	mg/L	1560	2900	----	----	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	----	----	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	----	----	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	351	743	----	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	351	743	----	----	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	153	251	----	----	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	563	968	----	----	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	90	119	----	----	----	
Magnesium	7439-95-4	1	mg/L	56	127	----	----	----	
Sodium	7440-23-5	1	mg/L	433	843	----	----	----	
Potassium	7440-09-7	1	mg/L	<1	<1	----	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.12	----	----	----	
EN67 PK: Field Tests									
Field Observations	----	0.01	--	----	----	----	----	----	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	1	9	----	----	----	
FWI-EN/001: Groundwater Sampling - Depth									
Depth	----	0.01	m	1.86	1.54	----	----	----	