



CERTIFICATE OF ANALYSIS

Work Order : **EW1700470**
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 : **3058354**
C-O-C number : **----**
Sampler : **Robert DaLio**
Site : **----**
Quote number : **SY/454/14 Tender**
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 : **06-Feb-2017 16:20**
Date Analysis Commenced : **06-Feb-2017**
Issue Date : **14-Feb-2017 12:40**



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

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>
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Dian Dao		Sydney Inorganics, Smithfield, NSW
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



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 no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

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.

- TDS by method EA-015 may bias high for various samples due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- Field tests completed on day of sampling/receipt.



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				06-Feb-2017 13:45	06-Feb-2017 13:25	06-Feb-2017 12:05	06-Feb-2017 13:05	06-Feb-2017 13:00	
Compound	CAS Number	LOR	Unit	EW1700470-001	EW1700470-002	EW1700470-003	EW1700470-004	EW1700470-005	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	----	7.0	7.5	5.9	----	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	----	2700	1300	289	----	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	----	2140	1180	543	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	----	<1	<1	<1	----	
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	----	<1	<1	<1	----	
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	----	479	523	39	----	
Total Alkalinity as CaCO ₃	----	1	mg/L	----	479	523	39	----	
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA									
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	----	149	74	14	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	----	525	83	37	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	----	224	55	8	----	
Magnesium	7439-95-4	1	mg/L	----	75	39	3	----	
Sodium	7440-23-5	1	mg/L	----	184	176	36	----	
Potassium	7440-09-7	1	mg/L	----	1	<1	<1	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	----	0.05	0.18	0.12	----	
EN67 PK: Field Tests									
Field Observations	----	0.01	--	DRY	----	----	----	DRY	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	----	2	3	4	----	
FWI-EN/001: Groundwater Sampling - Depth									
Depth	----	0.01	m	----	7.40	7.80	10.90	----	



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				06-Feb-2017 14:25	06-Feb-2017 14:35	06-Feb-2017 10:20	06-Feb-2017 10:25	06-Feb-2017 09:55	
Compound	CAS Number	LOR	Unit	EW1700470-006	EW1700470-007	EW1700470-008	EW1700470-009	EW1700470-010	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	6.8	6.9	6.1	6.9	6.8	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	3620	3330	1780	1810	4400	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	2540	2020	1820	1340	3080	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	576	512	227	239	638	
Total Alkalinity as CaCO ₃	----	1	mg/L	576	512	227	239	638	
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA									
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	204	189	100	24	288	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	686	646	376	437	875	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	140	124	90	92	198	
Magnesium	7439-95-4	1	mg/L	125	84	51	47	154	
Sodium	7440-23-5	1	mg/L	441	417	169	187	457	
Potassium	7440-09-7	1	mg/L	<1	<1	2	1	2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.01	0.51	0.05	0.01	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	3	2	13	2	3	
FWI-EN/001: Groundwater Sampling - Depth									
Depth	----	0.01	m	1.88	2.50	4.01	3.46	4.40	



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				06-Feb-2017 09:20	06-Feb-2017 12:40	06-Feb-2017 12:20	06-Feb-2017 12:25	06-Feb-2017 13:55	
Compound	CAS Number	LOR	Unit	EW1700470-011	EW1700470-012	EW1700470-013	EW1700470-014	EW1700470-015	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	6.9	----	6.6	6.9	7.0	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	3470	----	5700	5940	3200	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	2230	----	3840	4390	1920	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	----	<1	<1	<1	
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	----	<1	<1	<1	
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	571	----	1160	809	448	
Total Alkalinity as CaCO ₃	----	1	mg/L	571	----	1160	809	448	
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA									
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	210	----	168	193	206	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	669	----	1150	1330	606	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	126	----	300	359	77	
Magnesium	7439-95-4	1	mg/L	100	----	192	214	72	
Sodium	7440-23-5	1	mg/L	421	----	609	491	456	
Potassium	7440-09-7	1	mg/L	1	----	3	2	<1	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.06	----	0.02	0.02	0.02	
EN67 PK: Field Tests									
Field Observations	----	0.01	--	----	DESTROYED	----	----	----	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	3	----	7	6	2	
FWI-EN/001: Groundwater Sampling - Depth									
Depth	----	0.01	m	6.50	----	5.36	0.92	2.72	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GABH06D (Point 8)	BH6 (Point 20)	----	----	----
Client sampling date / time				06-Feb-2017 14:00	06-Feb-2017 11:30	----	----	----	
Compound	CAS Number	LOR	Unit	EW1700470-016	EW1700470-017	-----	-----	-----	
				Result	Result	----	----	----	
EA005FD: Field pH									
pH	----	0.1	pH Unit	6.7	6.7	----	----	----	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	3000	5350	----	----	----	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	1620	3210	----	----	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	----	----	----	
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	----	----	----	
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	362	771	----	----	----	
Total Alkalinity as CaCO ₃	----	1	mg/L	362	771	----	----	----	
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA									
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	174	244	----	----	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	605	1100	----	----	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	97	121	----	----	----	
Magnesium	7439-95-4	1	mg/L	58	121	----	----	----	
Sodium	7440-23-5	1	mg/L	399	755	----	----	----	
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	0.02	0.26	----	----	----	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	2	11	----	----	----	
FWI-EN/001: Groundwater Sampling - Depth									
Depth	----	0.01	m	2.28	1.65	----	----	----	