Carbon Based Environmental
Pty Limited
ABN 74 102 920 285

Rocla Quarry Products
Calga Quarry

Environmental Monitoring

Dust Deposition Gauges, Surface and Ground Waters and Meteorological Station

November 2015

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Date: 17 December 2015

Executive Summary

Carbon Based Environmental is contracted by Rocla Quarry Products to conduct environmental monitoring at the Calga Sand Quarry.

The monitoring includes;

- Dust Deposition Gauges;
- Surface Waters;
- Groundwaters; and
- Meteorological Station.

This report was prepared by Carbon Based Environmental and includes the following;

- Dust Deposition results for November 2015;
- Surface Water quality results for November 2015;
- Ground Water quality results for November 2015; and
- Meteorological report for November 2015.

The November 2015 dust deposition results for insoluble solids were generally low and free of major contamination. All sites, on a rolling annual average basis, are currently below the Air Quality Management Plan exceedance level of 3.7g/m^2.month. Results were found to be representative of dust levels as determined by the Australian Standard.

Surface water samples were collected on 3 December 2015 at sites A and F. Site B and D were dry or had no flow and Site C was inaccessible and was unable to be sampled this month. The samples were collected and analysed for a monthly sampling event. Results show pH within the slightly acidic range, low Electrical Conductivity, low Total Dissolved Solids and low Total Suspended Solids. Oil and Grease was not detected at any site in November 2015.

Groundwater depth generally increased compared to September 2015, indicating water moving away from the surface. pH at all sites is in the acidic to neutral range and generally decreased when compared to the previous results. EC levels slightly increased at a majority of groundwater sites when compared to the results obtained in September 2015.

Data for November 2015 shows that rainfall recorded at the Rocla Calga Quarry was lower than the Gosford BOM however higher than the Peats Ridge long term, mean rainfall for November 2015.

The rainfall comparison is provided below:

Rocla Calga Quarry	129.6 mm
BOM Peats Ridge*	NA
BOM Gosford*	171.2 mm
BOM Peats Ridge Long term mean for November*	100.7 mm

*Data sourced from Bureau of Meteorology (BOM) website (www.bom.gov.au). No data was available from the BOM Peats Ridge station for November 2015

Note: Differences in the daily rainfall readings between BOM and the Rocla station may occur due to BOM stations reporting rainfall at 9am and the Rocla station recording rainfall at midnight.

Sampling Program

Rocla Calga Quarry conducts environmental monitoring in accordance to Development Consent, OEH (EPA) licence and Environmental Management Plans. Carbon Based Environmental are contracted to undertake dust deposition gauge, surface and groundwater and meteorological monitoring for the project. Carbon Based Environmental commenced monitoring from the April 2006 monitoring period.

Dust deposition gauges are operated to the Australian Standard AS3580.10.1 "Methods for Sampling and Analysis of Ambient Air Method 10.1 Determination of Particulates—Deposited Matter—Gravimetric Method". Sampling is undertaken every 30 +/- 2 days and each gauge is analysed for insoluble solids and ash residue. The results are reported as g/m^2.month.

Surface waters are sampled in accordance with Australian Standards AS5667.1 "Guidance on the Design of Sample Programs, Sampling Techniques and the Preservation and Handling of Samples", AS5667.6 "Water Quality Sampling—Guidance on sampling of rivers and streams" and AS5667.4 "Water Quality Sampling—Guidance on sampling from lakes, natural and man-made". Surface water monitoring sites include local streams and dams. Basic analysis including pH, Electrical Conductivity, Total Suspended Solids, Total Dissolved Solids and Total Oil and Grease is conducted monthly at Sites A and F (dams) and when Sites B, C and D are flowing. Additional samples are collected when daily rainfall exceeds 50mm.

Groundwaters are sampled in accordance with Australian Standards AS5667.1 "Guidance on the Design of Sample Programs, Sampling Techniques and the Preservation and Handling of Samples" and AS5667.11 "Water Quality Sampling—Guidance on sampling of ground waters". Groundwater monitoring sites are sampled bi-monthly for depth and water quality. Groundwater monitoring loggers continuously record water levels in a selection of bores.

Meteorological monitoring is conducted at the quarry and displayed on the site computer with a real time display. Wind parameters are measured according to Australian Standard AS 2923 "Ambient Air— Guide for Measurement of Horizontal Wind for Air Quality Applications".

The weather stations have the following sensor configuration;
Air temperature

- Humidity
- Rainfall
- Atmospheric pressure
- Evaporation
- Solar radiation
- Wind speed
- Wind direction

Carbon Based Environmental continued to operate the monitoring equipment and utilise site collections at their existing locations.

The locations of monitoring points are provided in **Figure 1**.

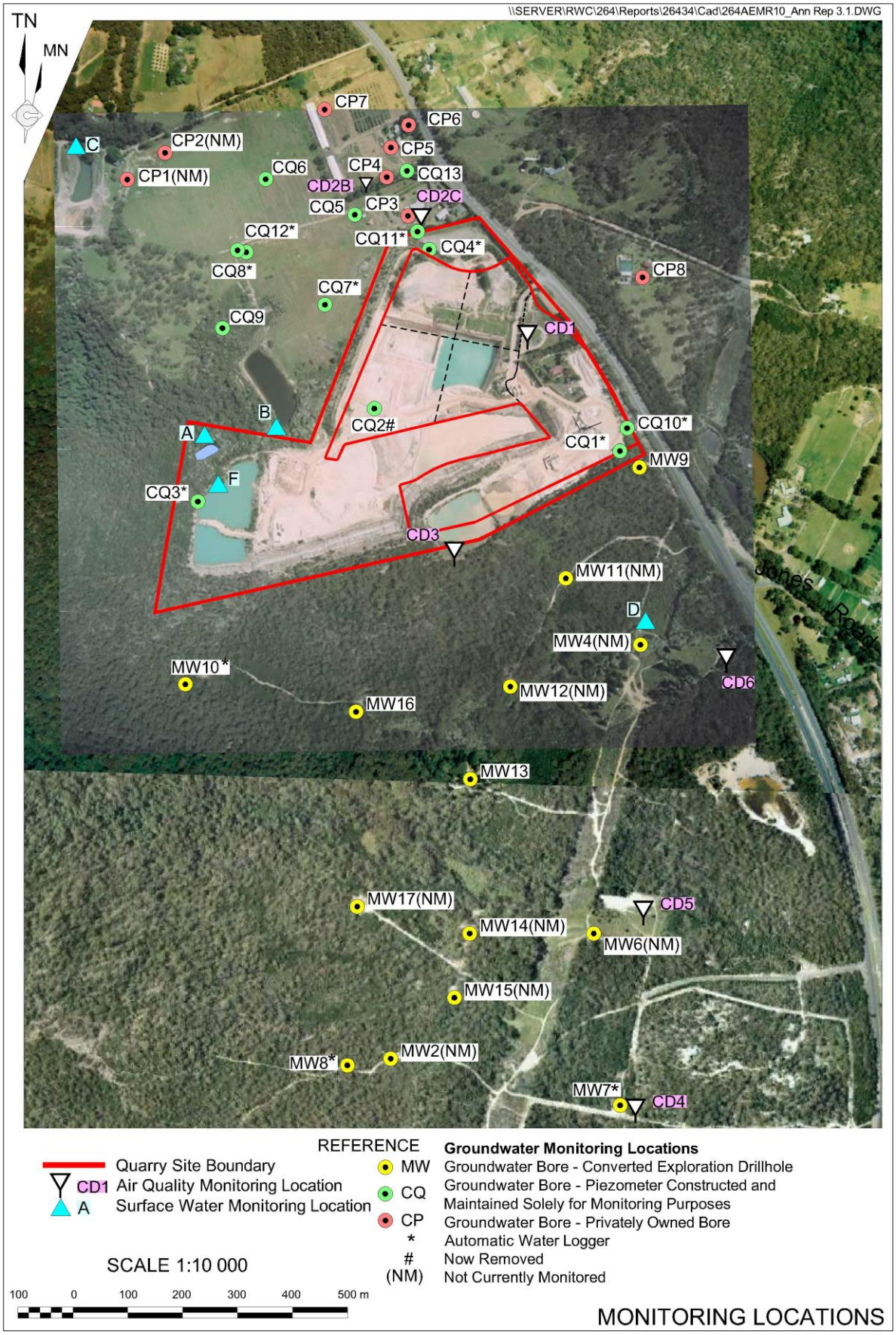


Figure 1: Rocla Calga Quarry environmental monitoring locations

2.0 Monthly Results

2.1 Dust Deposition Gauges

Table 1 displays the results for November 2015 and the project 12 month rolling average. Results are in g/m^2.month.

Table 1: Dust Deposition results: 2 November 2015 – 3 December 2015 (31 days)

Site	Monthly Insoluble Solids g/m^2.month	Monthly Ash Residue g/m^2.month	Monthly Combustible Matter g/m^2.month	Monthly Ash Residue/ Insoluble Solids %	Rolling Annual Average Insoluble Solids g/m^2.month
CD1	1.5	1.0	0.5	67	1.2
CD2c	1.8	1.0	0.8	56	1.4
CD3	0.9	0.6	0.3	67	0.9
CD4	0.3	0.2	0.1	67	0.6
CD5	1.9	1.7	0.2	89	0.7
CD6	0.7	0.4	0.3	57	0.7

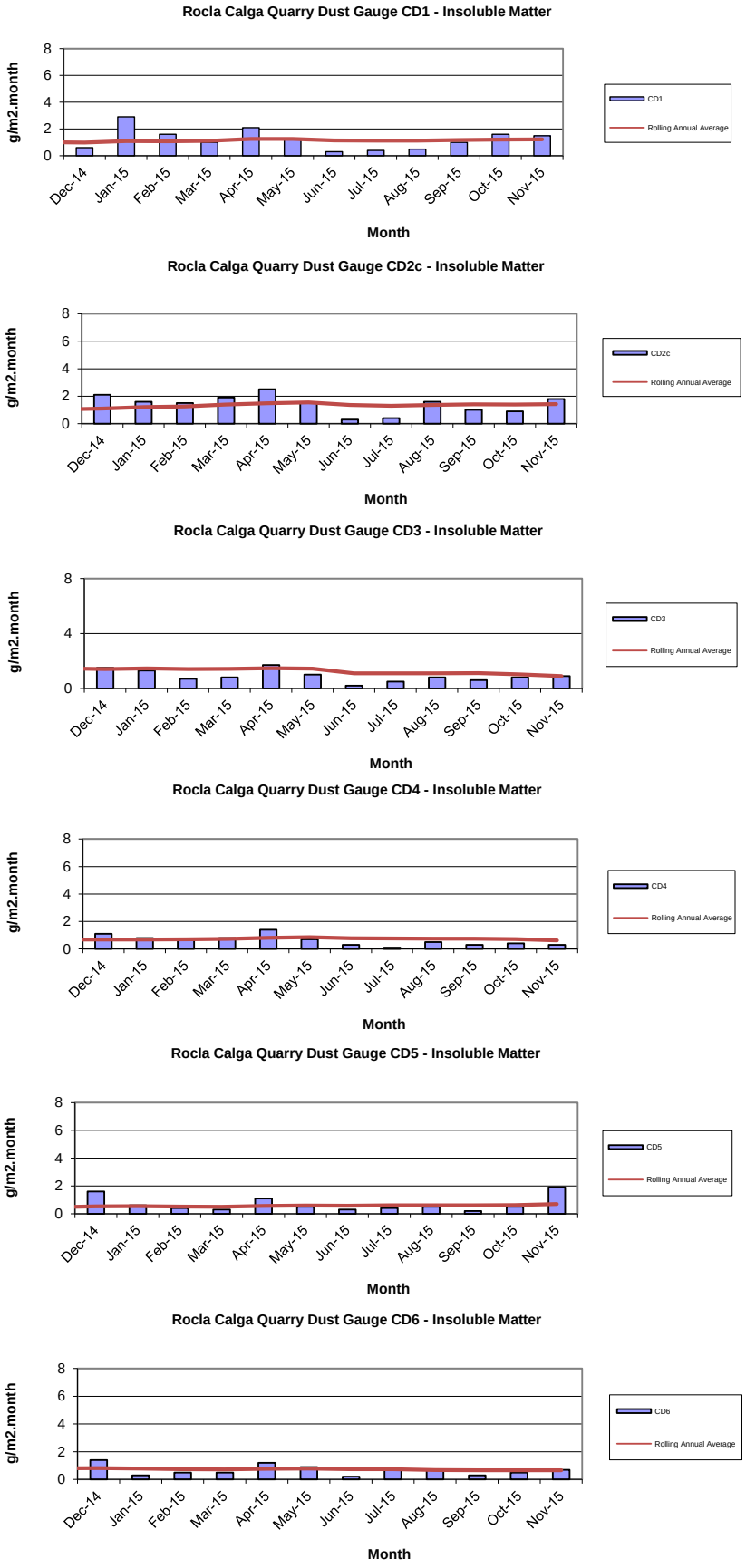
Insoluble Solids marked with an * indicate an excessively contaminated gauge. Contamination can include bird droppings, vegetation (such as plant matter, algae, pollen and seeds) and insects. Results in bold indicate insoluble solids levels above 3.7 g/m^2.month; the Development Consent's annual average amenity criteria at residential locations. The current rolling annual average is calculated from December 2014 to November 2015.

NA= Not Available.

CD1 was installed on the 1 May 2006. CD2a was discontinued at the start of August 2006 due to quarry operations "mining out" the site of the gauge. The replacement gauge, Site CD2b, was located in a position adjacent to the boundary between B. Kashouli and F. & J. Gazzana in conformance with the Air Quality Management Plan. CD4 was installed on 3 October 2006, to gauge air quality impacts to the south of the site operations, as were CD5 and CD6 which were installed on the 14 December 2006. CD2b was discontinued at the end of January 2010 due to contamination of the gauge by non-quarry related vehicle movements on a track adjacent to the gauge. The replacement gauge, CD2c, was located on a rehabilitated section of land between the extraction area and adjacent resident.

Dust deposition charts for all dust gauge sites appear in **Figure 2** below. The laboratory analysis is provided in **Appendix 1.**

Figure 2: Dust Deposition Charts



2.2 Surface Water Monitoring

Monthly surface water monitoring was conducted on the 3 December 2015 and results are listed in **Table 2**. The laboratory analysis sheets are provided in **Appendix 1.**

Table 2: Monthly surface water monitoring – November grab sample results

Site	Observed Flow Rate	Water Colour	Turbidity	pH	EC (µS/cm)	TDS (mg/L)	TSS (mg/L)	Oil and Grease (mg/L)
A	Dam	Brown	Slight	5.78	81	62	6	<5
B	No Flow							
C	No Access							
D	Dry							
F	Dam	Clear	Clear	4.67	94	68	<5	<5

Samples were collected at sites A and F. Site B and D were dry or had no flow and Site C was inaccessible and was unable to be sampled this month. The samples were collected and analysed for a monthly sampling event. Results show pH within the slightly acidic range, low Electrical Conductivity, low Total Dissolved Solids and low Total Suspended Solids. Oil and Grease was not detected at any site in November 2015.

2.2.1 Non-Routine Surface Water Sampling

No non routine sampling was undertaken during November 2015.

2.3 Groundwater Monitoring

Bi- monthly groundwaters were sampled on 3 December 2015. Water quality tests for pH and electrical conductivity were conducted by Carbon Based Environmental Pty Limited. For water quality purposes, water was purged from the bore until constant pH (+/- 0.1 pH units) and Electrical Conductivity (+/- 5%) was obtained between samples. Data is displayed in **Table 3** and **Figures 3 to 6.**

Groundwater depth generally increased compared to September 2015, indicating water moving away from the surface. pH at all sites is in the acidic to neutral range and generally decreased when compared to the previous results. EC levels slightly increased at a majority of groundwater sites when compared to the results obtained in September 2015.

Table 3: Groundwater Quality Data

Reference	Bore	Type	Depth to water TOC (m) April 06	Depth to water TOC (m) This report	pH This report	Electrical Conductivity (µS/cm) This report
CQ1	Voutos	* Monitor	20.59	Removed		
CQ3	Voutos	* Monitor	10.53	10.71	7.6	179
CQ4	Voutos	* Monitor	8.78	10.66	4.3	112
CQ5	Gazzana	DIP Only	8.69	7.31	3.7	140
CQ6	Gazzana	DIP Only	16.00	10.22	3.4	174
CQ7	Gazzana	* Monitor	6.89	6.43	3.8	101
CQ8	Gazzana	* Monitor	11.03	6.02	3.5	126
CQ9	Gazzana	DIP Only	10.10	8.42	Unable to sample- pipe bent	
CQ10	Voutos	* Monitor	NI	26.05	4.0	147
CQ11S	Gazzana	* Monitor	NI	10.83	4.2	141
CQ11D	Gazzana	* Monitor	NI	11.95	4.0	156
CQ12	Gazzana	* Monitor	NI	4.25	3.6	124
CQ13	Kashouli	* Monitor	NI	13.73	3.3	193
CP3	Gazzana	Domestic	10.40	Destroyed		
CP4	Kashouli	Domestic	13.63	10.74	NM	
CP5	Kashouli	Domestic	16.61	8.53	3.4	188
CP6	Kashouli	Domestic	16.27	10.46	3.5	166
CP7	Kashouli	Production	8.56	3.51	4.1	110
CP8	Rozmanec	Domestic	22.17	21.11	3.5	130
MW7	Rocla Bore	* Monitor	15.76	15.69	3.9	110
MW8	Rocla Bore	* Monitor	9.82	7.84	4.4	74
MW9	Rocla Bore	* Monitor	22.44	24.20	4.2	87
MW10	Rocla Bore	* Monitor	15.41	No Access- track eroded		
MW13	Rocla Bore	DIP Only	NI	No Access- track eroded		
MW16	Rocla Bore	DIP Only	NI	No Access- tree across track		
MW17	Rocla Bore	DIP Only		No Access- tree across track		

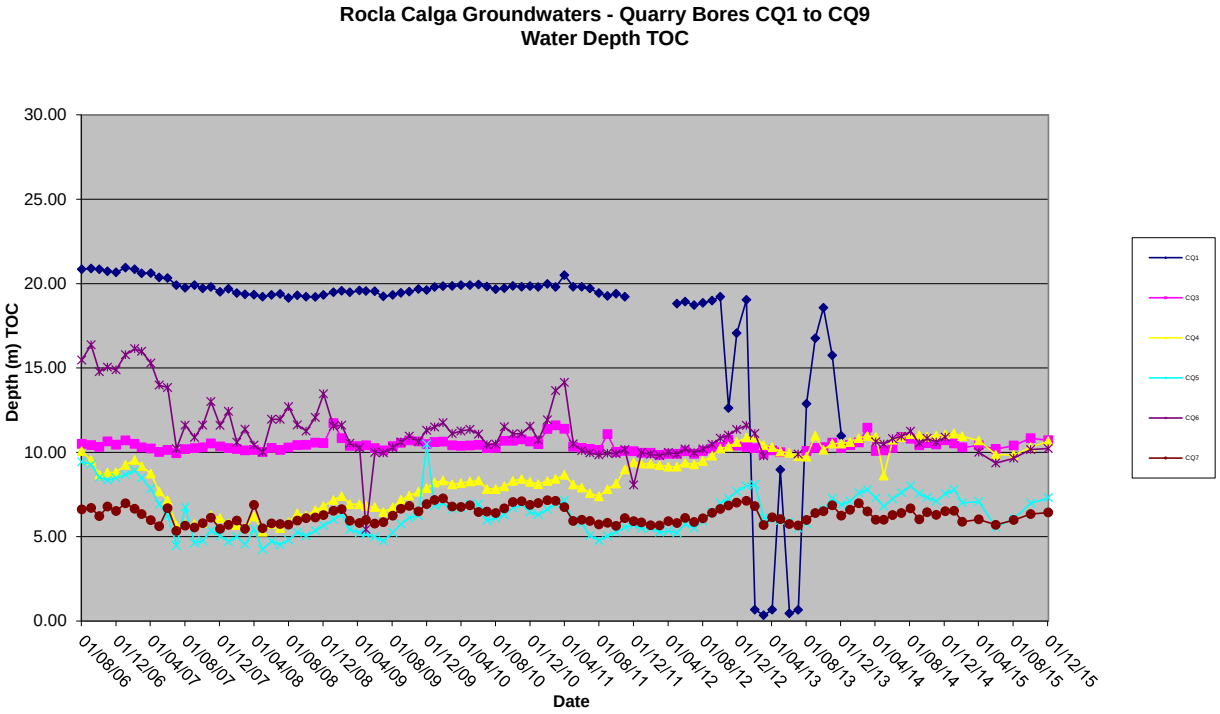
Notes:
TOC = Water level measured from top of bore case to water.
NM = Not Monitored – unable to sample water due to non-operational pump.
NR = Not Required by resident.
* = Logger Installed.
NI = These bores were not installed in April 2006 but are now operational. April 2006 was the first set of measurements taken by Carbon Based Environmental Pty Limited.

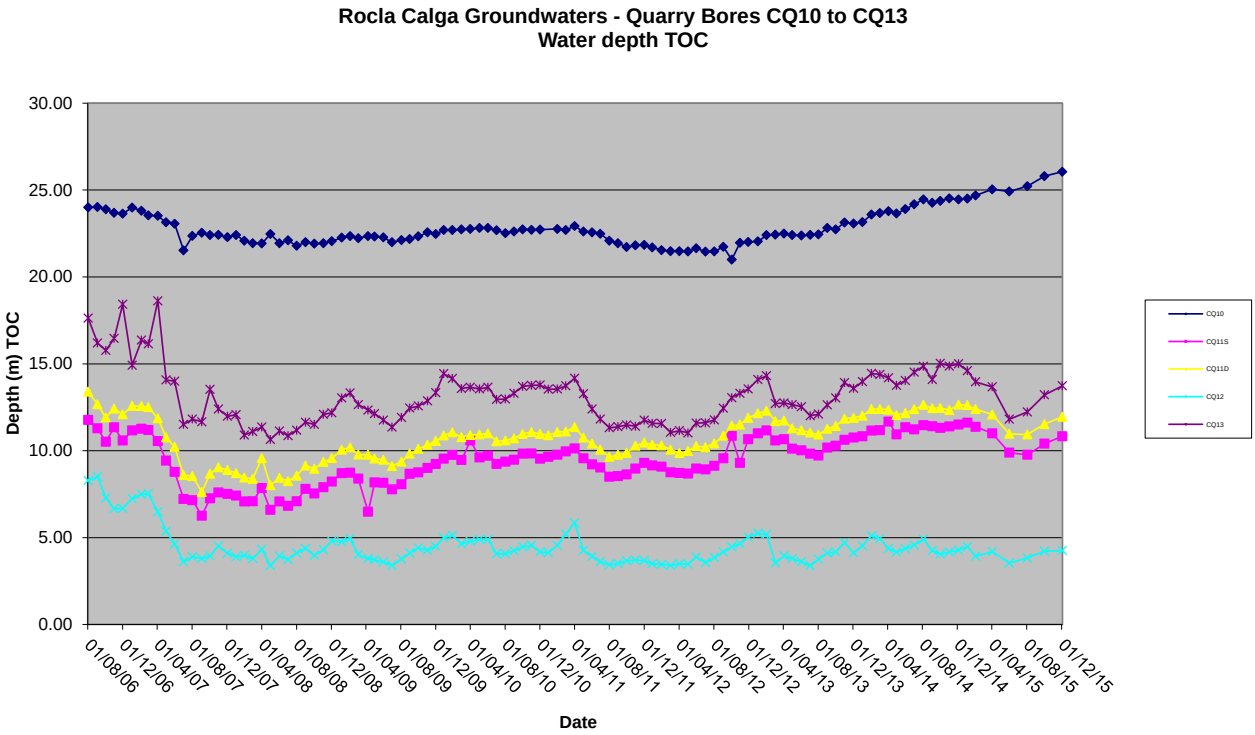
Shading is used to indicate the following trends in water depth (compared to the last reading):

	Increase to ground water depth (water moved away from surface)
	Decrease to ground water depth (water moved towards surface)
	Stable water depth (+/- 0.01m)

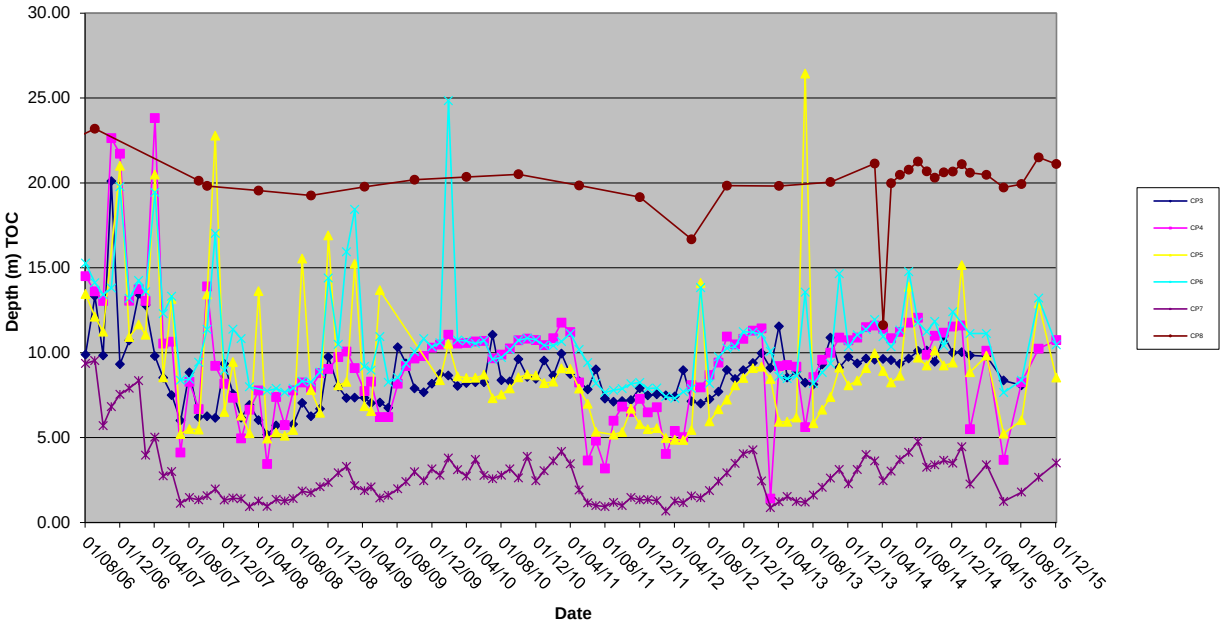
Available groundwater loggers were downloaded and will be forwarded to the Rocla Calga Quarry groundwater consultant.

Figures 3 to 6: Groundwater Depth Charts.

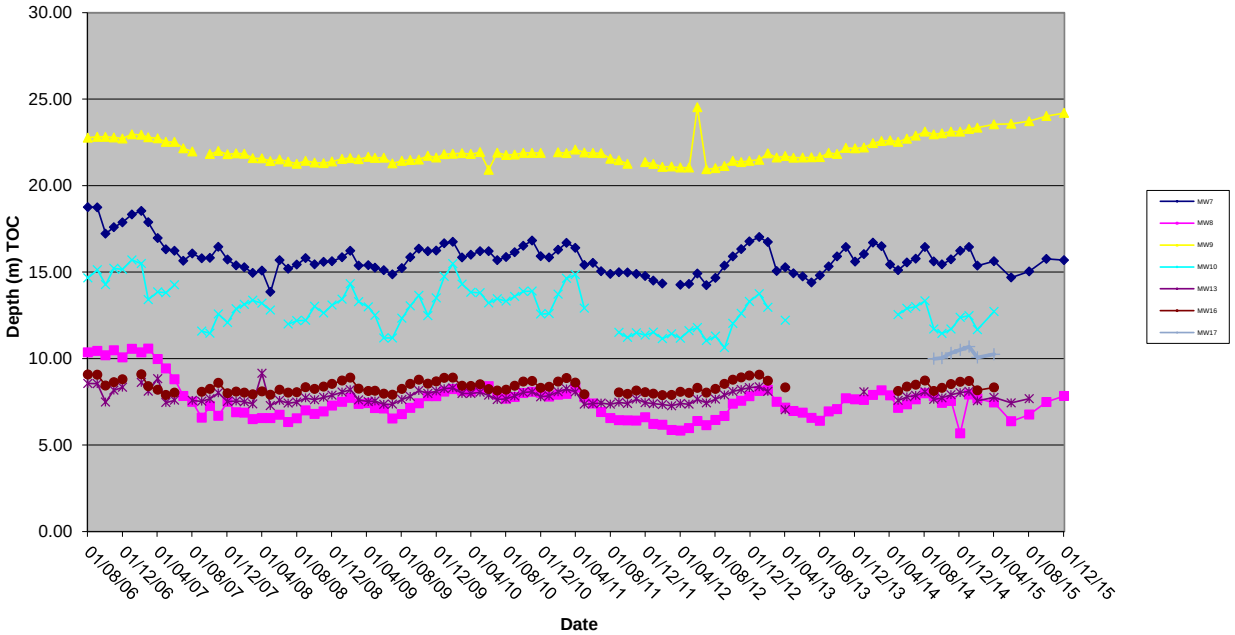




Rocla Calga Groundwaters - Quarry Bores CP3 to CP8
Water Depth TOC



Rocla Calga Groundwaters - Quarry Bores MW7 to MW17
Water Depth TOC



2.4 Meteorological Monitoring

The Rocla Calga Quarry weather station data recovery in November 2015 was approximately 100%.

The weather station data follows and includes;

- Monthly data numerical summary;
- Weather charts of air temperature, humidity, heat index and wind chill, atmospheric pressure, solar radiation, evapotranspiration, rain, wind speed and data reception; and
- Wind rose (frequency distribution diagram of wind speed and direction).

Monthly weather statistics from the nearby Bureau of Meteorology (BOM) at Peats Ridge station are no longer available. However, the long term rainfall mean is available via a link on the Gosford BOM Daily Weather Observation page.

Data for November 2015 shows that rainfall recorded at the Rocla Calga Quarry was lower than the Gosford BOM however higher than the Peats Ridge long term, mean rainfall for November 2015.

The rainfall comparison is provided below:

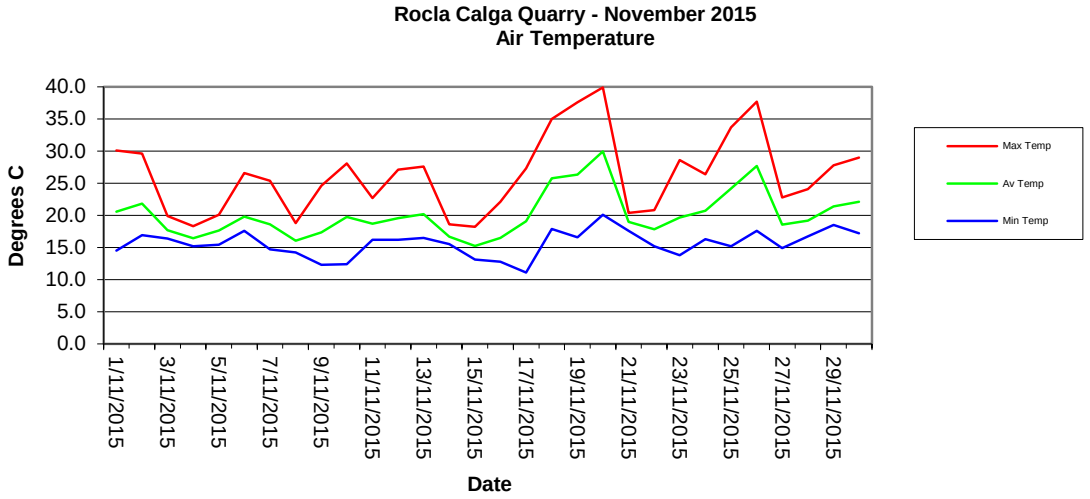
Rocla Calga Quarry	129.6 mm
BOM Peats Ridge*	NA
BOM Gosford*	171.2 mm
BOM Peats Ridge Long term mean for November*	100.7 mm

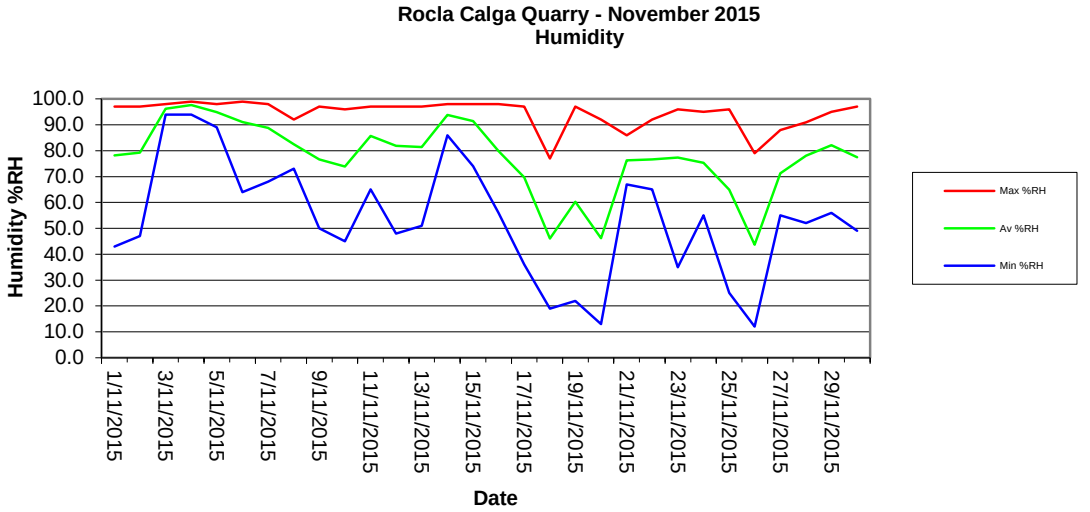
NA = Not Available
*Data sourced from Bureau of Meteorology (BOM) website (www.bom.gov.au).

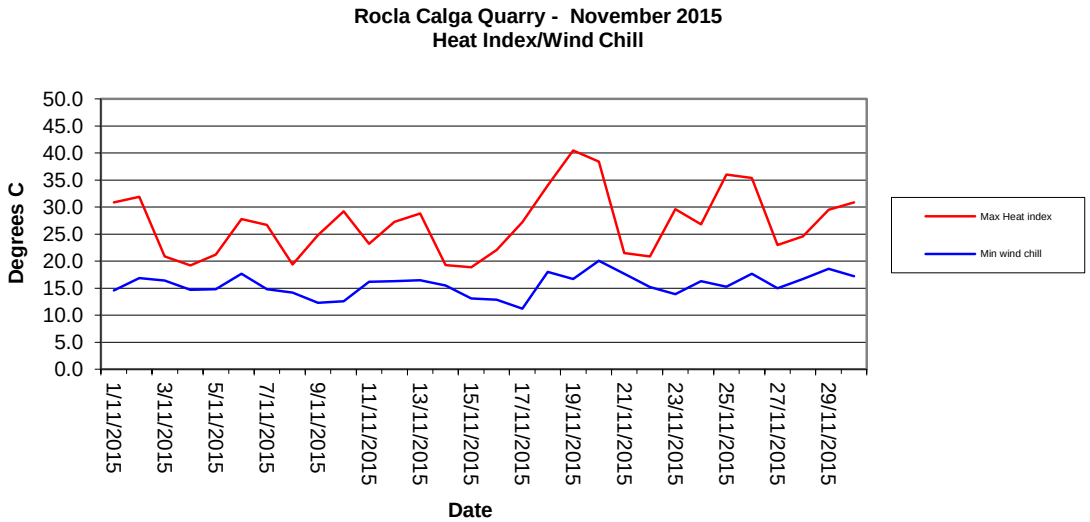
2.4.1 Monthly Meteorological Data Summary

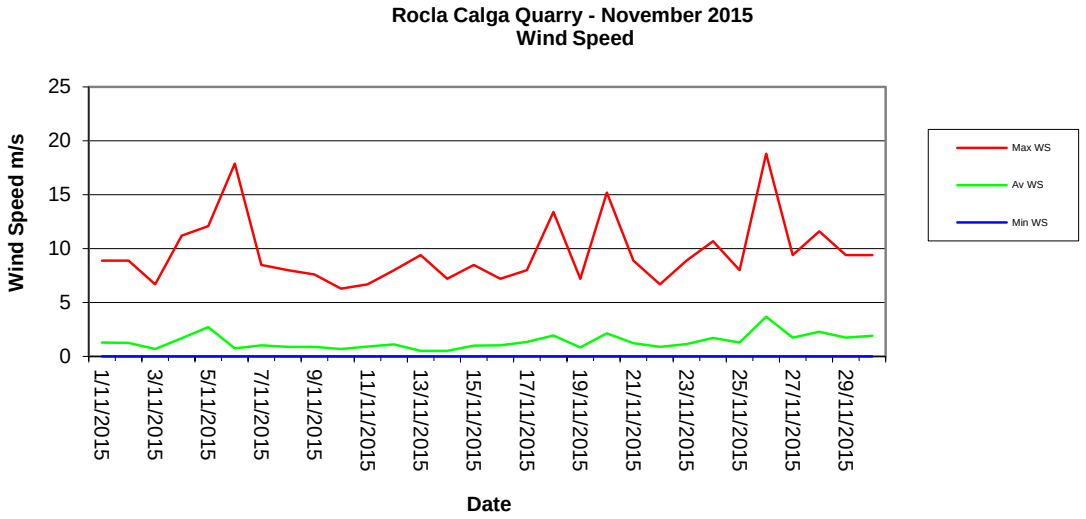
Date	Min Temp	Av Temp	Max Temp	Min %RH	Av %RH	Max %RH	RAIN mm	ET mm	Min WS	Av WS	Max WS	Min wind chill	Max Heat index	Min Atm P	Av Atm P	Max Atm P	Min Solar Rad	Av Solar Rad	Max Solar Rad	Min Data %	Av data %	Max Data %
1/11/2015	14.5	20.6	30.1	43.0	78.2	97.0	20.6	4.1	0.0	1.3	8.9	14.6	30.9	1009.5	1014.1	1018.8	0.0	240.9	1074.0	79.8	90.9	96.8
2/11/2015	16.9	21.8	29.6	47.0	79.3	97.0	4.1	4.1	0.0	1.3	8.9	16.9	31.9	1008.7	1011.6	1014.6	0.0	224.7	1080.0	25.4	91.3	98.0
3/11/2015	16.4	17.7	19.9	94.0	96.2	98.0	6.5	0.6	0.0	0.7	6.7	16.4	20.9	1014.4	1017.4	1019.7	0.0	38.4	179.0	57.3	92.9	98.0
4/11/2015	15.2	16.4	18.3	94.0	97.7	99.0	12.9	0.6	0.0	1.7	11.2	14.7	19.2	1017.0	1018.3	1020.0	0.0	43.2	209.0	57.0	88.0	98.0
5/11/2015	15.4	17.6	20.1	89.0	94.9	98.0	8.1	1.3	0.0	2.7	12.1	14.8	21.2	1009.9	1013.9	1019.2	0.0	81.9	530.0	83.0	94.1	98.0
6/11/2015	17.6	19.8	26.6	64.0	91.0	99.0	24.9	2.6	0.0	0.7	17.9	17.7	27.8	1006.0	1008.6	1010.7	0.0	158.5	1000.0	44.2	94.8	98.0
7/11/2015	14.7	18.6	25.4	68.0	88.8	98.0	7.9	3.9	0.0	1.0	8.5	14.8	26.7	1010.0	1013.7	1019.8	0.0	248.6	1134.0	80.4	95.1	98.0
8/11/2015	14.2	16.1	18.8	73.0	82.5	92.0	0.0	1.7	0.0	0.9	8.0	14.2	19.4	1018.8	1021.4	1023.9	0.0	98.3	524.0	90.1	95.8	98.0
9/11/2015	12.3	17.3	24.6	50.0	76.6	97.0	0.0	4.5	0.0	0.9	7.6	12.3	24.8	1017.4	1020.4	1023.6	0.0	278.7	1109.0	75.7	93.6	98.0
10/11/2015	12.4	19.7	28.1	45.0	73.8	96.0	0.0	5.4	0.0	0.7	6.3	12.6	29.2	1013.7	1016.4	1020.2	0.0	326.0	993.0	72.8	94.8	98.0
11/11/2015	16.2	18.7	22.7	65.0	85.7	97.0	2.0	2.4	0.0	0.9	6.7	16.2	23.2	1019.1	1021.2	1023.1	0.0	146.9	744.0	50.6	90.3	98.0
12/11/2015	16.2	19.6	27.1	48.0	81.9	97.0	6.6	3.5	0.0	1.1	8.0	16.3	27.3	1016.5	1019.7	1022.9	0.0	206.1	929.0	65.2	93.2	98.0
13/11/2015	16.5	20.2	27.6	51.0	81.4	97.0	8.6	3.7	0.0	0.5	9.4	16.5	28.8	1009.6	1013.4	1016.5	0.0	233.5	1092.0	72.5	93.3	98.0
14/11/2015	15.5	16.7	18.6	86.0	93.9	98.0	10.4	1.2	0.0	0.5	7.2	15.5	19.3	1012.8	1014.5	1016.6	0.0	86.2	446.0	88.0	94.8	98.0
15/11/2015	13.1	15.2	18.2	74.0	91.4	98.0	13.9	1.5	0.0	1.0	8.5	13.1	18.9	1015.9	1018.5	1021.3	0.0	104.1	557.0	77.2	92.9	97.7
16/11/2015	12.8	16.5	22.1	56.0	79.8	98.0	0.3	4.1	0.0	1.0	7.2	12.9	22.1	1018.3	1020.0	1021.6	0.0	258.7	1141.0	41.5	89.7	98.0
17/11/2015	11.1	19.1	27.3	36.0	69.8	97.0	0.0	5.8	0.0	1.4	8.0	11.2	27.2	1015.9	1018.7	1020.7	0.0	340.3	1038.0	57.6	94.3	98.0
18/11/2015	17.9	25.8	35.0	19.0	46.1	77.0	0.0	7.6	0.0	2.0	13.4	18.0	34.0	1009.9	1013.6	1017.6	0.0	340.0	1028.0	69.0	93.4	98.0
19/11/2015	16.6	26.4	37.6	22.0	60.3	97.0	0.0	6.3	0.0	0.8	7.2	16.7	40.5	1011.7	1013.7	1015.8	0.0	315.7	1009.0	78.1	95.9	98.0
20/11/2015	20.1	30.0	39.9	13.0	46.1	92.0	0.0	8.9	0.0	2.2	15.2	20.1	38.4	1006.8	1010.5	1014.2	0.0	329.4	1011.0	53.5	91.6	98.0
21/11/2015	17.6	19.0	20.4	67.0	76.2	86.0	0.0	2.2	0.0	1.2	8.9	17.7	21.5	1011.0	1016.7	1022.1	0.0	112.6	532.0	78.9	96.0	98.0
22/11/2015	15.2	17.9	20.8	65.0	76.6	92.0	0.0	1.8	0.0	0.9	6.7	15.2	20.9	1015.3	1018.5	1021.4	0.0	89.8	369.0	91.8	96.7	98.0
23/11/2015	13.8	19.7	28.6	35.0	77.4	96.0	0.0	5.3	0.0	1.1	8.9	13.9	29.6	1011.0	1013.1	1017.0	0.0	318.4	1114.0	75.1	96.0	98.0
24/11/2015	16.3	20.7	26.4	55.0	75.4	95.0	0.0	5.4	0.0	1.7	10.7	16.3	26.8	1013.4	1015.9	1018.3	0.0	303.1	1143.0	57.9	88.9	98.0
25/11/2015	15.2	24.2	33.7	25.0	64.9	96.0	0.0	6.5	0.0	1.3	8.0	15.3	36.0	1004.8	1010.2	1015.0	0.0	341.8	1041.0	42.7	94.2	98.0
26/11/2015	17.6	27.7	37.7	12.0	43.6	79.0	0.0	9.6	0.0	3.7	18.8	17.7	35.4	999.8	1003.9	1014.4	0.0	302.3	1024.0	37.4	90.0	98.0
27/11/2015	14.9	18.5	22.8	55.0	71.2	88.0	0.0	4.0	0.0	1.7	9.4	15.0	23.0	1013.1	1015.1	1016.9	0.0	200.9	1036.0	92.7	96.9	98.0
28/11/2015	16.7	19.2	24.1	52.0	78.1	91.0	0.3	3.0	0.0	2.3	11.6	16.7	24.6	1015.3	1016.6	1017.8	0.0	140.0	900.0	93.6	97.1	98.0
29/11/2015	18.5	21.4	27.8	56.0	82.1	95.0	2.5	3.6	0.0	1.8	9.4	18.6	29.5	1008.6	1012.4	1016.7	0.0	199.6	1220.0	93.3	97.3	98.0
30/11/2015	17.2	22.1	29.0	49.0	77.5	97.0	0.3	5.8	0.0	1.9	9.4	17.2	30.9	1008.4	1011.0	1013.6	0.0	323.4	1036.0	91.8	97.3	98.0
Monthly	11.1	20.1	39.9	12	77	99	129.6	120.9	0	1.4	18.8	11.2	40.5	999.8	1015.1	1023.9	0	214.4	1220	25.4	93.7	98

2.4.2 Monthly Weather Charts








Rocla Calga Quarry - November 2015
Wind Speed
Wind Speed m/s
25
20
15
10
5
0
1/11/2015
3/11/2015
5/11/2015
7/11/2015
9/11/2015
11/11/2015
13/11/2015
15/11/2015
17/11/2015
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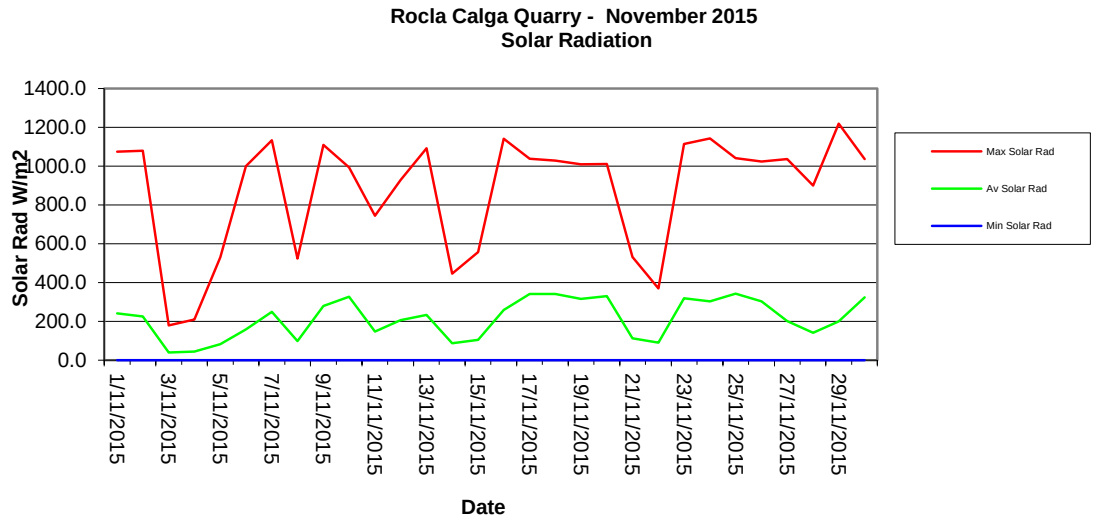
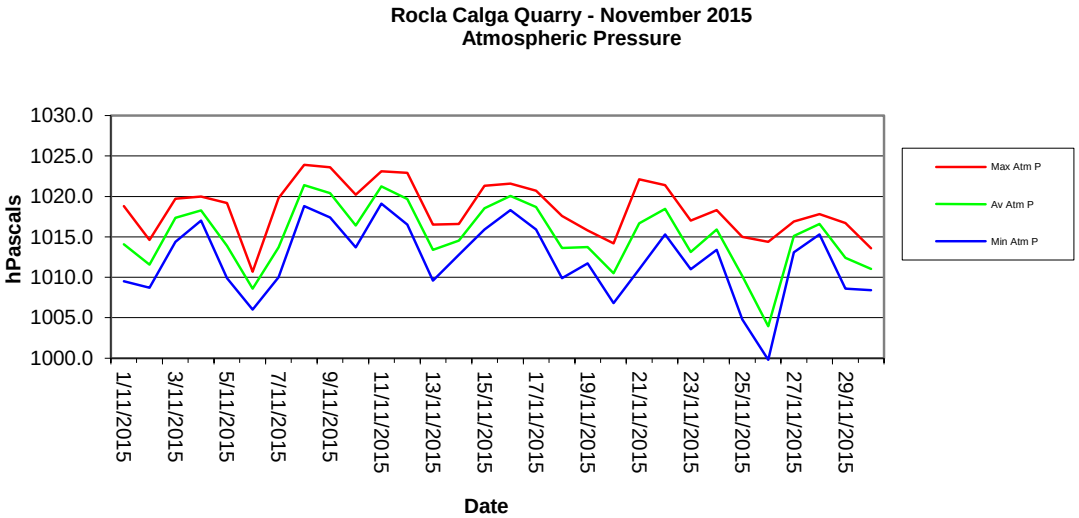
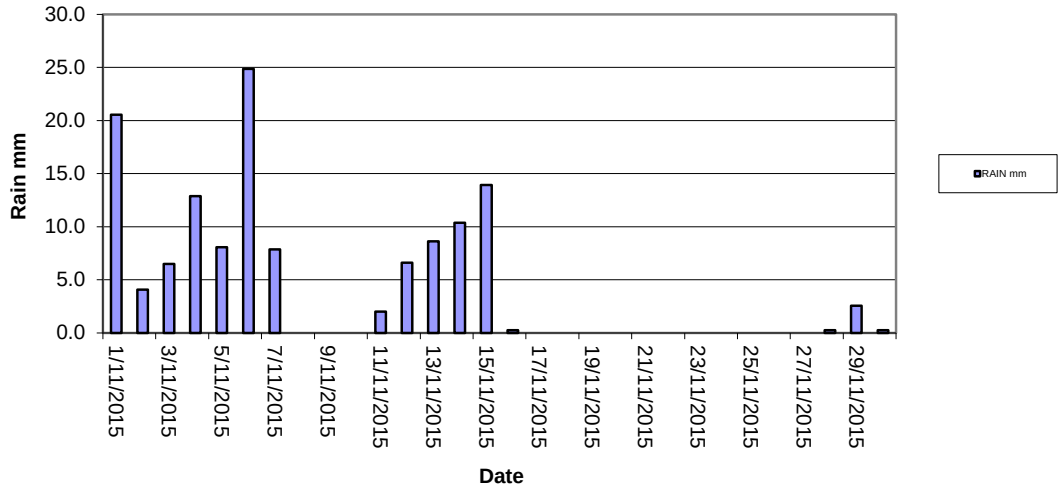
25/11/2015
27/11/2015
29/11/2015
Date
Max WS
Av WS
Min WS

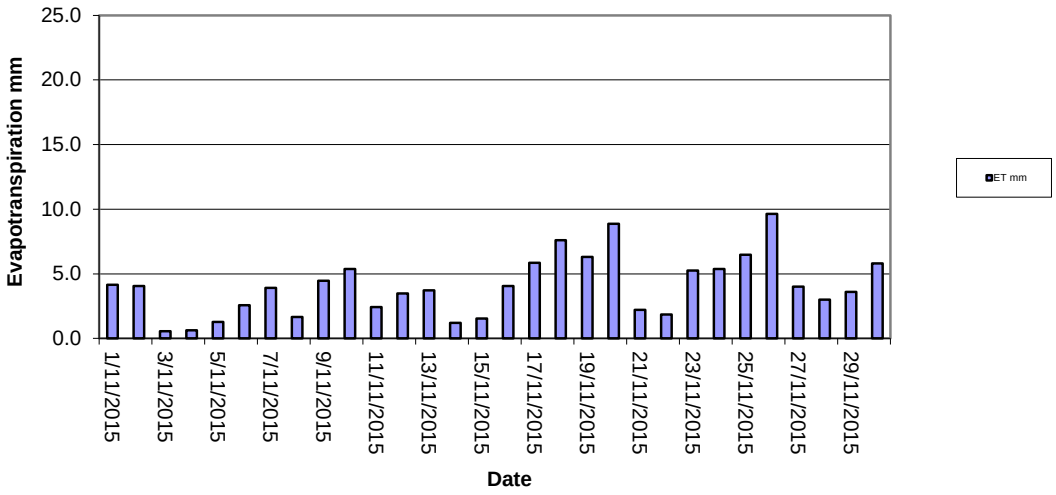

Rocla Calga Quarry - November 2015
Solar Radiation
Solar Rad W/m2
1400.0
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
1/11/2015
3/11/2015
5/11/2015
7/11/2015
9/11/2015
11/11/2015
13/11/2015
15/11/2015
17/11/2015
19/11/2015
21/11/2015
23/11/2015
25/11/2015
27/11/2015
29/11/2015
Date
Max Solar Rad
Av Solar Rad
Min Solar Rad


Rocla Calga Quarry - November 2015
Atmospheric Pressure
hPascals
1030.0
1025.0
1020.0
1015.0
1010.0
1005.0
1000.0
1/11/2015
3/11/2015
5/11/2015
7/11/2015
9/11/2015
11/11/2015
13/11/2015
15/11/2015
17/11/2015
19/11/2015
21/11/2015
23/11/2015
25/11/2015
27/11/2015
29/11/2015
Date
Max Atm P
Av Atm P
Min Atm P

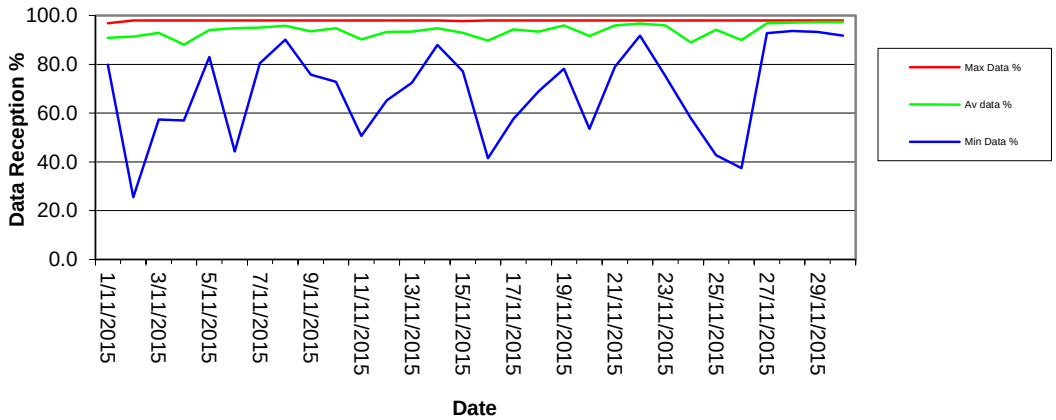
Rocla Calga Quarry - November 2015
Rainfall



Rocla Calga Quarry - November 2015
Evapotranspiration



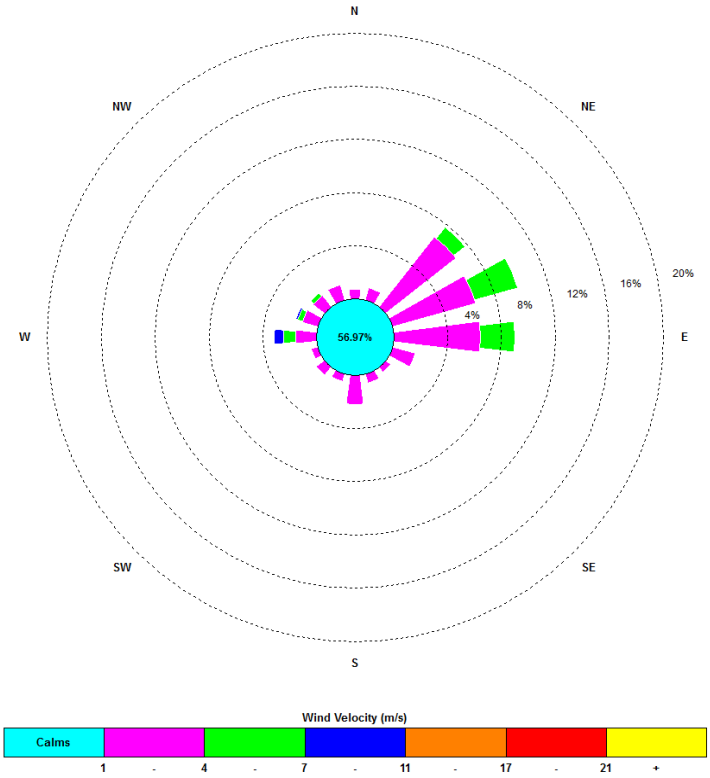
Rocla Calga Quarry - November 2015
Data Reception



2.4.3 Monthly Windrose Plot

Frequency plot of the average wind speed and average direction over each 15 minute sampling period. Wind is considered to be calm when less than a 15 minute average of 1m/s.

00:15, 1 November 2015 – 23:45, 30 November 2015



The predominant winds were from the ENE, with most frequent, strongest winds from the ENE. The maximum wind speed was 18.8 m/s from the W.

Appendix 1

Laboratory Certificates

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN1514143**	Page	: 1 of 4
Client	: **CARBON BASED ENVIRONMENTAL**	Laboratory	: Environmental Division Newcastle
Contact	: MR COLIN DAVIES (cbased)	Contact	:
Address	: 47 BOOMERANG ST CESSNOCK NSW, AUSTRALIA 2325	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
E-mail	: cbased@bigpond.com	E-mail	:
Telephone	: +61 49904443	Telephone	: +61 2 4014 2500
Facsimile	: +61 02 49904442	Facsimile	: +61 2 4967 7382
Project	: Rocla Calga Dusts	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: ----	Date Samples Received	: 03-Dec-2015 13:30
C-O-C number	: ----	Date Analysis Commenced	: 03-Dec-2015
Sampler	: ----	Issue Date	: 09-Dec-2015 11:56
Site	: ----		
		No. of samples received	: 6
Quote number	: ----	No. of samples analysed	: 6

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.

WORLD RECOGNISED ACCREDITATION

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*
Barbara Coupland	Quality Officer	Newcastle - 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
ø = ALS is not NATA accredited for these tests.

- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m².mth as sampling data was provided by the client.

Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST** (Matrix: **AIR**)

Compound	CAS Number	LOR	Unit	Client sample ID	CD1 02/11/15 - 03/12/15	CD2c 02/11/15 - 03/12/15	CD3 02/11/15 - 03/12/15	CD4 02/11/15 - 03/12/15	CD5 02/11/15 - 03/12/15
				Client sampling date / time	[03-Dec-2015]	[03-Dec-2015]	[03-Dec-2015]	[03-Dec-2015]	[03-Dec-2015]
					EN1514143-001	EN1514143-002	EN1514143-003	EN1514143-004	EN1514143-005
					Result	Result	Result	Result	Result
EA120: Ash Content									
Ash Content	----	0.1	g/m².month		**1.0**	**1.0**	**0.6**	**0.2**	**1.7**
Ash Content (mg)	----	1	mg		**19**	**18**	**11**	**3**	**31**
EA125: Combustible Matter									
Combustible Matter	----	0.1	g/m².month		**0.5**	**0.8**	**0.3**	**0.1**	**0.2**
Combustible Matter (mg)	----	1	mg		**9**	**15**	**6**	**3**	**4**
EA141: Total Insoluble Matter									
Total Insoluble Matter	----	0.1	g/m².month		**1.5**	**1.8**	**0.9**	**0.3**	**1.9**
Total Insoluble Matter (mg)	----	1	mg		**28**	**33**	**17**	**6**	**35**

Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST** (Matrix: **AIR**)			Client sample ID	**CD6 02/11/15 - 03/12/15**	----	----	----	----
			Client sampling date / time	[03-Dec-2015]	----	----	----	----
Compound	CAS Number	LOR	Unit	**EN1514143-006**	-------	-------	-------	-------
				Result	Result	Result	Result	Result
EA120: Ash Content								
Ash Content	----	0.1	g/m².month	**0.4**	----	----	----	----
Ash Content (mg)	----	1	mg	**8**	----	----	----	----
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m².month	**0.3**	----	----	----	----
Combustible Matter (mg)	----	1	mg	**4**	----	----	----	----
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m².month	**0.7**	----	----	----	----
Total Insoluble Matter (mg)	----	1	mg	**12**	----	----	----	----

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1537858**	Page	: 1 of 2
Client	: **CARBON BASED ENVIRONMENTAL**	Laboratory	: Environmental Division Sydney
Contact	: MR COLIN DAVIES (cbased)	Contact	:
Address	: 47 BOOMERANG ST CESSNOCK NSW, AUSTRALIA 2325	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: cbased@bigpond.com	E-mail	:
Telephone	: +61 49904443	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49904442	Facsimile	: +61-2-8784 8500
Project	: ROCLA QUARRY	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: ----	Date Samples Received	: 03-Dec-2015 13:30
C-O-C number	: ----	Date Analysis Commenced	: 03-Dec-2015
Sampler	: ----	Issue Date	: 10-Dec-2015 12:19
Site	:		
		No. of samples received	: 2
Quote number	: ----	No. of samples analysed	: 2

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.

Signatories	*Position*	*Accreditation Category*
Alison Graham	Supervisor - Inorganic	Newcastle - Inorganics
Ankit Joshi	Inorganic Chemist	Sydney 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
ø = ALS is not NATA accredited for these tests.

- Sampling time not provided. For operational reasons an assumed date/time (3pm on date of receipt) is used. Sample results may be affected if the analysis falls outside of actual holding time.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Client sample ID	**A**	**F**	----	----	----
			Client sampling date / time	[03-Dec-2015]	[03-Dec-2015]	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES1537858-001**	**ES1537858-002**	--------	--------	--------
				Result	Result	Result	Result	Result
EA005: pH								
pH Value	----	0.01	pH Unit	**5.78**	**4.67**	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**81**	**94**	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**62**	**68**	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	**6**	<5	----	----	----
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	<5	----	----	----

CARBON BASED ENVIRONMENTAL PTY LIMITED

Todays Collection	
Time Start:	8:30
Time Finish:	12:10

Date: 3.12.15

GROUNDWATERS

Client : Rocla Calga

Project :

Site	DEPTH	Odour	Water Turbidity	Water Colour	1		2		Bottles (Apr/Oct)	Downloaded Logger? (Y/N)
					pH	EC	pH	EC		
CQ3	10.71	N	C S T	C LO O B G	7.71	180.4uS	7.56	178.7 uS	1x 250ml GP, 1x 500mL GP, 1RP	Y
CQ4	10.66	N	C S T	C LO O B G	4.33	111.1uS	4.28	111.9uS	1x 250ml GP, 1x 500mL GP, 1RP	N
CQ5	7.31	N	C S T	C LO O B G	3.82	129.1uS	3.66	140.3uS	1x 250ml GP, 1x 500mL GP, 1RP	
CQ6	10.22	N	C S T	C LO O B G	3.37	172.7uS	3.41	174.3uS	1x 250ml GP, 1x 500mL GP, 1RP	
CQ7	6.43	N	C S T	C LO O B G	3.79	103.1uS	3.77	100.9uS	1x 250ml GP, 1x 500mL GP, 1RP	Y
CQ8	6.02	N	C S T	C LO O B G	3.43	126.2uS	3.47	125.8uS	1x 250ml GP, 1x 500mL GP, 1RP	Y
CQ9	8.42	N	C S T	C LO O B G					1x 250ml GP, 1x 500mL GP, 1RP	
CQ10	26.05	N	C S T	C LO O B G	4.09	144.6uS	4.04	147.2uS	1x 250ml GP, 1x 500mL GP, 1RP	Y
CQ11S	10.83	N	C S T	C LO O B G	4.20	141.1uS	4.22	141.3uS	1x 250ml GP, 1x 500mL GP, 1RP	N
CQ11D	11.95	N	C S T	C LO O B G	4.01	157.2uS	4.00	156.4uS	1x 250ml GP, 1x 500mL GP, 1RP	Y
CQ12	4.25	N	C S T	C LO O B G	3.72	124.7uS	3.64	123.6 uS	1x 250ml GP, 1x 500mL GP, 1RP	Y
CQ13	13.73	N	C S T	C LO O B G	3.29	193.7uS	3.28	193.2 uS	1x 250ml GP, 1x 500mL GP, 1RP	N
CP3			C S T	C LO O B G	GONE				1x 250ml GP, 1x 500mL GP, 1RP	GONE
CP4	10.74		C S T	C LO O B G	PUMP NOT WORKING.				1x 250ml GP, 1x 500mL GP, 1RP	
CP5	8.53	N	C S T	C LO O B G	3.37	188.1uS	3.37	188.2 uS	1x 250ml GP, 1x 500mL GP, 1RP	
CP6	10.46	N	C S T	C LO O B G	3.49	166.2uS	3.46	166.4uS	1x 250ml GP, 1x 500mL GP, 1RP	
CP7	3.51	N	C S T	C LO O B G	4.05	109.4uS	4.07	109.9uS	1x 250ml GP, 1x 500mL GP, 1RP	
CP8	21.11	N	C S T	C LO O B G	3.53	130.1uS	3.53	130.0uS	1x 250ml GP, 1x 500mL GP, 1RP	
MW7	15.69	N	C S T	C LO O B G	3.98	113.5uS	3.90	109.9uS	1x 250ml GP, 1x 500mL GP, 1RP	Y
MW8	7.84	N	C S T	C LO O B G	4.44	73.4uS	4.38	74.1uS	1x 250ml GP, 1x 500mL GP, 1RP	N
MW9	24.20	N	C S T	C LO O B G	4.23	86.6uS	4.16	87.4uS	1x 250ml GP, 1x 500mL GP, 1RP	N
MW10			C S T	C LO O B G	NO ACCESS - ROAD VERY UNSAFE				1x 250ml GP, 1x 500mL GP, 1RP	
MW13			C S T	C LO O B G	"		"		1x 250ml GP, 1x 500mL GP, 1RP	
MW16			C S T	C LO O B G	"		"		1x 250ml GP, 1x 500mL GP, 1RP	
MW17			C S T	C LO O B G	NO ACCESS - TREES OVER TRACK				1x 250ml GP, 1x 500mL GP, 1RP	

Turbidity: C=Clear, S= Slight, T=Turbid (CIRCLE)

Colour: C=Clear, LO=Light Orange, O=Orange, B=Brown, G=Green (CIRCLE)

pH/EC meter #: 16

Signed:

Sampled by: HAMISH & ALEX

pH4=4.21→4.00 ✓

pH10=10.01→10.04 ✓

EC276=2.97→2.76 ✓

STAND PIPE/MONUMENT BROKEN PIPE BENT.