



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**

August 2014

A handwritten signature in black ink, appearing to read 'Colin Davies'.

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 30 September 2014

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 August 2014;
- Surface Water quality results for August 2014;
- Groundwater depth and quality results for August 2014; and
- Meteorological report for August 2014.

The August 2014 dust deposition results for insoluble solids were generally low and free of major contamination this month. All sites, on a rolling annual average basis, are currently below the Air Quality Management Plan exceedance level of 3.7g/m².month. Results were found to be representative of dust levels as determined by the Australian Standard.

Surface water samples were collected on 4 September 2014 at sites A, B, D and F. Site C was inaccessible and unable to be sampled this month. The samples were collected and analysed for a monthly sampling event. Results show pH within the slightly acidic to neutral range, low Electrical Conductivity, low Total Dissolved Solids and low Total Suspended Solids. Oil and Grease was not detected at any site.

Groundwaters were sampled for normal monthly monitoring on 4 September 2014. Groundwater depth generally decreased across the sampled groundwater bores when compared to last month. Groundwater pH decreased slightly and EC remained steady across all bores this month.

Data for August 2014 shows that rainfall recorded at the Rocla Calga Quarry was lower than the Gosford BOM and higher than the Peats Ridge long term mean rainfall for August. The rainfall comparison is provided below:

Rocla Calga Quarry	202.5 mm
BOM Peats Ridge*	NA
BOM Gosford*	226.4 mm
BOM Peats Ridge Long term mean for August*	78.8 mm

NA = Not Available

*Data sourced from Bureau of Meteorology (BOM) website (www.bom.gov.au). No data was available from the BOM Peats Ridge station for August 2014

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/m².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 at least bi-monthly for water quality and at least quarterly for water level. 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**.

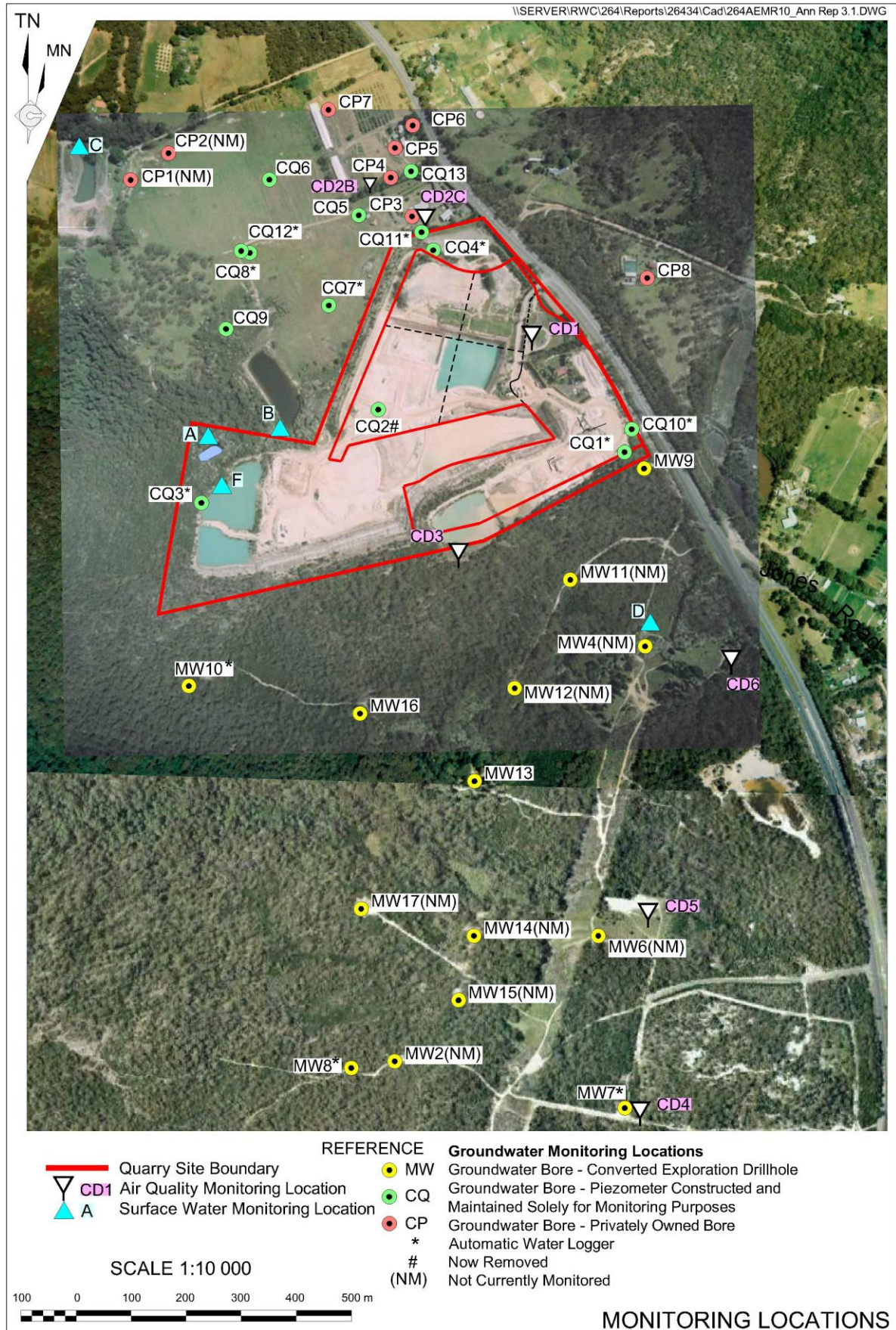


Figure 1: Rocla Calga Quarry environmental monitoring locations

2.0 Monthly Results

2.1 Dust Deposition Gauges

Table 1 displays the results for August 2014 and the project 12 month rolling average. Results are in g/m².month.

Table 1: Dust Deposition results: 4 August 2014 – 4 September 2014 (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	0.5	0.3	0.2	60	1.4
CD2c	1.0	0.3	0.7	30	1.2
CD3	0.7	0.3	0.4	43	2.6
CD4	0.7	0.2	0.5	29	0.7
CD5	0.5	0.1	0.4	20	0.5
CD6	1.4	0.6	0.8	43	0.9

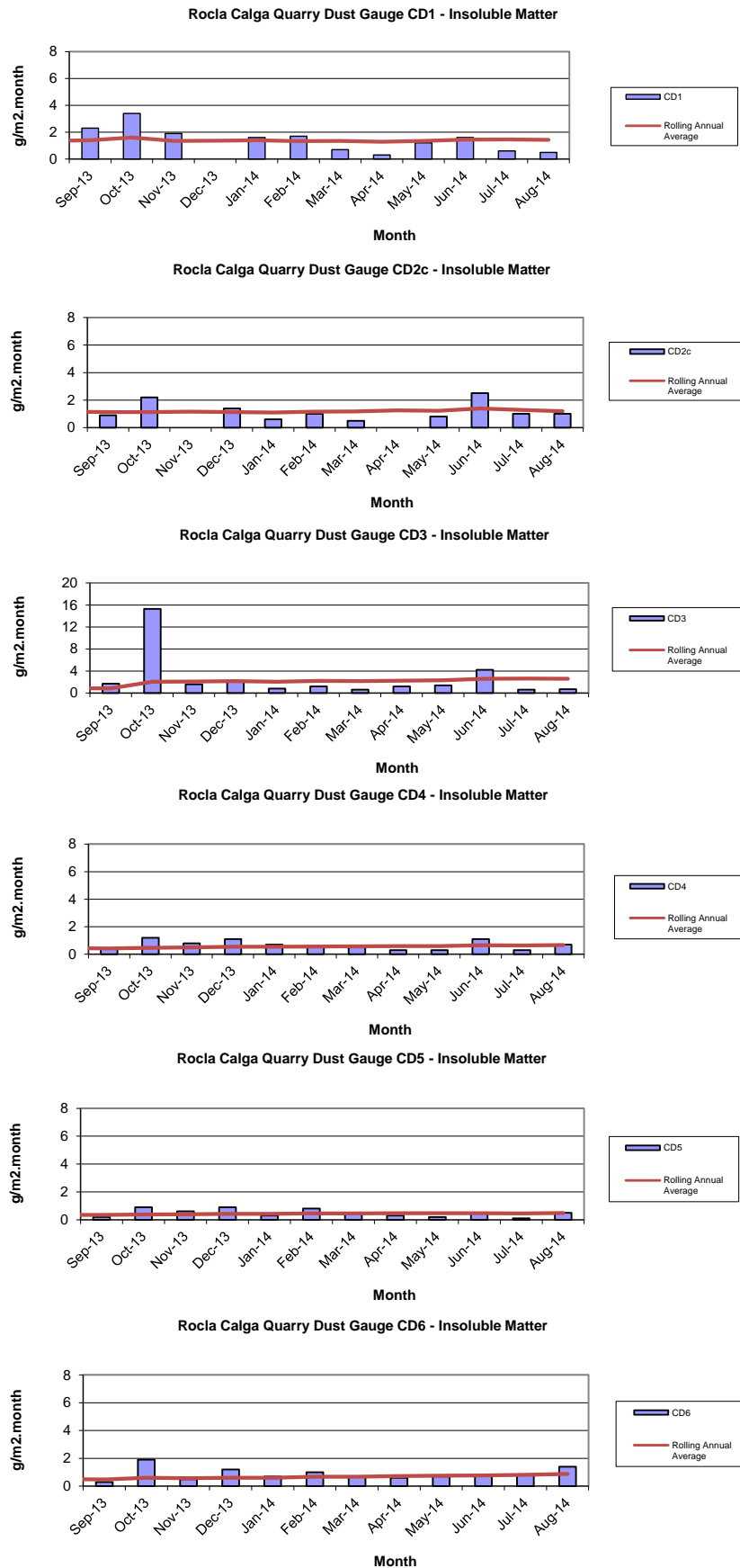
Insoluble Solids marked with an * indicate an excessively contaminated gauge. Contamination can include bird droppings, vegetation (such as plant matter, algae, pollen and seeds) and insects. Results in bold indicate insoluble solids levels above 3.7 g/m².month; the Development Consent's annual average amenity criteria at residential locations. The current rolling annual average is calculated from August 2013 to July 2014.

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 4 September 2014 and results are listed in **Table 2**. The laboratory analysis sheets are provided in **Appendix 1**.

Table 2: Monthly surface water monitoring – August 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	Clear	Clear	5.78	78	52	6	<5
B	Trickle	Clear	Clear	6.72	98	70	<5	<5
C	No access							
D	Trickle	Clear	Clear	5.66	87	70	<5	<5
F	Dam	Clear	Clear	5.69	79	58	12	<5

Samples were collected at sites A, B, D and F. Site C was inaccessible and unable to be sampled this month. The samples were collected and analysed for a monthly sampling event. Results show pH within the slightly acidic to neutral range, low Electrical Conductivity, low Total Dissolved Solids and low Total Suspended Solids. Oil and Grease was not detected at any site in August 2014.

2.3 Groundwater Monitoring

Groundwaters were sampled on 4 September 2014. 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 decreased at a majority of sites compared to last month, indicating water generally moving towards the surface. The exception was CP3 which showed a slight increase in depth.

pH at all sites is in the acidic to neutral range. pH levels decreased slightly across a majority of sampled sites. EC levels remained similar when compared to the results obtained in July 2014.

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	10.41	6.5	158
CQ4	Voutos	* Monitor	8.78	11.00	3.9	130
CQ5	Gazzana	DIP Only	8.69	7.55	3.6	185
CQ6	Gazzana	DIP Only	16.00	10.54	3.8	202
CQ7	Gazzana	* Monitor	6.89	6.02	3.9	119
CQ8	Gazzana	* Monitor	11.03	5.62	3.9	150
CQ9	Gazzana	DIP Only	10.10	8.64	4.0	126
CQ10	Voutos	* Monitor	NI	24.26	4.2	175
CQ11S	Gazzana	* Monitor	NI	11.40	4.3	165
CQ11D	Gazzana	* Monitor	NI	12.44	4.3	171
CQ12	Gazzana	* Monitor	NI	4.25	3.8	151
CQ13	Kashouli	* Monitor	NI	14.09	3.9	240
CP3	Gazzana	Domestic	10.40	10.13	4.5	155
CP4	Kashouli	Domestic	13.63	9.87	NM	NM
CP5	Kashouli	Domestic	16.61	9.24	4.4	213
CP6	Kashouli	Domestic	16.27	11.23	4.0	213
CP7	Kashouli	Production	8.56	3.25	4.5	108
CP8	Rozmanec	Domestic	22.17	20.68	4.1	157
MW7	Rocla Bore	* Monitor	15.76	15.61	3.9	126
MW8	Rocla Bore	* Monitor	9.82	7.82	4.1	88
MW9	Rocla Bore	* Monitor	22.44	22.96	4.0	102
MW10	Rocla Bore	* Monitor	15.41	11.70	4.1	134
MW13	Rocla Bore	DIP Only	NI	7.64	4.0	118
MW16	Rocla Bore	DIP Only	NI	8.12	4.1	127
MW17	Rocla Bore	DIP Only		9.99	5.0	132

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.

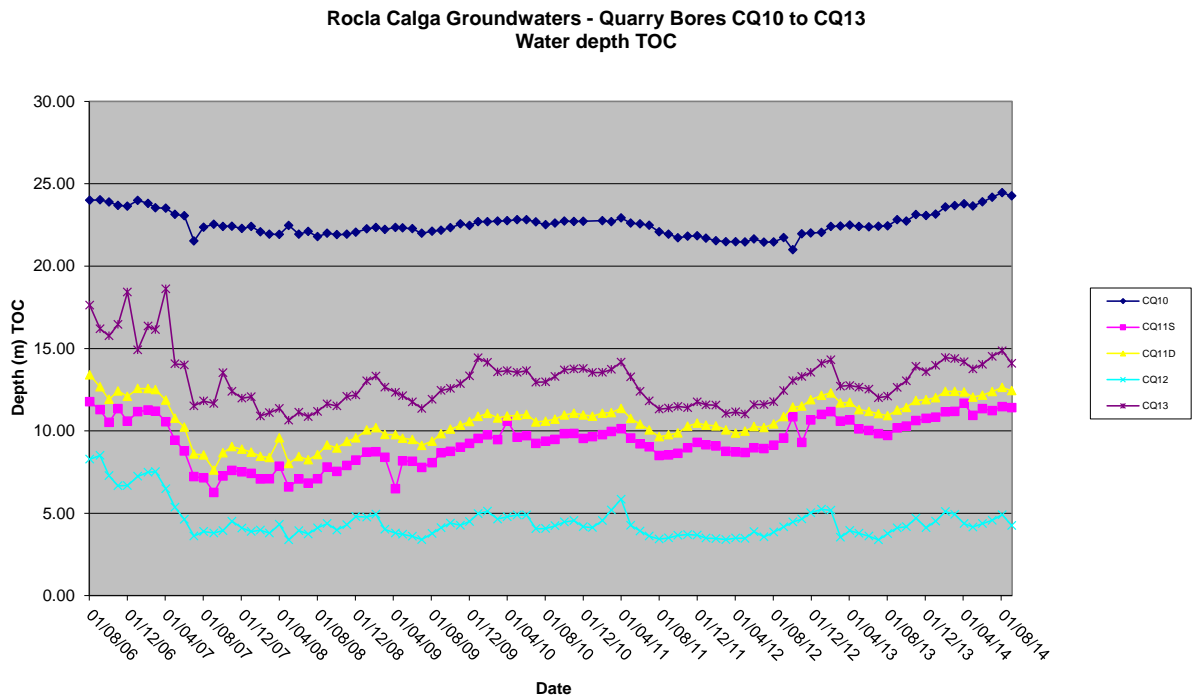
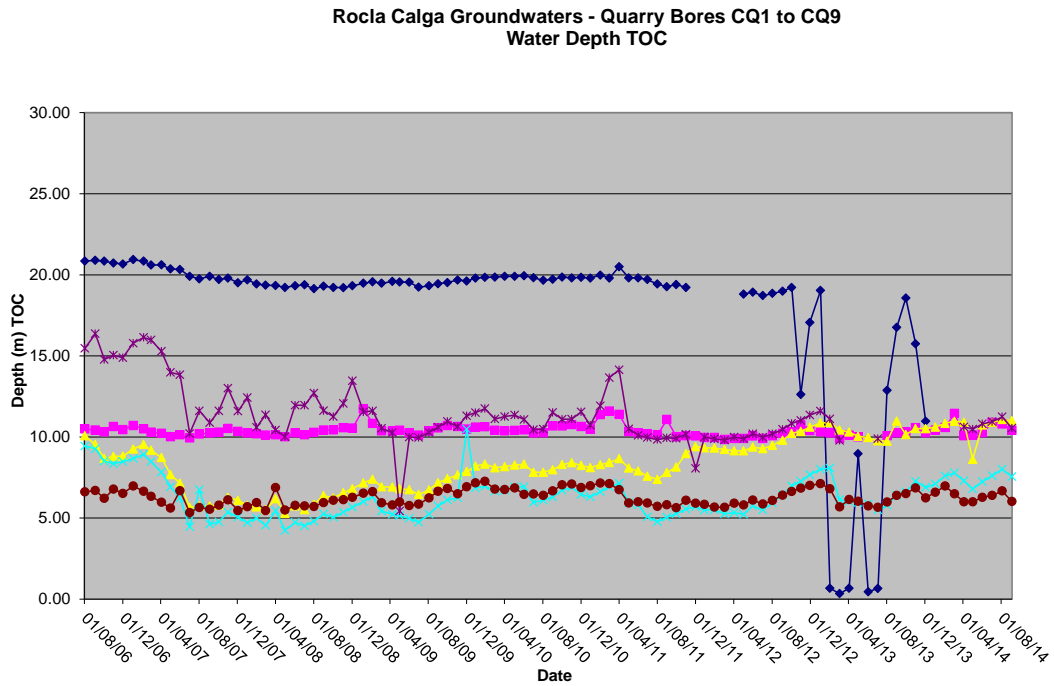
NI = These bores were not installed in April 2006 but are now operational. April 2006 was the first set of measurements taken by Carbon Based Environmental Pty Limited.

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

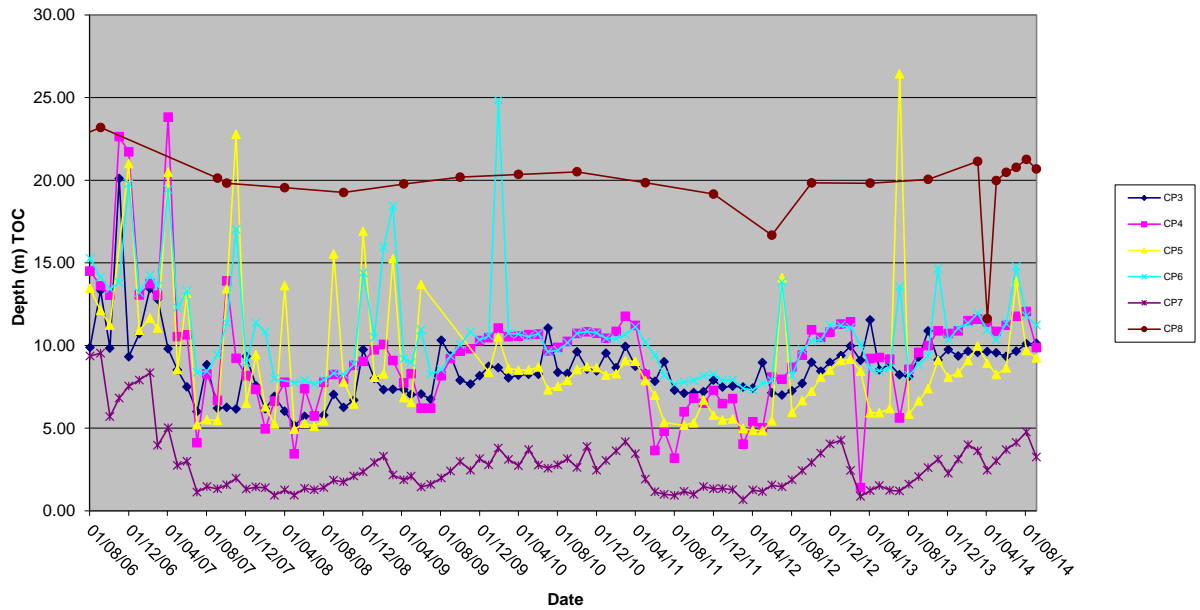
	Increase to ground water depth (water moved away from surface)
	Decrease to ground water depth (water moved towards surface)
	Stable water depth (+/- 0.01m)

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

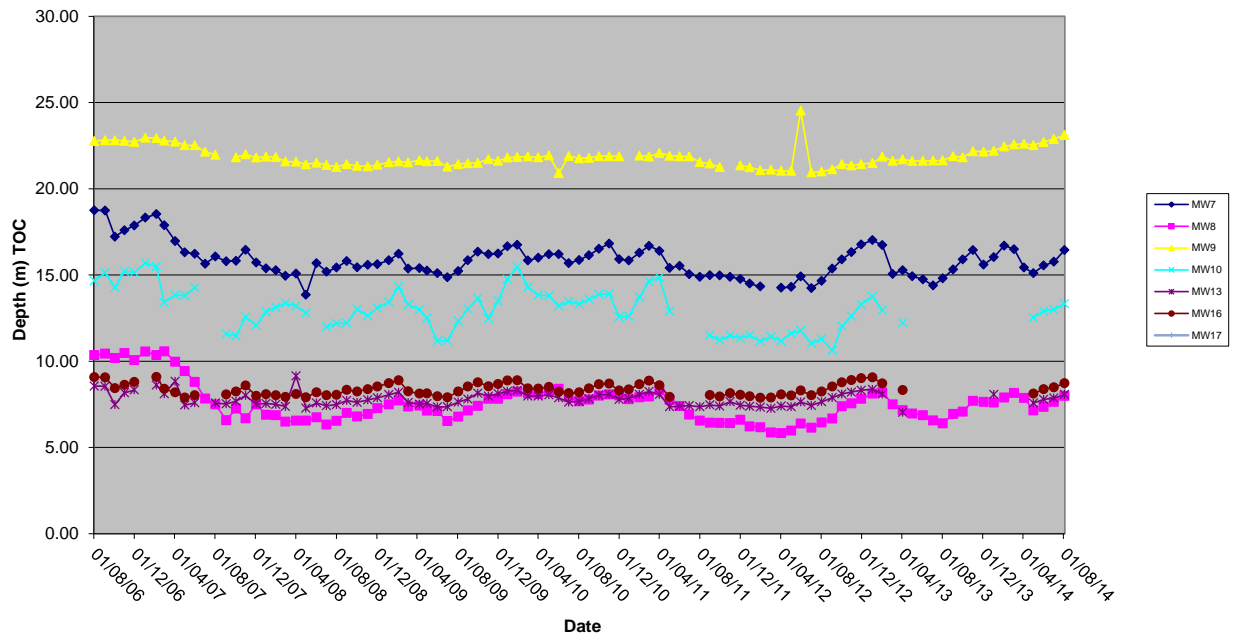
Figures 3 to 6: Groundwater Depth Charts.



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 August 2014 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 August 2014 shows that rainfall recorded at the Rocla Calga Quarry was lower than the Gosford BOM and higher than the Peats Ridge long term mean rainfall for August.

The rainfall comparison is provided below:

Rocla Calga Quarry	202.5 mm
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BOM Gosford*	226.4 mm
BOM Peats Ridge Long term mean for August*	78.8 mm

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*Data sourced from Bureau of Meteorology (BOM) website (www.bom.gov.au).

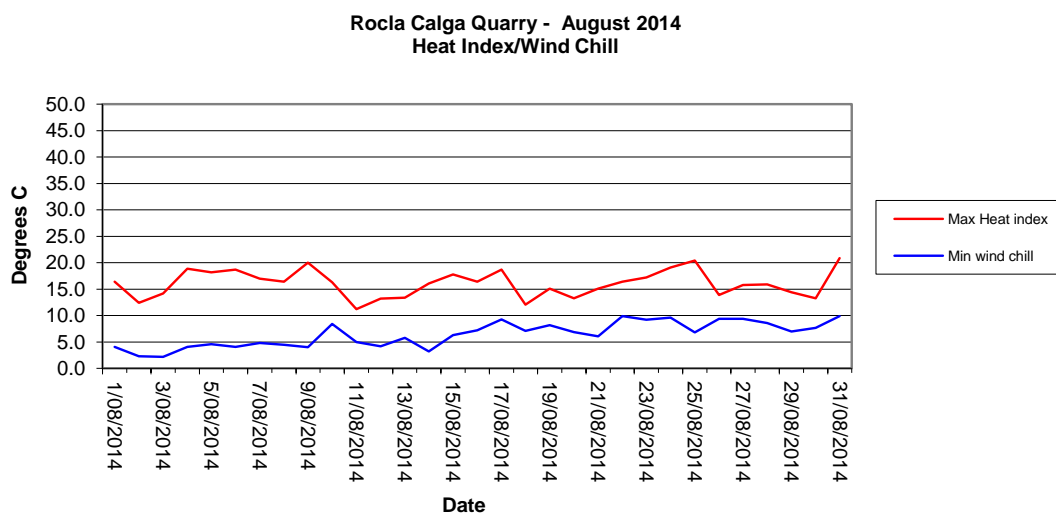
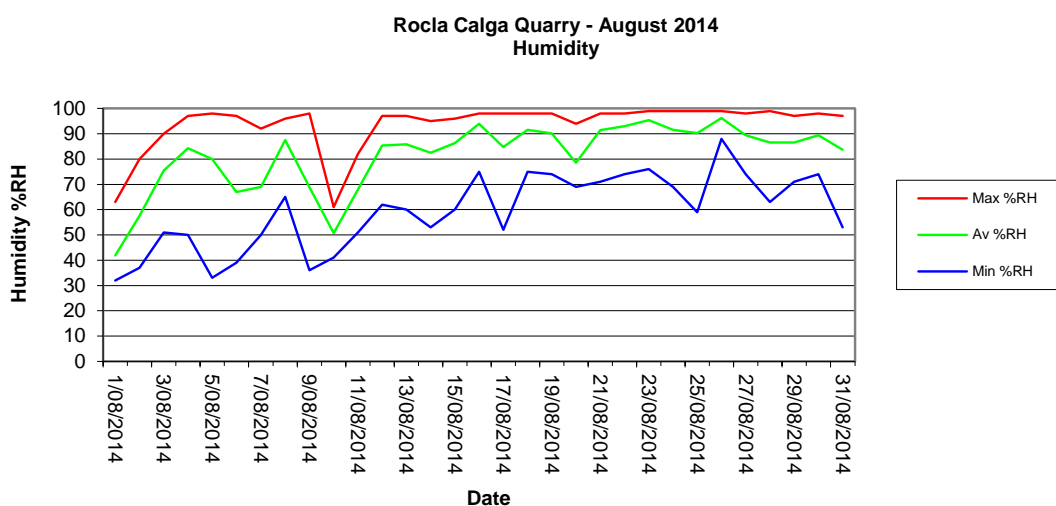
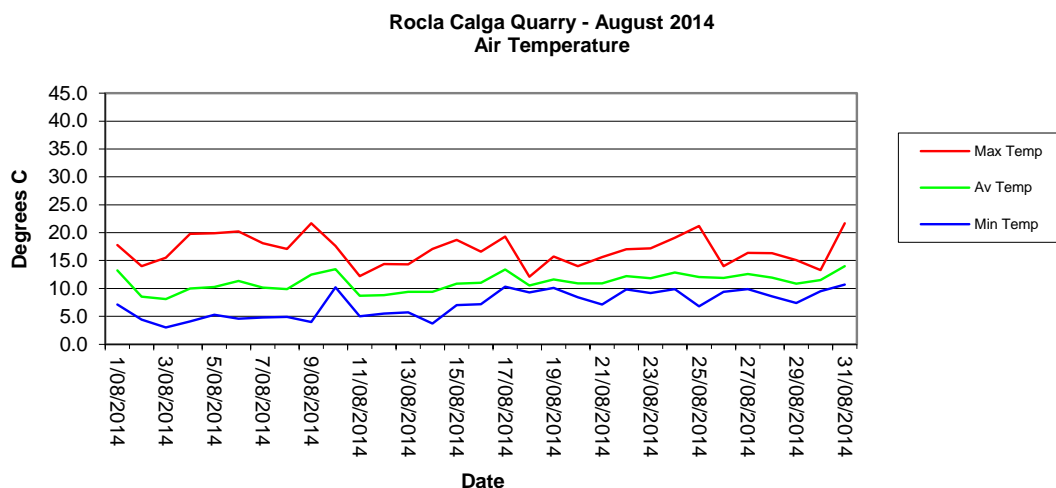
Results are displayed in the following table and figures.

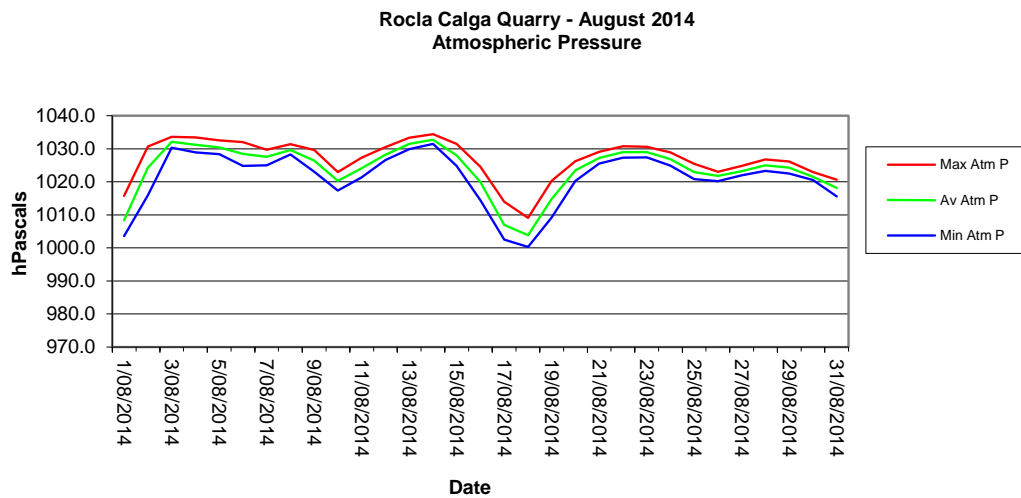
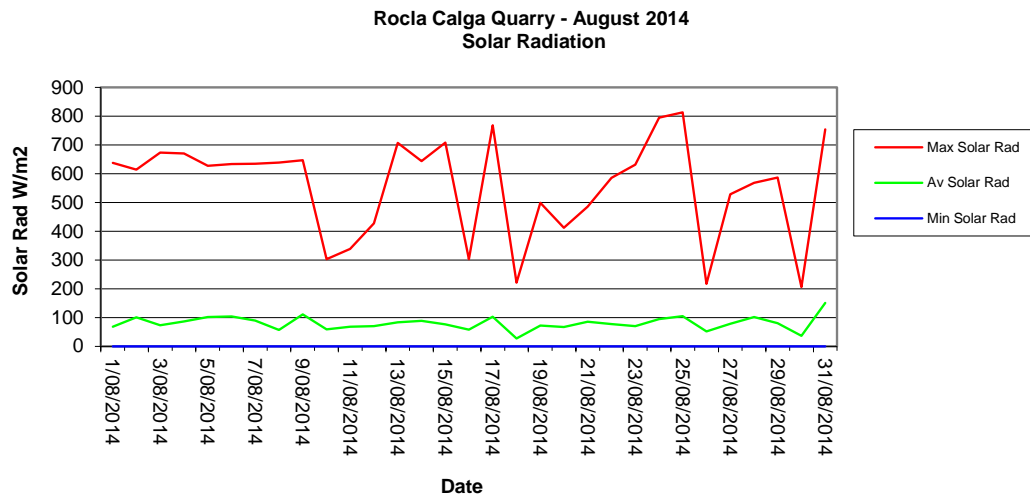
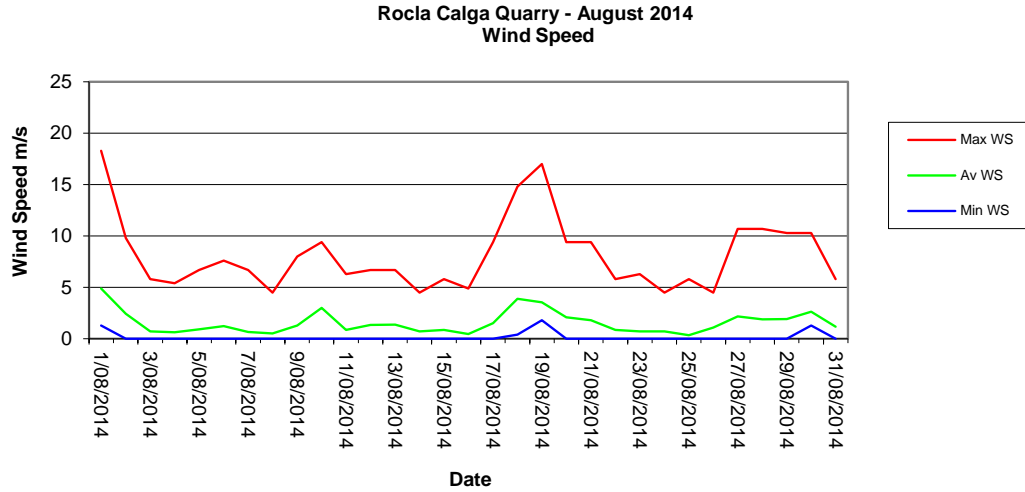
2.4.1 Monthly Meteorological Data Summary

Summary Aug-14 Rocla - Calga

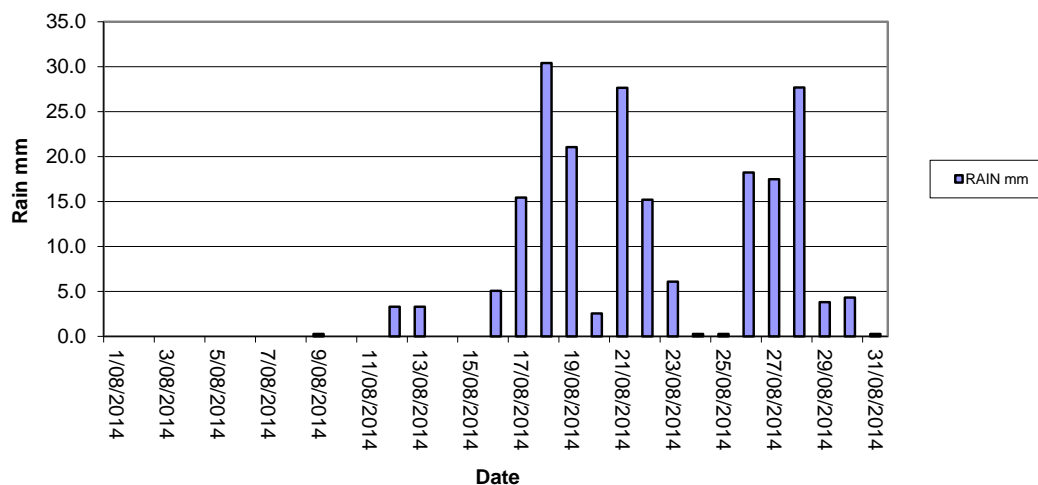
Date	Min Temp	Av Temp	Max Temp	Min %RH	Av %RH	Max %RH	RAIN mm	ET mm	Min WS	Av WS	Max WS	Min wind chill	Max Heat index	Min Atm P	Av Atm P	Max Atm P	Min Solar Rad	Av Solar Rad	Max Solar Rad	Min Data %	Av data %	Max Data %
1/08/2014	7.1	13.2	17.8	32	42	63	0.0	3.9	1.3	4.9	18.3	4.1	16.4	1003.6	1008.3	1015.7	0	68.2	638	91.2	97.4	98
2/08/2014	4.4	8.5	14.0	37	58	80	0.0	2.3	0	2.4	9.8	2.3	12.4	1015.9	1024.3	1030.7	0	101.1	614	91.5	97.6	98
3/08/2014	3.0	8.1	15.5	51	75	90	0.0	1.2	0	0.7	5.8	2.2	14.2	1030.3	1032.1	1033.6	0	72.6	674	89.5	97.6	98
4/08/2014	4.1	10.0	19.8	50	84	97	0.0	1.2	0	0.6	5.4	4.1	18.9	1028.9	1031.2	1033.4	0	86.2	670	94.7	97.4	98
5/08/2014	5.3	10.3	19.9	33	80	98	0.0	1.7	0	0.9	6.7	4.6	18.2	1028.4	1030.4	1032.5	0	102.0	628	94.4	97.3	98
6/08/2014	4.6	11.4	20.2	39	67	97	0.0	2.2	0	1.2	7.6	4.1	18.7	1024.8	1028.4	1032.0	0	103.4	634	94.7	97.4	98
7/08/2014	4.8	10.1	18.1	50	69	92	0.0	1.6	0	0.7	6.7	4.8	17.0	1025.0	1027.5	1029.7	0	88.9	635	89.2	97.7	98
8/08/2014	4.9	9.9	17.1	65	87	96	0.0	0.9	0	0.5	4.5	4.5	16.4	1028.3	1029.6	1031.4	0	56.7	639	93.9	97.6	98
9/08/2014	4.0	12.5	21.7	36	69	98	0.3	2.4	0	1.3	8	4.0	20.0	1023.0	1026.4	1029.6	0	110.7	647	94.4	97.6	98
10/08/2014	10.2	13.4	17.6	41	51	61	0.0	2.6	0	3.0	9.4	8.4	16.3	1017.3	1020.3	1022.9	0	59.0	303	95.6	97.3	98
11/08/2014	5.0	8.7	12.2	51	68	82	0.0	1.4	0	0.9	6.3	5.0	11.2	1021.3	1024.1	1027.3	0	67.6	339	94.4	97.8	98
12/08/2014	5.5	8.8	14.4	62	85	97	3.3	1.0	0	1.4	6.7	4.2	13.2	1026.6	1028.2	1030.5	0	69.6	427	86.8	96.7	98
13/08/2014	5.7	9.4	14.3	60	86	97	3.3	1.3	0	1.4	6.7	5.8	13.4	1029.9	1031.4	1033.3	0	83.3	707	87.4	95.4	98
14/08/2014	3.7	9.4	17.1	53	82	95	0.0	1.4	0	0.7	4.5	3.2	16.1	1031.5	1032.7	1034.4	0	88.8	644	88.6	96.9	98
15/08/2014	7.0	10.8	18.7	60	86	96	0.0	1.3	0	0.9	5.8	6.3	17.8	1024.8	1028.0	1031.5	0	76.3	708	93.9	97.5	98
16/08/2014	7.2	11.0	16.6	75	94	98	5.1	0.8	0	0.5	4.9	7.2	16.4	1014.4	1019.9	1024.5	0	57.3	303	90.6	96.6	98
17/08/2014	10.3	13.4	19.3	52	85	98	15.4	1.8	0	1.5	9.4	9.3	18.7	1002.5	1007.0	1014.0	0	102.8	769	90.9	94.6	98
18/08/2014	9.3	10.5	12.1	75	92	98	30.4	0.6	0.4	3.9	14.8	7.1	12.1	1000.3	1003.8	1009.1	0	27.1	221	81.3	93.4	98
19/08/2014	10.1	11.6	15.7	74	90	98	21.0	1.3	1.8	3.5	17	8.2	15.1	1009.2	1014.8	1020.3	0	71.8	499	70.5	88.7	97.7
20/08/2014	8.4	10.9	14.0	69	79	94	2.5	1.4	0	2.1	9.4	6.9	13.3	1020.3	1023.4	1026.2	0	67.1	412	86.5	95.4	98
21/08/2014	7.1	10.9	15.6	71	91	98	27.7	1.3	0	1.8	9.4	6.1	15.1	1025.5	1027.2	1029.1	0	85.1	486	76.3	93.2	98
22/08/2014	9.8	12.2	17.0	74	93	98	15.2	1.1	0	0.9	5.8	9.9	16.4	1027.3	1029.0	1030.8	0	77.4	586	82.5	94.6	98
23/08/2014	9.2	11.8	17.2	76	95	99	6.1	1.0	0	0.7	6.3	9.2	17.2	1027.4	1029.0	1030.6	0	70.2	632	91.2	96.9	98
24/08/2014	9.9	12.9	19.1	69	92	99	0.3	1.3	0	0.7	4.5	9.6	19.1	1024.9	1026.9	1028.9	0	94.7	795	95	97.7	98
25/08/2014	6.8	12.1	21.2	59	90	99	0.3	1.5	0	0.3	5.8	6.8	20.4	1020.8	1022.9	1025.4	0	105.2	813	90.6	96.9	98
26/08/2014	9.4	11.9	14.0	88	96	99	18.2	0.7	0	1.1	4.5	9.4	13.9	1020.2	1021.7	1023.0	0	51.5	217	92.4	97.3	98
27/08/2014	9.9	12.6	16.4	74	89	98	17.5	1.4	0	2.2	10.7	9.4	15.8	1022.0	1023.2	1024.8	0	77.8	529	82.7	96.1	98
28/08/2014	8.6	12.0	16.3	63	87	99	27.7	1.8	0	1.9	10.7	8.6	15.9	1023.3	1025.0	1026.8	0	101.3	568	84.8	96.4	98
29/08/2014	7.4	10.8	15.1	71	87	97	3.8	1.4	0	1.9	10.3	7.0	14.4	1022.5	1024.3	1026.1	0	79.7	587	88.6	95.6	98
30/08/2014	9.5	11.5	13.3	74	89	98	4.3	0.8	1.3	2.6	10.3	7.7	13.3	1020.5	1021.5	1022.9	0	36.6	206	94.2	97.4	98
31/08/2014	10.7	14.0	21.7	53	84	97	0.3	2.2	0	1.2	5.8	9.9	20.9	1015.6	1018.2	1020.6	0	151.0	754	95.6	97.6	98
Monthly	3	11.1	21.7	32	81	99	202.5	46.5	0	1.6	18.3	2.2	20.9	1000.3	1023.9	1034.4	0	80.3	813	70.5	96.4	98

2.4.2 Monthly Weather Charts

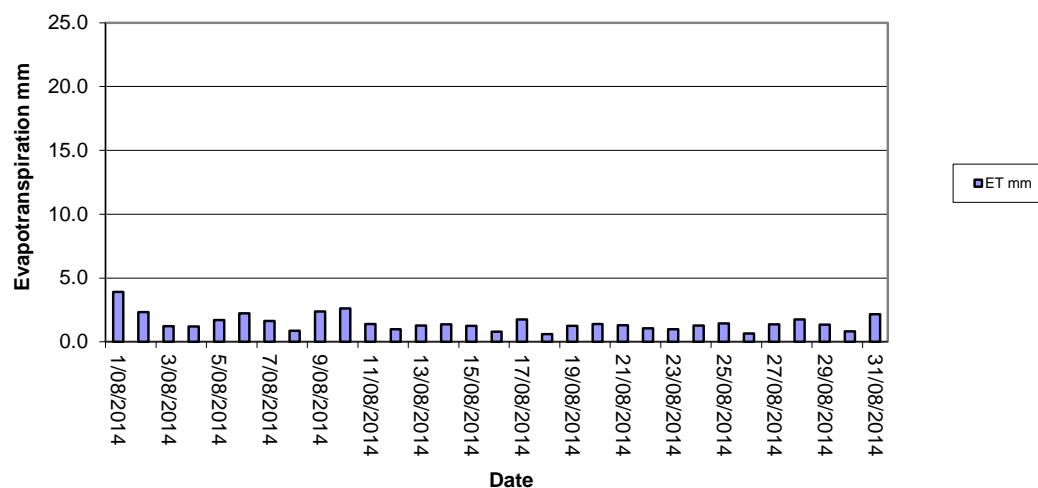




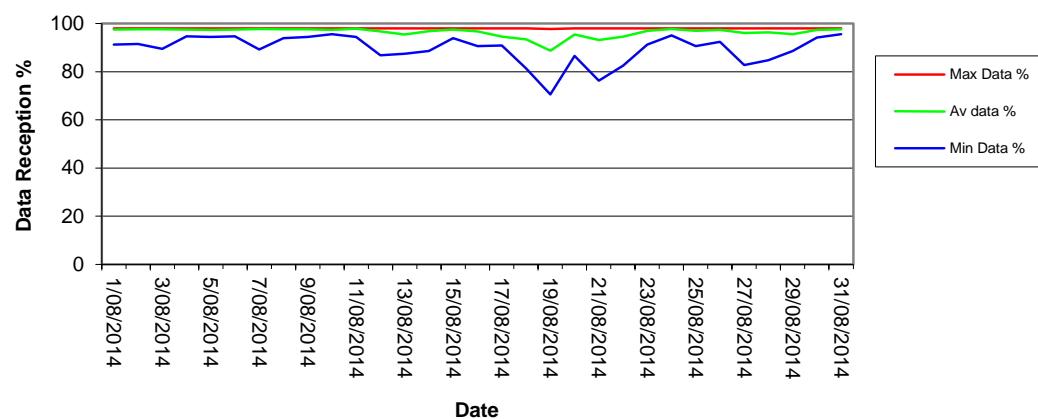
Rocla Calga Quarry - August 2014
Rainfall



Rocla Calga Quarry - August 2014
Evapotranspiration



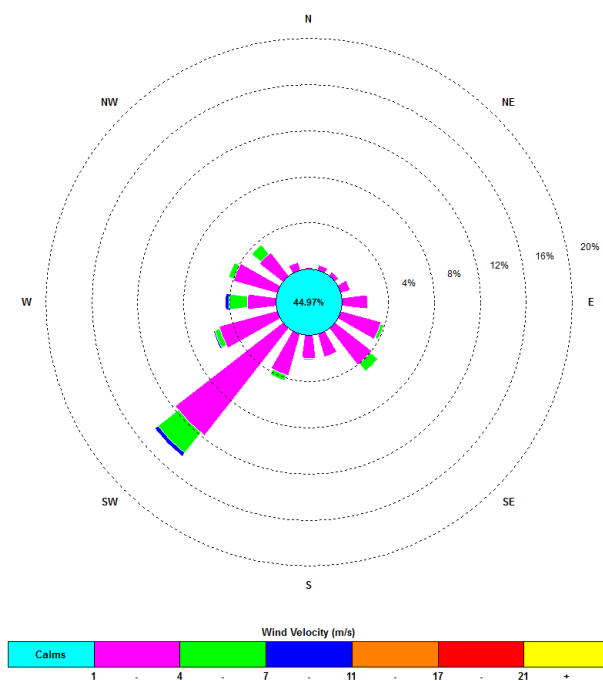
Rocla Calga Quarry - August 2014
Data Reception



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.

00:00, 1 August 2014 – 23:45, 31 August 2014



The predominant winds were from the SW, with most frequent, strongest winds from the SW. The maximum wind speed was 18.3 m/s from the WSW.

Appendix 1

Laboratory Certificates



Environmental

CERTIFICATE OF ANALYSIS

Work Order	: EN1403051	Page	: 1 of 4
Client	: CARBON BASED ENVIRONMENTAL	Laboratory	: Environmental Division Newcastle
Contact	: MR COLIN DAVIES (cbased)	Contact	: Peter Keyte
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	: peter.keyte@als.com.au
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 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 04-SEP-2014
C-O-C number	: ----	Issue Date	: 15-SEP-2014
Sampler	: ----	No. of samples received	: 6
Site	: ----	No. of samples analysed	: 6
Quote number	: SY/485/14		

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

Dianne Blane

Laboratory Coordinator (2IC)

Newcastle - Inorganics

Address 5/585 Maitland Road Mayfield West NSW Australia 2304 | PHONE +61 2 4014 2500 | Facsimile +61 2 4968 0349
Environmental Division Newcastle ABN 84 009 936 029 Part of the ALS Group An ALS Limited Company

Environmental

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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.

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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

- **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: DUST (Matrix: AIR)

Client sample ID

Client sampling date / time

				CD1 04/08/14 - 04/09/14 04-SEP-2014 14:15	CD2c 04/08/14 - 04/09/14 04-SEP-2014 14:15	CD3 04/08/14 - 04/09/14 04-SEP-2014 14:15	CD4 04/08/14 - 04/09/14 04-SEP-2014 14:15	CD5 04/08/14 - 04/09/14 04-SEP-2014 14:15
Compound	CAS Number	LOR	Unit	EN1403051-001	EN1403051-002	EN1403051-003	EN1403051-004	EN1403051-005
EA120: Ash Content								
Ash Content	----	0.1	g/m ² .month	0.3	0.3	0.3	0.2	0.1
Ash Content (mg)	----	1	mg	6	6	5	3	2
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m ² .month	0.2	0.7	0.4	0.5	0.4
Combustible Matter (mg)	----	1	mg	4	12	7	9	7
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m ² .month	0.5	1.0	0.7	0.7	0.5
Total Insoluble Matter (mg)	----	1	mg	10	18	12	12	9



Analytical Results

Sub-Matrix: DUST (Matrix: AIR)

Client sample ID

				CD6	----	----	----	----
				04/08/14 - 04/09/14	----	----	----	----
				Client sampling date / time	04-SEP-2014 14:15	----	----	----
Compound	CAS Number	LOR	Unit	EN1403051-006	----	----	----	----
EA120: Ash Content								
Ash Content	----	0.1	g/m ² .month	0.6	----	----	----	----
Ash Content (mg)	----	1	mg	11	----	----	----	----
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m ² .month	0.8	----	----	----	----
Combustible Matter (mg)	----	1	mg	15	----	----	----	----
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m ² .month	1.4	----	----	----	----
Total Insoluble Matter (mg)	----	1	mg	26	----	----	----	----



Environmental

CERTIFICATE OF ANALYSIS

Work Order	: ES1419873	Page	: 1 of 3
Client	: CARBON BASED ENVIRONMENTAL	Laboratory	: Environmental Division Sydney
Contact	: MR COLIN DAVIES (cbased)	Contact	: Client Services
Address	: 47 BOOMERANG ST CESSNOCK NSW, AUSTRALIA 2325	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: cbased@bigpond.com	E-mail	: sydney@alsglobal.com
Telephone	: +61 49904443	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49904442	Facsimile	: +61-2-8784 8500
Project	: ROCIA QUARRY	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 04-SEP-2014
Sampler	: CBE	Issue Date	: 09-SEP-2014
Site	: ----		
Quote number	: SY/485/14	No. of samples received	: 4
		No. of samples analysed	: 4

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
Barbara Coupland	Quality Officer	Newcastle - Inorganics
Dian Dao		Sydney Inorganics

Address: 277-289 Woodpark Road Smithfield NSW Australia 2164 | PHONE +61-2-8784 8555 | Facsimile +61-2-8784 8500
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Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Client sample ID

Client sampling date / time

				A	B	D	F	---
				[04-SEP-2014]	[04-SEP-2014]	[04-SEP-2014]	[04-SEP-2014]	---
Compound	CAS Number	LOR	Unit	ES1419873-001	ES1419873-002	ES1419873-003	ES1419873-004	---
EA005: pH								
pH Value	---	0.01	pH Unit	5.78	6.72	5.66	5.69	---
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	---	1	µS/cm	78	98	87	79	---
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	---	10	mg/L	52	70	---	58	---
Total Dissolved Solids @180°C	---	10	mg/L	---	---	70	---	---
EA025: Suspended Solids								
Suspended Solids (SS)	---	5	mg/L	6	<5	<5	12	---
EP020: Oil and Grease (O&G)								
Oil & Grease	---	5	mg/L	<5	<5	<5	<5	---



Today's Collection	
Time Start:	8:40
Time Finish:	13:10

Date: 4.9.14

Client : Rocla Calga

Project :

GROUNDWATERS

Site	DEPTH	Odour	Water Turbidity	Water Colour	1		2		Bottles (Apr/Oct)	Downloaded Logger? (Y/N)
					pH	EC	pH	EC		
CQ3	10.41	NIL	CST	CLO O B G	6.74	157.7uS	6.52	158.3uS	1x 250ml GP, 1x 500mL GP, 1RP	YES
CQ4	11.00	N	CST	CLO O B G	3.90	132.6uS	3.91	129.5uS	1x 250ml GP, 1x 500mL GP, 1RP	N
CQ5	7.55	N	CST	CLO O B G	3.51	183.8uS	3.64	185.2uS	1x 250ml GP, 1x 500mL GP, 1RP	
CQ6	10.54	N	CST	CLO O B G	3.75	201.1uS	3.79	202.4uS	1x 250ml GP, 1x 500mL GP, 1RP	
CQ7	6.02	N	CST	CLO O B G	3.83	118.2uS	3.89	119.2uS	1x 250ml GP, 1x 500mL GP, 1RP	NO LOGGER
CQ8	5.62	N	CST	CLO O B G	3.85	146.2uS	3.94	149.9uS	1x 250ml GP, 1x 500mL GP, 1RP	
CQ9	8.64	N	CST	CLO O B G	3.86	126.2uS	3.96	126.4uS	1x 250ml GP, 1x 500mL GP, 1RP	
CQ10	24.26	NIL	CST	CLO O B G	4.26	175.7uS	4.16	174.8uS	1x 250ml GP, 1x 500mL GP, 1RP	NO LOGGER
CQ11S	11.40	N	CST	CLO O B G	4.31	170.3uS	4.29	165.1uS	1x 250ml GP, 1x 500mL GP, 1RP	Y
CQ11D	12.44	Y	CST	CLO O B G	4.38	172.3uS	4.32	171.3uS	1x 250ml GP, 1x 500mL GP, 1RP	NO LOGGER
CQ12	4.25	N	CST	CLO O B G	3.83	146.8uS	3.78	150.8uS	1x 250ml GP, 1x 500mL GP, 1RP	Y
CQ13	14.09	N	CST	CLO O B G	3.88	235.1uS	3.89	239.9uS	1x 250ml GP, 1x 500mL GP, 1RP	Y
CP3	10.13	N	CST	CLO O B G	4.66	149.9uS	4.53	154.9uS	1x 250ml GP, 1x 500mL GP, 1RP	
CP4	9.87		CST	CLO O B G					1x 250ml GP, 1x 500mL GP, 1RP	PUMP NOT WORKING
CP5	9.24	N	CST	CLO O B G	4.50	211.2uS	4.43	212.6	1x 250ml GP, 1x 500mL GP, 1RP	
CP6	11.23	N	CST	CLO O B G	4.03	213.1uS	3.99	212.7uS	1x 250ml GP, 1x 500mL GP, 1RP	
CP7	3.25	N	CST	CLO O B G	4.48	112.1uS	4.51	107.9uS	1x 250ml GP, 1x 500mL GP, 1RP	
CP8	20.68	N	CST	CLO O B G	3.99	157.4uS	4.08	157.4uS	1x 250ml GP, 1x 500mL GP, 1RP	
MW7	15.61	N	CST	CLO O B G	3.93	126.4uS	3.93	126.2uS	1x 250ml GP, 1x 500mL GP, 1RP	NO LOGGER
MW8	7.82	N	CST	CLO O B G	4.15	90.5uS	4.07	88.3uS	1x 250ml GP, 1x 500mL GP, 1RP	Y
MW9	22.96	N	CST	CLO O B G	4.02	105.6uS	4.00	101.7uS	1x 250ml GP, 1x 500mL GP, 1RP	Y
MW10	11.70	N	CST	CLO O B G	3.90	142.4uS	4.13	133.8uS	1x 250ml GP, 1x 500mL GP, 1RP	NO LOGGER
MW13	7.64	N	CST	CLO O B G	3.99	117.3uS	4.03	117.7uS	1x 250ml GP, 1x 500mL GP, 1RP	
MW16	8.12	N	CST	CLO O B G	4.08	127.3uS	4.05	126.8uS	1x 250ml GP, 1x 500mL GP, 1RP	

MW17 9.99 N C
Turbidity: C=Clear, S= Slight, T=Turbid (CIRCLE)

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

pH/EC meter #: 12

Signed: [Signature]

pH 4 = 4.04

pH 10 = 10.15

EC 13 = 1413uS

EC 258 = 12.14uS

Sampled by: Hanisu & WAZ

TOC = 0.0845m