



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 2010**

A handwritten signature in black ink that reads 'Colin Davies'.

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Colin Davies BSc MEIA CENVP  
Environmental Scientist  
23 December 2010

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## 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 2010;
- Surface Water quality results for November 2010;
- Groundwater depth and quality results for November 2010; and
- Meteorological report for November 2010.

The November 2010 dust deposition results were generally similar to October 2010. All sites, on a year to date average basis, are currently below the Air Quality Management Plan exceedence level of 3.7g/m<sup>2</sup>.month. Results were found to be representative of dust levels as determined by the Australian Standard.

Surface water samples were collected for the normal monthly sampling event on the 1 December 2010 at sites A, B, D and F. There was no access to site C. At the time of sample collection, there was no water discharge observed from the site. Results show generally good quality water with most sites sampled maintaining low Electrical Conductivity, low Total Dissolved Solids, low Total Suspended Solids and no detectable Oil and Grease. pH levels remained stable and were within the neutral to slightly acidic range.

Groundwaters were sampled for normal monthly monitoring on 1 December 2010. Groundwater depths decreased at the majority of monitoring bores this month, indicating water moving towards the surface. pH and EC levels remained relatively steady at all sites.

The meteorological station data recovery for the month was approximately 100%. The predominant winds were from the NE, with strongest winds from the SW. Recorded rainfall on site for November was 180.2mm, which was below that recorded at the BOM Peats Ridge Station and above the Peats Ridge long-term average for November. Results are detailed below:

Rocla Calga Quarry	180.2mm
BOM Peats Ridge*	204.5mm
BOM Gosford*	220.2mm
BOM Peats Ridge Long term mean for November*	108.1mm

\*Data sourced from Bureau of Meteorology (BOM) website ([www.bom.gov.au](http://www.bom.gov.au))

**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.

## 1.0 Sampling Program

Rocla Calga Quarry conducts environmental monitoring in accordance to Development Consent, DEC (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<sup>2</sup>.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.

## 2.0 Monthly Results

### 2.1 Dust Deposition Gauges

**Table 1** displays the results for November 2010 and the project average. Results are in g/m<sup>2</sup>.month.

**Table 1: Dust Deposition results: 1-November-2010 to 1-December 2010**

Site	Monthly Insoluble Solids g/m <sup>2</sup> .month	Monthly Ash Residue g/m <sup>2</sup> .month	Monthly Combustible Matter g/m <sup>2</sup> .month	Monthly Ash Residue/ Insoluble Solids %	Rolling Annual Average Insoluble Solids g/m <sup>2</sup> .month
<b>CD1</b>	1.1	0.7	0.4	64	1.3
<b>CD2c</b>	0.5	0.2	0.3	40	1.1
<b>CD3</b>	0.4	0.2	0.2	50	0.6
<b>CD4</b>	0.2	0.2	<0.1	100	0.7
<b>CD5</b>	0.4	0.3	0.1	75	0.7
<b>CD6</b>	0.3	0.3	<0.1	100	0.6

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<sup>2</sup>.month, the Development Consent annual average amenity criteria at residential locations. The current rolling annual average is calculated from December 2009 to November 2010.

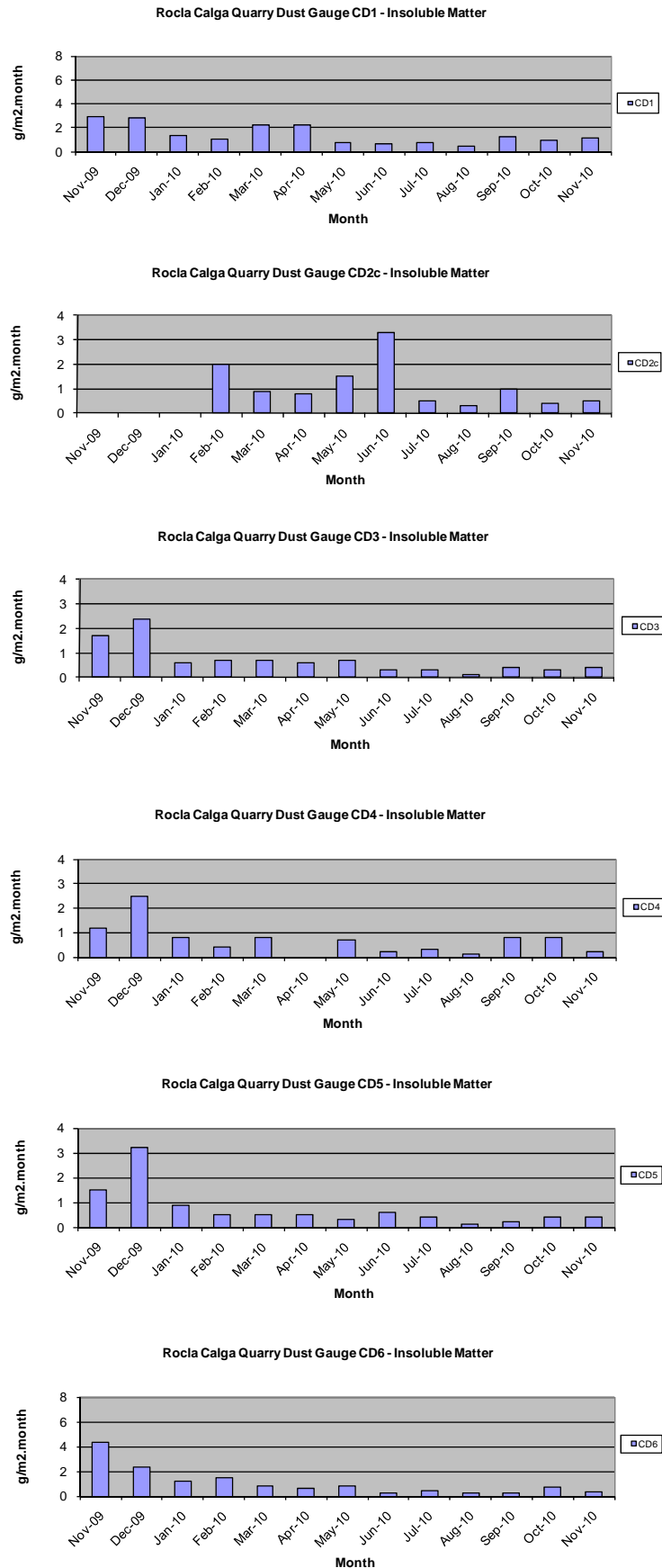
NA= Not Available.

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 1** below. The laboratory analysis is provided in **Appendix 1**.

The predominant winds were from the NE, with strongest winds from the SW.

Figure 1: Dust Deposition Charts



## 2.2 Water Monitoring

### 2.2.1 Surface Waters

Monthly surface water monitoring was conducted on the 1 December 2010 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	Clear	Clear	5.68	74	57	6	<5
B	Dam	Clear	Clear	5.94	73	101	17	<5
C	---	---	---	---	---	---	---	---
D	Trickle	Clear	Clear	5.48	88	57	8	<5
F	Dam	Clear	Clear	5.69	73	38	<5	<5

At the time of sampling, there were no water discharges off site from any sampling location. Samples were collected at all sites except Site C due to restricted access. The samples were collected and analysed for a monthly sampling event. Results show pH within the neutral to slightly acidic range, low Electrical Conductivity, low Total Dissolved Solids, low Total Suspended Solids and no detectable Oil and Grease.

### 2.2.2 Groundwaters

Groundwaters were sampled on 1 December 2010. 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 2 to 5**.

Groundwater depths decreased at the majority of monitoring bores this month, indicating water moving towards the surface. Longer term monitoring is required to fully evaluate groundwater depth trends.

pH and EC remained relatively steady at all sites. Detailed biannual water quality monitoring is next due in April 2011.

**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 (uS/cm) This report
CQ1	Voutos	* Monitor	20.59	19.84	4.4	120
CQ3	Voutos	* Monitor	10.53	15.64	5.9	100
CQ4	Voutos	* Monitor	8.78	8.24	4.7	80
CQ5	Gazzana	DIP Only	8.69	6.45	4.3	140
CQ6	Gazzana	DIP Only	16.00	11.55	4.7	160
CQ7	Gazzana	* Monitor	6.89	6.88	4.4	90
CQ8	Gazzana	* Monitor	11.03	6.71	4.2	160
CQ9	Gazzana	DIP Only	10.10	9.26	4.4	100
CQ10	Voutos	* Monitor	NI	22.72	5.0	150
CQ11S	Gazzana	* Monitor	NI	9.54	4.4	150
CQ11D	Gazzana	* Monitor	NI	10.96	4.9	130
CQ12	Gazzana	* Monitor	NI	4.18	4.3	130
CQ13	Kashouli	* Monitor	NI	13.78	5.1	180
CP3	Gazzana	Domestic	10.40	8.46	4.4	140
CP4	Kashouli	Domestic	13.63	10.74	5.0	200
CP5	Kashouli	Domestic	16.61	8.65	4.5	240
CP6	Kashouli	Domestic	16.27	10.76	4.3	210
CP7	Kashouli	Production	8.56	2.45	5.1	130
CP8	Rozmanec	Domestic	22.17	NR	NR	NR
MW7	Rocla Bore	* Monitor	15.76	15.92	4.5	110
MW8	Rocla Bore	* Monitor	9.82	8.01	4.7	80
MW9	Rocla Bore	* Monitor	22.44	21.88	5.4	80
MW10	Rocla Bore	* Monitor	15.41	12.57	4.4	120
MW13	Rocla Bore	DIP Only	NI	7.79	4.7	90
MW16	Rocla Bore	DIP Only	NI	8.30	4.5	100

**Notes:**

TOC = Water level measured from top of bore case to water.

NM = Not Monitored – unable to sample water due to access restrictions.

NR = Not Required by resident.

\* = Logger Installed.

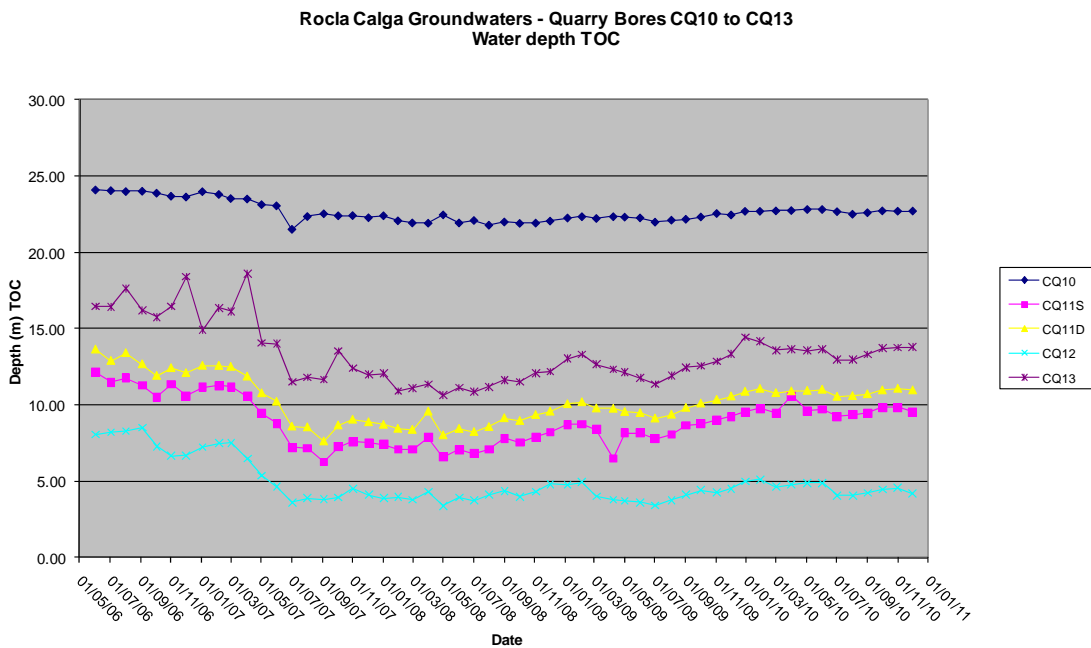
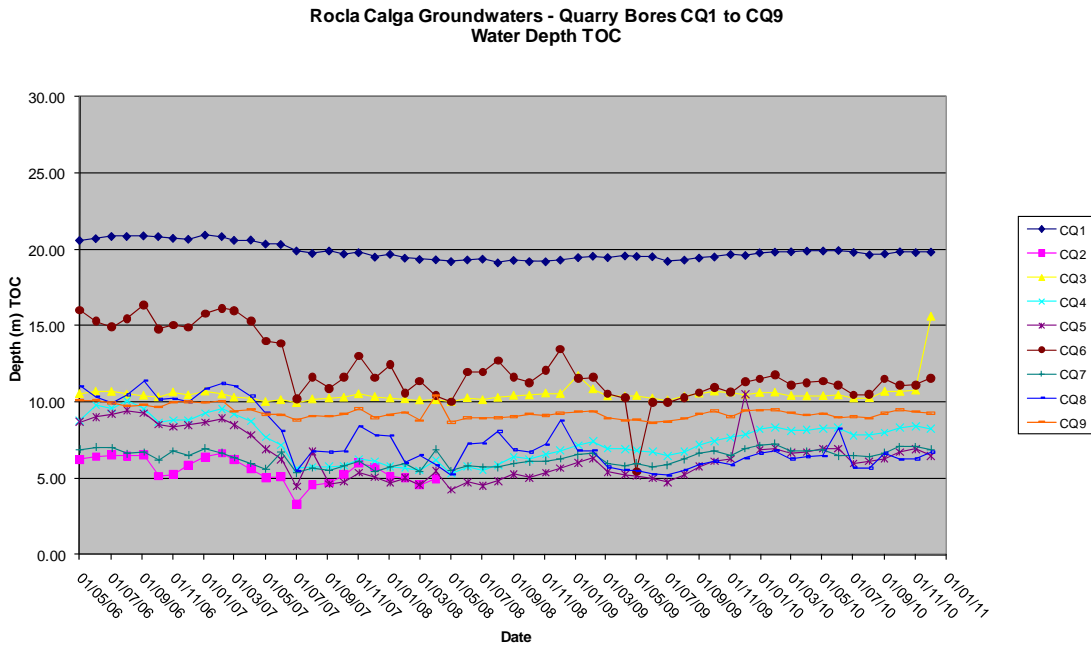
NI = These bores were not installed in April 2006 but are now operational. April 2006 was the first set of measurements taken by Carbon Based Environmental Pty Limited.

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

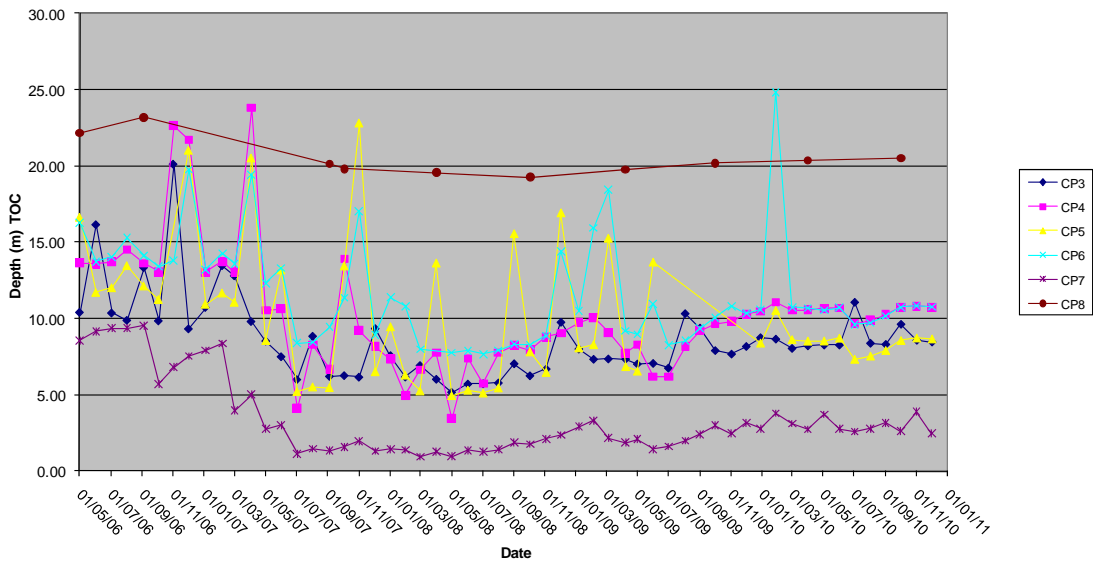
	Increase to ground water depth (water moved away from surface)
	Decrease to ground water depth (water moved towards surface)
	Stable water depth (+/- 0.01m)

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

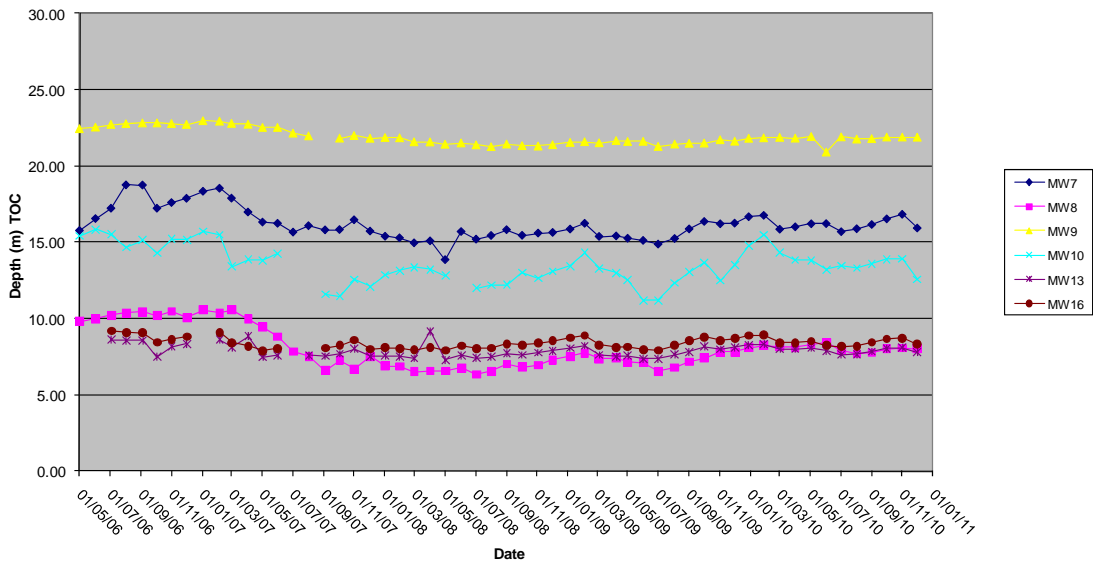
Figures 2 to 5: Groundwater Depth Charts.



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



Rocla Calga Groundwaters - Quarry Bores MW7 to MW16  
Water Depth TOC



## 2.3 Meteorological Monitoring

The Rocla Calga Quarry weather station data recovery in November 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 two nearby Bureau of Meteorology (BOM) stations, Peats Ridge and Gosford are included in **Appendix 2** for comparison purposes.

Data for November 2010 shows rainfall recorded at the Rocla Calga Quarry was below that recorded at nearby Peats Ridge BOM station and above that recorded at nearby Gosford BOM station. The rainfall comparison is provided below:

Rocla Calga Quarry	180.2mm
BOM Peats Ridge*	204.5mm
BOM Gosford*	220.2mm
BOM Peats Ridge Long term mean for November*	108.1mm

\*Data sourced from Bureau of Meteorology (BOM) website ([www.bom.gov.au](http://www.bom.gov.au))

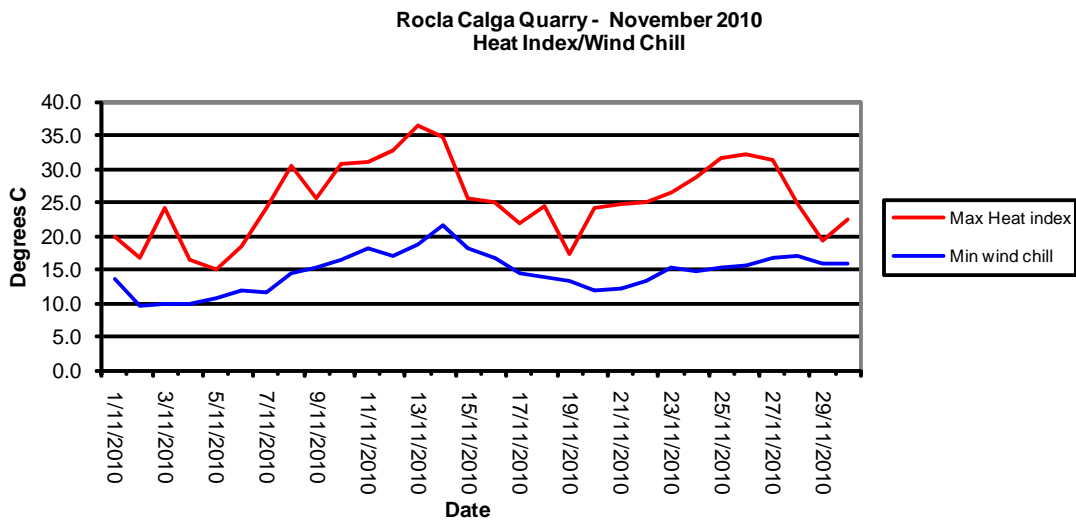
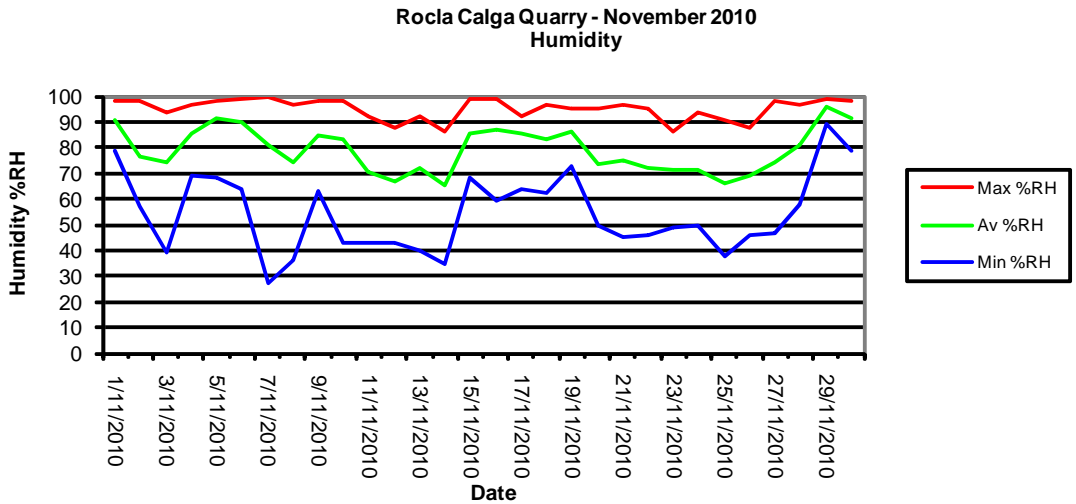
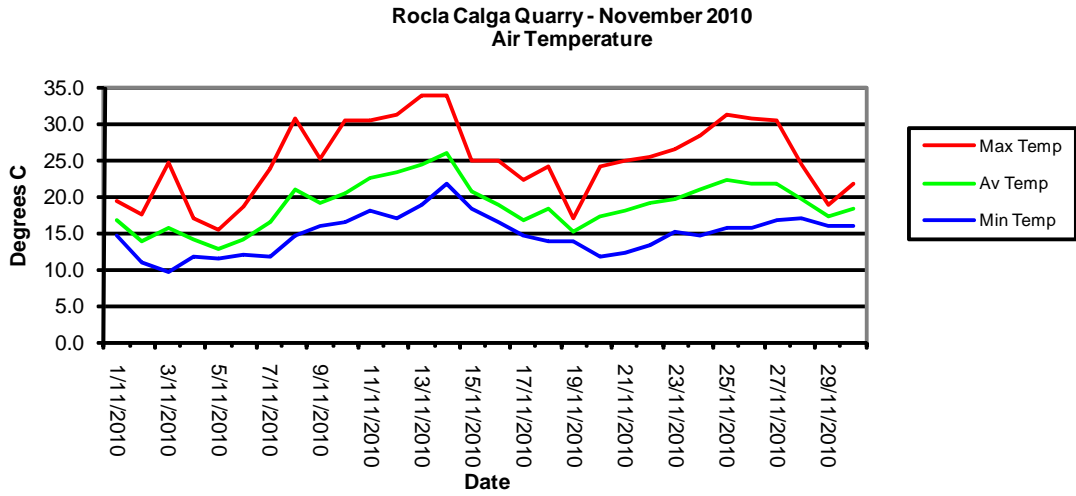
Results are displayed in the following table and figures.

### 2.3.1 Monthly Meteorological Data Summary

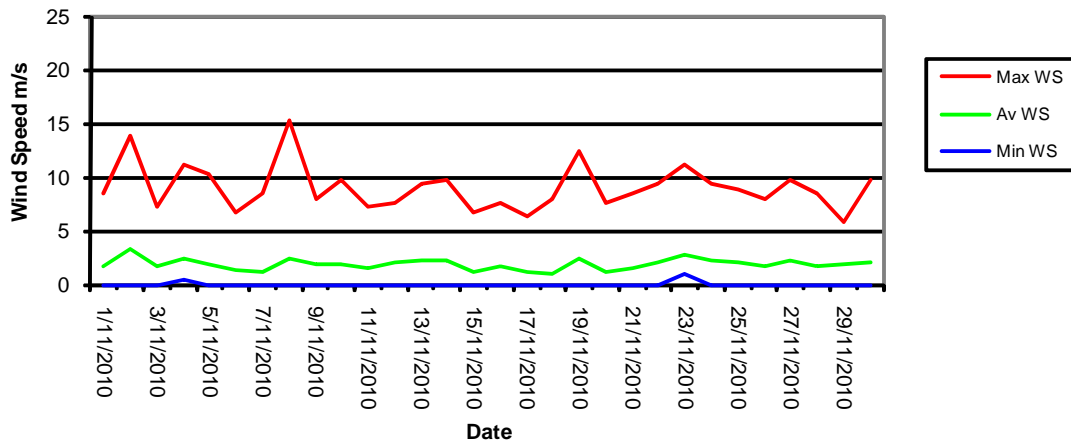
Summary Nov-10 Rocla - Calga

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 %
1/11/2010	14.7	16.7	19.3	79	91	98	27.0	0.9	0	1.8	8.5	13.7	19.8	1009.0	1011.7	1014.1	0	45.0	211	88.3	99.3	100
2/11/2010	10.8	13.9	17.5	57	77	98	0.6	3.1	0	3.4	13.9	9.5	16.8	1008.2	1012.1	1016.4	0	166.4	972	96.2	99.6	100
3/11/2010	9.7	15.8	24.7	39	74	94	0.2	4.5	0	1.6	7.2	9.8	24.2	1014.4	1016.8	1019.3	0	286.8	1110	96.8	99.8	100
4/11/2010	11.6	14.0	16.9	69	86	97	20.0	2.1	0.4	2.4	11.2	9.9	16.5	1018.0	1019.9	1021.9	0	127.9	604	90.6	99.3	100
5/11/2010	11.5	12.7	15.4	68	92	98	17.4	1.4	0	1.9	10.3	10.7	15.0	1020.6	1022.0	1023.4	0	93.7	696	89.5	99.1	100
6/11/2010	12.1	14.2	18.5	64	90	99	13.4	2.1	0	1.4	6.7	11.9	18.3	1019.9	1021.4	1022.8	0	139.2	744	94.2	99.6	100
7/11/2010	11.6	16.5	23.7	27	81	100	0.4	3.5	0	1.2	8.5	11.6	24.1	1015.4	1018.4	1021.4	0	212.9	980	96.2	99.7	100
8/11/2010	14.5	20.9	30.7	36	74	97	24.6	5.2	0	2.4	15.2	14.5	30.3	1012.9	1015.9	1022.5	0	270.9	1050	96.5	99.8	100
9/11/2010	15.9	19.2	25.1	63	85	98	12.8	3.0	0	1.8	8	15.3	25.5	1019.8	1022.7	1024.4	0	185.4	911	97.4	99.9	100
10/11/2010	16.5	20.3	30.3	43	83	98	1.8	3.7	0	1.9	9.8	16.5	30.8	1014.5	1018.5	1022.8	0	208.0	962	88.6	99.7	100
11/11/2010	18.0	22.4	30.3	43	71	92	0.0	5.3	0	1.5	7.2	18.1	30.9	1009.9	1013.0	1015.6	0	296.2	1046	98.5	99.9	100
12/11/2010	16.9	23.4	31.3	43	67	88	0.0	6.4	0	2.1	7.6	16.9	32.6	1009.5	1011.3	1013.0	0	323.7	1047	85.4	99.7	100
13/11/2010	18.7	24.3	33.9	40	72	92	6.6	5.3	0	2.2	9.4	18.7	36.4	1011.2	1012.8	1014.3	0	261.0	1072	93.6	99.4	100
14/11/2010	21.6	25.9	33.7	35	65	86	0.0	6.3	0	2.3	9.8	21.6	34.8	1010.0	1012.7	1014.8	0	302.5	1090	88	99.0	100
15/11/2010	18.2	20.7	24.9	68	85	99	37.0	1.4	0	1.1	6.7	18.2	25.7	1009.8	1011.0	1012.2	0	58.7	509	91.8	98.6	100
16/11/2010	16.5	18.9	24.8	59	87	99	3.8	3.8	0	1.7	7.6	16.6	25.0	1009.4	1011.7	1015.1	0	227.9	1073	95	99.5	100
17/11/2010	14.5	16.8	22.2	64	85	92	1.0	1.7	0	1.1	6.3	14.5	21.9	1013.2	1014.8	1016.4	0	105.2	792	91.8	99.7	100
18/11/2010	13.8	18.2	24.0	62	83	97	0.0	2.9	0	1.0	8	13.8	24.4	1010.7	1013.1	1015.0	0	174.2	858	90.6	98.3	100
19/11/2010	13.7	15.2	17.1	73	86	95	3.6	1.1	0	2.4	12.5	13.3	17.4	1013.3	1021.1	1026.5	0	49.0	214	75.4	98.4	100
20/11/2010	11.8	17.2	24.2	50	74	95	0.0	4.7	0	1.1	7.6	11.8	24.2	1022.8	1024.6	1026.8	0	288.7	1204	89.5	99.8	100
21/11/2010	12.2	18.2	24.9	45	75	97	0.2	5.5	0	1.5	8.5	12.2	24.7	1020.8	1022.5	1024.0	0	340.6	1098	100	100.0	100
22/11/2010	13.3	19.0	25.3	46	72	95	0.0	5.3	0	2.0	9.4	13.3	25.1	1021.8	1023.2	1024.9	0	291.5	1177	93.9	99.7	100
23/11/2010	15.2	19.7	26.5	49	71	86	0.0	5.5	0.9	2.8	11.2	15.2	26.4	1022.5	1024.1	1026.2	0	291.7	1150	94.4	99.9	100
24/11/2010	14.7	21.0	28.3	50	72	94	0.0	6.3	0	2.1	9.4	14.7	28.8	1019.6	1021.9	1023.9	0	346.8	1121	90.1	99.8	100
25/11/2010	15.6	22.3	31.2	38	66	91	0.0	6.5	0	2.1	8.9	15.3	31.5	1015.4	1017.8	1020.2	0	330.6	1177	94.2	99.8	100
26/11/2010	15.7	21.8	30.6	46	69	88	0.0	5.3	0	1.7	8	15.7	32.1	1013.1	1014.9	1016.9	0	282.3	1098	91.5	99.6	100
27/11/2010	16.6	21.8	30.4	47	74	98	0.0	5.3	0	2.2	9.8	16.6	31.3	1008.6	1012.0	1015.1	0	269.3	1230	95.3	99.8	100
28/11/2010	16.9	19.6	24.4	58	81	97	7.4	1.9	0	1.7	8.5	17.0	24.7	1008.2	1009.6	1010.5	0	88.6	409	87.4	99.1	100
29/11/2010	15.9	17.2	18.7	89	96	99	0.4	0.7	0	1.8	5.8	15.9	19.4	1009.2	1012.1	1014.6	0	49.9	201	93.9	99.7	100
30/11/2010	15.8	18.3	21.8	79	91	98	2.0	1.7	0	2.1	9.8	15.8	22.3	1012.5	1014.0	1015.4	0	101.5	519	97.7	99.9	100
Monthly	9.7	18.9	33.9	27	79	100	180.2	112.3	0	1.9	15.2	9.5	36.4	1008.2	1016.6	1026.8	0	207.2	1230	75.4	99.5	100

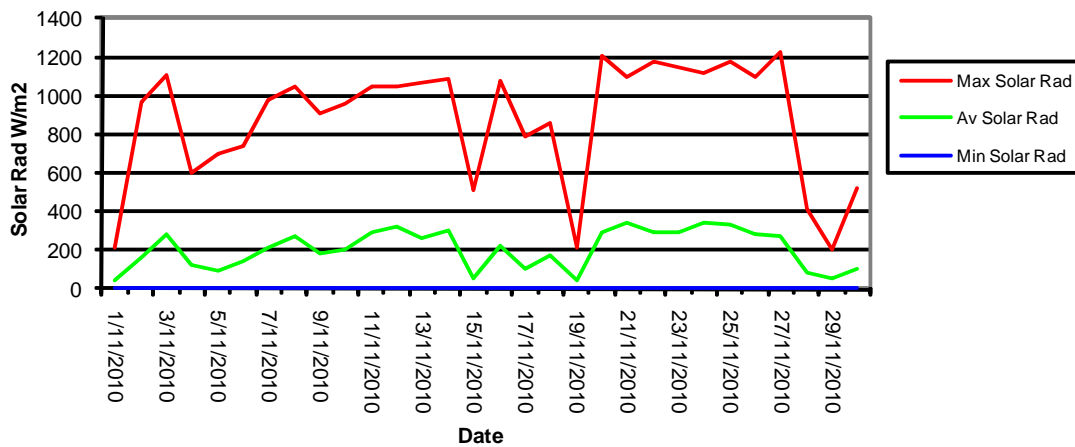
### 2.3.2 Monthly Weather Charts



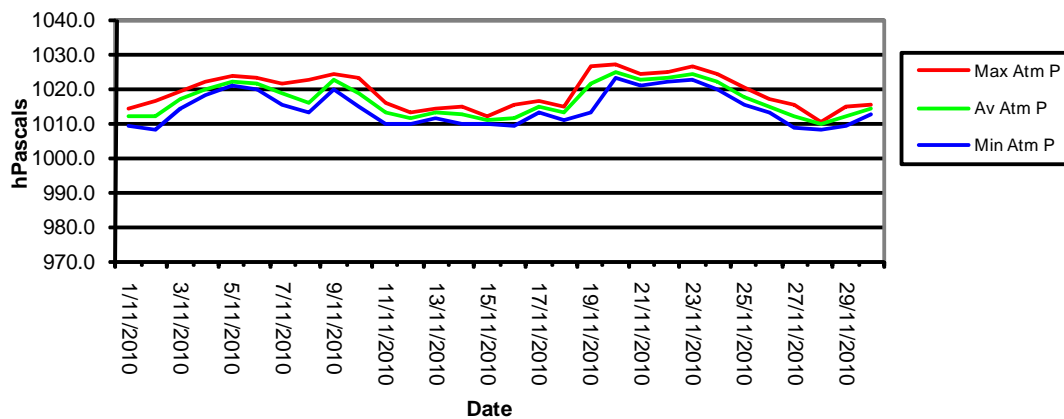
Rocla Calga Quarry - November 2010  
Wind Speed



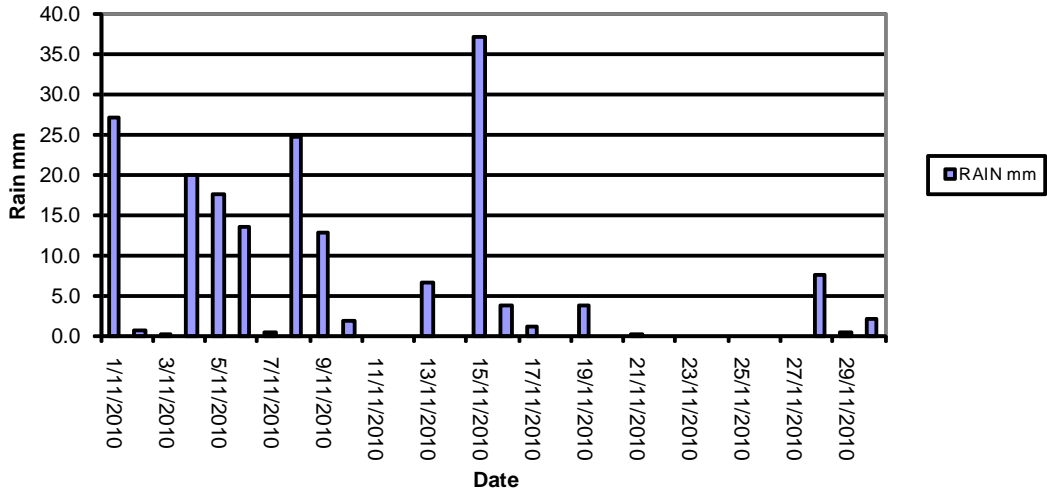
Rocla Calga Quarry - November 2010  
Solar Radiation



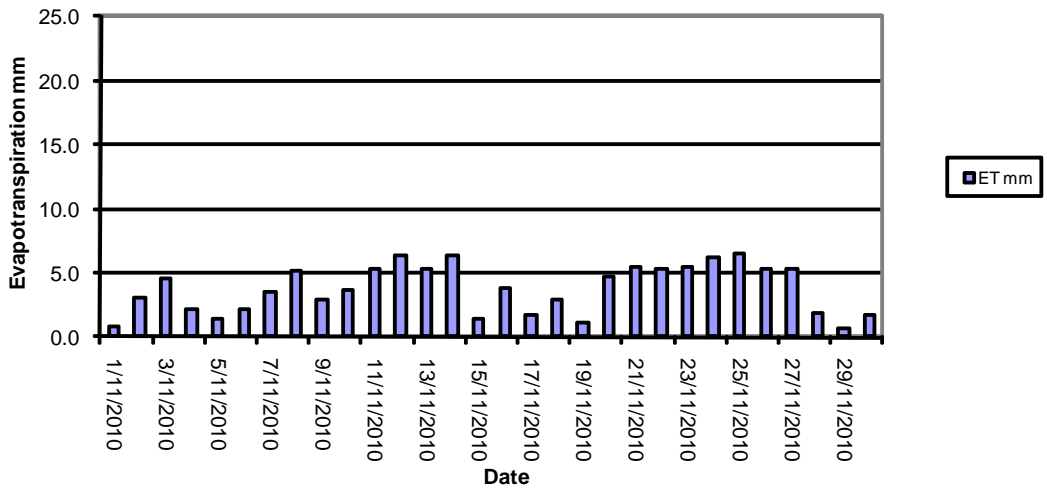
Rocla Calga Quarry - November 2010  
Atmospheric Pressure



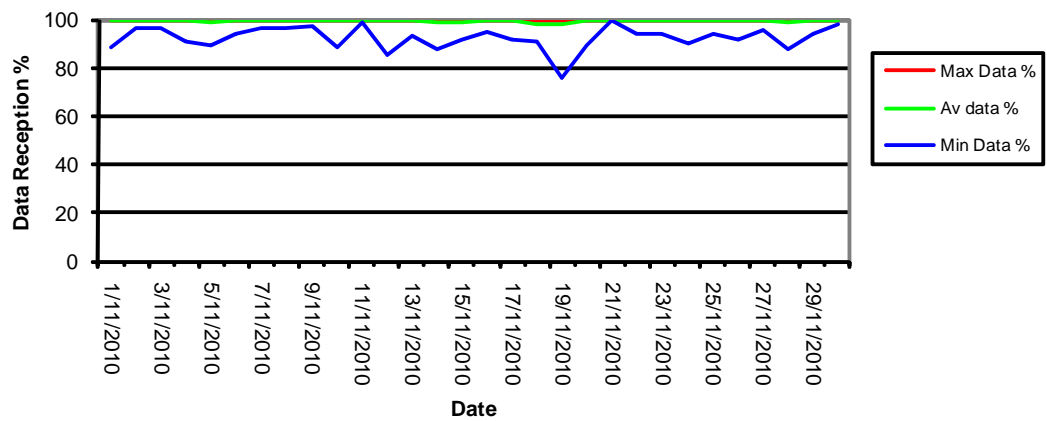
Rocla Calga Quarry - November 2010  
Rainfall



Rocla Calga Quarry - November 2010  
Evapotranspiration



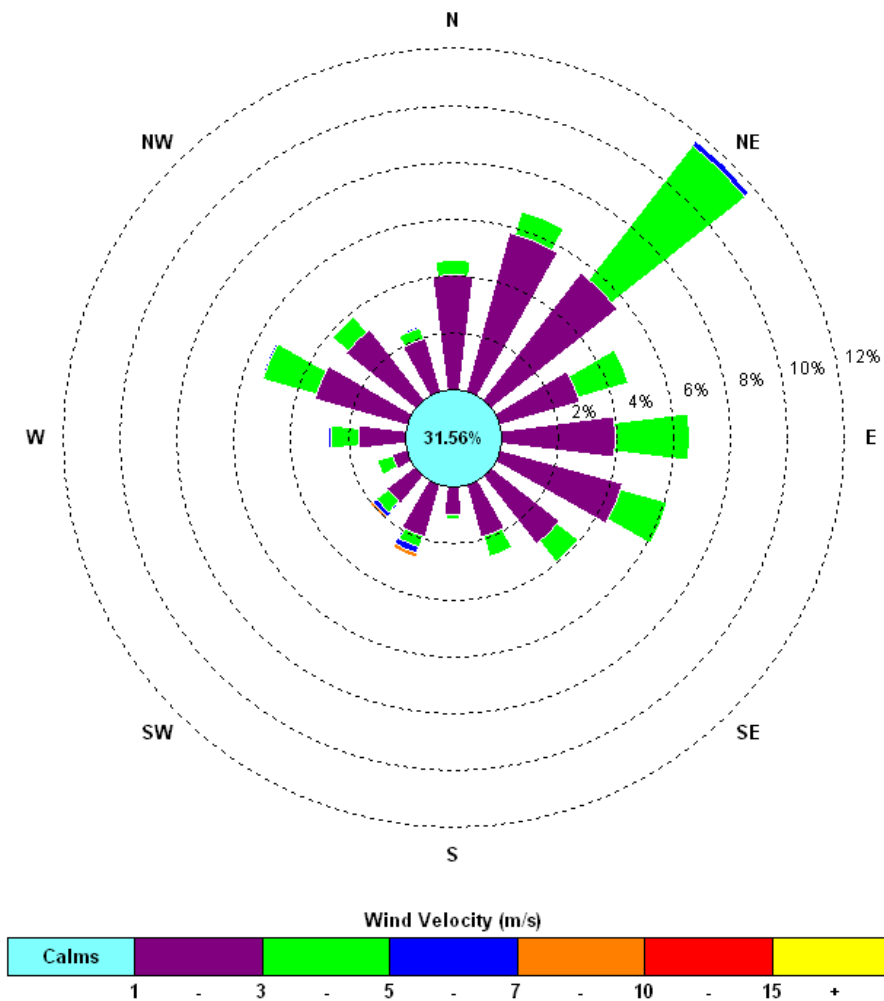
Rocla Calga Quarry - November 2010  
Data Reception



### 2.3.3 Monthly Windrose Plot

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

00:00, 1 November 2010 – 23:45, 30 November 2010



The predominant winds were from the NE, with strongest winds from the SW. The maximum wind speed was 8.0m/s from the SSW.

Appendix 1  
Laboratory Certificates

Environmental Division

**CERTIFICATE OF ANALYSIS**

Work Order : **EN1002893**

Client : **CARBON BASED ENVIRONMENTAL**

Contact : **MS RENA E MIKKA**

Address : **47 BOOMERANG ST  
CESSNOCK NSW, AUSTRALIA 2325**

E-mail : **cbased1@bigpond.com**

Telephone : **+61 49904443**

Facsimile : **+61 02 49904442**

Project : **ROCLA CALGA DUSTS**

Order number : **----**

C-O-C number : **----**

Sampler : **----**

Site : **----**

Quote number : **SY/269/10**

Page : 1 of 4

Laboratory : Environmental Division Newcastle

Contact : Peter Keyte

Address : 5 Rosegum Road Warabrook NSW Australia 2304

E-mail : peter.keyte@als.com.au

Telephone : 61-2-4968-9433

Facsimile : +61-2-4968 0349

QC Level : NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Date Samples Received : 01-DEC-2010

Issue Date : 10-DEC-2010

No. of samples received : 6

No. of samples analysed : 6

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

This document is issued in accordance with NATA accreditation requirements.

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  
Peter Keyte

Position  
Newcastle Manager

Accreditation Category  
Newcastle

**WORLD RECOGNISED ACCREDITATION**

**Environmental Division Newcastle**

Part of the **ALS Laboratory Group**

5 Rosegum Road Warabrook NSW Australia 2304  
Tel. +61-2-4968 9433 Fax. +61-2-4968 0349 [www.alsglobal.com](http://www.alsglobal.com)

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Page : 2 of 4  
Work Order : EN1002893  
Client : CARBON BASED ENVIRONMENTAL  
Project : ROCLA CALGA DUSTS

### 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 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

- Analysis as per AS3580.10.1-2003. Samples passed through a 1mm sieve prior to analysis. NATA accreditation is not held for results reported in g/m<sup>2</sup>.mth.



Page : 3 of 4  
 Work Order : EN1002893  
 Client : CARBON BASED ENVIRONMENTAL  
 Project : ROCLA CALGA DUSTS

### Analytical Results

Sub-Matrix: DUST	Client sample ID		Client sampling date / time		Client sample ID		Client sampling date / time	
	CAS Number	LOR	Unit	CD1	CD2C	CD3	CD4	CD5
<b>EA120: Ash Content</b>				01-DEC-2010 16:00	01-DEC-2010 16:00	01-DEC-2010 16:00	01-DEC-2010 16:00	01-DEC-2010 16:00
Ash Content	----	0.1	g/m <sup>2</sup> .month	EN1002893-001	EN1002893-002	EN1002893-003	EN1002893-004	EN1002893-005
Ash Content (mg)	----	1	mg	0.7	0.2	0.2	0.2	0.3
<b>EA125: Combustible Matter</b>								
Combustible Matter	----	0.1	g/m <sup>2</sup> .month	13	4	4	3	5
Combustible Matter (mg)	----	1	mg	0.4	0.3	0.2	<0.1	0.1
<b>EA141: Total Insoluble Matter</b>								
Total Insoluble Matter	----	0.1	g/m <sup>2</sup> .month	7	4	3	<1	2
Total Insoluble Matter (mg)	----	1	mg	1.1	0.5	0.4	0.2	0.4
				20	8	7	3	7



Page : 4 of 4  
 Work Order : EN1002893  
 Client : CARBON BASED ENVIRONMENTAL  
 Project : ROCLA CALGA DUSTS

### Analytical Results

Sub-Matrix: DUST

Compound	CAS Number		Client sampling date / time		LOR	Unit	CD6	*****	*****	*****
	*****	*****	*****	*****						
<b>EA120: Ash Content</b>										
Ash Content	*****	*****	0.1	g/m <sup>2</sup> .month	0.3	*****	*****	*****	*****	*****
Ash Content (mg)	*****	*****	1	mg	5	*****	*****	*****	*****	*****
<b>EA125: Combustible Matter</b>										
Combustible Matter	*****	*****	0.1	g/m <sup>2</sup> .month	<0.1	*****	*****	*****	*****	*****
Combustible Matter (mg)	*****	*****	1	mg	<1	*****	*****	*****	*****	*****
<b>EA141: Total Insoluble Matter</b>										
Total Insoluble Matter	*****	*****	0.1	g/m <sup>2</sup> .month	0.3	*****	*****	*****	*****	*****
Total Insoluble Matter (mg)	*****	*****	1	mg	5	*****	*****	*****	*****	*****



Environmental Division

**CERTIFICATE OF ANALYSIS**

Work Order	: ES1024388	Page	: 1 of 3
Client	: CARBON BASED ENVIRONMENTAL	Laboratory	: Environmental Division Sydney
Contact	: MS RENAE MIKKA	Contact	: Charlie Pierce
Address	: 47 BOOMERANG ST CESSNOCK NSW, AUSTRALIA 2325	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: cbased1@bigpond.com	E-mail	: sydney.enviro.services@alsglobal.com
Telephone	: +61 49904443	Telephone	: +61-2-8784 8555
Facsimile	: +61 02 49904442	Facsimile	: +61-2-8784 8500
Project	: ROCLA QUARRY	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 01-DEC-2010
C-O-C number	: ----	Issue Date	: 09-DEC-2010
Sampler	: CBE	No. of samples received	: 4
Site	: ----	No. of samples analysed	: 4
Quote number	: SY/269/10 V2		

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



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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	Inorganics
Hoa Nguyen	Inorganic Chemist	Inorganics



Page : 2 of 3  
Work Order : ES1024388  
Client : CARBON BASED ENVIRONMENTAL  
Project : ROCLA QUARRY

### 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

- EA015 TDS result has been confirmed by re-analysis for sample ID "A" and "B".



Page : 3 of 3  
 Work Order : ES1024388  
 Client : CARBON BASED ENVIRONMENTAL  
 Project : ROCLA QUARRY

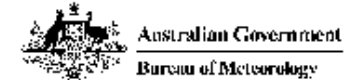
### Analytical Results

Sub-Matrix: WATER	Client sample ID		Client sampling date / time		Client sample ID			
	CAS Number	LOR	Unit	Unit	A	B	D	F
<b>EA005: pH</b>	----	0.01	pH Unit		5.68	5.94	5.48	5.69
<b>EA010P: Conductivity by PC Titrator</b>	----	1	µS/cm		74	73	88	73
<b>EA015: Total Dissolved Solids</b>	----	1	mg/L		----	----	57	38
^ Total Dissolved Solids @180°C	GIS-210-010	1	mg/L		57	101	----	----
<b>EA025: Suspended Solids</b>	----	5	mg/L		6	17	8	<5
^ Suspended Solids (SS)	----	5	mg/L		<5	<5	<5	<5
<b>EP020: Oil and Grease (O&amp;G)</b>	----	5	mg/L		<5	<5	<5	<5
^ Oil & Grease	----	5	mg/L		<5	<5	<5	<5

## Appendix 2

### Additional Bureau of Meteorology Data from Peats Ridge and Gosford Monitoring Stations

**Peats Ridge, New South Wales  
November 2010 Daily Weather Observations**

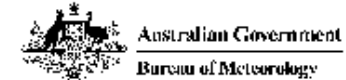


Date	Day	Temps		Rain mm	Evap mm	Sun hours	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C					km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Mo	16.1	18.0	0.4	3.6				17.8	83	8	S	4	15.3	98	8	S	8			
2	Tu	10.0	17.8	24.2	8.6				14.6	60	3	SW	11	16.5	65	8	W	2			
3	We	9.5	23.2	1.4	1.6				16.1	68	1	NW	2	21.0	53	0	N	4			
4	Th	11.4	17.4	13.2	4.6				13.2	91	8	SW	4	15.4	76	8	S	4			
5	Fr	10.7	14.3	19.6	3.0				11.9	97	8	S	4	12.9	88	8	S	4			
6	Sa		17.1	19.4										16.4	76	8	E	4			
7	Su	7.9	22.2	6.2	1.4				17.1	80	2	NE	9	21.6	70	3	W	9			
8	Mo	12.8	29.9	0	2.8				22.1	65	4	NW	4	28.0	42	0	NW	4			
9	Tu	15.2	24.2	37.4	5.4				19.2	86	8	W	4	22.8	72	8	W	4			
10	We	14.9	27.7	0.2	3.4				19.8	87	7	NW	4	27.1	56	0	N	4			
11	Th	16.8	27.7	18.2	4.6				20.8	77	6	SW	4	26.1	59	3	ENE	4			
12	Fr	17.2	29.7	0	4.6				24.5	65	1	WNW	4	28.7	54	3	W	9			
13	Sa	18.0	32.1	0	5.8				26.0	62	4	NW	4	29.5	63	7	E	4			
14	Su	21.5	31.2	1.0	6.2				25.7	65	5	NW	4	30.9	43	6	NW	9			
15	Mo	20.9	26.2	0	5.8				24.4	78	7	NW	4	18.8	88	8	S	2			
16	Tu	16.2	23.2	47.7	1.1				16.6	94	8	SW	2	22.8	68	6	NW	9			
17	We	14.5	18.8	0.8	4.6				17.0	85	8	SE	6	18.2	83	8	E	4			
18	Th	12.7	22.0	0.4	1.0				18.3	84	7	E	4	21.0	74	8	NE	7			
19	Fr	13.5	17.5	8.2	2.8				14.1	97	8	SSW	2	14.6	89	8		Calm			
20	Sa	9.4	21.4	1.4	0.0				17.5	70	3	SE	4	21.2	62	3	NNE	4			
21	Su	11.2	23.2	0	3.8				18.7	72	3	E	4	22.0	57	6	NE	9			
22	Mo	10.8	23.5	0	4.8				20.5	73	3	W	4	22.1	62	5	W	4			
23	Tu	13.6	24.8	0	6.6				20.2	75	0	E	4								
24	We	13.7	26.5	0	3.6				19.5	77	0	N	4	25.7	59	0	N	4			
25	Th	14.0	28.7	0	3.2				21.5	73	0	N	4	28.0	51	0	E	4			
26	Fr	13.7	29.2	0	6.2				23.9	60	0	NE	4	26.1	62	7	E	4			
27	Sa	14.9	28.4	0	4.2				23.4	74	0	N	4	27.4	50	0	E	4			
28	Su	16.7	25.3	0	3.8				21.0	65	8	N	4	23.8	66	7	NNW	4			
29	Mo	15.6	18.5	2.6	2.0				16.4	98	8	S	4	18.2	94	8	SW	6			
30	Tu	15.2	20.7	2.2	1.8				16.6	98	8	S	4	20.5	88	8	E	7			
<b>Statistics for November 2010</b>																					
Mean		14.1	23.7		3.8				19.3	77	4		4	22.2	67	5		4			
Lowest		7.9	14.3		0.0				11.9	60	0	#	2	12.9	42	0		Calm			
Highest		21.5	32.1	47.7	8.6				26.0	98	8	SW	11	30.9	96	8	#	9			
Total				204.5	110.9																

Observations were drawn from Peats Ridge (Waratah Road) (station 061351)  
The closest station with pressure observations is at Norah Head, about 32 km to the east. The closest station with sunshine observations is at Williamtown, about 82 km to the northeast.

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Gosford, New South Wales  
November 2010 Daily Weather Observations



Date	Day	Temps		Rain mm	Evap mm	Sun hours	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C					km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Mo	16.0	19.7	0.8			SSE	30	12:33	19.3	82		SSE	9		16.9	98		SSW	11	
2	Tu	10.5	19.9	31.8			SSW	35	09:13	16.7	52		SSW	11		18.6	50		W	7	
3	We	8.0	24.0	0.4			ESE	24	13:22	18.4	55		N	9		22.2	50		SE	11	
4	Th	13.2	18.9	14.6			SSW	33	21:08	15.0	90		SSE	6		17.4	64		SSE	15	
5	Fr	12.3	16.7	48.6			S	30	13:31	13.4	99		Calm			13.9	94		SE	7	
6	Sa	12.8	19.3	38.2			SSE	22	15:02	14.7	98		SSE	7		18.5	66		SSE	9	
7	Su	9.5	22.2	9.2			SE	26	13:58	16.8	80		SSE	6		21.3	63		E	11	
8	Mo	12.3	30.3	0			ENE	28	11:09	21.8	73		NE	8		26.3	53		ENE	11	
9	Tu	15.9	24.6	23.8			SE	20	08:46	20.7	77		SSE	7		23.3	67		S	9	
10	We	16.7	28.6	0			NE	30	14:19	21.8	81		N	6		26.4	59		E	13	
11	Th	16.7	27.9	1.6			SE	24	14:15	23.0	67		SSE	7		27.4	50		NE	7	
12	Fr	14.5	29.0	0			E	26	14:47	25.6	65		Calm			27.6	46		E	9	
13	Sa	15.6	32.4	0			ENE	30	14:16	27.3	62		ENE	6		29.2	51		ENE	11	
14	Su	19.8	32.3	0			ESE	46	07:00	27.7	61		NNE	7		29.8	53		E	11	
15	Mo	20.2	27.4	0			SE	28	09:52	25.8	76		SE	8		19.5	99		Calm		
16	Tu	17.8	23.4	33.0			S	26	19:03	18.4	99		SSE	6		22.6	65		SSE	13	
17	We	17.0	20.4	16.6			S	19	09:42	18.7	78		SSE	4		18.4	89		Calm		
18	Th	12.7	23.6	0.6			ENE	24	13:30	20.1	78		ESE	4		22.1	65		NNE	7	
19	Fr	14.8	19.4	0.2			SSW	43	04:50	16.3	87		SSE	15		17.5	69		SSE	13	
20	Sa	10.1	22.6	1.0			SSE	20	13:28	19.3	60		SSE	6		21.6	54		SE	11	
21	Su	10.0	23.6	0.2			SE	24	13:26	20.0	73		E	7		23.0	52		E	11	
22	Mo	11.3	24.4	0			ENE	33	13:24	20.1	78		Calm			23.1	58		NE	13	
23	Tu	11.9	25.0	0			NE	33	13:46	21.4	68		NE	9		23.7	57		NE	15	
24	We	12.7	25.7	0			N	46	19:41	21.8	68		NE	7		24.5	59		E	15	
25	Th	13.1	28.1	0			E	28	14:42	22.5	67		SE	6		26.2	48		E	13	
26	Fr	13.1	28.7	0			NE	20	15:53	22.9	69		ESE	6		26.9	53		ESE	7	
27	Sa	14.7	28.4	0			E	28	15:45	23.2	78		ESE	2		25.7	56		E	15	
28	Su	17.0	26.7	0			N	24	11:06	21.3	76		N	2		25.2	63		Calm		
29	Mo	17.1	22.1				SSE	24	01:42	17.9	98		ESE	2		21.7	80		SSW	6	
30	Tu	16.5	23.5				NNE	28	16:10	17.6	99		SE	7		22.6	84		E	7	
Statistics for November 2010																					
Mean		14.1	24.6							20.3	76			5		22.8	63			9	
Lowest		8.0	16.7							13.4	52		Calm			13.9	46		Calm		
Highest		20.2	32.4	48.6			#	46		27.7	99		SSE	15		29.8	99		#	15	
Total				220.2																	

Observations were drawn from Gosford (Narara Research Station) AWS (station 061087)  
The closest station with pressure observations is at Norah Head about 27 km to the northeast. The closest station with cloud and evaporation data is at Peats Ridge about 15 km to the northwest. The closest station with sunshine observations is at Sydney Airport about 59 km to the south.

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