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

February 2011

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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 February 2011;
- Surface Water quality results for February 2011;
- Groundwater depth and quality results for February 2011; and
- Meteorological report for February 2011.

The February 2011 dust deposition results were generally higher than January 2011. All sites, on a year to date average basis, are currently below the Air Quality Management Plan exceedence 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 for the normal monthly sampling event on the 1 March 2011 at sites A and F. Sites B and D were dry and 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 both 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 March 2011. Groundwater depths increased at the majority of monitoring bores this month, indicating water away from the surface. EC remained relatively steady at all sites. pH remained steady at most sites with the exception of a slight increase at MW8 and slight decreases at CP6 and CP7.

The meteorological station data recovery for the month was 100%. The predominant winds were from the W, with strongest winds from the WNW-WSW. Recorded rainfall on site for February was 53.6 mm, which was similar to that recorded at the BOM Peats Ridge Station and below the Peats Ridge long-term average for February. Results are detailed below:

Rocla Calga Quarry	53.6 mm
BOM Peats Ridge*	57.2 mm
BOM Gosford*	38.4 mm
BOM Peats Ridge Long term mean for February*	162.3 mm

*Data sourced from Bureau of Meteorology (BOM) website (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^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 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 February 2011 and the project average. Results are in g/m^2.month.

Table 1: Dust Deposition results: 31-January 2011 to 1-March 2011

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	**6.4**	6.0	0.4	94	1.7
CD2c	1.6	1.3	0.3	81	1.1
CD3	0.7	0.4	0.3	57	0.4
CD4	1.2	0.8	0.4	67	0.5
CD5	0.9	0.5	0.4	56	0.5
CD6	1.0	0.5	0.5	50	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^2.month; the Development Consent's annual average amenity criteria at residential locations. The current rolling annual average is calculated from March 2010 to February 2011.

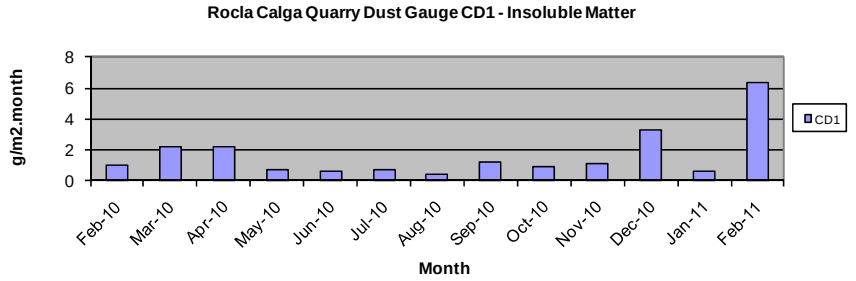
NA= Not Available.

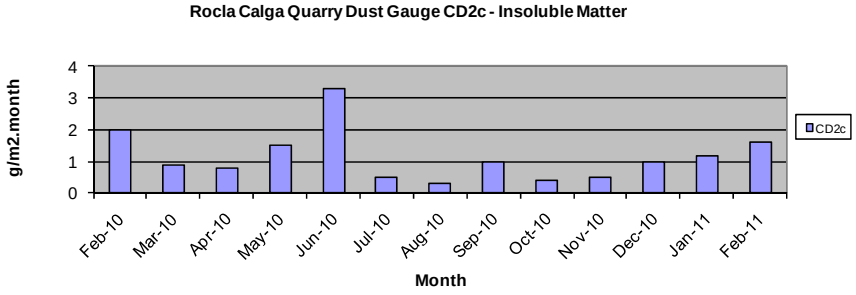
CD1 was installed on the 1 May 2006. CD2a was discontinued at the start of August 2006 due to quarry operations "mining out" the site of the gauge. The replacement gauge, Site CD2b, was located in a position adjacent to the boundary between B. Kashouli and F. & J. Gazzana in conformance with the Air 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.

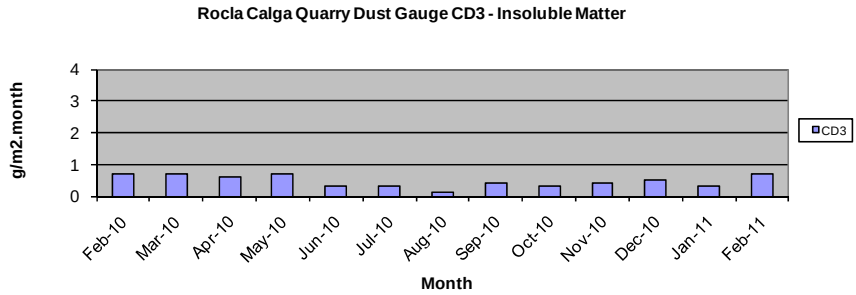
Dust deposition charts for all dust gauge sites appear in **Figure 1** below. The laboratory analysis is provided in **Appendix 1.**

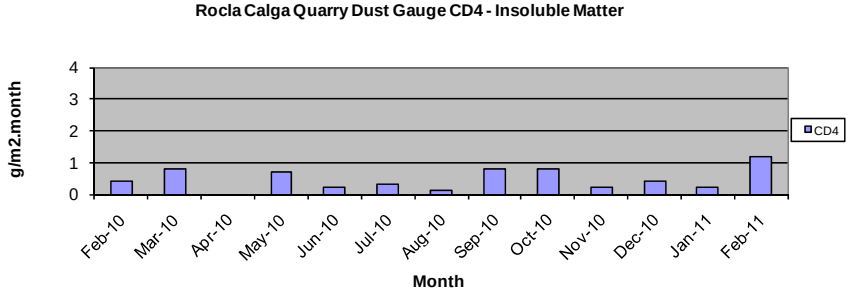
The predominant winds were from the W, with strongest winds from the WNW-WSW.

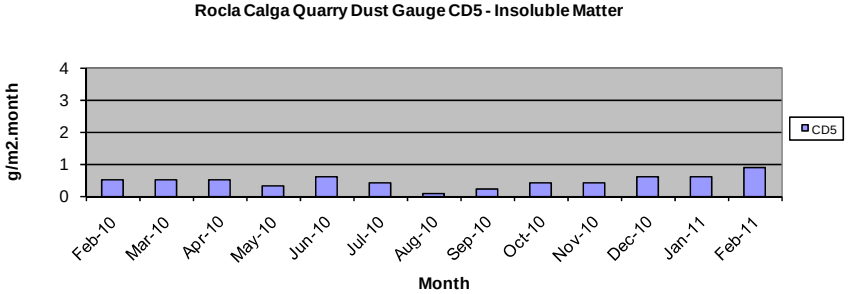
Figure 1: Dust Deposition Charts

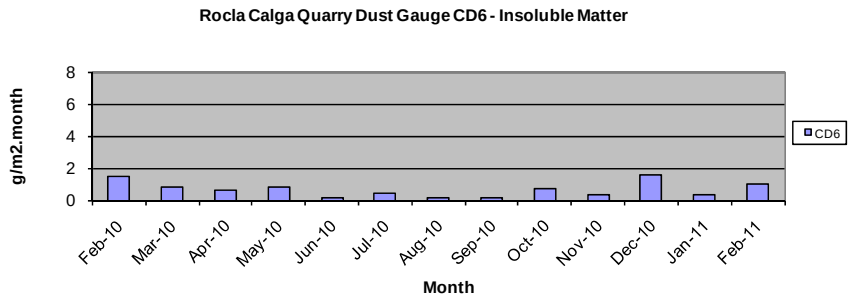












2.2 Water Monitoring

2.2.1 Surface Waters

Monthly surface water monitoring was conducted on the 1 March 2011 and results are listed in **Table 2**. The laboratory analysis sheets are provided in **Appendix 1.**

Table 2: Monthly surface water monitoring – February 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	5.79	80	48	<5	<5
B	Dry	---	---	---	---	---	---	---
C	---	---	---	---	---	---	---	---
D	Dry	---	---	---	---	---	---	---
F	Dam	Clear	Clear	4.60	86	49	<5	<5

At the time of sampling, there were no water discharges off site from any sampling location. Samples were collected at sites A and F. Sites B and D were dry and there was no access to site C. 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 March 2011. 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 increased at the majority of monitoring bores this month, indicating water moving away from the surface. Longer term monitoring is required to fully evaluate groundwater depth trends.

EC remained relatively steady at all sites. pH remained steady at most sites with the exception of a slight increase at MW8 and slight decreases at CP6 and CP7. 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 (µS/cm) This report
CQ1	Voutos	* Monitor	20.59	19.80	6.0	120
CQ3	Voutos	* Monitor	10.53	11.59	5.1	110
CQ4	Voutos	* Monitor	8.78	8.42	3.7	80
CQ5	Gazzana	DIP Only	8.69	6.93	3.7	130
CQ6	Gazzana	DIP Only	16.00	13.66	4.0	160
CQ7	Gazzana	* Monitor	6.89	7.12	4.0	90
CQ8	Gazzana	* Monitor	11.03	8.82	3.3	160
CQ9	Gazzana	DIP Only	10.10	9.73	3.6	90
CQ10	Voutos	* Monitor	NI	22.69	7.9	170
CQ11S	Gazzana	* Monitor	NI	9.96	3.4	150
CQ11D	Gazzana	* Monitor	NI	11.11	4.0	140
CQ12	Gazzana	* Monitor	NI	5.20	3.4	140
CQ13	Kashouli	* Monitor	NI	13.73	4.1	190
CP3	Gazzana	Domestic	10.40	9.94	3.5	150
CP4	Kashouli	Domestic	13.63	11.77	4.1	220
CP5	Kashouli	Domestic	16.61	9.08	3.6	230
CP6	Kashouli	Domestic	16.27	10.66	3.3	210
CP7	Kashouli	Production	8.56	4.18	3.7	150
CP8	Rozmanec	Domestic	22.17	NR	NR	NR
MW7	Rocla Bore	* Monitor	15.76	16.69	5.1	110
MW8	Rocla Bore	* Monitor	9.82	7.95	5.4	80
MW9	Rocla Bore	* Monitor	22.44	21.87	4.7	80
MW10	Rocla Bore	* Monitor	15.41	14.64	4.7	130
MW13	Rocla Bore	DIP Only	NI	8.24	4.1	100
MW16	Rocla Bore	DIP Only	NI	8.87	3.8	110

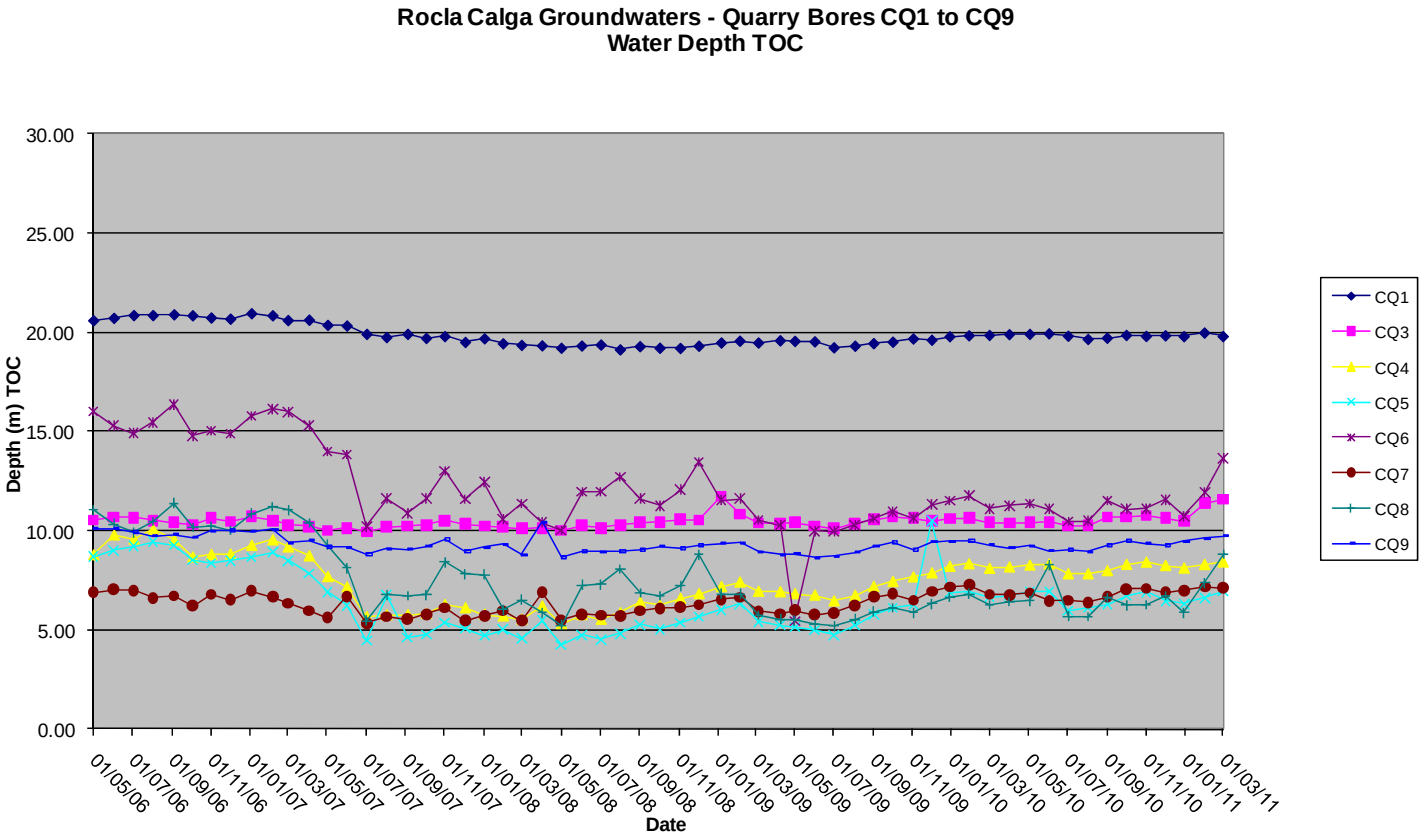
Notes:
TOC = Water level measured from top of bore case to water.
NM = Not Monitored – unable to sample water due to access restrictions.
NR = Not Required by resident.
* = Logger Installed.
NI = These bores were not installed in April 2006 but are now operational. April 2006 was the first set of measurements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

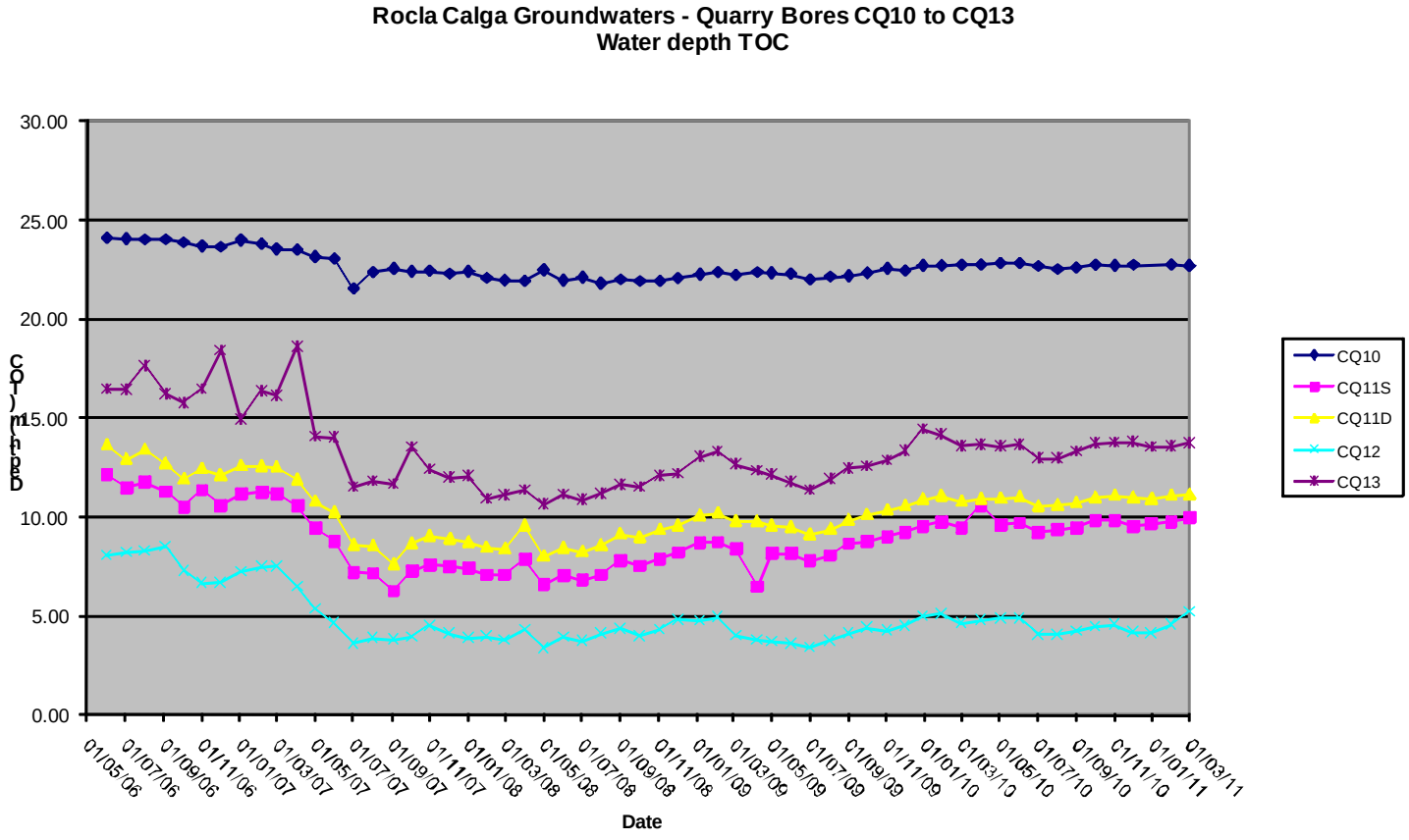
Shading is used to indicate the following trends in water depth (compared to the last reading):

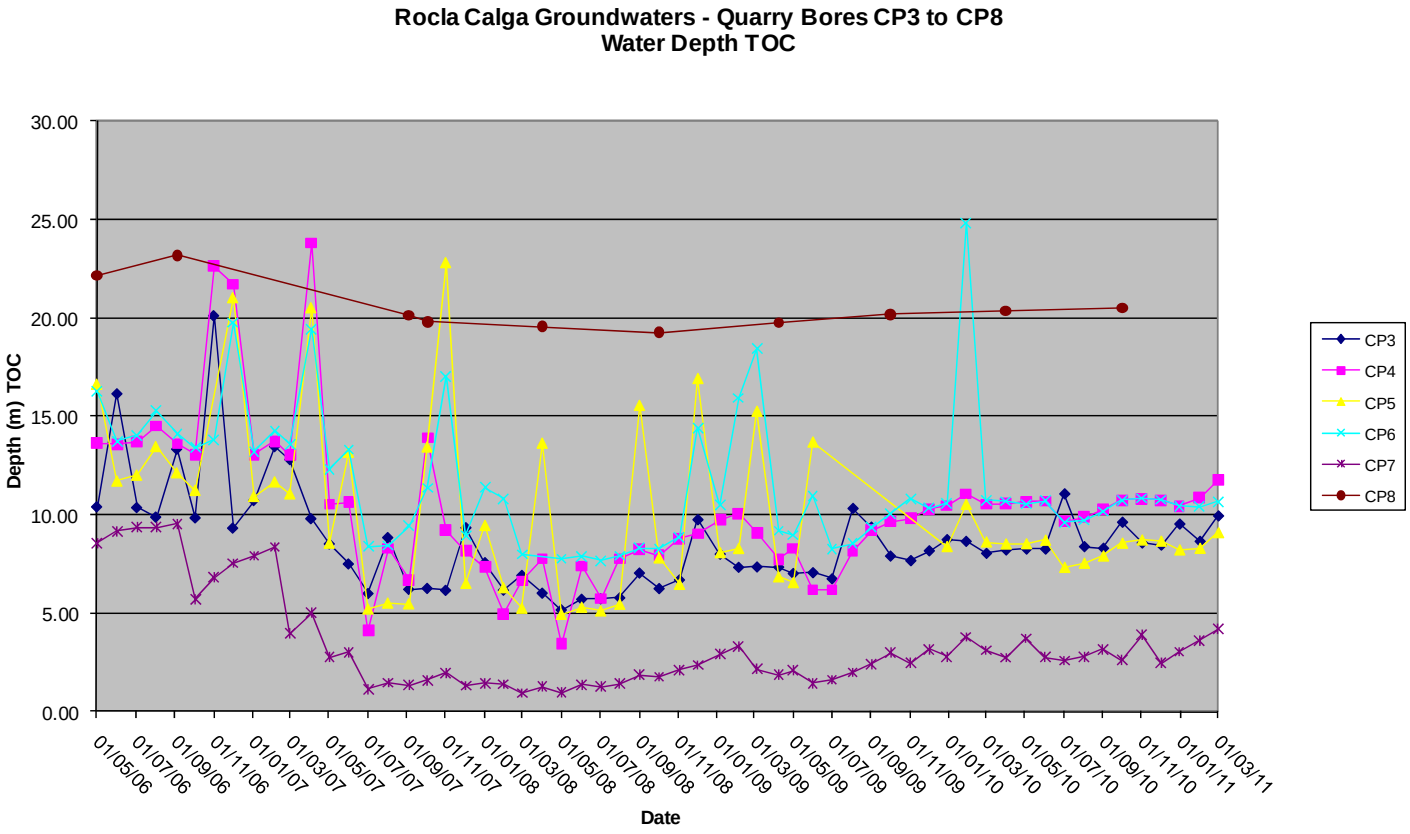
	Increase to ground water depth (water moved away from surface)
	Decrease to ground water depth (water moved towards surface)
	Stable water depth (+/- 0.01m)

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
Depth (m) TOC
30.00
25.00
20.00
15.00
10.00
5.00
0.00
01/05/06
01/07/06
01/09/06
01/11/06
01/01/07
01/03/07
01/05/07
01/07/07
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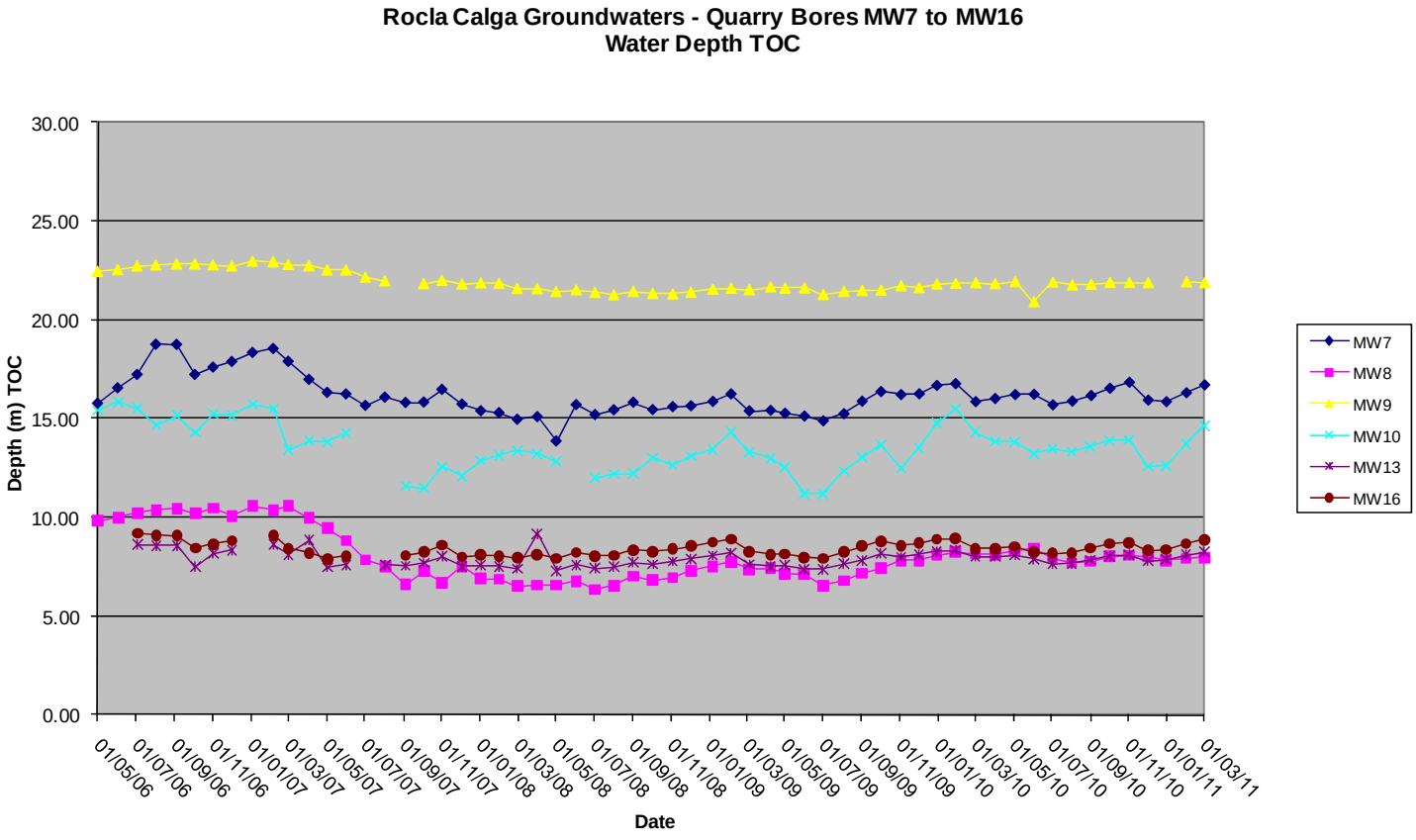
Date
CP3
CP4
CP5
CP6
CP7
CP8


Rocla Calga Groundwaters - Quarry Bores MW7 to MW16
Water Depth TOC
Depth (m) TOC
30.00
25.00
20.00
15.00
10.00
5.00
0.00
01/05/06
01/07/06
01/09/06
01/11/06
01/01/07
01/03/07
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01/09/10
01/11/10
01/01/11
01/03/11
Date
MW7
MW8
MW9
MW10
MW13
MW16

2.3 Meteorological Monitoring

The Rocla Calga Quarry weather station data recovery in February was 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 February 2011 shows rainfall recorded at the Rocla Calga Quarry was similar to that recorded at nearby Peats Ridge BOM stations. The rainfall comparison is provided below:

Rocla Calga Quarry	53.6 mm
BOM Peats Ridge*	57.2 mm
BOM Gosford*	38.4 mm
BOM Peats Ridge Long term mean for February*	162.3 mm

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

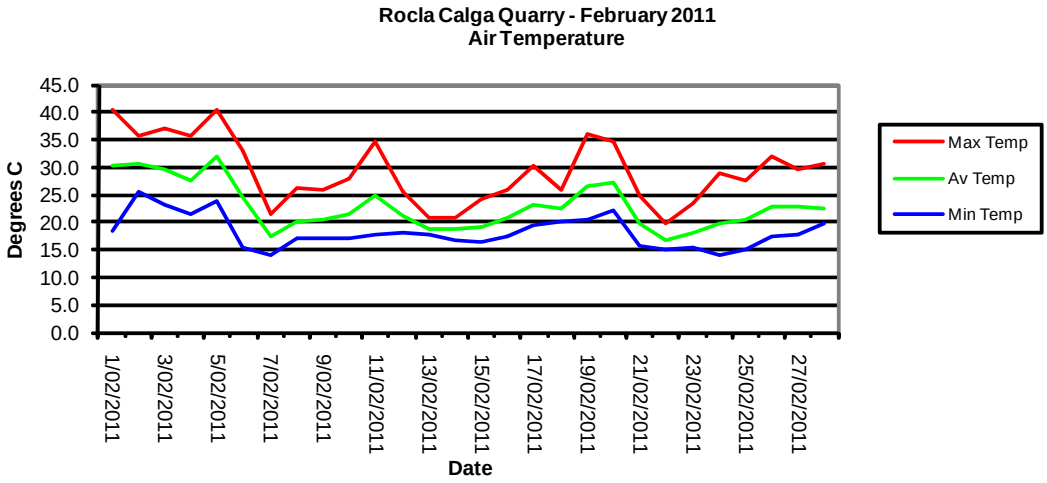
Results are displayed in the following table and figures.

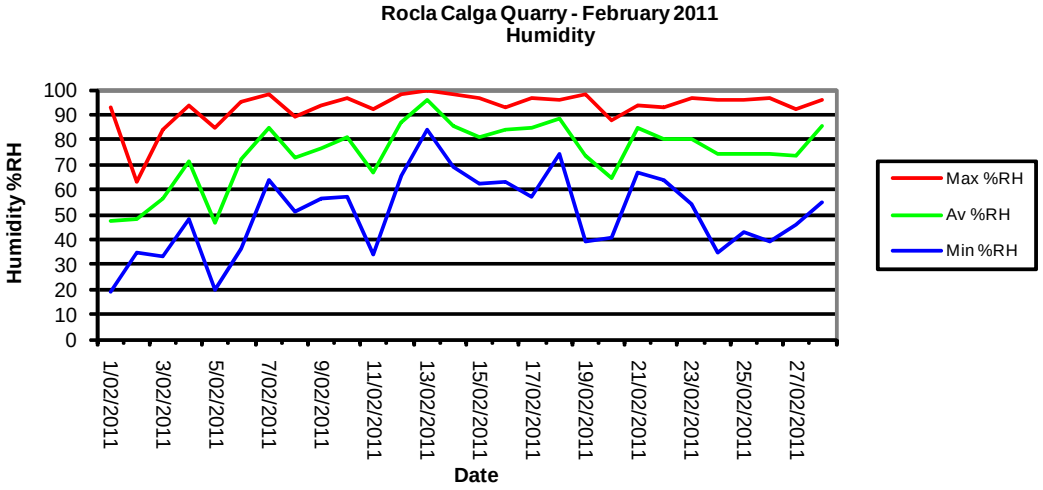
2.3.1 Monthly Meteorological Data Summary

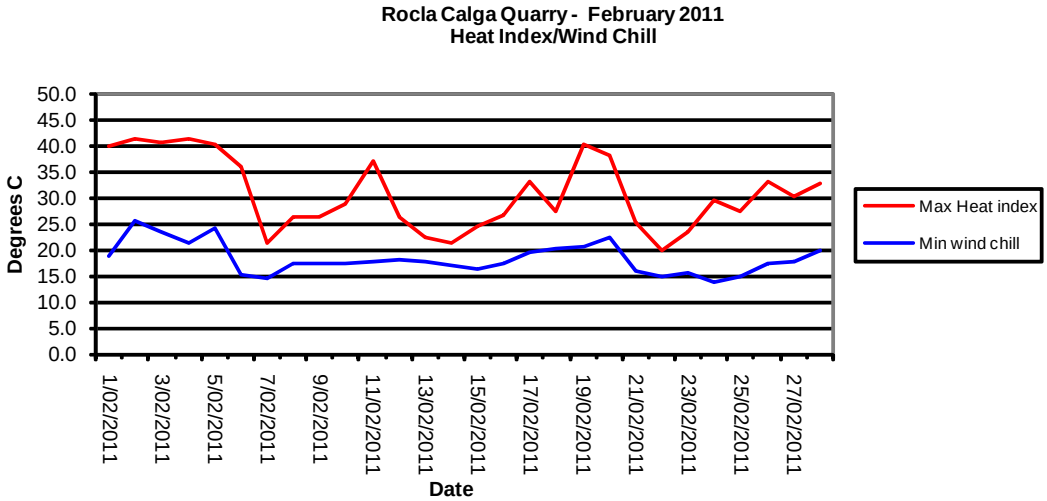
Summary **Feb-11** **Rocla - Calga**

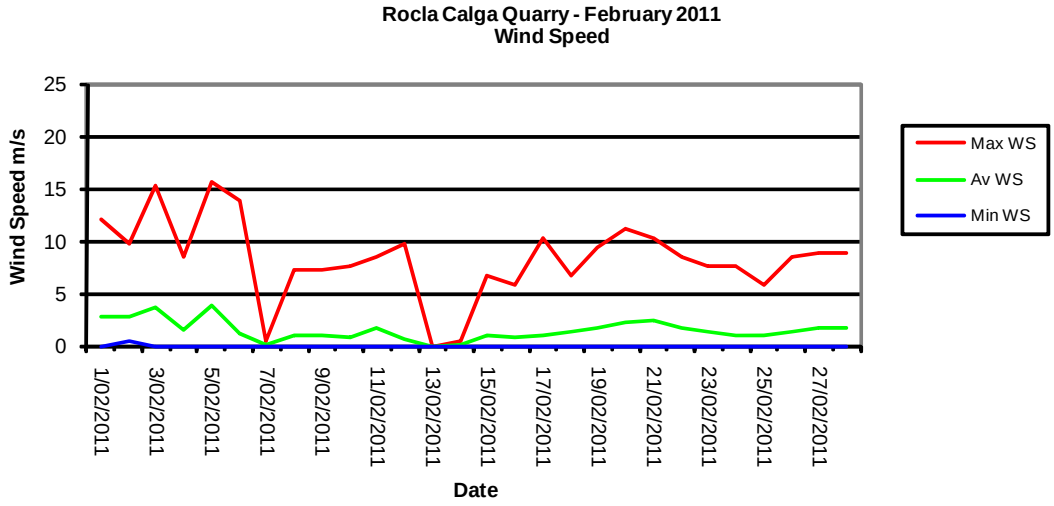
Date	Min Temp	Av Temp	Max Temp	Min %RH	Av %RH	Max %RH	RAIN mm	ET mm	Min WS	Av WS	Max WS	Min wind chill	Max Heat index	Min Atm P	Av Atm P	Max Atm P	Min Solar Rad	Av Solar Rad	Max Solar Rad	Min Data %	Av data %	Max Data %
1/02/2011	18.6	30.4	40.6	19	47	93	0.0	8.5	0	2.8	12.1	18.6	40.0	1005.7	1008.4	1010.7	0	333.3	991	93.3	98.8	100
2/02/2011	25.4	30.7	35.8	35	48	63	0.0	7.8	0.4	2.7	9.8	25.5	41.1	1008.4	1011.0	1014.2	0	310.1	963	97.4	99.5	100
3/02/2011	23.3	29.8	37.0	33	56	84	0.0	6.7	0	3.6	15.2	23.4	40.5	1008.2	1010.1	1013.9	0	222.0	1091	92.1	99.1	100
4/02/2011	21.4	27.6	35.6	48	71	94	0.0	5.8	0	1.4	8.5	21.4	41.3	1008.5	1011.4	1014.2	0	285.3	995	95.6	99.1	100
5/02/2011	24.0	32.0	40.6	20	47	85	0.0	9.6	0	3.9	15.6	24.1	40.3	1004.0	1007.5	1010.1	0	320.0	1019	96.5	99.3	100
6/02/2011	15.3	24.6	33.1	36	72	95	11.4	2.8	0	1.2	13.9	15.3	36.0	1007.4	1013.6	1023.8	0	101.3	846	89.5	98.7	100
7/02/2011	14.2	17.3	21.6	64	84	98	1.8	1.4	0	0.0	0.4	14.3	21.4	1018.5	1021.5	1024.3	0	102.6	882	87.7	99.4	100
8/02/2011	17.2	20.1	26.3	51	73	89	0.0	3.2	0	0.9	7.2	17.2	26.1	1017.2	1018.4	1020.3	0	175.8	1190	94.7	99.9	100
9/02/2011	17.2	20.4	25.9	56	76	94	0.8	3.7	0	1.0	7.2	17.3	26.1	1019.8	1022.0	1023.7	0	213.9	978	95	99.9	100
10/02/2011	17.1	21.4	27.8	57	81	97	4.2	3.6	0	0.8	7.6	17.2	28.6	1017.6	1020.5	1023.3	0	220.8	1086	100	100.0	100
11/02/2011	17.8	25.0	34.7	34	67	92	0.0	4.7	0	1.7	8.5	17.8	37.1	1008.7	1013.0	1018.2	0	228.0	895	99.7	100.0	100
12/02/2011	18.0	21.1	25.4	65	87	98	6.0	0.8	0	0.6	9.8	18.1	26.2	1008.8	1013.8	1017.2	0	32.5	131	98.2	99.6	100
13/02/2011	17.8	18.9	20.9	84	96	100	5.6	0.9	0	0.0	0	17.8	22.2	1014.2	1017.3	1021.5	0	61.2	342	92.1	99.9	100
14/02/2011	16.8	18.7	20.9	69	86	98	7.6	1.2	0	0.0	0.4	16.8	21.1	1020.4	1022.3	1023.6	5	80.7	311	98.8	100.0	100
15/02/2011	16.4	19.2	24.1	62	81	97	1.0	1.9	0	1.0	6.7	16.4	24.6	1020.2	1021.7	1023.3	5	109.5	567	98	100.0	100
16/02/2011	17.3	21.0	25.9	63	84	93	0.0	1.9	0	0.8	5.8	17.3	26.6	1013.3	1017.0	1020.5	0	123.5	729	97.7	99.9	100
17/02/2011	19.4	23.3	30.2	57	85	97	4.4	3.4	0	1.0	10.3	19.4	32.9	1009.4	1011.7	1013.3	0	199.7	1156	98	100.0	100
18/02/2011	20.2	22.4	25.8	74	89	96	0.0	1.7	0	1.3	6.7	20.3	27.2	1011.0	1013.1	1014.8	0	93.1	449	93.9	99.9	100
19/02/2011	20.6	26.7	36.1	39	73	98	0.0	5.0	0	1.6	9.4	20.6	40.2	1004.2	1008.4	1013.5	0	248.3	1017	88	99.8	100
20/02/2011	22.1	27.4	34.7	41	65	88	0.6	4.7	0	2.3	11.2	22.2	37.9	1003.4	1005.3	1009.0	0	191.2	1150	97.1	99.7	100
21/02/2011	15.9	19.7	24.7	67	85	94	2.0	2.1	0	2.4	10.3	15.9	25.1	1008.0	1012.2	1018.7	0	98.8	901	86.5	98.7	100
22/02/2011	15.1	16.7	19.8	64	81	93	2.6	2.2	0	1.7	8.5	14.8	19.9	1018.7	1021.2	1023.5	0	125.0	858	95	99.8	100
23/02/2011	15.3	18.2	23.5	54	80	97	3.2	2.8	0	1.3	7.6	15.4	23.4	1019.2	1021.4	1023.4	0	159.4	773	95.3	99.8	100
24/02/2011	13.9	19.9	29.0	35	74	96	0.2	5.1	0	1.0	7.6	13.9	29.3	1014.1	1017.1	1020.2	0	308.6	1011	92.7	99.9	100
25/02/2011	15.0	20.4	27.7	43	74	96	0.0	3.4	0	0.9	5.8	15.0	27.5	1010.4	1012.8	1014.7	0	188.7	971	100	100.0	100
26/02/2011	17.3	22.7	32.0	39	74	97	0.0	5.1	0	1.3	8.5	17.3	33.0	1007.1	1009.9	1012.6	0	277.4	1003	93.6	99.8	100
27/02/2011	17.8	22.7	29.7	46	73	92	0.6	2.7	0	1.7	8.9	17.8	30.1	1006.2	1007.7	1010.1	0	122.4	1115	98.8	100.0	100
28/02/2011	19.7	22.6	30.7	55	86	96	1.6	2.9	0	1.6	8.9	19.7	32.6	1003.8	1007.8	1011.5	0	169.6	1063	89.5	99.1	100
Monthly	13.9	22.9	40.6	19	75	100	53.6	105.4	0	1.5	15.6	13.9	41.3	1003.4	1014.2	1024.3	0	182.2	1190	86.5	99.6	100

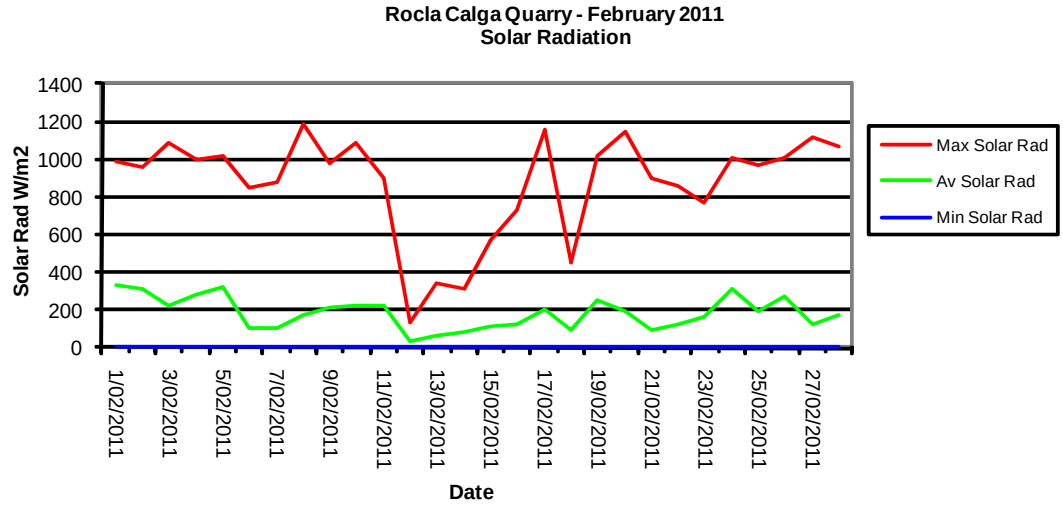
2.3.2 Monthly Weather Charts

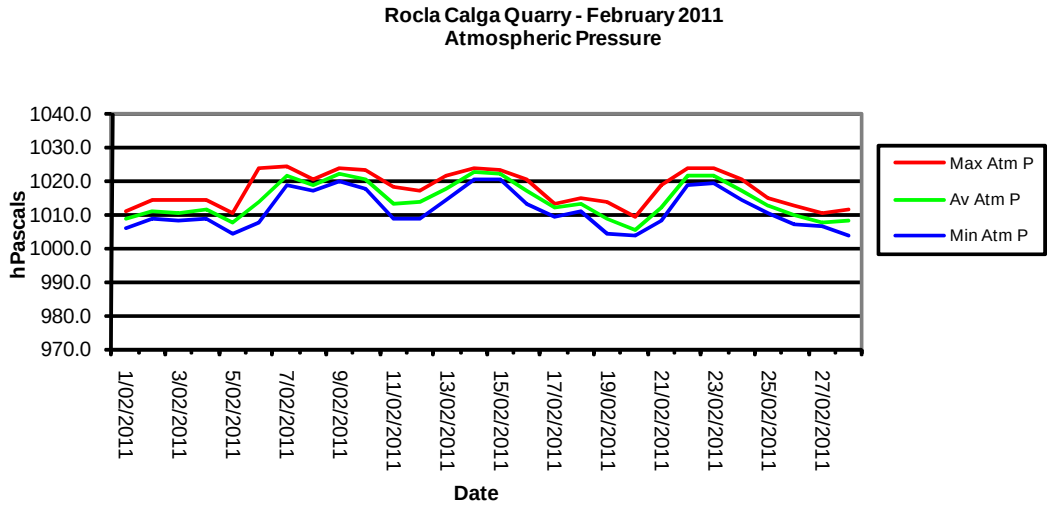


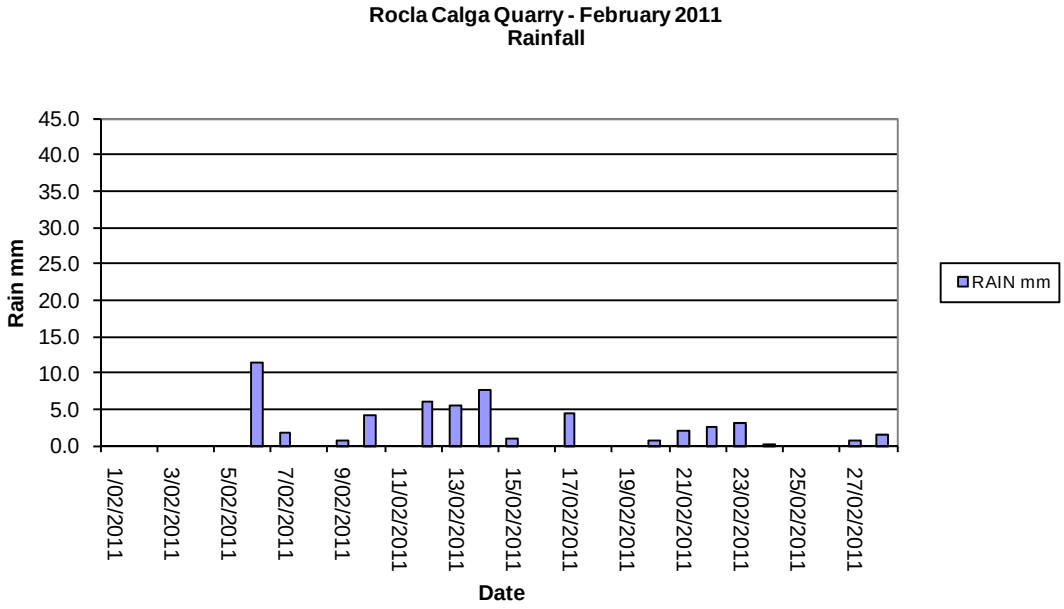


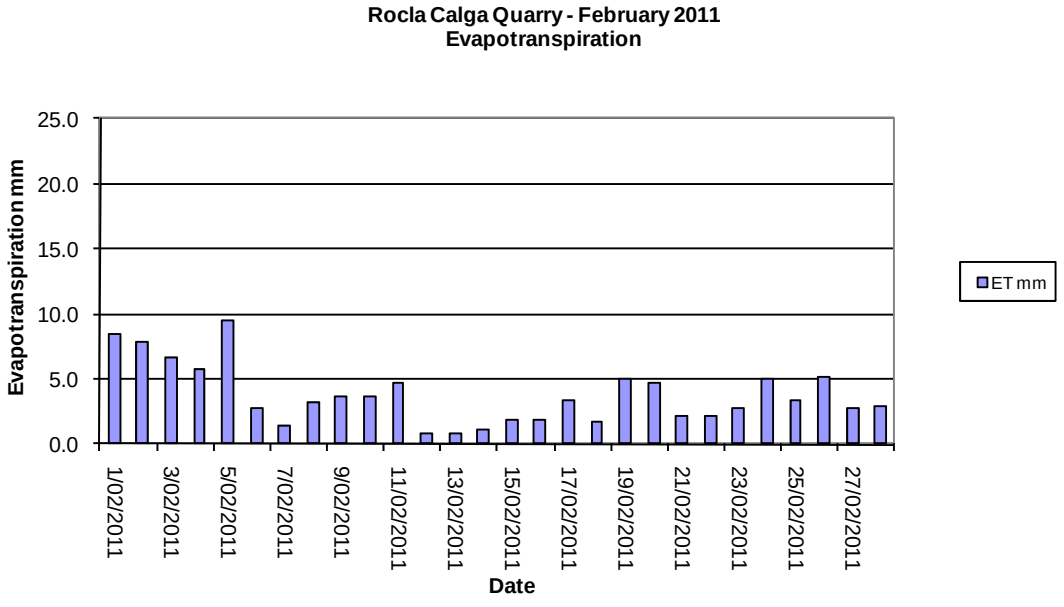


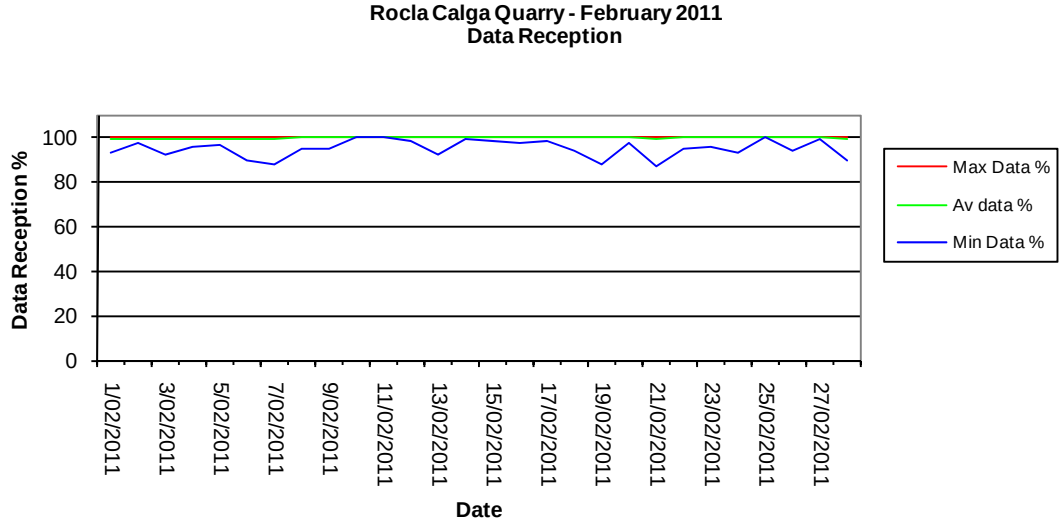

Rocla Calga Quarry - February 2011
Wind Speed
Wind Speed m/s
25
20
15
10
5
0
1/02/2011
3/02/2011
5/02/2011
7/02/2011
9/02/2011
11/02/2011
13/02/2011
15/02/2011
17/02/2011
19/02/2011
21/02/2011
23/02/2011
25/02/2011
27/02/2011
Date
Max WS
Av WS
Min WS


Rocla Calga Quarry - February 2011
Solar Radiation
Solar Rad W/m2
1400
1200
1000
800
600
400
200
0
1/02/2011
3/02/2011
5/02/2011
7/02/2011
9/02/2011
11/02/2011
13/02/2011
15/02/2011
17/02/2011
19/02/2011
21/02/2011
23/02/2011
25/02/2011
27/02/2011
Date
Max Solar Rad
Av Solar Rad
Min Solar Rad


Rocla Calga Quarry - February 2011
Atmospheric Pressure
hPascals
1040.0
1030.0
1020.0
1010.0
1000.0
990.0
980.0
970.0
1/02/2011
3/02/2011
5/02/2011
7/02/2011
9/02/2011
11/02/2011
13/02/2011
15/02/2011
17/02/2011
19/02/2011
21/02/2011
23/02/2011
25/02/2011
27/02/2011
Date
Max Atm P
Av Atm P
Min Atm P


Rocla Calga Quarry - February 2011
Rainfall
Rain mm
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
1/02/2011
3/02/2011
5/02/2011
7/02/2011
9/02/2011
11/02/2011
13/02/2011
15/02/2011
17/02/2011
19/02/2011
21/02/2011
23/02/2011
25/02/2011
27/02/2011
Date
RAIN mm

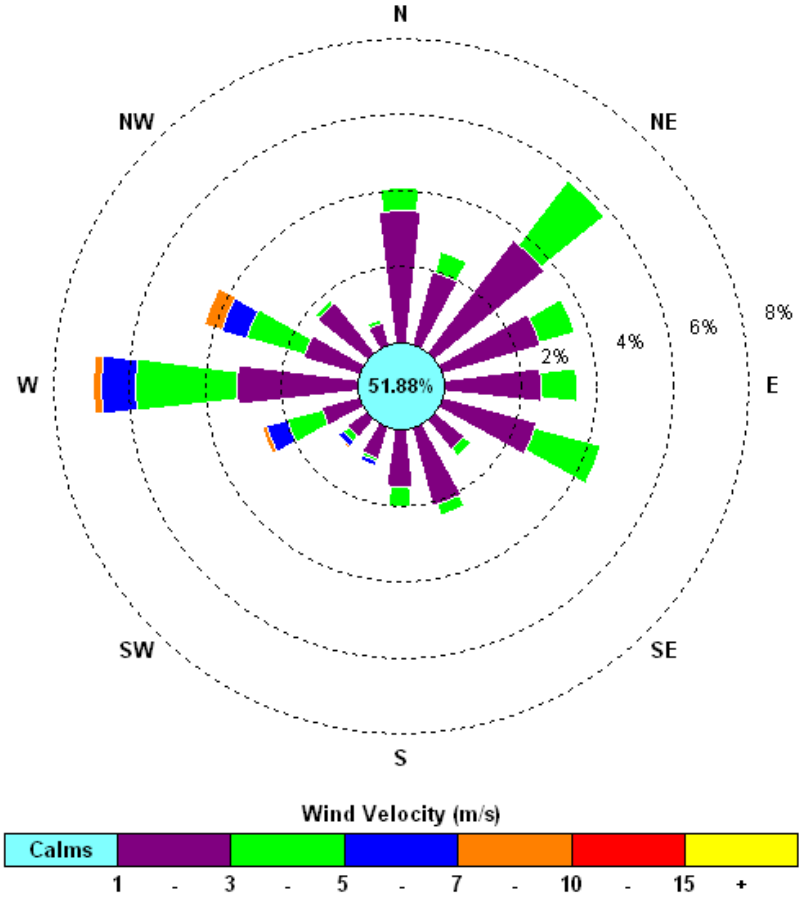

Rocla Calga Quarry - February 2011
Evapotranspiration
Evapotranspiration mm
25.0
20.0
15.0
10.0
5.0
0.0
1/02/2011
3/02/2011
5/02/2011
7/02/2011
9/02/2011
11/02/2011
13/02/2011
15/02/2011
17/02/2011
19/02/2011
21/02/2011
23/02/2011
25/02/2011
27/02/2011
Date
ET mm


Rocla Calga Quarry - February 2011
Data Reception
Data Reception %
100
80
60
40
20
0
1/02/2011
3/02/2011
5/02/2011
7/02/2011
9/02/2011
11/02/2011
13/02/2011
15/02/2011
17/02/2011
19/02/2011
21/02/2011
23/02/2011
25/02/2011
27/02/2011
Date
Max Data %
Av data %
Min Data %

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 to be calm when less than a 15 minute average of 1m/s.

00:15, 1 February 2011 – 23:45, 28 February 2011



The predominant winds were from the W, with strongest winds from the WSW-WNW. The maximum wind speed was 15.6m/s from the W.

Appendix 1

Laboratory Certificates

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **EN1100486**	Page	: 1 of 4
Client	: **CARBON BASED ENVIRONMENTAL**	Laboratory	: Environmental Division Newcastle
Contact	: MS RENAE MIKKA	Contact	: Peter Keyte
Address	: 47 BOOMERANG ST CESSNOCK NSW, AUSTRALIA 2325	Address	: 5 Rosegum Road Warabrook NSW Australia 2304
E-mail	: cbased1@bigpond.com	E-mail	: peter.keyte@als.com.au
Telephone	: +61 49904443	Telephone	: 61-2-4968-9433
Facsimile	: +61 02 49904442	Facsimile	: +61-2-4968 0349
Project	: ROCLA CALGA DUSTS	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 01-MAR-2011
Sampler	: ----	Issue Date	: 10-MAR-2011
Site	: ----		
		No. of samples received	: 6
Quote number	: SY/269/10 V2	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	*Position*	*Accreditation Category*
Petro Holowinskyj	Senior Analyst	Newcastle

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 insuffient 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/m².mth. Period sampled: 31/01/2011 - 01/03/2011.**

Analytical Results

Sub-Matrix: **DUST**

Compound	CAS Number	LOR	Unit	Client sample ID: CD1	CD2C	CD3	CD4	CD5
				Client sampling date / time: 01-MAR-2011 15:00	01-MAR-2011 15:00	01-MAR-2011 15:00	01-MAR-2011 15:00	01-MAR-2011 15:00
				EN1100486-001	EN1100486-002	EN1100486-003	EN1100486-004	EN1100486-005
EA120: Ash Content								
Ash Content	----	0.1	g/m².month	**6.0**	**1.3**	**0.4**	**0.8**	**0.5**
Ash Content (mg)	----	1	mg	**102**	**22**	**7**	**13**	**8**
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m².month	**0.4**	**0.3**	**0.3**	**0.4**	**0.4**
Combustible Matter (mg)	----	1	mg	**8**	**5**	**5**	**8**	**8**
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m².month	**6.4**	**1.6**	**0.7**	**1.2**	**0.9**
Total Insoluble Matter (mg)	----	1	mg	**110**	**27**	**12**	**21**	**16**

Analytical Results

Sub-Matrix: **DUST**				Client sample ID	**CD6**	----	----	----	----
				Client sampling date / time	01-MAR-2011 15:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*		**EN1100486-006**	**----**	**----**	**----**	**----**
EA120: Ash Content									
Ash Content	----	0.1	g/m².month		**0.5**	----	----	----	----
Ash Content (mg)	----	1	mg		**9**	----	----	----	----
EA125: Combustible Matter									
Combustible Matter	----	0.1	g/m².month		**0.5**	----	----	----	----
Combustible Matter (mg)	----	1	mg		**8**	----	----	----	----
EA141: Total Insoluble Matter									
Total Insoluble Matter	----	0.1	g/m².month		**1.0**	----	----	----	----
Total Insoluble Matter (mg)	----	1	mg		**17**	----	----	----	----

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **ES1104168**	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	: ----		
C-O-C number	: ----	Date Samples Received	: 01-MAR-2011
Sampler	: ----	Issue Date	: 08-MAR-2011
Site	: ----		
		No. of samples received	: 2
Quote number	: SY/269/10 V2	No. of samples analysed	: 2

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	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Inorganics
Peter Keyte	Newcastle Manager	Newcastle
Sarah Millington	Senior Inorganic Chemist	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 insuffient 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

Analytical Results

Sub-Matrix: WATER								
			Client sample ID	A	F	----	----	----
			Client sampling date / time	01-MAR-2011 13:50	01-MAR-2011 13:50	----	----	----
Compound	CAS Number	LOR	Unit	ES1104168-001	ES1104168-002	----	----	----
EA005: pH								
pH Value	----	0.01	pH Unit	**5.79**	**4.60**	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**80**	**86**	----	----	----
EA015: Total Dissolved Solids								
^ Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	**48**	**49**	----	----	----
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	5	mg/L	<5	<5	----	----	----
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	<5	----	----	----

Appendix 2

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

Peats Ridge, New South Wales
February 2011 Daily Weather Observations

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Tu	18.0	38.5	0	7.2					27.9	49	0	NW	7		37.9	24	0	NW	9	
2	We	25.0	34.3	0	11.2					28.9	58	0	S	4		33.9	54	2	NE	4	
3	Th	24.2	36.8	0	7.2					29.8	58	7	NNW	9		36.3	39	6	W	9	
4	Fr	20.5	33.0	0	7.0					26.6	76	6	NNW	4		32.9	59	3	N	9	
5	Sa	23.2	38.8	0	6.6					31.3	61	1	NW	9		37.6	48	3	N	4	
6	Su	24.2	33.2	0	7.8					28.8	71	3	NW	4		24.9	93	8	W	4	
7	Mo	13.7	20.0	14.8	5.0					15.6	91	8	SW	4		19.0	76	8	E	4	
8	Tu	15.0	24.3	0.2	0.8					17.5	90	7	E	4		21.4	66	8	E	4	
9	We	15.0	23.4	1.8	3.8					19.0	89	3	S	4		22.5	71	6	NE	4	
10	Th	16.7	26.1	3.4	2.2					19.9	93	7	E	4		25.8	65	5	SE	4	
11	Fr	16.2	33.0	0	3.8					23.1	74	2	NW	4		31.7	42	6	NW	4	
12	Sa	21.0	22.5	1.0	6.2					22.5	90	8	NE	4		19.4	96	8	S	4	
13	Su	17.4	21.6	7.8	3.0					19.1	98	8	SW	4		20.2	91	8	S	9	
14	Mo	16.3	20.1	16.8	0.6					17.2	99	8	SE	4		19.5	83	8	NE	4	
15	Tu	15.7	22.9	0.4	1.2					17.1	92	8	S	4		21.5	77	7	E	4	
16	We	16.3	23.9	2.2	1.2					19.1	90	8	E	4		23.6	73	8	SE	4	
17	Th	18.5	29.8	0	2.0					21.2	95	8	N	4		23.9	91	5	SE	9	
18	Fr	18.6	26.4	2.4	3.6					21.6	93	8	S	4		25.2	79	8	S	9	
19	Sa	19.5	33.6	0	2.8					22.2	87	0	NE	4		32.1	55	6	WNW	4	
20	Su	22.2	34.6	0	6.4					26.9	66	7	NW	4		29.4	65	6	E	4	
21	Mo	18.0	22.8	2.4	4.2					18.1	98	8	S	4		21.6	80	8	SE	4	
22	Tu	14.2	19.6	2.0	2.2					16.2	78	8	S	4		19.2	71	6	E	4	
23	We	14.7	22.9	1.8	1.6					16.6	91	7	S	4		21.5	66	6	E	4	
24	Th	12.9	26.4	0	2.8					16.4	91	1	W	4		25.6	52	1	N	4	
25	Fr	13.6	25.6	0	5.4					17.0	93	6	WNW	4		23.6	58	8	NE	4	
26	Sa	15.7	30.1	0	2.0					20.6	92	5	NE	4		28.2	56	1	E	9	
27	Su	18.0	28.3	0	7.8					23.0	69	8	W	4		28.1	53	7	WSW	4	
28	Mo	19.4	27.9	0.2	1.8					21.7	87	7	ENE	4		25.0	75	5	ESE	9	
Statistics for February 2011																					
	Mean	18.0	27.9		4.2					21.6	82	5		4		26.1	66	5		5	
	Lowest	12.9	19.6		0.6					15.6	49	0	#	4		19.0	24	0	#	4	
	Highest	25.0	38.8	16.8	11.2					31.3	99	8	#	9		37.9	96	8	#	9	
	Total			57.2	117.4																

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.

IDCJDW2110.201102 Prepared at 13:07 GMT on 7 Mar 2011

Gosford, New South Wales
February 2011 Daily Weather Observations

Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Tu	17.9	40.7	0			NNW	35	10:55	26.7	69		SSE	4		40.1	16		N	15	
2	We	24.0	34.6	0			N	22	17:09	28.7	50		SSE	9		33.0	50		E	9	
3	Th	22.4	39.7	0			W	43	11:44	31.1	55		NNE	9		36.5	36		NW	15	
4	Fr	21.0	34.0	0			ENE	26	13:32	28.4	71		E	6		30.7	63		E	11	
5	Sa	21.5	41.2	0			NNW	41	08:43	34.0	38		NNW	17		40.3	20		N	15	
6	Su	23.7	36.5	0			SSE	46	14:17	30.5	57		E	6		25.7	98		ENE	2	
7	Mo	15.6	22.5	8.2			NW	15	07:31	17.4	92		NNW	7		21.6	62			Calm	
8	Tu	17.3	25.7	0			SSE	48	17:19	18.9	98		N	7		23.5	57		SE	7	
9	We	15.3	25.4	0			SE	24	13:10	22.5	68		SSE	7		24.0	62		SSE	11	
10	Th	16.3	27.7	0			NE	28	16:50	20.8	99			Calm		27.0	57		E	11	
11	Fr	16.2	35.1	0			NNW	24	11:29	23.4	82			Calm		30.6	50		E	7	
12	Sa	21.3	24.1	0			SE	33	12:46	23.1	98		ENE	2		21.3	94		SSE	11	
13	Su	18.8	23.4	0			S	28	19:00	20.8	98			Calm		22.2	86		SSE	13	
14	Mo	18.0	22.9	0			SSE	46	12:27	19.0	98		S	6		22.4	67		SE	11	
15	Tu	16.6	25.4	1.0			ESE	22	11:58	18.6	99		N	4		24.0	66		ESE	9	
16	We	17.9	25.9	0.2			SE	15	16:40	21.0	93			Calm		25.2	69		SE	7	
17	Th	19.1	31.0	0			ENE	24	13:31	22.0	98			Calm		23.1	98		N	6	
18	Fr	19.4	27.0	17.2			ESE	24	13:56	23.6	97		SSE	7		26.2	78		SE	11	
19	Sa	19.7	34.1	0			E	26	14:37	23.7	98		NNE	7		31.8	57		E	9	
20	Su	22.6	35.8	0			WNW	24	12:17	25.2	98			Calm		29.1	65		SSE	13	
21	Mo	19.4	23.1	2.4			S	31	04:15	19.7	98		SW	6		22.4	79		SE	9	
22	Tu	15.8	22.4	6.8			SE	35	12:03	17.7	88		NNW	6		20.1	69		SE	9	
23	We	16.2	24.1	2.4			SSE	24	10:45	19.6	86		SE	6		23.6	50		SSE	13	
24	Th	12.3	26.6	0			NNW	20	10:12	20.0	82		NNE	6		26.1	52		E	9	
25	Fr	12.5	26.5	0			ESE	17	11:12	17.3	99			Calm		25.1	47		NNE	9	
26	Sa	15.9	29.5	0			SE	24	15:10	22.5	92			Calm		28.5	50		ENE	9	
27	Su	15.8	30.9	0			S	24	18:28	21.2	93			Calm		30.0	44		NNW	9	
28	Mo	20.8	29.2	0.2			ENE	30	23:00	23.0	92		N	6		26.4	67		ENE	11	
Statistics for February 2011																					
	Mean	18.3	29.5							22.9	85			4		27.2	61			9	
	Lowest	12.3	22.4							17.3	38			Calm		20.1	16			Calm	
	Highest	24.0	41.2	17.2			SSE	48		34.0	99		NNW	17		40.3	98		#	15	
	Total			38.4																	

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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