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

The November 2011 dust deposition results show generally similar or lower levels of insoluble solids compared to October 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 December 2011 at sites A, D and F. Site B was 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 water quality with all 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 slightly acidic range.

Groundwaters were sampled for normal monthly monitoring on 1 December 2011. Groundwater depths both decreased and increased evenly across the bores compared to last month. pH and EC remained relatively stable with the exception of CQ9, CQ10 and MW7 which all increased in pH.

The meteorological station data recovery for the month was 100%. Recorded rainfall on site for November was 193.0 mm, which was higher than that recorded at the BOM Peats Ridge Station and higher than the Peats Ridge long-term average for October. Results are detailed below:

Rocla Calga Quarry	193.0 mm
BOM Peats Ridge*	178.2 mm
BOM Gosford*	124.6 mm
BOM Peats Ridge Long term mean for November*	110.4 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, OEH (EPA) licence and Environmental Management Plans. Carbon Based Environmental are contracted to undertake dust deposition gauge, surface and groundwater and meteorological monitoring for the project. Carbon Based Environmental commenced monitoring from the April 2006 monitoring period.

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

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

Groundwaters are sampled in accordance with Australian Standards AS5667.1 "Guidance on the Design of Sample Programs, Sampling Techniques and the Preservation and Handling of Samples" and AS5667.11 "Water Quality Sampling—Guidance on sampling of ground waters". Groundwater monitoring sites are sampled 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**.

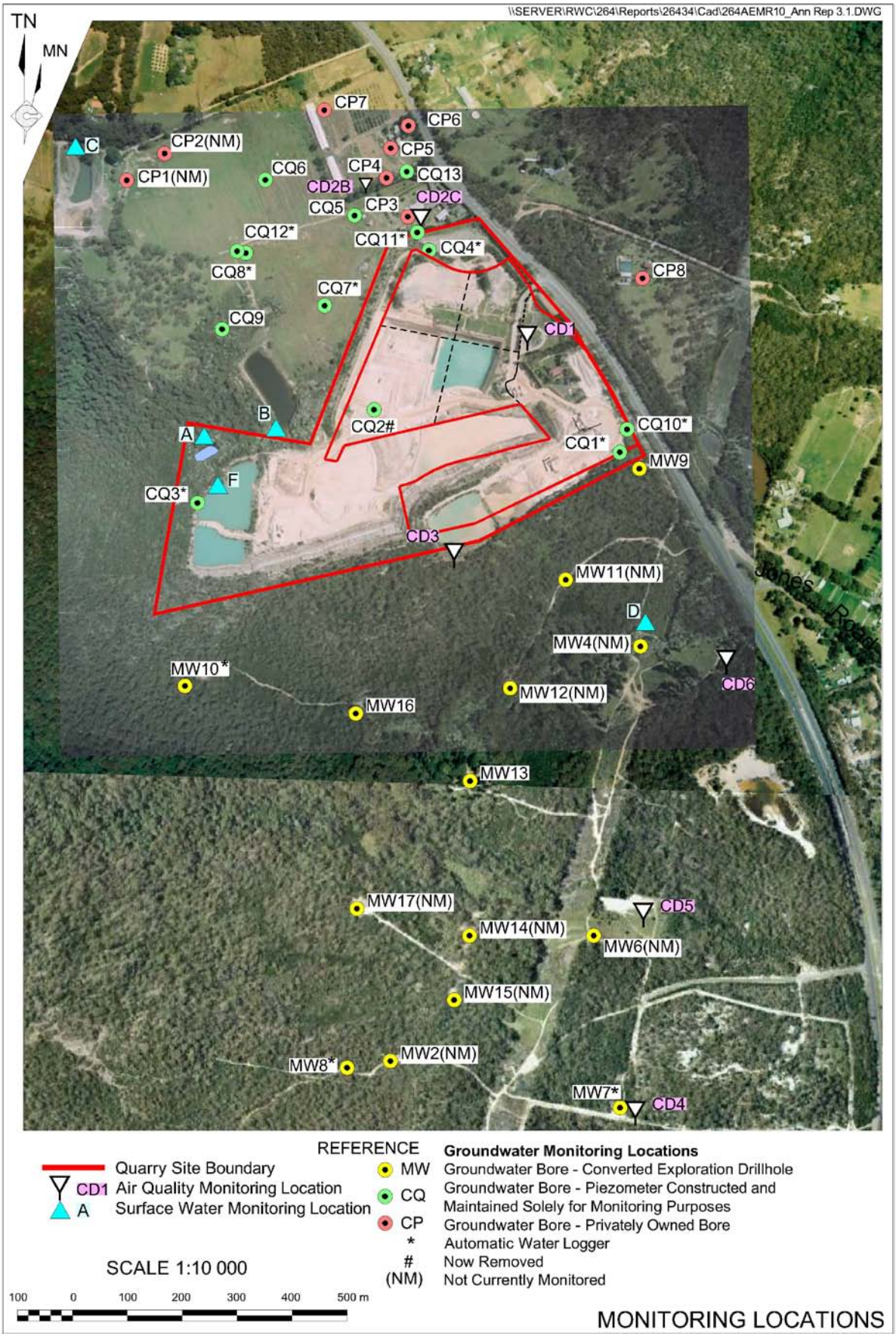


Figure 1: Rocla Calga Quarry environmental monitoring locations

2.0 Monthly Results

2.1 Dust Deposition Gauges

Table 1 displays the results for November 2011 and the project average. Results are in g/m^2.month.

Table 1: Dust Deposition results: 31-October 2011 – 1-December 2011 (32 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	0.9	0.7	0.2	78	2.2
CD2c	0.4	0.4	<0.1	100	0.8
CD3	0.3	0.2	0.1	66	0.7
CD4	0.7	0.3	0.4	43	0.4
CD5	0.4	0.2	0.2	50	0.3
CD6	0.5	0.3	0.2	60	0.6

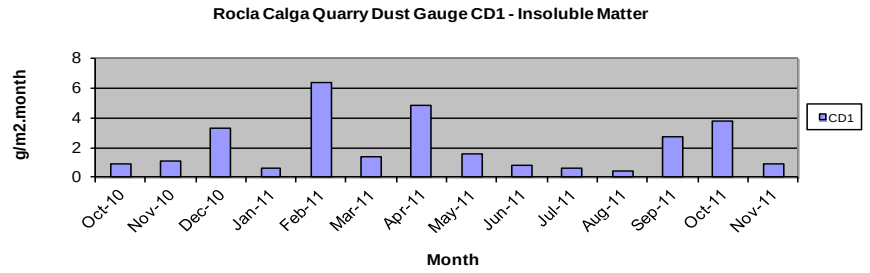
Insoluble Solids marked with an * indicate an excessively contaminated gauge. Contamination can include bird droppings, vegetation (such as plant matter, algae, pollen and seeds) and insects. Results in bold indicate insoluble solids levels above 3.7 g/m^2.month; the Development Consent's annual average amenity criteria at residential locations. The current rolling annual average is calculated from December 2010 to November 2011.

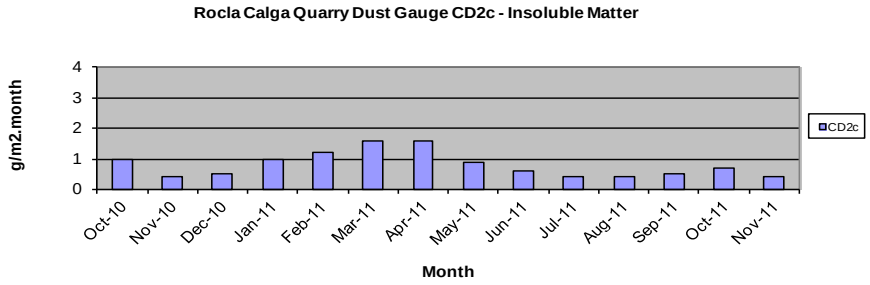
NA= Not Available.

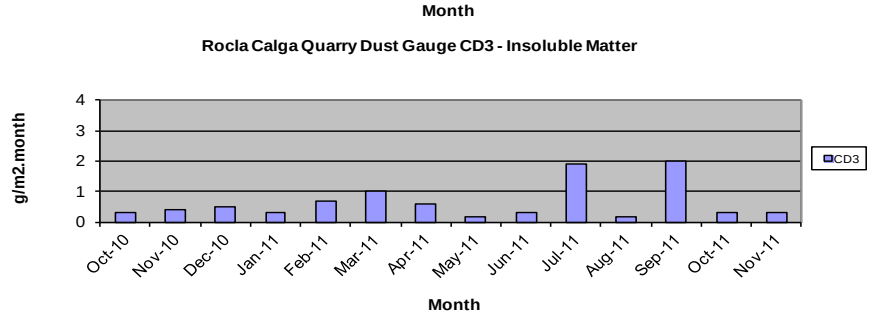
CD1 was installed on the 1 May 2006. CD2a was discontinued at the start of August 2006 due to quarry operations "mining out" the site of the gauge. The replacement gauge, Site CD2b, was located in a position adjacent to the boundary between B. Kashouli and F. & J. Gazzana in conformance with the Air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

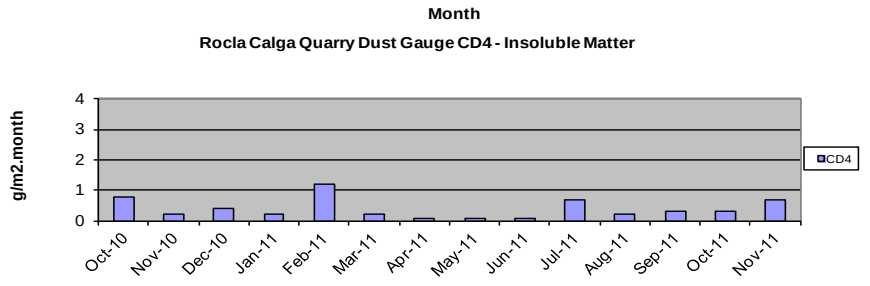
Dust deposition charts for all dust gauge sites appear in **Figure 2** below. The laboratory analysis is provided in **Appendix 1.**

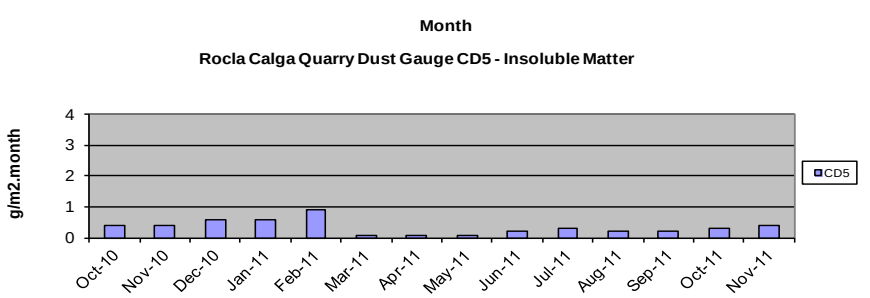
Figure 2: Dust Deposition Charts

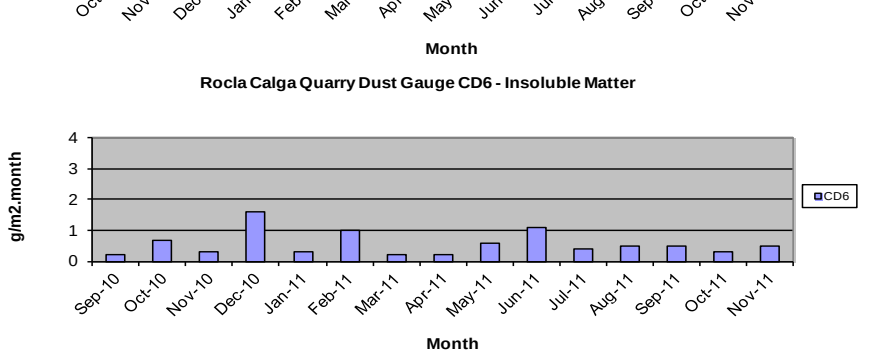












2.2 Water Monitoring

2.2.1 Surface Waters

Monthly surface water monitoring was conducted on the 1 December 2011 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	Still	Clear	Clear	5.97	68	55	6	<5
B	DRY							
C	NO ACCESS							
D	Trickle	Clear	Clear	5.74	88	72	<5	<5
F	Still	Clear	Clear	5.64	74	54	10	<5

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

2.2.2 Groundwaters

Groundwaters were sampled on 1 December 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 3 to 6.**

Groundwater depth both increased and decreased evenly across the sampled groundwater bores compared to last month. pH and EC remained relatively stable compared to last month with the exception of CQ9, CQ10 and MW7 which all increased in pH.

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	NM	NM	NM
CQ3	Voutos	* Monitor	10.53	10.06	6.2	120
CQ4	Voutos	* Monitor	8.78	9.40	5.3	80
CQ5	Gazzana	DIP Only	8.69	5.69	4.6	170
CQ6	Gazzana	DIP Only	16.00	8.06	4.6	190
CQ7	Gazzana	* Monitor	6.89	5.91	4.9	90
CQ8	Gazzana	* Monitor	11.03	5.28	4.8	150
CQ9	Gazzana	DIP Only	10.10	8.68	4.8	100
CQ10	Voutos	* Monitor	NI	21.84	5.0	170
CQ11S	Gazzana	* Monitor	NI	9.30	4.8	150
CQ11D	Gazzana	* Monitor	NI	10.46	5.1	140
CQ12	Gazzana	* Monitor	NI	3.67	4.7	130
CQ13	Kashouli	* Monitor	NI	11.75	5.4	190
CP3	Gazzana	Domestic	10.40	7.91	4.9	150
CP4	Kashouli	Domestic	13.63	7.28	5.1	200
CP5	Kashouli	Domestic	16.61	5.78	4.7	220
CP6	Kashouli	Domestic	16.27	8.25	4.7	200
CP7	Kashouli	Production	8.56	1.33	5.9	180
CP8	Rozmanec	Domestic	22.17	19.16	4.8	140
MW7	Rocla Bore	* Monitor	15.76	14.77	5.0	100
MW8	Rocla Bore	* Monitor	9.82	6.60	5.0	80
MW9	Rocla Bore	* Monitor	22.44	21.35	5.2	80
MW10	Rocla Bore	* Monitor	15.41	11.35	4.8	120
MW13	Rocla Bore	DIP Only	NI	7.45	4.9	100
MW16	Rocla Bore	DIP Only	NI	8.05	4.9	100

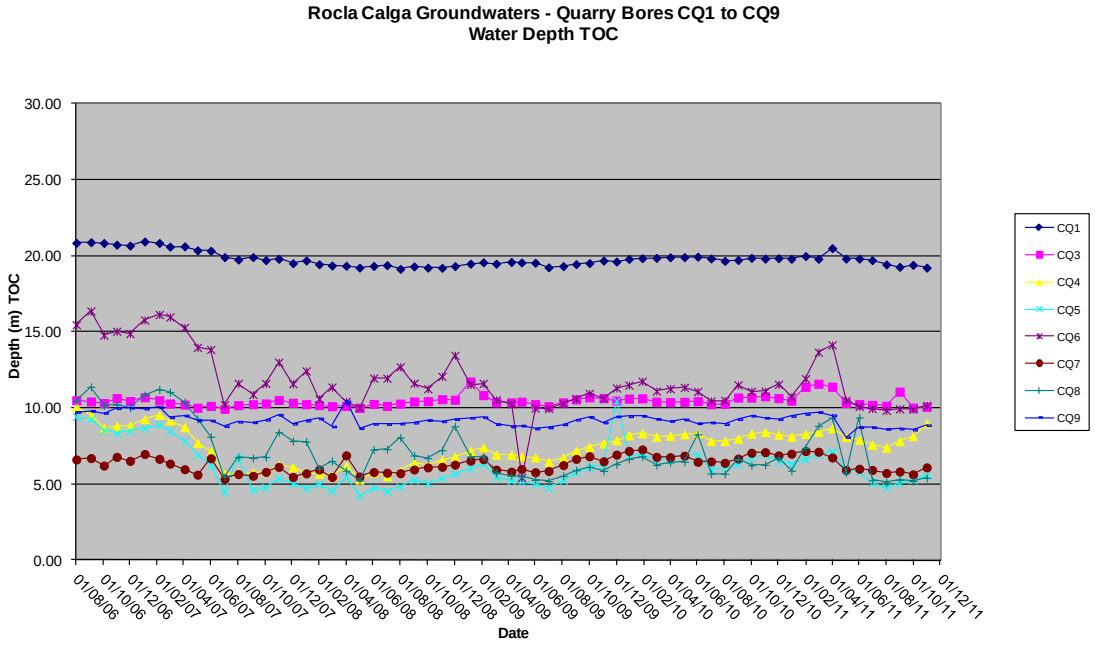
Notes:
TOC = Water level measured from top of bore case to water.
NM = Not Monitored – unable to sample water due to access restrictions.
NR = Not Required by resident.
* = Logger Installed.
NI = These bores were not installed in April 2006 but are now operational. April 2006 was the first set of measurements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

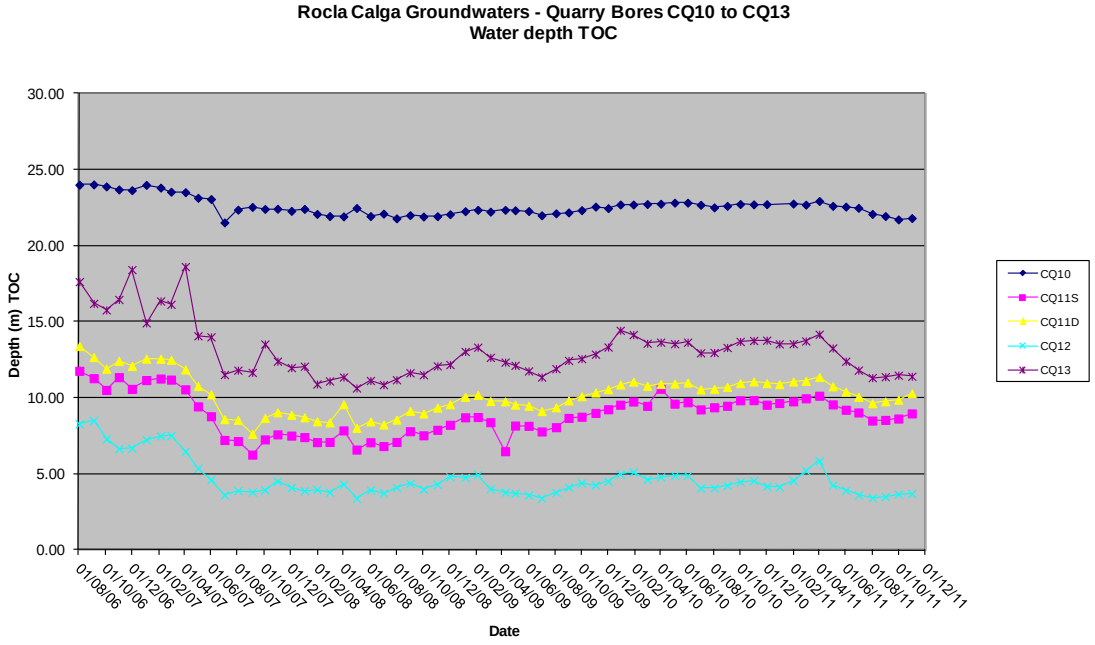
Shading is used to indicate the following trends in water depth (compared to the last reading):

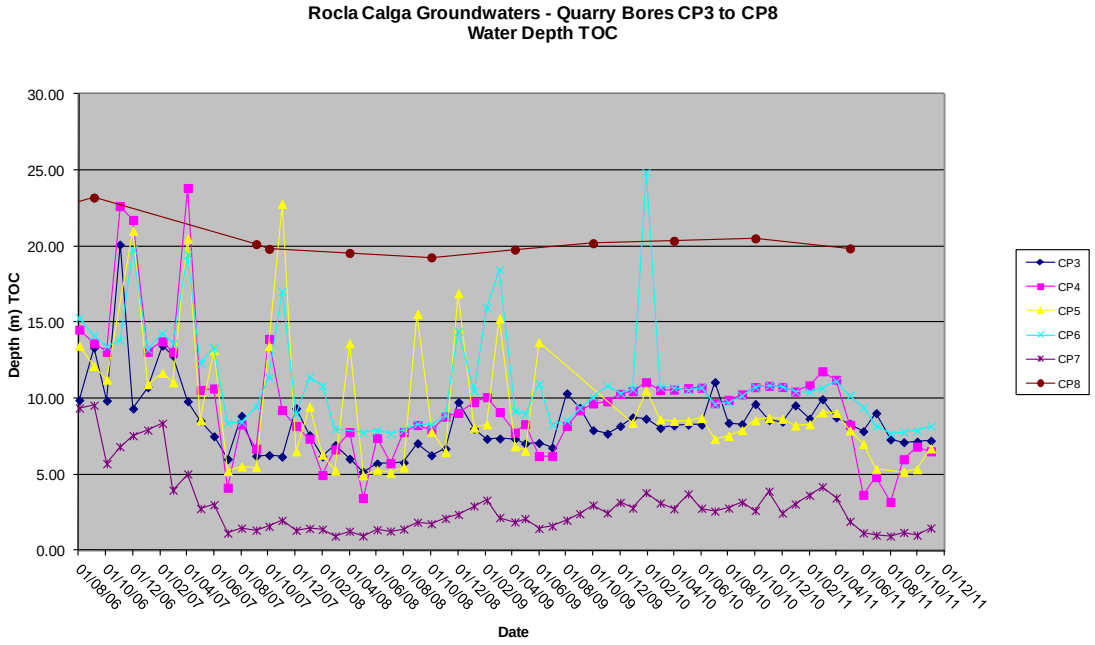
	Increase to ground water depth (water moved away from surface)
	Decrease to ground water depth (water moved towards surface)
	Stable water depth (+/- 0.01m)

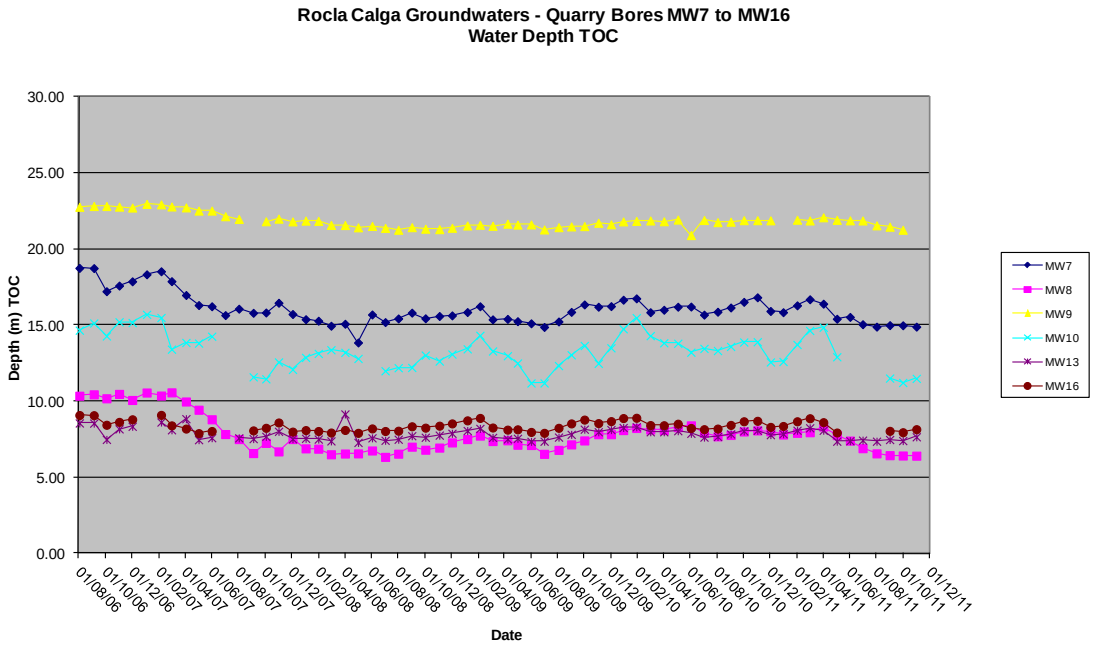
Available groundwater loggers were downloaded and will be forwarded to the Rocla Calga Quarry groundwater consultant.

Figures 3 to 6: 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
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
Date
MW7
MW8
MW9
MW10
MW13
MW16

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 2011 shows that rainfall recorded at the Rocla Calga Quarry was higher than that recorded at both the nearby Peats Ridge BOM station and Gosford BOM station. Recorded rainfall at Rocla Calga Quarry was higher than the Peats Ridge long term mean rainfall for November. The rainfall comparison is provided below:

Rocla Calga Quarry	193.0 mm
BOM Peats Ridge*	178.2 mm
BOM Gosford*	124.6 mm
BOM Peats Ridge Long term mean for November*	110.4 mm

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

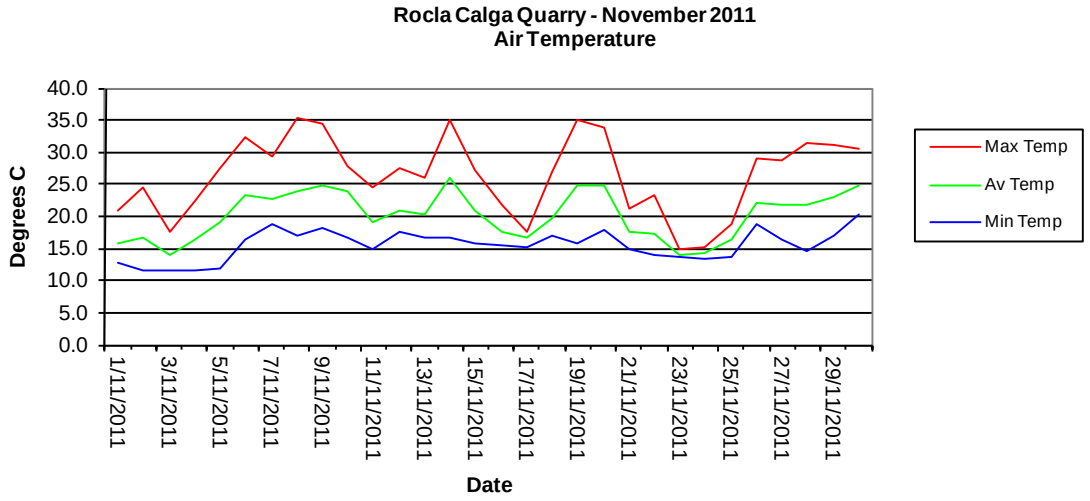
Results are displayed in the following table and figures.

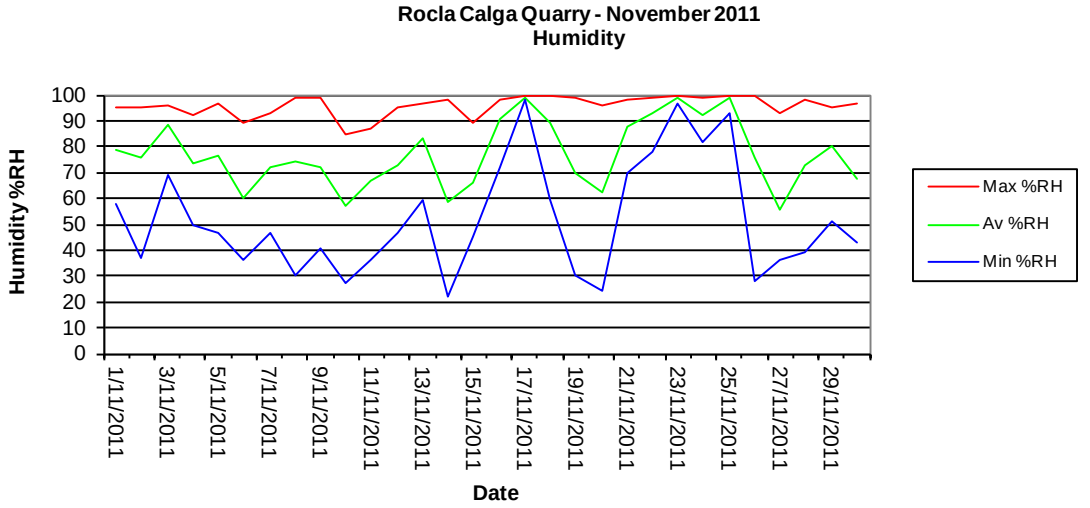
2.3.1 Monthly Meteorological Data Summary

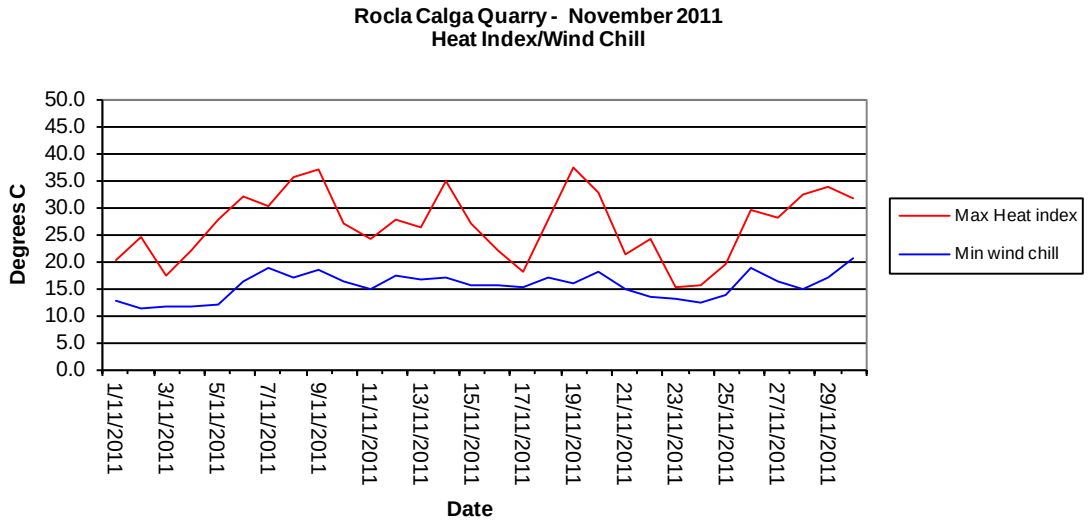
Summary **Nov-11** **Rocla - Calga**

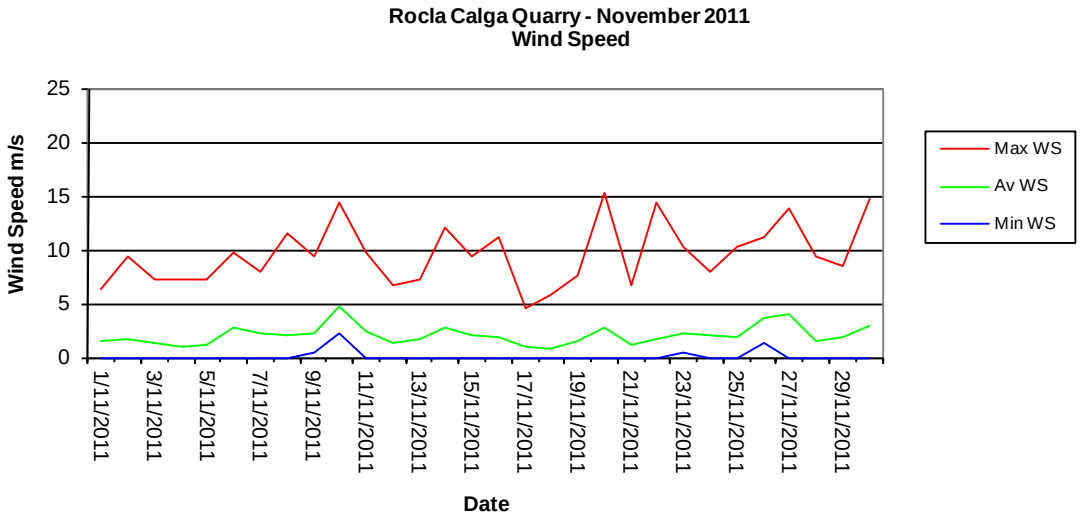
Date	Min Temp	Av Temp	Max Temp	Min %RH	Av %RH	Max %RH	RAIN mm	ET mm	Min WS	Av WS	Max WS	Min wind chill	Max Heat index	Min Atm P	Av Atm P	Max Atm P	Min Solar Rad	Av Solar Rad	Max Solar Rad	Min Data %	Av data %	Max Data %
1/11/2011	12.7	15.8	20.8	58	79	95	0.0	2.7	0	1.5	6.3	12.7	20.3	1013.4	1017.1	1020.7	0	152.2	953	93.3	99.8	100
2/11/2011	11.7	16.7	24.6	37	76	95	0.0	4.9	0	1.7	9.4	11.1	24.3	1008.3	1010.4	1014.0	0	301.4	1042	97.1	99.7	100
3/11/2011	11.6	14.0	17.6	69	88	96	10.6	1.5	0	1.4	7.2	11.7	17.2	1009.5	1012.8	1016.8	0	108.4	835	82.5	99.2	100
4/11/2011	11.5	16.3	22.4	50	74	92	0.0	4.1	0	1.0	7.2	11.5	22.1	1016.1	1017.7	1020.3	0	257.1	1171	83.9	98.9	100
5/11/2011	11.9	19.1	27.6	47	77	97	0.0	4.9	0	1.1	7.2	11.9	27.8	1012.6	1016.1	1019.9	0	300.8	1067	89.5	99.6	100
6/11/2011	16.3	23.4	32.2	36	60	89	0.0	6.0	0	2.8	9.8	16.3	31.9	1007.9	1010.7	1012.8	0	256.7	1036	92.7	99.8	100
7/11/2011	18.7	22.6	29.3	47	72	93	1.0	4.3	0	2.3	8	18.7	30.1	1009.6	1011.7	1013.9	0	212.9	1058	93.6	98.9	100
8/11/2011	17.1	23.9	35.3	30	74	99	19.8	5.7	0	2.1	11.6	17.1	35.6	1007.2	1012.0	1016.3	0	272.2	957	90.9	99.0	100
9/11/2011	18.3	24.9	34.4	41	72	99	0.2	5.4	0.4	2.3	9.4	18.4	36.9	1008.0	1011.0	1014.4	0	265.9	985	96.2	99.9	100
10/11/2011	16.6	23.8	27.9	27	57	85	0.0	5.3	2.2	4.7	14.3	16.4	26.9	1005.9	1011.3	1020.7	0	150.8	676	94.7	99.5	100
11/11/2011	15.0	19.1	24.4	36	67	87	0.0	5.6	0	2.4	9.8	15.0	24.1	1020.1	1021.7	1023.8	0	291.1	1017	95	99.9	100
12/11/2011	17.5	21.0	27.6	47	73	95	0.0	4.4	0	1.4	6.7	17.5	27.7	1012.9	1016.5	1020.7	0	243.3	995	99.7	100.0	100
13/11/2011	16.6	20.2	25.9	59	83	97	0.2	3.4	0	1.6	7.2	16.7	26.4	1011.3	1014.5	1017.5	0	192.0	960	100	100.0	100
14/11/2011	16.8	25.9	35.1	22	58	98	0.0	6.9	0	2.8	12.1	16.8	34.8	1004.6	1008.1	1011.9	0	276.4	996	97.7	99.9	100
15/11/2011	15.7	20.8	27.2	45	66	89	0.0	5.9	0	2.0	9.4	15.7	26.8	1011.9	1015.9	1018.4	0	320.3	1007	98.8	100.0	100
16/11/2011	15.5	17.6	21.7	72	90	98	15.2	1.3	0	1.9	11.2	15.5	21.8	1013.5	1017.2	1021.6	0	71.1	853	93.3	99.8	100
17/11/2011	15.2	16.6	17.7	98	99	100	10.8	0.4	0	1.0	4.5	15.2	18.2	1016.8	1018.4	1019.8	0	31.6	150	97.7	99.9	100
18/11/2011	16.9	19.8	26.9	59	89	100	0.0	2.5	0	0.8	5.8	17.0	27.7	1014.1	1016.4	1018.3	0	165.4	804	84.2	99.6	100
19/11/2011	15.9	24.7	35.0	30	70	99	0.2	6.0	0	1.4	7.6	15.9	37.5	1007.9	1011.8	1016.1	0	328.6	1013	93.9	99.7	100
20/11/2011	17.8	24.7	33.8	24	62	96	3.6	5.7	0	2.8	15.2	18.0	32.7	1005.5	1009.2	1014.7	0	222.8	972	95.9	99.5	100
21/11/2011	14.9	17.7	21.3	70	88	98	5.2	1.4	0	1.2	6.7	14.9	21.3	1013.7	1015.4	1017.5	0	84.2	322	86.3	97.8	100
22/11/2011	13.9	17.3	23.2	78	93	99	18.4	1.5	0	1.7	14.3	13.4	24.2	1007.5	1010.7	1013.5	0	90.8	511	89.5	99.0	100
23/11/2011	13.7	14.1	15.0	97	99	100	32.6	0.3	0.4	2.2	10.3	13.1	15.2	1011.0	1017.2	1024.1	0	24.4	117	97.1	99.8	100
24/11/2011	13.3	14.4	15.2	82	92	99	8.6	0.9	0	2.1	8	12.5	15.4	1022.5	1024.9	1026.7	0	55.0	293	94.4	99.7	100
25/11/2011	13.8	16.5	18.7	93	99	100	33.8	0.4	0	1.9	10.3	13.8	19.3	1014.1	1019.9	1024.6	0	31.5	155	98.8	100.0	100
26/11/2011	18.7	22.1	28.9	28	76	100	32.4	3.9	1.3	3.7	11.2	18.7	29.5	1002.3	1006.5	1013.5	0	177.1	1187	92.7	99.7	100
27/11/2011	16.3	21.8	28.6	36	55	93	0.0	7.9	0	4.1	13.9	16.3	28.0	1004.6	1008.0	1016.1	0	352.1	1122	88	99.2	100
28/11/2011	14.7	21.9	31.4	39	73	98	0.0	6.1	0	1.6	9.4	14.7	32.4	1013.9	1015.5	1017.2	0	338.2	1033	98.2	100.0	100
29/11/2011	17.1	23.0	31.2	51	80	95	0.0	4.3	0	1.9	8.5	17.1	33.6	1010.8	1013.7	1016.0	0	237.9	1033	98	99.7	100
30/11/2011	20.3	24.8	30.4	43	67	97	0.4	4.6	0	2.9	14.8	20.6	31.7	1007.7	1009.6	1012.8	0	191.9	966	85.4	98.9	100
Monthly	11.5	20.1	35.3	22	77	100	193.0	117.9	0	2.1	15.2	11.1	37.5	1002.3	1014.1	1026.7	0	200.1	1187	82.5	99.5	100

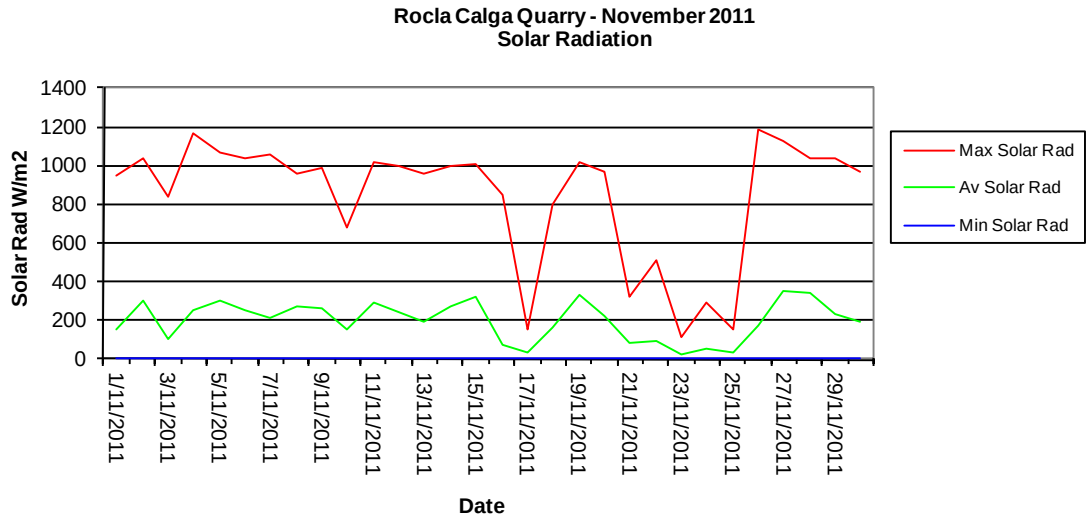
2.3.2 Monthly Weather Charts

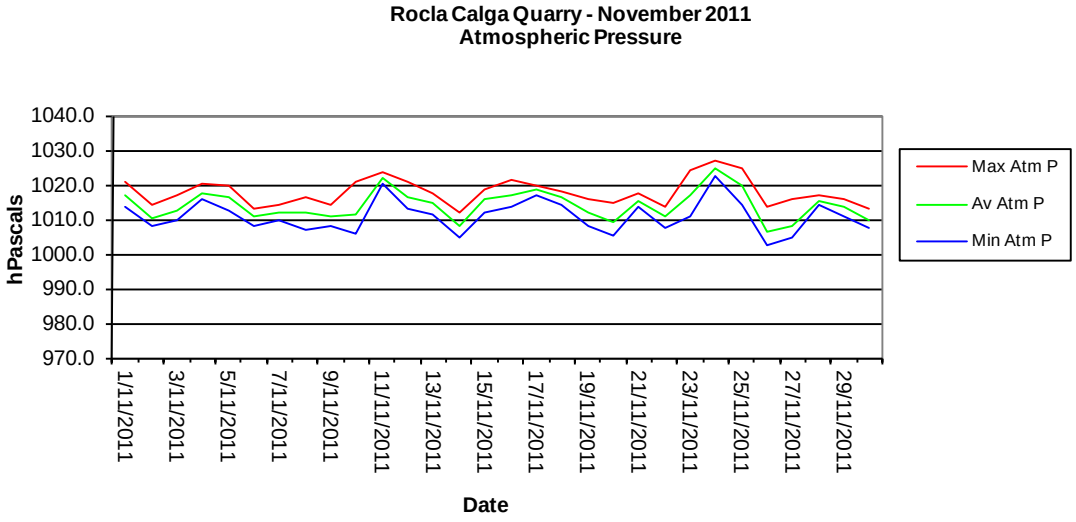


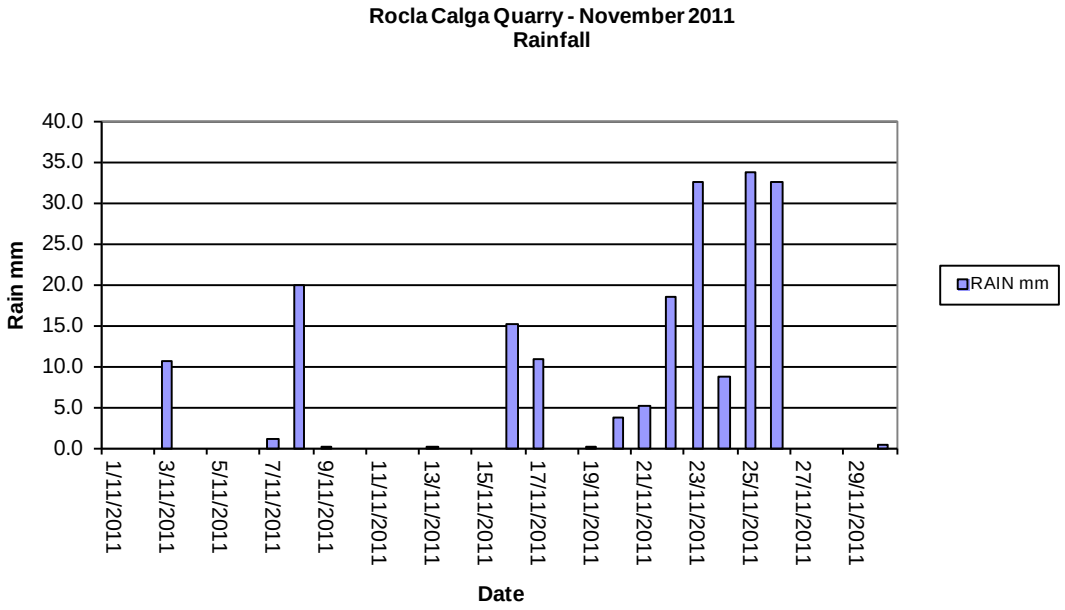


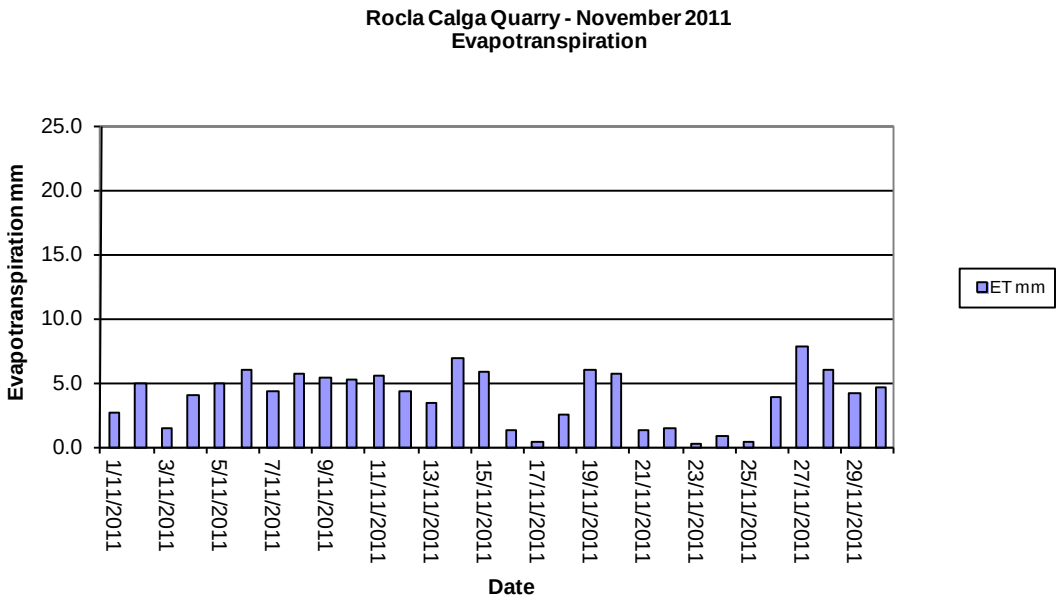


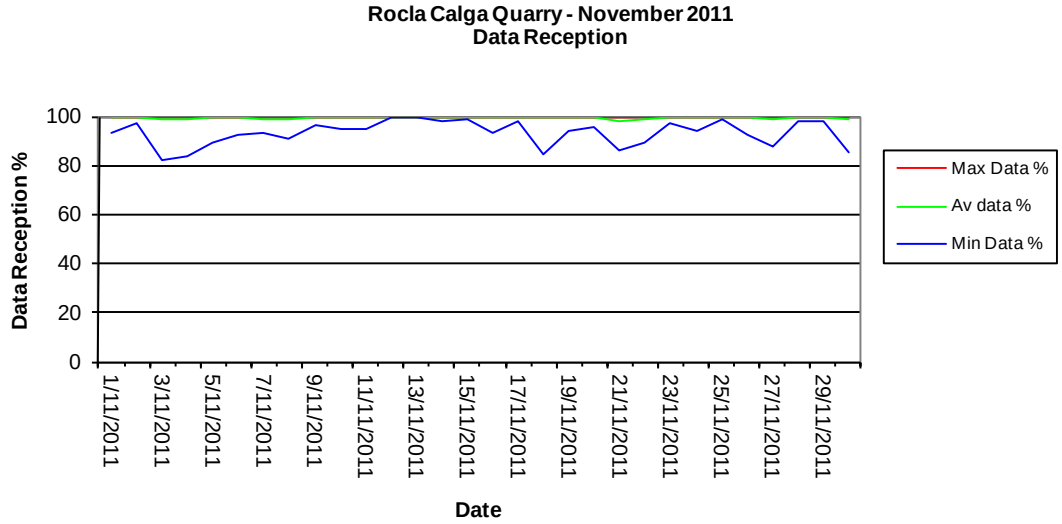

Rocla Calga Quarry - November 2011
Wind Speed
Wind Speed m/s
25
20
15
10
5
0
1/11/2011
3/11/2011
5/11/2011
7/11/2011
9/11/2011
11/11/2011
13/11/2011
15/11/2011
17/11/2011
19/11/2011
21/11/2011
23/11/2011
25/11/2011
27/11/2011
29/11/2011
Date
Max WS
Av WS
Min WS


Rocla Calga Quarry - November 2011
Solar Radiation
Solar Rad W/m2
1400
1200
1000
800
600
400
200
0
1/11/2011
3/11/2011
5/11/2011
7/11/2011
9/11/2011
11/11/2011
13/11/2011
15/11/2011
17/11/2011
19/11/2011
21/11/2011
23/11/2011
25/11/2011
27/11/2011
29/11/2011
Date
Max Solar Rad
Av Solar Rad
Min Solar Rad


Rocla Calga Quarry - November 2011
Atmospheric Pressure
hPascals
1040.0
1030.0
1020.0
1010.0
1000.0
990.0
980.0
970.0
1/11/2011
3/11/2011
5/11/2011
7/11/2011
9/11/2011
11/11/2011
13/11/2011
15/11/2011
17/11/2011
19/11/2011
21/11/2011
23/11/2011
25/11/2011
27/11/2011
29/11/2011
Date
Max Atm P
Av Atm P
Min Atm P


Rocla Calga Quarry - November 2011
Rainfall
Rain mm
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
1/11/2011
3/11/2011
5/11/2011
7/11/2011
9/11/2011
11/11/2011
13/11/2011
15/11/2011
17/11/2011
19/11/2011
21/11/2011
23/11/2011
25/11/2011
27/11/2011
29/11/2011
Date
RAIN mm

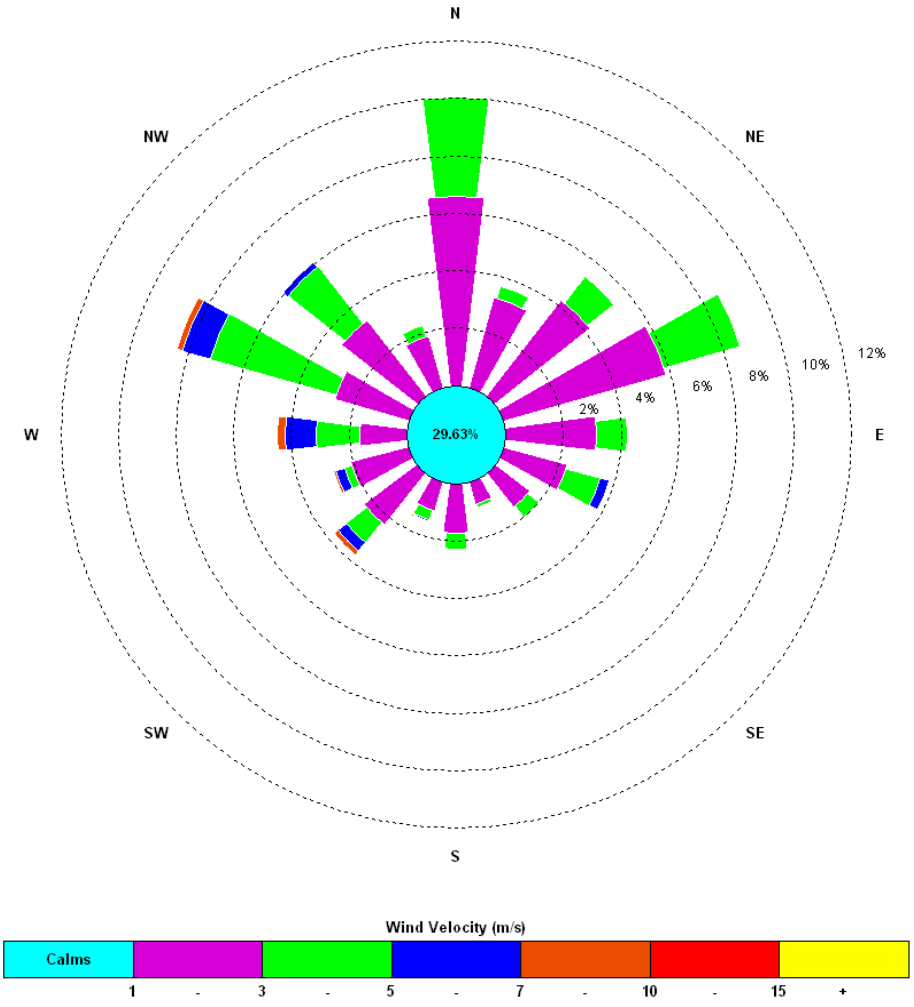

Rocla Calga Quarry - November 2011
Evapotranspiration
Evapotranspiration mm
25.0
20.0
15.0
10.0
5.0
0.0
1/11/2011
3/11/2011
5/11/2011
7/11/2011
9/11/2011
11/11/2011
13/11/2011
15/11/2011
17/11/2011
19/11/2011
21/11/2011
23/11/2011
25/11/2011
27/11/2011
29/11/2011
Date
ET mm


Rocla Calga Quarry - November 2011
Data Reception
Data Reception %
100
80
60
40
20
0
1/11/2011
3/11/2011
5/11/2011
7/11/2011
9/11/2011
11/11/2011
13/11/2011
15/11/2011
17/11/2011
19/11/2011
21/11/2011
23/11/2011
25/11/2011
27/11/2011
29/11/2011
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.

00:00, 1 November 2011 – 23:45, 30 November 2011



The predominant winds were from the ENE, with strongest winds from the W. The maximum wind speed was 15.2m/s from the W.

Appendix 1

Laboratory Certificates

ALS Group
Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **EN1103785**	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-DEC-2011
Sampler	: CBE	Issue Date	: 08-DEC-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
WORLD RECOGNISED ACCREDITATION

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*
Dianne Blane	Laboratory Supervisor	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 does not apply for results reported in g/m².mth as sampling data was provided by the client.**

Analytical Results

Sub-Matrix: **DUST**

Compound	CAS Number	LOR	Unit	Client sample ID: CD1 31/10/11 - 01/12/11	CD2C 31/10/11 - 01/12/11	CD3 31/10/11 - 01/12/11	CD4 31/10/11 - 01/12/11	CD5 31/10/11 - 01/12/11
			Client sampling date / time	[01-DEC-2011]	[01-DEC-2011]	[01-DEC-2011]	[01-DEC-2011]	[01-DEC-2011]
				EN1103785-001	EN1103785-002	EN1103785-003	EN1103785-004	EN1103785-005
EA120: Ash Content								
Ash Content	----	0.1	g/m².month	0.7	0.4	0.2	0.3	0.2
Ash Content (mg)	----	1	mg	13	7	4	5	4
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m².month	0.2	<0.1	0.1	0.4	0.2
Combustible Matter (mg)	----	1	mg	3	1	1	7	3
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m².month	0.9	0.4	0.3	0.7	0.4
Total Insoluble Matter (mg)	----	1	mg	16	8	5	12	7

Analytical Results

Sub-Matrix: DUST			Client sample ID	CD6 31/10/11 - 01/12/11	----	----	----	----
			Client sampling date / time	[01-DEC-2011]	----	----	----	----
Compound	CAS Number	LOR	Unit	EN1103785-006	----	----	----	----
EA120: Ash Content								
Ash Content	----	0.1	g/m².month	0.3	----	----	----	----
Ash Content (mg)	----	1	mg	5	----	----	----	----
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m².month	0.2	----	----	----	----
Combustible Matter (mg)	----	1	mg	4	----	----	----	----
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m².month	0.5	----	----	----	----
Total Insoluble Matter (mg)	----	1	mg	9	----	----	----	----

ALS Group
Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **ES1126300**	Page	: 1 of 3
Client	: **CARBON BASED ENVIRONMENTAL**	Laboratory	: Environmental Division Sydney
Contact	: MS RENAE MIKKA	Contact	: Client Services
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@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-DEC-2011
Sampler	: CBE	Issue Date	: 08-DEC-2011
Site	: ----		
		No. of samples received	: 3
Quote number	: SY/269/10 V2	No. of samples analysed	: 3

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
WORLD RECOGNISED ACCREDITATION

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	Sydney Inorganics
Dianne Blane	Laboratory Supervisor	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

Analytical Results

Sub-Matrix: WATER				Client sample ID	A	D	F	----	----
				Client sampling date / time	[01-DEC-2011]	[01-DEC-2011]	[01-DEC-2011]	----	----
Compound	CAS Number	LOR	Unit		ES1126300-001	ES1126300-002	ES1126300-003	----	----
EA005: pH									
pH Value	----	0.01	pH Unit		5.97	5.74	5.64	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		68	88	74	----	----
EA015: Total Dissolved Solids									
Total Dissolved Solids @180°C	GIS-210-010	5	mg/L		55	72	54	----	----
EA025: Suspended Solids									
Suspended Solids (SS)	----	5	mg/L		6	<5	10	----	----
EP020: Oil and Grease (O&G)									
Oil & Grease	----	5	mg/L		<5	<5	<5	----	----

Appendix 2

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

Peats Ridge, New South Wales
November 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	11.6	18.8	0.2	3.0					15.0	80	8	S	4							
2	We	10.9	25.2	0	2.8					18.0	72	2	NW	4		19.9	72	4	SE	9	
3	Th	11.8	17.2	4.2	4.4					12.8	99	8	ESE	4		14.9	80	7	E	4	
4	Fr	9.1	21.0	1.2	1.6					17.2	66	1	E	4		19.8	58	5	E	4	
5	Sa	9.6	25.5	0	3.8					19.5	68	5	E	4		24.4	66	0	E	9	
6	Su	16.9	30.8	0	4.6					23.4	60	3	NW	4		29.1	44	7	WNW	4	
7	Mo	17.8	30.1	0	5.6					23.6	64	2	WSW	9							
8	Tu	16.3	32.6	0	4.2					24.1	75	3	NW	4		31.7	39	7	NNW	4	
9	We	17.3	32.2	11.0	6.2					24.4	75	5	NNW	4							
10	Th	23.3	26.9	0	6.0					25.3	53	8	NW	9		26.3	55	5	W	9	
11	Fr	14.8	22.6	0	3.8					19.5	56	2	E	19		21.7	62	6	NW	28	
12	Sa	16.4	25.2	0	5.2					17.6	85	8	WNW	4		23.9	66	3	W	9	
13	Su	15.3	24.7	0	2.0					19.0	87	8	SSE	4		22.2	78	8	E	9	
14	Mo	14.8	33.9	0	3.4					23.6	66	1	NW	9		33.9	27	3	W	4	
15	Tu	13.7	25.0	0	6.2					19.9	69	3	NE	9		24.3	50	0	E	19	
16	We	14.7	22.0	0	6.0					20.2	82	8	NW	9		19.6	80	8	S	4	
17	Th	14.8	18.1	11.4	2.2					16.3	98	8	ENE	4		17.1	98	8	ENE	4	
18	Fr	15.8	23.8	6.2	0.8					18.1	94	7	E	4		23.0	76	3	E	19	
19	Sa	14.8	32.1	0	2.4					22.2	87	2	NW	4		32.0	39	1	NE	9	
20	Su	19.4	34.0	0	6.4					25.9	51	5	NW	9		30.0	36	7	S	19	
21	Mo	13.8	20.1	3.6	6.2					17.2	77	8	S	4		19.7	79	8	NE	4	
22	Tu	15.7	23.9	10.2	1.8					18.5	91	8	W	4		23.0	83	8	S	9	
23	We	13.0	14.6	21.8	2.6					14.0	94	8	S	4							
24	Th	13.0	16.2	21.6	4.4					14.6	96	8	E	9		14.5	94	8	E	4	
25	Fr	12.7	19.8	15.4	1.0					16.2	99	8	ENE	4		16.6	99	8	E	19	
26	Sa	15.6	26.7	64.0						19.8	97	8	NE	9		25.8	59	4	E	4	
27	Su	14.6		7.4	2.0					22.0	54	0	W	4		26.8	40	2	SW	4	
28	Mo		29.5	0												27.0	58	3	W	4	
29	Tu	15.2	29.2	0	9.2					23.2	74	0	N	4		27.0	73	7	E	4	
30	We	19.5	29.9	0	3.0					25.4	66	7	N	4		27.5	50	7	N	9	
Statistics for November 2011																					
	Mean	14.9	25.2		4.0					19.9	77	5		5		23.9	63	5		8	
	Lowest	9.1	14.6		0.8					12.8	51	0	#	4		14.5	27	0	#	4	
	Highest	23.3	34.0	64.0	9.2					25.9	99	8	E	19		33.9	99	8	NW	28	
	Total			178.2	110.8																

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.

IDCJDW2110.201111 Prepared at 13:07 GMT on 7 Dec 2011

Gosford, New South Wales
November 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	13.8	19.8	0.8			ESE	20	09:18	17.9	74		SE	7		18.6	65		E	7	
2	We	9.7	24.6	0			SE	33	13:02	17.3	89		ESE	2		19.6	71		SE	17	
3	Th	13.2	18.4	1.8			SE	22	11:47	14.2	100		ESE	7		16.2	93		ENE	7	
4	Fr	9.3	22.0	4.0			SE	22	13:03	18.2	61		E	6		20.5	55		ESE	11	
5	Sa	10.4	24.2	3.4			ESE	24	12:58	18.6	79		NNW	11		23.3	70		E	11	
6	Su	12.4	31.9	0			N	30	14:02	23.3	76			Calm		31.4	38		N	11	
7	Mo	17.0	30.1	0			N	26	11:30	25.6	61		NNW	7		26.1	58		SE	6	
8	Tu	17.1	34.1	0			NNE	31	10:09	24.4	84		ESE	2		33.5	36		N	9	
9	We	17.3	33.9	3.6			NNE	24	12:33	24.8	82		NE	2		33.6	37		NW	7	
10	Th	19.3	29.3	2.0			N	33	11:22	25.5	62		NW	7		28.0	45		NW	11	
11	Fr	15.1	23.8	0.2			NE	33	11:33	21.2	50		ENE	7		22.8	51		NE	11	
12	Sa	18.7	26.6	0			N	24	07:58	20.4	78		N	11		26.3	56		NE	7	
13	Su	16.7	25.1	0			NE	22	16:28	21.0	96		SE	7		23.5	69		ENE	9	
14	Mo	15.4	36.3	0			S	37	21:18	24.3	77		N	7		34.8	32		N	13	
15	Tu	14.6	25.1	0			SSE	35	23:12	22.6	57		E	7		24.4	52		ENE	13	
16	We	14.6	24.0	0			ESE	31	10:21	20.8	89			Calm		21.6	85		SE	6	
17	Th	16.2	21.4	3.8			SE	17	08:21	17.5	100			Calm		18.0	100		SSW	6	
18	Fr	17.3	24.7	0.2			ENE	19	14:37	21.3	96		SSE	2		24.0	75		ENE	7	
19	Sa	13.9	31.9	0.2			N	22	18:13	20.9	98		SE	7		31.6	53		ENE	9	
20	Su	18.1	35.6	0			N	35	09:37	23.7	90		SSE	6		33.7	27		NNW	15	
21	Mo	15.2	21.6	0			NNW	19	19:18	19.1	94			Calm		20.9	77		ENE	6	
22	Tu	16.8	25.5	0			SE	28	15:28	19.8	100		W	2		22.5	90		SE	9	
23	We	14.7	16.7	1.2			SE	26	13:56	15.3	100		SSE	11		15.7	100		SE	15	
24	Th	14.4	17.6	13.6			SSE	24	14:04	16.6	99			Calm		17.0	87		SE	11	
25	Fr	14.5	20.9	14.6			SE	24	20:12	17.4	100		ESE	6		18.1	99		SE	2	
26	Sa	17.4	27.7	68.8			ENE	28	23:48	20.9	100		N	11		26.7	63		N	15	
27	Su	12.0	29.4	6.2			SW	31	13:35	23.3	45		NW	11		29.1	34		SSE	11	
28	Mo	13.0	28.5	0.2			NE	24	09:30	22.4	74		N	9		26.4	64		ENE	11	
29	Tu	15.7	28.3	0			NE	24	11:49	23.8	78		N	6		25.7	85		ENE	11	
30	We	19.6	32.0	0			N	28	14:11	24.5	98		NNW	7		30.9	39		NW	11	
Statistics for November 2011																					
Mean		15.1	26.4							20.9	82			5		24.8	63			9	
Lowest		9.3	16.7							14.2	45			Calm		15.7	27		SE	2	
Highest		19.6	36.3	68.8			S	37		25.6	100		#	11		34.8	100		SE	17	
Total				124.6																	

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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