



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

January 2013

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Environmental Scientist
20 March 2013

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 January 2013;
- Surface Water quality results for January 2013;
- Groundwater depth and quality results for January 2013; and
- Meteorological report for January 2013.

The January 2013 dust deposition results for insoluble solids were generally similar when compared to those of December 2012. All sites, on a rolling annual average basis, are currently below the Air Quality Management Plan exceedance level of 3.7g/m².month. Results were found to be representative of dust levels as determined by the Australian Standard.

Surface water samples were collected for the normal monthly sampling event on the 1 February 2013 at sites A, B, D and F. Site C was inaccessible and unable to be sampled. 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 steady pH within the slightly acidic range, and low Electrical Conductivity, Total Dissolved Solids and Total Suspended Solids. Oil and Grease was not detected at any site. An additional high rainfall surface water sampling event was undertaken on 28 January 2013 at sites A, D and F.

Groundwaters were sampled for normal monthly monitoring on 1 February 2013. Groundwater depth generally varied across the sampled groundwater bores when compared to last month. Groundwater pH increased and EC levels remained relatively stable.

The meteorological station data recovery for the month was approximately 100%, however the rain gauge became blocked towards the end of the month with recorded rainfall from the 27-29 March significantly lower than those recorded at the Gosford BOM station. Recorded rainfall on site for January was 29.8 mm, which was lower than the Peats Ridge long-term average for January. A comparison is shown below:

Rocla Calga Quarry	29.8 mm**
BOM Peats Ridge*	Not Available
BOM Gosford*	312.0 mm
BOM Peats Ridge Long term mean for January*	117.0 mm

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

** Inaccurate rainfall readings during high rainfall event 27-29 January 2013.

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/m².month.

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

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

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

The weather stations have the following sensor configuration;

Air temperature

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

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

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

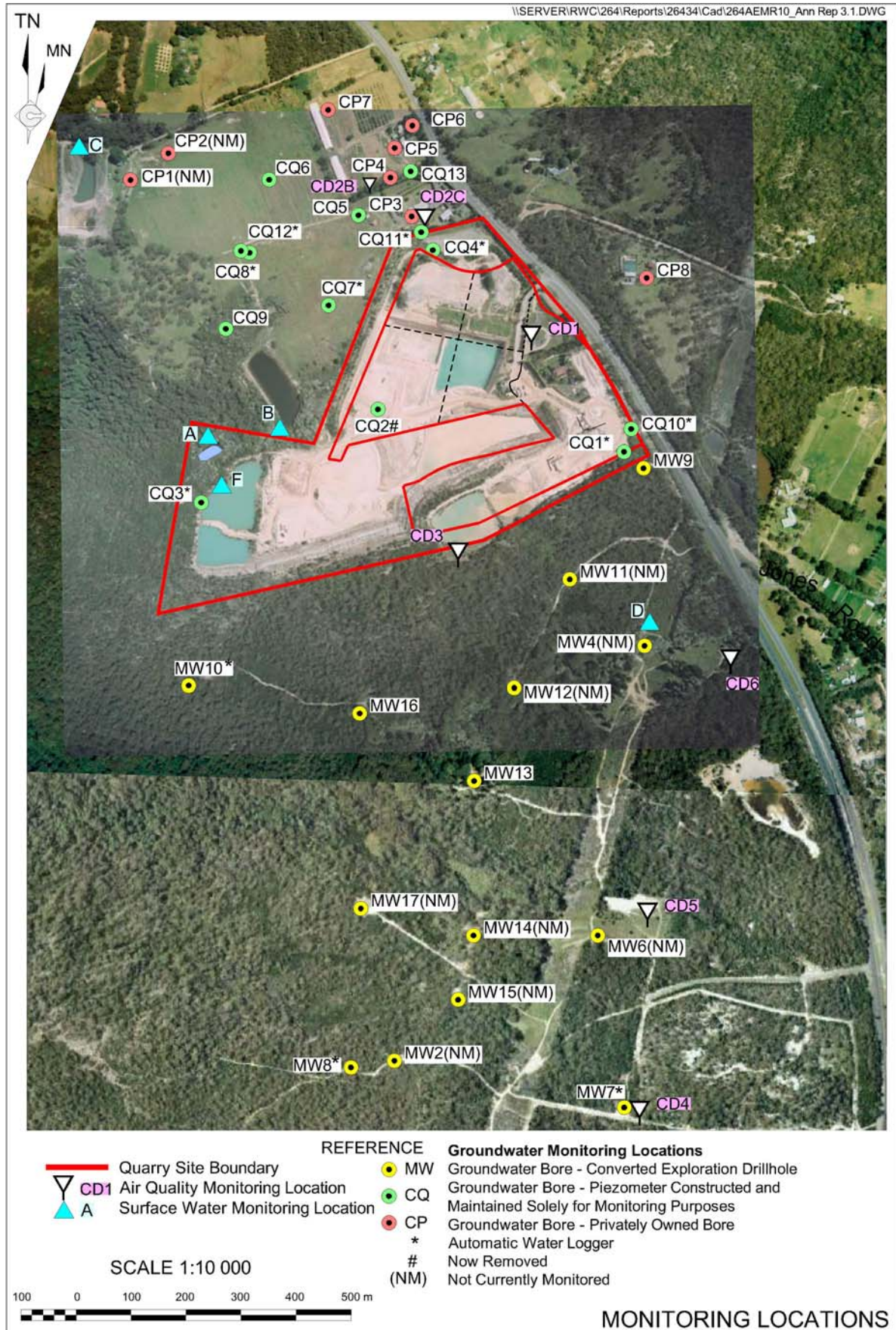


Figure 1: Rocla Calga Quarry environmental monitoring locations

2.0 Monthly Results

2.1 Dust Deposition Gauges

Table 1 displays the results for January 2013 and the project 12 month rolling average. Results are in g/m².month.

Table 1: Dust Deposition results: 2 January 2013 – 1 February 2013 (30 days)

Site	Monthly Insoluble Solids g/m ² .month	Monthly Ash Residue g/m ² .month	Monthly Combustible Matter g/m ² .month	Monthly Ash Residue/ Insoluble Solids %	Rolling Annual Average Insoluble Solids g/m ² .month
CD1	1.5	1.0	0.5	67	1.7
CD2c	0.9	0.6	0.3	67	1.2
CD3	1.1	0.8	0.3	73	1.3
CD4	0.6	0.3	0.3	50	0.6
CD5	0.4	0.3	0.1	75	0.4
CD6	0.5	0.4	0.1	80	0.5

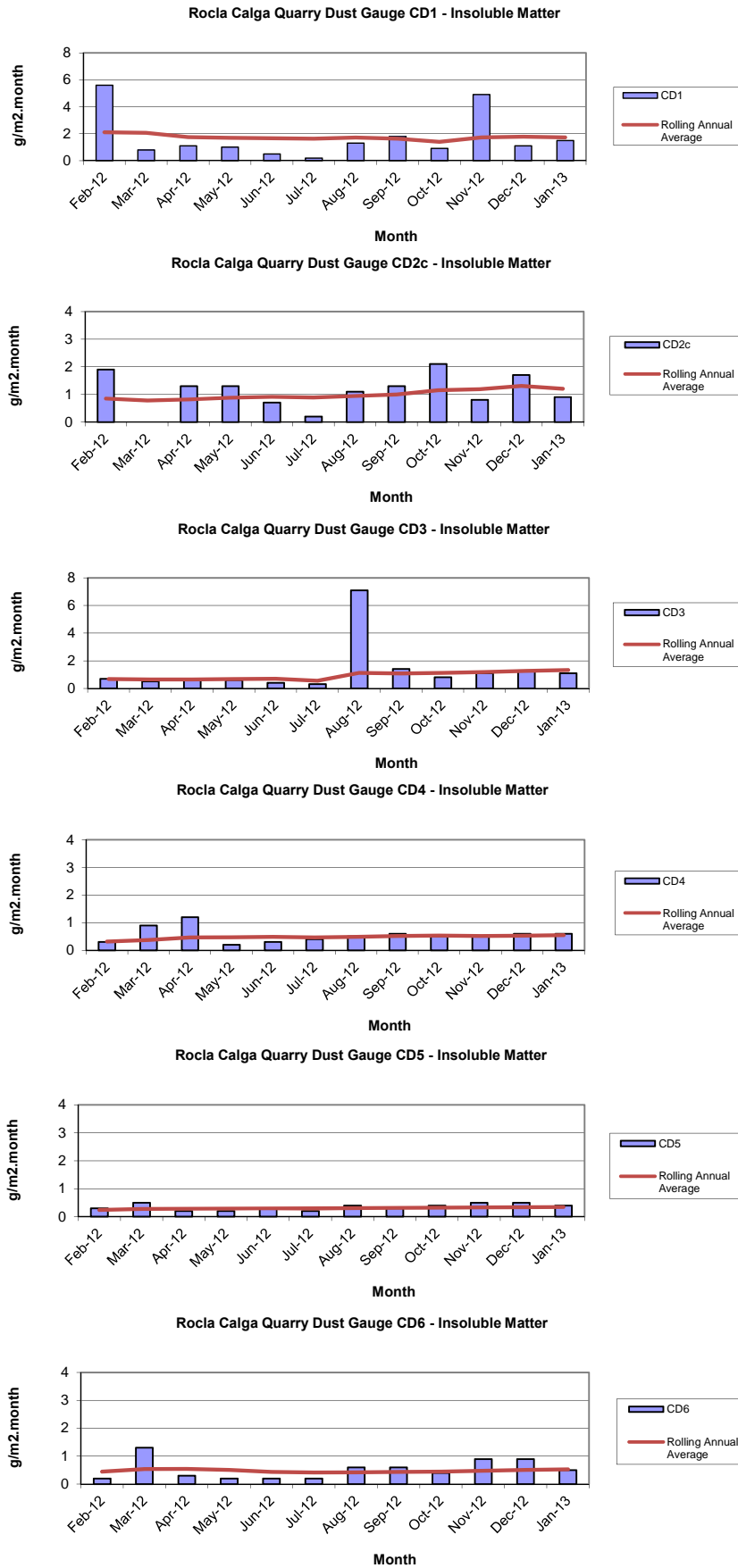
Insoluble Solids marked with an * indicate an excessively contaminated gauge. Contamination can include bird droppings, vegetation (such as plant matter, algae, pollen and seeds) and insects. Results in bold indicate insoluble solids levels above 3.7 g/m².month; the Development Consent’s annual average amenity criteria at residential locations. The current rolling annual average is calculated from February 2012 to January 2013.

NA= Not Available.

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

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

Figure 2: Dust Deposition Charts



2.2 Surface Water Monitoring

Monthly surface water monitoring was conducted on the 1 February 2013 and results are listed in **Table 2**. The laboratory analysis sheets are provided in **Appendix 1**.

Table 2: Monthly surface water monitoring – January 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	6.26	64	47	9	<5
B	Dam	Clear	Clear	6.76	82	84	109	<5
C	No Access							
D	Slow	Clear	Clear	5.51	117	98	<5	<5
F	Dam	Clear	Clear	5.93	62	70	<5	<5

At the time of sampling, there were no water discharges off site from any sampling location observed. Samples were collected at sites A, B, D and F. Site C was inaccessible and unable to be sampled this month. The samples were collected and analysed for a monthly sampling event. Results show pH within the slightly acidic to neutral range, low Electrical Conductivity, low Total Dissolved Solids and low Total Suspended Solids. Oil and Grease was not detected at any site.

An additional high rainfall surface water sampling event was undertaken on 28 January 2013 at sites A, D and F. Results are provided in **Appendix 1**.

2.3 Groundwater Monitoring

Groundwaters were sampled on 1 February 2013. Water quality tests for pH and electrical conductivity were conducted by Carbon Based Environmental Pty Limited. For water quality purposes, water was purged from the bore until constant pH (+/- 0.1 pH units) and Electrical Conductivity (+/- 5%) was obtained between samples. Data is displayed in **Table 3** and **Figures 3 to 6**.

Groundwater depth generally varied across the sampled groundwater bores when compared to last month. A substantial decrease in water depth was recorded at CQ1 indicating water moving towards the surface.

pH levels generally increased when compared to last month. pH at all sites is in the acidic range except for CQ1 which was in the alkaline range. EC levels remained low and relatively stable compared to the results obtained in December 2012.

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	0.67	10.2	218
CQ3	Voutos	* Monitor	10.53	10.24	6.4	129
CQ4	Voutos	* Monitor	8.78	10.89	5.2	105
CQ5	Gazzana	DIP Only	8.69	8.08	4.6	204
CQ6	Gazzana	DIP Only	16.00	11.11	4.8	237
CQ7	Gazzana	* Monitor	6.89	6.80	5.0	114
CQ8	Gazzana	* Monitor	11.03	6.24	4.8	168
CQ9	Gazzana	DIP Only	10.10	8.89	5.0	124
CQ10	Voutos	* Monitor	NI	22.40	5.2	192
CQ11S	Gazzana	* Monitor	NI	11.16	4.9	183
CQ11D	Gazzana	* Monitor	NI	12.30	5.1	174
CQ12	Gazzana	* Monitor	NI	5.18	4.8	133
CQ13	Kashouli	* Monitor	NI	14.31	5.1	243
CP3	Gazzana	Domestic	10.40	9.97	5.1	169
CP4	Kashouli	Domestic	13.63	11.43	5.2	228
CP5	Kashouli	Domestic	16.61	9.17	5.1	268
CP6	Kashouli	Domestic	16.27	11.09	4.9	224
CP7	Kashouli	Production	8.56	2.44	5.5	181
CP8	Rozmanec	Domestic	22.17	NR	NR	NR
MW7	Rocla Bore	* Monitor	15.76	16.73	4.9	128
MW8	Rocla Bore	* Monitor	9.82	8.20	5.2	103
MW9	Rocla Bore	* Monitor	22.44	21.86	5.0	103
MW10	Rocla Bore	* Monitor	15.41	12.96	4.7	146
MW13	Rocla Bore	DIP Only	NI	8.10	5.1	117
MW16	Rocla Bore	DIP Only	NI	8.71	5.0	129

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.

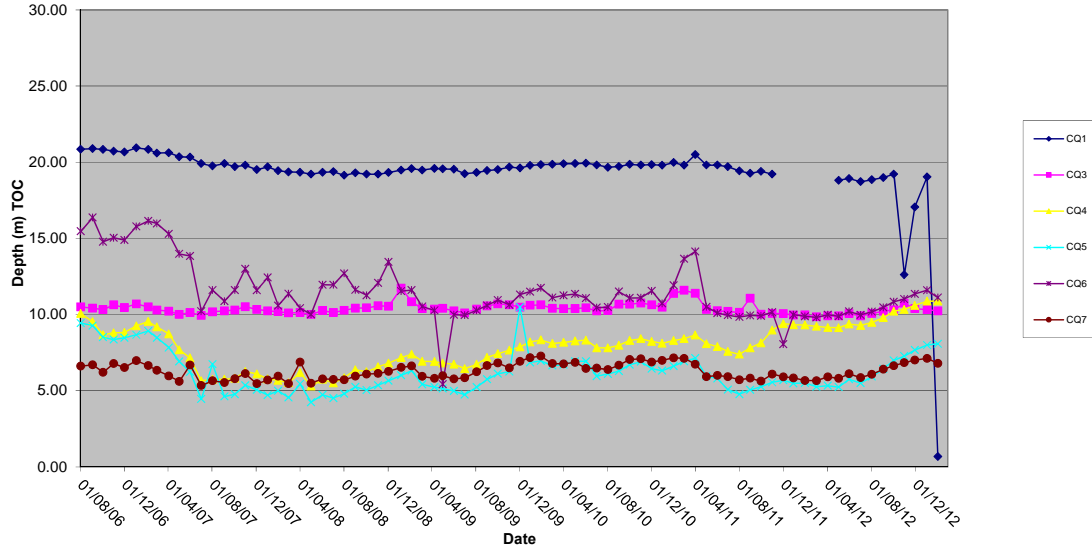
Shading is used to indicate the following trends in water depth (compared to the last reading):

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

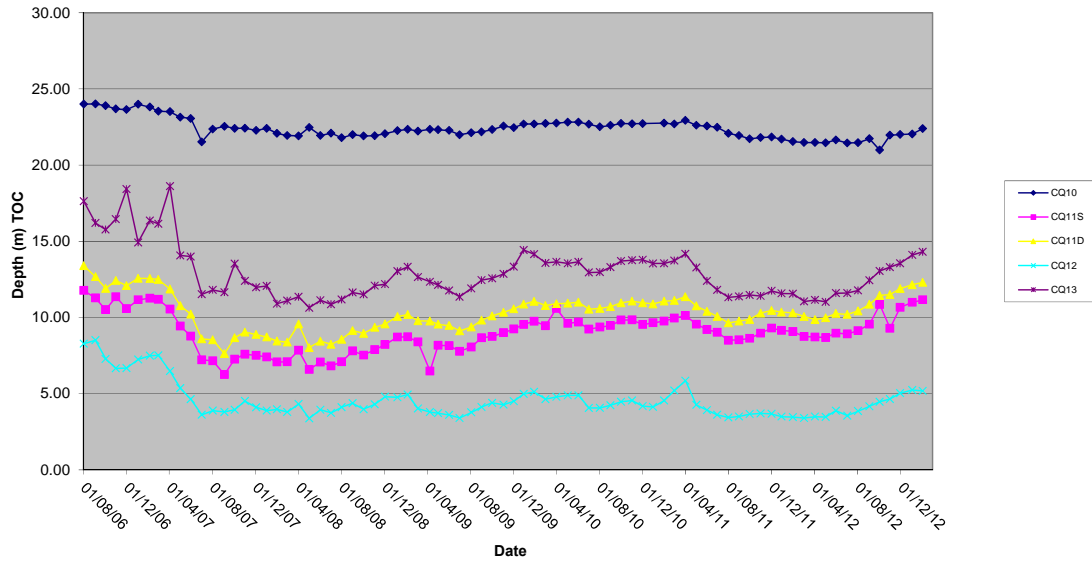
Available groundwater loggers were downloaded and will be forwarded to the Rocla Calga Quarry groundwater consultant.

Figures 3 to 6: Groundwater Depth Charts.

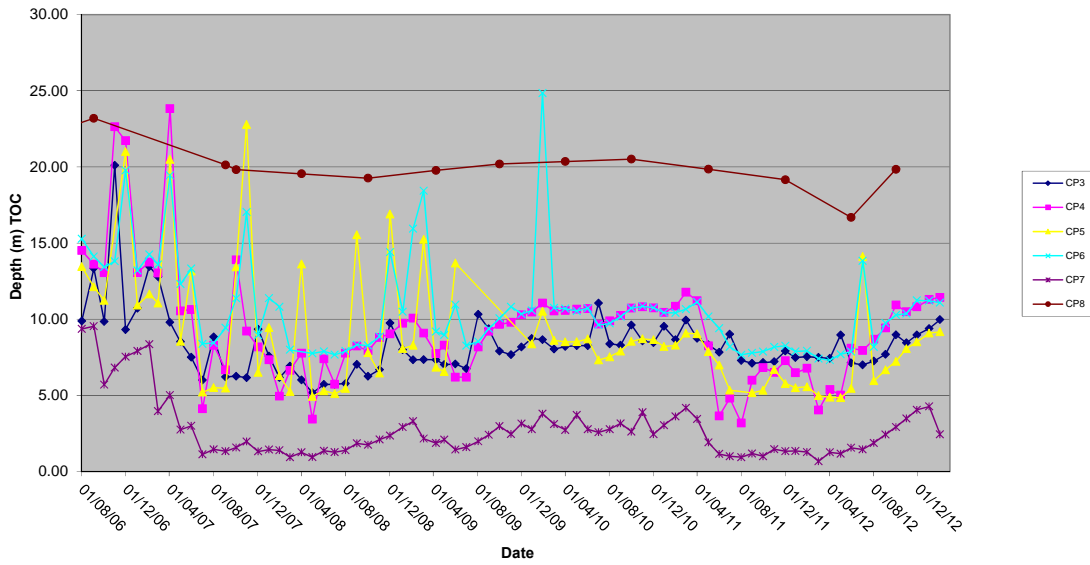
Rocla Calga Groundwaters - Quarry Bores CQ1 to CQ9
Water Depth TOC



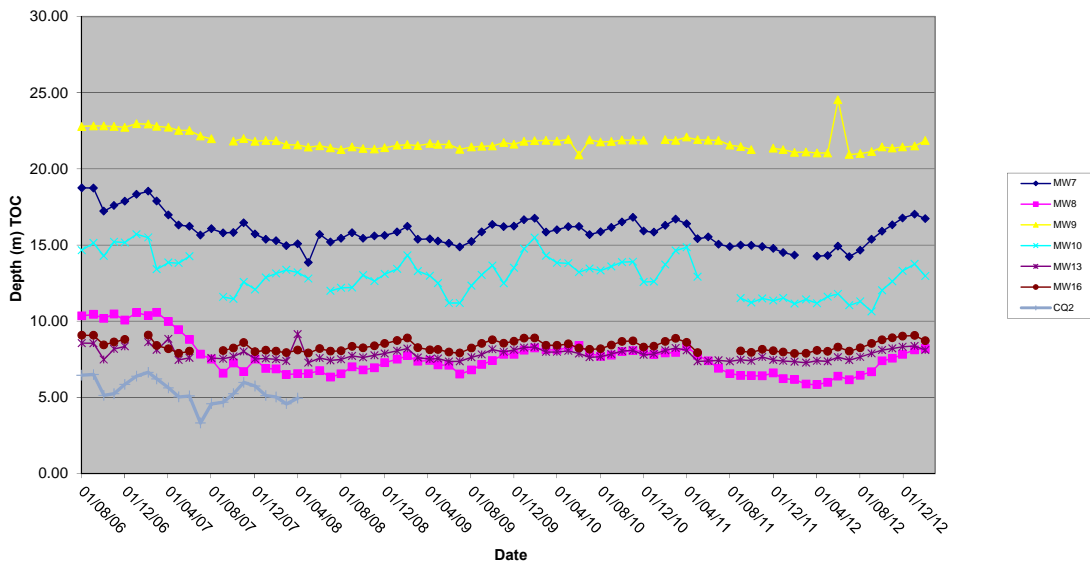
Rocla Calga Groundwaters - Quarry Bores CQ10 to CQ13
Water depth TOC



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



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



2.4 Meteorological Monitoring

The Rocla Calga Quarry weather station data recovery in January was approximately 100%. The weather station data follows and includes;

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

Monthly weather statistics from the nearby Bureau of Meteorology (BOM) Gosford station is included in **Appendix 2** for comparison purposes. Data from the Peats Ridge BOM station for January 2013 was unavailable.

Data for January 2013 shows that rainfall recorded at the Rocla Calga Quarry was significantly lower than the Gosford BOM station recorded rainfall. This is due to the rain gauge on the Rocla Calga station becoming blocked towards the end of the month meaning only a small proportion of the actual rainfall was captured during a high rainfall event between the 27-29 March. The blockage was cleared on the 29 March. Recorded rainfall at Rocla Calga Quarry was lower than the Peats Ridge long term mean rainfall for January. The rainfall comparison is provided below:

Rocla Calga Quarry	29.8 mm**
BOM Peats Ridge*	Not Available
BOM Gosford*	312.0 mm
BOM Peats Ridge Long term mean for January*	117.0 mm

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

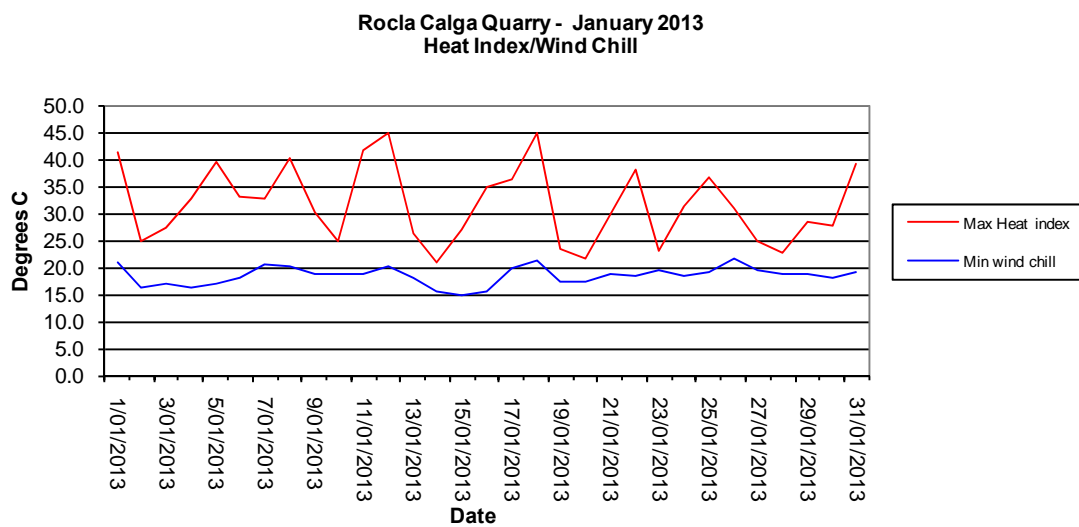
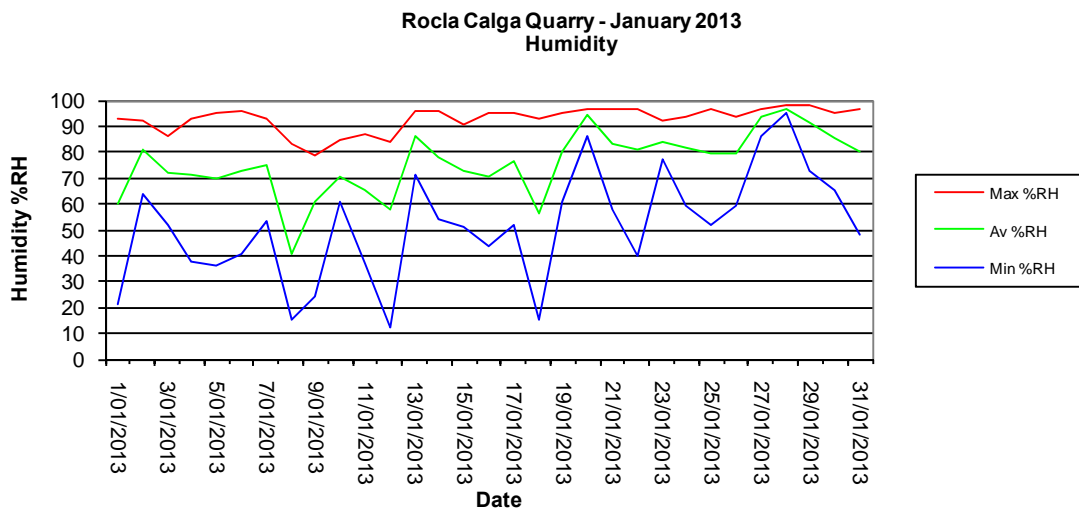
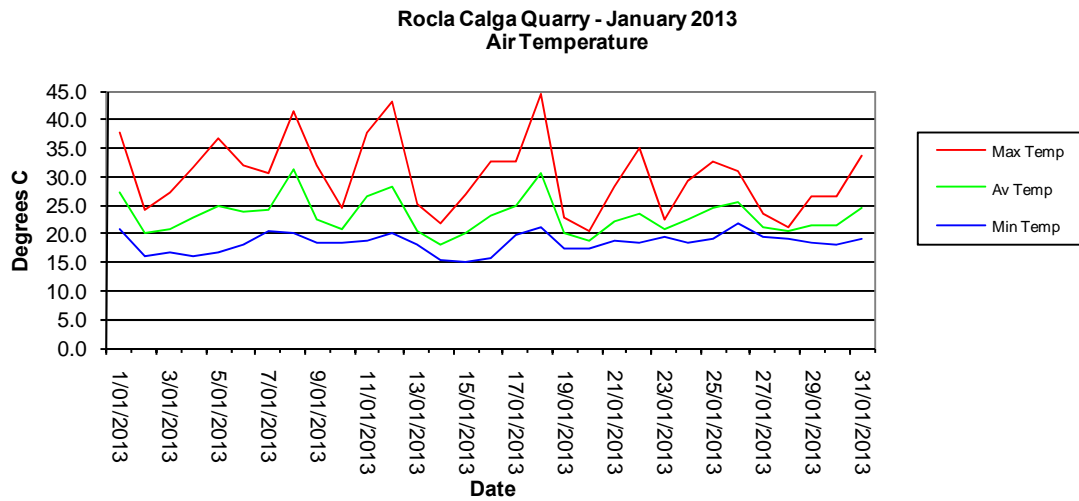
Results are displayed in the following table and figures.

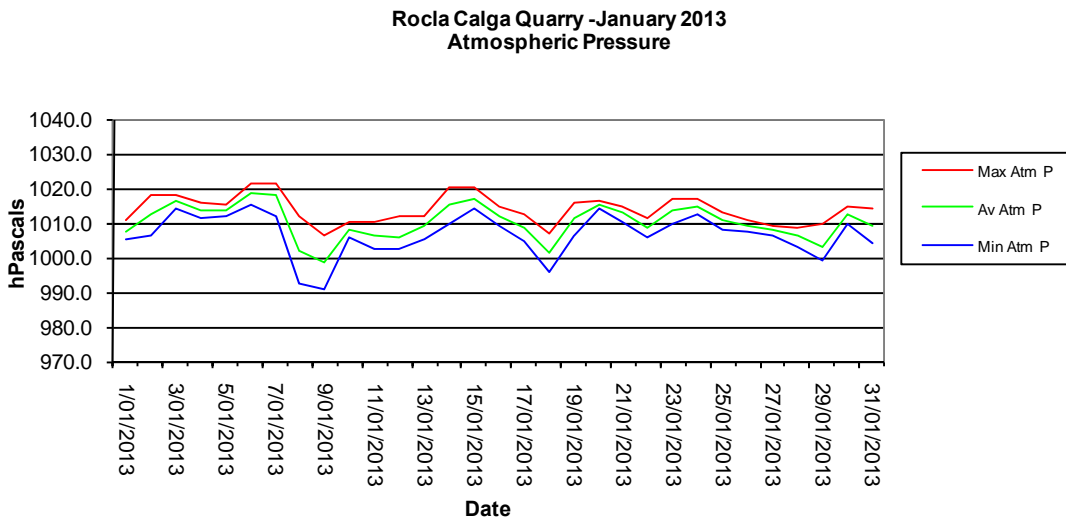
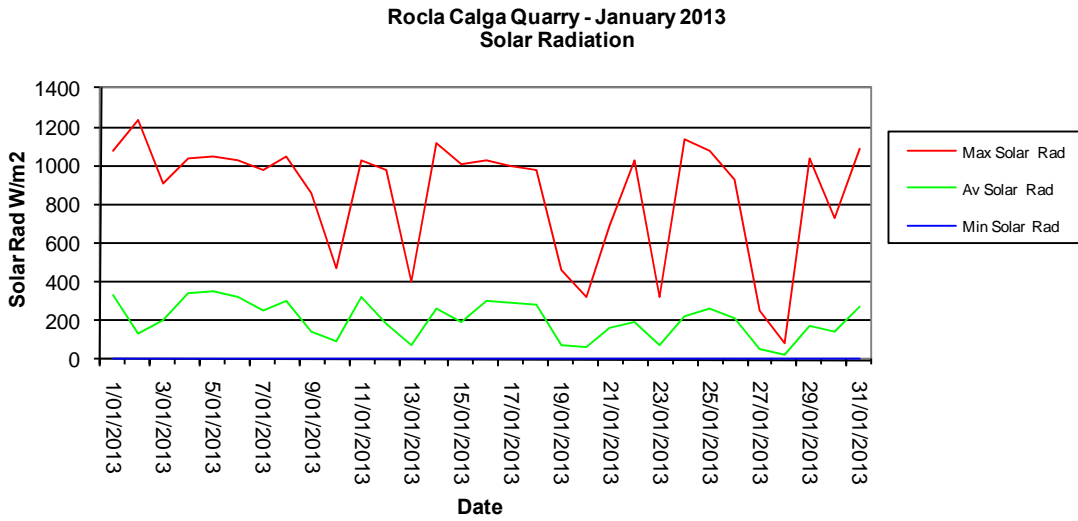
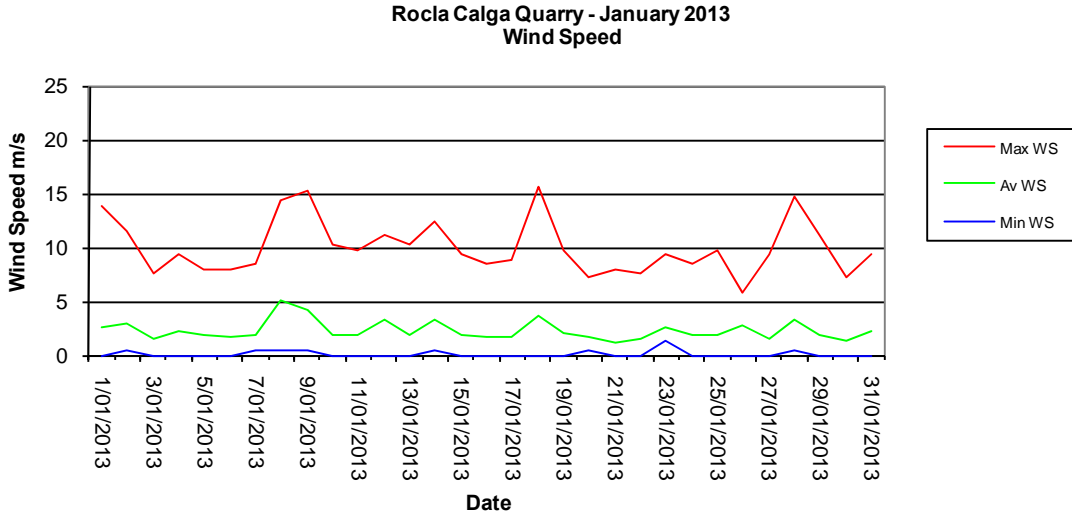
2.4.1 Monthly Meteorological Data Summary

Summary Jan-13 Rocla - Calga

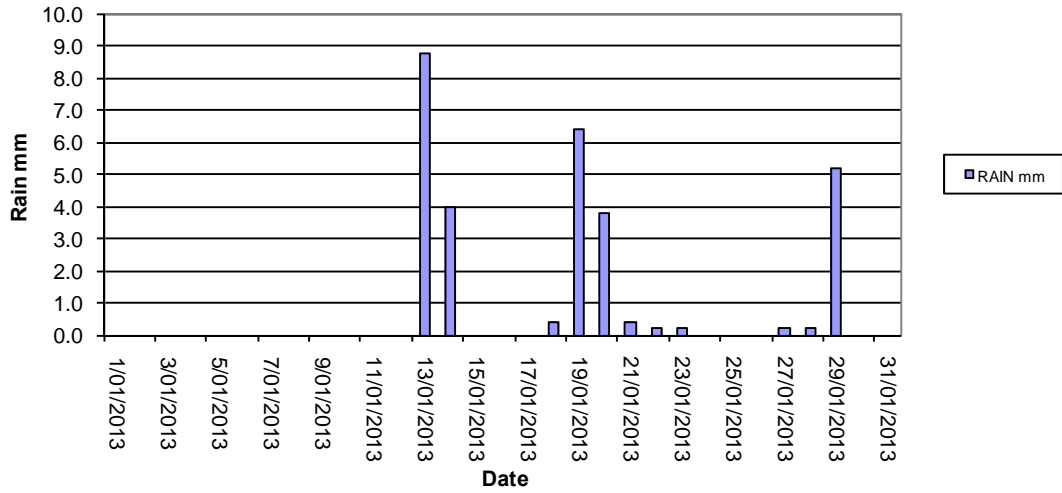
Date	Min Temp	Av Temp	Max Temp	Min %RH	Av %RH	Max %RH	RAIN mm	ET mm	Min WS	Av WS	Max WS	Min wind chill	Max Heat index	Min Atm P	Av Atm P	Max Atm P	Min Solar Rad	Av Solar Rad	Max Solar Rad	Min Data %	Av data %	Max Data %
1/01/2013	20.7	27.3	37.6	21	60	93	0.0	7.4	0	2.5	13.9	20.8	41.4	1005.4	1007.7	1010.7	0	329.7	1079	99.7	100.0	100
2/01/2013	16.2	20.0	24.3	64	81	92	0.0	3.1	0.4	3.0	11.6	16.3	24.7	1006.3	1012.6	1017.9	0	138.4	1236	99.7	100.0	100
3/01/2013	16.9	20.8	27.2	52	72	86	0.0	4.0	0	1.6	7.6	16.9	27.2	1014.4	1016.3	1018.0	0	203.3	904	100	100.0	100
4/01/2013	16.1	22.8	31.6	38	71	93	0.0	6.6	0	2.2	9.4	16.2	32.8	1011.6	1013.7	1016.0	0	346.4	1033	99.7	100.0	100
5/01/2013	16.9	25.0	36.8	36	70	95	0.0	6.9	0	1.9	8	16.9	39.4	1012.0	1013.4	1015.5	0	350.6	1044	93.9	99.9	100
6/01/2013	18.0	23.9	32.0	41	73	96	0.0	6.2	0	1.6	8	18.0	32.9	1015.3	1018.3	1021.4	0	320.9	1028	99.7	100.0	100
7/01/2013	20.4	24.2	30.5	53	75	93	0.0	4.9	0.4	1.9	8.5	20.5	32.8	1012.2	1018.0	1021.4	0	254.7	979	93.6	99.9	100
8/01/2013	20.1	31.2	41.3	15	41	83	0.0	10.2	0.4	5.1	14.3	20.1	40.3	992.7	1001.8	1012.1	0	304.0	1051	99.4	100.0	100
9/01/2013	18.6	22.5	31.9	24	60	79	0.0	5.2	0.4	4.3	15.2	18.6	30.2	990.8	998.5	1006.4	0	142.8	857	99.4	100.0	100
10/01/2013	18.6	20.8	24.5	61	71	85	0.0	2.3	0	1.9	10.3	18.6	24.8	1005.7	1008.2	1010.3	0	95.6	474	98.5	100.0	100
11/01/2013	18.8	26.7	37.6	37	65	87	0.0	6.9	0	1.9	9.8	18.8	41.5	1002.7	1006.5	1010.2	0	322.0	1032	99.4	100.0	100
12/01/2013	20.2	28.2	43.0	12	58	84	0.0	5.8	0	3.4	11.2	20.2	44.8	1002.3	1005.7	1011.7	0	184.0	982	94.2	99.9	100
13/01/2013	18.1	20.6	25.1	71	86	96	8.8	1.6	0	1.9	10.3	18.1	26.1	1005.5	1009.2	1012.1	0	77.5	405	81.3	98.4	100
14/01/2013	15.5	18.1	21.7	54	78	96	4.0	4.6	0.4	3.3	12.5	15.5	20.8	1009.6	1015.1	1020.2	0	263.7	1113	78.7	96.6	100
15/01/2013	15.0	20.1	26.8	51	73	91	0.0	4.0	0	1.8	9.4	15.0	26.8	1013.9	1016.9	1020.1	0	197.5	1012	99.1	100.0	100
16/01/2013	15.7	23.2	32.6	44	71	95	0.0	5.9	0	1.7	8.5	15.7	34.7	1009.4	1012.0	1014.5	0	307.5	1027	93.6	99.9	100
17/01/2013	19.8	24.9	32.6	52	77	95	0.0	5.6	0	1.7	8.9	19.8	36.4	1004.5	1008.5	1012.5	0	290.7	993	94.2	99.9	100
18/01/2013	21.1	30.5	44.5	15	56	93	0.4	8.3	0	3.7	15.6	21.2	44.9	996.0	1001.3	1006.7	0	285.3	980	93.3	99.9	100
19/01/2013	17.3	20.1	23.0	61	80	95	6.4	2.0	0	2.1	9.8	17.3	23.3	1006.6	1011.4	1015.6	0	77.9	460	91.8	99.9	100
20/01/2013	17.4	18.6	20.6	86	95	97	3.8	0.9	0.4	1.6	7.2	17.5	21.5	1013.9	1015.2	1016.5	0	60.2	323	73.4	96.5	100
21/01/2013	18.8	22.3	28.4	58	83	97	0.4	3.0	0	1.2	8	18.8	29.8	1010.4	1013.0	1015.0	0	164.8	694	93.3	99.8	100
22/01/2013	18.4	23.6	34.9	40	81	97	0.2	3.6	0	1.5	7.6	18.5	37.9	1005.8	1008.7	1011.2	0	194.2	1029	92.1	99.9	100
23/01/2013	19.6	20.8	22.4	77	84	92	0.2	1.9	1.3	2.6	9.4	19.6	23.2	1009.9	1013.7	1016.7	0	78.3	318	91.8	99.9	100
24/01/2013	18.4	22.6	29.3	59	82	94	0.0	4.2	0	1.9	8.5	18.4	31.4	1012.3	1014.9	1016.7	0	222.0	1133	93	99.9	100
25/01/2013	19.2	24.7	32.8	52	80	97	0.0	5.0	0	1.8	9.8	19.2	36.5	1008.2	1010.6	1013.2	0	259.7	1074	96.2	99.9	100
26/01/2013	21.7	25.4	31.1	59	79	94	0.0	4.5	0	2.8	5.8	21.7	30.9	1007.5	1009.3	1011.0	0	212.0	925	100	100.0	100
27/01/2013	19.3	21.1	23.5	86	94	97	0.2	0.9	0	1.5	9.4	19.3	24.9	1006.6	1007.8	1009.1	0	50.5	252	100	100.0	100
28/01/2013	19.1	20.4	21.1	95	97	98	0.2	0.4	0.4	3.3	14.8	18.9	22.6	1002.9	1006.6	1008.4	0	21.6	81	97.4	99.9	100
29/01/2013	18.6	21.5	26.7	73	91	98	5.2	2.9	0	1.9	11.2	18.6	28.5	999.1	1003.0	1009.6	0	178.1	1038	85.7	98.8	100
30/01/2013	18.0	21.4	26.6	65	85	95	0.0	2.5	0	1.3	7.2	18.1	27.7	1010.0	1012.7	1014.5	0	148.8	725	86.3	99.1	100
31/01/2013	19.0	24.7	33.6	48	80	97	0.0	5.1	0	2.1	9.4	19.0	39.0	1004.0	1009.3	1014.0	0	275.9	1083	90.9	99.7	100
Monthly	15	23.2	44.5	12	76	98	29.8	136.4	0	2.3	15.6	15.0	44.9	990.8	1010.3	1021.4	0	205.1	1236	73.4	99.6	100

2.4.2 Monthly Weather Charts

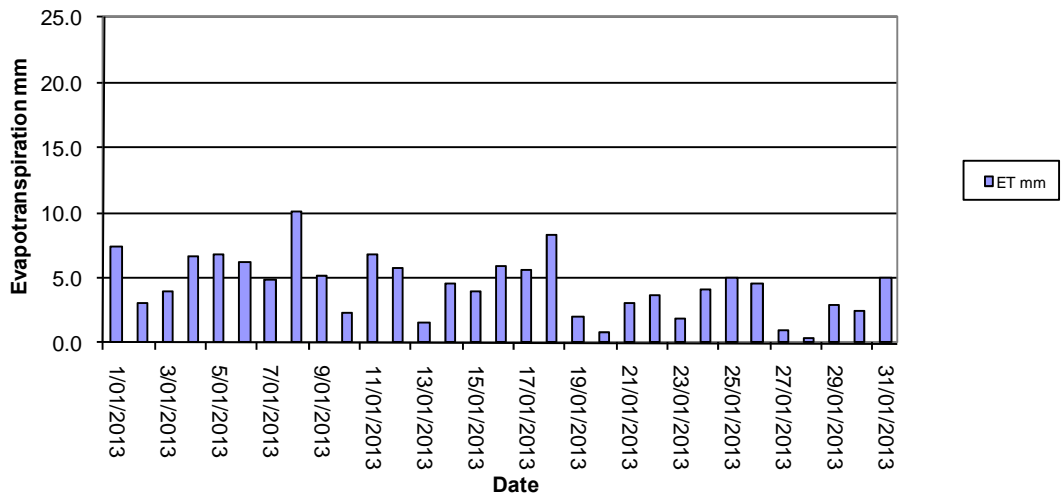




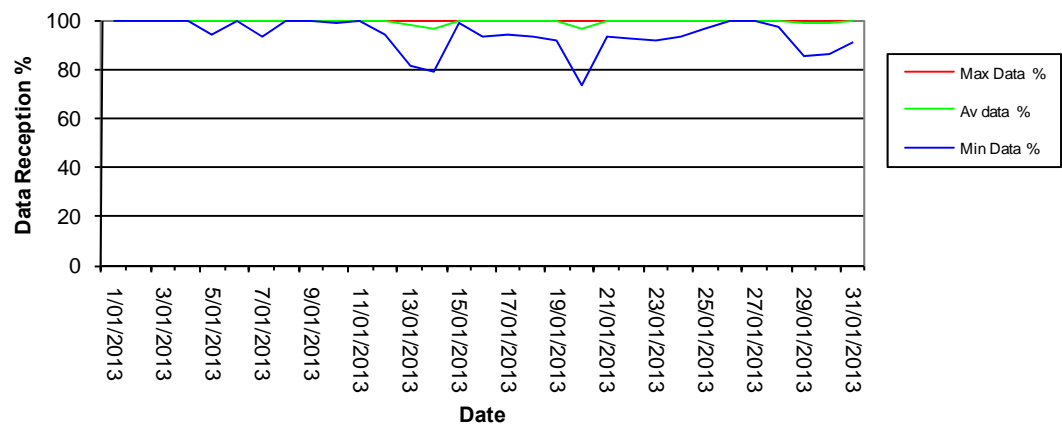
Rocla Calga Quarry - January 2013
Rainfall



Rocla Calga Quarry - January 2013
Evapotranspiration



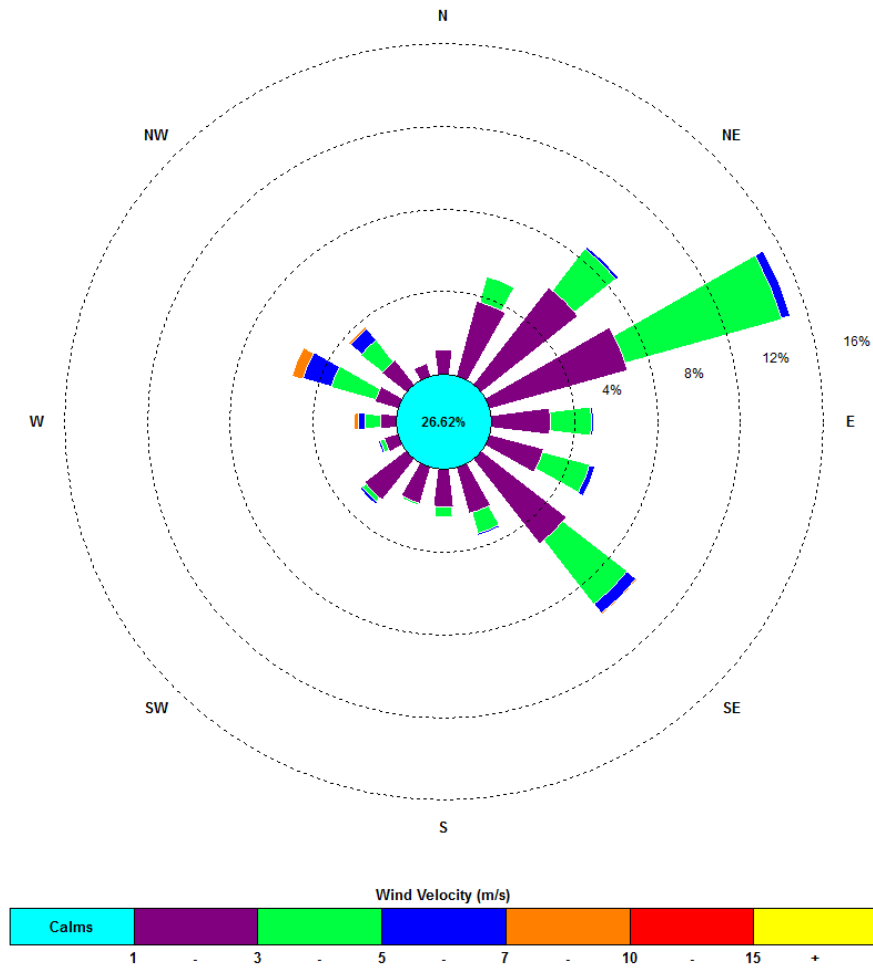
Rocla Calga Quarry - January 2013
Data Reception



2.4.3 Monthly Windrose Plot

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

00:15, 01 January 2012 – 23:45, 31 January 2012



The predominant winds were from the ENE, with strongest winds from the WNW. The maximum wind speed was 15.6 m/s from the SSW.

Appendix 1
Laboratory Certificates

Appendix 2

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

Gosford, New South Wales
January 2013 Daily Weather Observations



Australian Government
Bureau of Meteorology

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	Tu	17.2	30.4	0			SE	22	09:39	25.2			ESE	6		28.5			ENE	9	
2	We	17.8	24.1	0			SSE	35	01:38	22.4			SE	13		21.6			ESE	13	
3	Th	17.8	25.4	0			S	24	12:07	20.8			ESE	7		24.5			ENE	9	
4	Fr	13.8	27.3	0			NE	28	16:29	22.8			NNW	11		26.4			ENE	11	
5	Sa	14.6	31.2	0			NE	26	14:31	23.6			N	7		29.7			ENE	9	
6	Su	16.2	28.8	0			NE	28	15:32	24.8			NNE	9		27.7			ENE	9	
7	Mo	18.6		0			ESE	24	13:42	23.5			SE	7		27.6			SE	7	
8	Tu	15.8	41.5				NNW	43	10:31							40.0	13		NW	17	
9	We	21.3	22.3	0.4			SSE	37	05:22	21.4	88		SE	15		21.0	60		SSE	13	
10	Th	18.0	25.5	0			NE	26	14:38	22.3	70		ESE	4		23.4	62		E	11	
11	Fr	16.9	31.9	0			NNE	26	15:14	24.8	68		NNE	7		31.0	53		ENE	11	
12	Sa	17.9	42.3	0			NNW	35	12:49	30.6	56		SE	4		32.0	46		SE	11	
13	Su	18.6	24.4	0			SSE	35	22:37	22.3	98		SE	7		22.5	98		SE	9	
14	Mo	16.5	21.9	15.4			SSE	44	09:38	18.5	98		SE	13		21.4	49		SE	20	
15	Tu	15.1	25.1	0			E	28	16:54	20.3	70		SSW	4		24.4	48		ENE	13	
16	We	13.4	30.0	0			SE	24	11:17	23.4	80		SE	4		28.7	50		E	11	
17	Th	19.7	30.2	0			N	31	16:41	24.2	98		SSE	6		28.7	57		ENE	11	
18	Fr	18.7	44.8	0			N	43	10:14	29.3	70		SSE	2		43.9	15		NW	11	
19	Sa	21.3	24.2	0.4			SW	33	23:45	21.9	83		SE	7		21.2	79		SE	11	
20	Su	17.8	23.8	7.2			NNW	22	20:57				Calm			21.6	98		SE	7	
21	Mo	18.8	26.7	2.6			NE	22	18:10	23.6	98		NNE	4		25.7	62		E	9	
22	Tu	16.5	32.4	0			SE	26	11:45	25.0	98		ENE	7		28.6	64		ENE	7	
23	We	19.3	23.2	0.6			SSE	33	15:36	21.2	98		SSE	7		22.2	92		SE	11	
24	Th	19.4	27.7	0			SE	26	13:24	21.6	98		Calm			26.4	69		SSE	13	
25	Fr	19.2	31.1	0			NE	31	18:32	24.9	98		N	6		29.5	59		NE	13	
26	Sa	21.2	30.6	0			NE	48	13:42	26.3	90		NE	9		27.5	78		ENE	13	
27	Su	20.3	22.3	31.8			N	19	23:10				Calm						Calm		
28	Mo	20.4	22.6	51.2			NE	43	21:26				Calm						ENE	11	
29	Tu	19.9	28.1	197.2			SE	39	12:17	22.4			N	4		21.1	99		SE	13	
30	We	18.7	25.8	5.2			SE	19	15:06	20.9	99		SE	6		24.5	68		SSE	9	
31	Th	18.1	29.2	0			ENE	35	13:15	24.4	98		NNE	4		27.7	73		NE	11	
Statistics for January 2013																					
Mean		18.0	28.5							23.4	88			6		26.9	63			10	
Lowest		13.4	21.9							18.5	56			Calm		21.0	13			Calm	
Highest		21.3	44.8	197.2			NE	48		30.6	99		SE	15		43.9	99		SE	20	
Total				312.0																	

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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