**CBased Environmental Pty Limited**
ABN 62 611 924 264

**Calga Quarry**

# Environmental Monitoring

# Dust Deposition Gauges, Surface and Ground Waters and Meteorological Station

## July 2016

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Date: 18 August 2016

# Executive Summary

CBased Environmental is contracted by Hanson 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 CBased Environmental and includes the following;

- Dust Deposition results for July 2016;
- Surface Water quality results for July 2016;
- Ground Water quality results for July 2016; and
- Meteorological report for July 2016.

The July 2016 dust deposition results for insoluble solids were generally low and free of major contamination. All sites, on a rolling annual average basis, are currently below the Air Quality Management Plan exceedance 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 on 2 August 2016 at sites at sites A, B, C1, C2, D and F. C1 and C2 were added to the sampling regime in July 2016. 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 and low Total Suspended Solids. Oil and Grease was not detected at any site in July 2016.

Bi-monthly groundwater were collected on 2 August 2016 and bimonthly groundwater is next due for sampling in September 2016. Groundwater depth generally decreased compared to May 2016, indicating water moving towards the surface. pH at all sites is in the acidic to neutral range and generally remained similar or slightly increased when compared to the previous results. EC levels were similar or slightly increased at a majority of groundwater sites when compared to the May 2016 results.

Data for July 2016 shows that rainfall recorded at the Calga Quarry was lower than the Gosford BOM mean rainfall however similar to the Peats Ridge long term rainfall for July.

The rainfall comparison is provided below:

| | |
|---|---|
| Calga Quarry | 54.6mm |
| BOM Peats Ridge* | NA |
| BOM Gosford* | 104.6 mm |
| BOM Peats Ridge Long term mean for July* | 62.7 mm |

*Data sourced from Bureau of Meteorology (BOM) website (www.bom.gov.au).
**Note**: Differences in the daily rainfall readings between BOM and the Calga station may occur due to BOM stations reporting rainfall at 9am and the Calga station recording rainfall at midnight.

# Sampling Program

Hanson Calga Quarry conducts environmental monitoring in accordance to Development Consent, OEH (EPA) licence and Environmental Management Plans. CBased Environmental are contracted to undertake dust deposition gauge, surface and groundwater and meteorological monitoring for the project. CBased 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. 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 bi-monthly for depth and water quality. 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. Metrological parameters are measured according to Australian Standard AS3580.14 "Methods for sampling and analysis of ambient air. Meteorological monitoring for ambient air quality monitoring applications"

The weather stations have the following sensor configuration;

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

CBased 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**.

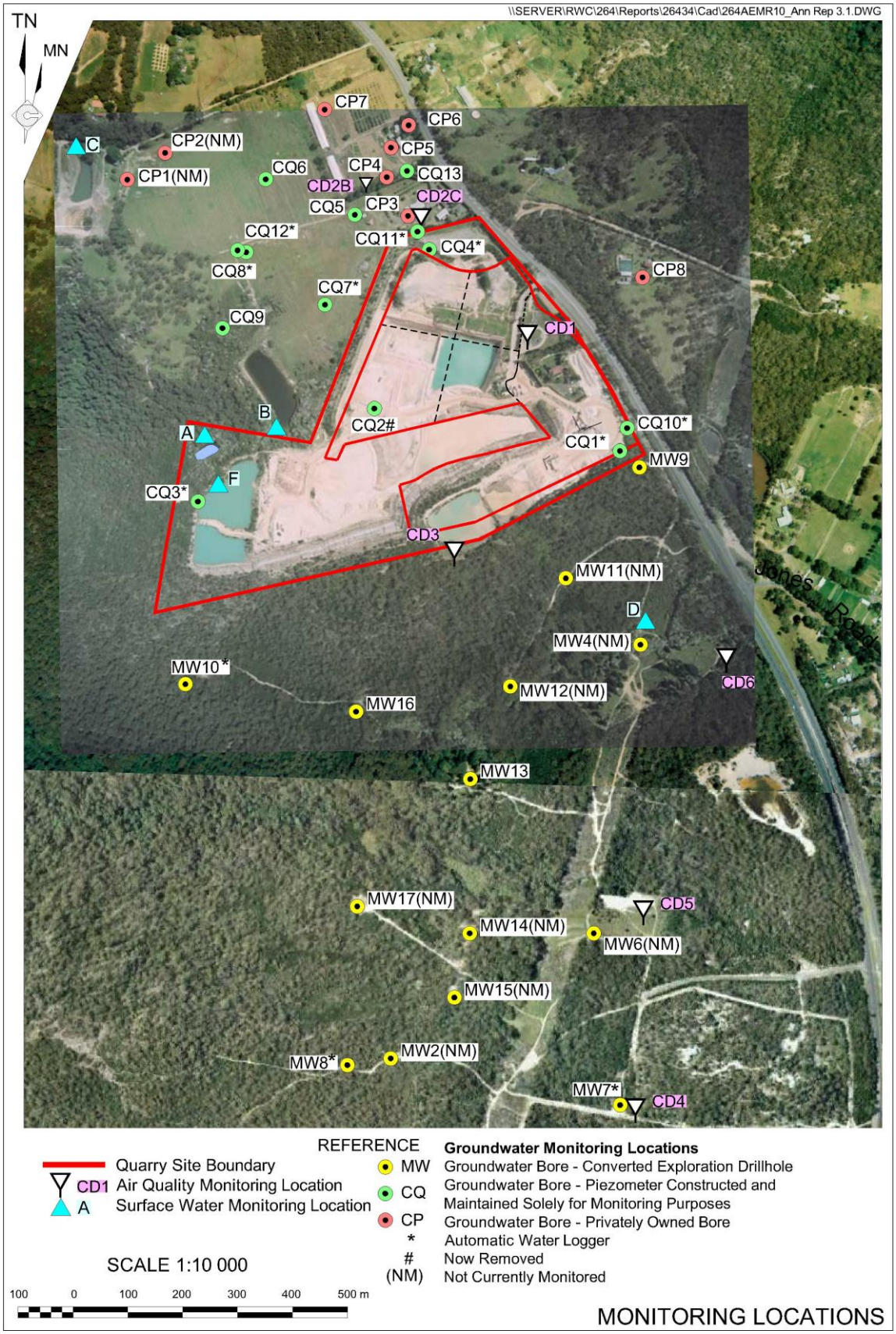



**Figure 1:** Hanson Calga Quarry environmental monitoring locations

# 2.0 Monthly Results

## 2.1 Dust Deposition Gauges

**Table 1** displays the results for July 2016 and the project 12 month rolling average. Results are in g/m$^2$.month.

**Table 1: Dust Deposition results: 1 July 2016 – 2 August 2016 (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** | 1.1 | 0.7 | 0.4 | 64 | 1.0 |
| **CD2c** | 0.7 | 0.3 | 0.4 | 43 | 1.0 |
| **CD3** | 1.4 | 1.1 | 0.3 | 79 | 0.9 |
| **CD4** | 0.5 | 0.2 | 0.3 | 40 | 0.6 |
| **CD5** | 0.4 | 0.1 | 0.3 | 25 | 0.5 |
| **CD6** | 1.2 | 0.6 | 0.6 | 50 | 0.8 |

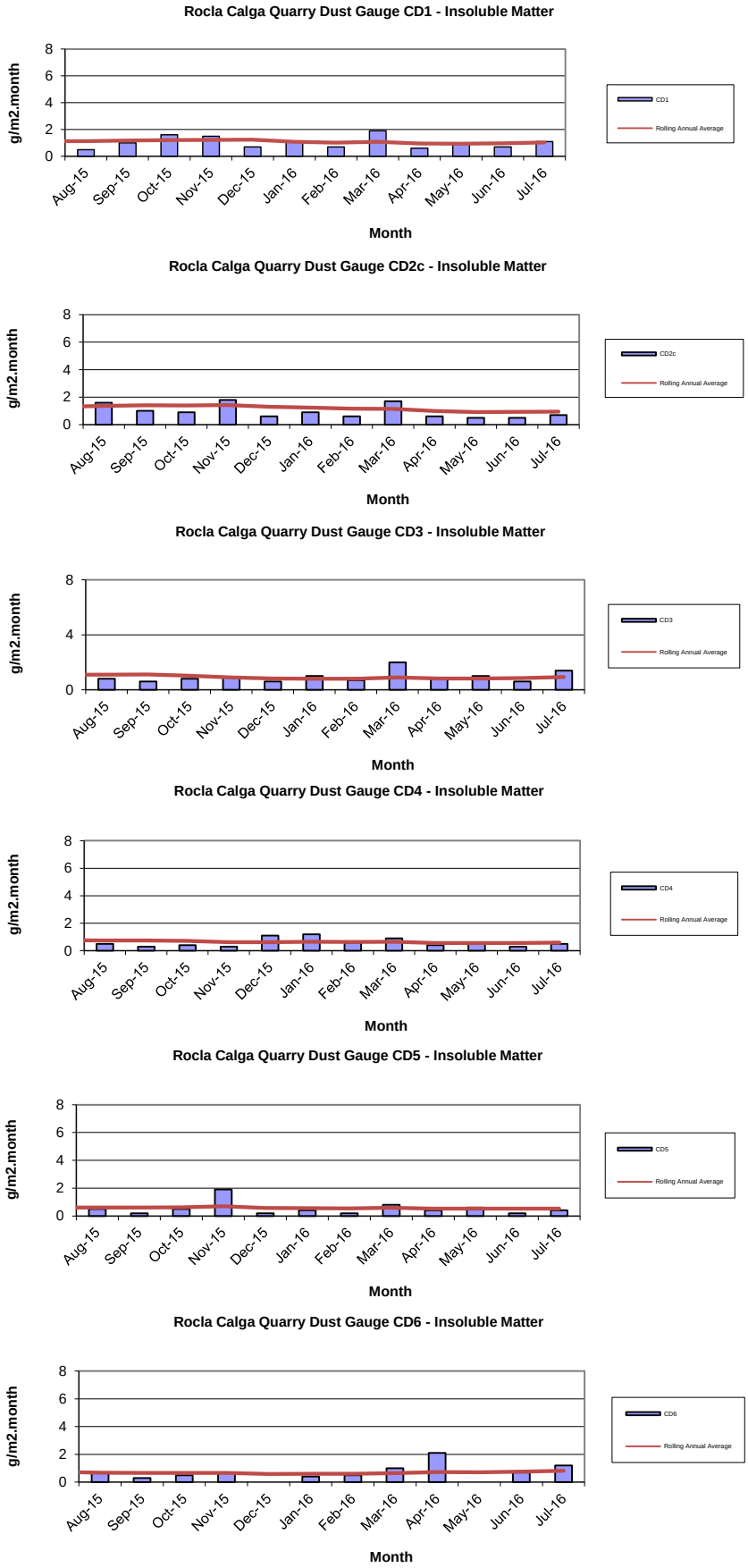
Insoluble Solids marked with an * indicate an excessively contaminated gauge. Contamination can include bird droppings, vegetation (such as plant matter, algae, pollen and seeds) and insects. Results in bold indicate insoluble solids levels above 3.7 g/m$^2$.month; the Development Consent's annual average amenity criteria at residential locations. The current rolling annual average is calculated from July 2015 to June 2016.

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 2 August 2016 and results are listed in **Table 2**. The laboratory analysis sheets are provided in **Appendix 1.**

**Table 2: Monthly surface water monitoring – July 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 | 5.66 | 71 | 60 | 7 | <5 |
| **B** | Trickle | Clear | Clear | 6.44 | 92 | 72 | 9 | <5 |
| **C1** | Dam | Brown | Slight | 6.89 | 95 | 71 | 15 | <5 |
| **C2** | Trickle | Clear | Clear | 6.09 | 102 | 66 | 10 | <5 |
| **D** | Trickle | Clear | Clear | 5.40 | 91 | 72 | <5 | <5 |
| **F** | Dam | Clear | Clear | 6.10 | 72 | 68 | 37 | <5 |

Samples were collected at sites A, B, C1, C2, D and F. C1 and C2 were added to the sampling regime in July 2016. 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 and low Total Suspended Solids. Oil and Grease was not detected at any site in July 2016.

### 2.2.1 Non-Routine Surface Water Sampling

No non routine sampling was undertaken during July 2016.

## 2.3 Groundwater Monitoring

Bi- monthly groundwaters were sampled on 2 August 2016. 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 decreased compared to May 2016, indicating water moving towards the surface. pH at all sites is in the acidic to neutral range and generally remained similar or slightly increased when compared to the previous results. EC levels were similar or slightly increased at a majority of groundwater sites when compared to the May 2016 results.

**Table 3: Groundwater Quality Data**

| Reference | Bore | Type | Depth to water TOC (m) April 06 | Depth to water TOC (m) This report | pH This report | Electrical Conductivity (µS/cm) This report |
|---|---|---|---|---|---|---|
| **CQ1** | Voutos | * Monitor | 20.59 | Removed | | |
| **CQ3** | Voutos | * Monitor | 10.53 | 10.38 | 6.6 | 172 |
| **CQ4** | Voutos | * Monitor | 8.78 | 10.16 | 5.2 | 103 |
| **CQ5** | Gazzana | DIP Only | 8.69 | 6.46 | 4.3 | 134 |
| **CQ6** | Gazzana | DIP Only | 16.00 | Removed | | |
| **CQ7** | Gazzana | * Monitor | 6.89 | 5.91 | 4.7 | 82 |
| **CQ8** | Gazzana | * Monitor | 11.03 | 5.54 | 4.6 | 107 |
| **CQ9** | Gazzana | DIP Only | 10.10 | Unable to sample- pipe bent | | |
| **CQ10** | Voutos | * Monitor | NI | 24.70 | 4.7 | 116 |
| **CQ11S** | Gazzana | * Monitor | NI | 10.28 | 4.8 | 128 |
| **CQ11D** | Gazzana | * Monitor | NI | 11.40 | 4.9 | 137 |
| **CQ12** | Gazzana | * Monitor | NI | 3.92 | 4.3 | 106 |
| **CQ13** | Kashouli | * Monitor | NI | 12.70 | 4.3 | 172 |
| **CP3** | Gazzana | Domestic | 10.40 | Destroyed | | |
| **CP4** | Kashouli | Domestic | 13.63 | 8.07 | NM | |
| **CP5** | Kashouli | Domestic | 16.61 | 6.94 | 4.5 | 135 |
| **CP6** | Kashouli | Domestic | 16.27 | 9.03 | 4.4 | 143 |
| **CP7** | Kashouli | Production | 8.56 | 2.41 | 4.9 | 91 |
| **CP8** | Rozmanec | Domestic | 22.17 | 19.98 | 4.5 | 111 |
| **MW7** | Rocla Bore | * Monitor | 15.76 | 15.14 | 4.4 | 97 |
| **MW8** | Rocla Bore | * Monitor | 9.82 | 7.24 | 5.0 | 65 |
| **MW9** | Rocla Bore | * Monitor | 22.44 | 23.44 | 4.7 | 76 |
| **MW10** | Rocla Bore | * Monitor | 15.41 | No Access- track eroded | | |
| **MW13** | Rocla Bore | DIP Only | NI | No Access- track eroded | | |
| **MW16** | Rocla Bore | DIP Only | NI | No Access- tree across track | | |
| **MW17** | Rocla Bore | DIP Only | | No Access- tree across track | | |

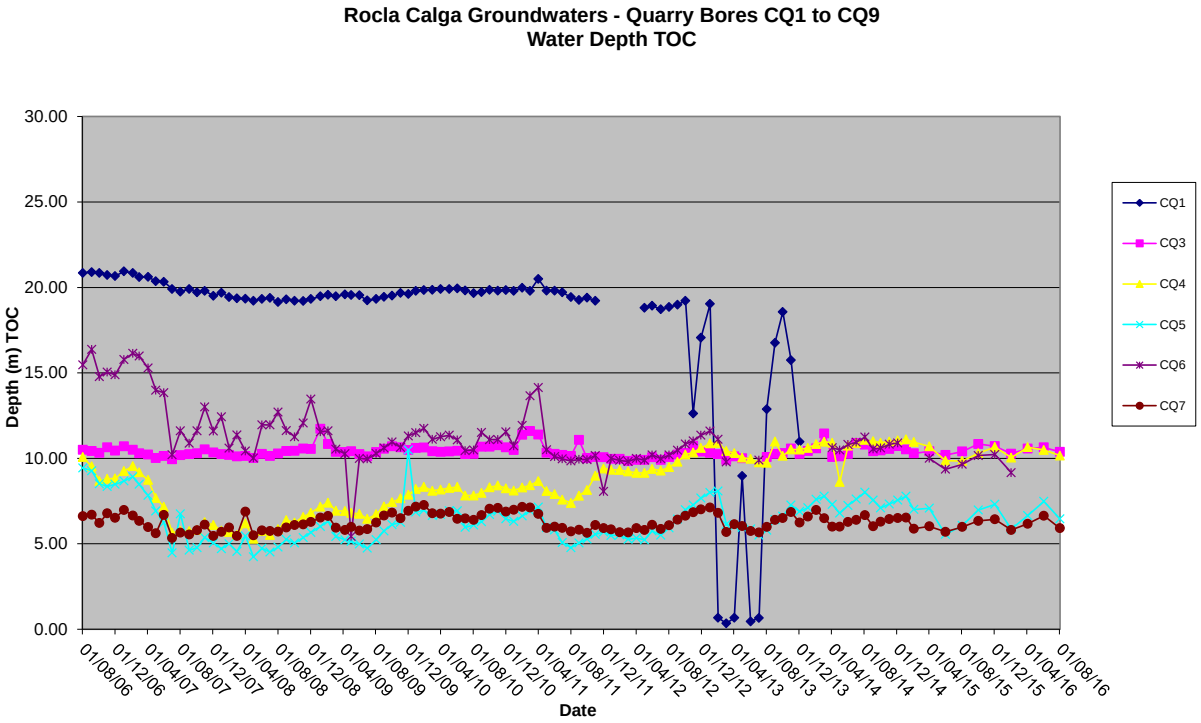
Notes:
TOC = Water level measured from top of bore case to water.
NM = Not Monitored – unable to sample water due to non-operational pump.
NR = Not Required by resident.
* = Logger Installed.
NI = These bores were not installed in April 2006 but are now operational. April 2006 was the first set of measurements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

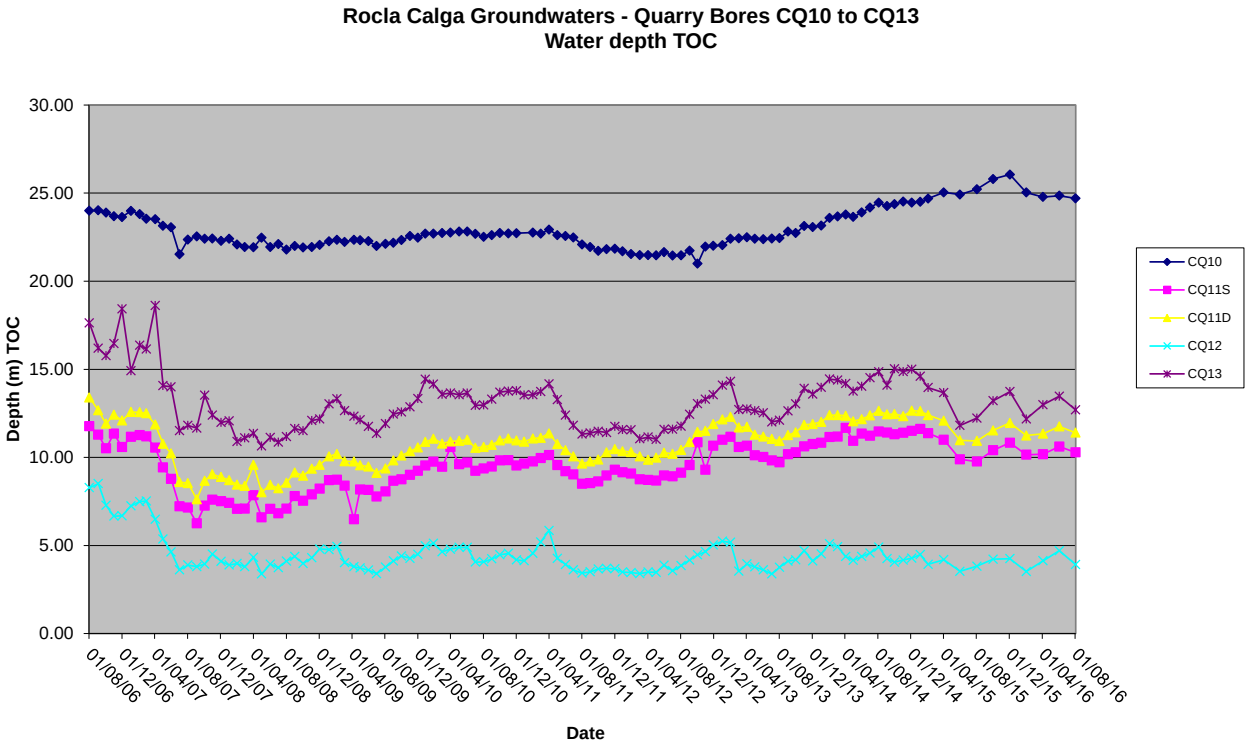
Shading is used to indicate the following trends in water depth (compared to the last reading):

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

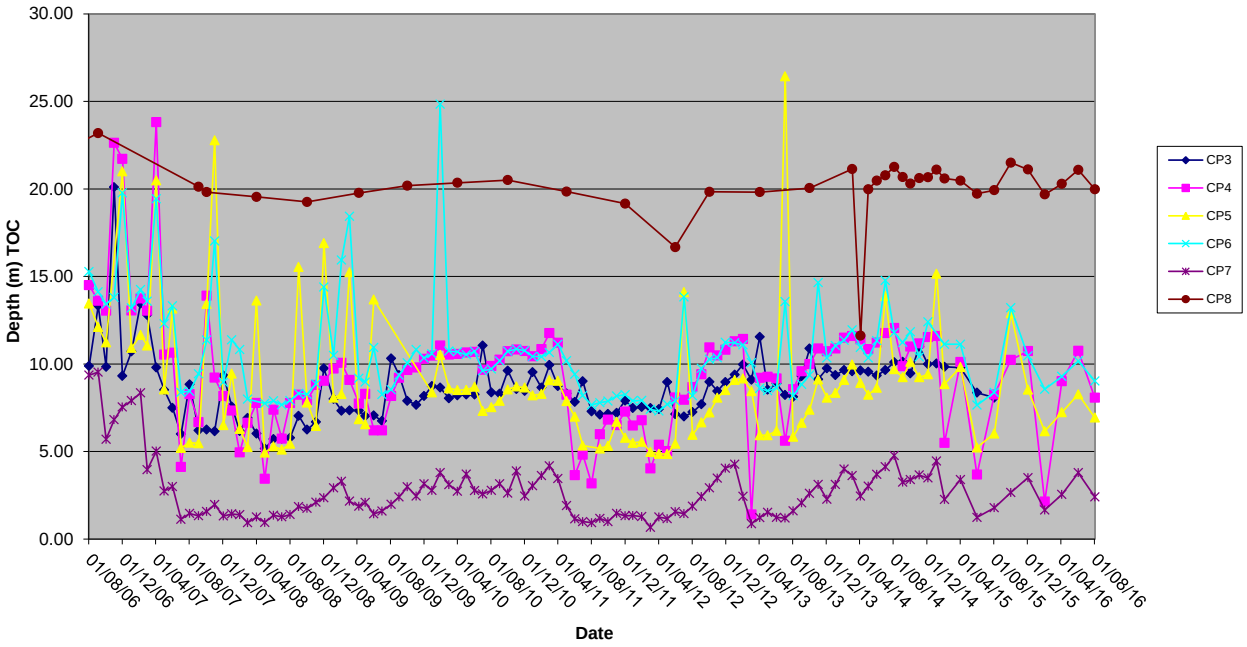
Available groundwater loggers were downloaded and will be forwarded to the Hanson Calga Quarry groundwater consultant.

## Figures 3 to 6: Groundwater Depth Charts.

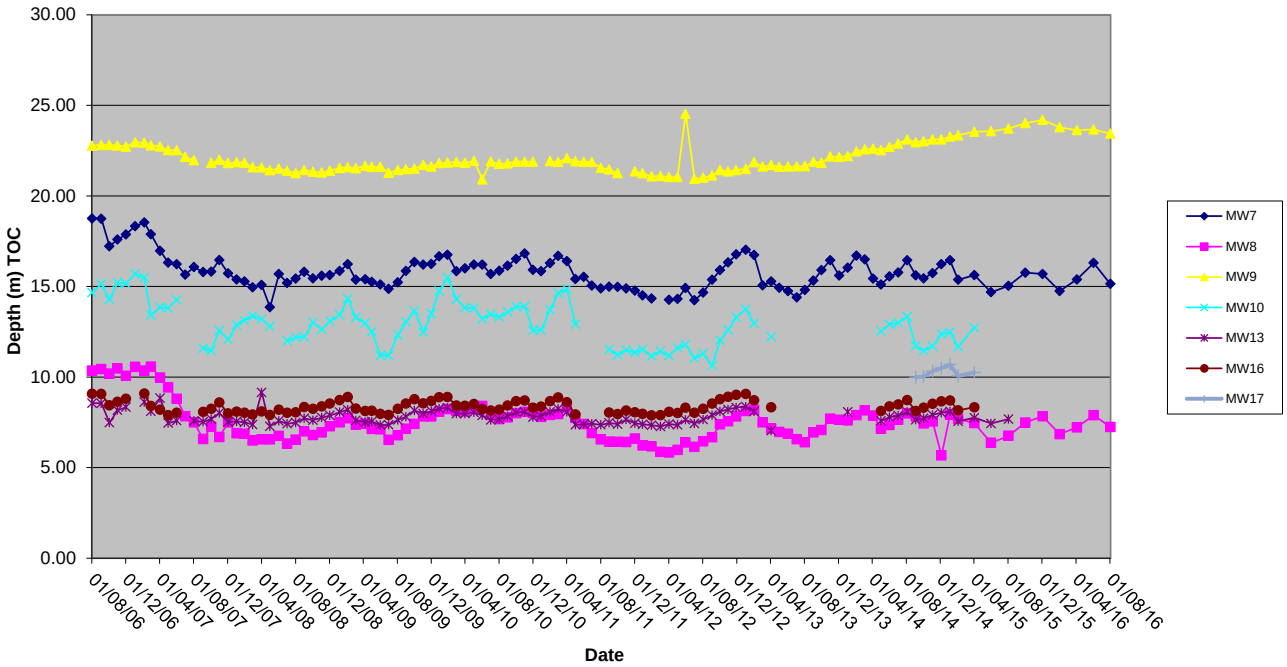


**Rocla Calga Groundwaters - Quarry Bores CP3 to CP8**
**Water Depth TOC**




**Rocla Calga Groundwaters - Quarry Bores MW7 to MW17**
**Water Depth TOC**



## 2.4 Meteorological Monitoring

The Calga Quarry weather station data recovery in July 2016 was approximately 100%.

The weather station data follows and includes;

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

Monthly weather statistics from the nearby Bureau of Meteorology (BOM) at Peats Ridge station are no longer available. However, the long term rainfall mean is available via a link on the Gosford BOM Daily Weather Observation page.

Data for July 2016 shows that rainfall recorded at the Calga Quarry was lower than the Gosford BOM mean rainfall however similar to the Peats Ridge long term rainfall for July.

The rainfall comparison is provided below:

| | |
|---|---|
| Calga Quarry | 54.6mm |
| BOM Peats Ridge* | NA |
| BOM Gosford* | 104.6 mm |
| BOM Peats Ridge Long term mean for July* | 62.7 mm |

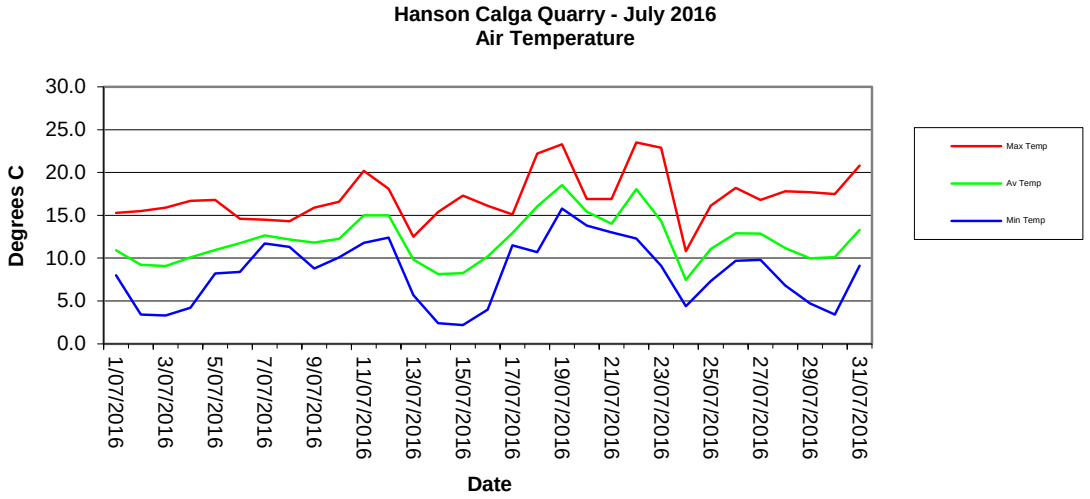
NA = Not Available
*Data sourced from Bureau of Meteorology (BOM) website (www.bom.gov.au).

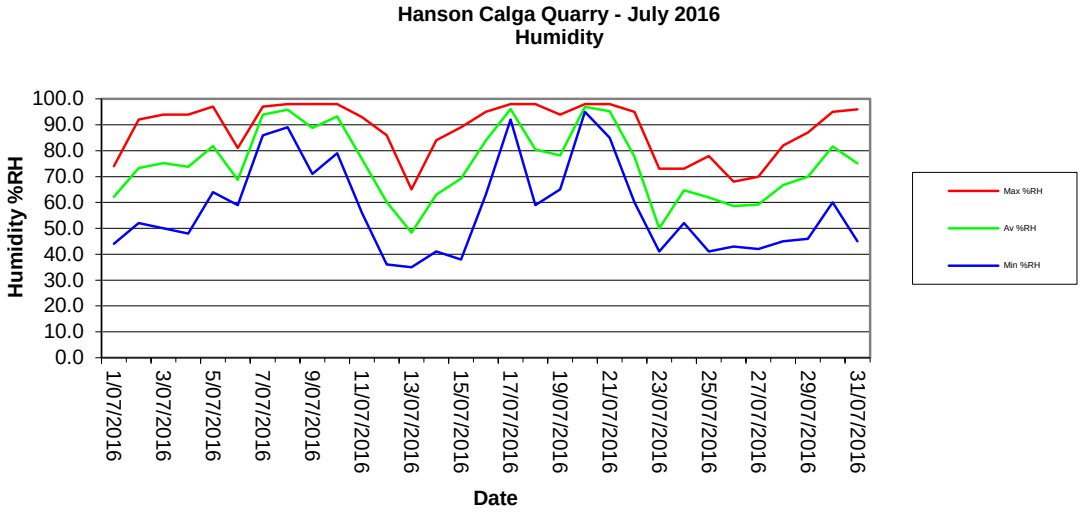
## 2.4.1 Monthly Meteorological Data Summary

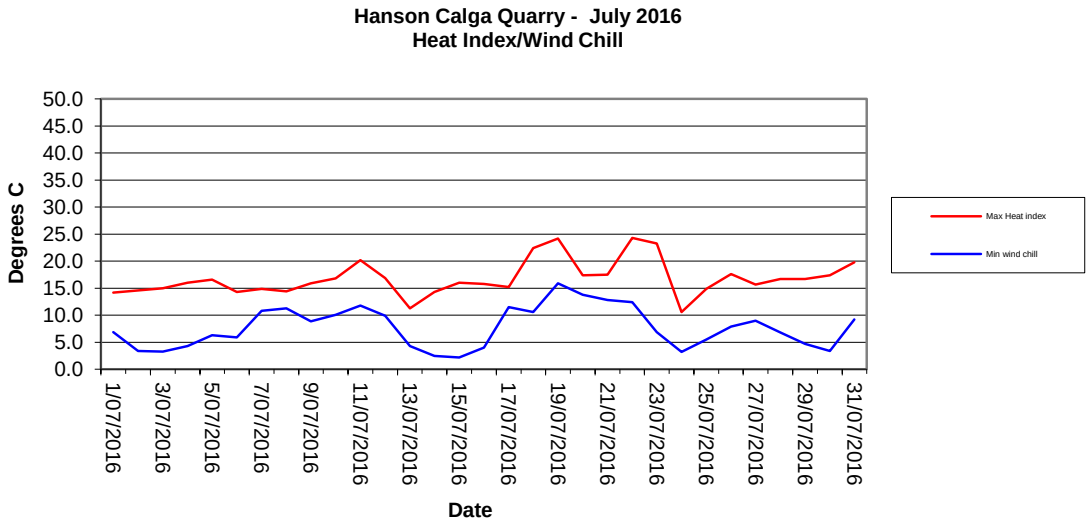
**Summary** **Jul-16** **Hanson - Calga**

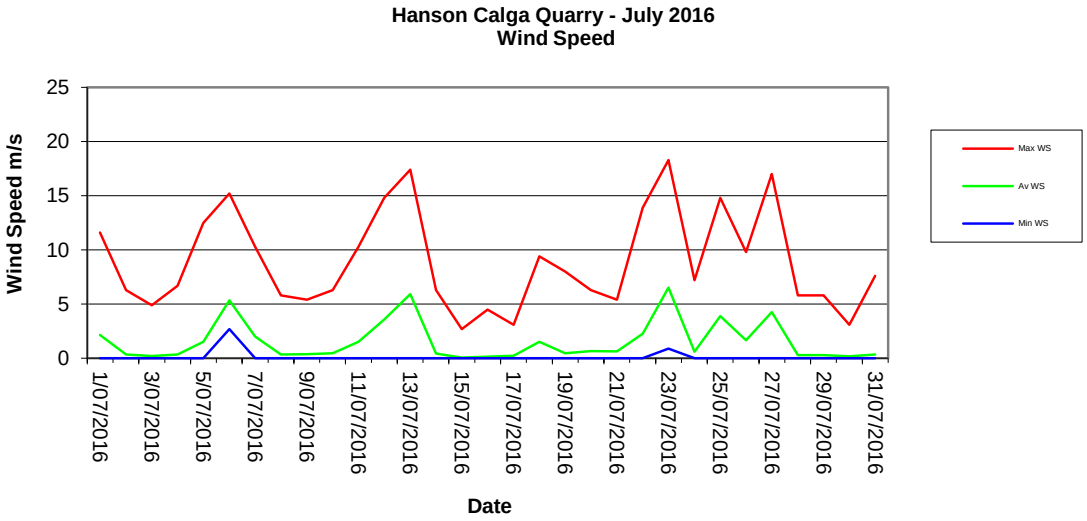
| Date | Min Temp | Av Temp | Max Temp | Min %RH | Av %RH | Max %RH | RAIN mm | Min WS | Av WS | Max WS | Min wind chill | Max Heat index | Min Atm P | Av Atm P | Max Atm P | Min Data % | Av data % | Max Data % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/07/2016 | 8.0 | 10.9 | 15.3 | 44.0 | 62.2 | 74.0 | 0.0 | 0.0 | 2.2 | 11.6 | 6.9 | 14.2 | 1014.9 | 1018.3 | 1024.0 | 75.7 | 93.4 | 98.0 |
| 2/07/2016 | 3.4 | 9.2 | 15.5 | 52.0 | 73.3 | 92.0 | 0.0 | 0.0 | 0.4 | 6.3 | 3.4 | 14.6 | 1024.0 | 1026.0 | 1028.2 | 71.6 | 95.9 | 98.0 |
| 3/07/2016 | 3.3 | 9.1 | 15.9 | 50.0 | 75.1 | 94.0 | 0.0 | 0.0 | 0.2 | 4.9 | 3.3 | 15.0 | 1023.6 | 1026.0 | 1028.7 | 90.9 | 97.5 | 98.0 |
| 4/07/2016 | 4.2 | 10.1 | 16.7 | 48.0 | 73.8 | 94.0 | 0.0 | 0.0 | 0.4 | 6.7 | 4.3 | 16.0 | 1016.5 | 1020.1 | 1024.0 | 62.9 | 95.5 | 98.0 |
| 5/07/2016 | 8.2 | 10.9 | 16.8 | 64.0 | 81.7 | 97.0 | 6.6 | 0.0 | 1.5 | 12.5 | 6.3 | 16.6 | 1007.2 | 1011.2 | 1016.3 | 61.1 | 93.7 | 98.0 |
| 6/07/2016 | 8.4 | 11.8 | 14.6 | 59.0 | 68.7 | 81.0 | 0.2 | 2.7 | 5.4 | 15.2 | 5.9 | 14.3 | 1004.1 | 1006.9 | 1009.8 | 67.0 | 92.7 | 98.0 |
| 7/07/2016 | 11.7 | 12.6 | 14.5 | 86.0 | 93.9 | 97.0 | 8.6 | 0.0 | 2.0 | 10.3 | 10.8 | 14.9 | 1010.0 | 1016.4 | 1021.1 | 68.4 | 90.4 | 98.0 |
| 8/07/2016 | 11.3 | 12.2 | 14.3 | 89.0 | 95.8 | 98.0 | 9.2 | 0.0 | 0.4 | 5.8 | 11.3 | 14.4 | 1019.0 | 1020.5 | 1022.4 | 42.7 | 87.7 | 98.0 |
| 9/07/2016 | 8.8 | 11.8 | 15.9 | 71.0 | 88.8 | 98.0 | 0.2 | 0.0 | 0.4 | 5.4 | 8.9 | 15.9 | 1022.0 | 1023.9 | 1025.8 | 88.0 | 96.9 | 98.0 |
| 10/07/2016 | 10.1 | 12.2 | 16.6 | 79.0 | 93.2 | 98.0 | 0.4 | 0.0 | 0.5 | 6.3 | 10.1 | 16.8 | 1020.1 | 1023.9 | 1026.8 | 90.4 | 97.0 | 98.0 |
| 11/07/2016 | 11.8 | 15.0 | 20.2 | 56.0 | 76.8 | 93.0 | 0.0 | 0.0 | 1.5 | 10.3 | 11.8 | 20.2 | 1011.6 | 1014.7 | 1020.0 | 80.4 | 96.0 | 98.0 |
| 12/07/2016 | 12.4 | 15.0 | 18.1 | 36.0 | 60.1 | 86.0 | 0.0 | 0.0 | 3.6 | 14.8 | 9.9 | 16.9 | 1009.1 | 1011.0 | 1014.1 | 79.4 | 97.2 | 100.0 |
| 13/07/2016 | 5.7 | 9.8 | 12.5 | 35.0 | 48.4 | 65.0 | 0.0 | 0.0 | 5.9 | 17.4 | 4.3 | 11.3 | 1014.2 | 1021.0 | 1028.8 | 77.5 | 94.1 | 100.0 |
| 14/07/2016 | 2.4 | 8.1 | 15.4 | 41.0 | 63.0 | 84.0 | 0.0 | 0.0 | 0.4 | 6.3 | 2.5 | 14.3 | 1027.1 | 1029.3 | 1031.5 | 38.0 | 95.2 | 98.0 |
| 15/07/2016 | 2.2 | 8.2 | 17.3 | 38.0 | 69.2 | 89.0 | 0.0 | 0.0 | 0.1 | 2.7 | 2.2 | 16.0 | 1028.8 | 1030.9 | 1033.3 | 83.3 | 95.4 | 98.0 |
| 16/07/2016 | 4.0 | 10.2 | 16.1 | 63.0 | 83.9 | 95.0 | 0.0 | 0.0 | 0.2 | 4.5 | 4.0 | 15.8 | 1031.5 | 1032.8 | 1035.0 | 87.7 | 96.1 | 98.0 |
| 17/07/2016 | 11.5 | 13.0 | 15.1 | 92.0 | 96.0 | 98.0 | 1.8 | 0.0 | 0.2 | 3.1 | 11.5 | 15.2 | 1027.7 | 1030.3 | 1032.5 | 88.3 | 96.7 | 98.0 |
| 18/07/2016 | 10.7 | 16.0 | 22.2 | 59.0 | 80.5 | 98.0 | 0.2 | 0.0 | 1.5 | 9.4 | 10.6 | 22.4 | 1021.3 | 1024.0 | 1027.5 | 44.2 | 86.2 | 98.0 |
| 19/07/2016 | 15.8 | 18.5 | 23.3 | 65.0 | 78.2 | 94.0 | 2.6 | 0.0 | 0.5 | 8.0 | 15.9 | 24.2 | 1020.1 | 1021.4 | 1023.1 | 38.5 | 87.5 | 100.0 |
| 20/07/2016 | 13.8 | 15.4 | 16.9 | 95.0 | 96.9 | 98.0 | 23.8 | 0.0 | 0.7 | 6.3 | 13.8 | 17.4 | 1019.1 | 1020.3 | 1021.8 | 53.5 | 91.8 | 100.0 |
| 21/07/2016 | 13.0 | 14.0 | 16.9 | 85.0 | 95.3 | 98.0 | 0.8 | 0.0 | 0.6 | 5.4 | 12.8 | 17.5 | 1016.4 | 1018.9 | 1021.4 | 43.6 | 92.9 | 100.0 |
| 22/07/2016 | 12.3 | 18.1 | 23.5 | 60.0 | 77.8 | 95.0 | 0.2 | 0.0 | 2.3 | 13.9 | 12.4 | 24.3 | 997.6 | 1007.3 | 1016.1 | 65.2 | 92.4 | 98.0 |
| 23/07/2016 | 9.1 | 14.3 | 22.9 | 41.0 | 50.0 | 73.0 | 0.0 | 0.9 | 6.5 | 18.3 | 6.9 | 23.3 | 997.4 | 1006.0 | 1015.3 | 78.4 | 93.2 | 98.0 |
| 24/07/2016 | 4.4 | 7.4 | 10.8 | 52.0 | 64.7 | 73.0 | 0.0 | 0.0 | 0.6 | 7.2 | 3.2 | 10.6 | 1013.9 | 1016.0 | 1018.3 | 96.2 | 97.4 | 98.0 |
| 25/07/2016 | 7.3 | 11.1 | 16.1 | 41.0 | 61.9 | 78.0 | 0.0 | 0.0 | 3.9 | 14.8 | 5.5 | 14.9 | 1012.8 | 1014.2 | 1015.6 | 82.7 | 96.2 | 98.0 |
| 26/07/2016 | 9.7 | 12.9 | 18.2 | 43.0 | 58.6 | 68.0 | 0.0 | 0.0 | 1.7 | 9.8 | 7.9 | 17.6 | 1014.0 | 1015.2 | 1016.6 | 77.8 | 94.6 | 98.0 |
| 27/07/2016 | 9.8 | 12.9 | 16.8 | 42.0 | 59.3 | 70.0 | 0.0 | 0.0 | 4.3 | 17.0 | 9.0 | 15.7 | 1013.6 | 1016.1 | 1021.8 | 42.7 | 86.0 | 98.0 |
| 28/07/2016 | 6.8 | 11.2 | 17.8 | 45.0 | 66.7 | 82.0 | 0.0 | 0.0 | 0.3 | 5.8 | 6.8 | 16.7 | 1021.7 | 1023.5 | 1025.8 | 78.7 | 93.6 | 98.0 |
| 29/07/2016 | 4.7 | 10.0 | 17.7 | 46.0 | 69.9 | 87.0 | 0.0 | 0.0 | 0.3 | 5.8 | 4.7 | 16.7 | 1019.1 | 1022.3 | 1024.4 | 78.1 | 93.1 | 98.0 |
| 30/07/2016 | 3.4 | 10.1 | 17.5 | 60.0 | 81.7 | 95.0 | 0.0 | 0.0 | 0.2 | 3.1 | 3.4 | 17.4 | 1020.8 | 1022.5 | 1024.8 | 80.4 | 95.2 | 98.0 |
| 31/07/2016 | 9.1 | 13.3 | 20.8 | 45.0 | 75.1 | 96.0 | 0.0 | 0.0 | 0.3 | 7.6 | 9.2 | 19.8 | 1016.1 | 1018.3 | 1020.6 | 96.5 | 97.7 | 98.0 |
| | | | | | | | | | | | | | | | | | | |
| Monthly | 2.2 | 12.1 | 23.5 | 35 | 75 | 98 | 54.6 | 0 | 1.6 | 18.3 | 2.2 | 24.3 | 997.4 | 1019.7 | 1035 | 38 | 93.8 | 100 |

## 2.4.2 Monthly Weather Charts




Hanson Calga Quarry - July 2016
Wind Speed
Wind Speed m/s
25
20
15
10
5
0
1/07/2016
3/07/2016
5/07/2016
7/07/2016
9/07/2016
11/07/2016
13/07/2016
15/07/2016
17/07/2016
19/07/2016
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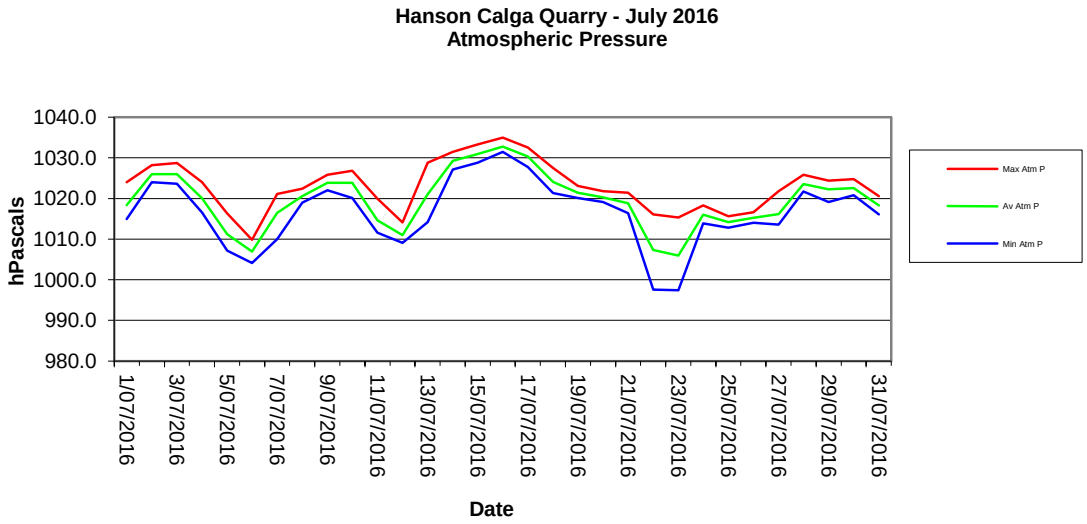
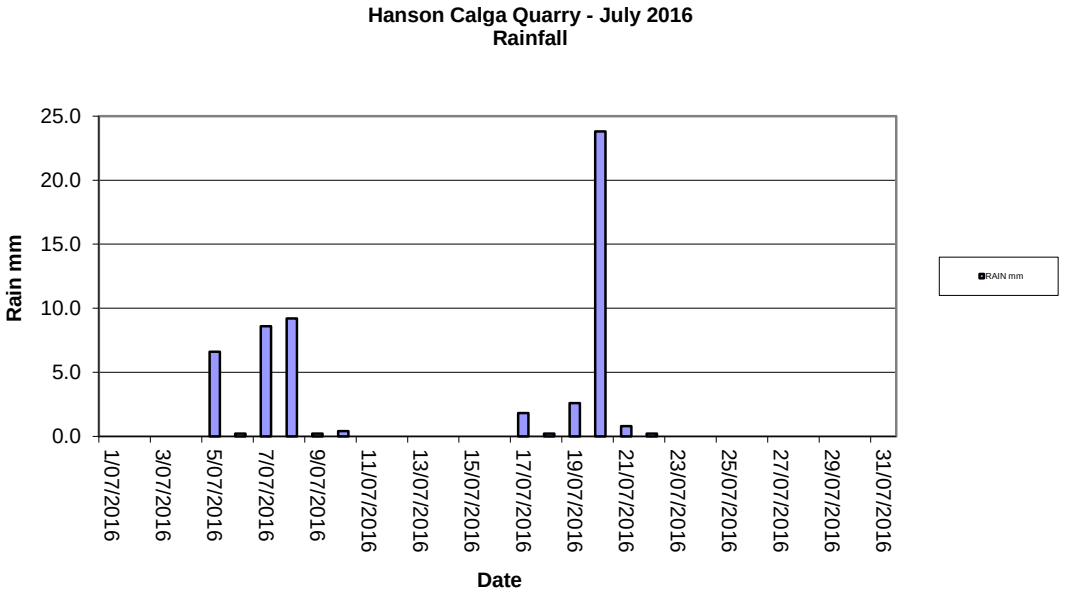
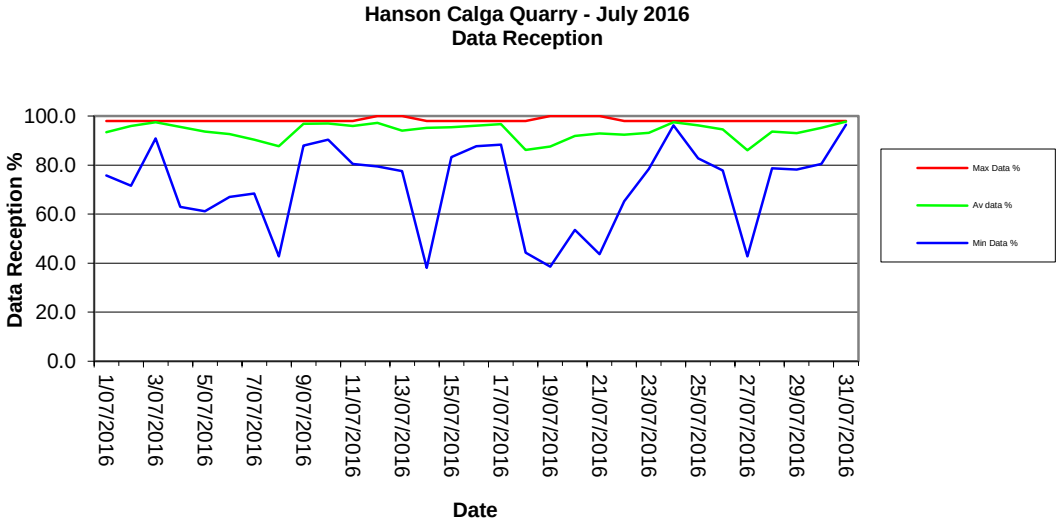
29/07/2016
31/07/2016
Date
Max WS
Av WS
Min WS


Hanson Calga Quarry - July 2016
Atmospheric Pressure
hPascals
1040.0
1030.0
1020.0
1010.0
1000.0
990.0
980.0
1/07/2016
3/07/2016
5/07/2016
7/07/2016
9/07/2016
11/07/2016
13/07/2016
15/07/2016
17/07/2016
19/07/2016
21/07/2016
23/07/2016
25/07/2016
27/07/2016
29/07/2016
31/07/2016
Date
Max Atm P
Av Atm P
Min Atm P

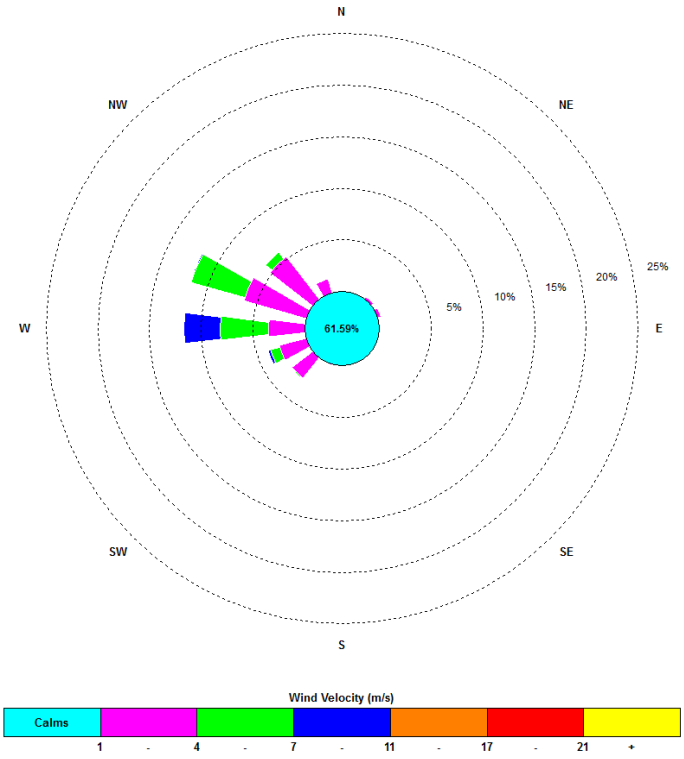

Hanson Calga Quarry - July 2016
Rainfall
Rain mm
25.0
20.0
15.0
10.0
5.0
0.0
1/07/2016
3/07/2016
5/07/2016
7/07/2016
9/07/2016
11/07/2016
13/07/2016
15/07/2016
17/07/2016
19/07/2016
21/07/2016
23/07/2016
25/07/2016
27/07/2016
29/07/2016
31/07/2016
Date
RAIN mm


Hanson Calga Quarry - July 2016
Data Reception
Data Reception %
100.0
80.0
60.0
40.0
20.0
0.0
1/07/2016
3/07/2016
5/07/2016
7/07/2016
9/07/2016
11/07/2016
13/07/2016
15/07/2016
17/07/2016
19/07/2016
21/07/2016
23/07/2016
25/07/2016
27/07/2016
29/07/2016
31/07/2016
Date
Max Data %
Av data %
Min Data %

### 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 at less than a 15 minute average of 1m/s.

00:15, 1 July 2016 – 23:45, 31 July 2016




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

# Appendix 1

Field Sheets

Chain of Custody

Laboratory Certificates

# DEPOSITIONAL DUST MONITORING

Client: ..... **Rocla Calga Quarry** .....  Date Installed: 1-7-16  Collection Start Time: 800  Sampled By: W YOUNG. A SMITH

Date Collected: 2-8-16  Collection Stop Time: 1330  Sampling ID: .....

| Site | Time Collected | Water Level (mL) | Insoluble Material (✔ = slight, ✔ ✔ = mod etc) | | | | Water Turbidity | Water Colour | Stand Level (Y/N) | Funnel Level (Y/N) | New Funnel Diameter (mm) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Insects | Bird droppings | Vegetation | Dust | | | | | | |
| CD1 | 1220 | 1600 | ✔ | | | ✔ | C S T | C O Bn Gn Gy | Y | Y | | |
| CD2C | 10:50 | 1700 | ✔ | | | ✔ | C S T | C O Bn Gn Gy | Y | Y | | LID REPLACED |
| CD3 | 9.10 | 1600 | ✔ | | ✔ | ✔ | C S T | C O Bn Gn Gy | Y | Y | | |
| CD4 | 10:15 | 1400 | ✔ | | ✔✔ | ✔ | C S T | C O Bn Gn Gy | Y | Y | | |
| CD5 | 950 | 1700 | ✔ | | | ✔ | C S T | C O Bn Gn Gy | Y | Y | | |
| CD6 | 940 | 1800 | ✔ | | | ✔ | C S T | C O Bn Gn Gy | Y | Y | | |
| | | | | | | | C S T | C O Bn Gn Gy | | | | |
| | | | | | | | C S T | C O Bn Gn Gy | | | | |
| | | | | | | | C S T | C O Bn Gn Gy | | | | |
| | | | | | | | C S T | C O Bn Gn Gy | | | | |
| | | | | | | | C S T | C O Bn Gn Gy | | | | |
| | | | | | | | C S T | C O Bn Gn Gy | | | | |
| | | | | | | | C S T | C O Bn Gn Gy | | | | |
| | | | | | | | C S T | C O Bn Gn Gy | | | | |
| | | | | | | | C S T | C O Bn Gn Gy | | | | |
| | | | | | | | C S T | C O Bn Gn Gy | | | | |
| | | | | | | | C S T | C O Bn Gn Gy | | | | |
| | | | | | | | C S T | C O Bn Gn Gy | | | | |
| | | | | | | | C S T | C O Bn Gn Gy | | | | |
| | | | | | | | C S T | C O Bn Gn Gy | | | | |
| | | | | | | | C S T | C O Bn Gn Gy | | | | |
| | | | | | | | C S T | C O Bn Gn Gy | | | | |

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

Colour: C=Clear, O=Orange, Bn=Brown, Gn=Green, Gy = Grey (CIRCLE)

**Report broken funnels and replacement diameters**

Signed: _____

# CHAIN OF CUSTODY DOCUMENTATION

Australian Laboratory Services Pty Ltd

CLIENT: Carbon Based Environmental Pty Ltd
POSTAL ADDRESS: 47 Boomerang St CESSNOCK NSW 2325
SEND REPORT TO: Colin Davies, Renae Mikka SEND INVOICE TO: Carbon Based Environmental
DATA NEEDED BY: 7 working days REPORT NEEDED BY: 7 working days
PROJECT ID: Rocla Calga Dusts QUOTE NO.: SY/269/10
P.O. NO.: COMMENTS/SPECIAL HANDLING/STORAGE OR DIPOSAL:
FOR LAB USE ONLY ~~also email cbased1@bigpond.com~~
COOLER SEAL
Yes ..... No .....
Broken ..... Intact .....
COOLER TEMP: deg.C Total unless specified

LABORATORY BATCH NO.:
SAMPLERS:Carbon Based Environmental Pty Ltd
PHONE: 0439604443 FAX: 0249904442 E-MAIL: cbased@bigpond.com, cbased1@bigpond.com
REPORT FORMAT: HARD: Yes FAX: DISK: BULLETIN BOARD: E-MAIL: Yes
QC LEVEL: QCS1: QCS2: QCS3: Yes QCS4:

| SAMPLE DATA | | | | CONTAINER DATA | | ANALYSIS REQUIRED | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE ID | MATRIX | DATE ON | DATE OFF | TYPE & PRESERVATIVE | NO. | Insoluable Soldi | Ash Residue | Combustable Matt | | NOTES |
| CD1 | Dust | 1.7.16 | 2.8.16 | | | x | x | x | | |
| CD2c | Dust | | | | | x | x | x | | |
| CD3 | Dust | | | | | x | x | x | | |
| CD4 | Dust | | | | | x | x | x | | |
| CD5 | Dust | | | | | x | x | x | | |
| CD6 | Dust | | | | | x | x | x | | |

RELINQUISHED BY:
NAME : Colin Davies DATE: 2-8-16
OF: Carbon Based Environmental TIME: 1500
NAME : DATE:
OF: TIME:

RECEIVED BY
NAME : DATE: 2/8/16
OF: ACL TIME: 15:00
NAME : DATE:
OF: TIME:

METHOD OF SHIPMENT
CONSIGNMENT NOTE NO.
TRANSPORT CO. NAME.

*Container Type and Preservative Codes: P = Neutral Plastic; N = Nitric Acid Preserved; C = Sodium Hydroxide Preserved; J = Solvent Washed Acid Rinced Jar; S = Solvent Washed Acid Rinced Glass Bottle; VC = Hydrochloric Acid Preserved Vial; VS = Sulfuric Acid Preserved Vial; BS = Sulfuric Acid Preserved Glass Bottle; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; O = Other.

**AUSTRALIAN LABORATORY SERVICES P/L**

Environmental Division
Sydney
Work Order Reference
ES1616843

Telephone : + 61-2-8784 8555

ALS Environmental

# CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| **Work Order** | : **EN1602751** | Page | : 1 of 4 |
| Client | : **CBASED ENVIRONMENTAL PTY LTD** | Laboratory | : Environmental Division Newcastle |
| Contact | : MR COLIN DAVIES (cbased) | Contact | : |
| Address | : 47 BOOMERANG ST<br>CESSNOCK NSW, AUSTRALIA 2325 | Address | : 5/585 Maitland Road Mayfield West NSW Australia 2304 |
| Telephone | : +61 49904443 | Telephone | : +61 2 4014 2500 |
| Project | : Rocla Calga Dusts | Date Samples Received | : 02-Aug-2016 15:00 |
| Order number | : ---- | Date Analysis Commenced | : 03-Aug-2016 |
| C-O-C number | : ---- | Issue Date | : 09-Aug-2016 16:30 |
| Sampler | : ---- | | |
| Site | : | | |
| Quote number | : ---- | | |
| No. of samples received | : 6 | | |
| No. of samples analysed | : 6 | | |

NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

**Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.**

## *Signatories*

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| *Signatories* | *Position* | *Accreditation Category* |
|---|---|---|
| Jennifer Targett | Laboratory Technician | Newcastle - Inorganics, Mayfield West, NSW |

## General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

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
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- 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: **DEPOSITIONAL DUST** (Matrix: **AIR**) | | | Client sample ID | **CD1 01/07/16 - 02/08/16** | **CD2c 01/07/16 - 02/08/16** | **CD3 01/07/16 - 02/08/16** | **CD4 01/07/16 - 02/08/16** | **CD5 01/07/16 - 02/08/16** |
|---|---|---|---|---|---|---|---|---|
| | | | Client sampling date / time | [02-Aug-2016] | [02-Aug-2016] | [02-Aug-2016] | [02-Aug-2016] | [02-Aug-2016] |
| *Compound* | *CAS Number* | *LOR* | *Unit* | **EN1602751-001** | **EN1602751-002** | **EN1602751-003** | **EN1602751-004** | **EN1602751-005** |
| | | | | Result | Result | Result | Result | Result |
| **EA120: Ash Content** | | | | | | | | |
| **Ash Content** | ---- | 0.1 | g/m².month | **0.7** | **0.3** | **1.1** | **0.2** | **0.1** |
| **Ash Content (mg)** | ---- | 1 | mg | **14** | **6** | **20** | **3** | **1** |
| **EA125: Combustible Matter** | | | | | | | | |
| **Combustible Matter** | ---- | 0.1 | g/m².month | **0.4** | **0.4** | **0.3** | **0.3** | **0.3** |
| **Combustible Matter (mg)** | ---- | 1 | mg | **7** | **8** | **6** | **6** | **7** |
| **EA141: Total Insoluble Matter** | | | | | | | | |
| **Total Insoluble Matter** | ---- | 0.1 | g/m².month | **1.1** | **0.7** | **1.4** | **0.5** | **0.4** |
| **Total Insoluble Matter (mg)** | ---- | 1 | mg | **21** | **14** | **26** | **9** | **8** |

## Analytical Results

| Sub-Matrix: **DEPOSITIONAL DUST** (Matrix: **AIR**) | | | | Client sample ID | **CD6 01/07/16 - 02/08/16** | ---- | ---- | ---- | ---- |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Client sampling date / time | [02-Aug-2016] | ---- | ---- | ---- | ---- |
| *Compound* | *CAS Number* | *LOR* | *Unit* | | **EN1602751-006** | -------- | -------- | -------- | -------- |
| | | | | | Result | --- | --- | --- | --- |
| **EA120: Ash Content** | | | | | | | | | |
| **Ash Content** | ---- | 0.1 | g/m².month | | **0.6** | ---- | ---- | ---- | ---- |
| **Ash Content (mg)** | ---- | 1 | mg | | **11** | ---- | ---- | ---- | ---- |
| **EA125: Combustible Matter** | | | | | | | | | |
| **Combustible Matter** | ---- | 0.1 | g/m².month | | **0.6** | ---- | ---- | ---- | ---- |
| **Combustible Matter (mg)** | ---- | 1 | mg | | **12** | ---- | ---- | ---- | ---- |
| **EA141: Total Insoluble Matter** | | | | | | | | | |
| **Total Insoluble Matter** | ---- | 0.1 | g/m².month | | **1.2** | ---- | ---- | ---- | ---- |
| **Total Insoluble Matter (mg)** | ---- | 1 | mg | | **23** | ---- | ---- | ---- | ---- |

Carbon Based Environmental Pty Limited

Date: 2.8.16

| Todays Collection | |
|---|---|
| Time Start: | 8.00 |
| Time Finish: | 1330 |

**Client :** Rocla Calga

**Project :**

# SURFACE WATERS

| Site | Flow Rate | Odour | Sampling Time | Bottles | Water Turbidity | Water Colour | Comments |
|---|---|---|---|---|---|---|---|
| A | DAM | N | 8:40 | 1x 250ml GP, 1x 500mL GP, 1x PG | C S T | C LO O B G | |
| B | TRICKLE | N | 8:20 | 1x 250ml GP, 1x 500mL GP, 1x PG | C S T | C LO O B G | |
| C1 | DAM | N | 1300 | 1x 250ml GP, 1x 500mL GP, 1x PG | C S T | C LO O B G | 33°24'577S 151°12.572E |
| D | STILL | N | 935 | 1x 250ml GP, 1x 500mL GP, 1x PG | C S T | C LO O B G | |
| F | DAM | N | 8:30 | 1x 250ml GP, 1x 500mL GP, 1x PG | C S T | C LO O B G | |
| C2 | TRICKLE | N | 1310 | " | C S T | C LO O B G | |
| | | | | | C S T | C LO O B G | |
| | | | | | C S T | C LO O B G | |
| | | | | | C S T | C LO O B G | |
| | | | | | C S T | C LO O B G | |

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

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

Signed:

Sampled by: A SMITH
W YOUNG

| | PH | EC | T. |
|---|---|---|---|
| C1 - | 6.58 | 67.9 us | 14° |
| C2 - | 6-12 | 73.5 us | 13.6° |

-33.24.597S 151.12-568E

# CHAIN OF CUSTODY DOCUMENTATION

**Australian Laboratory Services Pty Ltd**

CLIENT: Carbon Based Environmental Pty Ltd

POSTAL ADDRESS: 47 Boomerang St CESSNOCK NSW 2325

SEND REPORT TO: Colin Davies, Renae Mikka SEND INVOICE TO: Carbon Based Environmental

DATA NEEDED BY: 7 working days REPORT NEEDED BY: 7 working days

PROJECT ID: Rocla Quarry QUOTE NO.: SYBQ-222-15

P.O. NO.: COMMENTS/SPECIAL HANDLING/STORAGE OR DIPOSAL:

FOR LAB USE ONLY
COOLER SEAL
Yes ..... No .....
Broken ..... 15 - 3 Intact ...
COOLER TEMP: deg.C

~~also email results to cbased1@bigpond.com~~

Total unless specified

LABORATORY BATCH NO.:

SAMPLERS:Carbon Based Environmental Pty Ltd

PHONE: 0439604443 FAX: 0249904442 E-MAIL: cbased@bigpond.com, cbased1@bigpond.com

REPORT FORMAT: HARD: Yes FAX: DISK: BULLETIN BOARD: E-MAIL: Yes

QC LEVEL: QCS1: QCS2: QCS3: Yes QCS4:

ANALYSIS REQUIRED

| SAMPLE DATA | | | | CONTAINER DATA | | Ph | EC | TSS | TDS | O + G | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLE ID | MATRIX | DATE | TIME | TYPE & PRESERVATIVE | NO. | | | | | | |
| A | Water | 2.8.16 | 840 | 1x 250mlGP,1x 500mLGP,1xPG | | x | x | x | x | x | |
| B | Water | | 820 | 1x 250mlGP,1x 500mLGP,1xPG | | x | x | x | x | x | |
| C1 | Water | | 1300 | 1x 250mlGP,1x 500mLGP,1xPG | | x | x | x | x | x | |
| D | Water | | 9.35 | 1x 250mlGP,1x 500mLGP,1xPG | | x | x | x | x | x | |
| F | Water | | 830 | 1x 250mlGP,1x 500mLGP,1xPG | | x | x | x | x | x | |
| C2 | 11 | | 1310 | 11 | | x | x | x | x | x | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | TOTAL BOTTLES: | | | | | | | |

| RELINQUISHED BY: | | RECEIVED BY | | METHOD OF SHIPMENT |
|---|---|---|---|---|
| NAME : Colin Davies | DATE: 2.8.16 | NAME : | DATE: 2/8/16 | CONSIGNMENT NOTE NO. |
| OF: Carbon Based Environmental | TIME: 1500 | OF: ALS | TIME: 15:00 | |
| NAME : | DATE: | NAME : | DATE: | TRANSPORT CO. NAME. |
| OF: | TIME: | OF: | TIME: | |

*Container Type and Preservative Codes: P = Neutral Plastic; N = Nitric Acid Preserved; C = Sodium Hydroxide Preserved; J = Solvent Washed Acid Rinced Jar; S = Solvent Washed Acid Rinced Glass Bottle; VC = Hydrochloric Acid Preserved Vial; VS = Sulfuric Acid Preserved Vial; BS = Sulfuric Acid Preserved Glass Bottle; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; O = Other.

**AUSTRALIAN LABORATORY SERVICES P/L**

Environmental Division
Newcastle
Work Order Reference
EN1602751

Telephone : +6" 2 4014 2500

ALS Environmental

# CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| **Work Order** | : **ES1616843** | Page | : 1 of 4 |
| Client | : **CBASED ENVIRONMENTAL PTY LTD** | Laboratory | : Environmental Division Sydney |
| Contact | : MS RENAE MIKKA | Contact | : |
| Address | : 47 BOOMERANG ST<br>CESSNOCK NSW, AUSTRALIA 2325 | Address | : 277-289 Woodpark Road Smithfield NSW Australia 2164 |
| Telephone | : +61 49904443 | Telephone | : +61-2-8784 8555 |
| Project | : ROCLA QUARRY | Date Samples Received | : 02-Aug-2016 15:00 |
| Order number | : ---- | Date Analysis Commenced | : 02-Aug-2016 |
| C-O-C number | : ---- | Issue Date | : 08-Aug-2016 13:54 |
| Sampler | : ---- | | |
| Site | : | | |
| Quote number | : ---- | | |
| No. of samples received | : 6 | | |
| No. of samples analysed | : 6 | | |

NATA Accredited Laboratory 825
Accredited for compliance with
ISO/IEC 17025.

NATA
WORLD RECOGNISED ACCREDITATION

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

**Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.**

## *Signatories*

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| *Signatories* | *Position* | *Accreditation Category* |
|---|---|---|
| Ashesh Patel | Inorganic Chemist | Sydney Inorganics, Smithfield, NSW |
| Neil Martin | Team Leader - Chemistry | Chemistry, Newcastle West, NSW |

## General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

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
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Samples #1-2 and 4-5 not received in a suitable time frame t conduct the analysis EA005 within recommended holding time.
- TDS by method EA-015 may bias high for various samples due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.

## Analytical Results

| Sub-Matrix: **WATER** (Matrix: **WATER**) | | | Client sample ID | A | B | C1 | D | F |
|---|---|---|---|---|---|---|---|---|
| | | | Client sampling date / time | 02-Aug-2016 08:40 | 02-Aug-2016 08:20 | 02-Aug-2016 13:00 | 02-Aug-2016 09:35 | 02-Aug-2016 08:30 |
| Compound | CAS Number | LOR | Unit | ES1616843-001 | ES1616843-002 | ES1616843-003 | ES1616843-004 | ES1616843-005 |
| | | | | Result | Result | Result | Result | Result |
| **EA005: pH** | | | | | | | | |
| **pH Value** | ---- | 0.01 | pH Unit | **5.66** | **6.44** | **6.89** | **5.40** | **6.10** |
| **EA010P: Conductivity by PC Titrator** | | | | | | | | |
| **Electrical Conductivity @ 25°C** | ---- | 1 | µS/cm | **71** | **92** | **95** | **91** | **72** |
| **EA015: Total Dissolved Solids dried at 180 ± 5 °C** | | | | | | | | |
| **Total Dissolved Solids @180°C** | ---- | 10 | mg/L | **60** | **72** | **71** | **72** | **68** |
| **EA025: Total Suspended Solids dried at 104 ± 2°C** | | | | | | | | |
| **Suspended Solids (SS)** | ---- | 5 | mg/L | **7** | **9** | **15** | <5 | **37** |
| **EP020: Oil and Grease (O&G)** | | | | | | | | |
| **Oil & Grease** | ---- | 5 | mg/L | <5 | <5 | <5 | <5 | <5 |

## Analytical Results

| Sub-Matrix: **WATER** (Matrix: **WATER**) | | | Client sample ID | C2 | ---- | ---- | ---- | ---- |
|---|---|---|---|---|---|---|---|---|
| | | | Client sampling date / time | 02-Aug-2016 13:10 | ---- | ---- | ---- | ---- |
| *Compound* | *CAS Number* | *LOR* | *Unit* | **ES1616843-006** | -------- | -------- | -------- | -------- |
| | | | | Result | --- | --- | --- | --- |
| **EA005: pH** | | | | | | | | |
| **pH Value** | ---- | 0.01 | pH Unit | **6.09** | ---- | ---- | ---- | ---- |
| **EA010P: Conductivity by PC Titrator** | | | | | | | | |
| **Electrical Conductivity @ 25°C** | ---- | 1 | µS/cm | **102** | ---- | ---- | ---- | ---- |
| **EA015: Total Dissolved Solids dried at 180 ± 5 °C** | | | | | | | | |
| **Total Dissolved Solids @180°C** | ---- | 10 | mg/L | **66** | ---- | ---- | ---- | ---- |
| **EA025: Total Suspended Solids dried at 104 ± 2°C** | | | | | | | | |
| **Suspended Solids (SS)** | ---- | 5 | mg/L | **10** | ---- | ---- | ---- | ---- |
| **EP020: Oil and Grease (O&G)** | | | | | | | | |
| **Oil & Grease** | ---- | 5 | mg/L | <5 | ---- | ---- | ---- | ---- |

Carbon Based Environmental Pty Limited

| Todays Collection | |
|---|---|
| Time Start: | 800 |
| Time Finish: | 1330 |

Date: 2.8.16

# GROUNDWATERS

**Client :** Rocla Calga

**Project :**

| Site | DEPTH | Odour | Water Turbidity | Water Colour | 1 | | 2 | | Bottles (Apr/Oct) | Downloaded Logger? (Y/N) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | pH | EC | pH | EC | | |
| CQ3 | 10.38 | Y | C S T | C LO O B G | 6.60 | 216.us | 6.62 | 172.3us | 1x 250ml GP, 1x 500mL GP, 1RP | Y |
| CQ4 | 10.16 | N | C S T | C LO O B G | 5.05 | 104.4us | 5.16 | 102.8us | 1x 250ml GP, 1x 500mL GP, 1RP | N. |
| CQ5 | 6.46 | N | C S T | C LO O B G | 4.47 | 134.us | 4.28 | 134.0us | 1x 250ml GP, 1x 500mL GP, 1RP | |
| ~~CQ6~~ | | | C S T | C LO O B G | | | | | ~~1x 250ml GP, 1x 500mL GP, 1RP~~ | GONE |
| CQ7 | 5.91 | N | C S T | C LO O B G | 4.75 | 82.4us | 4.65 | 82.0us | 1x 250ml GP, 1x 500mL GP, 1RP | Y |
| CQ8 | 5.54 | N | C S T | C LO O B G | 4.64 | 106.8us | 4.60 | 107.1us | 1x 250ml GP, 1x 500mL GP, 1RP | Y |
| ~~CQ9~~ | | | C S T | C LO O B G | BLOCKED / DAMAGED | | | | 1x 250ml GP, 1x 500mL GP, 1RP | |
| CQ10 | 24.70 | N | C S T | C LO O B G | 4.87 | 114.7us | 4.74 | 116.2us | 1x 250ml GP, 1x 500mL GP, 1RP | |
| CQ11S | 10.28 | N | C S T | C LO O B G | 4.97 | 133.9us | 4.82 | 127.7us | 1x 250ml GP, 1x 500mL GP, 1RP | WONT CONNECT |
| CQ11D | 11.40 | N | C S T | C LO O B G | 4.78 | 135.5us | 4.87 | 137.2us | 1x 250ml GP, 1x 500mL GP, 1RP | Y |
| CQ12 | 3.92 | N | C S T | C LO O B G | 4.26 | 106.0us | 4.27 | 105.8us | 1x 250ml GP, 1x 500mL GP, 1RP | Y |
| CQ13 | 12.70 | N | C S T | C LO O B G | 4.24 | 172.5us | 4.26 | 172.1us | 1x 250ml GP, 1x 500mL GP, 1RP | FAILED TO CONNECT |
| ~~CP3~~ | | | C S T | C LO O B G | | | | | ~~1x 250ml GP, 1x 500mL GP, 1RP~~ | GONE |
| CP4 | 8.07 | | C S T | C LO O B G | PUMP NOT WORKING. | | | | 1x 250ml GP, 1x 500mL GP, 1RP | |
| CP5 | 6.94 | N | C S T | C LO O B G | 4.40 | 134.1us | 4.46 | 135.0us | 1x 250ml GP, 1x 500mL GP, 1RP | |
| CP6 | 9.03 | N | C S T | C LO O B G | 4.31 | 143.3us | 4.41 | 142.8us | 1x 250ml GP, 1x 500mL GP, 1RP | |
| CP7 | 2.41 | N | C S T | C LO O B G | 4.85 | 90.4us | 4.89 | 90.8us | 1x 250ml GP, 1x 500mL GP, 1RP | |
| CP8 | 19.98 | N | C S T | C LO O B G | 4.42 | 108.7us | 4.48 | 110.6us | 1x 250ml GP, 1x 500mL GP, 1RP | |
| MW7 | 15.14 | N | C S T | C LO O B G | 4.46 | 97.9us | 4.43 | 97.2us | 1x 250ml GP, 1x 500mL GP, 1RP | Y |
| MW8 | 7.24 | N | C S T | C LO O B G | 4.89 | 64.9us | 4.99 | 64.5us | 1x 250ml GP, 1x 500mL GP, 1RP | WONT CONNECT. |
| MW9 | 23.44 | N | C S T | C LO O B G | 4.92 | 83.6us | 4.70 | 76.1us | 1x 250ml GP, 1x 500mL GP, 1RP | WONT CONNECT |
| ~~MW10~~ | | | C S T | C LO O B G | NO ACCESS BAD TRACKS | | | | 1x 250ml GP, 1x 500mL GP, 1RP | |
| ~~MW13~~ | . | | C S T | C LO O B G | UNSAFE TRACK - | | PIC x 2. | 9.45. | 1x 250ml GP, 1x 500mL GP, 1RP | |
| ~~MW16~~ | | | C S T | C LO O B G | " | " | " | " | 1x 250ml GP, 1x 500mL GP, 1RP | |
| ~~MW17~~ | | | C S T | C LO O B G | TREES OVER TRACKS | | | 1025 | 1x 250ml GP, 1x 500mL GP, 1RP | |

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

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

pH/EC meter #:

Signed:_____

Sampled by: