



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



**Calga Quarry**

**Environmental Monitoring**

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

**April 2017**

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Colin Davies BSc MEIA CENVP  
Environmental Scientist  
Date: 19 May 2017

**Executive Summary**

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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 April 2017;
- Surface Water quality results for April 2017; and
- Meteorological report for April 2017.

The April 2017 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<sup>2</sup>.month. Results were found to be representative of dust levels as determined by the Australian Standard.

Monthly surface water samples were collected at sites A, B, C1, C2 and F. Site D was not flowing at the time of sampling. 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 detected at Site B in April 2017.

Bi-monthly groundwater monitoring is next scheduled for May 2017.

The Calga Quarry weather station data recovery in April 2017 was approximately 90%. Data for April 2017 shows that rainfall recorded at the Calga Quarry was lower than the Gosford BOM mean rainfall and the Peats Ridge long term rainfall for April.

The rainfall comparison is provided below:

Calga Quarry	48.0 mm
BOM Peats Ridge*	NA
BOM Gosford*	113.4 mm
BOM Peats Ridge Long term mean for April*	123.0 mm

NA = Not Available

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

**Note:** Differences in the daily rainfall readings between BOM and the 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<sup>2</sup>.month.

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

Groundwaters are sampled in accordance with Australian Standards AS5667.1 “*Guidance on the design of sample programs, sampling techniques and the preservation and handling of samples*” and AS5667.11 “*Water quality sampling—guidance on sampling of ground waters*”. Groundwater monitoring sites are sampled bi-monthly for depth and water quality. Groundwater monitoring loggers continuously record water levels in a selection of bores.

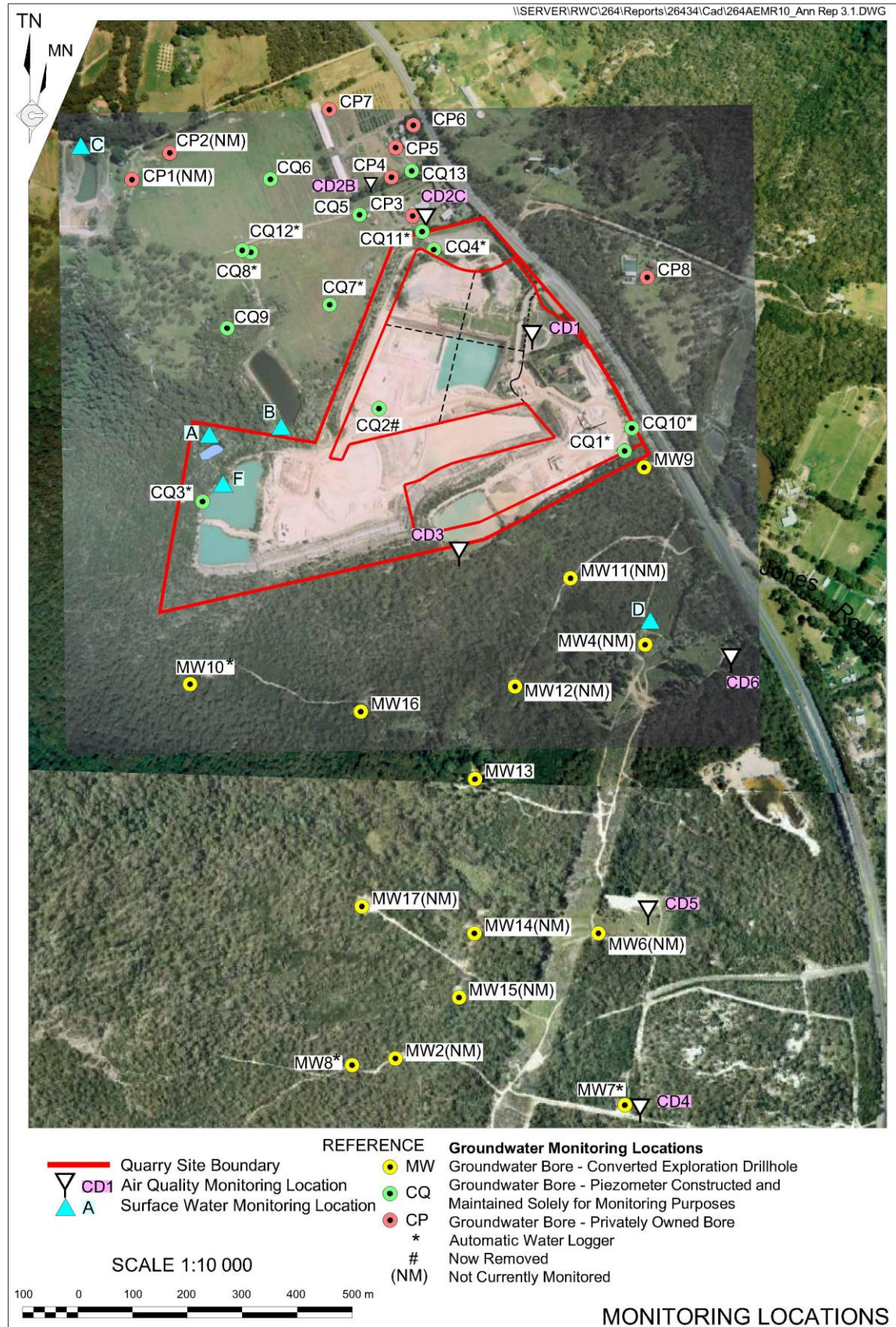
Meteorological monitoring is conducted at the quarry and displayed on the site computer with a real-time display. Metrological parameters are measured according to Australian Standard AS3580.14 “*Methods for sampling and analysis of ambient air. Meteorological monitoring for ambient air quality monitoring 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 April 2017 and the project 12-month rolling average. Results are in g/m<sup>2</sup>.month.

**Table 1: Dust Deposition results: 3 April 2017 – 3 May 2017 (30 days)**

Site	Monthly Insoluble Solids (g/m <sup>2</sup> .month)	Monthly Ash Residue (g/m <sup>2</sup> .month)	Monthly Combustible Matter (g/m <sup>2</sup> .month)	Monthly Ash Residue/ Insoluble Solids %	Rolling Annual Average Insoluble Solids (g/m <sup>2</sup> .month)
<b>CD1</b>	2.3	2.0	0.3	87	3.0
<b>CD2c</b>	0.5	0.3	0.2	60	1.0
<b>CD3</b>	1.0	0.5	0.5	50	1.2
<b>CD4</b>	0.6	0.1	0.5	17	0.6
<b>CD5</b>	1.3	0.3	1.0	23	0.6
<b>CD6</b>	0.4	0.1	0.3	25	0.8

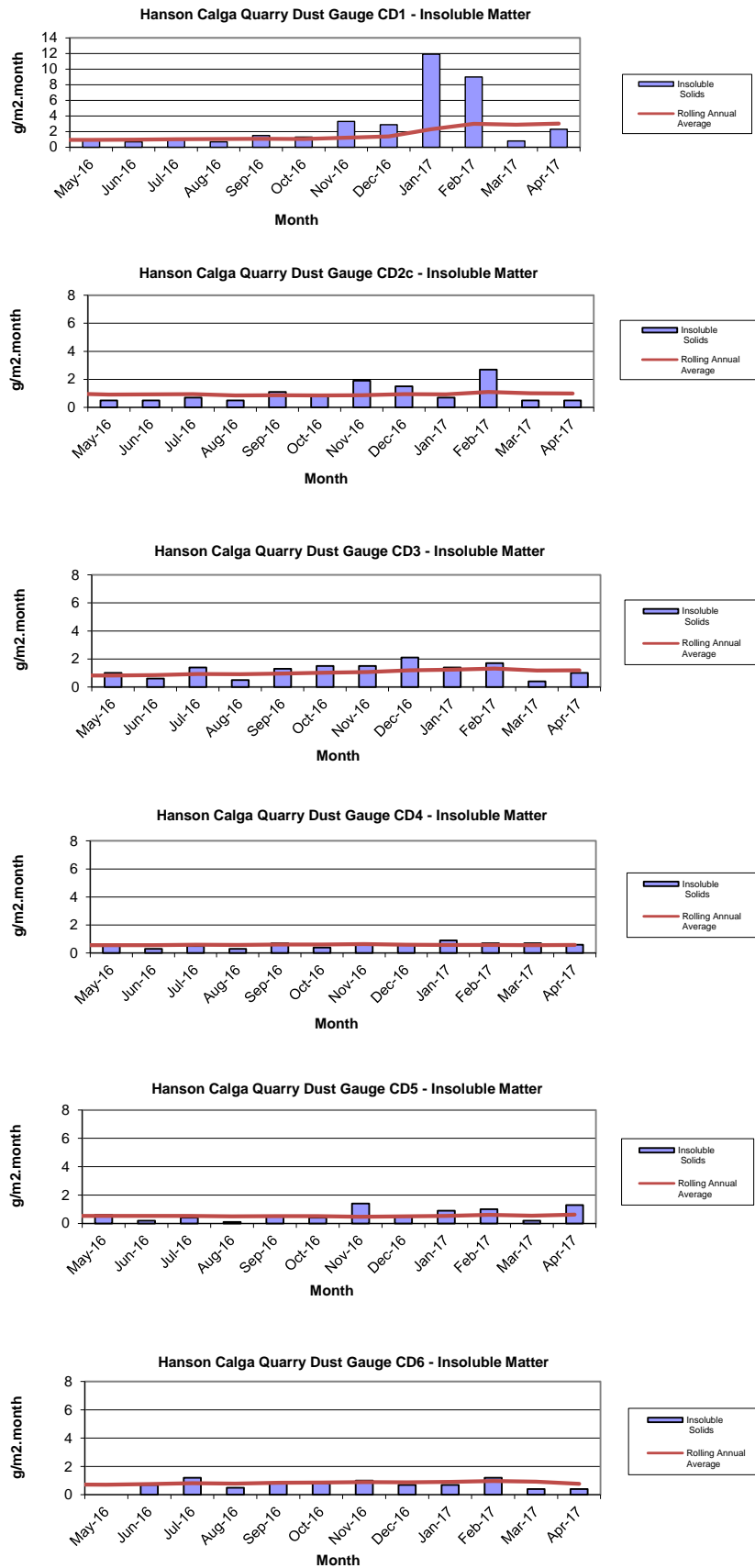
Insoluble Solids marked with an \* indicate an excessively contaminated gauge. Contamination can include bird droppings, vegetation (such as plant matter, algae, pollen and seeds) and insects. Results in bold indicate insoluble solids levels above 3.7 g/m<sup>2</sup>.month; the Development Consent's annual average amenity criteria at residential locations. The current rolling annual average is calculated from May 2016 to April 2017.

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 3 May 2017 and results are listed in **Table 2**. The laboratory analysis sheets are provided in **Appendix 1**.

**Table 2: Monthly surface water monitoring – April grab sample results**

Site	Observed Flow Rate	Water Colour	Turbidity	pH	EC ( $\mu\text{S}/\text{cm}$ )	TDS (mg/L)	TSS (mg/L)	Oil and Grease (mg/L)
<b>A</b>	Dam	Clear	Clear	6.02	60	60	25	<5
<b>B</b>	Trickle	Brown	Clear	6.67	102	172	98	8
<b>C1</b>	Still	Clear	Clear	6.92	92	60	10	<5
<b>C2</b>	Steady	Clear	Clear	6.17	99	66	<5	<5
<b>D</b>	No flow							
<b>F</b>	Dam	Clear	Clear	5.89	60	60	30	<5

Samples were collected at sites A, B, C1, C2 and F. Site D was not flowing at the time of sampling. 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 detected at Site B in April 2017.

### 2.2.1 Non-Routine Surface Water Sampling

No non-routine sampling was undertaken during April 2017.

## 2.3 Groundwater Monitoring

Bi-monthly groundwater monitoring is next scheduled for May 2017.

## 2.4 Meteorological Monitoring

The Calga Quarry weather station data recovery in April 2017 was approximately 90% data was not recorded between the 28 and 30 April 2017.

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 April 2017 shows that rainfall recorded at the Calga Quarry was lower than the Gosford BOM mean rainfall and the Peats Ridge long term rainfall for April.

The rainfall comparison is provided below:

Calga Quarry	48.0 mm
BOM Peats Ridge*	NA
BOM Gosford*	113.4 mm
BOM Peats Ridge Long term mean for April*	123.0 mm

NA = Not Available

^Rain data not based on a full set of data.

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



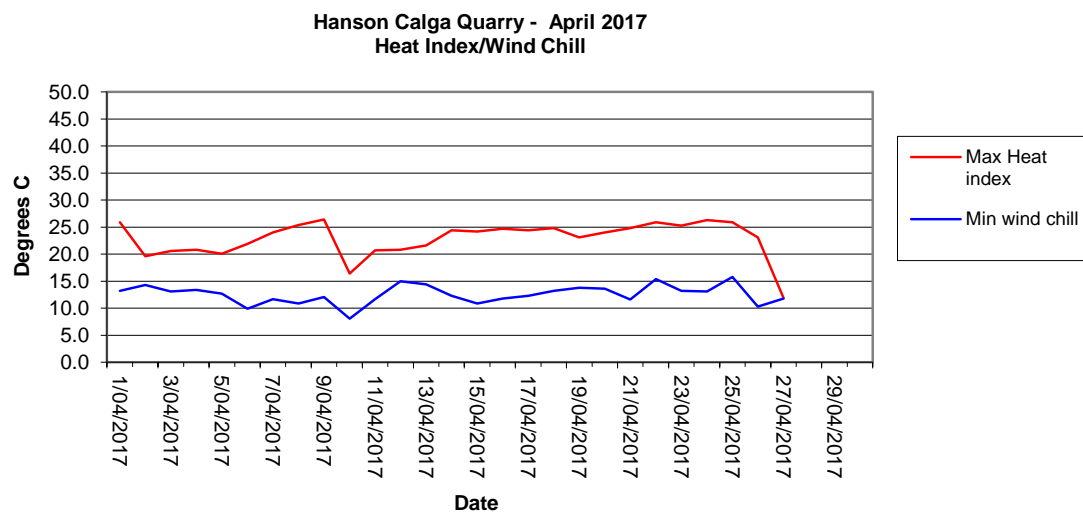
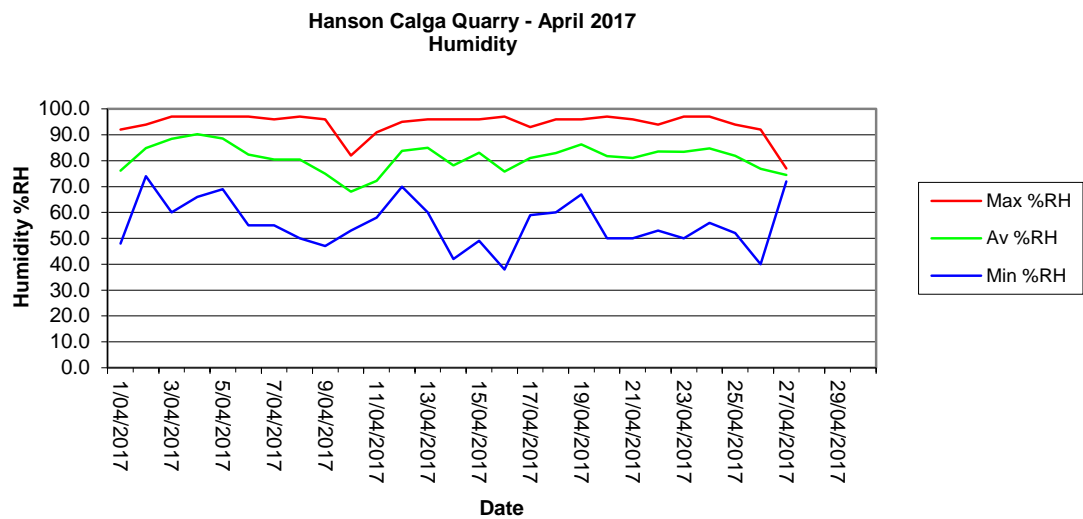
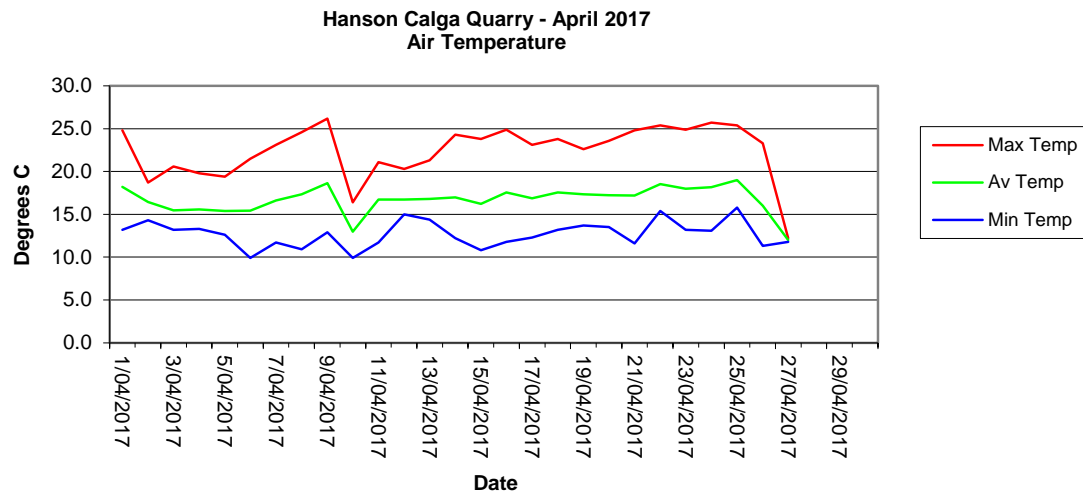
## 2.4.1 Monthly Meteorological Data Summary

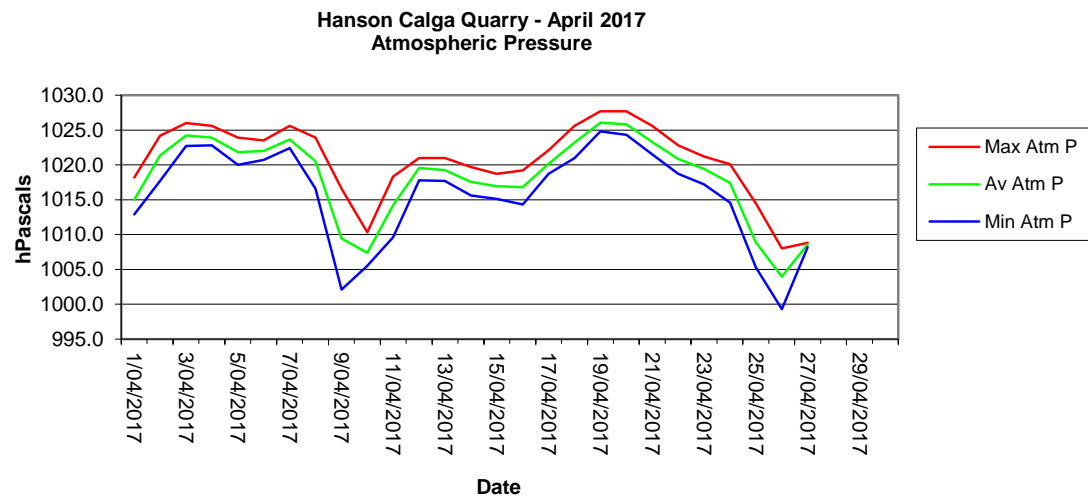
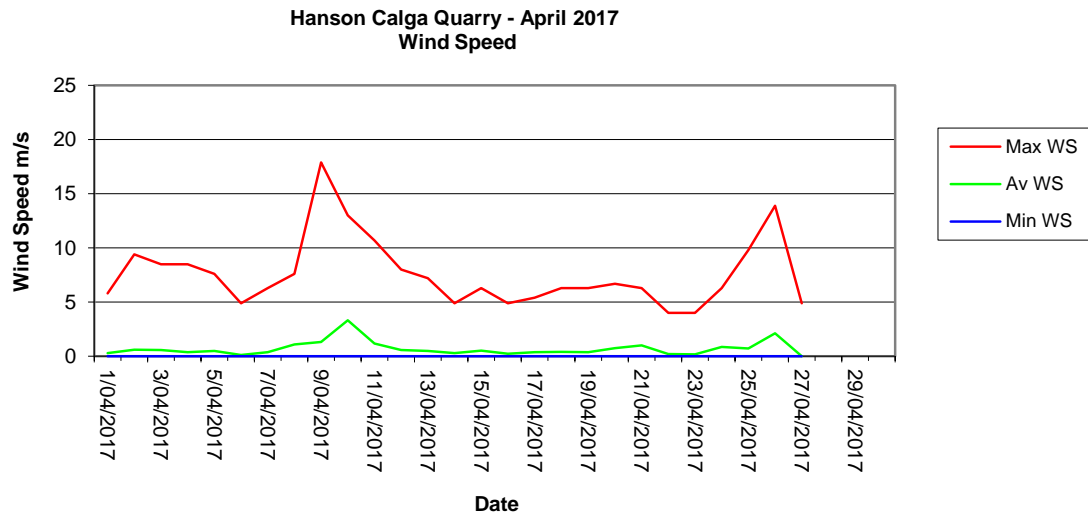
Summary      Apr-17      Hanson - Calga

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 %
1/04/2017	13.2	18.2	24.8	48.0	76.2	92.0	0.8	0.0	0.3	5.8	13.2	25.9	1012.9	1015.0	1018.2	71.7	86.2	100.0
2/04/2017	14.3	16.4	18.7	74.0	84.9	94.0	1.0	0.0	0.6	9.4	14.3	19.6	1017.7	1021.3	1024.2	85.2	93.1	100.0
3/04/2017	13.2	15.5	20.6	60.0	88.4	97.0	9.8	0.0	0.6	8.5	13.1	20.6	1022.7	1024.2	1026.0	63.7	92.5	100.0
4/04/2017	13.3	15.6	19.8	66.0	90.2	97.0	16.2	0.0	0.4	8.5	13.4	20.8	1022.8	1023.9	1025.6	72.0	91.1	100.0
5/04/2017	12.6	15.4	19.4	69.0	88.6	97.0	1.6	0.0	0.5	7.6	12.7	20.1	1020.0	1021.8	1023.9	56.3	88.3	100.0
6/04/2017	9.9	15.4	21.5	55.0	82.3	97.0	0.2	0.0	0.1	4.9	9.9	21.9	1020.7	1022.0	1023.5	32.9	70.0	98.8
7/04/2017	11.7	16.6	23.1	55.0	80.5	96.0	0.0	0.0	0.4	6.3	11.7	24.0	1022.4	1023.6	1025.6	45.8	74.1	100.0
8/04/2017	10.9	17.4	24.6	50.0	80.4	97.0	0.2	0.0	1.1	7.6	10.9	25.4	1016.6	1020.5	1023.9	41.5	69.3	93.2
9/04/2017	12.9	18.6	26.2	47.0	74.9	96.0	11.2	0.0	1.3	17.9	12.1	26.4	1002.1	1009.4	1016.6	48.6	75.4	100.0
10/04/2017	9.9	13.0	16.4	53.0	68.0	82.0	0.0	0.0	3.3	13.0	8.1	16.4	1005.5	1007.4	1010.3	84.9	99.3	100.0
11/04/2017	11.7	16.7	21.1	58.0	72.2	91.0	0.8	0.0	1.2	10.7	11.7	20.7	1009.6	1014.2	1018.3	40.9	92.8	100.0
12/04/2017	15.0	16.7	20.3	70.0	83.8	95.0	0.4	0.0	0.6	8.0	15.0	20.8	1017.8	1019.6	1021.0	56.0	86.2	100.0
13/04/2017	14.4	16.8	21.3	60.0	85.0	96.0	0.2	0.0	0.5	7.2	14.4	21.6	1017.7	1019.3	1021.0	49.5	75.4	100.0
14/04/2017	12.2	17.0	24.3	42.0	78.2	96.0	0.0	0.0	0.3	4.9	12.3	24.4	1015.6	1017.6	1019.7	30.8	61.4	84.9
15/04/2017	10.8	16.2	23.8	49.0	83.1	96.0	0.2	0.0	0.5	6.3	10.9	24.2	1015.1	1016.9	1018.7	46.8	77.7	100.0
16/04/2017	11.8	17.6	24.9	38.0	75.8	97.0	0.2	0.0	0.2	4.9	11.8	24.7	1014.3	1016.8	1019.2	52.0	76.8	100.0
17/04/2017	12.3	16.9	23.1	59.0	81.0	93.0	0.0	0.0	0.4	5.4	12.3	24.4	1018.7	1020.2	1022.1	50.5	60.6	70.2
18/04/2017	13.2	17.6	23.8	60.0	82.9	96.0	0.0	0.0	0.4	6.3	13.2	24.8	1021.0	1023.2	1025.6	41.8	76.0	100.0
19/04/2017	13.7	17.3	22.6	67.0	86.2	96.0	0.2	0.0	0.4	6.3	13.8	23.1	1024.8	1026.0	1027.7	48.6	78.6	99.7
20/04/2017	13.5	17.2	23.6	50.0	81.8	97.0	0.2	0.0	0.8	6.7	13.6	24.0	1024.3	1025.8	1027.7	50.8	81.9	100.0
21/04/2017	11.6	17.2	24.8	50.0	81.0	96.0	0.0	0.0	1.0	6.3	11.6	24.8	1021.5	1023.3	1025.6	33.5	73.0	100.0
22/04/2017	15.4	18.5	25.4	53.0	83.5	94.0	0.0	0.0	0.2	4.0	15.4	25.9	1018.7	1020.9	1022.8	50.8	74.9	100.0
23/04/2017	13.2	18.0	24.9	50.0	83.4	97.0	0.2	0.0	0.2	4.0	13.2	25.3	1017.2	1019.4	1021.2	38.2	72.4	100.0
24/04/2017	13.1	18.2	25.7	56.0	84.8	97.0	0.0	0.0	0.9	6.3	13.1	26.3	1014.6	1017.4	1020.1	43.1	81.5	100.0
25/04/2017	15.8	19.0	25.4	52.0	81.9	94.0	3.4	0.0	0.7	9.8	15.8	25.9	1005.3	1008.9	1014.5	53.5	79.3	100.0
26/04/2017	11.3	16.0	23.3	40.0	76.9	92.0	1.0	0.0	2.1	13.9	10.3	23.1	999.3	1004.0	1008.0	54.8	87.2	100.0
27/04/2017	11.8	12.0	12.2	72.0	74.5	77.0	0.2	0.0	0.0	4.9	11.8	11.9	1008.2	1008.6	1008.8	100.0	100.0	100.0
28/04/2017																		
29/04/2017																		
30/04/2017																		
Monthly	9.9	16.7	26.2	38	81	97	48.0	0	0.7	17.9	8.1	26.4	999.3	1018.2	1027.7	30.8	80.6	100

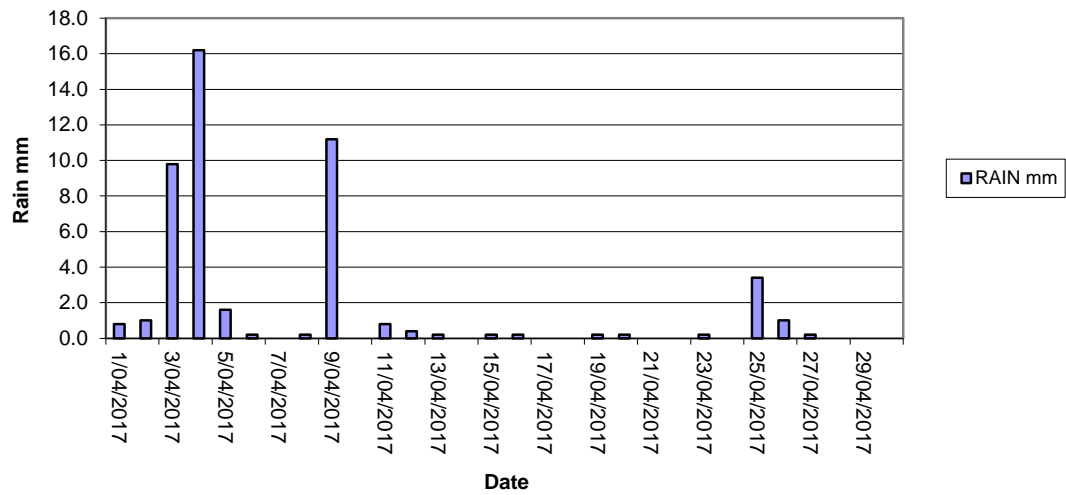
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## 2.4.2 Monthly Weather Charts

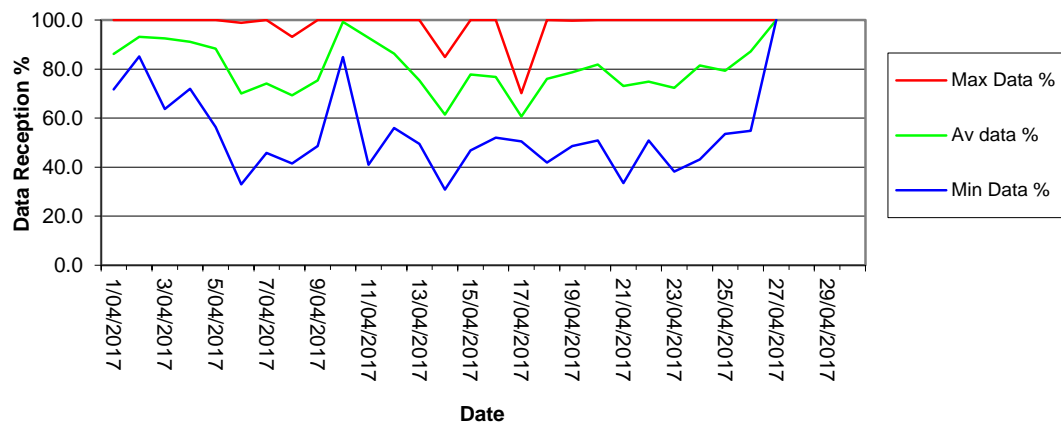




Hanson Calga Quarry - April 2017  
Rainfall



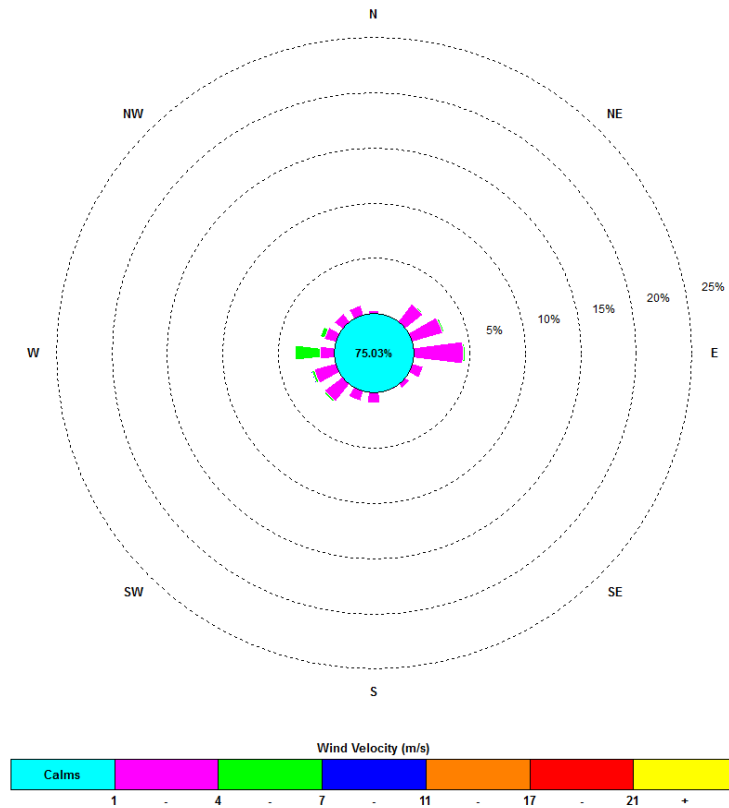
Hanson Calga Quarry - April 2017  
Data Reception



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

00:15, 1 April 2017 – 23:45, 30 April 2017



The predominant winds were from the W and E, with most frequent, strongest winds also from the W. The maximum wind speed was 17.9 m/s from the W.

## **Appendix 1**

Field Sheets

Chain of Custody

Laboratory Certificates





[illegible]

Environmental Division  
Newcastle  
Work Order Reference  
**EN1701732**



Telephone : + 61 2 4014 2500

## CERTIFICATE OF ANALYSIS

**Work Order** : EN1701732  
**Client** : CBASED ENVIRONMENTAL PTY LTD  
**Contact** : All Deliverables  
**Address** : 47 BOOMERANG ST  
                   CESSNOCK NSW, AUSTRALIA 2325  
**Telephone** : +61 02 6571 3334  
**Project** : Hanson Calga Dusts  
**Order number** : ----  
**C-O-C number** : ----  
**Sampler** : CARBON BASED ENVIRONMENTAL PTY LTD  
**Site** :  
**Quote number** : SYBQ/222/16  
**No. of samples received** : 6  
**No. of samples analysed** : 6

**Page** : 1 of 4  
**Laboratory** : Environmental Division Newcastle  
**Contact** :  
**Address** : 5/585 Maitland Road Mayfield West NSW Australia 2304  
**Telephone** : +61 2 4014 2500  
**Date Samples Received** : 03-May-2017 14:38  
**Date Analysis Commenced** : 05-May-2017  
**Issue Date** : 10-May-2017 11:42



Accreditation No. 825  
 Accredited for compliance with  
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

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 no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

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

∅ = 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/m<sup>2</sup>.mth as sampling data was provided by the client.



## Analytical Results

Sub-Matrix: DEPOSITIONAL DUST  
(Matrix: AIR)

Client sample ID

				CD1	CD2c	CD3	CD4	CD5
				03/04/17 - 03/05/17	03/04/17 - 03/05/17	03/04/17 - 03/05/17	03/04/17 - 03/05/17	03/04/17 - 03/05/17
Client sampling date / time				03-May-2017 00:00	03-May-2017 00:00	03-May-2017 00:00	03-May-2017 00:00	03-May-2017 00:00
Compound	CAS Number	LOR	Unit	EN1701732-001	EN1701732-002	EN1701732-003	EN1701732-004	EN1701732-005
				Result	Result	Result	Result	Result
<b>EA120: Ash Content</b>								
Ash Content	----	0.1	g/m <sup>2</sup> .month	2.0	0.3	0.5	0.1	0.3
Ash Content (mg)	----	1	mg	35	5	9	2	5
<b>EA125: Combustible Matter</b>								
Combustible Matter	----	0.1	g/m <sup>2</sup> .month	0.3	0.2	0.5	0.5	1.0
Combustible Matter (mg)	----	1	mg	6	3	8	9	18
<b>EA141: Total Insoluble Matter</b>								
Total Insoluble Matter	----	0.1	g/m <sup>2</sup> .month	2.3	0.5	1.0	0.6	1.3
Total Insoluble Matter (mg)	----	1	mg	41	8	17	11	23



## Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST**  
 (Matrix: **AIR**)

Client sample ID

				<b>CD6</b>	----	----	----	----
				<b>03/04/17 - 03/05/17</b>	----	----	----	----
				03-May-2017 00:00	----	----	----	----
				<b>EN1701732-006</b>	-----	-----	-----	-----
				Result	---	---	---	---
<b>EA120: Ash Content</b>								
Ash Content	----	0.1	g/m².month	<b>0.1</b>	----	----	----	----
Ash Content (mg)	----	1	mg	<b>2</b>	----	----	----	----
<b>EA125: Combustible Matter</b>								
Combustible Matter	----	0.1	g/m².month	<b>0.3</b>	----	----	----	----
Combustible Matter (mg)	----	1	mg	<b>5</b>	----	----	----	----
<b>EA141: Total Insoluble Matter</b>								
Total Insoluble Matter	----	0.1	g/m².month	<b>0.4</b>	----	----	----	----
Total Insoluble Matter (mg)	----	1	mg	<b>7</b>	----	----	----	----





Date: 3.5.17

Todays Collection	
Time Start:	11.00
Time Finish:	1.10

Client :  
Project :

Hanson Calga

## SURFACE WATERS

Site	Flow Rate	Odour	Sampling Time	Bottles	Water Turbidity	Water Colour	Comments
A	Dam	NO	11.15	1x 250ml GP, 1x 500mL GP, 1x PG	CST	CLOOBG	
B	trickle	NO	11.40	1x 250ml GP, 1x 500mL GP, 1x PG	CST	CLOOBG	
C1	still	NO	1.00	1x 250ml GP, 1x 500mL GP, 1x PG	CST	CLOOBG	
C2	steady	NO	1.10	1x 250ml GP, 1x 500mL GP, 1x PG	CST	CLOOBG	
D	NO flow	NO	12.30	1x 250ml GP, 1x 500mL GP, 1x PG	CST	CLOOBG	
F	Dam	NO	11.00	1x 250ml GP, 1x 500mL GP, 1x PG	CST	CLOOBG	
					CST	CLOOBG	
					CST	CLOOBG	
					CST	CLOOBG	
					CST	CLOOBG	
					CST	CLOOBG	

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

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

Signed: 2/1/17Sampled by: Leesa + Jill

[illegible]**AUSTRALIAN LABORATORY SERVICES P/L**



## CERTIFICATE OF ANALYSIS

Work Order	<b>ES1710453</b>	Page	1 of 2
Client	<b>CBASED ENVIRONMENTAL PTY LTD</b>	Laboratory	Environmental Division Sydney
Contact	All Deliverables	Contact	Customer Services ES
Address	47 BOOMERANG ST CESSNOCK NSW, AUSTRALIA 2325	Address	277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	+61 02 6571 3334	Telephone	+61-2-8784 8555
Project	HANSON QUARRY	Date Samples Received	03-May-2017 14:37
Order number	---	Date Analysis Commenced	03-May-2017
C-O-C number	---	Issue Date	09-May-2017 11:26
Sampler	CARBON BASED ENVIRONMENTAL PTY LTD		
Site			
Quote number	SYBQ/222/16		
No. of samples received	5		
No. of samples analysed	5		



Accreditation No. 825  
Accredited for compliance with  
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

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

Ankit Joshi  
Neil Martin

#### Position

Inorganic Chemist  
Team Leader - Chemistry

#### Accreditation Category

Sydney Inorganics, Smithfield, NSW  
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 no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

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

∅ = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- TDS by method EA-015 may bias high 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	C2	F
				03-May-2017 11:15	03-May-2017 11:40	03-May-2017 13:00	03-May-2017 13:10	03-May-2017 11:00
Client sampling date / time				03-May-2017 11:15	03-May-2017 11:40	03-May-2017 13:00	03-May-2017 13:10	03-May-2017 11:00
Compound	CAS Number	LOR	Unit	ES1710453-001	ES1710453-002	ES1710453-003	ES1710453-004	ES1710453-005
				Result	Result	Result	Result	Result
<b>EA005: pH</b>								
pH Value	----	0.01	pH Unit	6.02	6.67	6.92	6.17	5.89
<b>EA010P: Conductivity by PC Titrator</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	60	102	92	99	60
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>								
Total Dissolved Solids @180°C	----	10	mg/L	60	172	60	66	60
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>								
Suspended Solids (SS)	----	5	mg/L	25	98	10	<5	30
<b>EP020: Oil and Grease (O&amp;G)</b>								
Oil & Grease	----	5	mg/L	<5	8	<5	<5	<5