

CBased Environmental Pty Limited ABN 62 611 924 264



Calga Quarry

Environmental Monitoring

Dust Deposition Gauges, Surface and Ground Waters and Meteorological Station

February 2017

Colin Davies BSc MEIA CENVP

Environmental Scientist Date: 22 March 2017

© CBased Environmental Pty Limited 2014. This document was prepared solely for the original recipient and no third party must rely on or use any information without the consent of CBased Environmental Pty Limited. CBased Environmental Pty Limited and the author accept no responsibility to any third party who uses or relies upon the information contained in this report.

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

The February 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/m².month. Results were found to be representative of dust levels as determined by the Australian Standard.

Surface water samples were collected at sites A, B, C1, C2, D and F. 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 sites in February 2017.

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

The Calga Quarry weather station data recovery in February 2017 was approximately 52%. No data was available from the 2 February 2017 to the 15 February 2017. Data for February 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 January.

The rainfall comparison is provided below:

Calga Quarry

BOM Peats Ridge*

NA

BOM Gosford*

BOM Peats Ridge Long term mean for February*

2.2^ mm

NA

152.4 mm

154.3 mm

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.

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

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

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 <u>AS3580.10.1</u> "*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/m².month.

Surface waters are sampled in accordance with Australian Standards <u>AS5667.1</u> "Guidance on the design of sample programs, sampling techniques and the preservation and handling of samples", <u>AS5667.6</u> "Water quality sampling—guidance on sampling of rivers and streams" and <u>AS5667.4</u> "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 <u>AS5667.1</u> "Guidance on the design of sample programs, sampling techniques and the preservation and handling of samples" and <u>AS5667.11</u> "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 <u>AS3580.14</u> "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**.

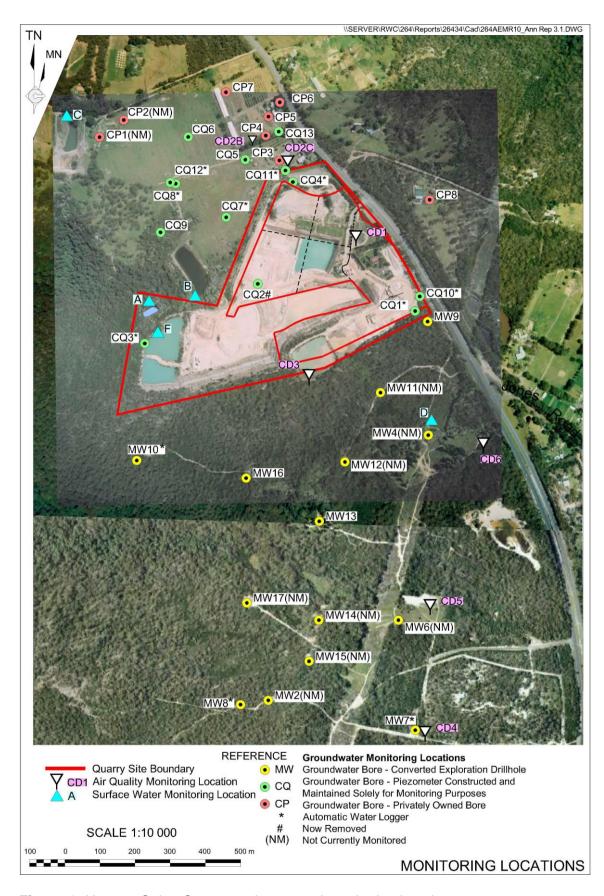


Figure 1: Hanson Calga Quarry environmental monitoring locations

2.0 Monthly Results

2.1 Dust Deposition Gauges

Table 1 displays the results for February 2017 and the project 12-month rolling average. Results are in g/m².month.

Table 1: Dust Deposition results: 2 February 2017 – 2 March 2017 (28 days)

| Site | Monthly Insoluble Solids (g/m².month) | Monthly Ash Residue (g/m².month) | Monthly Combustible Matter (g/m².month) | Monthly Ash Residue/ Insoluble Solids % | Rolling Annual Average Insoluble Solids (g/m².month) |
|------|--|--|--|---|---|
| CD1 | 9.0 | 7.8 | 1.2 | 87 | 3.0 |
| CD2c | 2.7 | 1.9 | 0.8 | 70 | 1.1 |
| CD3 | 1.7 | 1.2 | 0.5 | 71 | 1.3 |
| CD4 | 0.7 | 0.4 | 0.3 | 57 | 0.6 |
| CD5 | 1.0 | 0.6 | 0.4 | 60 | 0.6 |
| CD6 | 1.2 | 0.8 | 0.4 | 67 | 1.0 |

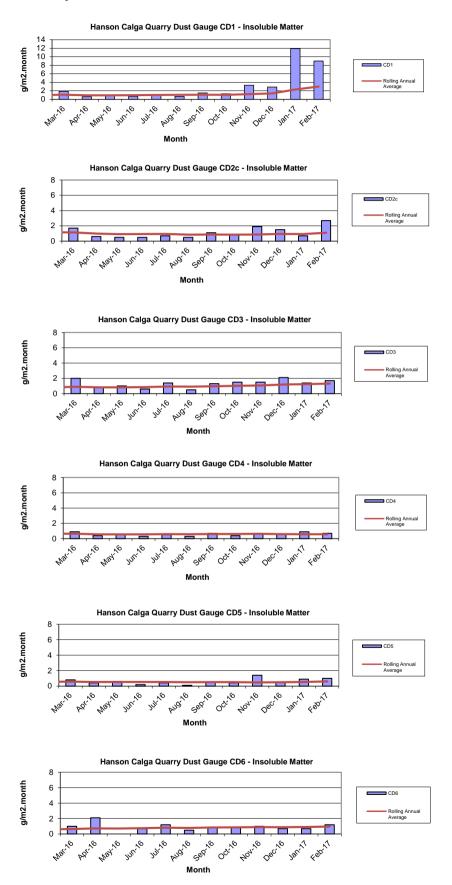
Insoluble Solids marked with an * indicate an excessively contaminated gauge. Contamination can include bird droppings, vegetation (such as plant matter, algae, pollen and seeds) and insects. Results in bold indicate insoluble solids levels above 3.7 g/m².month; the Development Consent's annual average amenity criteria at residential locations. The current rolling annual average is calculated from March 2016 to February 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 2 March 2017 and results are listed in **Table 2**. The laboratory analysis sheets are provided in **Appendix 1**.

Table 2: Monthly surface water monitoring – February grab sample results

| Site | Observed Flow Rate | Water Colour | Turbidity | рН | EC (μS/cm) | TDS (mg/L) | TSS (mg/L) | Oil and Grease (mg/L) |
|------|--------------------|-----------------|-----------|------|---------------|---------------|---------------|-----------------------------|
| Α | Dam | Clear | Clear | 7.10 | 93 | 90 | 29 | <5 |
| В | Still | Clear | Clear | 5.87 | 135 | 135 | 6 | <5 |
| C1 | Dam | Clear | Clear | 6.78 | 101 | 61 | 6 | <5 |
| C2 | Fast | Clear | Clear | 7.02 | 106 | 93 | 6 | < 5 |
| D | Still | Clear | Clear | 5.26 | 93 | 73 | < 5 | <5 |
| F | Dam | Clear | Clear | 6.49 | 85 | 88 | 30 | <5 |

Samples were collected at sites A, B, C1, C2, D and F. 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 sites in February 2017.

2.2.1 Non-Routine Surface Water Sampling

No non-routine sampling was undertaken during February 2017.

2.3 Groundwater Monitoring

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

2.4 Meteorological Monitoring

The Calga Quarry weather station data recovery in February 2017 was approximately 52%. No data was available from the 2 February 2017 to the 15 February 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 February 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 February.

The rainfall comparison is provided below:

Calga Quarry

BOM Peats Ridge*

NA

BOM Gosford*

BOM Peats Ridge Long term mean for February*

154.3 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).

2.4.1 Monthly Meteorological Data Summary

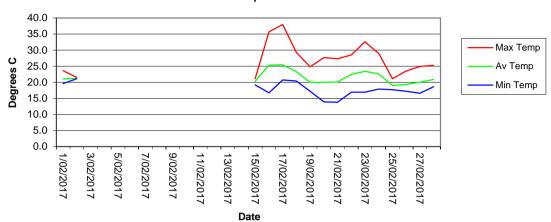
| Summary | Feb-17 | Hanson - Calga |
|---------|--------|----------------|
|---------|--------|----------------|

| 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 % |
|------------|----------|---------|----------|---------|--------|---------|---------|--------|-------|--------|----------------|----------------|-----------|----------|-----------|------------|-----------|------------|
| 1/02/2017 | 19.6 | 21.0 | 23.6 | 90.0 | 94.6 | 97.0 | 0.2 | 0.0 | 0.2 | 5.8 | 19.6 | 25.3 | 1007.6 | 1010.8 | 1013.3 | 72.9 | 92.4 | 100.0 |
| 2/02/2017 | 21.1 | 21.2 | 21.5 | 97.0 | 97.0 | 97.0 | 0.0 | 0.0 | 0.0 | 4.0 | 21.1 | 23.2 | 1006.3 | 1007.4 | 1009.0 | 80.6 | 89.5 | 100.0 |
| 3/02/2017 | | | | | | | | | | | | | | | | | | |
| 4/02/2017 | | | | | | | | | | | | | | | | | | |
| 5/02/2017 | | | | | | | | | | | | | | | | | | |
| 6/02/2017 | | | | | | | | | | | | | | | | | | |
| 7/02/2017 | | | | | | | | | | | | | | | | | | |
| 8/02/2017 | | | | | | | | | | | | | | | | | | |
| 9/02/2017 | | | | | | | | | | | | | | | | | | |
| 10/02/2017 | | | | | | | | | | | | | | | | | | |
| 11/02/2017 | | | | | | | | | | | | | | | | | | |
| 12/02/2017 | | | | | | | | | | | | | | | | | | |
| 13/02/2017 | | | | | | | | | | | | | | | | | | |
| 14/02/2017 | | | | | | | | | | | | | | | | | | |
| 15/02/2017 | 19.2 | 20.3 | 21.1 | 76.0 | 80.9 | 87.0 | 0.0 | 0.0 | 0.3 | 5.4 | 19.2 | 21.5 | 1009.0 | 1009.3 | 1009.7 | 93.8 | 97.0 | 100.0 |
| 16/02/2017 | 16.7 | 25.4 | 35.7 | 30.0 | 63.8 | 95.0 | 0.4 | 0.0 | 1.6 | 10.3 | 16.7 | 38.7 | 1004.5 | 1007.2 | 1009.5 | 84.0 | 95.2 | 100.0 |
| 17/02/2017 | 20.7 | 25.4 | 38.0 | 28.0 | 68.4 | 94.0 | 0.6 | 0.0 | 1.7 | 32.6 | 20.7 | 39.7 | 1000.1 | 1005.4 | 1008.1 | 80.0 | 96.9 | 100.0 |
| 18/02/2017 | 20.4 | 23.3 | 29.3 | 59.0 | 81.5 | 95.0 | 0.2 | 0.0 | 1.4 | 8.9 | 20.5 | 32.7 | 999.9 | 1002.5 | 1004.9 | 52.9 | 98.0 | 100.0 |
| 19/02/2017 | 17.2 | 19.9 | 24.8 | 65.0 | 85.8 | 96.0 | 0.0 | 0.0 | 0.8 | 8.0 | 17.2 | 25.8 | 1001.6 | 1003.8 | 1006.0 | 91.7 | 98.9 | 100.0 |
| 20/02/2017 | 13.9 | 20.0 | 27.7 | 21.0 | 54.3 | 97.0 | 0.0 | 0.0 | 1.6 | 13.0 | 13.9 | 26.1 | 1004.0 | 1007.9 | 1013.4 | 85.2 | 97.9 | 100.0 |
| 21/02/2017 | 13.8 | 20.1 | 27.3 | 49.0 | 66.9 | 88.0 | 0.0 | 0.0 | 1.5 | 8.9 | 13.8 | 27.7 | 1013.3 | 1015.7 | 1018.1 | 76.9 | 96.2 | 100.0 |
| 22/02/2017 | 16.9 | 22.5 | 28.5 | 54.0 | 72.3 | 93.0 | 0.0 | 0.0 | 2.5 | 11.6 | 17.0 | 29.9 | 1013.9 | 1016.2 | 1018.5 | 72.3 | 96.7 | 100.0 |
| 23/02/2017 | 16.9 | 23.4 | 32.6 | 44.0 | 72.4 | 95.0 | 0.0 | 0.0 | 1.2 | 8.0 | 16.9 | 35.7 | 1013.1 | 1015.0 | 1016.9 | 70.5 | 96.7 | 100.0 |
| 24/02/2017 | 17.9 | 22.6 | 29.0 | 54.0 | 78.0 | 95.0 | 0.0 | 0.0 | 1.3 | 8.5 | 17.9 | 30.4 | 1013.7 | 1015.7 | 1017.7 | 84.3 | 98.3 | 100.0 |
| 25/02/2017 | 17.7 | 19.0 | 21.1 | 91.0 | 94.1 | 96.0 | 0.2 | 0.0 | 0.4 | 7.2 | 17.7 | 22.2 | 1015.2 | 1016.8 | 1018.2 | 75.7 | 97.9 | 100.0 |
| 26/02/2017 | 17.2 | 19.3 | 23.5 | 58.0 | 83.5 | 97.0 | 0.2 | 0.0 | 0.9 | 10.3 | 17.2 | 24.0 | 1016.3 | 1018.5 | 1020.1 | 90.5 | 98.7 | 100.0 |
| 27/02/2017 | 16.6 | 20.0 | 24.9 | 58.0 | 84.1 | 97.0 | 0.0 | 0.0 | 0.9 | 12.5 | 16.6 | 25.7 | 1018.7 | 1019.8 | 1021.4 | 86.8 | 98.2 | 100.0 |
| 28/02/2017 | 18.6 | 20.8 | 25.3 | 68.0 | 90.1 | 97.0 | 0.4 | 0.0 | 0.8 | 8.5 | 18.6 | 26.7 | 1017.5 | 1018.8 | 1020.2 | 90.8 | 99.0 | 100.0 |
| | | | | | | | | | | | | | | | | | | <u> </u> |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | · | | | | | | | | |
| Monthly | 13.8 | 21.5 | 38 | 21 | 79 | 97 | 2.2 | 0 | 1.1 | 32.6 | 13.8 | 39.7 | 999.9 | 1011.9 | 1021.4 | 52.9 | 96.7 | 100 |

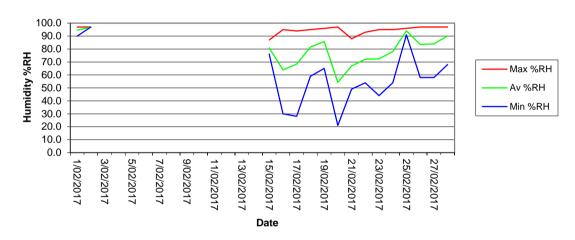
No data

2.4.2 Monthly Weather Charts

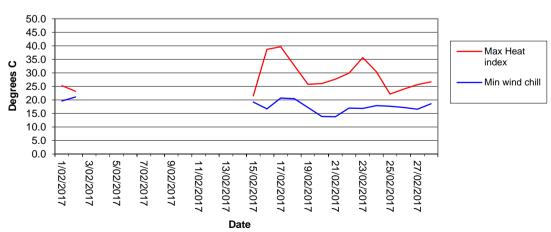


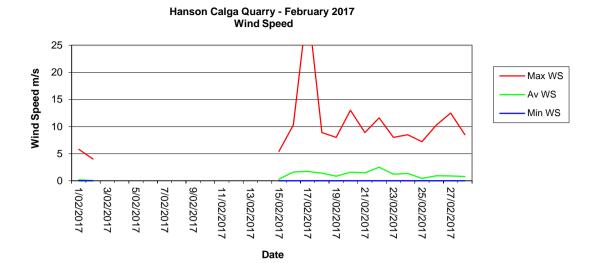


Hanson Calga Quarry - February 2017 Humidity

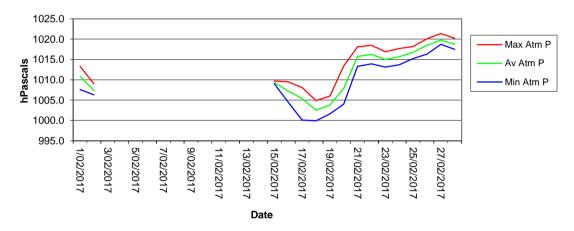


Hanson Calga Quarry - February 2017 Heat Index/Wind Chill

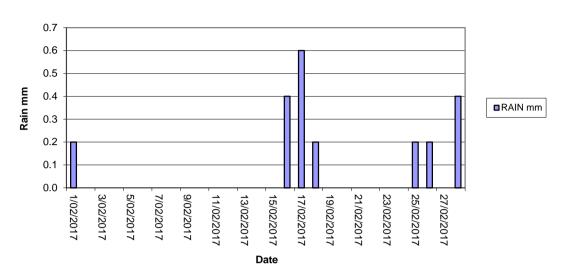




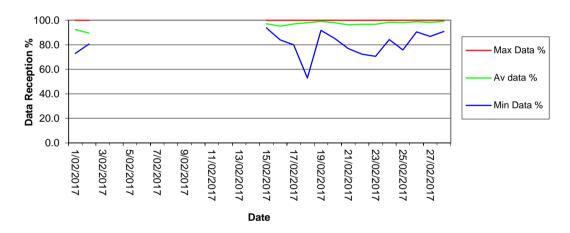
Hanson Calga Quarry - February 2017 Atmospheric Pressure



Hanson Calga Quarry - February 2017 Rainfall

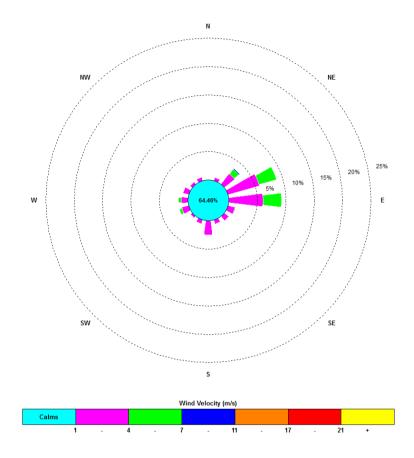


Hanson Calga Quarry - February 2017 Data Reception



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 February 2017 – 23:45, 28 February 2017

The predominant winds were from the E and ENE, with most frequent, strongest winds also from the E. The maximum wind speed was 32.6 m/s from the W.

Appendix 1

Field Sheets

Chain of Custody

Laboratory Certificates



Client: Hanson Calga Quarry Date Installed: 2.2.17

Sampled By: JUL TUC
Sampling ID:

| Site | Time | Water | Insolu | ble Material (✓ = s | slight, 🗸 🗸 = n | nod etc) | Water | Water | Stand Level | Funnel Level | New Funnel | Comments |
|------|-----------|------------|---------|----------------------|-----------------|----------|-----------|---------------------|-------------|--------------|---------------|------------------|
| | Collected | Level (mL) | Insects | Bird droppings | Vegetation | Dust | Turbidity | Colour | (Y/N) | (Y/N) | Diameter (mm) | |
| CD1 | 1.25 | 199921 | 1 | | | / | ØST. | O O Bn Gn Gy | V | V | | |
| CD2C | 1.40 | 1999ml | | | | / | Cs T | © Bn Gn Gy | 4 | 5 | | |
| CD3 | 12.20 | 1999ml | | | | / | CS T | C Bn Gn Gy | 4 | 7 | | |
| CD4 | 12.45 | 1999m | | | | / | Øs T | O Bn Gn Gy | 4 | 7 | | EXTREMELY OVERCE |
| CD5 | 12:55 | 1999m | | | | / | ©s T | CO Bn Gn Gy | 7 | | | |
| CD6 | 1.05 | 1999m | / | | | / | Øsт | CO Bn Gn Gy | V | V | | |
| | | | | | | | CST | C O Bn Gn Gy | 1 | 1 | | |
| | | | | | | | CST | C O Bn Gn Gy | | | | |
| | | | | | | | CST | C O Bn Gn Gy | | | | |
| | | | | | | | CST | C O Bn Gn Gy | | | | |
| | | | | | | | CST | C O Bn Gn Gy | | | | |
| | | | | | | | CST | C O Bn Gn Gy | | | | |
| | | | | | | | CST | C O Bn Gn Gy | | | | |
| | | | | | | | CST | C O Bn Gn Gy | | | | |
| | | | | | | | CST | C O Bn Gn Gy | | | | |
| | | | | | | | CST | C O Bn Gn Gy | | | | = |
| 4 | | | | | | | CST | C O Bn Gn Gy | | | | |
| | | | | | | | CST | C O Bn Gn Gy | | | | |
| | | | | | | | CST | C O Bn Gn Gy | | | | |
| | | | | | | | CST | 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:

| CLIENT: Carbon Based Environmenta | al Pty Ltd | | | | | | LABO | RATO | RY P | ATCH NO |) | A 54.34 | 81 3 346 | | | Non-April | - W. L | ar Salas Pa | | Services Pty Ltd |
|---|---|------------|-------------------------------|----------------------------|------|-------------|--|-------------|------------------|----------|--|---------|----------|----------------|-------------------|------------------|---|----------------|----------------------------|------------------|
| POSTAL ADDRESS: 47 Boomerang | | K NSW 2325 | 5 | | | | - | | | on Based | THE RESERVE OF THE PARTY OF THE | | | Hydron College | e Adjulieuse per | altanique, e | | S. April aller | Language And Park Carlon C | 3,00 |
| SEND REPORT TO: monitoringresults@cbased.com.au | | | /OICE TO: cba ka@cbased.co | ased@bigpond.com, om.au | | | PHON | | | | | | 2499044 | 42 | E | E-MAIL: r | nonitoring | gresults@ | cbased.com | .au |
| OATA NEEDED BY: 7 working days | | REPORT | NEEDED BY: | 7 working days | | | REPORT FORMAT: HARD: Yes FAX: DISK: BULLETIN BOA | | | | | | | ARD: | E-N | MAIL: Yes | | | | |
| PROJECT ID: Hanson Calga Dusts | QUOTE NO.: | SY/269/10 | | | | | QC LE | VEL: | | QCS1: | | | QCS2: | | QCS3: ` | | | QC | | |
| P.O. NO.: | COMMENTS | /SPECIAL H | IANDLING/ST | ORAGE OR DIPOSAL: | | | | | | | | | | | ANALYSI | | IRED | | | |
| OR LAB USE ONLY COOLER SEAL (es | Total unless | specified | | | | | able Soldi | Ash Residue | Combustable Matt | | | | | | | | | | | |
| roken 2 Zeg.C Intact | | | | | | | Insoluable | Ash R | Combu | | | | | | | | | | | NOTES |
| SAMP | LE DATA | | | 'CONTAINER I | DATA | | | | | | | | | | | | | | | |
| SAMPLE ID | MATRIX | DATE ON | DATE OFF | TYPE & PRESERVATIVE | NO. | | | | | | | | | | | | | | | |
| CD1 | Dust | 2.2.17 | 2.3.17 | | | | х | х | х | | | | | | 7 | | | | | 10.0 |
| CD2c | Dust | | | 1 | | | х | х | х | | | | | | | | | | | |
| CD3 | Dust | | | | | | х | х | х | | | | | | <u> </u> | | | | | |
| CD4 | Dust | | | | | | х | х | х | | | | | | | | | | | |
| CD5 | Dust | | | | | | х | х | х | | | | | | | | | | , t | |
| CD6 | Dust | | 4 | | | | Х | х | х | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | _ | | | | | | | - | | | | |
| | - | | + | | - | | | - | - | | | _ | | | | | | | | |
| | | | + | | - | | | - | | | - | | | | | + | _ | | | |
| | | | + | | | | | | - | - | + | _ | - | - | | - | | | | |
| | | | | | | - | | | _ | - | 1 | | ++ | - | | | - | - | | |
| | | | | | | | | | | - | | _ | + | | - | + | - | - | \rightarrow | |
| | | | | | | | | | | | | | | | | | - | | | |
| | | | | 4 | | | | | | | | | | | | | = | | | |
| | | | 1 | | | | | | | | 100 | | | | | | | | | |
| , | | RELINQUISH | IED BY: | | | | | | M | | | RECE | IVED BY | | | | | | | METHOD OF SHIPME |
| AME : Colin Davies (DE) F: Carbon Based Environmental | |) | TIMI | TE: 2-3.17 | | | NAME : 1/1 S DATE: 2 OF: 14-05 TIME: 2 | | | | | | | 5 | | CONSIGNMENT NOTE | | | | |
| AME: | 04 | 589 V3 | 5681 E | DATE: | | NAME: DATE: | | | | | | 140 | | | TRANSPORT CO. NAN | | | | | |
| F: | OF: TIME: 'Container Type and Preservative Codes: P = Neutral Plastic; N = Nitric Acid Preserved; C = Sodium Hydroxide Preserved | | | | | OF: TIME: | | | | | | | | | | | | | | |

AUSTRALIAN LABORATORY SERVICES P/L

Environmental Division
Newcastle
Work Order Reference
EN1700869



Telephone: +61 2 4014 2500



CERTIFICATE OF ANALYSIS

Work Order EN1700869

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

Site

Quote number SYBQ/222/16

No. of samples received 6 No. of samples analysed

Page

1 of 4 Laboratory **Environmental Division Newcastle**

Contact Address

5/585 Maitland Road Mayfield West NSW Australia 2304

Telephone

+61 2 4014 2500 02-Mar-2017 14:48

Date Samples Received Date Analysis Commenced

06-Mar-2017

Issue Date 10-Mar-2017 12:36



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.

Accreditation Category

Alison Graham Supervisor - Inorganic Newcastle - Inorganics, Mayfield West, NSW Page

2 of 4

Work Order EN1700869

Client

CBASED ENVIRONMENTAL PTY LTD

Project

Hanson Calga Dusts



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

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.

Page Work Order 3 of 4 EN1700869

ork Order EN170

Client Project CBASED ENVIRONMENTAL PTY LTD

Hanson Calga Dusts

Analytical Results

| Sub-Matrix: DEPOSITIONAL DUST (Matrix: AIR) | | CI | ient sample ID | CD1 02/02/17 - 02/03/17 | CD2c 02/02/17 - 02/03/17 | CD3 02/02/17 - 02/03/17 | CD4 02/02/17 - 02/03/17 | CD5 02/02/17 - 02/03/17 02-Mar-2017 00:00 | |
|--|------------|-----------|------------------|----------------------------|-----------------------------|----------------------------|----------------------------|---|--|
| Commence of the Commence of th | Cli | ent sampl | ling date / time | 02-Mar-2017 00:00 | 02-Mar-2017 00:00 | 02-Mar-2017 00:00 | 02-Mar-2017 00:00 | | |
| Compound | CAS Number | LOR | Unit | EN1700869-001 | EN1700869-002 | EN1700869-003 | EN1700869-004 | EN1700869-005 | |
| | | | | Result | Result | Result | Result | Result | |
| EA120: Ash Content | | | | | | | | | |
| Ash Content | | 0.1 | g/m².month | 7.8 | 1.9 | 1.2 | 0.4 | 0.6 | |
| Ash Content (mg) | | 1 | mg | 128 | 31 | 20 | 6 | 10 | |
| EA125: Combustible Matter | | | | | | | | | |
| Combustible Matter | | 0.1 | g/m².month | 1.2 | 0.8 | 0.5 | 0.3 | 0.4 | |
| Combustible Matter (mg) | | 1 | mg | 20 | 13 | 8 | 6 | 7 | |
| EA141: Total Insoluble Matter | | | | | | | | | |
| Total Insoluble Matter | | 0.1 | g/m².month | 9.0 | 2.7 | 1.7 | 0.7 | 1.0 | |
| Total Insoluble Matter (mg) | | 1 | mg | 148 | 44 | 28 | 12 | 17 | |



Page

4 of 4

Work Order

EN1700869

Client

CBASED ENVIRONMENTAL PTY LTD

Project

Hanson Calga Dusts

Analytical Results







Date: 2.3.17.

| Todays Collection | | | | | | | | | |
|-------------------|--------|--|--|--|--|--|--|--|--|
| Time Start: | 11.30. | | | | | | | | |
| Time Finish: | 1.35 | | | | | | | | |

Client:

Hanson Calga

Project:

SURFACE WATERS

| Site | Flow Rate | Odour | Sampling Time | Bottles | Water Turbidity | Water Colour | Comments |
|------|-----------|-------|------------------|---------------------------------|--------------------|-----------------|----------|
| A | Dan | Nol. | 11.40 | 1x 250ml GP, 1x 500mL GP, 1x PG | ©s t | CLOOBG | |
| В | Still | NI | 12.10 | 1x 250ml GP, 1x 500mL GP, 1x PG | CST | (C)OOBG | |
| C1 | Dam | Nil | 1.30 | 1x 250ml GP, 1x 500mL GP, 1x PG | C ₂ ST | CLOOBG | |
| C2 | Fast | N'I | 1.35 | 1x 250ml GP, 1x 500mL GP, 1x PG | CST | C)LO O B G | |
| D | Stul | NII | 1.15 | 1x 250ml GP, 1x 500mL GP, 1x PG | CST. | CLOOBG | |
| F | Dam | N.1 | 11.30 | 1x 250ml GP, 1x 500mL GP, 1x PG | ©s ⊤ | (CLOOBG | |
| | | | | | CST | CLOOBG | |
| | | | | | CST | CLOOBG | |
| | | | | | CST | CLOOBG | |
| | | | | | CST | CLOOBG | |
| | 1 | | | | CST | CLOOBG | |

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

Sampled by: fill Poterson Lee Sa lung.

| CLIENT: Carbon Based Environm | ental Pty Ltd | | | | LABORATORY BATCH NO.: | | | | | | | | | A Michigan | State of the Section | Services Pty Ltd | |
|--|---|-----------|---------|--------------------------------------|-----------------------|---|--------------------|-------------------------|------|-------|----------------|-------|-------------------------------|-------------------------|--|--------------------|--|
| POSTAL ADDRESS: 47 Boomera | | CK NSW 23 | 25 | | | | Cap. Party Chapter | The same of the same of | | | mental Pty Ltd | | t to constitute of the second | | New Art of College Col | 16 | |
| SEND REPORT TO: nonitoringresults@cbased.com.a | | | OICE TO | 0: cbased@bigpond.com, ed.com.au | | PHONE: 0265713334 FAX: 0249904442 E-MAIL: monitorin | | | | | | | .: monitoring | ngresults@cbased.com.au | | | |
| OATA NEEDED BY: 7 working da | ys | REPORT | NEEDED | BY: 7 working days | REF | PORT | FORM | IAT: | HARD | : Yes | FAX: | DISK: | BULLETIN | BOARD: | E-MAIL: Yes | S | |
| PROJECT ID: Hanson Quarry | QUOTE NO. | | | | QC | LEVE | L: | QC | S1: | | QCS2: | | QCS3: Yes | | QCS4: | | |
| P.O. NO.: | COMMENTS | SPECIAL H | HANDLIN | G/STORAGE OR DIPOSAL: | | | | | | | | A | NALYSIS REQU | IRED | | | |
| OR LAB USE ONLY COOLER SEAL | | | | | | | | | | | | | | | | | |
| es No | Total unless | specified | | | | | | | | | | | | 1 1 | | | |
| roken Intact | (i) | | | | | | l o | S | 9 | | | | | | | | |
| COOLER TEMP: deg.C | 1.7 | | | | ٦ d | _ L | TSS | TDS | ō | | | | | | | NOTES | |
| SAME | PLE DATA | | | *CONTAINER DATA | | | | | | | | | | | | | |
| SAMPLE ID | MATRIX | DATE | TIME | TYPE & PRESERVATIVE NO | | | | | | | | | | | | | |
| Α | Water | 23-17 | 11.40 | 1x 250mlGP,1x 500mLGP,1xPG | x | x | x | х | х | | | | | | | | |
| В | Water | 11 | | 1x 250mIGP,1x 500mLGP,1xPG | х | - | _ | _ | х | | | | | | | | |
| C1 | Water | | | 1x 250mIGP,1x 500mLGP,1xPG | х | X | | | х | | | | 11 -1 -0 | | | | |
| C2 | Water | | 1-35 | 1x 250mlGP,1x 500mLGP,1xPG | х | х | X | х | х | | | | | | | | |
| D | Water | | 1.15 | 1x 250mIGP,1x 500mLGP,1xPG | х | X | X | X | х | | | | | | | | |
| F | Water | | 11.30 | 1x 250mlGP,1x 500mLGP,1xPG | х | X | X | х | х | | | | | | | | |
| | | • | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | 1 | | | | _ | | | | | | | | | | | | |
| | | la all | - | | | - | | | | 11/16 | | | | | | | |
| | | | | | _ | - | | | | | | | | | | | |
| | 1/4 | | | | _ | - | | | | | | | | | | | |
| | 1 | | | | - | - | - | | | - | | | | | | | |
| | - | | - | TOTAL BOTTLES: | + | - | +- | - | - | _ | | | | | | | |
| | DEL | INCLUCIE |) D)/r | TOTAL BOTTLES: | + | 1 | | | | | | | | | | | |
| AME : Colin Daviso 1 CA 5 | RELINQUISHED BY: E: Colin Davies Lessa Kin. DATE: 2-3.17 | | | | 1,,,, | ΛE: | M | 5 | | | RECEIVED B | Y | | 102/1 | 7 | METHOD OF SHIPMEN | |
| | Earbon Based Environmental TIME: 2-50 | | | | OF: | | - 1 | _ | - | | | | DATE: 2 | 103/1 | | CONSIGNMENT NOTE | |
| AME : | 04389 | 12/01 | | DATE: | NAN | | 100 | _ | | | | | | 2:48 | | TDANIODORT CO | |
| F: | | | | | OF: | | - | | 47 | | | | DATE: | | | TRANSPORT CO. NAMI | |
| /F • | | | | Acid Preserved; C = Sodium Hydroxide | | | | | | | | | TIME: | | | | |

AUSTRALIAN LABORATORY SERVICES P/L

Environmental Division Sydney Work Order Reference ES1704898



Telephone · + 61-2-8784 8555



CERTIFICATE OF ANALYSIS

ES1704898 Work Order

Client CBASED ENVIRONMENTAL PTY LTD

All Deliverables Contact

Address 47 BOOMERANG ST

CESSNOCK NSW, AUSTRALIA 2325

+61 02 6571 3334 Telephone

Project Hanson Quarry

Order number

C-O-C number

Carbon Based Sampler

Site

Quote number SYBQ/222/16

No. of samples received 6 No. of samples analysed

: 1 of 4 Page

Laboratory **Environmental Division Sydney**

Customer Services ES Contact

277-289 Woodpark Road Smithfield NSW Australia 2164 Address

Telephone +61-2-8784 8555

Date Samples Received 02-Mar-2017 14:48

Date Analysis Commenced 02-Mar-2017

Issue Date 08-Mar-2017 10:12



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

Andrea Swan

Manager

Chemistry, Newcastle West, NSW

Ashesh Patel

Inorganic Chemist

Sydney Inorganics, Smithfield, NSW

Page : 2 of 4
Work Order : ES1704898

Client CBASED ENVIRONMENTAL PTY LTD

Project Hanson Quarry



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

ø = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

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.

Page

Work Order

3 of 4 ES1704898

Client

CBASED ENVIRONMENTAL PTY LTD

Project

Hanson Quarry

Analytical Results

| Sub-Matrix: WATER (Matrix: WATER) | | Clie | ent sample ID | Α | В | C1 | C2 | D | |
|---------------------------------------|-----------------|------------|----------------|-------------------|-------------------|-------------------|-------------------|-------------------|--|
| (Watth, WATER) | Cli | ent sampli | ng date / time | 02-Mar-2017 11:40 | 02-Mar-2017 12:10 | 02-Mar-2017 13:30 | 02-Mar-2017 13:35 | 02-Mar-2017 13:15 | |
| Compound | CAS Number | LOR | Unit | ES1704898-001 | ES1704898-002 | ES1704898-003 | ES1704898-004 | ES1704898-005 | |
| Compound | O/10 / tallisol | | | Result | Result | Result | Result | Result | |
| EA005: pH | | | 100 | | | | | 1 | |
| pH Value | | 0.01 | pH Unit | 7.10 | 5.87 | 6.78 | 7.02 | 5.26 | |
| EA010P: Conductivity by PC Titrator | | | | | | | | | |
| Electrical Conductivity @ 25°C | | 1 | μS/cm | 93 | 135 | 101 | 106 | 93 | |
| EA015: Total Dissolved Solids dried a | t 180 ± 5 °C | | | | | | | T | |
| Total Dissolved Solids @180°C | | 10 | mg/L | 90 | 135 | 61 | 93 | 73 | |
| EA025: Total Suspended Solids dried | at 104 ± 2°C | | | | | | | 7 | |
| Suspended Solids (SS) | | 5 | mg/L | 29 | 6 | 6 | 6 | <5 | |
| EP020: Oil and Grease (O&G) | | | | | | | | <5 | |
| Oil & Grease | | 5 | mg/L | <5 | <5 | <5 | <5 | <5 | |



Page

4 of 4 ES1704898 Work Order

CBASED ENVIRONMENTAL PTY LTD Client

Hanson Quarry Project



Analytical Results

| Gub-Matrix: WATER (Matrix: WATER) | | Clie | ent sample ID | F | | | | |
|---|------------|------------|----------------|-------------------|------|--|-------------|--|
| Contract to the second | CI | ent sampli | ng date / time | 02-Mar-2017 11:30 | | | | |
| Compound | CAS Number | LOR | Unit | ES1704898-006 | | | | |
| | | | - | Result | | | | |
| EA005: pH | | | | | | | | |
| pH Value | | 0.01 | pH Unit | 6.49 | | | | |
| EA010P: Conductivity by PC Titrator | | | | | | | | |
| Electrical Conductivity @ 25°C | | 1 | μS/cm | 85 | | | | |
| EA015: Total Dissolved Solids dried at 1 | 80 ± 5 °C | | | | | | | |
| Total Dissolved Solids @180°C | | 10 | mg/L | 88 | | | | |
| EA025: Total Suspended Solids dried at | 104 ± 2°C | | | | | | | |
| Suspended Solids (SS) | | 5 | mg/L | 30 | | | | |
| EP020: Oil and Grease (O&G) | | TYLE | | | | | | |
| Oil & Grease | | 5 | mg/L | <5 | | | | |