



CBased Environmental Pty Limited

ABN 62 611 924 264



Calga Quarry

Environmental Monitoring

Dust Deposition Gauges, Surface and Ground
Waters and Meteorological Station

October 2019

Colin Davies BSc MEIA CEnvP
Environmental Scientist
Date: 20 November 2019

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 October 2019;
- Surface Water quality results for October 2019; and
- Meteorological report for October 2019.

The October 2019 dust deposition results for insoluble solids were variable when compared to September 2019. There were no excessively contaminated dust gauges this month. 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.

Monthly surface water samples were collected at sites A, C1, C2 and F. B and D was dry 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 not detected at any sites in October 2019.

Bi-monthly groundwaters monitoring is next scheduled for November 2019.

The Calga Quarry weather station data recovery in October 2019 was approximately 100%. Data for October 2019 shows that rainfall recorded at the Calga Quarry was below the Gosford BOM mean rainfall and the Peats Ridge long term rainfall for October.

The rainfall comparison is provided below:

| | |
|---|---------|
| Calga Quarry | 27.6 mm |
| BOM Peats Ridge* | NA |
| BOM Gosford* | 49.8 mm |
| BOM Peats Ridge Long term mean for October* | 85.3 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/m².month.

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

Groundwaters are sampled in accordance with Australian Standards [AS5667.1](#) *“Guidance on the design of sample programs, sampling techniques and the preservation and handling of samples”* and [AS5667.11](#) *“Water quality sampling—guidance on sampling of ground waters”*. Groundwater monitoring sites are sampled 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 station has 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**.

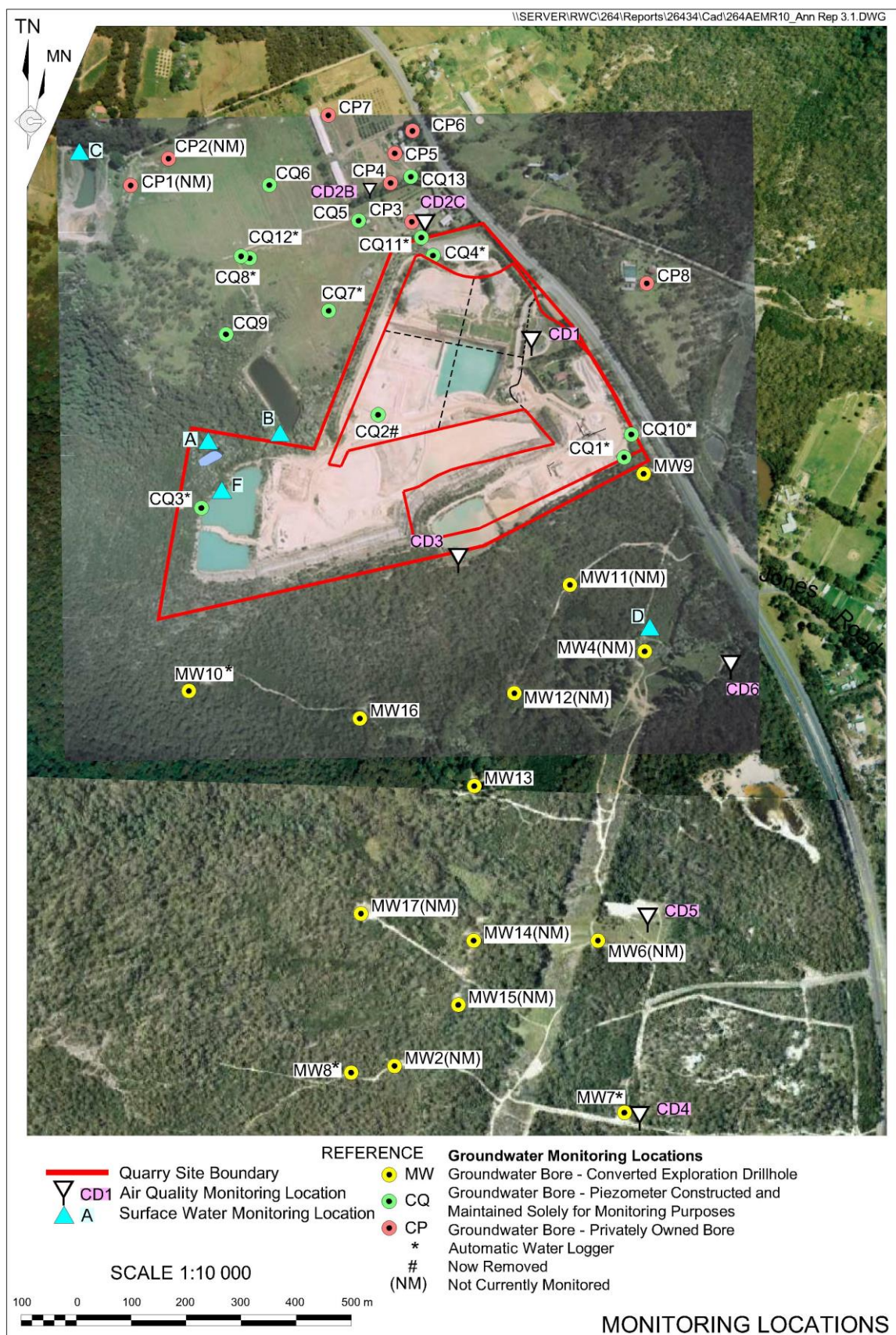


Figure 1: Hanson Calga Quarry environmental monitoring locations

2.0 Monthly Results

2.1 Dust Deposition Gauges

Table 1 displays the results for October 2019 and the project 12-month rolling average. Results are in g/m².month.

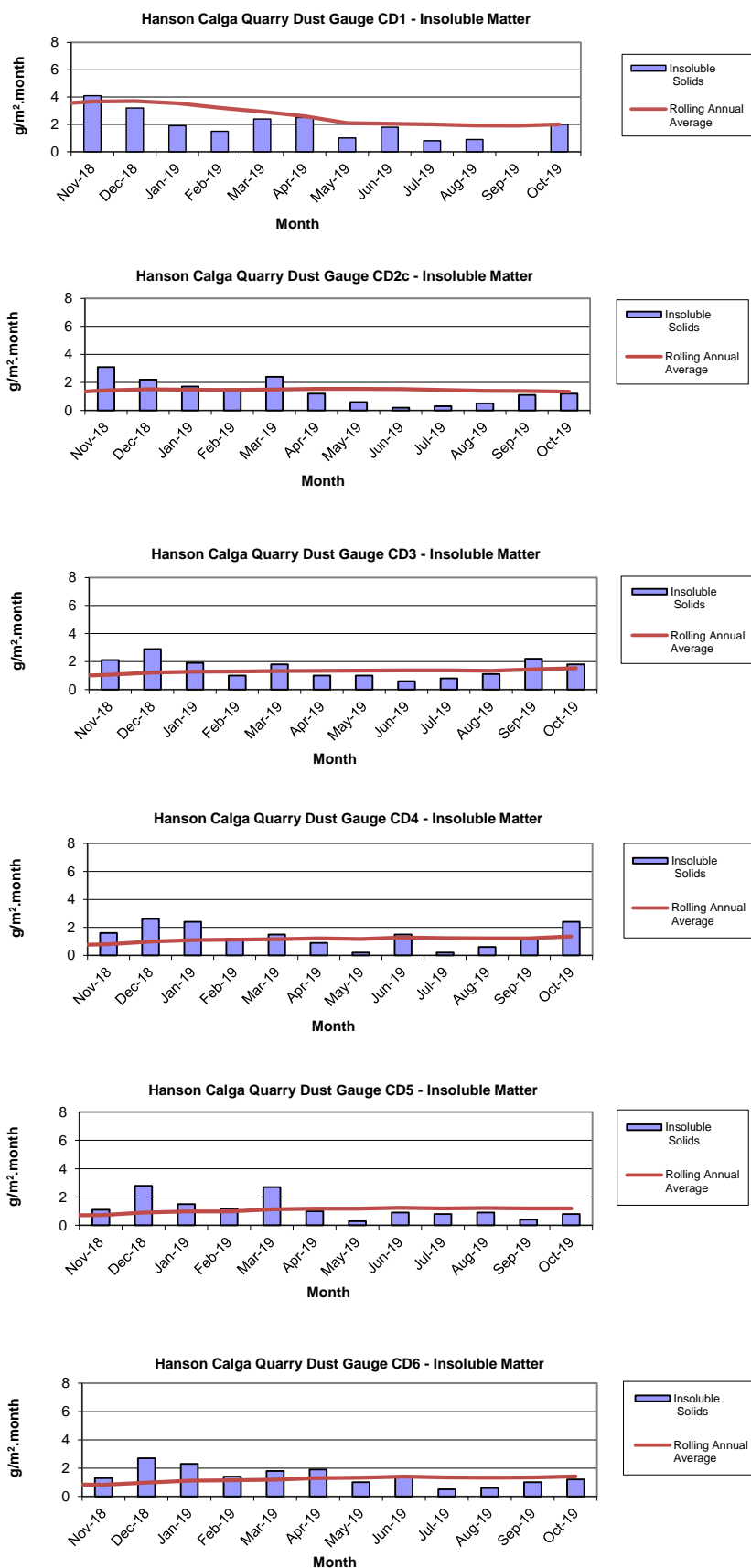
Table 1: Dust Deposition results: 1 October – 1 November 2019 (31 days)

| 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 | 2.0 | 1.7 | 0.3 | 85 | 2.0 |
| CD2c | 1.2 | 0.7 | 0.5 | 58 | 1.3 |
| CD3 | 1.8 | 1.5 | 0.3 | 83 | 1.5 |
| CD4 | 2.4 | 1.4 | 1.0 | 58 | 1.4 |
| CD5 | 0.8 | 0.6 | 0.2 | 75 | 1.2 |
| CD6 | 1.2 | 0.7 | 0.5 | 58 | 1.4 |

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 November 2018 to October 2019.

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

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

Figure 2: Dust Deposition Charts


2.2 Surface Water Monitoring

Monthly surface water monitoring was conducted on the 1 November 2019 and results are listed in **Table 2**. The laboratory analysis sheets are provided in **Appendix 1**.

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

| Site | Observed Flow Rate | Water Colour | Turbidity | pH | EC ($\mu\text{S/cm}$) | TDS (mg/L) | TSS (mg/L) | Oil and Grease (mg/L) |
|-----------|--------------------|--------------|-----------|------|-------------------------|------------|------------|-----------------------|
| A | Dam | Clear | Clear | 6.61 | 92 | 72 | <5 | <5 |
| B | Dry | | | | | | | |
| C1 | Dam | Clear | Clear | 6.65 | 110 | 69 | <5 | <5 |
| C2 | Steady | Clear | Clear | 6.23 | 106 | 58 | <5 | <5 |
| D | Dry | | | | | | | |
| F | Dam | Clear | Clear | 5.12 | 92 | 64 | 8 | <5 |

Samples were collected at sites A, C1, C2 and F. B and D was dry 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 not detected at any sites in October 2019.

2.2.1 Non-Routine Surface Water Sampling

The following non-routine sampling was undertaken by Hanson staff in October 2019;

- Discharge Dam 1 (A) sampled 9, 11 and 15 October 2019.

Laboratory analysis certificates are provided in **Appendix 1**.

2.3 Groundwater Monitoring

Bi-monthly groundwater monitoring is next scheduled for November 2019.

2.4 Meteorological Monitoring

The Calga Quarry weather station data recovery in October 2019 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).

An annual calibration was undertaken on the weather station during March 2019 and is next due in March 2020.

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 October 2019 shows that rainfall recorded at the Calga Quarry was below the Gosford BOM mean rainfall and the Peats Ridge long term rainfall for October.

The rainfall comparison is provided below:

| | |
|---|---------|
| Calga Quarry | 27.6 mm |
| BOM Peats Ridge* | NA |
| BOM Gosford* | 49.8 mm |
| BOM Peats Ridge Long term mean for October* | 85.3 mm |

NA = Not Available

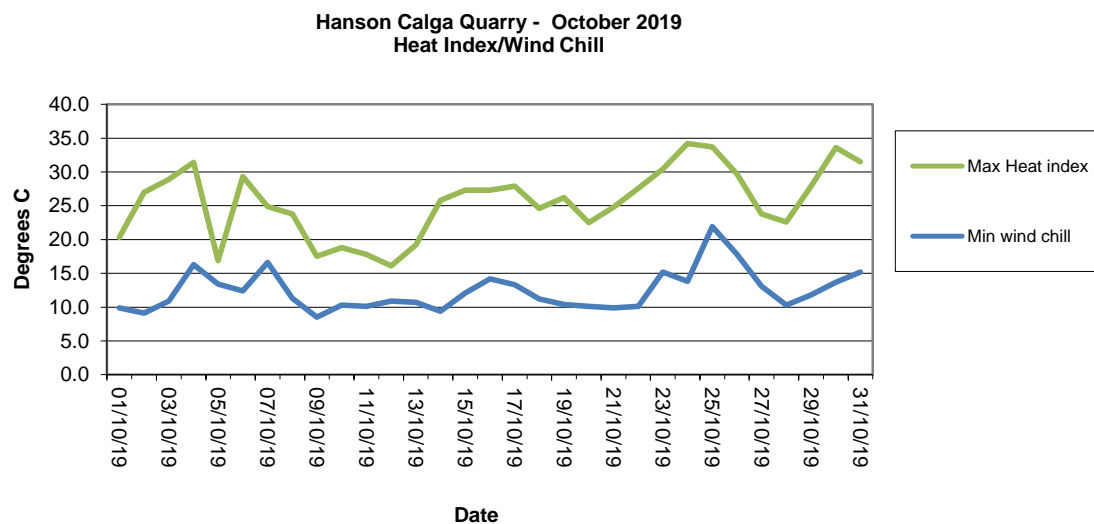
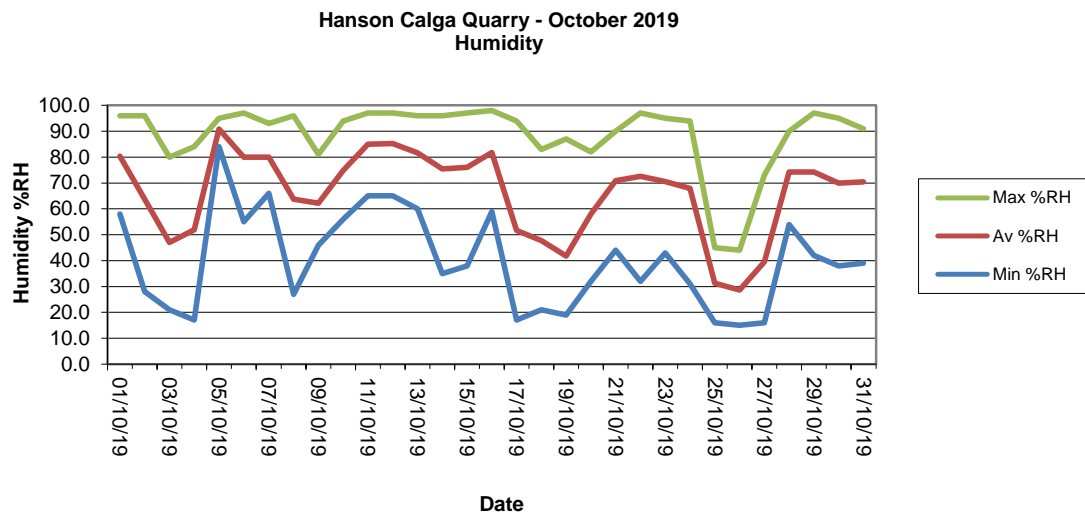
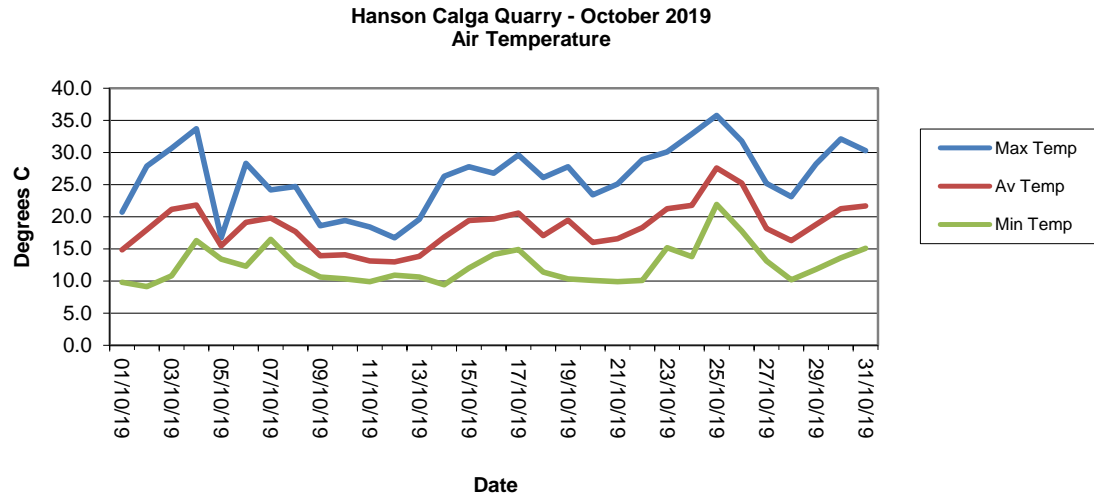
*Data sourced from Bureau of Meteorology (BOM) website (www.bom.gov.au).

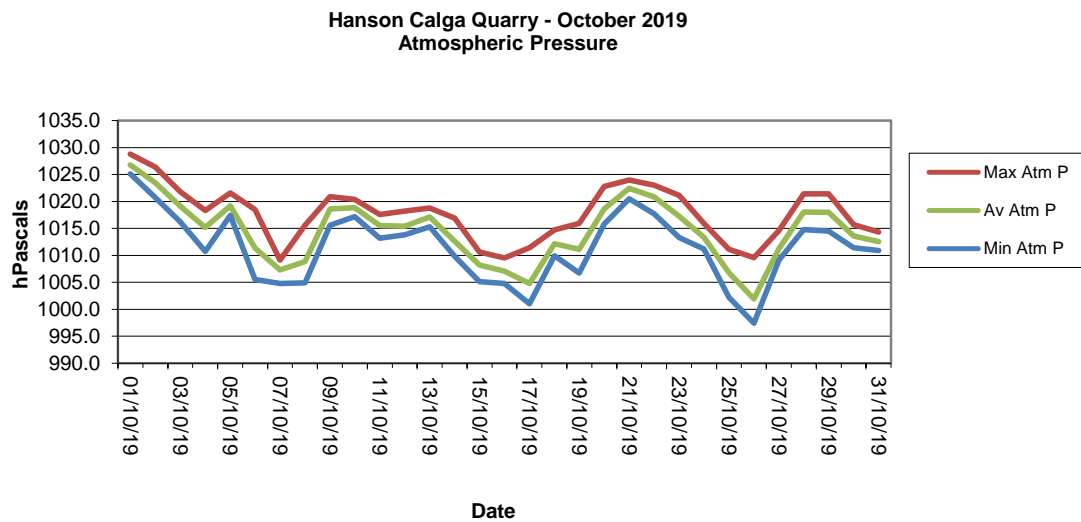
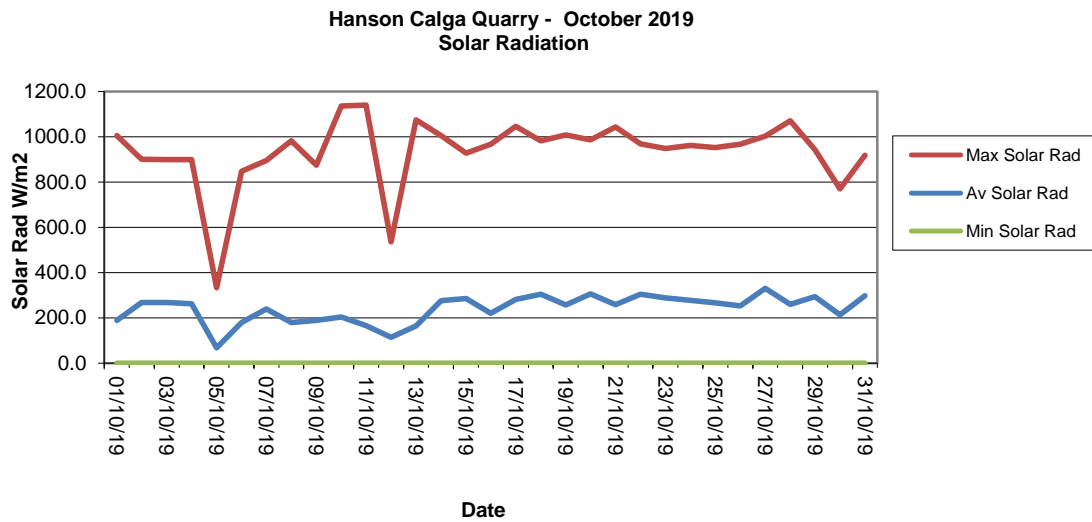
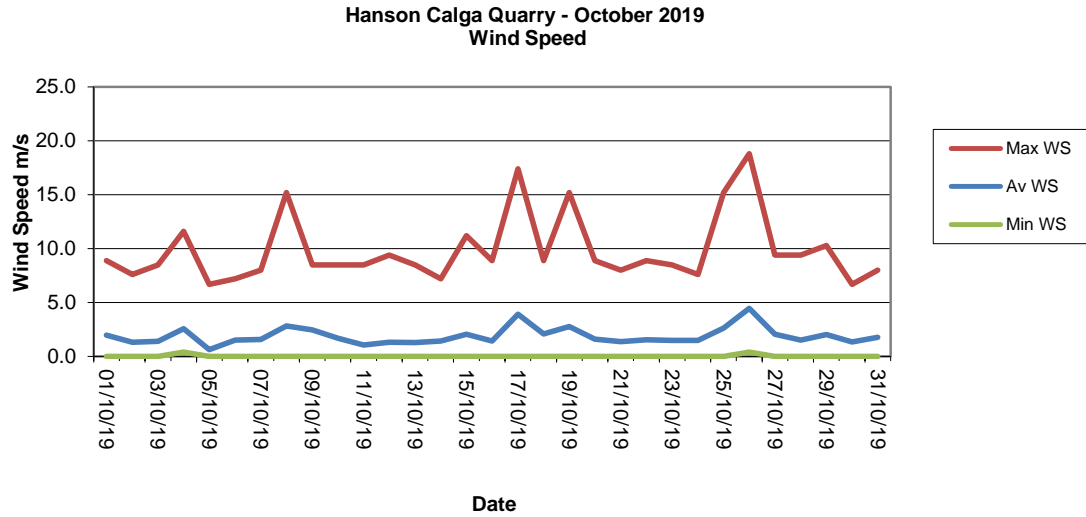
2.4.1 Monthly Meteorological Data Summary

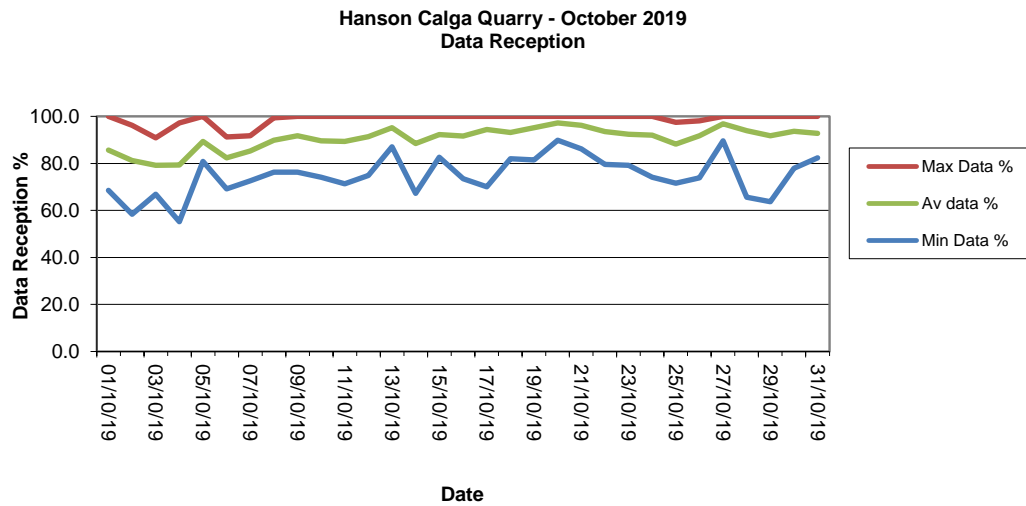
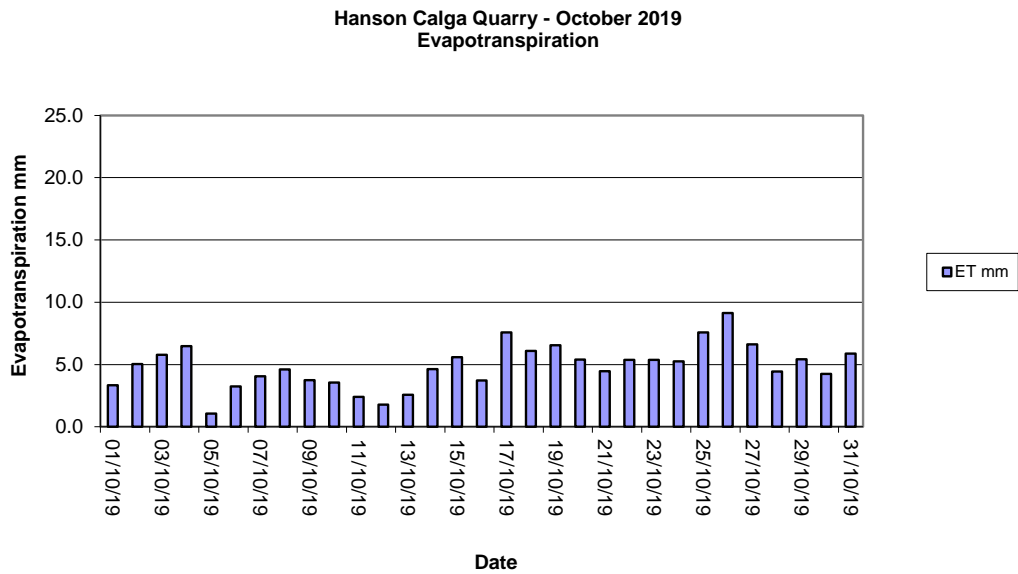
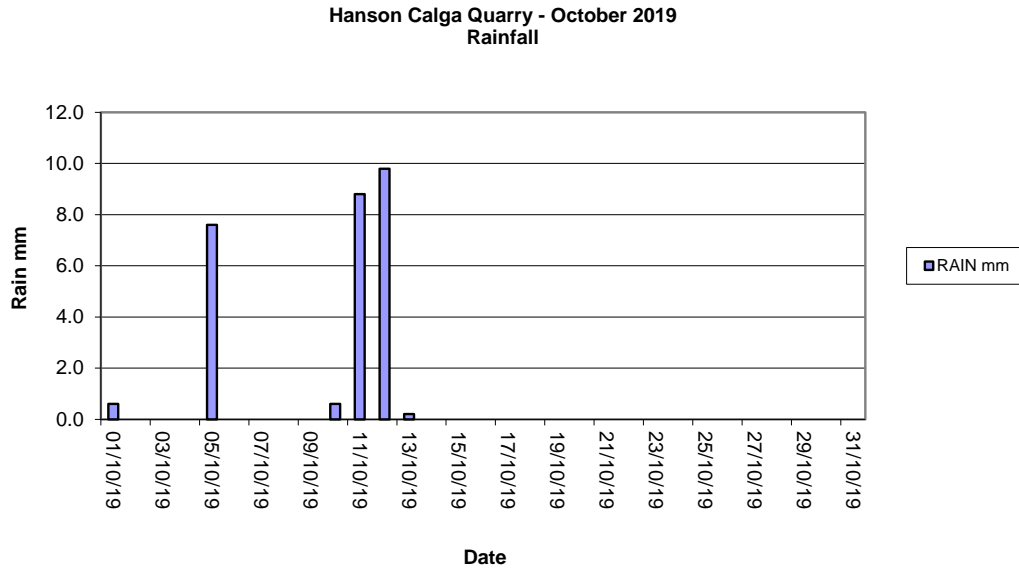
Summary Oct-19 Hanson - Calga

| Date | Min Temp | Av Temp | Max Temp | Min %RH | Av %RH | Max %RH | RAIN mm | ET mm | Min WS | Av WS | Max WS | Min wind chill | Max Heat index | Min Atm P | Av Atm P | Max Atm P | Min Solar Rad | Av Solar Rad | Max Solar Rad | Min Data % | Av data % | Max Data % |
|------------|----------|---------|----------|---------|--------|---------|---------|-------|--------|-------|--------|----------------|----------------|-----------|----------|-----------|---------------|--------------|---------------|------------|-----------|------------|
| 1/10/2019 | 9.8 | 14.9 | 20.7 | 58.0 | 80.4 | 96.0 | 0.6 | 3.3 | 0.0 | 2.0 | 8.9 | 9.9 | 20.3 | 1025.1 | 1026.8 | 1028.8 | 0.0 | 189.2 | 1006.0 | 68.5 | 85.7 | 100.0 |
| 2/10/2019 | 9.1 | 18.0 | 27.9 | 28.0 | 63.8 | 96.0 | 0.0 | 5.0 | 0.0 | 1.3 | 7.6 | 9.1 | 27.0 | 1020.7 | 1023.4 | 1026.4 | 0.0 | 267.1 | 901.0 | 58.4 | 81.2 | 96.2 |
| 3/10/2019 | 10.8 | 21.2 | 30.7 | 21.0 | 47.0 | 80.0 | 0.0 | 5.8 | 0.0 | 1.4 | 8.5 | 10.9 | 28.9 | 1016.2 | 1019.1 | 1021.8 | 0.0 | 268.1 | 900.0 | 66.9 | 79.1 | 90.9 |
| 4/10/2019 | 16.3 | 21.8 | 33.7 | 17.0 | 52.0 | 84.0 | 0.0 | 6.5 | 0.4 | 2.6 | 11.6 | 16.3 | 31.4 | 1010.7 | 1015.2 | 1018.3 | 0.0 | 262.3 | 900.0 | 55.2 | 79.3 | 97.2 |
| 5/10/2019 | 13.4 | 15.5 | 16.7 | 84.0 | 90.8 | 95.0 | 7.6 | 1.1 | 0.0 | 0.6 | 6.7 | 13.4 | 16.9 | 1017.4 | 1019.2 | 1021.6 | 0.0 | 66.9 | 333.0 | 80.8 | 89.3 | 100.0 |
| 6/10/2019 | 12.3 | 19.1 | 28.3 | 55.0 | 80.0 | 97.0 | 0.0 | 3.2 | 0.0 | 1.5 | 7.2 | 12.4 | 29.3 | 1005.5 | 1011.3 | 1018.5 | 0.0 | 179.5 | 848.0 | 69.1 | 82.3 | 91.2 |
| 7/10/2019 | 16.5 | 19.8 | 24.2 | 66.0 | 79.9 | 93.0 | 0.0 | 4.1 | 0.0 | 1.6 | 8.0 | 16.6 | 24.9 | 1004.8 | 1007.3 | 1009.1 | 0.0 | 239.4 | 895.0 | 72.6 | 85.3 | 91.8 |
| 8/10/2019 | 12.6 | 17.7 | 24.7 | 27.0 | 63.7 | 96.0 | 0.0 | 4.6 | 0.0 | 2.8 | 15.2 | 11.3 | 23.8 | 1004.9 | 1008.8 | 1015.6 | 0.0 | 179.3 | 982.0 | 76.3 | 89.8 | 99.4 |
| 9/10/2019 | 10.6 | 13.9 | 18.6 | 46.0 | 62.1 | 81.0 | 0.0 | 3.8 | 0.0 | 2.5 | 8.5 | 8.5 | 17.5 | 1015.6 | 1018.6 | 1020.9 | 0.0 | 189.0 | 875.0 | 76.3 | 91.8 | 100.0 |
| 10/10/2019 | 10.3 | 14.1 | 19.4 | 56.0 | 74.9 | 94.0 | 0.6 | 3.6 | 0.0 | 1.7 | 8.5 | 10.3 | 18.8 | 1017.2 | 1018.8 | 1020.4 | 0.0 | 204.1 | 1137.0 | 74.1 | 89.6 | 100.0 |
| 11/10/2019 | 9.9 | 13.1 | 18.4 | 65.0 | 85.0 | 97.0 | 8.8 | 2.4 | 0.0 | 1.1 | 8.5 | 10.1 | 17.8 | 1013.2 | 1015.5 | 1017.6 | 0.0 | 166.0 | 1141.0 | 71.3 | 89.3 | 100.0 |
| 12/10/2019 | 10.9 | 13.0 | 16.7 | 65.0 | 85.2 | 97.0 | 9.8 | 1.8 | 0.0 | 1.3 | 9.4 | 10.9 | 16.1 | 1013.8 | 1015.4 | 1018.2 | 0.0 | 113.5 | 536.0 | 74.8 | 91.4 | 100.0 |
| 13/10/2019 | 10.6 | 13.8 | 19.6 | 60.0 | 81.6 | 96.0 | 0.2 | 2.6 | 0.0 | 1.3 | 8.5 | 10.7 | 19.2 | 1015.3 | 1017.1 | 1018.8 | 0.0 | 164.7 | 1075.0 | 87.1 | 95.1 | 100.0 |
| 14/10/2019 | 9.4 | 16.8 | 26.3 | 35.0 | 75.4 | 96.0 | 0.0 | 4.6 | 0.0 | 1.4 | 7.2 | 9.4 | 25.8 | 1009.8 | 1012.6 | 1016.9 | 0.0 | 275.9 | 1005.0 | 67.2 | 88.4 | 100.0 |
| 15/10/2019 | 12.0 | 19.4 | 27.8 | 38.0 | 76.0 | 97.0 | 0.0 | 5.6 | 0.0 | 2.1 | 11.2 | 12.1 | 27.3 | 1005.1 | 1008.2 | 1010.6 | 0.0 | 285.7 | 928.0 | 82.6 | 92.2 | 100.0 |
| 16/10/2019 | 14.1 | 19.7 | 26.8 | 59.0 | 81.7 | 98.0 | 0.0 | 3.7 | 0.0 | 1.4 | 8.9 | 14.2 | 27.3 | 1004.8 | 1007.1 | 1009.5 | 0.0 | 219.6 | 968.0 | 73.5 | 91.7 | 100.0 |
| 17/10/2019 | 14.9 | 20.6 | 29.6 | 17.0 | 51.6 | 94.0 | 0.0 | 7.6 | 0.0 | 3.9 | 17.4 | 13.3 | 27.9 | 1001.0 | 1004.8 | 1011.4 | 0.0 | 280.7 | 1046.0 | 70.0 | 94.4 | 100.0 |
| 18/10/2019 | 11.4 | 17.0 | 26.1 | 21.0 | 47.7 | 83.0 | 0.0 | 6.1 | 0.0 | 2.1 | 8.9 | 11.2 | 24.6 | 1009.9 | 1012.2 | 1014.7 | 0.0 | 303.8 | 982.0 | 82.0 | 93.2 | 100.0 |
| 19/10/2019 | 10.3 | 19.4 | 27.8 | 19.0 | 41.7 | 87.0 | 0.0 | 6.5 | 0.0 | 2.8 | 15.2 | 10.4 | 26.2 | 1006.7 | 1011.1 | 1015.9 | 0.0 | 256.2 | 1009.0 | 81.4 | 95.2 | 100.0 |
| 20/10/2019 | 10.1 | 16.0 | 23.4 | 32.0 | 58.0 | 82.0 | 0.0 | 5.4 | 0.0 | 1.6 | 8.9 | 10.1 | 22.5 | 1015.8 | 1018.6 | 1022.8 | 0.0 | 305.1 | 987.0 | 89.9 | 97.2 | 100.0 |
| 21/10/2019 | 9.9 | 16.6 | 25.1 | 44.0 | 70.9 | 90.0 | 0.0 | 4.5 | 0.0 | 1.4 | 8.0 | 9.9 | 24.8 | 1020.5 | 1022.4 | 1024.0 | 0.0 | 258.6 | 1044.0 | 86.1 | 96.2 | 100.0 |
| 22/10/2019 | 10.1 | 18.3 | 28.9 | 32.0 | 72.5 | 97.0 | 0.0 | 5.4 | 0.0 | 1.6 | 8.9 | 10.1 | 27.6 | 1017.7 | 1020.8 | 1023.0 | 0.0 | 303.8 | 969.0 | 79.5 | 93.5 | 100.0 |
| 23/10/2019 | 15.2 | 21.3 | 30.1 | 43.0 | 70.6 | 95.0 | 0.0 | 5.4 | 0.0 | 1.5 | 8.5 | 15.2 | 30.4 | 1013.3 | 1017.2 | 1021.1 | 0.0 | 287.4 | 949.0 | 79.2 | 92.4 | 100.0 |
| 24/10/2019 | 13.8 | 21.8 | 32.9 | 31.0 | 67.9 | 94.0 | 0.0 | 5.3 | 0.0 | 1.5 | 7.6 | 13.8 | 34.2 | 1011.2 | 1013.3 | 1015.9 | 0.0 | 277.5 | 962.0 | 74.1 | 92.0 | 100.0 |
| 25/10/2019 | 21.9 | 27.6 | 35.8 | 16.0 | 31.2 | 45.0 | 0.0 | 7.6 | 0.0 | 2.6 | 15.2 | 21.9 | 33.7 | 1002.2 | 1006.8 | 1011.1 | 0.0 | 266.2 | 952.0 | 71.6 | 88.2 | 97.5 |
| 26/10/2019 | 17.8 | 25.3 | 31.8 | 15.0 | 28.7 | 44.0 | 0.0 | 9.1 | 0.4 | 4.5 | 18.8 | 17.8 | 29.7 | 997.4 | 1001.9 | 1009.6 | 0.0 | 253.0 | 968.0 | 73.8 | 91.7 | 98.1 |
| 27/10/2019 | 13.1 | 18.1 | 25.2 | 16.0 | 39.5 | 73.0 | 0.0 | 6.6 | 0.0 | 2.1 | 9.4 | 13.1 | 23.8 | 1009.1 | 1011.2 | 1014.6 | 0.0 | 330.4 | 1003.0 | 89.6 | 96.8 | 100.0 |
| 28/10/2019 | 10.2 | 16.3 | 23.1 | 54.0 | 74.2 | 90.0 | 0.0 | 4.4 | 0.0 | 1.5 | 9.4 | 10.3 | 22.6 | 1014.8 | 1018.0 | 1021.4 | 0.0 | 260.1 | 1071.0 | 65.6 | 93.9 | 100.0 |
| 29/10/2019 | 11.8 | 18.8 | 28.2 | 42.0 | 74.2 | 97.0 | 0.0 | 5.4 | 0.0 | 2.0 | 10.3 | 11.8 | 27.9 | 1014.5 | 1018.0 | 1021.4 | 0.0 | 293.5 | 943.0 | 63.7 | 91.8 | 100.0 |
| 30/10/2019 | 13.6 | 21.2 | 32.1 | 38.0 | 69.9 | 95.0 | 0.0 | 4.2 | 0.0 | 1.3 | 6.7 | 13.7 | 33.6 | 1011.4 | 1013.6 | 1015.7 | 0.0 | 213.3 | 770.0 | 77.9 | 93.6 | 100.0 |
| 31/10/2019 | 15.1 | 21.7 | 30.3 | 39.0 | 70.4 | 91.0 | 0.0 | 5.9 | 0.0 | 1.8 | 8.0 | 15.2 | 31.5 | 1010.9 | 1012.5 | 1014.3 | 0.0 | 297.8 | 918.0 | 82.3 | 92.8 | 100.0 |
| Monthly | 9.1 | 18.4 | 35.8 | 15 | 66 | 98 | 27.6 | 150.9 | 0 | 1.9 | 18.8 | 8.5 | 34.2 | 997.4 | 1014.4 | 1028.8 | 0 | 240.6 | 1141 | 55.2 | 90.5 | 100 |

2.4.2 Monthly Weather Charts



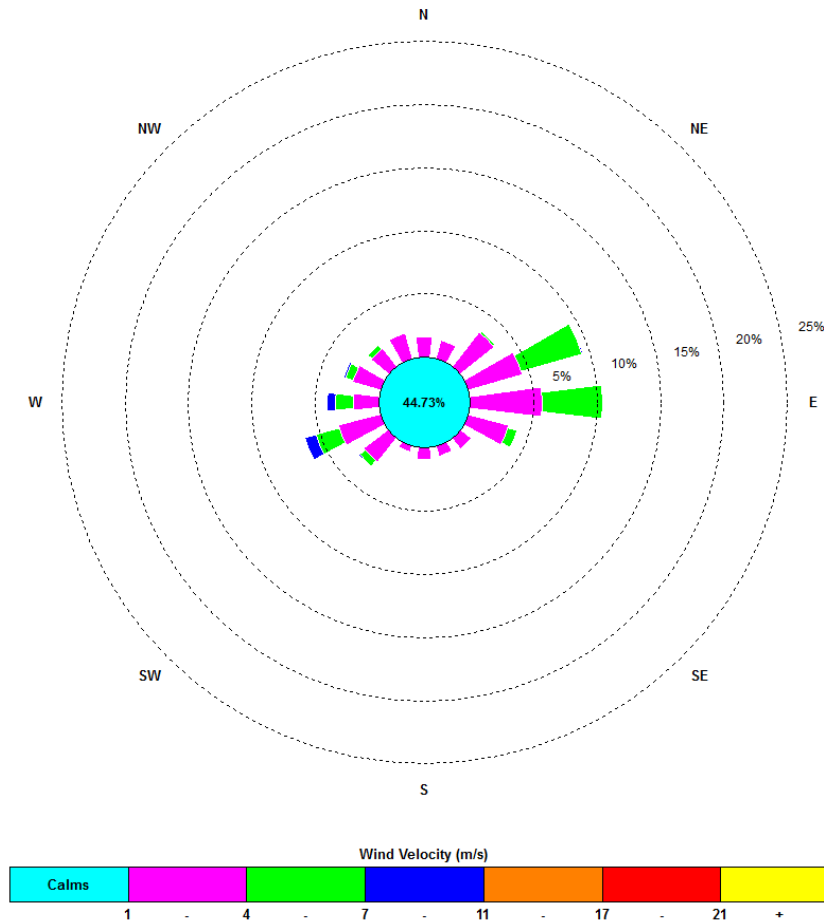




2.4.3 Monthly Windrose Plot

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.

0:00, 1 October 2019 – 23: 45, 31 October 2019



The predominant winds were from the E/ENE, with most frequent, strongest winds from the WSW. The maximum wind speed was 18.8 m/s from the WNW.

Appendix 1

Field Sheets

Chain of Custody

Laboratory Certificates

[illegible]

AUSTRALIAN LABORATORY SERVICES P/L

CERTIFICATE OF ANALYSIS

Work Order : **EN1907749**
Client : **CBASED ENVIRONMENTAL PTY LTD**
Contact : All Deliverables
Address : Unit 3 2 Enterprise Cres
 Singleton NSW 2330
Telephone : +61 02 6571 3334
Project : Hanson Calga Dusts
Order number : ----
C-O-C number : ----
Sampler : Leesa and Jill
Site :
Quote number : SYBQ/403/18 - COMPASS
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 : 01-Nov-2019 13:59
Date Analysis Commenced : 01-Nov-2019
Issue Date : 06-Nov-2019 16:18



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.

| <i>Signatories</i> | <i>Position</i> | <i>Accreditation Category</i> |
|--------------------|-----------------------|--|
| 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 AS3580.10.1-2016. 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 01/10/19-01/11/19 | CD2c 01/10/19-01/11/19 | CD3 01/10/19-01/11/19 | CD4 01/10/19-01/11/19 | CD5 01/10/19-01/11/19 |
|--------------------------------------|------------|-----|-------------------------|--------------------------|---------------------------|--------------------------|--------------------------|--------------------------|
| Client sampling date / time | | | | 01-Nov-2019 00:00 | 01-Nov-2019 00:00 | 01-Nov-2019 00:00 | 01-Nov-2019 00:00 | 01-Nov-2019 00:00 |
| Compound | CAS Number | LOR | Unit | EN1907749-001 | EN1907749-002 | EN1907749-003 | EN1907749-004 | EN1907749-005 |
| | | | | Result | Result | Result | Result | Result |
| EA120: Ash Content | | | | | | | | |
| Ash Content | ---- | 0.1 | g/m ² .month | 1.7 | 0.7 | 1.5 | 1.4 | 0.6 |
| Ash Content (mg) | ---- | 1 | mg | 31 | 12 | 28 | 26 | 11 |
| EA125: Combustible Matter | | | | | | | | |
| Combustible Matter | ---- | 0.1 | g/m ² .month | 0.3 | 0.5 | 0.3 | 1.0 | 0.2 |
| Combustible Matter (mg) | ---- | 1 | mg | 6 | 10 | 4 | 17 | 3 |
| EA141: Total Insoluble Matter | | | | | | | | |
| Total Insoluble Matter | ---- | 0.1 | g/m ² .month | 2.0 | 1.2 | 1.8 | 2.4 | 0.8 |
| Total Insoluble Matter (mg) | ---- | 1 | mg | 37 | 22 | 32 | 43 | 14 |



Analytical Results

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

Client sample ID

| | | | | CD6 | | | | |
|--------------------------------------|------------|-----|-------------------------|-----------------------------|-------------------|------|------|------|
| | | | | 01/10/19-01/11/19 | | | | |
| | | | | Client sampling date / time | 01-Nov-2019 00:00 | | | |
| Compound | CAS Number | LOR | Unit | EN1907749-006 | | | | |
| | | | | Result | | | | |
| EA120: Ash Content | | | | | | | | |
| Ash Content | ---- | 0.1 | g/m ² .month | 0.7 | ---- | ---- | ---- | ---- |
| Ash Content (mg) | ---- | 1 | mg | 12 | ---- | ---- | ---- | ---- |
| EA125: Combustible Matter | | | | | | | | |
| Combustible Matter | ---- | 0.1 | g/m ² .month | 0.5 | ---- | ---- | ---- | ---- |
| Combustible Matter (mg) | ---- | 1 | mg | 9 | ---- | ---- | ---- | ---- |
| EA141: Total Insoluble Matter | | | | | | | | |
| Total Insoluble Matter | ---- | 0.1 | g/m ² .month | 1.2 | ---- | ---- | ---- | ---- |
| Total Insoluble Matter (mg) | ---- | 1 | mg | 21 | ---- | ---- | ---- | ---- |



Date: 1-11-19

Client :
Project :

Hanson Calga

SURFACE WATERS

| Site | Flow Rate | Odour | Sampling Time | Bottles | Water Turbidity | Water Colour | Comments |
|------|----------------|-------|-----------------|--|-----------------|----------------------|----------------|
| A | DAM | NO | 10-00 | 1x 250ml GP, 1x 500mL GP, 1x PG | CST | CLO O B G | |
| B | DRY | | 9-40 | 1x 250ml GP, 1x 500mL GP, 1x PG | CST | CLO O B G | DRY |
| C1 | DAM | NO | 10-30 | 1x 250ml GP, 1x 500mL GP, 1x PG | CST | CLO O B G | |
| C2 | Steady | NO | 10-40 | 1x 250ml GP, 1x 500mL GP, 1x PG | CST | CLO O B G | |
| D | DRY | | 12-10 | 1x 250ml GP, 1x 500mL GP, 1x PG | CST | CLO O B G | |
| F | DAM | NO | 9-45 | 1x 250ml GP, 1x 500mL GP, 1x PG | CST | CLO O B G | |
| | | | | | | | |
| | | | | | | | |
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| | | | | | | | |

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

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

Signed: [Signature]

Sampled by: Leesa + Jill

CHAIN OF CUSTODY DOCUMENTATION

CLIENT: CBased Environmental Pty Ltd

POSTAL ADDRESS: PO Box 245 CESSNOCK NSW 2325

SEND REPORT TO:
monitoringresults@cbased.com.au

SEND INVOICE TO: renae.mikka@cbased.com.au;
accounts@cbased.com.au

DATA NEEDED BY: 5 working days

REPORT NEEDED BY: 5 working days

PROJECT ID: Hanson Quarry SW

QUOTE NO.: SYBQ-403-18

P.O. NO.:

COMMENTS/SPECIAL HANDLING/STORAGE OR DIPOSAL:

FOR LAB USE ONLY

COOLER SEAL

Yes

No

Broken

Intact

COOLER TEMP

deg C

LABORATORY BATCH NO.

SAMPLERS: CBased Environmental Pty Ltd

Leesa + Jill

PHONE: 0265713334

E-MAIL: monitoringresults@cbased.com.au

REPORT FORMAT: HARD: Yes

FAX:

DISK:

BULLETIN BOARD:

E-MAIL: Yes

QC LEVEL:

QCS1:

QCS2:

QCS3: Yes

QCS4:

ANALYSIS REQUIRED

pH

EC

TSS

TDS

O + G

NOTES

SAMPLE DATA

CONTAINER DATA

SAMPLE ID

MATRIX

DATE

TIME

TYPE & PRESERVATIVE

NO.

A

Water

1-11-19

10:30

1x 250mlGP, 1x 500mlGP, 1xPG

X

X

X

X

X

B

Water

1-11-19

10:30

1x 250mlGP, 1x 500mlGP, 1xPG

X

X

X

X

X

C1

Water

1-11-19

10:30

1x 250mlGP, 1x 500mlGP, 1xPG

X

X

X

X

X

C2

Water

1-11-19

10:40

1x 250mlGP, 1x 500mlGP, 1xPG

X

X

X

X

X

D

Water

1-11-19

9:45

1x 250mlGP, 1x 500mlGP, 1xPG

X

X

X

X

X

F

Water

1-11-19

9:45

1x 250mlGP, 1x 500mlGP, 1xPG

X

X

X

X

X

TOTAL BOTTLES:

RELINQUISHED BY:

NAME:

Leesa King

DATE:

1-11-19

OF: CBased Environmental

TIME:

RECEIVED BY:

NAME:

PLS

DATE:

1-11-19

OF:

TIME:

1:59pm

NAME:

DATE:

NAME:

DATE:

OF:

TIME:

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 Rinsed Jar; S = Solvent Washed Acid Rinsed 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

ES1936123



Telephone +61-2-8784 8555

CERTIFICATE OF ANALYSIS

Work Order : **ES1936123**
Client : **CBASED ENVIRONMENTAL PTY LTD**
Contact : All Deliverables
Address : Unit 3 2 Enterprise Cres
 Singleton NSW 2330
Telephone : +61 02 6571 3334
Project : Hanson Quarry SW
Order number : ----
C-O-C number : ----
Sampler : Leesa + Jill
Site :
Quote number : SYBQ/403/18 - COMPASS
No. of samples received : 4
No. of samples analysed : 4

Page : 1 of 2
Laboratory : Environmental Division Sydney
Contact : Customer Services ES
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

Telephone : +61-2-8784 8555
Date Samples Received : 01-Nov-2019 14:00
Date Analysis Commenced : 01-Nov-2019
Issue Date : 06-Nov-2019 14:47



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.

| <i>Signatories</i> | <i>Position</i> | <i>Accreditation Category</i> |
|--------------------|-------------------------|------------------------------------|
| Ankit Joshi | 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.

Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

| | | | | A | C1 | C2 | F | ---- |
|--|------------|------|---------|-------------------|-------------------|-------------------|-------------------|-------|
| Client sampling date / time | | | | 01-Nov-2019 10:00 | 01-Nov-2019 10:30 | 01-Nov-2019 10:40 | 01-Nov-2019 09:45 | ---- |
| Compound | CAS Number | LOR | Unit | ES1936123-001 | ES1936123-002 | ES1936123-003 | ES1936123-004 | ----- |
| | | | | Result | Result | Result | Result | ---- |
| EA005: pH | | | | | | | | |
| pH Value | ---- | 0.01 | pH Unit | 6.61 | 6.65 | 6.23 | 5.12 | ---- |
| EA010P: Conductivity by PC Titrator | | | | | | | | |
| Electrical Conductivity @ 25°C | ---- | 1 | µS/cm | 92 | 110 | 106 | 92 | ---- |
| EA015: Total Dissolved Solids dried at 180 ± 5 °C | | | | | | | | |
| Total Dissolved Solids @180°C | ---- | 10 | mg/L | 72 | 69 | 58 | 64 | ---- |
| EA025: Total Suspended Solids dried at 104 ± 2°C | | | | | | | | |
| Suspended Solids (SS) | ---- | 5 | mg/L | <5 | <5 | <5 | 8 | ---- |
| EP020: Oil and Grease (O&G) | | | | | | | | |
| Oil & Grease | ---- | 5 | mg/L | <5 | <5 | <5 | <5 | ---- |



ALS Laboratory:
please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095
 Ph: 08 8359 0890 E: adelaide@alsglobal.com
BRISBANE 32 Shand Street Stafford QLD 4053
 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com
GLADSTONE 40 Callamondah Drive Clinton QLD 4680
 Ph: 07 7471 5600 E: gladstone@alsglobal.com

MACKEY 78 Harbour Road Mackay QLD 4740
 Ph: 07 4844 3177 E: mackay@alsglobal.com
MELBOURNE 2-4 Westall Road Springvale VIC 3171
 Ph: 03 8549 9000 E: samples.melbourne@alsglobal.com
MUDGE 27 Sydney Road Mudgee NSW 2850
 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

NEWCASTLE 5 585 Maitland Rd Mayfield West NSW 2304
Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

NOWRA 413 Geary Place North Nowra NSW 2511
Ph: 02423 2063 E: nwra@alsglobal.com

PERTH 10 Hed Way Malaga WA 6009
Ph: 08 9208 7655 E: samples.perth@alsglobal.com

QSYDNEY 277-289 Woodpark Road Smithfield NSW 2164
Ph: 02 8784 8556 E: samples.sydney@aisglobal.com
QTCOWNSVILLE 14-15 Desma Court Bohle QLD 4812
Ph: 07 4796 0800 E: townsville.environment@aisglobal.com
QWOLLONGONG 99 Kenny Street Wollongong NSW 2500
Ph: 02 4225 3125 E: porkembia@aisglobal.com

| | | | | | | | |
|--|--|---|--|---|--|---|--|
| CLIENT: Hanson Calga Quarry - 151 Peats Ridge Rd Calga NSW 2250 | | TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g., Ultra Trace Organics) | | <input type="checkbox"/> Standard TAT (List due date): <input checked="" type="checkbox"/> Non Standard or urgent TAT (List due date): pH priority 9/10/2019 | | PORT LABORATORY USE ONLY (CNSC) CUSTOMER USE ONLY Free and Accurate independent analysis No liability Sample temperature and pH noted Chain of custody | |
| OFFICE: | | ALS QUOTE NO.: SYBG 222-19 | | COC SEQUENCE NUMBER (Circle) | | | |
| PROJECT: Hanson Calga Quarry, Site Water Discharge Dam 1 (A) | | | | COC: 1 | | | |
| ORDER NUMBER: 4502635126 | | | | OF: 1 | | | |
| PROJECT MANAGER: Shane Pescud | | CONTACT PH: (02) 4375 1151 | | | | | |
| SAMPLER: Shane Pescud | | SAMPLER MOBILE: 0425 290 692 | | RELINQUISHED BY: | | RECEIVED BY: | |
| COC emailed to ALS? Provided on receipt of samples | | EDD FORMAT (or default): | | DATE/TIME: 9/10/2019 | | DATE/TIME: | |
| Email Reports to: shane.pescud@hanson.com.au & monitoringresults@cbased.com.au | | | | | | DATE/TIME: | |
| Email Invoiced to: nsw.accounts@hanson.com.au & chanae.delaney@hanson.com.au | | | | | | DATE/TIME: | |

[illegible]

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulfate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic bag for Acid Sulfate Solids; B = Unpreserved Bag.

CERTIFICATE OF ANALYSIS

Work Order : **ES1932894**
Client : **HANSON CONSTRUCTION MATERIALS PTY LTD**
Contact : MR SHANE PESCU
Address : FARLEIGH-HABANA RD FARLEIGH
MACKAY QUEENSLAND 4741
Telephone : 02 4375 1151
Project : HANSON CALGA QUARRY, SITE WATER DISCHARGE DAM 1
(A)
Order number : 4502635126
C-O-C number : ----
Sampler : SHANE PESCU
Site : ----
Quote number : EN/333
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 2
Laboratory : Environmental Division Sydney
Contact : Customer Services ES
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 09-Oct-2019 10:30
Date Analysis Commenced : 09-Oct-2019
Issue Date : 11-Oct-2019 17:12



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 |
|-------------|-------------------|------------------------------------|
| Ankit Joshi | Inorganic Chemist | Sydney Inorganics, Smithfield, 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.

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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.

Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

| | | | | Discharge Dam 1 (A) 09102019 (Comparison test prior to release) | ---- | ---- | ---- | ---- |
|--|------------|------|---------|--|-------|-------|-------|-------|
| Client sampling date / time | | | | 09-Oct-2019 08:55 | ---- | ---- | ---- | ---- |
| Compound | CAS Number | LOR | Unit | ES1932894-001 | ----- | ----- | ----- | ----- |
| Result | | | | | ---- | ---- | ---- | ---- |
| EA005P: pH by PC Titrator | | | | | | | | |
| pH Value | ---- | 0.01 | pH Unit | 7.01 | ---- | ---- | ---- | ---- |
| EA010P: Conductivity by PC Titrator | | | | | | | | |
| Electrical Conductivity @ 25°C | ---- | 1 | µS/cm | 118 | ---- | ---- | ---- | ---- |
| EA015: Total Dissolved Solids dried at 180 ± 5 °C | | | | | | | | |
| Total Dissolved Solids @180°C | ---- | 10 | mg/L | 62 | ---- | ---- | ---- | ---- |
| EA025: Total Suspended Solids dried at 104 ± 2°C | | | | | | | | |
| Suspended Solids (SS) | ---- | 5 | mg/L | 6 | ---- | ---- | ---- | ---- |
| EP020: Oil and Grease (O&G) | | | | | | | | |
| Oil & Grease | ---- | 5 | mg/L | <5 | ---- | ---- | ---- | ---- |

ALS Laboratory:
please tick →

JAGS 4000 24 Napa Road, Newark CA 94560
 Tel: 925 895 0000 Fax: 925 895 0000
 JEN BRAND 12 Shred Street, Salford, GLD 1 1 1
 Tel: 01753 600 500 Fax: 01753 600 500
 JENKINS 1000 16 Colindale Avenue, London GLD 4 4 4
 Tel: 07 153 1234 Fax: 07 153 1234

J. JACKSON, 70 Harpers Road, Mackay, Qld 4740
 Tel. 07 41 11 1777. mackay@dreamnet.com
 J. NELSON, RNE 141, Central Road, St Leonards, VIC 3158
 Tel. 03 9416 9100. csamples@mc.man.ac.uk
 M. J. PARRER, 20 Ardenby Road, St Leonards, VIC 3158
 Tel. 03 9416 9100. m.parrer@mc.man.ac.uk

[illegible]

JSDONOR 277-296 Shawnee Road, Suite # 100, 216
 St. Louis, MO 63104-4448, a non-profit organization
 JSDONOR 277-296 Shawnee Road, Suite # 100, 216
 St. Louis, MO 63104-4448, a non-profit organization
 JSDONOR 277-296 Shawnee Road, Suite # 100, 216
 St. Louis, MO 63104-4448, a non-profit organization

CLIENT: Hanson Galga Quarry - 151 Peats Ridge Rd Galga NSW 2250

OFFICE:

PROJECT: Hanson Calga Quarry, Site Water Discharge Dam 1 (A)

ORDER NUMBER: 4502635126

PROJECT MANAGER: Shane Pescud

CONTACT PH: (02) 4375 1151

SAMPLER: Shane Pescud

SAMPLER MOBILE: 0425 290 692

COC emailed to ALS? Provided on receipt of samples

EDD FORMAT (or default):

Email Reports to: shane.pescud@hanson.com.au & monitoringresults@cbased.com.au

Email invoice to: nsw.accounts@hanson.com.au & chanae.delany@hanson.com.au ,

TURNAROUND REQUIREMENTS :

(Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)

☐ Standard TAT (List due date):

☒ Non Standard or urgent TAT (List due date): pH priority 11/10/2019

ALS QUOTE NO.:

SYBQ 222-19

COC SEQUENCE NUMBER (Circle)

GOC: 1

OF: 1

RELINQUISHED BY:

DATE/TIME: 11/10/2019

RECEIVED BY:

DATE/TIME:

FOR LABORATORY USE ONLY (Circle)

| | | | |
|--|---------|----|-------|
| Custody Seal Intact? | Yes | No | (N/A) |
| Free Ice / frozen ice bricks present upon receipt? | Yes | No | N/A |
| Random Sample Temperature on Receipt: | 17.0 °C | | |
| Other comment: | | | |

RELINQUISHED BY:

DATE/TIME:

RECEIVED BY:

DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

| ALS USE | SAMPLE DETAILS MATRG: SOLID (S) WATER (W) | | CONTAINER INFORMATION | | | ANALYSIS REQUIRED including SUITES (NB, Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required). | | | | | | | | Additional Information |
|---------|--|-------------------|-----------------------|---|------------------|--|----|-----|-----|--------------|--|--|--|--|
| LAB ID | SAMPLE ID | DATE / TIME | MATRIX | TYPE & PRESERVATIVE <i>codes below</i> | TOTAL CONTAINERS | pH | EC | TSS | TDS | Oil & Grease | | | | Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc. |
| ① | Discharge Dam 1 (A) 11102019 | 11/10/2019 6:50am | W | 1x P, 1x O&G | 2 | 1 | 1 | 1 | 1 | 1 | | | | |
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Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Gd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SO₂ = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Solis; B = Unpreserved Bag.

CERTIFICATE OF ANALYSIS

Work Order : **ES1933251**
Client : **HANSON CONSTRUCTION MATERIALS PTY LTD**
Contact : MR SHANE PESCU
Address : PO BOX 206
 BATHURST NSW,AUSTRALIA 2795
Telephone : 02 4375 1151
Project : HANSON CALGA QUARRY, SITE WATER DISCHARGE DAM 1
 (A)
Order number : 4502635126
C-O-C number : ----
Sampler : SHANE PESCU
Site : ----
Quote number : EN/333
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 2
Laboratory : Environmental Division Sydney
Contact : Customer Services ES
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164

Telephone : +61-2-8784 8555
Date Samples Received : 11-Oct-2019 09:00

Date Analysis Commenced : 11-Oct-2019
Issue Date : 14-Oct-2019 14:51



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 |
|-------------|-------------------|------------------------------------|
| Ankit Joshi | Inorganic Chemist | Sydney Inorganics, Smithfield, 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.

Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

| | | | | Discharge Dam 1 (A) 11102019 | ---- | ---- | ---- | ---- |
|--|------------|------|---------|---------------------------------|-------|-------|-------|-------|
| Client sampling date / time | | | | 11-Oct-2019 06:50 | ---- | ---- | ---- | ---- |
| Compound | CAS Number | LOR | Unit | ES1933251-001 | ----- | ----- | ----- | ----- |
| Result | | | | ---- | ---- | ---- | ---- | ---- |
| EA005P: pH by PC Titrator | | | | | | | | |
| pH Value | ---- | 0.01 | pH Unit | 7.13 | ---- | ---- | ---- | ---- |
| EA010P: Conductivity by PC Titrator | | | | | | | | |
| Electrical Conductivity @ 25°C | ---- | 1 | µS/cm | 94 | ---- | ---- | ---- | ---- |
| 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 | <5 | ---- | ---- | ---- | ---- |
| EP020: Oil and Grease (O&G) | | | | | | | | |
| Oil & Grease | ---- | 5 | mg/L | <5 | ---- | ---- | ---- | ---- |



ALS
Environmental

ALS Laboratory:
please tick →

UADLAIDE 21 Surma Road Formosa SA 5095
 Ph: 08 8359 9890 E: adolalide@alsglobal.com
JBURISBANE 37 Shand Street Stafford QLD 4057
 Ph: 07 3243 7722 E: sales@alsglobal.com
UGLADSTONE 48 Callomavich Drive Clonca QLD 47
 Ph: 07 7471 5620 E: madstone@alsglobal.com

DI MACKAY 28 Harbour Road Mackay QLD 4740
 Ph: 07 4941 0177 E: mackay@alsglobal.com
DI MELBOURNE 24 Westall Road Springvale VIC 3171
 Ph: 03 8549 0800 E: samples.melbourne@alsglobal.com
DI MUDGEE 27 Swiny Road Mudgee NSW 2850
 Ph: 02 8372 8735 E: mudgee.mel@alsglobal.com

NEWCASTLE 5 585 Mainland Rd Mayfield West NSW 2304
Ph: 02 4014 2506 E: samples.newcastle@global.com

NOOWARA 4 113 Geary Place North Nowra NSW 2541
Ph: 02 4423 2063 E: nowra@global.com

PERTH 10 Hod Way Malaga WA 6000
Ph: 08 9209 7655 E: samples.perth@global.com

SYDNEY 277-299 Woodpark Road Smithfield NSW 2164
Ph. 02 8781 8555 E. samplesydney@alsglobal.com
JOHANNESBURG 1515 Deans Court Bohle G.D. 4812
Ph. 07 4798 0000 E. johannesburg@alsglobal.com

WOLLONGONG 99 Kenny Street Wollongong NSW 2500
Ph. 02 4225 3125 E. northmbla@alsglobal.com

Email involve to: nsw.accounts@hanson.com.au & chanae.delany@hanson.com.au

Non Standard or urgent TAT (List due date): pH priority 15/10/2019

COC SEQUENCE NUMBER (Circle)

OF: 1

DATE/TIME: 15/10/2019

DATE/TIME:

RECEIVED BY:

DATE/TIME:

DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

| ALS USE | | SAMPLE DETAILS MATRIX: SOLID (S) WATER (W) | | CONTAINER INFORMATION | | ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required). | | | | | | | | | | Additional Information | |
|---------|------------------------------|---|--------|---|------------------|--|----|-----|-----|--------------|--|--|--|--|--|------------------------|--|
| LAB ID | SAMPLE ID | DATE / TIME | MATRIX | TYPE & PRESERVATIVE <i>codes below</i> | TOTAL CONTAINERS | pH | EC | TSS | TDS | Oil & Grease | | | | | | | Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc. |
| 1 | Discharge Dam 1 (A) 15102019 | 15/10/2019 6:55am | W | 1x P, 1x O&G | 2 | 1 | 1 | 1 | 1 | 1 | | | | | | | |
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Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Gd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP = Airtight Unpreserved Plastic

V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulfite Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; F = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.



| | |
|-------------------------|--|
| Work Order | : ES1933589 |
| Client | : HANSON CONSTRUCTION MATERIALS PTY LTD |
| Contact | : MR SHANE PESCU |
| Address | : 20 Parker street Carrington 2294 |
| Telephone | : 02 4375 1151 |
| Project | : HANSON CALGA QUARRY, SITE WATER DISCHARGE DAM 1 (A) |
| Order number | : 4502635126 |
| C-O-C number | : --- |
| Sampler | : Dale Wilcox |
| Site | : --- |
| Quote number | : EN/333 |
| No. of samples received | : 1 |
| No. of samples analysed | : 1 |

| | |
|-------------------------|---|
| Page | : 1 of 2 |
| Laboratory | : Environmental Division Sydney |
| Contact | : Customer Services ES |
| Address | : 277-289 Woodpark Road Smithfield NSW Australia 2164 |
| Telephone | : +61-2-8784 8555 |
| Date Samples Received | : 15-Oct-2019 09:15 |
| Date Analysis Commenced | : 15-Oct-2019 |
| Issue Date | : 18-Oct-2019 11:02 |

The logo for IAC-MRA (International Accreditation Consortium - Measurement Reporting Australia) is located in the bottom right corner. It features a circular design with a stylized sunburst or fan-like pattern in the background. The text "IAC-MRA" is prominently displayed in the foreground, with "IAC" in a larger, bold font and "MRA" in a slightly smaller font to its right. The logo is rendered in a blue color scheme.

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

Ankit Joshi

Inorganic Chemist

Sydney Inorganics, Smithfield, NSW



General Comments

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 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.

Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

| | | | | Discharge Dam 1 (A) 15102019 | ---- | ---- | ---- | ---- |
|--|------------|------|---------|---------------------------------|-------|-------|-------|-------|
| Client sampling date / time | | | | 15-Oct-2019 06:55 | ---- | ---- | ---- | ---- |
| Compound | CAS Number | LOR | Unit | ES1933589-001 | ----- | ----- | ----- | ----- |
| Result | | | | ---- | ---- | ---- | ---- | ---- |
| EA005P: pH by PC Titrator | | | | | | | | |
| pH Value | ---- | 0.01 | pH Unit | 6.19 | ---- | ---- | ---- | ---- |
| EA010P: Conductivity by PC Titrator | | | | | | | | |
| Electrical Conductivity @ 25°C | ---- | 1 | µS/cm | 84 | ---- | ---- | ---- | ---- |
| EA015: Total Dissolved Solids dried at 180 ± 5 °C | | | | | | | | |
| Total Dissolved Solids @180°C | ---- | 10 | mg/L | 74 | ---- | ---- | ---- | ---- |
| EA025: Total Suspended Solids dried at 104 ± 2°C | | | | | | | | |
| Suspended Solids (SS) | ---- | 5 | mg/L | <5 | ---- | ---- | ---- | ---- |
| EP020: Oil and Grease (O&G) | | | | | | | | |
| Oil & Grease | ---- | 5 | mg/L | <5 | ---- | ---- | ---- | ---- |