



CBased Environmental Pty Limited

ABN 62 611 924 264



Calga Quarry

Environmental Monitoring

Dust Deposition, Surface Water, Groundwater and Meteorological Data

April 2021

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Environmental Scientist
Date: 20 May 2021

Executive Summary

CBased Environmental is contracted by Hanson Quarry Products to conduct environmental monitoring at the Calga Sand Quarry.

The monitoring includes:

- Dust deposition;
- Surface water; and
- A meteorological data.

This report was prepared by CBased Environmental and includes the following results for April 2021:

- Dust deposition;
- Surface water quality;
- Bi-annual ground water quality; and
- Meteorological parameters.

The April 2021 dust deposition results for insoluble solids showed:

- Decreased levels when compared to March 2021 with exception to CD3 which has increased levels in comparison.
- No excessively contaminated dust gauges; and
- Rolling annual averages below the Air Quality Management Plan criteria of 3.7g/m².month.

Monthly 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 were not detected at sites A, B, C1, C2, D and F in April 2021.

The Calga Quarry weather station data recovery in April 2021 was approximately 100%. A summary of rainfall comparison is provided below.

Location	Rainfall (mm)
Calga Quarry	10.2mm
BOM Peats Ridge*	NA
BOM Gosford*	41.4mm
BOM Peats Ridge long-term mean for April*	123.0mm

Notes: NA = Not Available

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

BOM stations report rainfall at 9am

Calga Quarry station reports rainfall at midnight.

1.0 Sampling Programme

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 water, 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.

Six (6) dust deposition gauges are monitored as follows:

- CD1 – installed 1 May 2006. Gauges air quality impacts to the east of site operations;
- CD2c – located on a rehabilitated section of land between the extraction area and adjacent resident. Gauges air quality impacts to the north of site operations. Replaces former gauges CD2a and CD2b;
- CD3 – installed prior to May 2006. Gauges air quality impacts to the south of site operations;
- CD4 – installed 3 October 2006. Gauges air quality impacts to the south of site operations;
- CD5 – installed 14 December 2006. Gauges air quality impacts to the south of site operations; and
- CD6 installed 14 December 2006. Gauges air quality impacts to the south of the operations.

Dust gauge CD2a was discontinued at the start of August 2006 due to quarry operations "mining out" the site of the gauge. The replacement gauge, 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. 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. CD2b was replacement by dust gauge CD2c.

Surface water is 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. Laboratory analysis includes pH, electrical conductivity, total suspended solids, total dissolved solids and total oil and grease. Monitoring 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.

Groundwater is 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; and
- 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**.

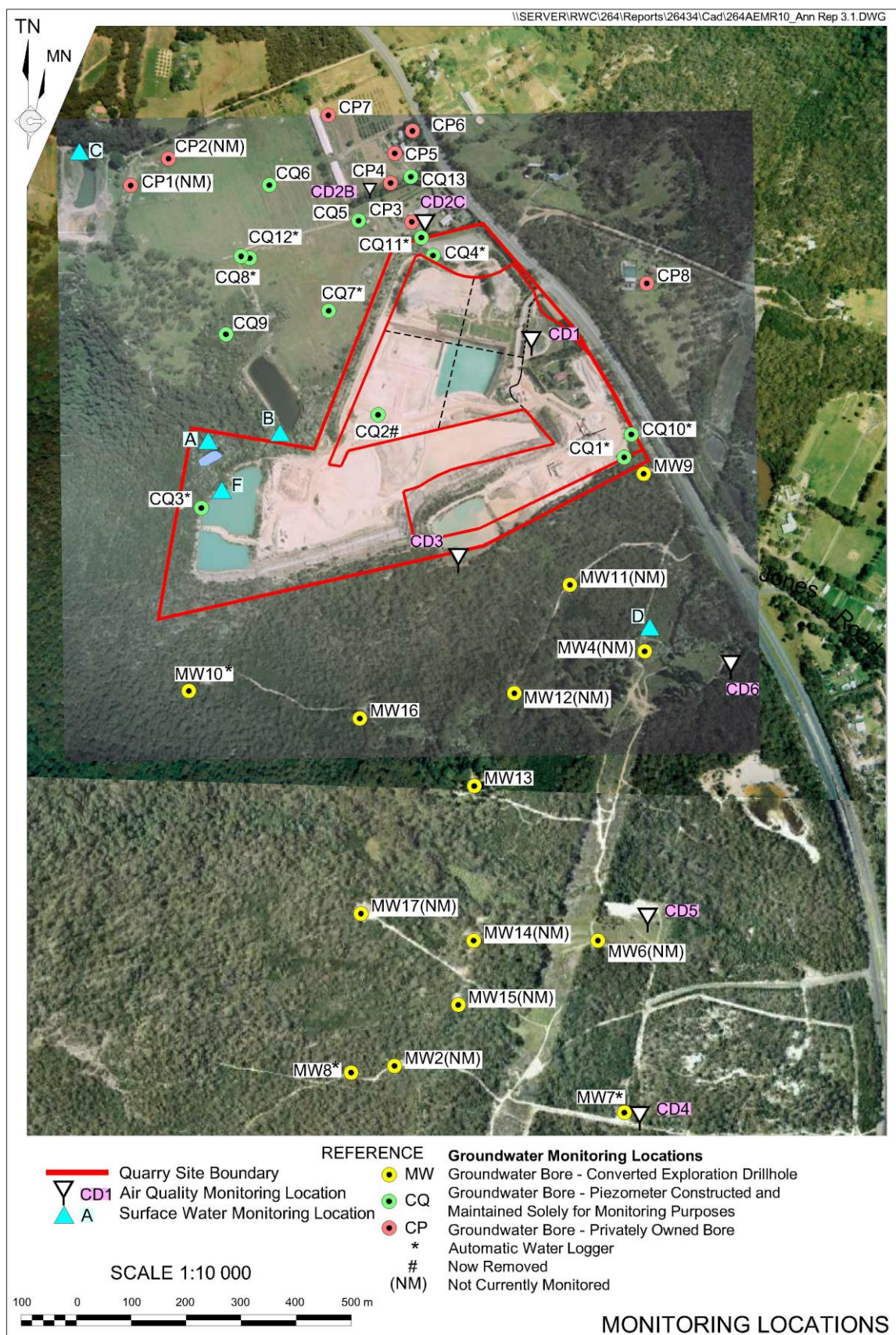


Figure 1: Hanson Calga Quarry Environmental Monitoring Locations

2.0 Results

2.1 Dust Deposition

The results for April 2021 and the project 12-month rolling average are provided **Table 1**.

Dust deposition charts for all dust gauge sites appear in **Figure 2** below. The field sheet, chain of custody documentation and laboratory analysis certificates are provided in **Appendix 1**.

Table 1: Dust Deposition Results: 1 April 2021 – 3 May 2021 (32 days)

Site	Monthly Insoluble Solids	Monthly Ash Residue	Monthly Combustible Matter	Monthly Ash Residue/ Insoluble Solids %	Rolling Annual Average Insoluble Solids
CD1	1.0	0.5	0.5	50	1.4
CD2c	0.4	0.3	0.1	75	0.8
CD3	0.7	0.3	0.4	43	1.2
CD4	0.3	0.1	0.2	33	0.7
CD5	0.2	0.1	0.1	50	0.8
CD6	0.4	0.2	0.2	50	0.7

Notes:

Units in g/m².month unless indicated

*Insoluble solid results 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 3.7g/m².month; the Development Consent's annual average amenity criteria at residential locations*

The current rolling annual average is calculated from May 2020 to April 2021

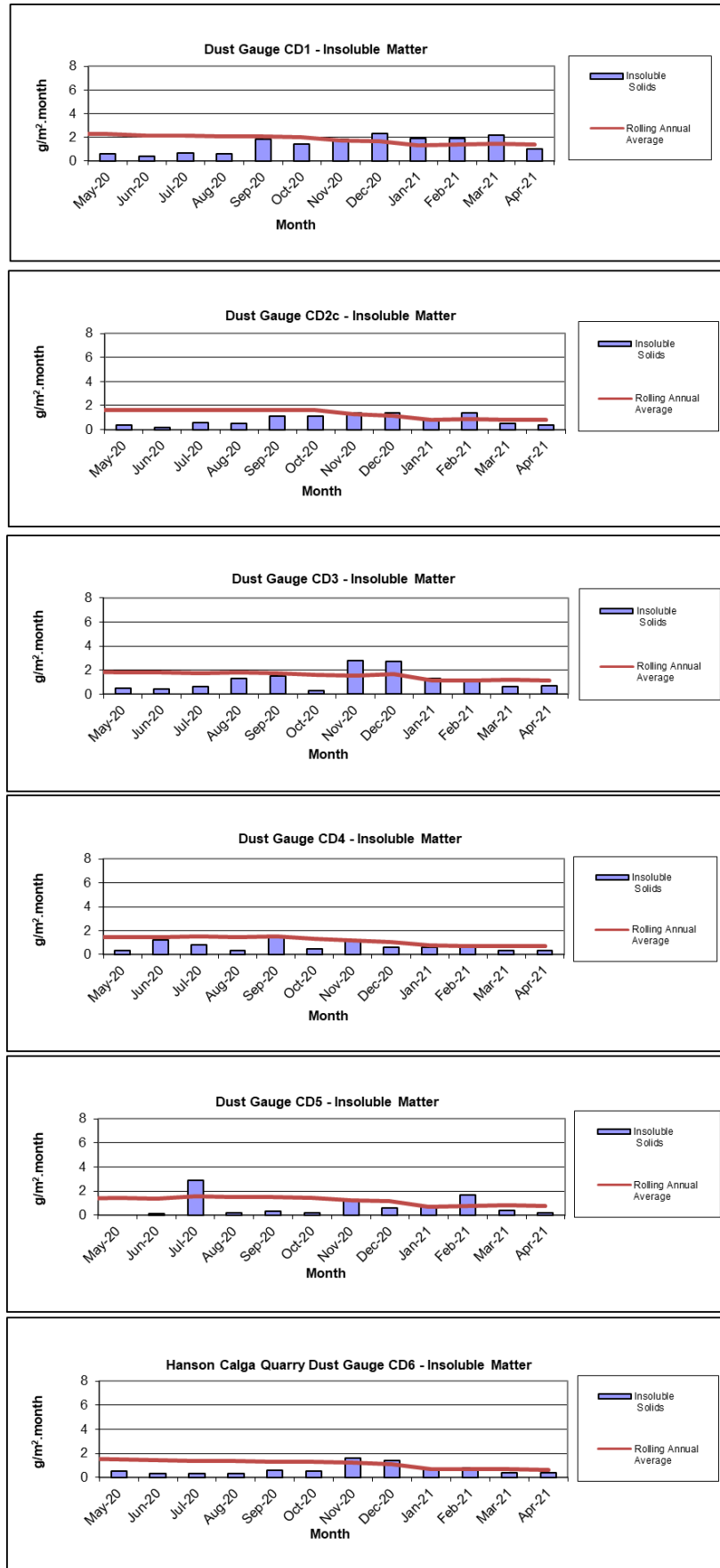


Figure 2: Summary Monthly/Annual Dust Deposition Results for Insoluble Solids

2.2 Surface Water (Monthly)

Monthly surface water monitoring was conducted on 1 April 2021 and results are provided in **Table 2**. The field sheet, chain of custody documentation and laboratory analysis certificates are provided in **Appendix 1**.

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

Table 2: Monthly Surface Water Monitoring Results – April 2021

Site	Observed Flow Rate* (visual)	Water Colour* (visual)	Turbidity* (visual)	pH	EC (μ S/cm)	TDS (mg/L)	TSS (mg/L)	Oil and Grease (mg/L)
A	Dam	Clear	Clear	5.78	56	36	10	<5
B	Trickle	Brown	Clear	6.69	79	58	<5	<5
C1	Dam	Clear	Clear	6.42	88	49	9	<5
C2	Steady	Clear	Clear	6.14	103	54	5	<5
D	Still	Clear	Clear	5.44	76	48	<5	<5
F	Dam	Clear	Slight	6.1	94	58	<5	<5

* Indicates field measurements. All other results are laboratory analysed

EC = Electrical conductivity

TDS = Total dissolved solids

TSS = Total suspended solids

2.2.1 Non-Routine Surface Water Sampling

No non-routine surface water sampling was completed in April 2021.

2.3 Groundwater (Bi-monthly)

Groundwater was sampled on 1 April 2021. Data is displayed in Table 3 and Figures 3 – 6. The field sheet, chain of custody documentation and laboratory analysis certificates are provided in Appendix 1.

Water quality tests for pH and electrical conductivity were conducted by CBased Environmental Pty Limited. For water quality purposes, water was purged from the bore until constant pH (\pm 0.1 pH units) and electrical conductivity (\pm 5%) was obtained between samples.

Table 3: Groundwater Quality Data

Site	Bore	Type	Depth to Water April 2006	Depth to Water (this report)	pH (this report)	Electrical Conductivity (this report)
CQ3	Voutos	* Monitor	10.53	10.69	6.08	141.9
CQ4	Voutos	* Monitor	8.78	10.69	4.7	163.6
CQ5	Gazzana	Dip only	8.69	5.55	4.09	273.9
CQ6	Gazzana	Dip only	16.00			
CQ7	Gazzana	* Monitor	6.89	5.53	5.04	239.4
CQ8	Gazzana	* Monitor	11.03	5.36	4.89	162.7
CQ9	Gazzana	Dip only	10.10			
CQ10	Voutos	* Monitor	NI	24.65	5.48	141.7
CQ11S	Gazzana	* Monitor	NI	10.98	5.63	213.9
CQ11D	Gazzana	* Monitor	NI	12.16	5.16	178.3
CQ12	Gazzana	* Monitor	NI	3.47	4.14	190.3
CQ13	Kashouli	* Monitor	NI	12.28	4.3	195.1
CP3	Gazzana	Domestic	10.40			
CP4	Kashouli	Domestic	13.63	1.61	5.28	265.1
CP5	Kashouli	Domestic	16.61	4.97	6.11	141.3
CP6	Kashouli	Domestic	16.27	7.76	4.4	169.4
CP7	Kashouli	Production	8.56	0.86	6.08	134.6
CP8	Rozmanec	Domestic	22.17	20.41	4.36	135.6
CP13	W P White	Domestic	NI	10.07	4.58	149.1
CP15	32 Polins Road, Calga	Domestic	NI	1.81	5.8	166.7
MW7	Rocla Bore	* Monitor	15.76	13.42	5.52	25.3
MW8	Rocla Bore	* Monitor	9.82	6.50	4.95	81.8
MW9	Rocla Bore	* Monitor	22.44	23.27	4.47	111.8
MW10	Rocla Bore	* Monitor	15.41			
MW13	Rocla Bore	Dip only	NI	7.59	4.48	129.1
MW16	Rocla Bore	Dip only	NI	8.12	4.40	143.7
MW17	Rocla Bore	Dip only	NI	9.96	4.83	152.8

Notes:

Water level measured from top of bore case (TOC) to water

pH measured in pH units / electrical conductivity measured in $\mu\text{S}/\text{cm}$

Blank cells = no data available

* = Logger Installed

NI = Bores installed after April 2006. April 2006 was the first set of measurements taken by CBased Environmental Pty Limited

Yellow shading indicates increase to groundwater depth (water moved away from surface) since last sampling event

Green shading indicates decrease to groundwater depth (water moved towards surface) since last sampling event

Pink shading indicates stable groundwater depth (+/- 0.01m) since last sampling event

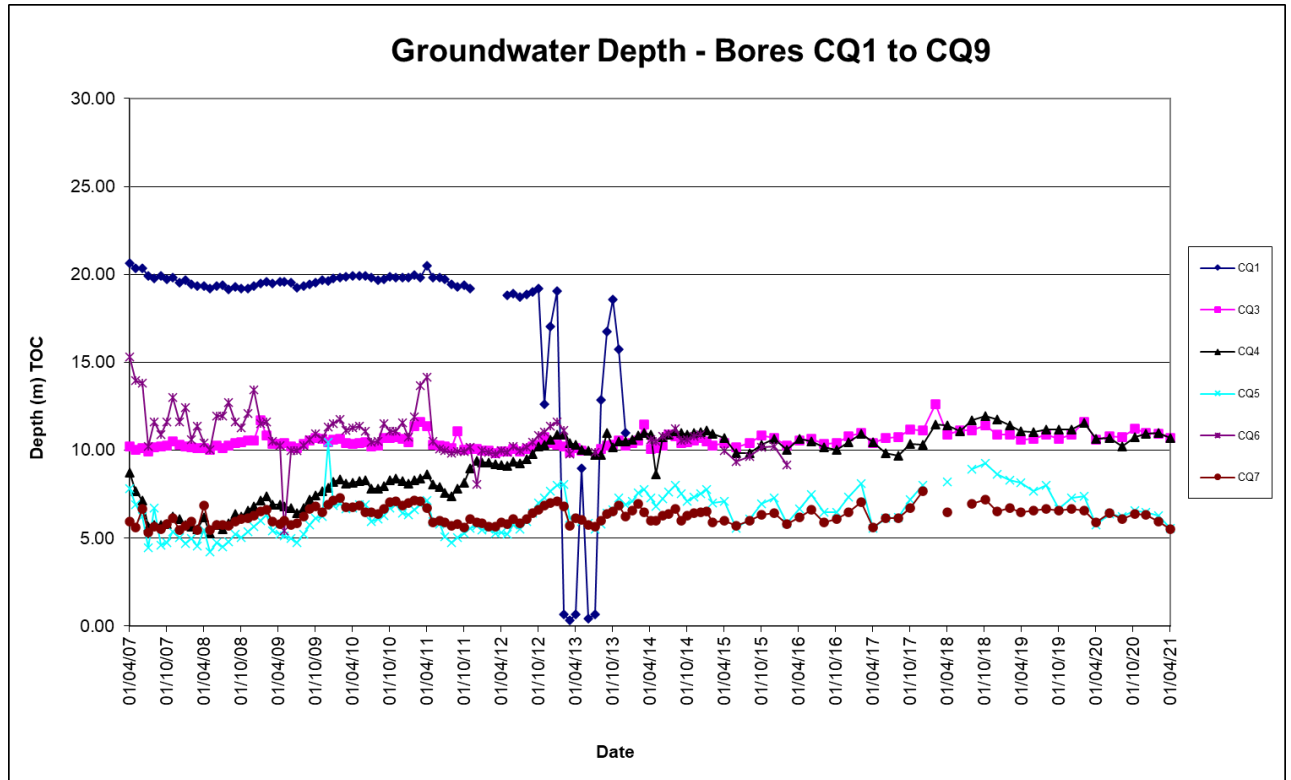


Figure 3: *Groundwater Depth – Bores CQ1 to CQ9*

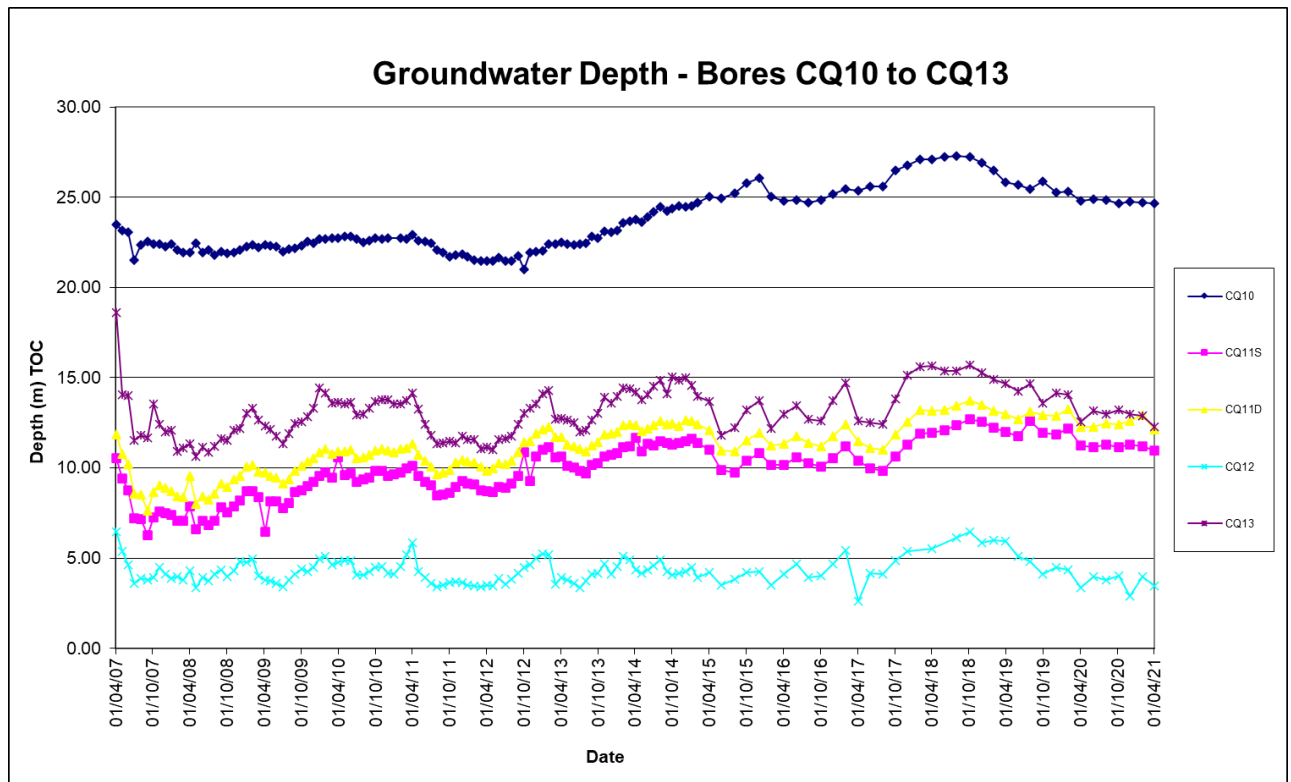


Figure 4: *Groundwater Depth – Bores CQ10 to CQ13*

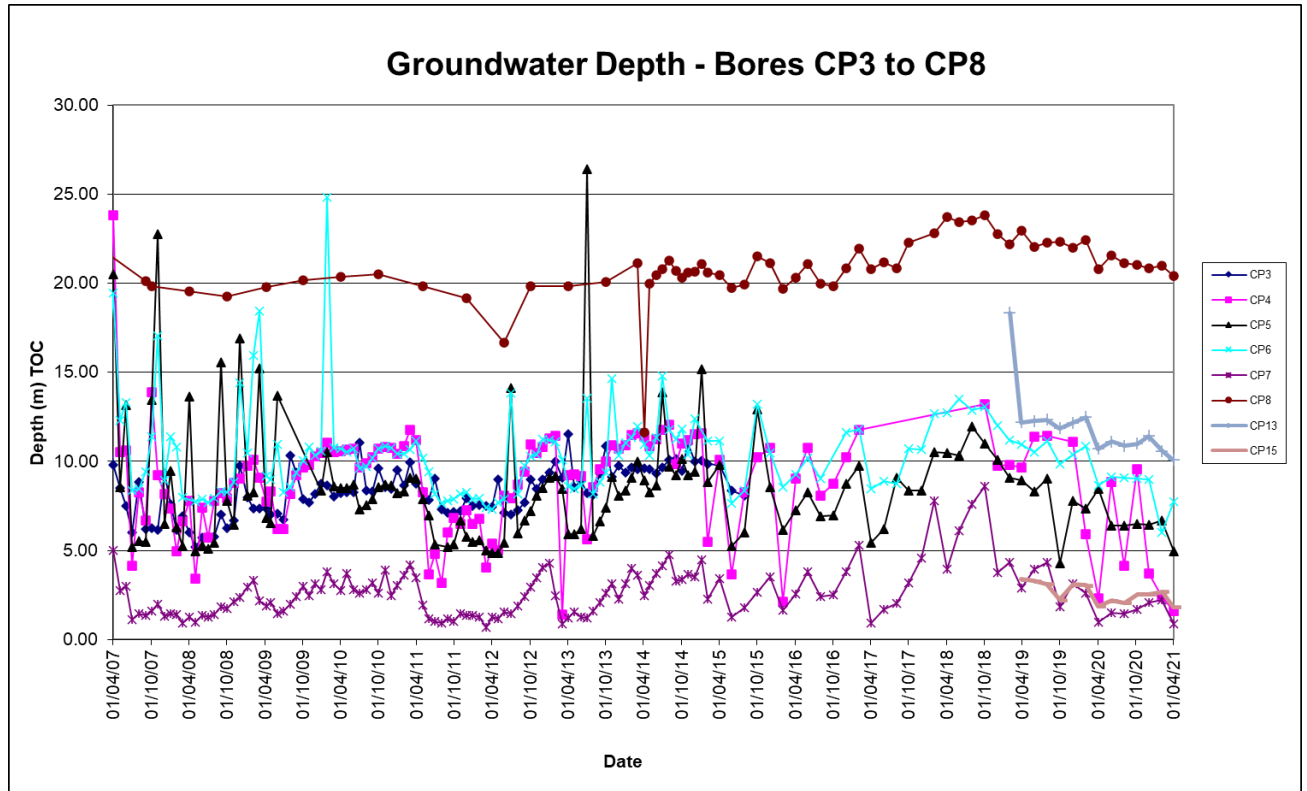


Figure 5: Groundwater Depth – Bores CP3 to CP8

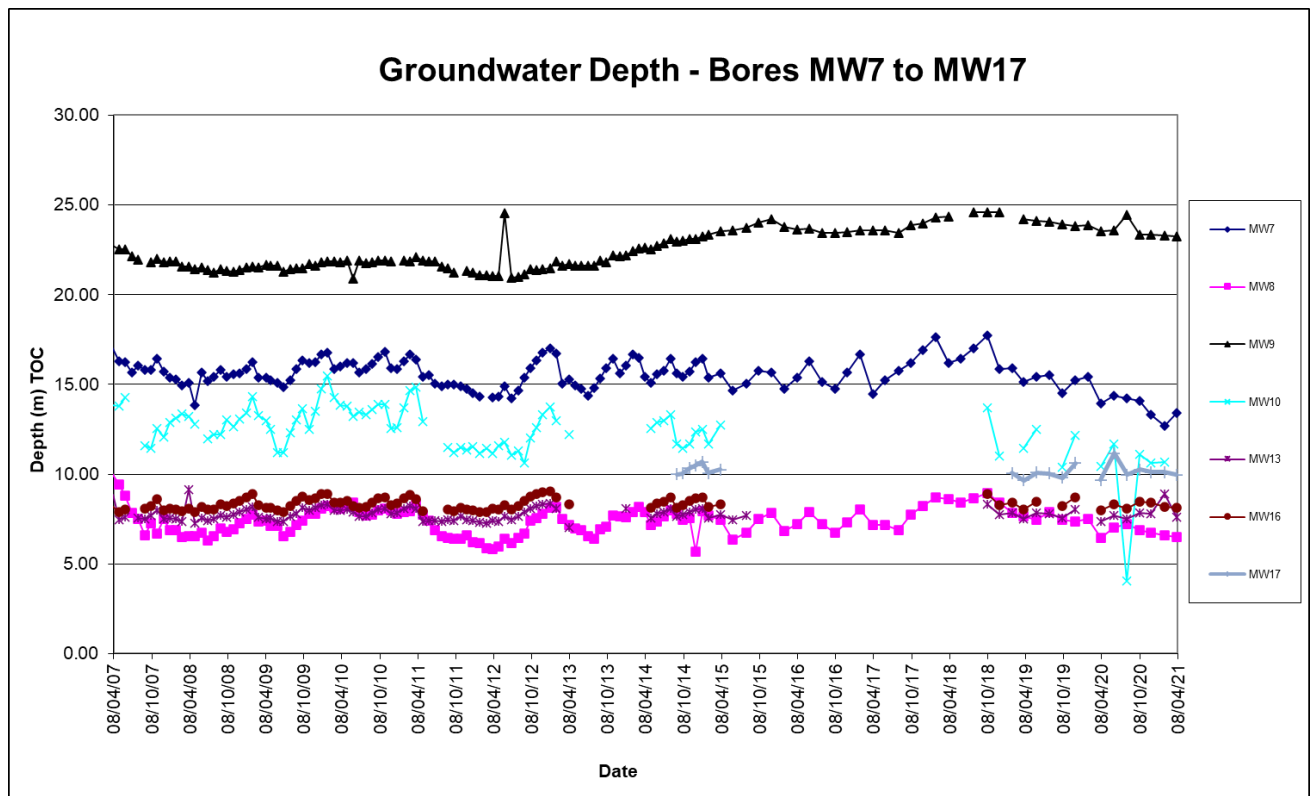


Figure 6: Groundwater Depth – Bores MW7 to MW17

2.4 Meteorological Data

The Calga Quarry weather station data recovery for April 2021 was approximately 100%.

The weather station data follows and includes:

- Monthly rainfall comparison between quarry data and BOM data. Refer to **Table 4**;
- Monthly data summary. Refer to **Table 5**;
- Weather charts of air temperature, humidity, heat index and wind chill, atmospheric pressure, solar radiation, evapotranspiration, rain, wind speed and data reception. Refer to **Figures 7 – 10**; and
- Wind rose (frequency distribution diagram of wind speed and direction). Refer to **Figure 10**.

A summary of rainfall comparison is provided in **Table 4**.

Table 4: Comparison of Local Rainfall – April 2021

Location	Rainfall (mm)
Calga Quarry	10.2mm
BOM Peats Ridge*	NA
BOM Gosford*	41.4mm
BOM Peats Ridge long-term mean for March*	123.0mm

Notes: NA = Not Available

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

BOM stations report rainfall at 9am

Calga Quarry station reports rainfall at midnight.

An annual calibration was undertaken on the weather station during April 2020 and is next due in May 2021. Please refer to **Appendix 1**.

Table 5: Summary of Monthly Meteorological Data – April 2021

Date	Temperature Min	Temperature Avg	Temperature Max	Relative Humidity Min	Relative Humidity Avg	Relative Humidity Max	Rain	Evapotranspiration	Wind Speed Min	Wind Speed Avg	Wind Speed Max	Wind Chill Min	Heat Index Max	Atmospheric Pressure Min	Atmospheric Pressure Avg	Atmospheric Pressure Max	Solar Radiation Min	Solar Radiation Avg	Solar Radiation Max	Data Min	Data Avg	Data Max
1/04/2021	13.8	18.1	23.9	67.0	86.9	97.0	0.6	2.3	0.0	0.8	6.7	13.9	24.3	1019.4	1021.2	1022.7	0.0	139.3	645.0	75.7	91.8	100.0
2/04/2021	13.9	18.9	26.2	56.0	84.8	98.0	0.2	3.5	0.0	0.9	6.7	13.9	26.4	1021.4	1022.7	1024.0	0.0	220.9	982.0	81.1	87.7	94.6
3/04/2021	13.1	19.1	26.6	61.0	85.1	98.0	0.2	3.4	0.0	1.5	7.2	13.2	27.3	1018.1	1020.4	1023.1	0.0	203.6	886.0	83.0	89.1	96.8
4/04/2021	14.8	21.2	29.1	53.0	78.4	96.0	0.0	3.5	0.0	0.8	5.8	14.9	29.8	1012.4	1014.9	1018.1	0.0	209.1	822.0	80.8	88.7	94.0
5/04/2021	13.9	20.3	26.9	59.0	85.2	98.0	0.0	2.9	0.0	0.7	8.5	13.9	27.7	1012.6	1015.3	1017.9	0.0	178.1	885.0	79.2	86.5	92.1
6/04/2021	16.4	19.7	23.8	80.0	93.3	98.0	5.4	1.3	0.0	0.5	6.7	16.4	24.9	1015.9	1017.1	1018.7	0.0	88.9	482.0	68.8	87.7	99.1
7/04/2021	17.1	18.9	23.2	84.0	95.2	99.0	1.2	1.0	0.0	0.4	6.7	17.1	24.2	1012.2	1015.0	1016.3	0.0	112.3	779.0	58.4	86.0	99.7
8/04/2021	16.4	17.9	20.4	89.0	92.6	94.0	0.0	0.0	0.0	0.5	4.5	16.4	21.1	1005.5	1006.4	1007.1	0.0	0.0	0.0	92.1	95.0	96.8
9/04/2021	16.3	20.9	27.1	59.0	80.2	95.0	0.2	2.8	0.0	1.4	9.4	16.4	28.0	998.5	1001.8	1005.3	0.0	152.0	798.0	78.9	90.7	100.0
10/04/2021	14.3	18.1	23.5	42.0	71.3	97.0	0.4	4.1	0.0	2.1	9.4	14.3	22.8	1000.2	1002.7	1005.5	0.0	198.4	777.0	71.6	89.0	97.5
11/04/2021	11.4	14.8	17.9	36.0	51.8	69.0	0.0	5.3	0.9	4.2	13.9	10.8	16.2	1003.9	1007.4	1012.6	0.0	210.9	843.0	86.1	92.0	97.8
12/04/2021	7.7	13.1	20.0	39.0	62.4	85.0	0.0	3.7	0.0	1.1	7.6	7.8	19.1	1012.2	1015.5	1018.6	0.0	215.4	778.0	78.5	92.9	99.7
13/04/2021	7.1	14.4	22.8	43.0	75.3	95.0	0.0	3.4	0.0	1.0	6.7	7.1	22.3	1014.5	1017.1	1020.1	0.0	211.8	771.0	68.5	90.4	98.7
14/04/2021	13.0	20.0	26.8	27.0	50.2	85.0	0.0	4.7	0.0	1.9	9.4	13.1	25.7	1008.6	1011.1	1014.5	0.0	189.5	753.0	81.4	92.1	97.8
15/04/2021	13.9	19.6	26.9	38.0	55.7	75.0	0.0	4.0	0.0	0.7	5.8	14.0	26.1	1008.2	1010.9	1013.0	0.0	206.7	756.0	89.0	96.2	100.0
16/04/2021	14.3	16.7	20.6	55.0	67.6	81.0	0.0	2.4	0.0	1.3	9.8	14.4	20.4	1011.9	1016.9	1020.8	0.0	105.6	671.0	75.7	93.7	99.7
17/04/2021	10.6	14.3	15.7	75.0	88.4	96.0	0.6	0.7	0.0	0.0	1.8	10.6	15.8	1018.4	1019.5	1020.6	0.0	34.3	190.0	87.7	95.8	97.5
18/04/2021	9.8	14.3	22.2	53.0	83.8	98.0	0.2	2.4	0.0	0.7	4.0	9.9	21.9	1015.2	1017.6	1019.4	0.0	165.8	736.0	87.7	95.3	100.0
19/04/2021	8.7	16.0	24.2	44.0	74.6	97.0	0.2	3.1	0.0	0.6	4.9	8.8	23.6	1011.2	1013.9	1016.5	0.0	196.7	731.0	77.9	95.6	100.0
20/04/2021	11.2	16.6	22.3	48.0	60.7	76.0	0.0	3.0	0.0	1.0	7.2	11.2	21.3	1006.6	1010.0	1013.2	0.0	151.6	778.0	70.7	93.1	100.0
21/04/2021	10.3	15.7	20.1	39.0	61.4	89.0	0.0	3.8	0.0	1.6	10.3	10.3	19.1	1005.6	1009.3	1012.5	0.0	197.7	752.0	66.9	93.9	100.0
22/04/2021	7.1	13.4	20.5	36.0	64.6	94.0	0.0	3.6	0.0	1.4	9.8	7.1	19.0	1006.8	1010.3	1012.9	0.0	196.7	732.0	72.6	90.7	98.7
23/04/2021	8.8	14.2	21.9	44.0	64.2	87.0	0.0	3.2	0.0	0.4	6.7	8.8	21.1	1012.3	1014.3	1017.5	0.0	190.8	718.0	65.0	93.0	98.7
24/04/2021	7.9	14.6	22.9	48.0	77.3	95.0	0.0	2.8	0.0	0.6	5.4	8.0	22.7	1016.0	1017.9	1019.8	0.0	186.7	709.0	84.2	92.8	100.0
25/04/2021	8.7	14.5	22.8	55.0	82.7	95.0	0.0	2.6	0.0	0.5	5.4	8.7	22.8	1018.3	1019.9	1021.4	0.0	178.8	707.0	83.9	89.4	95.0
26/04/2021	9.2	15.2	22.8	54.0	84.3	98.0	0.2	2.7	0.0	0.6	4.9	9.2	22.8	1019.6	1021.3	1022.7	0.0	186.3	761.0	76.7	87.5	97.2
27/04/2021	11.1	15.4	23.6	54.0	85.3	97.0	0.0	1.9	0.0	0.5	5.8	11.1	23.6	1021.3	1022.9	1024.9	0.0	126.1	666.0	77.0	89.1	99.4
28/04/2021	11.8	15.7	20.9	69.0	86.2	98.0	0.6	1.8	0.0	0.7	5.4	11.9	20.8	1020.1	1021.8	1023.8	0.0	114.8	665.0	57.4	89.0	99.1
29/04/2021	9.6	15.7	23.6	56.0	84.5	98.0	0.0	2.3	0.0	0.6	5.4	9.7	23.6	1019.2	1021.1	1022.9	0.0	152.1	672.0	82.6	94.2	100.0
30/04/2021	10.1	15.4	21.8	69.0	89.6	98.0	0.2	1.6	0.0	0.4	5.4	10.1	21.9	1022.6	1024.6	1026.2	0.0	111.6	699.0	76.0	88.7	100.0
Monthly	7.1	16.8	29.1	27	77	99	10.2	83.6	0.0	1.0	13.9	7.1	29.8	998.5	1015.4	1026.2	0.0	161.1	982.0	57.4	91.3	100.0
Unit	Degrees Celcius (°C)			Percentage Relative Humidity			mm	mm	Metres per second (m/s)			°C	°C	Hector Pascals (hPa)			Watts per square metre (W/m ²)			Percentage (%)		

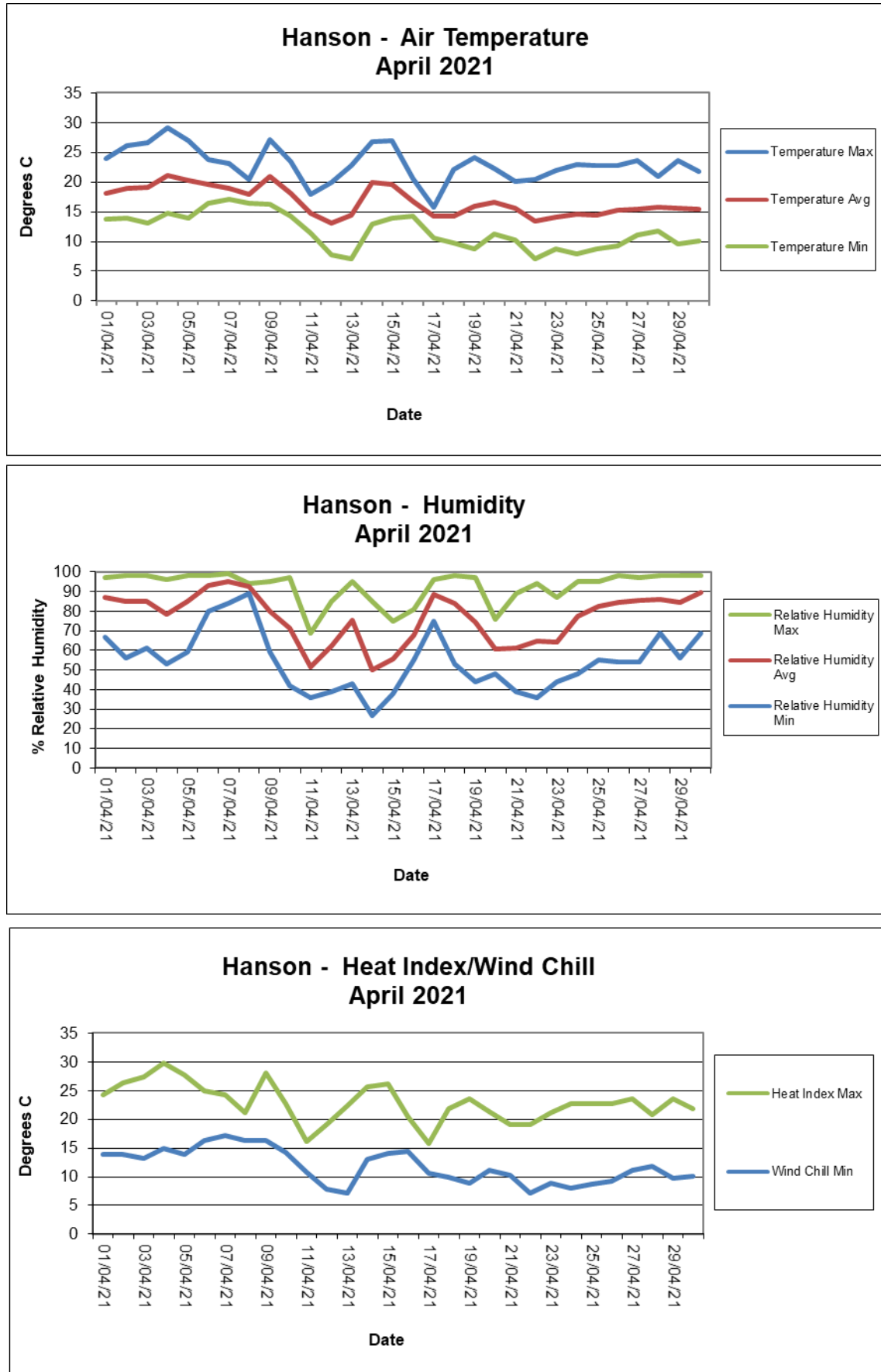


Figure 7 Summary of Monthly Temperature, Humidity and Heat Index Results

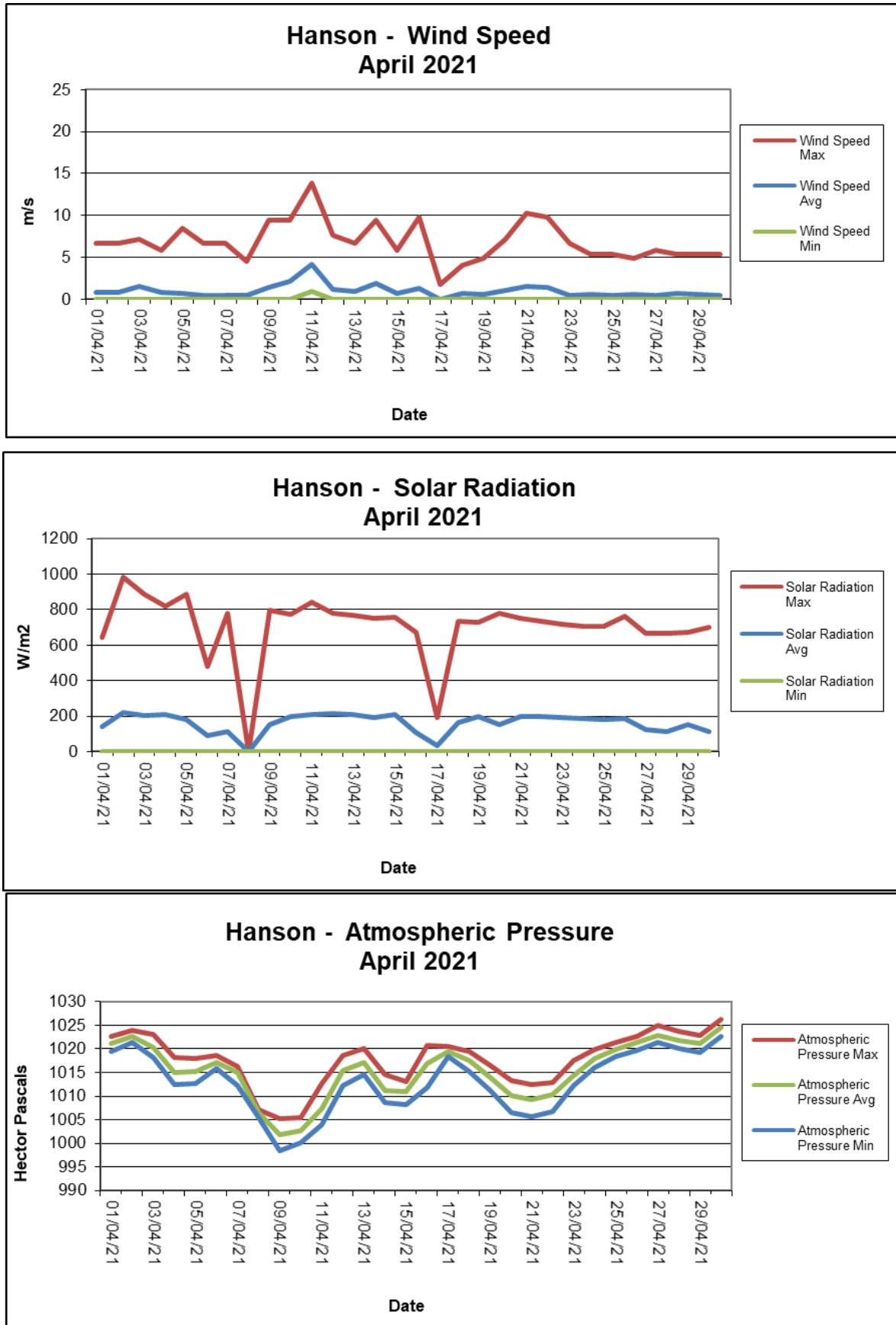


Figure 8 Summary of Monthly Wind Speed, Solar Radiation and Atmospheric Pressure Results

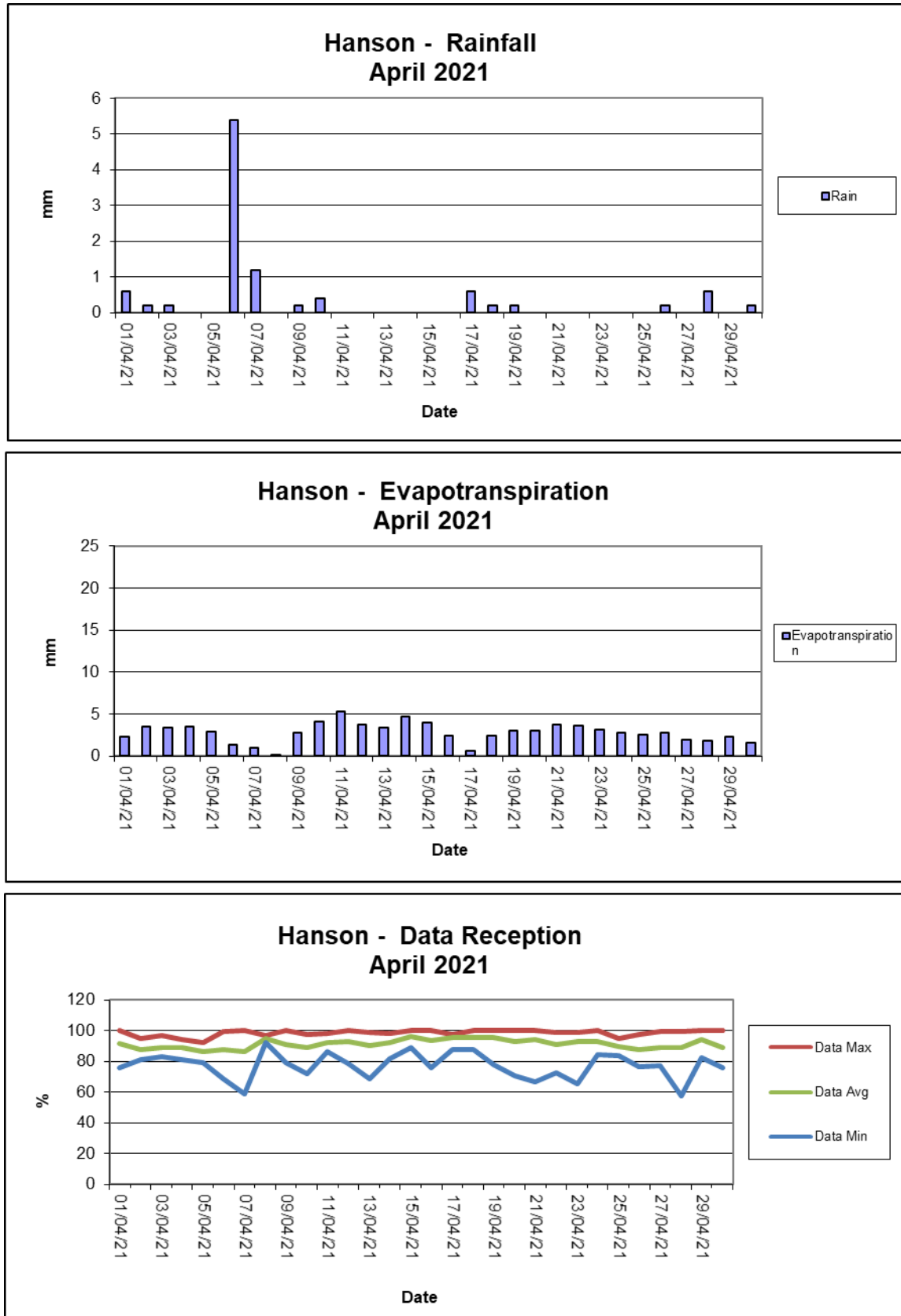


Figure 9 Summary of Monthly Rainfall, Evapotranspiration and Data Reception Results

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.

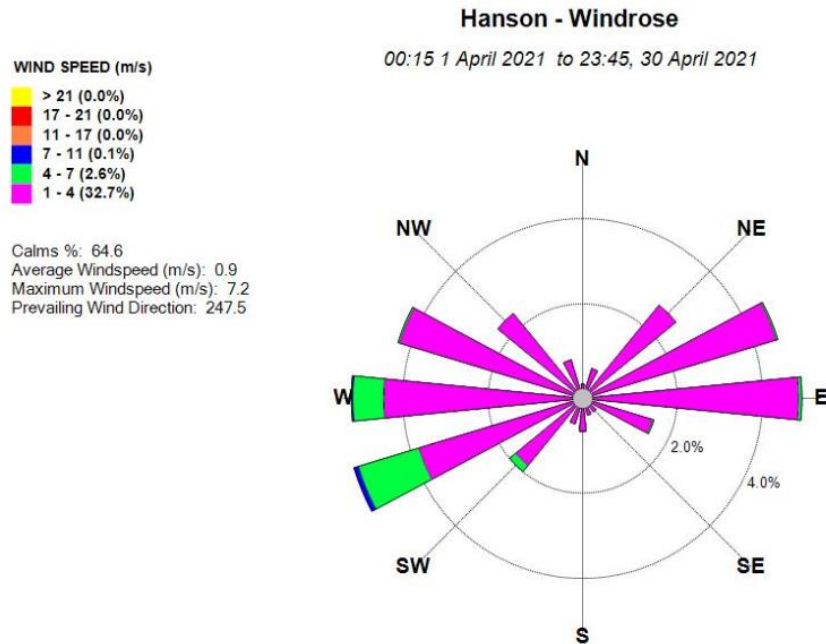


Figure 10: *Monthly Windrose Plot – April 2021*

The predominant wind for April was from the West-South-West with most frequent, strongest winds from the West-South-West. The maximum wind speed was 13.9 m/s from the West.

Appendix 1

Field Sheets

Chain of Custody Documentation

Laboratory Analysis Certificates



Sampled By: Leela + Alex

Date Collected:3.5.21.....

Signed: *Shy*

[illegible]

AUSTRALIAN LABORATORY SERVICES P/L

CERTIFICATE OF ANALYSIS

Work Order : **EN2103626**
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 : ALEX SMITH, Leesa King
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 : 03-May-2021 15:00
Date Analysis Commenced : 05-May-2021
Issue Date : 12-May-2021 16:15



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, unless the sampling was conducted by ALS. 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
Zoran Grozdanovski	Laboratory Operator	Newcastle - Inorganics, Mayfield West, NSW



General Comments

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

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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.

- 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)

Sample ID

				CD1 01/04/21 - 03/05/21	CD2c 01/04/21 - 03/05/21	CD3 01/04/21 - 03/05/21	CD4 01/04/21 - 03/05/21	CD5 01/04/21 - 03/05/21
Sampling date / time				03-May-2021 00:00	03-May-2021 00:00	03-May-2021 00:00	03-May-2021 00:00	03-May-2021 00:00
Compound	CAS Number	LOR	Unit	EN2103626-001	EN2103626-002	EN2103626-003	EN2103626-004	EN2103626-005
				Result	Result	Result	Result	Result
EA120: Ash Content								
Ash Content	----	0.1	g/m ² .month	0.5	0.3	0.3	0.1	0.1
Ash Content (mg)	----	1	mg	10	5	5	2	1
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m ² .month	0.5	0.1	0.4	0.2	0.1
Combustible Matter (mg)	----	1	mg	9	3	8	3	2
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m ² .month	1.0	0.4	0.7	0.3	0.2
Total Insoluble Matter (mg)	----	1	mg	19	8	13	5	3



Analytical Results

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

Sample ID

				CD6	----	----	----	----
				01/04/21 - 03/05/21	----	----	----	----
				03-May-2021 00:00	----	----	----	----
<i>Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	EN2103626-006	-----	-----	-----	-----
				Result	----	----	----	----
EA120: Ash Content								
Ash Content	----	0.1	g/m ² .month	0.2	----	----	----	----
Ash Content (mg)	----	1	mg	3	----	----	----	----
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m ² .month	0.2	----	----	----	----
Combustible Matter (mg)	----	1	mg	5	----	----	----	----
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m ² .month	0.4	----	----	----	----
Total Insoluble Matter (mg)	----	1	mg	8	----	----	----	----



CBASED ENVIRONMENTAL PTY LIMITED

Date: 1.4.21

Client :
Project :

Hanson Calga

SURFACE WATERS

Site	Flow Rate	Odour	Sampling Time	Bottles	Water Turbidity	Water Colour	Comments
A	DAM	N	8:55	1x 250ml GP, 1x 500mL GP, 1x PG	CST	LO O B G	
B	TRICKLE	N	9:10	1x 250ml GP, 1x 500mL GP, 1x PG	CST	C LO O B G	
C1	DAM	N	14:20	1x 250ml GP, 1x 500mL GP, 1x PG	CST	LO O B G	
C2	STEADY	N	14:15	1x 250ml GP, 1x 500mL GP, 1x PG	CST	LO O B G	
D	STILL	N	10:05	1x 250ml GP, 1x 500mL GP, 1x PG	CST	LO O B G	
F	DAM	N	8:35	1x 250ml GP, 1x 500mL GP, 1x PG	CST	LO O B G	

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

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

Signed:

Sampled by:

ALEX SMITH +
LEESA KING

[illegible]

AUSTRALIAN LABORATORY SERVICES P/L

CERTIFICATE OF ANALYSIS

Work Order	: ES2111762	Page	: 1 of 4
Amendment	: 1		
Client	: CBASED ENVIRONMENTAL PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: All Deliverables	Contact	: Helen Simpson
Address	: Unit 3 2 Enterprise Cres Singleton NSW 2330	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 6571 3334	Telephone	: +61 2 8784 8555
Project	: HANSON QUARRY SW	Date Samples Received	: 01-Apr-2021 17:34
Order number	: ----	Date Analysis Commenced	: 01-Apr-2021
C-O-C number	: ----	Issue Date	: 13-Apr-2021 09:12
Sampler	: CBased Environmental Pty Ltd		
Site	:		
Quote number	: SYBQ/403/18 - COMPASS		
No. of samples received	: 6		
No. of samples analysed	: 6		



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, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

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- General Comments
- Analytical Results

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<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

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

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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.

- 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.
- Amendment (13/04/2021): This report has been amended to correct the sampling date of samples . All analysis results are as per the previous report.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	A	B	C1	C2	D
Sampling date / time					01-Apr-2021 08:55	01-Apr-2021 09:10	01-Apr-2021 14:20	01-Apr-2021 14:15	01-Apr-2021 10:05
Compound	CAS Number	LOR	Unit		ES2111762-001	ES2111762-002	ES2111762-003	ES2111762-004	ES2111762-005
					Result	Result	Result	Result	Result
EA005: pH									
pH Value	----	0.01	pH Unit		5.78	6.69	6.97	6.23	5.44
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		56	79	71	103	76
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L		36	58	52	66	48
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		10	<5	11	6	<5
EP020: Oil and Grease (O&G)									
Oil & Grease	----	5	mg/L		<5	<5	<5	<5	<5



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	F	----	----	----	----
Sampling date / time				01-Apr-2021 08:35	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2111762-006	-----	-----	-----	-----
Result					----	----	----	----
EA005: pH								
pH Value	----	0.01	pH Unit	6.31	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	49	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	39	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	66	----	----	----	----
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	----	----	----	----

Inter-Laboratory Testing

Analysis conducted by ALS Newcastle - Water, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(WATER) EA005: pH



Date: 1.4.21

Client :
Project :Hanson Calga
Bi-Annual Bores

GROUNDWATERS

Site	Time	DEPTH	Typical Depth (m)	Odour	Water Turbidity	Water Colour	1		2		Bottles (Apr/Oct)	Downloaded Logger? (Y/N)*	Comments
							pH	EC	pH	EC			
CQ3	8:45	10.69	10.74	N	0 ST	0 LO O B G	6.10	148.2 uS	6.08	141.9 uS	1x 250ml GP, 1x 500mL GP, 1RP	Y	
CQ4	12:20	10.69	11.19	N	0 ST	0 LO O B G	4.62	160.3 uS	4.70	163.6 uS	1x 250ml GP, 1x 500mL GP, 1RP	Y	
CQ5	13:30	5.55	8.04	N	0 ST	0 LO O B G	4.2	211.6 uS	4.09	273.9 uS	1x 250ml GP, 1x 500mL GP, 1RP		
CQ7	13:15	5.53	6.61	N	0 ST	0 LO O B G	5.21	249.0 uS	5.04	239.4 uS	1x 250ml GP, 1x 500mL GP, 1RP	Y	
CQ8	12:50	5.36	6.93	N	0 ST	0 LO O B G	4.91	159.2 uS	4.89	162.1 uS	1x 250ml GP, 1x 500mL GP, 1RP	Y	
CQ10	9:35	21.65	25.86	Y	0 ST	0 LO O B G	5.48	191.7 uS	5.48	191.7 uS	1x 250ml GP, 1x 500mL GP, 1RP	Y	H ₂ S Smecc.
CQ11S	12:10	10.98	12.1	Y	0 ST	0 LO O B G	5.68	220.1 uS	5.63	213.4 uS	1x 250ml GP, 1x 500mL GP, 1RP	Y	" "
CQ11D	12:05	12.16	12.98	Y	0 ST	0 LO O B G	5.14	179.3 uS	5.16	178.3 uS	1x 250ml GP, 1x 500mL GP, 1RP	Y	" "
CQ12	13:00	3.47	5.46	N	0 ST	0 LO O B G	4.30	189.5 uS	4.14	190.3 uS	1x 250ml GP, 1x 500mL GP, 1RP	Y	
CQ13	13:40	12.28	14.42	N	0 ST	0 LO O B G	4.29	194.3 uS	4.30	195.1 uS	1x 250ml GP, 1x 500mL GP, 1RP	Y	
CP4	13:50	1.61	10.56	N	0 ST	0 LO O B G	5.25	261.8 uS	5.28	265.1 uS	1x 250ml GP, 1x 500mL GP, 1RP		
CP5	14:00	4.97	7.95	N	0 ST	0 LO O B G	6.06	139.7 uS	6.11	141.3 uS	1x 250ml GP, 1x 500mL GP, 1RP		
CP6	13:55	7.76	10.73	N	0 ST	0 LO O B G	4.41	174.8 uS	4.40	169.4 uS	1x 250ml GP, 1x 500mL GP, 1RP		
CP7	14:10	0.86	3.47	N	0 ST	0 LO O B G	6.06	132.4 uS	6.08	134.6 uS	1x 250ml GP, 1x 500mL GP, 1RP		
CP8	15:05	20.41	22.36	N	0 ST	0 LO O B G	4.39	135.3 uS	4.36	135.6 uS	1x 250ml GP, 1x 500mL GP, 1RP		
CP13**	14:50	10.07	13.4	N	0 ST	0 LO O B G	4.58	153.3 uS	4.58	149.1 uS	1x 250ml GP, 1x 500mL GP, 1RP		
CP15	14:40	1.81	3.01	N	0 ST	0 LO O B G	5.84	165.1 uS	5.80	166.7 uS	1x 250ml GP, 1x 500mL GP, 1RP		
MW7	11:40	13.42	15.3	N	0 ST	0 LO O B G	5.47	24.7 uS	5.52	25.3 uS	1x 250ml GP, 1x 500mL GP, 1RP		
MW8	11:30	6.50	7.66	N	0 ST	0 LO O B G	4.96	82.5 uS	4.95	81.8 uS	1x 250ml GP, 1x 500mL GP, 1RP	Y	
MW9	9:45	23.27	24.09	N	0 ST	0 LO O B G	4.53	107.9 uS	4.47	111.8 uS	1x 250ml GP, 1x 500mL GP, 1RP	Y	
MW10			11.44		0 ST	0 LO O B G					1x 250ml GP, 1x 500mL GP, 1RP		NO ACCESS - TREE ACROSS TRACK
MW13	10:15	7.59	7.71	N	0 ST	0 LO O B G	4.48	127.9 uS	4.48	129.1 uS	1x 250ml GP, 1x 500mL GP, 1RP		
MW16	10:30	8.12	8.29	N	0 ST	0 LO O B G	4.42	143.1 uS	4.40	143.7 uS	1x 250ml GP, 1x 500mL GP, 1RP		
MW17	11:10	9.96	9.93	N	0 ST	0 LO O B G	4.85	152.5 uS	4.83	152.8 uS	1x 250ml GP, 1x 500mL GP, 1RP		

Turbidity: C=Clear, S= Slight, T=Turbid (CIRCLE)
pH/EC meter #: T8K-003 515 453
Laptop ID #:
Signed:

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

*If unable to download logger please provide comment/ explanation above

**Contact Wynston 15 min prior to access on: 0414 900 555

Sampled by: ALEX SMITH + LEE SA KING.

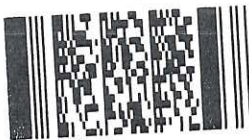
* TREE ACROSS TRACK. REQUIRES CLEARING.

NO LOGGER IN BORE, REMOVED AS IT NO LONGER WORKS AND COULD NOT BE REPAIRED.

[illegible]

Page 1 of 1

Environmental Division
Sydney
Work Order Reference
ES2112168



Telephone : + 61-2-8784 8555

AUSTRALIAN LABORATORY SERVICES P/L

CERTIFICATE OF ANALYSIS

Work Order : **ES2112168**
Client : **CBASED ENVIRONMENTAL PTY LTD**
Contact : All Deliverables
Address : Unit 3 2 Enterprise Cres
Singleton NSW 2330
Telephone : +61 02 6571 3334
Project : Hanson GW
Order number : ----
C-O-C number : ----
Sampler : Alex Smith + Leesa Fing
Site :
Quote number : SYBQ/403/18 - COMPASS
No. of samples received : 23
No. of samples analysed : 23

Page : 1 of 12
Laboratory : Environmental Division Sydney
Contact : Helen Simpson
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61 2 8784 8555
Date Samples Received : 01-Apr-2021 17:34
Date Analysis Commenced : 06-Apr-2021
Issue Date : 13-Apr-2021 21:48



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

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- Analytical Results

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<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Neil Martin	Team Leader - Chemistry	Chemistry, Newcastle West, NSW



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^ = 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.

- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



Analytical Results

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

Sample ID

				CQ3	CQ4	CQ5	CQ7	CQ8
Sampling date / time				01-Apr-2021 08:45	01-Apr-2021 12:20	01-Apr-2021 13:30	01-Apr-2021 13:15	01-Apr-2021 12:50
Compound	CAS Number	LOR	Unit	ES2112168-001	ES2112168-002	ES2112168-003	ES2112168-004	ES2112168-005
				Result	Result	Result	Result	Result
EA005: pH								
pH Value	----	0.01	pH Unit	6.13	4.80	4.11	5.19	4.62
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	136	148	231	214	140
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	21	2	<1	1	<1
Total Alkalinity as CaCO3	----	1	mg/L	21	2	<1	1	<1
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	3	7	17	13	12
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	24	24	27	28	20
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	2	<1	7	8	<1
Magnesium	7439-95-4	1	mg/L	5	3	6	8	5
Sodium	7440-23-5	1	mg/L	14	20	14	18	14
Potassium	7440-09-7	1	mg/L	1	<1	6	4	1
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.08	0.81	2.44	0.51	0.60
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.003	<0.001	0.001
Copper	7440-50-8	0.001	mg/L	<0.001	0.005	0.002	0.003	0.002
Lead	7439-92-1	0.001	mg/L	<0.001	0.005	0.003	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L	0.624	0.007	0.014	0.009	0.005
Nickel	7440-02-0	0.001	mg/L	0.014	<0.001	<0.001	<0.001	0.001
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L	0.083	0.223	0.068	0.020	0.044
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Iron	7439-89-6	0.05	mg/L	0.48	0.61	0.51	0.22	0.21
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1



Analytical Results

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

Sample ID

				CQ3	CQ4	CQ5	CQ7	CQ8
Sampling date / time				01-Apr-2021 08:45	01-Apr-2021 12:20	01-Apr-2021 13:30	01-Apr-2021 13:15	01-Apr-2021 12:50
Compound	CAS Number	LOR	Unit	ES2112168-001	ES2112168-002	ES2112168-003	ES2112168-004	ES2112168-005
				Result	Result	Result	Result	Result
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.03	<0.01	0.08
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.16	4.26	10.4	9.78	4.13
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.16	4.26	10.4	9.78	4.21
EN055: Ionic Balance								
∅ Total Anions	----	0.01	meq/L	----	----	1.86	1.78	----
∅ Total Anions	----	0.01	meq/L	1.16	0.86	----	----	0.81
∅ Total Cations	----	0.01	meq/L	1.14	1.12	1.60	1.94	1.05



Analytical Results

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

Sample ID

				CQ10	CQ11S	CQ11D	CQ12	CQ13
Sampling date / time				01-Apr-2021 09:35	01-Apr-2021 12:10	01-Apr-2021 12:05	01-Apr-2021 13:00	01-Apr-2021 13:40
Compound	CAS Number	LOR	Unit	ES2112168-006	ES2112168-007	ES2112168-008	ES2112168-009	ES2112168-010
				Result	Result	Result	Result	Result
EA005: pH								
pH Value	----	0.01	pH Unit	5.36	5.22	5.71	4.18	4.40
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	125	188	157	158	162
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	6	23	8	<1	<1
Total Alkalinity as CaCO ₃	----	1	mg/L	6	23	8	<1	<1
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	1	16	22	23	3
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	28	27	25	17	30
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	2	5	<1	1	<1
Magnesium	7439-95-4	1	mg/L	3	4	5	6	5
Sodium	7440-23-5	1	mg/L	19	22	20	12	17
Potassium	7440-09-7	1	mg/L	<1	6	2	<1	2
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.23	1.83	0.62	1.04	0.43
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.002	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.0007	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	0.003	0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	0.004	0.018	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L	0.001	0.018	0.002	0.002	0.001
Manganese	7439-96-5	0.001	mg/L	0.030	0.062	0.021	0.004	0.002
Nickel	7440-02-0	0.001	mg/L	0.002	0.004	0.001	0.001	<0.001
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L	0.027	0.263	0.097	0.083	0.014
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Iron	7439-89-6	0.05	mg/L	0.52	2.76	0.65	0.06	<0.05
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1



Analytical Results

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

				Sample ID	CQ10	CQ11S	CQ11D	CQ12	CQ13
Sampling date / time					01-Apr-2021 09:35	01-Apr-2021 12:10	01-Apr-2021 12:05	01-Apr-2021 13:00	01-Apr-2021 13:40
Compound	CAS Number	LOR	Unit		ES2112168-006	ES2112168-007	ES2112168-008	ES2112168-009	ES2112168-010
					Result	Result	Result	Result	Result
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	0.09	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		0.01	1.36	0.09	4.04	5.42
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		0.01	1.45	0.09	4.04	5.42
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L		0.93	1.55	1.32	0.96	0.91
∅ Total Cations	----	0.01	meq/L		1.17	1.69	1.33	1.06	1.20



Analytical Results

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

Sample ID

				CP4	CP5	CP6	CP7	CP8
Sampling date / time				01-Apr-2021 13:50	01-Apr-2021 14:00	01-Apr-2021 13:55	01-Apr-2021 14:10	01-Apr-2021 15:05
Compound	CAS Number	LOR	Unit	ES2112168-011	ES2112168-012	ES2112168-013	ES2112168-014	ES2112168-015
				Result	Result	Result	Result	Result
EA005: pH								
pH Value	----	0.01	pH Unit	5.40	5.60	4.44	6.24	4.46
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	218	123	149	119	119
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	5	11	<1	13	<1
Total Alkalinity as CaCO ₃	----	1	mg/L	5	11	<1	13	<1
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	22	9	11	16	10
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	29	16	24	12	24
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	11	1	<1	6	<1
Magnesium	7439-95-4	1	mg/L	6	8	5	3	2
Sodium	7440-23-5	1	mg/L	18	9	15	7	16
Potassium	7440-09-7	1	mg/L	6	2	1	10	<1
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.17	0.02	0.42	0.42	0.43
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	0.0003	0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	0.002	0.005	0.001	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	0.002	0.005	0.015	<0.001
Lead	7439-92-1	0.001	mg/L	0.035	0.002	0.004	0.003	<0.001
Manganese	7439-96-5	0.001	mg/L	0.010	0.121	0.010	0.151	0.001
Nickel	7440-02-0	0.001	mg/L	0.001	0.022	0.032	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L	0.282	0.290	0.085	0.048	0.007
Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Iron	7439-89-6	0.05	mg/L	0.18	0.33	0.09	2.60	0.10
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	CP4	CP5	CP6	CP7	CP8
Sampling date / time					01-Apr-2021 13:50	01-Apr-2021 14:00	01-Apr-2021 13:55	01-Apr-2021 14:10	01-Apr-2021 15:05
Compound	CAS Number	LOR	Unit		ES2112168-011	ES2112168-012	ES2112168-013	ES2112168-014	ES2112168-015
				Result	Result	Result	Result	Result	Result
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		7.81	3.84	4.65	1.28	1.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		7.81	3.84	4.65	1.29	1.01
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L		1.98	----	----	----	----
∅ Total Anions	----	0.01	meq/L		----	0.86	0.91	0.93	0.88
∅ Total Cations	----	0.01	meq/L		1.98	1.15	1.09	1.11	0.86



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	CP13	CP15	MW7	MW8	MW9
Sampling date / time					01-Apr-2021 14:50	01-Apr-2021 14:40	01-Apr-2021 11:40	01-Apr-2021 11:30	01-Apr-2021 09:45
Compound	CAS Number	LOR	Unit		ES2112168-016	ES2112168-017	ES2112168-018	ES2112168-019	ES2112168-020
					Result	Result	Result	Result	Result
EA005: pH									
pH Value	----	0.01	pH Unit		4.61	5.86	5.65	5.18	4.63
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		132	144	29	74	96
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		<1	3	<1	<1	<1
Total Alkalinity as CaCO3	----	1	mg/L		<1	3	<1	<1	<1
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		13	19	<1	4	4
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		26	12	5	17	23
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		2	1	<1	<1	<1
Magnesium	7439-95-4	1	mg/L		2	5	<1	1	1
Sodium	7440-23-5	1	mg/L		15	15	4	10	13
Potassium	7440-09-7	1	mg/L		3	4	<1	<1	<1
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		1.87	0.08	1.26	0.09	0.24
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L		0.002	<0.001	0.002	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L		0.002	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L		0.019	0.086	0.009	0.007	0.005
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Zinc	7440-66-6	0.005	mg/L		0.018	0.025	0.054	0.032	0.012
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
Iron	7439-89-6	0.05	mg/L		1.27	1.30	1.15	<0.05	0.26
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	CP13	CP15	MW7	MW8	MW9
Sampling date / time					01-Apr-2021 14:50	01-Apr-2021 14:40	01-Apr-2021 11:40	01-Apr-2021 11:30	01-Apr-2021 09:45
Compound	CAS Number	LOR	Unit		ES2112168-016	ES2112168-017	ES2112168-018	ES2112168-019	ES2112168-020
					Result	Result	Result	Result	Result
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	0.04	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		0.32	6.48	<0.01	0.01	0.26
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		0.32	6.52	<0.01	0.01	0.26
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L		1.00	0.79	0.14	0.56	0.73
∅ Total Cations	----	0.01	meq/L		0.99	1.22	0.17	0.52	0.65



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW13	MW16	MW17	----	----
Sampling date / time					01-Apr-2021 10:15	01-Apr-2021 10:30	01-Apr-2021 11:10	----	----
Compound	CAS Number	LOR	Unit		ES2112168-021	ES2112168-022	ES2112168-023	-----	-----
				Result	Result	Result	Result	----	----
EA005: pH									
pH Value	----	0.01	pH Unit		4.46	4.50	4.88	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		111	123	149	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L		<1	<1	<1	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L		<1	<1	<1	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L		<1	<1	<1	----	----
Total Alkalinity as CaCO ₃	----	1	mg/L		<1	<1	<1	----	----
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA									
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L		3	2	3	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		27	31	34	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		<1	<1	1	----	----
Magnesium	7439-95-4	1	mg/L		2	2	3	----	----
Sodium	7440-23-5	1	mg/L		14	17	18	----	----
Potassium	7440-09-7	1	mg/L		<1	<1	<1	----	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		0.12	0.24	0.06	----	----
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	<0.001	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	0.003	----	----
Manganese	7439-96-5	0.001	mg/L		0.031	0.012	0.185	----	----
Nickel	7440-02-0	0.001	mg/L		0.002	0.001	0.004	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	----	----
Zinc	7440-66-6	0.005	mg/L		0.049	0.031	0.044	----	----
Boron	7440-42-8	0.05	mg/L		<0.05	<0.05	<0.05	----	----
Iron	7439-89-6	0.05	mg/L		<0.05	0.06	0.06	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	<0.1	<0.1	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW13	MW16	MW17	----	----
Sampling date / time					01-Apr-2021 10:15	01-Apr-2021 10:30	01-Apr-2021 11:10	----	----
Compound	CAS Number	LOR	Unit		ES2112168-021	ES2112168-022	ES2112168-023	-----	-----
				Result	Result	Result		----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		0.65	0.34	0.61	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		0.65	0.34	0.61	----	----
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L		0.82	0.92	1.02	----	----
∅ Total Cations	----	0.01	meq/L		0.77	0.90	1.08	----	----

Inter-Laboratory Testing

Analysis conducted by ALS Newcastle - Water, NATA accreditation no. 825, site no. 1656 (Chemistry) 9854 (Biology).

(WATER) EA005: pH