CBased Environmental Pty Limited
ABN 62 611 924 264

Calga Quarry

Environmental Monitoring

Dust Deposition, Surface Water, Groundwater and Meteorological Data

August 2022

Colin Davies BSc MEIA CEnvP
Environmental Scientist
Date: 21 September 2022

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;
- Ground water and
- Meteorological data.

This report was prepared by CBased Environmental and includes the following results for August 2022:

- Dust deposition;
- Surface water quality;
- Ground water and
- Meteorological parameters;

The August 2022 dust deposition results for insoluble solids showed:

- Similar levels when compared to July 2022.
- Rolling annual averages below the Air Quality Management Plan criteria of 3.7g/m^2.month.

Monthly surface water samples were collected at sites A, C1, C2, D and F. Surface water site B was too low at the time of sampling. The samples that were collected were 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, C1, C2, D and F in August 2022.

The Calga Quarry weather station data recovery in August 2022 was approximately 0% due to site outages. A summary of rainfall comparison is provided below.

Location	Rainfall (mm)
Calga Quarry	No data
BOM Gosford*	30.2mm

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 with 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/m^2.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**.

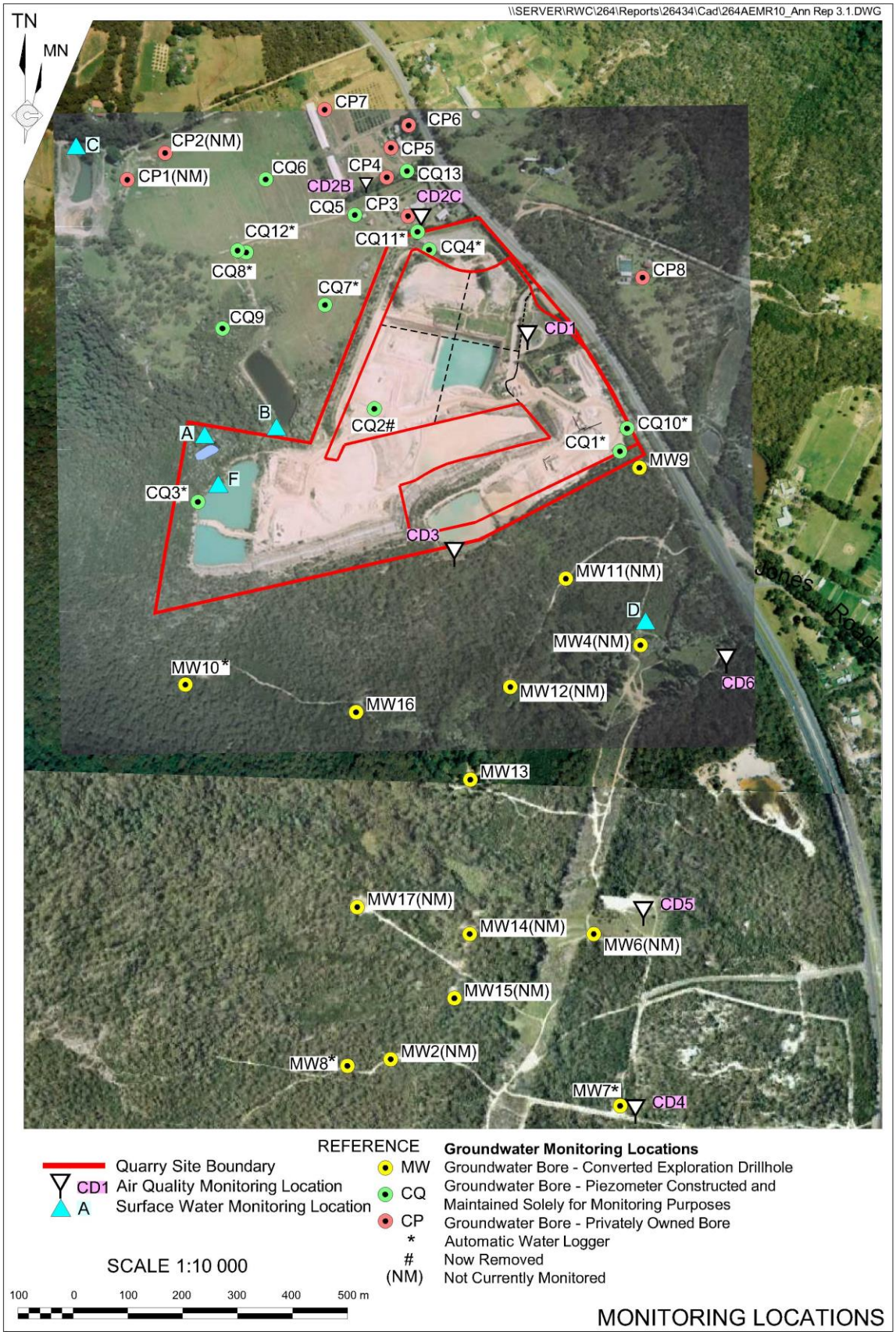

Figure 1: *Hanson Calga Quarry Environmental Monitoring Locations*

2.0 Results

2.1 Dust Deposition

The results for August 2022 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: 01 August 2022 – 01 September 2022 (31 days)

Site	Monthly Insoluble Solids	Monthly Ash Residue	Monthly Combustible Matter	Monthly Ash Residue/ Insoluble Solids %	Rolling Annual Average Insoluble Solids
CD1	1.2	0.7	0.5	58	2.0
CD2c	1.3	0.5	0.8	38	0.9
CD3	0.9	0.5	0.4	56	1.5
CD4	0.2	0.1	0.1	50	0.8
CD5	0.2	0.1	0.1	50	0.6
CD6	0.5	0.4	0.1	80	0.5

Notes:
Units in g/m^2.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/m^2.month; the Development Consent's annual average amenity criteria at residential locations*
The current rolling annual average is calculated from September 2021 to August 2022

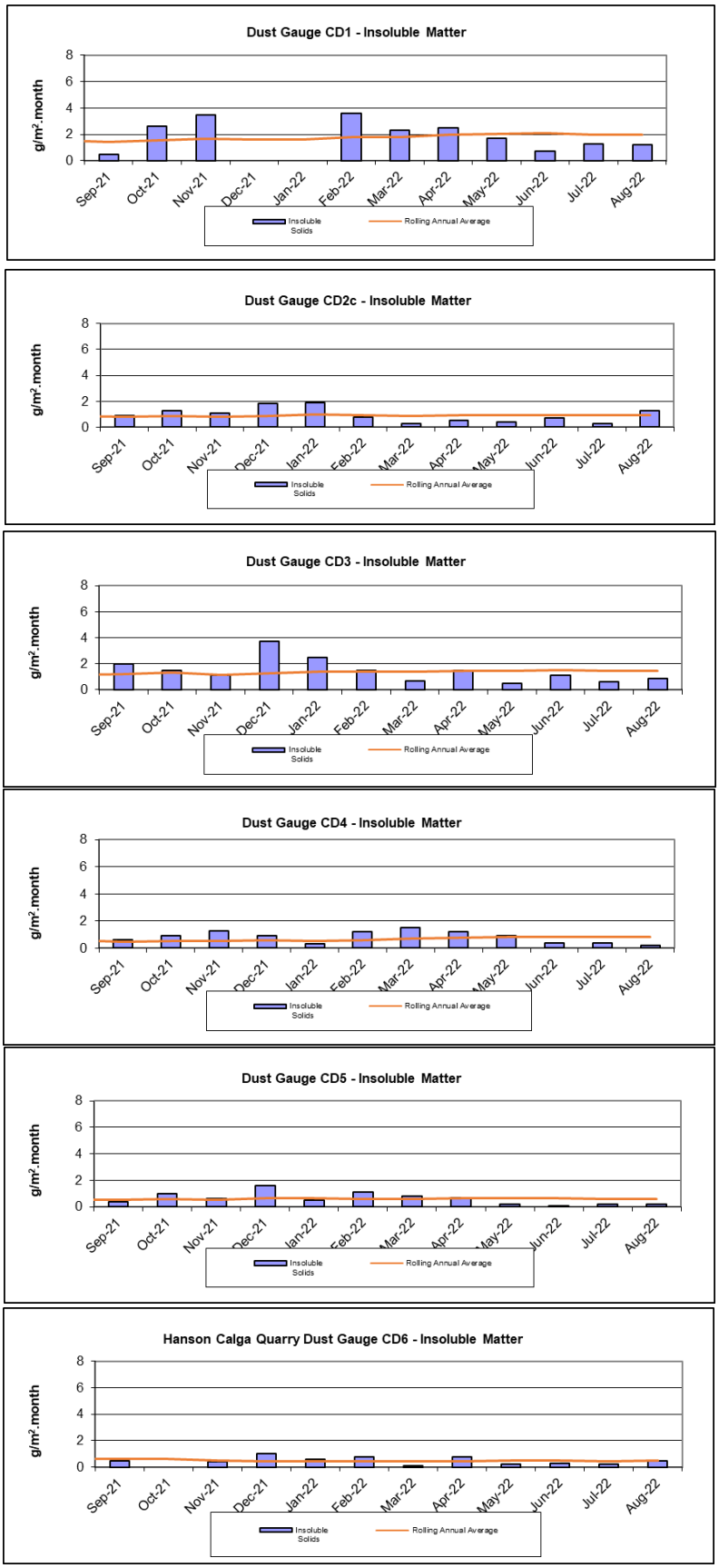

Figure 2: *Summary Monthly/Annual Dust Deposition Results for Insoluble Solids*

2.2 Surface Water (Monthly)

Monthly surface water monitoring was conducted on 01 August 2022 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, C1, C2, D and F.

Table 2: Monthly Surface Water Monitoring Results – August 2022

Site	Observed Flow Rate* (visual)	Water Colour* (visual)	Turbidity* (visual)	pH	EC (µS/cm)	TDS (mg/L)	TSS (mg/L)	Oil and Grease (mg/L)
A	Trickle	Colourless	Slight	5.51	53	32	18	<5
B	Too Low To Sample							
C1	Dam	Brown	Slight	6.32	72	88	8	<5
C2	Slow	Colourless	Clear	6.05	93	<5	<5	<5
D	Still	Colourless	Clear	5.76	75	58	<5	<5
F	Dam	Colourless	Clear	5.39	53	32	10	----

** 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 August 2022.

3.0 Groundwater (Bi-annual)

Groundwater was sampled on 1 August 2022. 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 (+/- 0.1 pH units) and electrical conductivity (+/- 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	10.78	7.28	110.7
CQ4	Voutos	* Monitor	8.78	10.06	4.50	114 8
CQ5	Gazzana	Dip only	8.69	5.32	3.98	209.7
CQ7	Gazzana	* Monitor	6.89	5.85	4.09	131.3
CQ8	Gazzana	* Monitor	11.03	4.81	Bore damaged	
CQ10	Voutos	* Monitor	NI	24.30	4.30	121.1
CQ11S	Gazzana	* Monitor	NI	10.11	5.87	144.3
CQ11D	Gazzana	* Monitor	NI	11.59	5.52	140.3
CQ12	Gazzana	* Monitor	NI	3.51	4.08	160.2
CQ13	Kashouli	* Monitor	NI	11.89	4.18	121.9
CP4	Kashouli	Domestic	13.63	1.35	4.58	126.1
CP5	Kashouli	Domestic	16.61	4.66	5.51	86.5
CP6	Kashouli	Domestic	16.27	7.12	4.92	103.7
CP7	Kashouli	Production	8.56	0.52	4.68	121.6
CP8	Rozmanec	Domestic	22.17	19.52	4.32	99.5
CP13	W P White	Domestic	NI	9.04	4.41	130.7
CP15	32 Polins Road, Calga	Domestic	NI	1.84	4.37	141.6
MW7	Rocla Bore	* Monitor	15.76	11.22	6.04	27.5
MW9	Rocla Bore	* Monitor	22.44	22.88	4.29	69.8
MW10	Rocla Bore	* Monitor	15.41	No access		
MW13	Rocla Bore	Dip only	NI	7.55	4.35	59.6

Notes:
Water level measured from top of bore case (TOC) to water
pH measured in pH units / electrical conductivity measured in µS/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

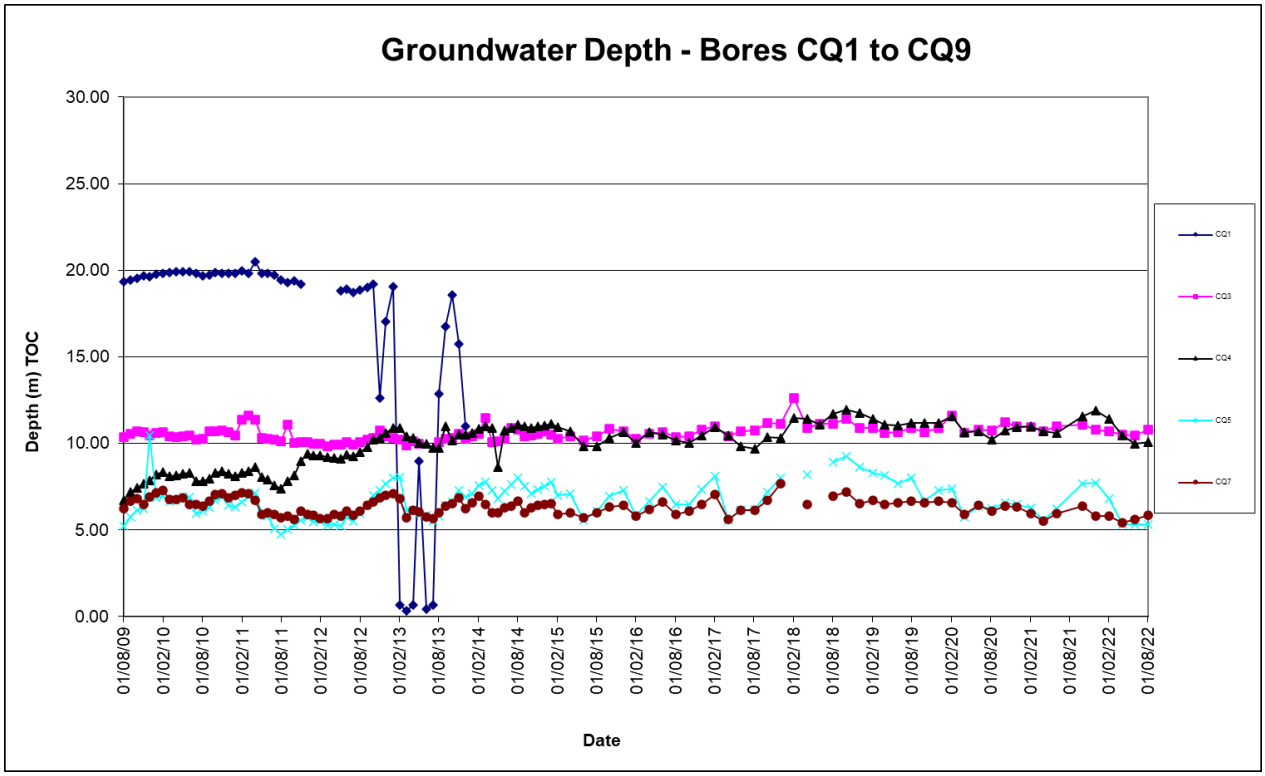

Figure 3: *Groundwater Depth – Bores CQ1 to CQ9*

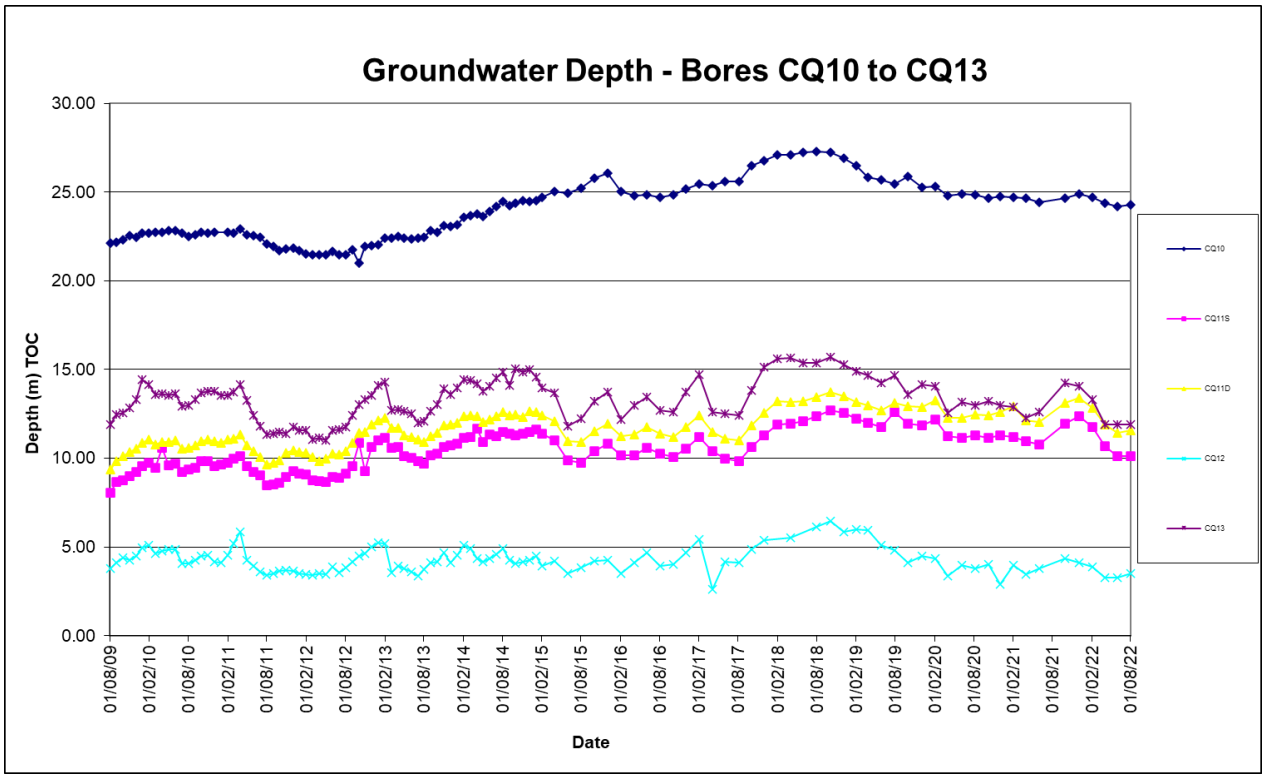

Figure 4: *Groundwater Depth – Bores CQ10 to CQ13*

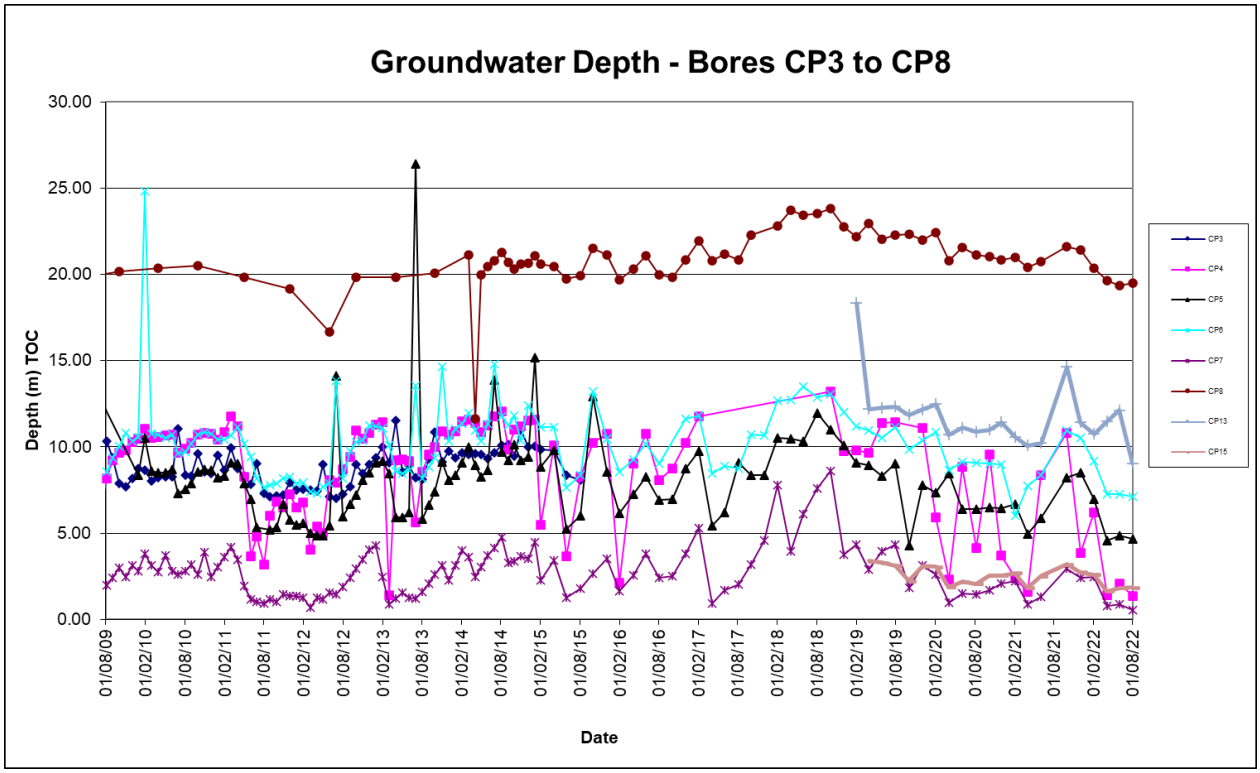

Figure 5: *Groundwater Depth – Bores CP3 to CP8*

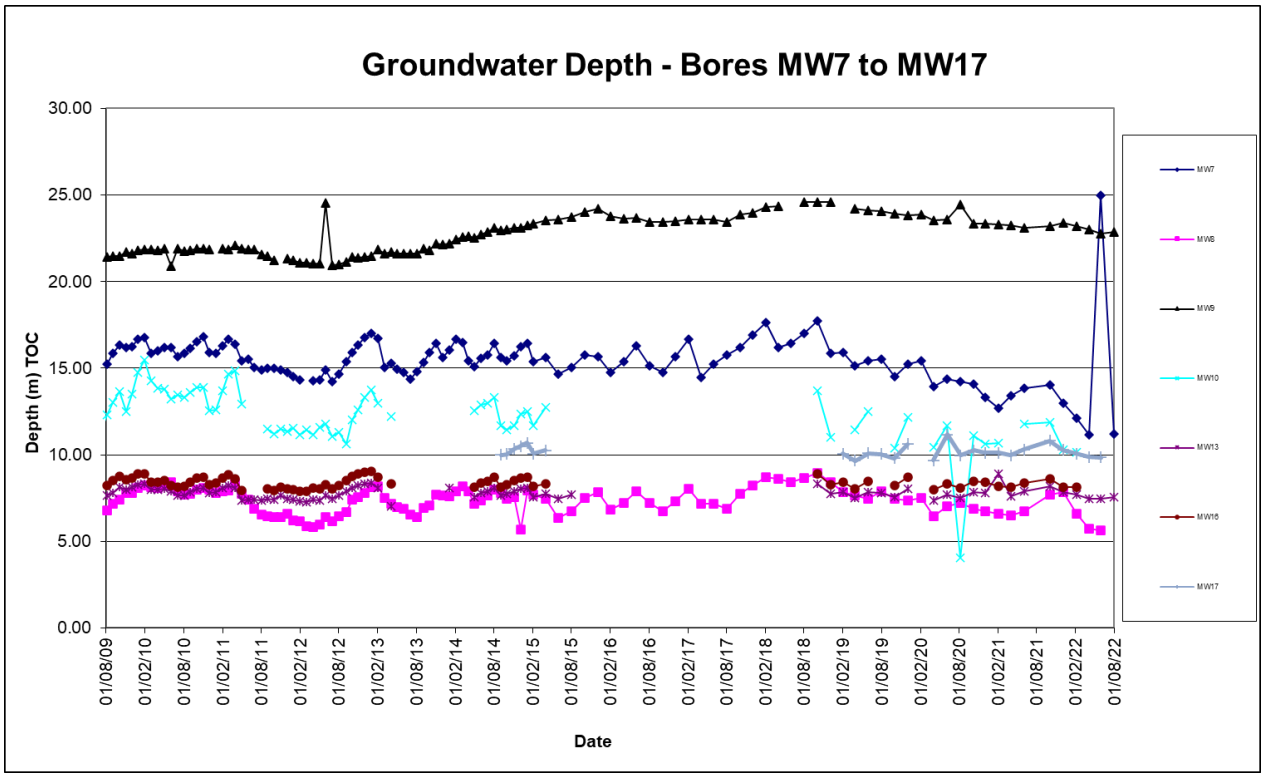

Figure 6: *Groundwater Depth – Bores MW7 to MW17*

2.3 Meteorological Data

The Calga Quarry weather station data recovery for August 2022 was approximately 0% due to site issues.

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 – August 2022

Location	Rainfall (mm)
Calga Quarry	No data
BOM Gosford*	30.2mm

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.

Table 5: Summary of Monthly Meteorological Data – August 2022

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
1/08/2022																						
2/08/2022																						
3/08/2022																						
4/08/2022																						
5/08/2022																						
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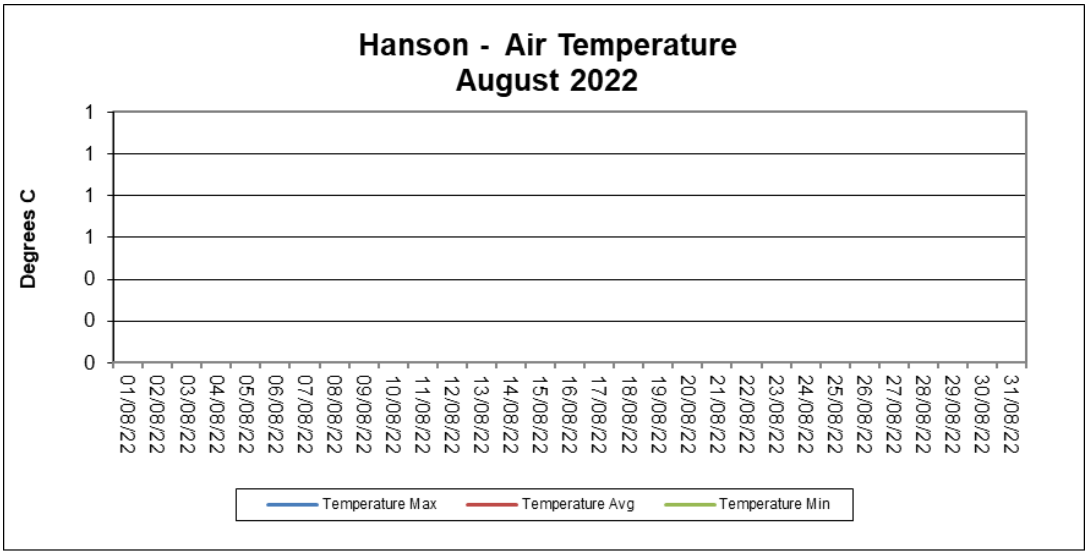
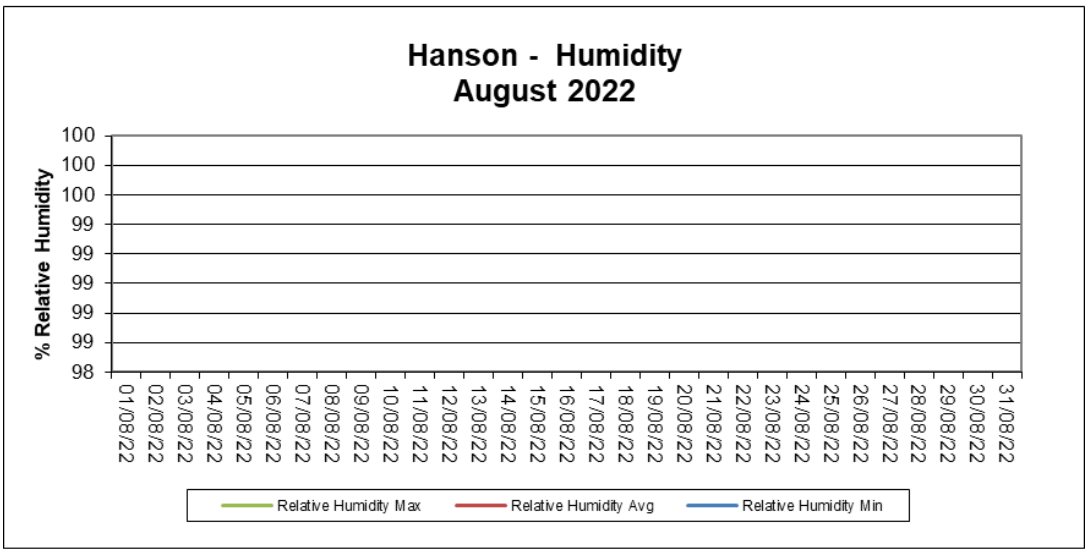
31/08/2022																						
Monthly	0.0	#DIV/0!	0.0	0	#DIV/0!	0	0.0	0.0	0.0	#DIV/0!	0.0	0.0	0.0	0.0	#DIV/0!	0.0	0.0	#DIV/0!	0.0	0.0	#DIV/0!	0.0
Unit	*Degrees Celcius (^{o}C)*			*Percentage Relative Humidity*			*mm*	*mm*	*Metres per second (m/s)*			^{o}C	^{o}C	*Hector Pascals (hPa)*			*Watts per square metre (W/m^2)*			*Percentage (%)*		

No data for August 2022 due to site issues.





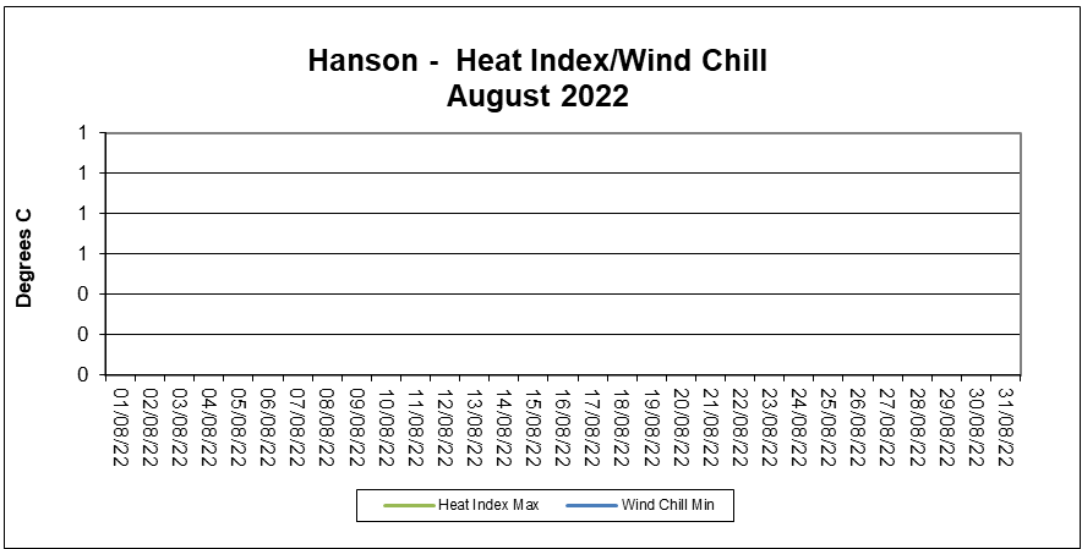
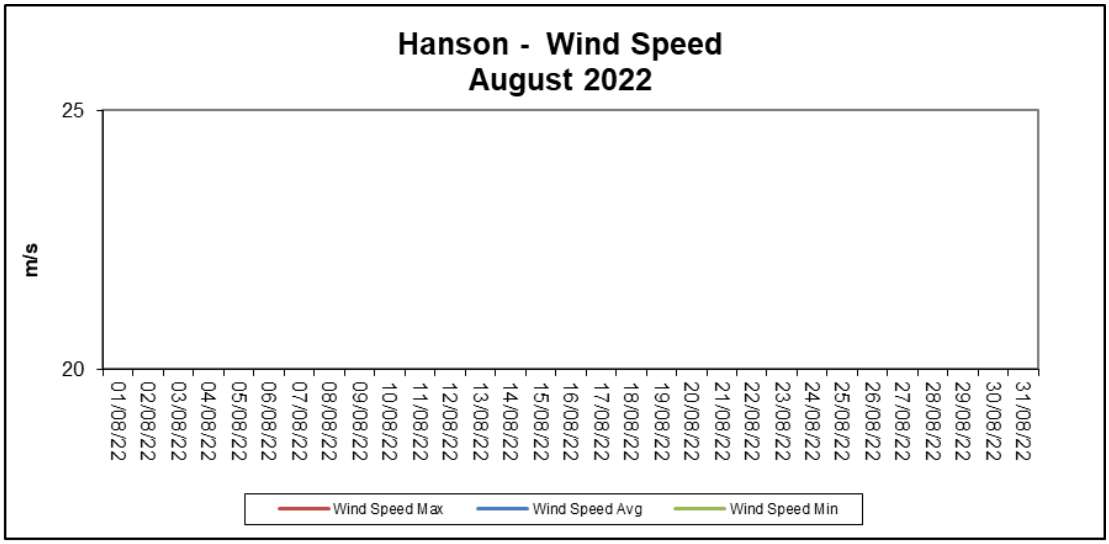
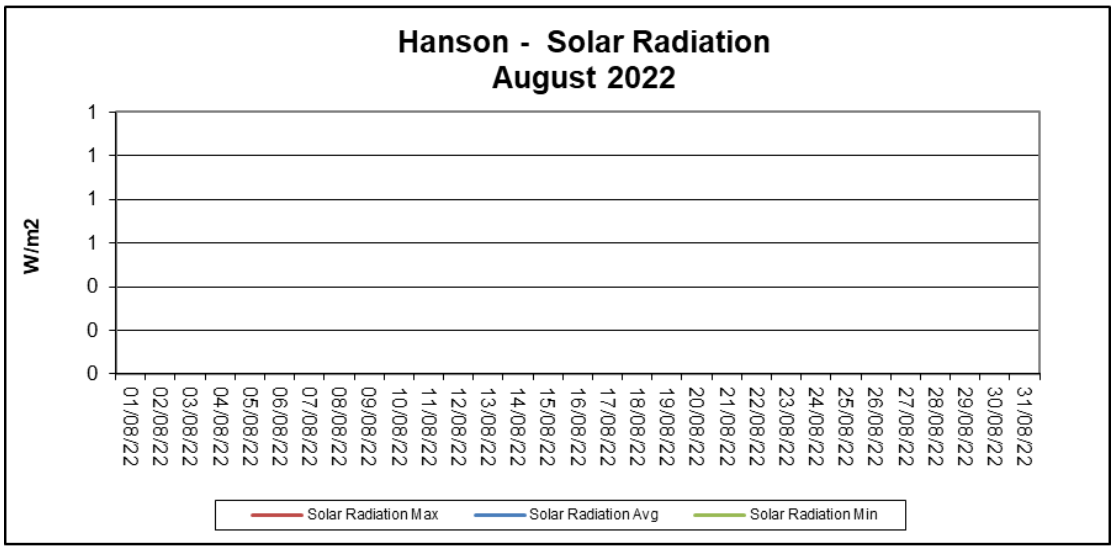


Figure 7: *Summary of Monthly Temperature, Humidity and Heat Index Results*





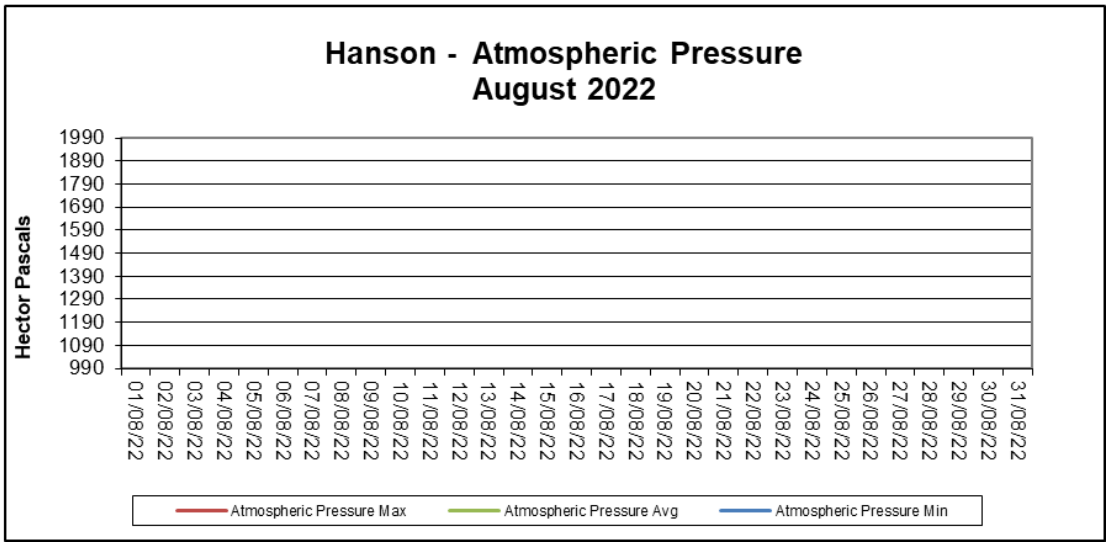
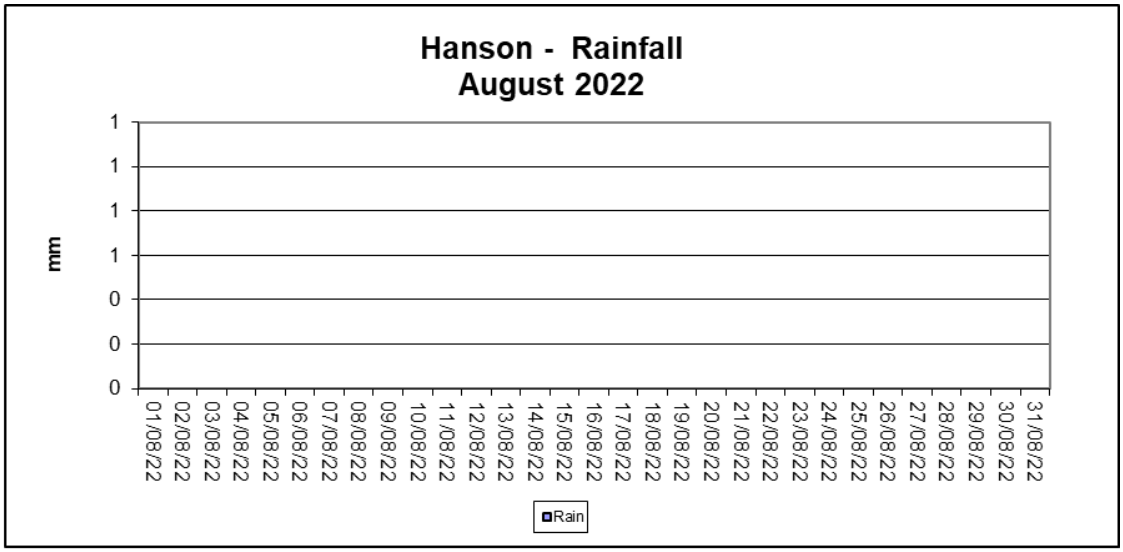
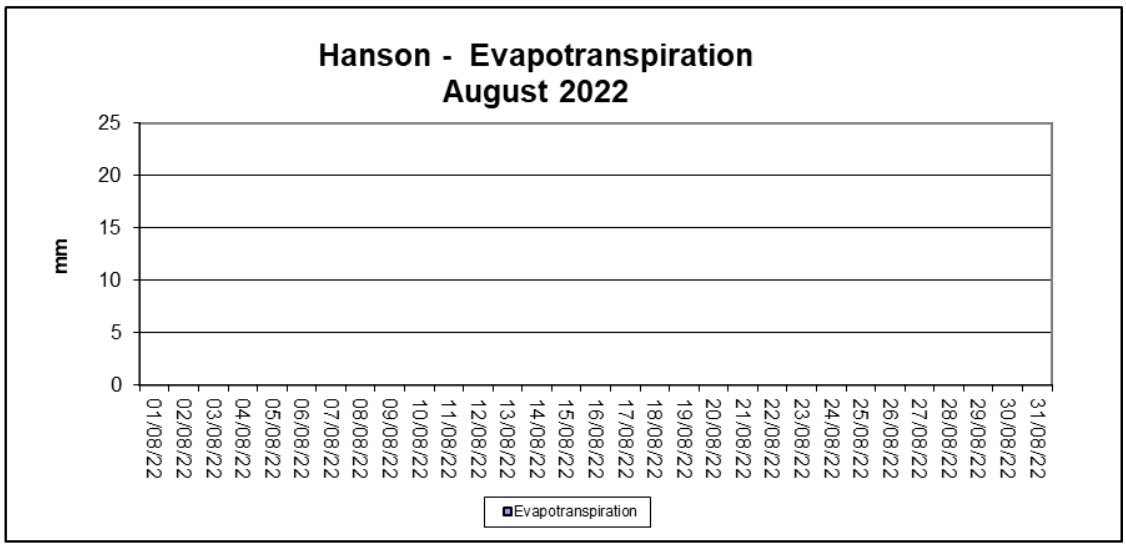


Figure 8: *Summary of Monthly Wind Speed, Solar Radiation and Atmospheric Pressure Results*





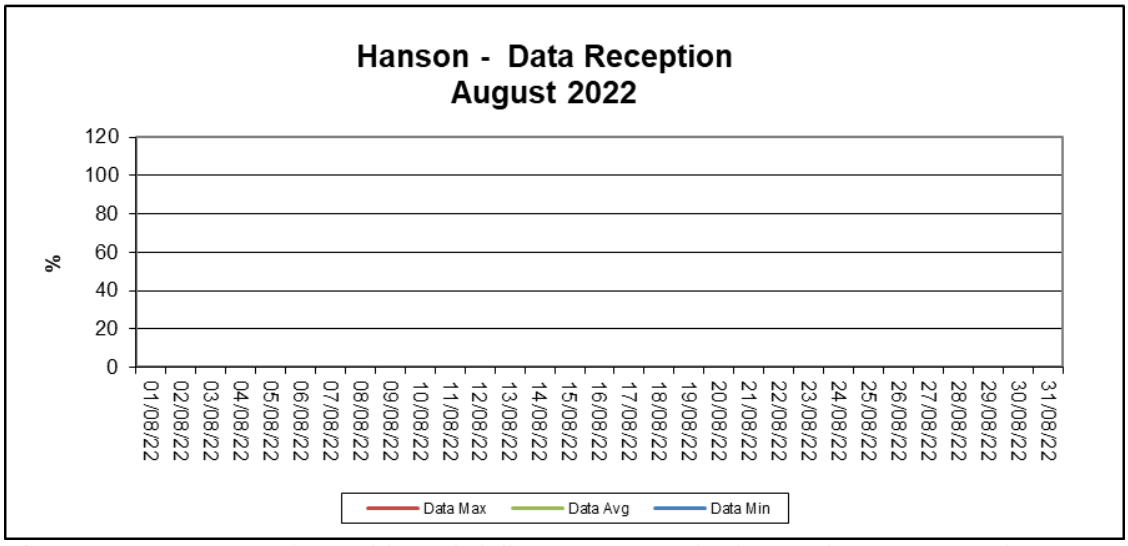


Figure 9: *Summary of Monthly Rainfall, Evapotranspiration and Data Reception Results*

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.

No windrose for August 2022 due to no data being available due to site issues.

Appendix 1

Field Sheets

Chain of Custody Documentation

Laboratory Analysis Certificates

DEPOSITIONAL DUST MONITORING

Client: ..... **Hanson Calga Quarry** .....

Date Installed: 1.8.22

Date Collected: 1.9.22

Sampled By: AL + SO

Signed: .....

Site	Time Collected	Water Level (mL)	Insoluble Material (✓ = slight, ✓ ✓ = mod etc)				Water Turbidity	Water Colour	Stand Level (Y/N)	Funnel Level (Y/N)	Funnel Diameter (mm)	New Funnel Diameter (mm)*	Comments
			Insects	Bird droppings	Vegetation	Dust							
CD1	10.20	500	✓		✓	✓	C S (T)	(C) O Bn Gn Gy	Y	Y	150	–	
CD2C	10.25	500	✓		✓	✓	(C) S T	(C) O Bn Gn Gy	Y	Y	150	–	
CD3	10.00	400	✓		✓	✓	C (S) T	(C) O Bn Gn Gy	Y	Y	150	NA.	
CD4	11.00	400	✓		✓	✓	(C) S T	(C) O Bn Gn Gy	Y	Y	150	–	
CD5	11.30	500	✓		✓	✓	(C) S T	(C) O Bn Gn Gy	Y	Y	150	–	
CD6	11.15	500	✓		✓	✓	(C) S T	(C) O Bn Gn Gy	Y	Y	150	–	

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

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

***Record new funnel diameter whenever funnel is replaced and update on COC**

CHAIN OF CUSTODY DOCUMENTATION

Australian Laboratory Services Pty Ltd

CLIENT: CBased Environmental Pty Ltd

POSTAL ADDRESS: PO Box 245 Cessnock NSW 2325

SEND REPORT TO: monitoringresults@cbased.com.au SEND INVOICE TO: accounts@cbased.com.au

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

PROJECT ID: Hanson Calga Dusts QUOTE NO.: SYBQ 403-18

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

FOR LAB USE ONLY
COOLER SEAL
Yes ..... 21.2 No ..... ✓
Broken ..... Intact ....
COOLER TEMP: deg.C

Total unless specified

LABORATORY BATCH NO.:

SAMPLERS: AL + SO

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

SAMPLE DATA				CONTAINER DATA		Insoluable Solids	Ash Residue	Combustable Matte	NOTES
SAMPLE ID	MATRIX	DATE ON	DATE OFF	TYPE & PRESERVATIVE	Funnel Diameter (mm)				
CD1	Dust	1.8.22	1.9.22	1x dust gauge jar	150	x	x	x	
CD2c	Dust			1x dust gauge jar	150	x	x	x	
CD3	Dust			1x dust gauge jar	150	x	x	x	
CD4	Dust			1x dust gauge jar	150	x	x	x	
CD5	Dust			1x dust gauge jar	150	x	x	x	
CD6	Dust			1x dust gauge jar	150	x	x	x	

Environmental Division
Newcastle
Work Order Reference
EN2208561

Telephone : + 61 2 4014 2500

RELINQUISHED BY:

NAME : AL + SO DATE: 1.9.22
OF: CBased Environmental TIME: 1446
NAME : DATE:
OF: TIME:

RECEIVED BY

NAME : AG DATE: 1/9/22
OF: TIME: 14:45
NAME : DATE:
OF: TIME:

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

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

AUSTRALIAN LABORATORY SERVICES P/L

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN2208561**	Page	: 1 of 4
Client	: **CBASED ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Newcastle
Contact	: All Deliverables	Contact	:
Address	: Unit 3 2 Enterprise Cres Singleton NSW 2330	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
Telephone	: +61 02 6571 3334	Telephone	: +61 2 4014 2500
Project	: Hanson Calga Dusts	Date Samples Received	: 01-Sep-2022 14:45
Order number	: ----	Date Analysis Commenced	: 02-Sep-2022
C-O-C number	: ----	Issue Date	: 12-Sep-2022 15:58
Sampler	: AL + SD		
Site	:		
Quote number	: SYBQ/403/18		
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.

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

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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 Contract 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.
- For dust analysis, the Limit of Reporting (LOR) referenced in the reports for deposited matter parameters represents the reporting increment rather than reporting limit.

Analytical Results

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

Compound	CAS Number	LOR	Unit	Sample ID	CD1 01/08/22 - 01/09/22	CD2c 01/08/22 - 01/09/22	CD3 01/08/22 - 01/09/22	CD4 01/08/22 - 01/09/22	CD5 01/08/22 - 01/09/22
				Sampling date / time	01-Sep-2022 00:00	01-Sep-2022 00:00	01-Sep-2022 00:00	01-Sep-2022 00:00	01-Sep-2022 00:00
					EN2208561-001	EN2208561-002	EN2208561-003	EN2208561-004	EN2208561-005
					Result	Result	Result	Result	Result
EA120: Ash Content									
Ash Content	----	0.1	g/m².month		**0.7**	**0.5**	**0.5**	**0.1**	**0.1**
Ash Content (mg)	----	2	mg		**13**	**9**	**10**	<2	**2**
EA125: Combustible Matter									
Combustible Matter	----	0.1	g/m².month		**0.5**	**0.8**	**0.4**	**0.1**	**0.1**
Combustible Matter (mg)	----	2	mg		**9**	**14**	**6**	**2**	<2
EA141: Total Insoluble Matter									
Total Insoluble Matter	----	0.1	g/m².month		**1.2**	**1.3**	**0.9**	**0.2**	**0.2**
Total Insoluble Matter (mg)	----	2	mg		**22**	**23**	**16**	**3**	**3**

Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST** (Matrix: **AIR**)				Sample ID	**CD6 01/08/22 - 01/09/22**	----	----	----	----
				Sampling date / time	01-Sep-2022 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*		**EN2208561-006**	--------	--------	--------	--------
					Result	----	----	----	----
EA120: Ash Content									
Ash Content	----	0.1	g/m².month		**0.4**	**----**	**----**	**----**	**----**
Ash Content (mg)	----	2	mg		**7**	**----**	**----**	**----**	**----**
EA125: Combustible Matter									
Combustible Matter	----	0.1	g/m².month		**0.1**	**----**	**----**	**----**	**----**
Combustible Matter (mg)	----	2	mg		**3**	**----**	**----**	**----**	**----**
EA141: Total Insoluble Matter									
Total Insoluble Matter	----	0.1	g/m².month		**0.5**	**----**	**----**	**----**	**----**
Total Insoluble Matter (mg)	----	2	mg		**10**	**----**	**----**	**----**	**----**

CBASED ENVIRONMENTAL PTY LIMITED

Date: 1.8.22

Client : Hanson Calga

Project :

SURFACE WATERS

Site	Flow Rate	Odour	Sampling Time	Bottles	Water Turbidity	Water Colour	Comments
A	Trickle	N	0950	1x 250ml GP, 1x 500mL GP, 1x PG	C S T	C LO O B G	
B	LOW			1x 250ml GP, 1x 500mL GP, 1x PG	C S T	C LO O B G	TLTS
C1	DAM	N	12.45	1x 250ml GP, 1x 500mL GP, 1x PG	C S T	C LO O B G	
C2	SLOW	N	12.50	1x 250ml GP, 1x 500mL GP, 1x PG	C S T	C LO O B G	
D	STILL	N	14.00	1x 250ml GP, 1x 500mL GP, 1x PG	C S T	C LO O B G	
F	DAM	N	9.45	1x 250ml GP, 1x 500mL GP, 1x PG	C S T	C LO O B G	

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

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

Signed:_____

Sampled by: SM AL

CHAIN OF CUSTODY DOCUMENTATION

Australian Laboratory Services Pty Ltd

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

Total unless specified

LABORATORY BATCH NO.:

SAMPLERS:CBased Environmental Pty Ltd SM AL

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

SAMPLE DATA				CONTAINER DATA		pH	EC	TSS	TDS	O + G	NOTES
SAMPLE ID	MATRIX	DATE	TIME	TYPE & PRESERVATIVE	NO.						
A	Water	1-8-22	9:50	1x 250mlGP,1x 500mLGP,1xPG		x	x	x	x	x	
B	Water			~~1x 250mlGP,1x 500mLGP,1xPG~~		~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	TLTS
C1	Water		12:45	1x 250mlGP,1x 500mLGP,1xPG		x	x	x	x	x	
C2	Water		12:50	1x 250mlGP,1x 500mLGP,1xPG		x	x	x	x	x	
D	Water		14:00	1x 250mlGP,1x 500mLGP,1xPG		x	x	x	x	x	
F	Water		9:45	1x 250mlGP,1x 500mLGP,1xPG		x	x	x	x	x	
				TOTAL BOTTLES:							

RELINQUISHED BY:

NAME: A Lewis DATE: 2.8.22

OF: CBased Environmental TIME: 1400

NAME: DATE:

OF: TIME:

RECEIVED BY

NAME: TOB DATE: 2/8/22

OF: ALS TIME: 1:57pm

NAME: DATE:

OF: TIME:

METHOD OF SHIPMENT

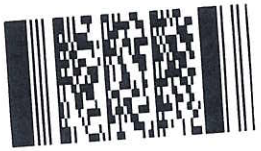
CONSIGNMENT NOTE NO.

TRANSPORT CO. NAME.

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

AUSTRALIAN LABORATORY SERVICES P/L

Environmental Division
Sydney
Work Order Reference
ES2227261



Telephone : +61-2-8784 8555

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2227261**	Page	: 1 of 2
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	: 02-Aug-2022 14:04
Order number	: ----	Date Analysis Commenced	: 02-Aug-2022
C-O-C number	: ----	Issue Date	: 09-Aug-2022 11:19
Sampler	: Cbased Environmental Pty Ltd, SM AL		
Site	:		
Quote number	: SYBQ/403/18		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, 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*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Neil Martin	Team Leader - Chemistry	Chemistry, Newcastle West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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 Contract 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 due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)			Sample ID	A	C1	C2	D	F
			Sampling date / time	01-Aug-2022 09:50	01-Aug-2022 12:45	01-Aug-2022 12:50	01-Aug-2022 14:00	01-Aug-2022 09:45
Compound	*CAS Number*	*LOR*	*Unit*	**ES2227261-001**	**ES2227261-002**	**ES2227261-003**	**ES2227261-004**	**ES2227261-005**
				Result	Result	Result	Result	Result
EA005: pH								
pH Value	----	0.01	pH Unit	**5.51**	**6.32**	**6.05**	**5.76**	**5.39**
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	**53**	**72**	**93**	**75**	**53**
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	**32**	**88**	**64**	**58**	**32**
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	**18**	**8**	<5	<5	**10**
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	<5	<5	<5	<5	**----**

Inter-Laboratory Testing

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

(WATER) EA005: pH

C BASED ENVIRONMENTAL PTY LIMITED

GROUNDWATERS

pH/EC meter #: V0228 Sampled by: Steve Adam

Laptop ID #: TBK006 Signed:

Client : Hanson Calga
Project : Bi-Monthly Bores

Site	Sampling Date	Time	DEPTH	Typical Depth (m)	Odour	Water Turbidity	Water Colour	1		2		Downloaded Logger? (Y/N)*	Comments
								pH	EC	pH	EC		
CQ3	1-8-22	9-40	10-78	10.74	N	CST	CLOOBG	7.89	136.3us	7.28	110-7us	Y	TBK006
CQ4		10-55	10-06	11.19	N	CST	CLOOBG	4.57	115-7us	4.50	114-8us	Y	
CQ5		11-50	5-32	8.04	N	CST	CLOOBG	3.98	208-8us	3.98	209-7us		
CQ7		11-40	5-85	6.61	N	CST	CLOOBG	4-12	130-5us	4-09	131-3us	Y	
CQ8		11-30	4-81	6.93		CST	CLOOBG						NO LOGGER *
CQ10		14-20	24-30	25.86	N	CST	CLOOBG	4.32	122-4us	4-30	121-1us	Y	
CQ11S		10-40	10-11	12.1	Y	CST	CLOOBG	6-01	144-2us	5-87	144-3us	Y	
CQ11D		10-45	11-59	12.98	Y	CST	CLOOBG	5-61	141-6us	5-52	140-3us	Y	
CQ12		11-20	3-51	5.46	N	CST	CLOOBG	4-07	165-1us	4-08	160-2us	Y	
CQ13		11-55	11-89	14.42	N	CST	CLOOBG	4-17	122-3us	4-18	121-9us	Y	
CP4		12-05	1-35	10.56	N	CST	CLOOBG	4-58	142-5us	4-58	126-1us.		
CP5		12-15	4-66	7.95	N	CST	CLOOBG	5-43	85-6us	5-51	86-5us		
CP6		12-10	7-12	10.73	N	CST	CLOOBG	6-03	104-8us	4-92	103-7us		
CP7		12-25	0-52	3.47	N	CST	CLOOBG	4-72	115-9us	4-68	121-6us		
CP8		1310	19-52	22.36	N	CST	CLOOBG	4-33	98-1us	4-32	99-5us		
CP13**		13-00	9-04	13.4	N	CST	CLOOBG	4-41	130-2us	4-41	130-7us		
CP15		12-35	1-84	3.01	N	CST	CLOOBG	4-37	140-3us	4-37	141-6us		
MW7		13-25	11-22	15.3	N	CST	CLOOBG	5-76	27-4us	6-04	27-5us	N	NO LOGGER
MW9		14-30	22-88	24.09	N	CST	CLOOBG	4-29	71-6us	4-29	69-8us	Y	
MW10	—			11.44		CST	CLOOBG						NO ACCESS
MW13		13-50	7-55	7.71	N	CST	CLOOBG	4-45	76-4us	4-35	59-6us		

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

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

Colour: C=Clear, LO=Light Orange, O=Orange, B=Brown, G=Green (CIRCLE)
Turbidity: C=Clear, S= Slight, T=Turbid (CIRCLE)

* BORE DAMAGED