

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



# Calga Quarry

# **Environmental Monitoring**

Dust Deposition, Surface Water, Groundwater and Meteorological Data

May 2020

Colin Davies BSc MEIA CENVP

**Environmental Scientist** 

Date: 19 June 2020

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# **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;
- · Groundwater; and
- A meteorological data.

This report was prepared by CBased Environmental and includes the following results for May 2020:

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

The May 2020 dust deposition results for insoluble solids showed:

- Decreased levels when compared to April 2020;
- Dust Gauge CD5 was not analyzed due to the sample bottle breaking in transit to the laboratory.
- 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, and F. D was not flowing at the time of sampling. The samples were collected and analysed for a monthly sampling event. Results show pH within the slightly acidic range, low electrical conductivity, low total dissolved solids and low total suspended solids. Oil and grease was not detected at sites A, B, C1, C2, and F in May 2020.

The Calga Quarry weather station data recovery in May 2020 was approximately 48%. This was due to a machine malfunction resulting in data from the 6 until the 22 of May not being recorded. A summary of rainfall comparison is provided below.

Location	Rainfall (mm)
Calga Quarry	38.2mm
BOM Peats Ridge*	NA
BOM Gosford*	50.2mm
BOM Peats Ridge long-term mean for May*	89.7mm

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.

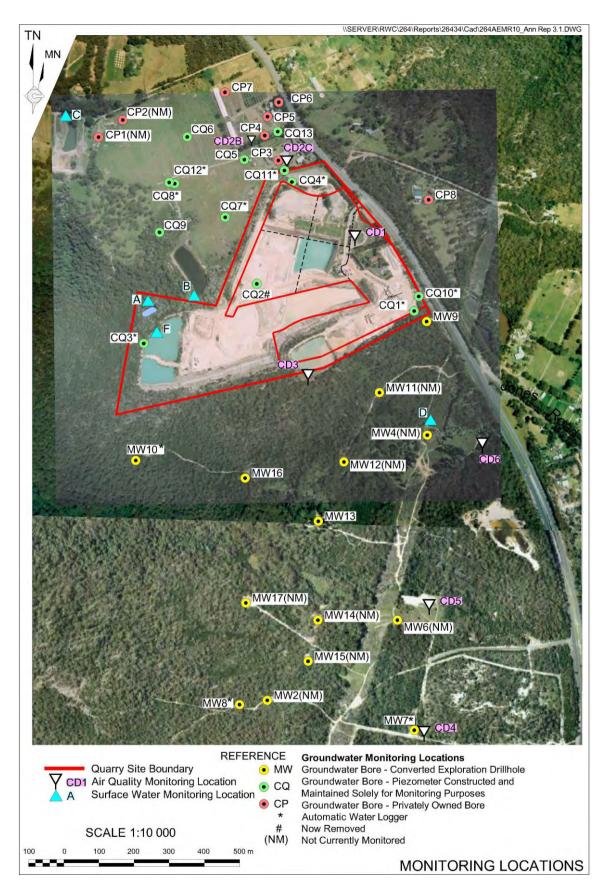


Figure 1: Hanson Calga Quarry Environmental Monitoring Locations

## 2.0 Results

# 2.1 Dust Deposition

The results for May 2020 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 – 1 May 2020 (31 days)

Site	Monthly Insoluble Solids	Monthly Ash Residue	Monthly Combustible Matter	Monthly Ash Residue/ Insoluble Solids %	Rolling Annual Average Insoluble Solids
CD1	0.6	0.5	0.1	83	2.2
CD2c	0.4	0.3	0.1	75	1.6
CD3	0.5	0.5	<0.1	100	1.8
CD4	0.3	0.1	0.2	33	1.5
CD5	Sample no	ot analysed due	to broken bottle in	transit	1.4
CD6	0.5	0.2	0.3	40	1.5

Notes:

Units in g/m<sup>2</sup>.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 June 2019 to May 2020

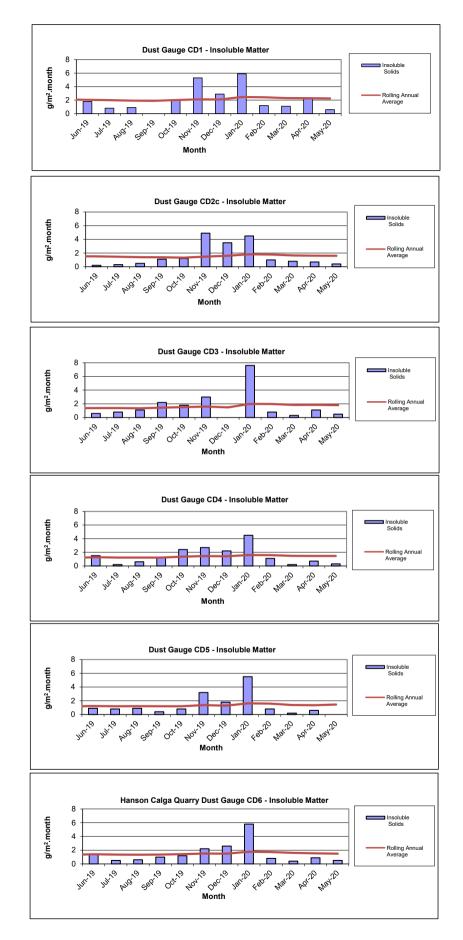


Figure 2: Summary Monthly/Annual Dust Deposition Results for Insoluble Solids

# 2.2 Surface Water (Monthly)

Monthly surface water monitoring was conducted on 1 May 2020 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, and F. D was not flowing at the time of sampling.

**Table 2:** Monthly Surface Water Monitoring Results – May 2020

Site	Observed Flow Rate* (visual)	Water Colour* (visual)	Turbidity* (visual)	рН	EC (μS/cm)	TDS (mg/L)	TSS (mg/ L)	Oil and Grease (mg/L)
Α	Still	Clear	Clear	6.11	76	56	<5	<5
В	Trickle	Brown	Clear	6.74	102	98	12	<5
C1	Dam	Clear	Clear	6.66	84	62	33	<5
C2	Steady	Clear	Clear	6.03	120	69	<5	<5
D			N	lot Flow	ng			
F	Dam	Clear	Clear	6.81	109	89	26	<5

<sup>\*</sup> Indicates field measurements. All other results are laboratory analysed

# 2.2.1 Non-Routine Surface Water Sampling

Discharge Dam 1 (A) 27052020 (Test prior to release) was sampled on 27 of May 2020. The field sheet, chain of custody documentation and laboratory analysis certificates are provided in Appendix 1

# 2.3 Groundwater (Bi-annually)

Groundwater was sampled during April 2020 and is next scheduled in August 2020.

EC = Electrical conductivity

TDS = Total dissolved solids

TSS = Total suspended solids

# 2.4 Meteorological Data

The Calga Quarry weather station data recovery for May 2020 was approximately 48%. This was due to a machine malfunction resulting in data from the 6 until the 22 of May not being recorded.

The weather station data follows and includes:

- Monthly rainfall comparison between quarry data and BOM data. Refer to Table 3:
- Monthly data summary. Refer to Table 4;
- 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 3 – 5; and
- Wind rose (frequency distribution diagram of wind speed and direction). Refer to Figure 6.

A summary of rainfall comparison is provided in **Table 3**.

**Table 3:** Comparison of Local Rainfall – May 2020

Location	Rainfall (mm)
Calga Quarry	38.2mm
BOM Peats Ridge*	NA
BOM Gosford*	50.2mm
BOM Peats Ridge long-term mean for May*	89.7mm

Notes: NA = Not Available

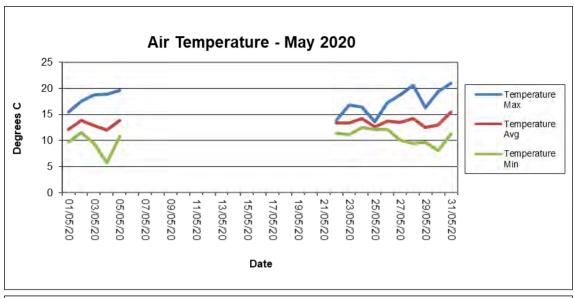
\*Data sourced from Bureau of Meteorology (BOM) website: www.bom.gov.au BOM stations report rainfall at 9am

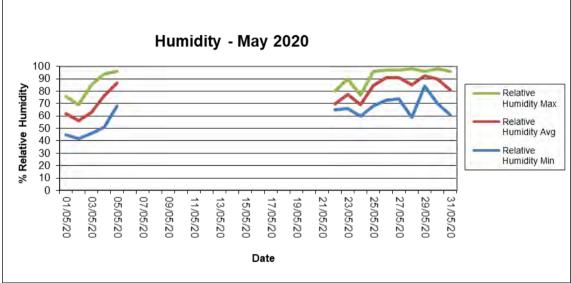
Calga Quarry station reports rainfall at midnight.

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

Table 4:Summary of Monthly Meteorological Data – May 2020

Date	Temperature Min	Temperature Avg	Temperature Max	Relative Humidity Min	Humidity Avg	Humidity Max	Rain	Evapotrans piration	Wind Speed Min	Wind Speed Avg	Wind Speed Max	Wind Chill Min	Heat Index Max	Atmospheric Pressure Min	Pressure Avg	Atmospheric Pressure Max	Solar Radiation Min	Solar Radiation Avg	Solar Radiation Max	Data Min	Data Avg	Data Max
1/05/2020	9.7	12.1	15.4	45.0	62.0	76.0	0.2	4.0	1.8	4.6	15.6	8.0	14.1	1002.6	1005.2	1006.9	0.0	181.1	763.0	33.4	53.4	70.3
2/05/2020	11.5	13.8	17.6	42.0	56.3	69.0	0.0	5.3	3.1	6.4	20.1	8.6	16.1	1000.4	1003.0	1007.3	0.0	176.2	675.0	45.1	68.4	87.1
3/05/2020	9.4	12.9	18.8	46.0	63.0	85.0	0.0	3.2	0.0	1.8	10.7	8.1	17.5	1007.4	1014.4	1020.6	0.0	164.0	664.0	71.9	84.3	91.2
4/05/2020	5.8	12.0	18.9	51.0	76.6	94.0	0.0	2.5	0.0	0.6	6.3	5.8	18.2	1020.3	1022.5	1025.6	0.0	168.5	659.0	57.7	76.5	90.2
5/05/2020	10.8	13.8	19.6	68.0	86.6	96.0	0.2	1.4	0.0	8.0	6.3	10.9	19.4	1025.1	1026.5	1028.1	0.0	88.3	690.0	47.3	81.6	97.2
6/05/2020																						
7/05/2020																						
8/05/2020																						
9/05/2020																						
10/05/2020																						
11/05/2020																						
12/05/2020																						
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17/05/2020																						
18/05/2020																						
19/05/2020																						
20/05/2020																						
21/05/2020																						
22/05/2020	11.4	13.3	13.9	65.0	69.5	80.0	0.4	0.6	3.1	4.5	11.6	8.6	13.4	1005.4	1006.2	1006.7	0.0	3.5	44.0	84.2	91.9	100.0
23/05/2020	11.2	13.3	16.8	66.0	77.3	90.0	0.2	1.8	1.3	3.5	11.2	8.3	16.4	1003.7	1004.8	1006.2	0.0	64.8	537.0	76.0	96.9	100.0
24/05/2020	12.5	14.2	16.4	60.0	69.0	77.0	0.0	2.3	2.2	4.5	12.1	10.8	15.9	1005.9	1009.0	1012.7	0.0	52.6	327.0	83.3	88.0	100.0
25/05/2020	12.2	12.7	13.6	68.0	84.5	96.0	27.4	1.2	2.7	4.4	12.5	9.3	13.7	1011.8	1014.1	1017.2	0.0	35.4	187.0	66.2	84.8	95.0
26/05/2020	12.1	13.7	17.3	73.0	90.9	97.0	7.8	0.9	0.4	2.0	9.8	10.1	17.1	1017.1	1018.7	1020.3	0.0	59.5	310.0	78.2	90.4	98.4
27/05/2020	10.0	13.5	18.8	74.0	90.6	97.0	0.6	1.7	0.0	0.7	4.5	10.0	18.8	1016.5	1018.4	1020.1	0.0	121.4	739.0	85.2	97.1	100.0
28/05/2020	9.4	14.3	20.6	59.0	85.0	98.0	0.4	2.0	0.0	0.4	4.9	9.4	20.3	1016.0	1018.1	1020.6	0.0	138.7	564.0	61.5	93.1	100.0
29/05/2020	9.7	12.5	16.3	84.0	92.5	96.0	0.4	0.9	0.0	0.5	5.4	9.7	16.2	1020.3	1023.5	1025.7	0.0	62.7	623.0	87.7	93.8	100.0
30/05/2020	8.1	13.0	19.4	70.0	90.0	98.0	0.4	1.6	0.0	0.9	6.3	8.2	19.4	1018.1	1022.6	1025.7	0.0	113.1	655.0	85.8	94.9	100.0
31/05/2020	11.3	15.5	21.0	61.0	80.8	96.0	0.2	1.8	0.0	1.3	6.7	11.3	20.8	1011.1	1014.8	1018.0	0.0	97.5	557.0	88.6	95.8	100.0
Monthly	5.8	13.4	21.0	42	78	98	38.2	31.1	0.0	2.4	20.1	5.8	20.8	1000.4	1014.8	1028.1	0.0	101.8	763.0	33.4	86.1	100.0
Unit	De	grees Celcius (°	°C)	Percentag	ge Relative	Humidity	mm	mm	Metres	per second	d (m/s)	°C	°C	Не	ector Pascals (h	Pa)	Watts per	r square metr	e (W/m²)	F	ercentage (%	%)





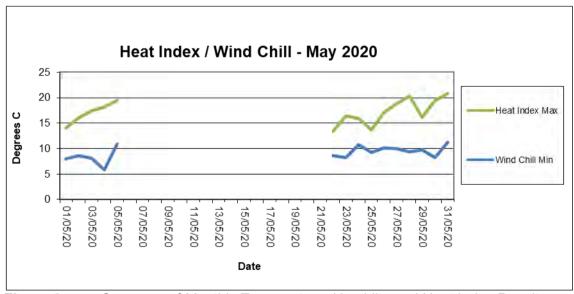
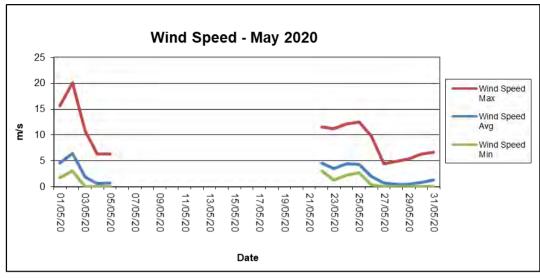
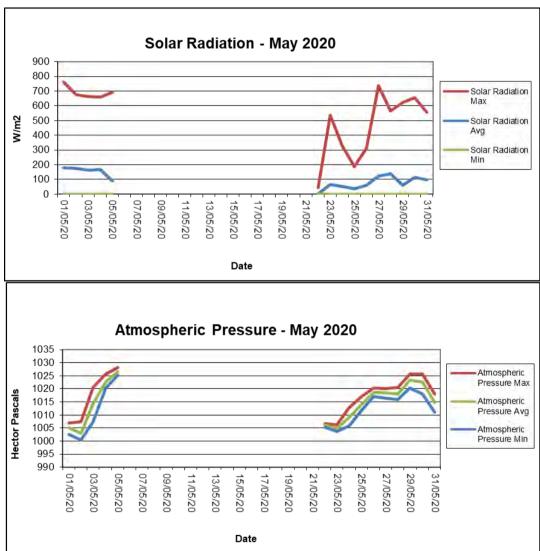
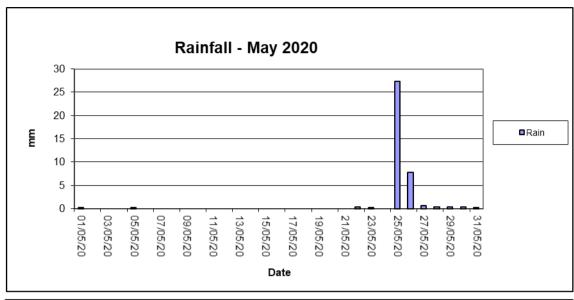


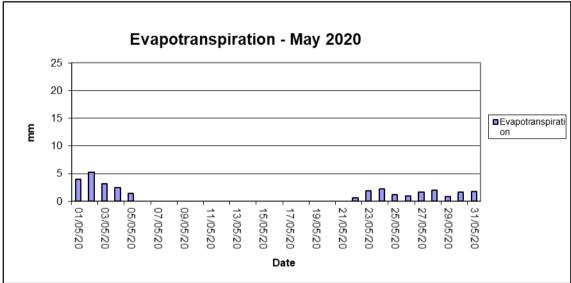
Figure 3 Summary of Monthly Temperature, Humidity and Heat Index Results

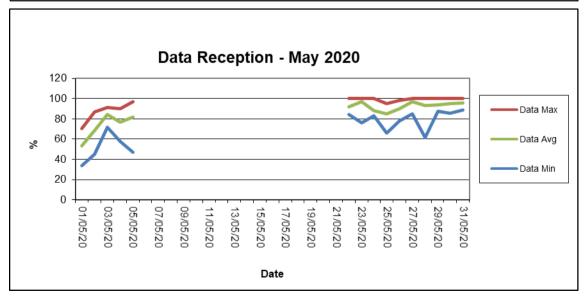




**Figure 4** Summary of Monthly Wind Speed, Solar Radiation and Atmospheric Pressure Results







**Figure 5** 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.

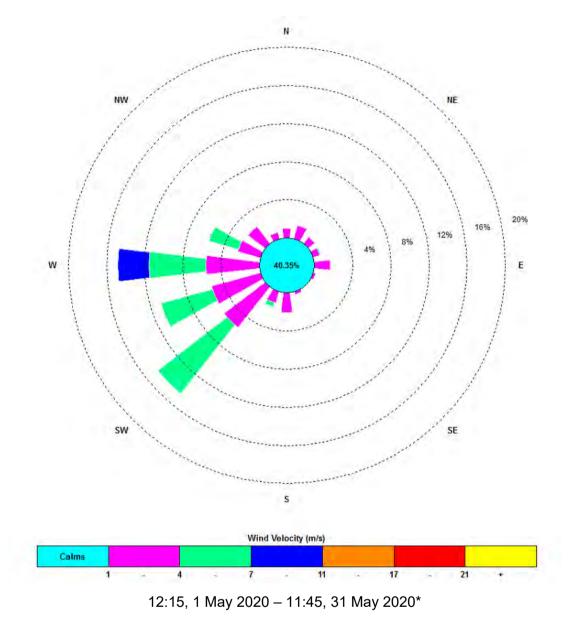


Figure 6: Monthly Windrose Plot – May 2020

\*Please note from 6-21 May 2020, there is no data available due to machine malfunction as advised by site.

The predominant wind for May was from the West, with most frequent, strongest winds also from the West. The maximum wind speed was 10.7m/s from the West.

# Appendix 1

Field Sheets
Chain of Custody Documentation
Laboratory Analysis Certificates



#### **DEPOSITIONAL DUST MONITORING**

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

Date Installed: 1 . 5 . 20

Date Collected: 1 . 6 . 20

Sampled By: Lesa King

Site	Time	Water	Insolu	ble Material ( 🗸 = s	light, 🗸 🗸 = n	nod etc)	Water	Water	Stand Level	Funnel Level	New Funnel	Comments
	Collected	Level (mL)	Insects	Bird droppings	Vegetation	Dust	Turbidity	Colour	(Y/N)	(Y/N)	Diameter (mm)	7.7.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2
CD1	1.05	1200				)	<b>⊘</b> ST	O Bn Gn Gy	У	V		
CD2C	2,05	1200				)		O Bn Gn Gy		<b>V</b>		
CD3	1.00	1200	V		-	/	<b>©</b> S T	Bn Gn Gy	Y	4		
CD4	2.15	1300	/				<b>⊘</b> s ⊤	O Bn Gn Gy	7	4		
CD5	2.25	1300				1	<b>O</b> S T	O Bn Gn Gy	-7	4	¥	Bottle Brok
CD6	2'45	1400				)	<b>⊘</b> ST	O Bn Gn Gy	-7	4		
						1						
					2							
												-
				-								

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

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

Report broken funnels and replacement diameters

Signed:

CHAIN OF CUSTO						LARC	PATO	DRY I	BATCH NO.:				7-11	= -	Australian Laboratory Ser Pty Ltd
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SEND REPORT TO: monitoringresults@cbased.com.au			DICE TO: acco a@cbased.co	ounts@cbased.com.au, m.au		РНО	NE: 02	26571	3334	E-MAIL: mo	nitoringresult	s@cbased.com	n,au		
DATA NEEDED BY: 7 working days		REPORT	IEEDED BY: 7	working days		REPO	RTF	ORM	AT: HARD: Yes		DISK:	BULLETIN	BOARD:	E-MAIL: Yes	
PROJECT ID: Hanson Calga Dusts	QUOTE NO.:	SYBQ 403-1	8			QC L	EVEL		QCS1:	QCS2		QCS3: Yes	4:	QCS4:	
P.O. NO.;	COMMENTS	SPECIAL HA	ANDLING/STC	RAGE OR DIPOSAL:								ANALYSIS F	REQUIRED		
FOR LAB USE ONLY						Soldis		atte							
COOLER SEAL							e	Combustable Matt			111	1 1 1			1.1
Yes No	Total unless s	specified				Insoluable	Ash Residue	stab				1 1 1			1 1
Broken Intact	4					olus	S.	g				1 1 1		- 11 12 - 11 - 11	The second
COOLER TEMP: deg.C						Ins	Asl	S							NOTES
SAMPLE DATA CONTAINER DATA															
SAMPLE ID	MATRIX	DATE ON	DATE OFF	TYPE & PRESERVATIVE	NO.							1: 1: 1:			
CD1 Dust 1.5.20 (.6.20						х	x	x				Env	ronme	ntal Division	
CD1 Dust 1.5-20 1.6-10 CD2c Dust							×	X					castle		
												W	ork Orde	r Reference	
CD4	Dust				T- 2	×	х	x			12.11	C	CINE	003691	
CD5	Dust					×	×	×						003031	
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OF: CBased Environmental		-	TIME:	12.35		OF:						TIME:	, ,		
NAME: DATE:													TRANSPORT CO. NAME.		
OF: TIME:  *Container Type and Preservative Codes: P = Neutral Plastic; N = Nitric Acid Preserved; C = Sodium Hydroxide Preserved;						OF:						TIME:			

AUSTRALIAN LABORATORY SERVICES P/L



## **CERTIFICATE OF ANALYSIS**

Work Order : EN2003691

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 King

Site

Quote number : SYBQ/403/18 - COMPASS

No. of samples received : 5
No. of samples analysed : 5

Page : 1 of 2

Laboratory : Environmental Division Newcastle

Contact :

Address : 5/585 Maitland Road Mayfield West NSW Australia 2304

Telephone : +61 2 4014 2500
Date Samples Received : 02-Jun-2020 12:38

Date Analysis Commenced : 04-Jun-2020

Issue Date : 11-Jun-2020 12:34



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

Joel Mullarvey Laboratory Technician Newcastle - Inorganics, Mayfield West, NSW

Page : 2 of 2 Work Order : EN2003691

Client : CBASED ENVIRONMENTAL PTY LTD

Project : Hanson Calga Dusts

#### **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 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: <b>DEPOSITIONAL DUST</b> (Matrix: <b>AIR</b> )	Client sample ID  Client sampling date / time  CAS Number LOR Unit  0.1 g/m².month 1 mg		CD1 01/05/20 - 01/06/20	CD2c 01/05/20 - 01/06/20	CD3 01/05/20 - 01/06/20	CD4 01/05/20 - 01/06/20	CD6 01/05/20 - 01/06/20	
	Cli	ent sampli	ng date / time	01-Jun-2020 00:00	01-Jun-2020 00:00	01-Jun-2020 00:00	01-Jun-2020 00:00	01-Jun-2020 00:00
Compound	Client sampling date / time  CAS Number LOR Unit  0.1 g/m².month		EN2003691-001	EN2003691-002	EN2003691-003	EN2003691-004	EN2003691-005	
				Result	Result	Result	Result	Result
EA120: Ash Content								
Ash Content		0.1	g/m².month	0.5	0.3	0.5	0.1	0.2
Ash Content (mg)		1	mg	10	5	9	2	4
EA125: Combustible Matter								
Combustible Matter		0.1	g/m².month	0.1	0.1	<0.1	0.2	0.3
Combustible Matter (mg)		1	mg	1	2	1	4	6
EA141: Total Insoluble Matter								
Total Insoluble Matter		0.1	g/m².month	0.6	0.4	0.5	0.3	0.5
Total Insoluble Matter (mg)		1	mg	11	7	10	6	10





Date: 1.5.20

Client:

Hanson Calga

Project:

# **SURFACE WATERS**

Site	Flow Rate	Odour	Sampling Time	Bottles	Water Turbidity	Water Colour	Comments
A	Stell	N	11:10	1x 250ml GP, 1x 500mL GP, 1x PG	CST	(C)LOOBG	
3	tricke	N	11.25	1x 250ml GP, 1x 500mL GP, 1x PG	(C)S T	C LO O B G	
C1	Dan	N	12.05	1x 250ml GP, 1x 500mL GP, 1x PG	CST	(CLOOBG	
02	Sleady	N	1210	1x 250ml GP, 1x 500mL GP, 1x PG	CST	CLOOBG	
)				1x 250ml GP, 1x 500mL GP, 1x PG	CST	CLOOBG	Not Howing.
7	DAM	N	11.00	1x 250ml GP, 1x 500mL GP, 1x PG	C)ST	CLOOBG	9
			Maria In the following	Home state and			

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

Signed: Leters

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

Sampled by:

	REPORT TO: SEND INVOICE TO: renae.mikka@cbased.com.									LINO					-	-		_		Australian Laboratory Services Pty Ltd
	TAL ADDRESS: PO Box 245 CESSNOCK NSW 2325  D REPORT TO: SEND INVOICE TO: renae.mikka@cbased.com.au accounts@cbased.com.au									H NO.		1.51.1			-					- Oct vices i ty Ltd
	ESSNOCK NS				_	SAMI	PLER	S:CBa	sed b	nviro	nmenta	al Pty L	.td	_				1		4
SEND REPORT TO: monitoringresults@cbased.com.au						PHOI	NE: 0	26571	3334			E-M	AIL: mon	itoringres	ults@cl	pased.	com.au			
DATA NEEDED BY: 5 working days	3	REPORT	NEEDED	BY: 5 working days		REPO	ORT F	ORM	AT:	HARD	: Yes	F	AX:	DISK	: E	BULLET	IN BOARD:	E-	MAIL: Yes	
		SYBQ-403	-18			QCL	EVEL	:	QC	S1:			QCS2:		QCS	3: Yes		QCS4		
P.O. NO.:	COMMENTS	SPECIAL H	ANDLING	G/STORAGE OR DIPOSAL:											ANAL	YSIS R	EQUIRED			
FOR LAB USE ONLY			and the second					100												
COOLER SEAL													1 1			- {		1 1		
Yes No	, Total unless	specified											1 1							
Broken 15 '> Intact .									S	9			1 1				1 1			
COOLER TEMP: deg.C	ER TEMP: deg.C *CONTAINER DATA *CONTAINER DATA							TSS	TDS	Ö										NOTES
SAMPL	SUSE ONLY R SEAL Total unless specified Intact R TEMP: deg.C SAMPLE DATA CONTAINER DATA																-0-2	- التواو		
SAMPLE ID	MATRIX	DATE	TIME	TYPE & PRESERVATIVE	NO.											=0.	1111			
Α	Water	1.5.20	11.60	1x 250mIGP,1x 500mLGP,1xP0	3	х	x	x	х	х										
	Water	1				х	х	х	х	х							51/10/15			
C1	Water	Water         // 25 1x 250mIGP, 1x 500mLGP, 1xPG           Water         /2 < 5 1x 250mIGP, 1x 500mLGP, 1xPG							х	х							11 10/10			
C2	Water	U	12:10	1x 250mIGP,1x 500mLGP,1xP0	3	X	X	Х	х	х										
D	Water-			1x-250mlGP,1x-500mLGP,1xP0	3	X	-X-	-X-	X_	х							3 P. S.			Not floung
F	Water	1.5.2	11.00	1x 250mlGP,1x 500mLGP,1xP0	3	х	х	х		х						338				
							-													
													11	200						
	100000000000000000000000000000000000000						1											4 - 1		
													1 1 = 1				3 11.7	1 7 40		
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				TOTAL BOTTLES:	1.1.									V			= 1			
	RELINQUISHED BY:											REC	EIVED B	Υ						METHOD OF SHIPMENT
NAME: J./9	Ciron			DATE: 1.5.2C		NAMI OF:	E:	1	1100			_					=:115/20			CONSIGNMENT NOTE NO.
OF: CBased Environmental								- /	AC	- 5							E: 14: 10			
NAME: DATE:						NAME : DATE:  OF: TIME:						TRANSPORT CO. NAME.								
OF:	F: TIME:															TIM	E: Rinced Glass			

**AUSTRALIAN LABORATORY SERVICES P/L** 

O = Other.

Environmental Division Sydney Work Order Reference ES2014934



Telephone: + 61-2-8784-8555



## **CERTIFICATE OF ANALYSIS**

Work Order : ES2014934

: 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 : CARBON BASED ENVIRONMENTAL PTY LTD

Site

Client

Quote number : SYBQ/222/16 and PLANNED EVENTS

No. of samples received : 5
No. of samples analysed : 5

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-May-2020 14:10

Date Analysis Commenced : 01-May-2020

Issue Date : 07-May-2020 16:11



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 Gregory Towers Technical Officer Sydney Inorganics, Smithfield, NSW Chemistry, Newcastle West, NSW

Page : 2 of 2 Work Order : ES2014934

Client : CBASED ENVIRONMENTAL PTY LTD

Project : HANSON QUARRY SW

#### **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 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.

#### **Analytical Results**

Sub-Matrix: WATER (Matrix: WATER)		Clie	ent sample ID	Α	В	C1	C2	F
(massa m. <u>L</u> iv)	CI	ient sampli	ng date / time	01-May-2020 11:10	01-May-2020 11:25	01-May-2020 12:05	01-May-2020 12:10	01-May-2020 11:00
Compound	CAS Number	LOR	Unit	ES2014934-001	ES2014934-002	ES2014934-003	ES2014934-004	ES2014934-005
				Result	Result	Result	Result	Result
EA005: pH								
pH Value		0.01	pH Unit	6.11	6.74	6.66	6.03	6.81
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C		1	μS/cm	76	102	84	120	109
EA015: Total Dissolved Solids dried at 18	80 ± 5 °C							
Total Dissolved Solids @180°C		10	mg/L	56	98	62	69	89
EA025: Total Suspended Solids dried at	104 ± 2°C							
Suspended Solids (SS)		5	mg/L	<5	12	33	<5	26
EP020: Oil and Grease (O&G)								
Oil & Grease		5	mg/L	<5	<5	<5	<5	<5





# CHAIN OF CUSTODY

ALS Laboratory:

nlease tick →

Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

□ADE\_AICE 21 Birmo Road Pooraka SA 6095 Ph: 08 8259 0801; adebide@alsqlobal com JBRISBANE 32 Shand Sheet Stafford (J. 2.053 Ph: 07 3243 7222 E: semplas brisbana@alsglobal.com □G\_ADSTONE 46 Collemendal: Drive Clinton CLD 4680 Ph; 07 7471 5600 E: gladston@alsglobal.com 
 DMACKAY /8 Harbour Road Mackay QLD 4740
 □NEW

 Ph: 07 4944 0177 E: mackay@alsglobal.com
 Ph: 02 4

 DMELBOURNE 2-4 Westell Road Soringvale VIC 3174
 Ph: 03 544 9600 E: samples melbourne@assglobal.com

OMUDGEE 27 Sydney Road Mudgee NSW 2850

Ph: C2 6372 6735 E: mudglee.mail@alsglobal.com

DNEWCASTLE 5/585 Mait:and Rd Mayfield West NSW 2304
Ph. 02 4014 2500 E. samples.newcasale@elaglobal.com
LINGWRA 4/13 Geary Place North Nowra NSW 2541
m Ph. 024423 2063 E. nowra@elaglobal.com
LIPERTH 10 Hod Way Malaga WA 6090
Ph. 08 9209 7/65 E. samples perh@elaglobal.com

LISYDNEY 277-289 Woodpark Road Smithfield NSW 2164 면도 CONSTITUTE (STDEISE STORM SHEEDER STDEISE STORM SHEEDER STDEISE STORM SHEEDER SHEEDER STORM SHEEDER SHEED

DWOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

		-															
CLIENT: I	Hanson Calga Quarry - 151 Peats Ridge	AROUND REQUIREMENTS :	☐ Stand	lard TAT (List	due date):					FOR L	ABORATOR	/ USE ONL	Y (Circle)				
OFFICE:	> :		(Standar Trace Or	d TAT may be longer for some tests e.g Ultra ganics)	☐ Non S	Standard or urg	ent TAT (Lis	t due date)	ı: pH p	riority 27/	05/2020	经济流流 海洋污	Seal Intact?		Yes	No	N/A
PROJECT:	Hanson Calga Quarry, Site Water Disch	UOTE NO.: SYBQ 2	222-19	,	A		COC SEQU	ENCE NUMBI	ER (Circle)	Free ice receipt?	/ frozen ice bri	ks present up	on Yes	No	N/A		
ORDER NU	MBER: 4502728451					coc:	1			Randon	Sample Temp	erature on Rei	Celpt:	<b>'c</b>			
PROJECT I	MANAGER: Paul Slough	1375 1151				OF:	1			Othero	omment:						
SAMPLER:	Brad Seaman	0436013113	RELINQU	ISHED BY:		RECI	EIVED BY:			RELINQUIS	HED BY:		RECEIVED BY				
COC emaile	ed to ALS? Provided on reciept of samp	es EDD FORMA	T (or de	fault):	Brad Sear	man		10	וכנף								
Email Repo	orts to: paul.slough@hanson.com.au & n	nonitoringresults@cbased	.com.au		DATE/TIM	IE: 27/05/2020	}	DATE	E/TIME:			DATE/TIME:			DATE/TIME:		
Email invoi	ve to: nsw.accounts@hanson.com.au &	ben.ridley@hanson.com.a	ıu		]			286	15/~	11-							
COMMENT	S/SPECIAL HANDLING/STORAGE OR D	SPOSAL:															
ALS USE	SAMPLE DE MATRIX: SOLID (S)			CONTAINER INFORM	ATION					Total (unfilter		must be listed to lred) or Dissolve			Additional Ir	formation	
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below)	(refer to	TOTAL	H.	EC	TSS	TDS	Oil & Grease			dile	omments on likely cont utions, or samples requ alysis etc.		
1	Discharge Dam 1 (A) 27052020 (Test prior to release)	27/05/2020 08:15am	w	1x P, 1x O&G		2	1	1	1	1	1						
	NA.																
														and the state of t			
														25.40			
								-					Enviro Sydne Worl	onmenta y Order F 3201	al Division  Beforence 1840		
					TOTAL	2	1	1	1	1	1		Telephone :	+ 61-2-876⁄	<b>4</b> € 555		
M	to a contract to the state of t	Description of Discourse ODO - Miles		d ODO: OH - Cadless I bedeselds/Od Besses and	C = C = disses	Ultradensiale Dece	man Diameter	40 - 4	Class I Issues	AD A	-f:						

V = VOA Vial HCI Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved, AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCI preserved Plastic; HS = HCI preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;



## **CERTIFICATE OF ANALYSIS**

Work Order : ES2018408

: HANSON CONSTRUCTION MATERIALS PTY LTD

Contact : PAUL SLOUGH

Address : 151 Peats Ridge Rd

Calga 2250

Telephone : ---

Client

Project : HANSON CALGA QUARRY, SITE WATER DISCHARGE DAM 1

(A)

Order number : 4502728451

C-O-C number : ----

Sampler : Brad Seaman

Site : ----

Quote number : EN/222

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 : 28-May-2020 11:00

Date Analysis Commenced : 28-May-2020

Issue Date : 04-Jun-2020 11:15



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

Page : 2 of 2 Work Order : ES2018408

Client : HANSON CONSTRUCTION MATERIALS PTY LTD

Project : HANSON CALGA QUARRY, SITE WATER DISCHARGE DAM 1 (A)

# ALS

#### **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.

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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) 27052020 (Test prior to release)	 	 
Client sampling date / time				27-May-2020 00:00	 	 
Compound	CAS Number	LOR	Unit	ES2018408-001	 	 
				Result	 	 
EA005P: pH by PC Titrator						
pH Value		0.01	pH Unit	7.68	 	 
EA010P: Conductivity by PC Titrator						
Electrical Conductivity @ 25°C		1	μS/cm	121	 	 
EA015: Total Dissolved Solids dried a	t 180 ± 5 °C					
Total Dissolved Solids @180°C		10	mg/L	103	 	 
EA025: Total Suspended Solids dried	at 104 ± 2°C					
Suspended Solids (SS)		5	mg/L	16	 	 
EP020: Oil and Grease (O&G)						
Oil & Grease		5	mg/L	<5	 	 