

**Monthly Air Quality Monitoring – August 2019**  
**Bass Point Quarry**

**Licensee**

HANSON CONSTRUCTION MATERIALS PTY LTD  
LOCKED BAG 5260  
PARRAMATTA NSW 2124

**Premises Details**

HANSON CONSTRUCTION MATERIALS PTY LTD  
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SHELLHARBOUR  
NSW 2529  
LOT 16 DP 627783, LOT 78 DP 751290, LOT 22 DP 1010797

Project Approval: Ref 08\_0143, January 28, 2014  
Environmental Protection Licence (EPL) No: 2193\*

\* Listed in the [EPA Public Register](#)



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## 1. Air quality monitoring requirements

As per the Project Approval and Air Quality Management Plan (AQMP), the quarry is required to report on the following:

### 1.1. **Particulate Matter**

The quarry monitors two PM<sub>10</sub> samplers (**Table 1, Figure 1**) and will gather representative data, to compare the results against the following tables:

Table 4: Long-Term Impact Assessment Criteria for Particulate Matter

<i>Pollutant</i>	<i>Averaging period</i>	<i><sup>d</sup> Criterion</i>
Total suspended particulates (TSP)	Annual	<sup>a</sup> 90 µg/m <sup>3</sup>
Particulate matter < 10 µm (PM <sub>10</sub> )	Annual	<sup>a</sup> 30 µg/m <sup>3</sup>

Table 5: Short Term Impact Assessment Criteria for Particulate Matter

<i>Pollutant</i>	<i>Averaging period</i>	<i><sup>d</sup> Criterion</i>
Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	<sup>a</sup> 50 µg/m <sup>3</sup>

### 1.2. **Dust Deposition Gauges**

The quarry monitors two Dust Deposition Gauges (DDGs) (**Table 1, Figure 1**) and will compare the results against the following table:

Table 6: Long-Term Impact Assessment Criteria for Deposited Dust

<i>Pollutant</i>	<i>Averaging period</i>	<i>Maximum increase in deposited dust level</i>	<i>Maximum total deposited dust level</i>
<sup>c</sup> Deposited dust	Annual	<sup>b</sup> 2 g/m <sup>2</sup> /month	<sup>a</sup> 4 g/m <sup>2</sup> /month

### 1.3. **Representative Meteorological Data**

The quarry will gather representative meteorological data for the respective month including temperature, rainfall, wind speed and direction.

## 2. Air quality monitoring program

The Air Quality Management Plan was prepared by SLR Global Environmental solutions and details the assessment criteria, monitoring locations and procedures, and the compliance checking procedures for the subsequent reporting in accordance with the Department of Planning, Industry and Environment (DPIE) and the Environment Protection Authority (EPA) requirements.

All monitoring locations conform to the requirements of AS 3580.1.1:2016, subject to local site constraints. Monitoring activities are outlined in **Table 1**, with site monitoring points shown in **Figure 1**. Note that Site No. PM10-1 is used as a management tool and not for compliance purposes, and as such, is not used to establish compliance monitoring for PM<sub>10</sub>. In addition, though not part of the Bass Point Quarry air quality monitoring program, regional background data for 24 hour PM<sub>10</sub> concentration is sourced from the Office of Environment and Heritage (OEH) Albion Park South Air Quality Monitoring Station (AQMS) as per the AQMP.

**Table 1:** Summary of the air quality monitoring program at Bass Point Quarry. Sites that are not monitored for compliance purposes (e.g. used as management tools only) are shaded pale grey.

Site No.	Location	Parameter	Instrument	Sampling frequency	Reporting frequency
DDG-1	Western Boundary	Dust Deposition	Dust Deposition Gauge (DDG)	30 days (± 2 days)	Monthly
DDG-2	Northwest of Pit	Dust Deposition	Dust Deposition Gauge (DDG)	30 days (± 2 days)	Monthly
Automatic Weather Station	Kiama (Bombo Headland)	Meteorological Parameters	Automatic Weather Station (AWS)	Continuous	Monthly
PM10-1	West of the Main Site Office	PM <sub>10</sub>	Beta Attenuation Monitor (BAM)	Continuous	Monthly
PM10-2	West, on the amenity bund	PM <sub>10</sub>	Low Volume Air Sampler (LVAS)	1 in 6 day sampling	Monthly



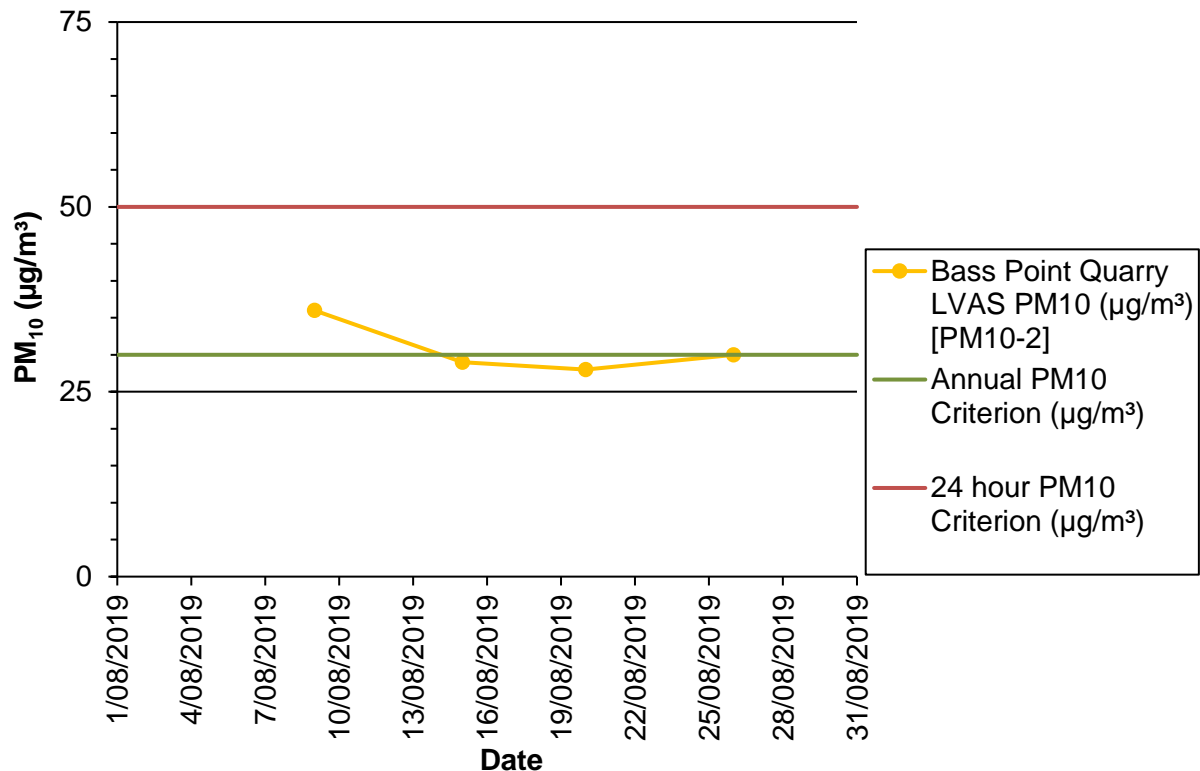


**Figure 1:** Air quality monitoring locations at the Bass Point Quarry. Locations have been acronymised as follows: DDG-1 – Dust Deposition Gauge 1; DDG-2 – Dust Deposition Gauge 2; PM10-1 – Continuous PM<sub>10</sub> Monitor; PM10-2 – Low Volume PM<sub>10</sub> Sampler.

### 3. Monthly results

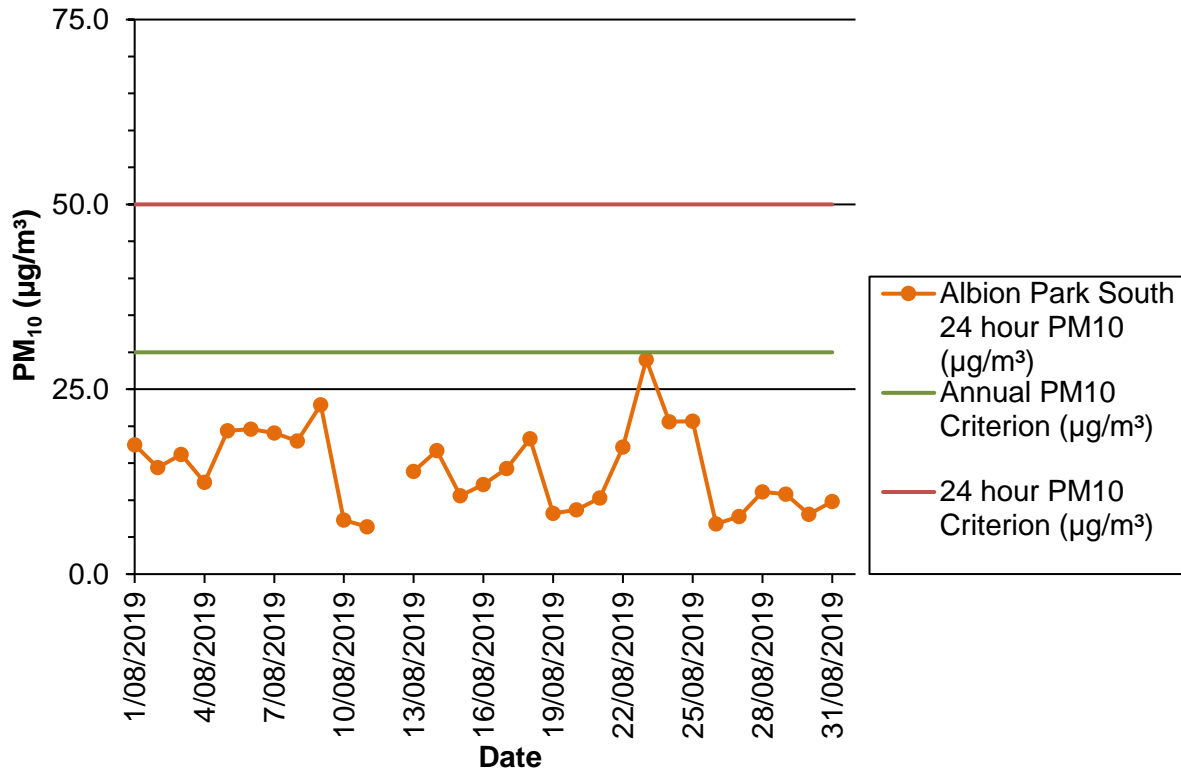
#### 3.1. Particulate Matter – Particulate Matter < 10 µm (PM<sub>10</sub>)

The PM<sub>10</sub>-2 (LVAS) monitoring site is located on the site boundary (as per the AQMP). An exceedance of the 24 hour or annual average criteria at this monitoring point therefore does not necessarily mean that there has been an exceedance of the assessment criteria outlined in Project Approval 08\_0143 Schedule 3 (which apply at any residence on privately-owned land). All monitoring data collected at PM<sub>10</sub>-2 during August 2019 was below the 24 hour average PM<sub>10</sub> criterion of 50 µg/m<sup>3</sup>, and was hence compliant (**Figure 2**).



**Figure 2:** Twenty-four hour PM<sub>10</sub> concentration (µg/m<sup>3</sup>) as measured at PM<sub>10</sub>-2 during August 2019, compared to the annual criterion and 24 hour criterion (µg/m<sup>3</sup>).

The 24 hour average PM<sub>10</sub> reading from the OEH Albion Park South AQMS was below the 50 µg/m<sup>3</sup> criterion – and hence was compliant – for all days during August 2019 (Figure 3, Table 2).



**Figure 3:** Twenty-four hour PM<sub>10</sub> concentration (µg/m<sup>3</sup>) as measured at Albion Park South AQMS during August 2019, compared to the annual criterion and 24 hour criterion (µg/m<sup>3</sup>).

Hanson are required to report on the annual average 24 hour PM<sub>10</sub> concentration for the identified periods: (i) calendar year, as part of the Environmental Management Annual Review, and; (ii) 15<sup>th</sup> June to 14<sup>th</sup> June, as part of the EPL Annual Return. Annual average PM<sub>10</sub> data is therefore not required as part of the August 2019 monthly report. However, as a management tool, Hanson have begun calculating the rolling annual average 24 hour PM<sub>10</sub> for the monthly air quality reports.

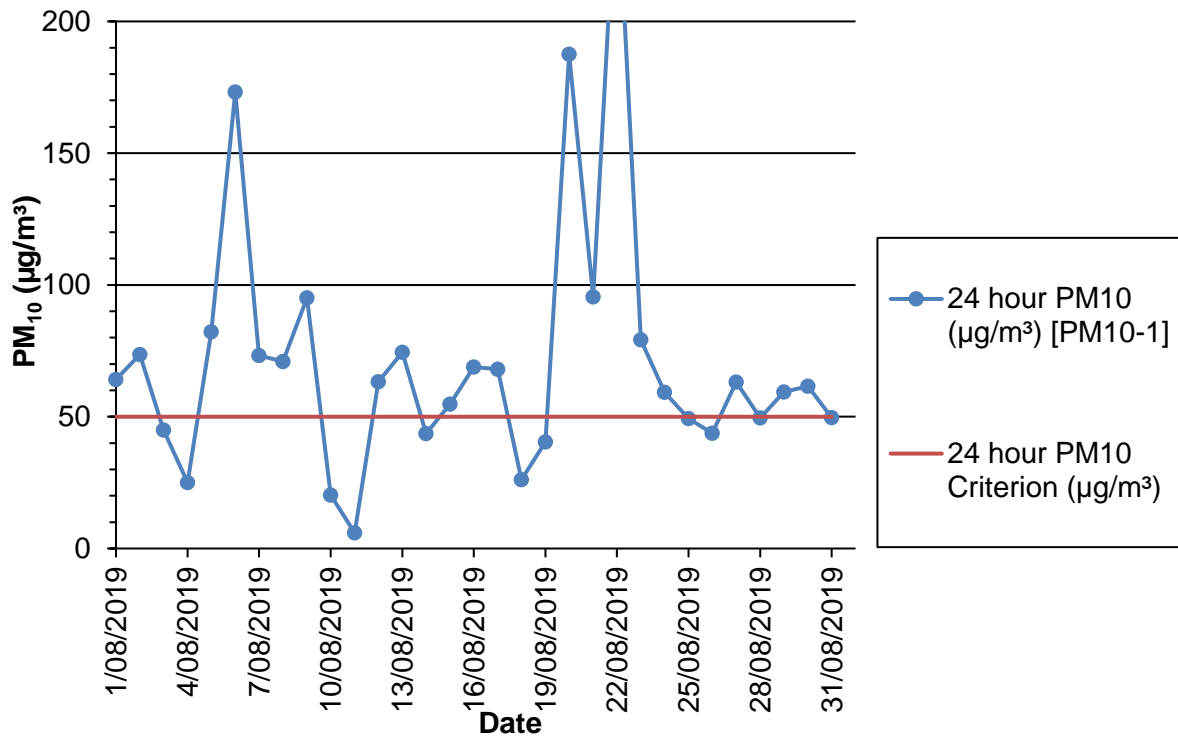
The rolling annual average 24 hour PM<sub>10</sub> for the PM10-2 site, as calculated using data up to and including August 2019, was 43.4 µg/m<sup>3</sup>. This is above the annual PM<sub>10</sub> criterion of 30 µg/m<sup>3</sup>. As such, Hanson will be undertaking a more detailed investigation into the PM<sub>10</sub> levels experienced at a relevant nearby residence or receiver, as is required under the site AQMP.

The rolling annual average 24 hour PM<sub>10</sub> from the OEH Albion Park South AQMS, as calculated using data the 12 months up to and including August 2019, was 17.5 µg/m<sup>3</sup>. This is less than two-thirds of the 30 µg/m<sup>3</sup> annual limit as outlined in the Project Approval 08\_0143.

As per the AQMP, the PM10-1 (BAM) monitoring site is located on-site and is significantly closer to the quarrying activities than the nearest sensitive receptors. An exceedance of the PM<sub>10</sub> criterion recorded at this location (Figure 4, Table 2) therefore does not represent non-compliance with the criteria outlined in Project



Approval 08\_0143 Schedule 3 (which apply at any residence on privately-owned land). In addition, PM10-1 is used as a management tool and not for compliance purposes, and as such, is not used to establish compliance monitoring for PM<sub>10</sub>.



**Figure 4:** Twenty-four hour PM<sub>10</sub> concentration (µg/m<sup>3</sup>) as measured at PM10-1 during August 2019, compared to the annual PM<sub>10</sub> criterion and 24 hour PM<sub>10</sub> criterion (µg/m<sup>3</sup>).

**Table 2:** Raw data monitoring results for Particulate Matter – PM<sub>10</sub> monitoring for August 2019. Prevailing wind conditions and climate data were measured at PM10-1. Apparent exceedances of the 24 hour PM<sub>10</sub> criteria are shaded red. Note that as previously discussed, PM10-1 is not used for compliance monitoring; exceedances of the 24 hour PM<sub>10</sub> criteria at this monitoring location are shaded orange.

Date	24 hour PM <sub>10</sub> (µg/m <sup>3</sup> ) [PM10-1]	24 hour PM <sub>10</sub> (µg/m <sup>3</sup> ) [PM10-2]	24 hour PM <sub>10</sub> (µg/m <sup>3</sup> ) [Albion Park South]	24 hour PM <sub>10</sub> Criterion (µg/m <sup>3</sup> )	Wind Speed (m/s)	Wind Direction (°)	Wind Direction	Atm. Temp. (°C)	Relative Humidity (%)	Bar. Pressure (mmHg)	Comments
1/08/2019	64	-	17.5	50	1.7	166.2	SSE	14.0	69	770	
2/08/2019	74	-	14.4	50	2.5	186.4	S	14.4	68	770	
3/08/2019	45	-	16.2	50	1.8	183.9	S	13.8	65	768	
4/08/2019	25	-	12.4	50	2.3	208.6	SSW	13.7	65	768	
5/08/2019	82	-	19.4	50	2.2	154.6	SSE	14.7	74	766	
6/08/2019	173	-	19.6	50	1.7	189.5	S	13.4	47	762	
7/08/2019	73	-	19.1	50	2.2	243.3	WSW	16.5	37	757	
8/08/2019	71	-	18.0	50	3.8	291.6	WNW	14.6	42	750	
9/08/2019	95	36	22.9	50	8.9	284.3	WNW	13.4	41	747	
10/08/2019	20	-	7.3	50	7.1	267.8	W	11.1	42	748	
11/08/2019	6	-	6.4	50	4.1	259.4	W	11.5	46	750	
12/08/2019	63	-	-	50	3.8	206.4	SSW	13.2	55	760	
13/08/2019	74	-	13.9	50	1.9	185.0	S	13.1	57	766	
14/08/2019	44	-	16.7	50	2.0	159.6	SSE	13.5	62	768	
15/08/2019	55	29	10.6	50	1.9	239.8	WSW	14.3	47	766	
16/08/2019	69	-	12.1	50	2.3	239.5	WSW	17.0	37	761	
17/08/2019	68	-	14.3	50	2.7	191.9	SSW	15.7	52	762	
18/08/2019	26	-	18.3	50	5.2	212.7	SSW	15.0	78	760	
19/08/2019	41	-	8.2	50	5.6	281.3	WNW	13.8	54	755	
20/08/2019	188	28	8.7	50	3.6	251.6	WSW	15.8	38	761	
21/08/2019	95	-	10.3	50	4.4	244.4	WSW	16.5	44	758	
22/08/2019	259	-	17.2	50	5.0	218.2	SW	15.1	47	758	
23/08/2019	79	-	29.0	50	3.3	191.8	SSW	12.7	52	766	
24/08/2019	59	-	20.6	50	2.5	243.1	WSW	16.9	42	761	
25/08/2019	49	-	20.7	50	2.0	181.6	S	14.6	56	761	
26/08/2019	44	30	6.8	50	3.1	199.6	SSW	12.0	86	765	
27/08/2019	63	-	7.8	50	2.7	187.0	S	13.5	77	765	
28/08/2019	50	-	11.1	50	2.0	186.3	S	14.8	68	762	
29/08/2019	59	-	10.8	50	5.2	193.4	SSW	12.3	75	765	
30/08/2019	62	-	8.1	50	5.2	173.0	S	13.3	69	767	
31/08/2019	50	-	9.8	50	3.4	188.1	S	14.3	72	766	

### 3.2. Particulate Matter – Total Suspended Particles (TSP)

Total Suspended Particles (TSP) is not currently monitored in the vicinity of the Bass Point Quarry. The SLR Global Environmental Solutions (formerly Heggies Pty Ltd) prepared report *Bass Point Quarry Expansion – Air Quality Impact Assessment* (2010) determined that the approximate PM<sub>10</sub> to TSP ratio is 36.2% for the Illawarra region.

Hanson are required to report on the annual average TSP concentration for the calendar year, as part of the Environmental Management Annual Review. This annual average TSP data is therefore not required as part of the August 2019 monthly report. However, as a management tool, Hanson have begun calculating the rolling annual average TSP for the monthly air quality reports. In the absence of TSP readings, the 36.2% ratio has been applied to the Albion Park South AQMS rolling annual average 24 hour PM<sub>10</sub> data (as per the AQMP) for August 2019 (**Table 3**). The rolling annual average TSP is therefore 48.5 µg/m<sup>3</sup>; just over half of the annual TSP criterion of 90 µg/m<sup>3</sup> identified in Project Approval 08\_0143 Schedule 3.

**Table 3:** Calculation of Rolling Annual Average TSP (µg/m<sup>3</sup>) for the month of August 2019.

Rolling annual average 24 hour PM <sub>10</sub> (µg/m <sup>3</sup> ) [Albion Park South]	PM <sub>10</sub> to TSP ratio	Calculated rolling annual average TSP	Annual TSP criterion
17.5 µg/m <sup>3</sup>	36.2%	48.5 µg/m <sup>3</sup>	90 µg/m <sup>3</sup>

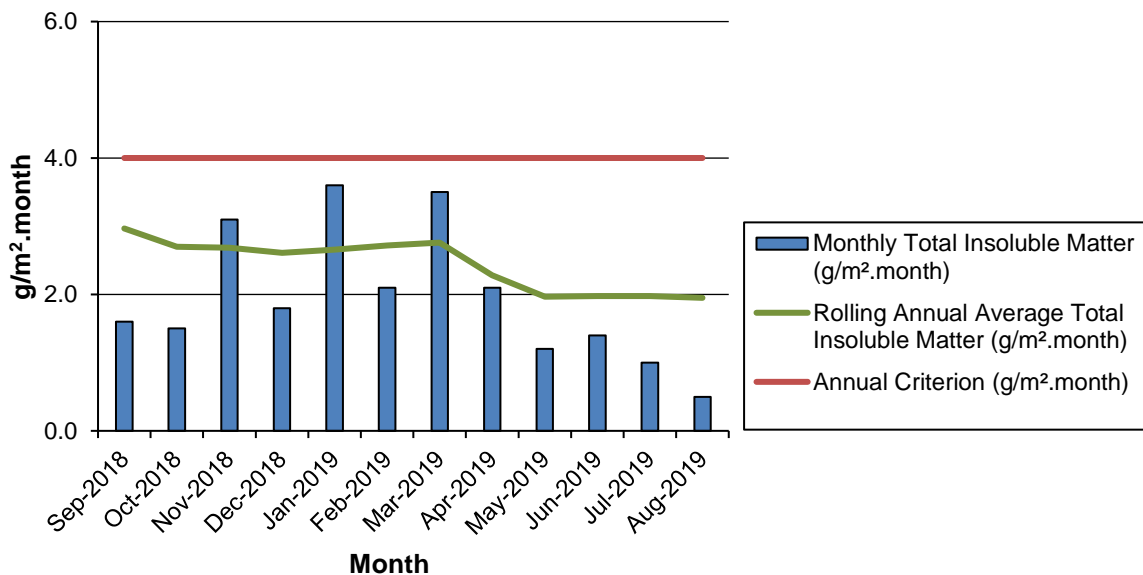
### 3.3. Dust Deposition Gauges

Monthly analyses of deposited dust samples collected at DDG-1 and DDG-2 are completed by NATA-accredited laboratory ALS Environmental. Monitoring results for the month of August 2019 indicate that dust deposition at DDG-1 was less than the annual criterion of 4 g/m<sup>2</sup>.month identified in Project Approval 08\_0143 Schedule 3 and EPL-2193 (**Table 4, Figure 5(a), Figure 5(b)**). Dust deposition at DDG-2 was far greater than the annual criterion, however, approximately half of the sample consisted of combustible matter (i.e. not dust), which typically consists of contaminants such as leaves and other organic matter. The actual dust content of the sample is therefore considerably lower than the data we are required to report, although it is likely still above the annual criterion. It is believed that this is due to the close proximity to the haul route being used for the Shell Cove Marina construction. DDG-2 is in the process of being relocated as per EPL-2193.

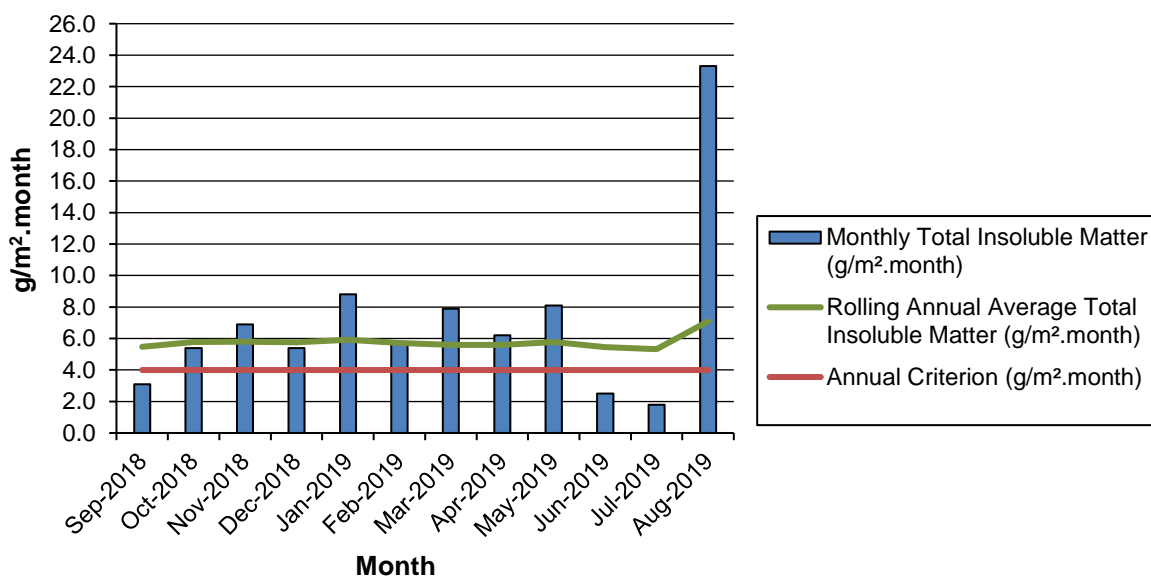
**Table 4:** Monthly Total Insoluble Matter ( $\text{g}/\text{m}^2\cdot\text{month}$ ) measured at the two Bass Point Quarry Dust Deposition Gauges (DDGs) during the period 12/07/2019 to 13/08/2019 (i.e. August 2019), and calculated rolling annual average Total Insoluble Matter ( $\text{g}/\text{m}^2\cdot\text{month}$ ).

Site	Monthly Total Insoluble Matter ( $\text{g}/\text{m}^2\cdot\text{month}$ )	Rolling Annual Average Total Insoluble Matter ( $\text{g}/\text{m}^2\cdot\text{month}$ )	Comments
DDG-1	0.5	2.0	
DDG-2	23.3	7.1	Results likely affected by Marina construction. DDG-2 to be relocated as per EPL variation.

**5(a)**



**5(b)**



**Figure 5:** Total Insoluble Matter, rolling annual average, and annual criterion ( $\text{g}/\text{m}^2\cdot\text{month}$ ) for the Bass Point Quarry as measured at (a) DDG-1, and; (b) DDG-2; during the 12-month period to August 2019.



#### 4. Representative Meteorological Data

Representative meteorological data has been sourced from the Bureau of Meteorology's (BOM) Kiama (Bombo Headland) Automatic Weather Station (AWS), as per the AQMP.

##### 4.1. *Monthly Meteorological Data Summary*

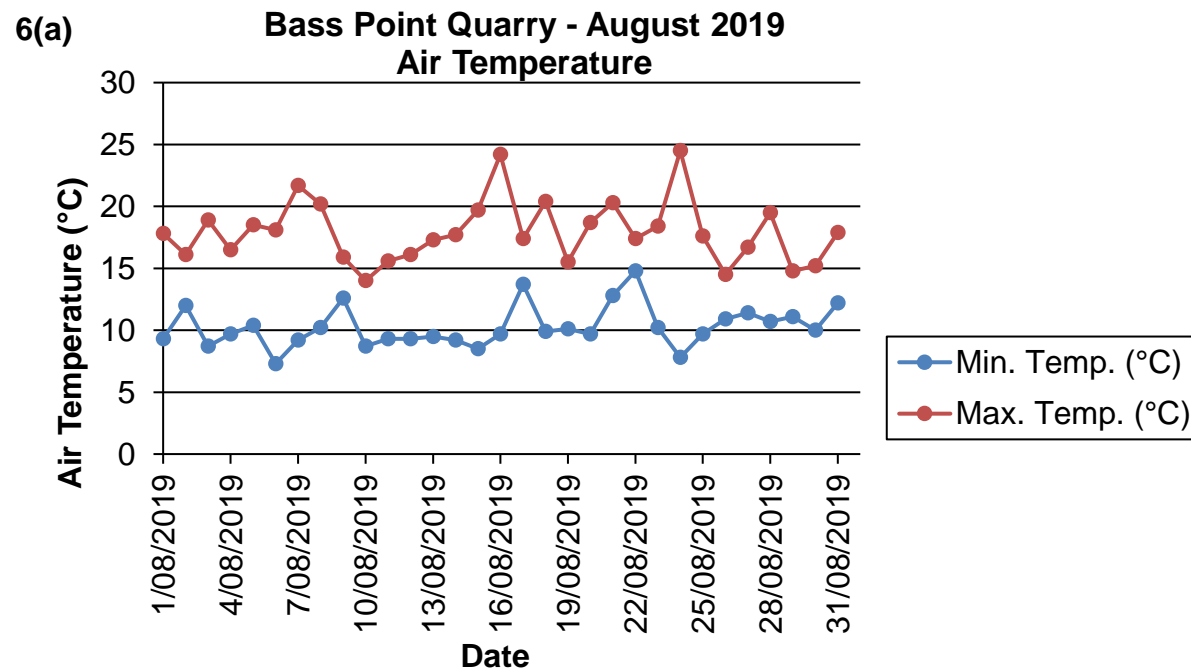
**Table 5:** Summary of representative meteorological data sourced from the BOM Kiama (Bombo Headland) AWS.

Date	Min. Temp. (°C)	Max. Temp. (°C)	Evapo-Transp. (mm)	Rainfall (mm)	Min. RH (%)	Max. RH (%)	Direction of maximum wind gust	Speed of maximum wind gust (km/h)	Time of maximum wind gust	Average 10 m Wind Speed (m/sec)	Solar Radiation (MJ/sq m)
1/08/2019	9.3	17.8	1.8	0	54	83	SSW	20	21:45	2.23	12.8
2/08/2019	12	16.1	2.1	0	58	79	SSW	35	4:53	3.66	12.9
3/08/2019	8.7	18.9	2.7	0	28	82	SSE	41	13:39	3.03	13.08
4/08/2019	9.7	16.5	2.3	0	52	71	SSE	30	12:51	3.7	11.74
5/08/2019	10.4	18.5	2.1	0	43	81	NNE	28	13:45	2.17	12.98
6/08/2019	7.3	18.1	2.3	0	31	62	WSW	28	3:59	2.17	13.44
7/08/2019	9.2	21.7	2.8	0	19	61	W	35	6:22	2.18	13.51
8/08/2019	10.2	20.2	3.6	0	29	55	W	63	16:14	4.13	11.76
9/08/2019	12.6	15.9	5.1	0	30	49	W	107	21:27	9.84	13.76
10/08/2019	8.7	14	4.2	0	31	50	WSW	87	22:49	8.7	11.27
11/08/2019	9.3	15.6	3.3	0	34	76	SW	76	0:04	6.53	10.66
12/08/2019	9.3	16.1	3.3	1.6	41	73	SSW	65	1:11	6.62	14.05
13/08/2019	9.5	17.3	2.6	0	45	71	WSW	31	1:06	3.2	14.21
14/08/2019	9.2	17.7	2.5	0	47	72	N	19	17:26	2.82	14.37
15/08/2019	8.5	19.7	3.1	0	21	67	SSW	39	13:57	2.86	14.51
16/08/2019	9.7	24.2	3.9	0	15	60	WSW	35	13:52	3.06	13.66
17/08/2019	13.7	17.4	3.4	0	27	78	S	41	10:06	4.55	13.97
18/08/2019	9.9	20.4	3.4	0	49	80	WSW	74	23:41	6.01	13.22
19/08/2019	10.1	15.5	4.6	0	29	49	WSW	67	0:27	7.96	14.98
20/08/2019	9.7	18.7	5	0	28	49	WSW	69	19:48	7.56	15.15
21/08/2019	12.8	20.3	5.3	0	33	51	SW	78	23:31	7.87	15.04
22/08/2019	14.8	17.4	4.9	0	41	60	S	78	15:02	10.27	13.69
23/08/2019	10.2	18.4	3.1	0	41	70	S	39	0:18	3.71	15.26
24/08/2019	7.8	24.5	3.4	0	15	71	WSW	39	13:56	2.09	15.73
25/08/2019	9.7	17.6	3	0	32	80	S	48	9:48	3.98	11.04
26/08/2019	10.9	14.5	1.4	2.8	76	87	SSW	33	12:08	4.49	4.77
27/08/2019	11.4	16.7	2.1	1	66	81	-	-	-	4.19	8.5
28/08/2019	10.7	19.5	2.9	0.6	40	81	WSW	37	22:50	2.84	15.88
29/08/2019	11.1	14.8	3.2	0.8	39	89	SE	69	21:24	9.69	6.63
30/08/2019	10	15.2	2.8	39	59	83	SSE	61	0:25	8.76	12.46
31/08/2019	12.2	17.9	2.9	0	60	79	S	41	7:45	5.46	14.7

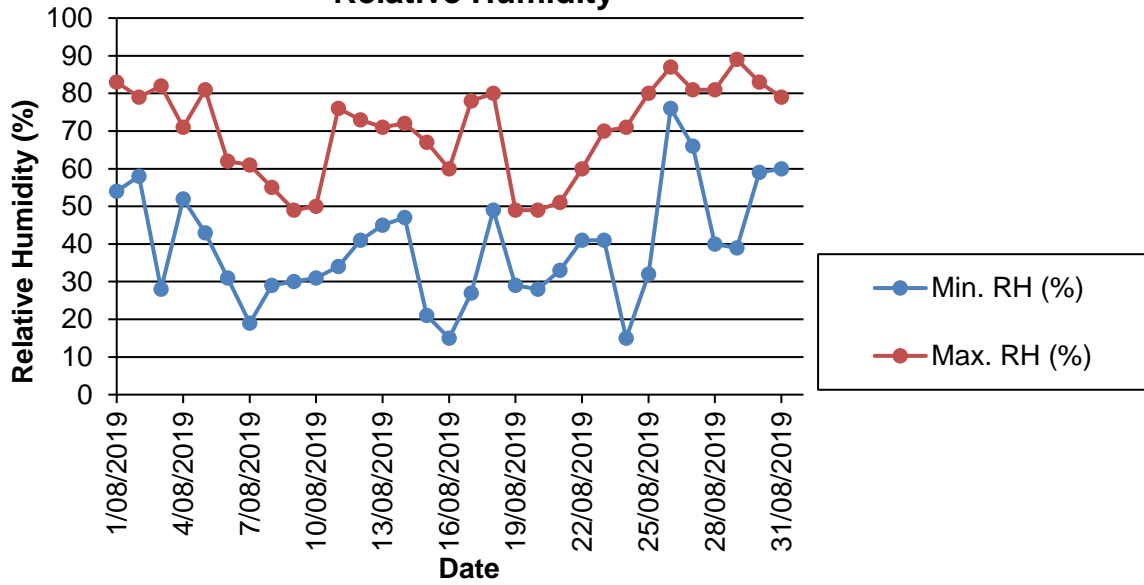
Monthly	Min. Temp. (°C)	Max. Temp. (°C)	Evapo-Transp. (mm)	Rainfall (mm)	Min. RH (%)	Max. RH (%)	Direction of maximum wind gust	Speed of maximum wind gust (km/h)	Time of maximum wind gust	Average 10 m Wind Speed (m/sec)	Solar Radiation (MJ/sq m)
Mean	10.3	18.0	3.2	1.5	39	70	-	50	-	5.04	12.89
Lowest	7.3	14.0	1.4	0.0	15	49	N	19	17:26	2.09	4.77
Highest	14.8	24.5	5.3	39.0	76	89	W	107	21:27	10.27	15.88
Total	-	-	99.1	45.8	-	-	-	-	-	-	-

## 4.2. Monthly Weather Charts

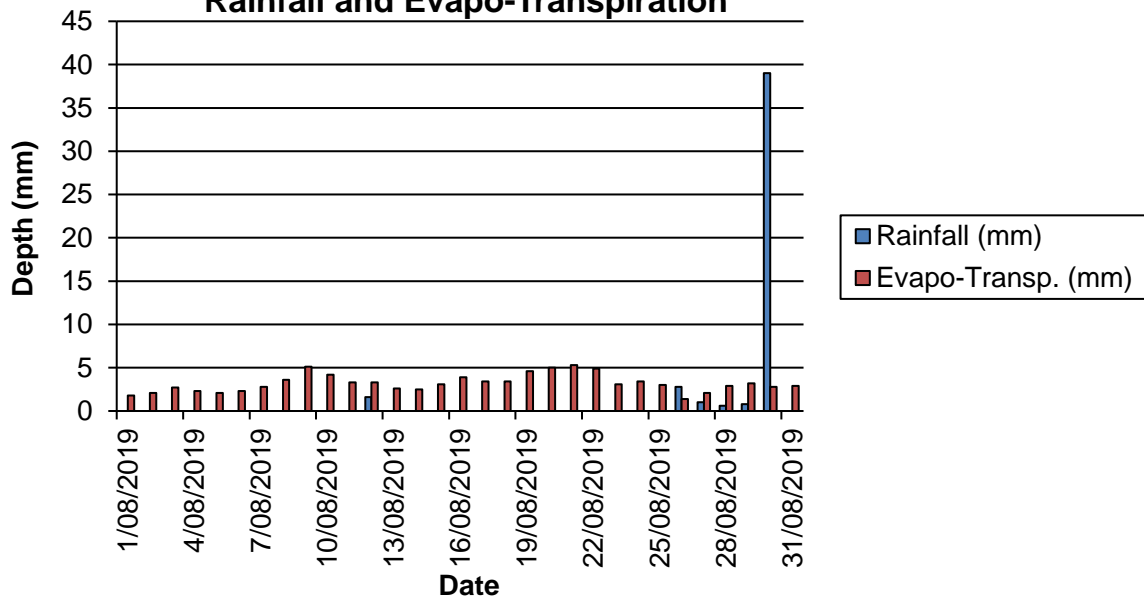
**Figure 6:** Summary of representative meteorological data sourced from the BOM Kiama (Bombo Headland) AWS for (a) Air Temperature; (b) Relative Humidity; and, (c) Rainfall and Evapo-Transpiration.



**6(b) Bass Point Quarry - August 2019  
Relative Humidity**



**6(c) Bass Point Quarry - August 2019  
Rainfall and Evapo-Transpiration**



**Appendix 1**  
**Chain of Custody & Laboratory Certificates**





**CHAIN OF CUSTODY**

ALS Laboratory: please tick →

□ Sydney: 277 Woodpark Rd. Smithfield NSW 2176  
Ph: 02 8784 8555 E: samples.syd@alsenviro.com  
□ Newcastle: 5 Rosegum Rd. Warabrook NSW 2314  
Ph: 02 4968 8433 E: samples.newcastle@alsenviro.com

□ Brisbane: 32 Shand St. Stafford QLD 4053  
Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com  
□ Townsville: 14-15 Dumas Ct. Bohle QLD 4813  
Ph: 07 4786 0790 E: samples.townsville@alsenviro.com

□ Melbourne: 2-4 Westbill Rd. Springvale VIC 3171  
Ph: 03 8519 9800 E: samples.melbourne@alsenviro.com  
□ Adelaide: 2-1 Burns Rd. Postaka SA 5095  
Ph: 08 8359 0390 E: samples.adelaide@alsenviro.com

□ Perth: 10 Red Way Malaga WA 6090  
Ph: 08 9209 7655 E: samples.perth@alsenviro.com  
□ Launceston: 27 Wellington St. Launceston TAS 7250  
Ph: 03 6331 2158 E: samples.launceston@alsenviro.com

CLIENT: Hanson Construction Materials	TURNAROUND REQUIREMENTS: <input type="checkbox"/> Standard TAT (List due date):	<b>FOR LABORATORY USE ONLY (Circle)</b>	
OFFICE: Boolwarroo Pde Shellharbour NSW 2529	(Standard TAT may be longer for some tests e.g. Ultra Trace Organics) <input type="checkbox"/> Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes No N/A	
PROJECT: Bass Point Dust Monitoring	ALS QUOTE NO.: WL/043/11	Free ice / frozen ice blocks present upon receipt? Yes No N/A	
ORDER NUMBER:	COC SEQUENCE NUMBER (Circle)	Random Sample Temperature on Receipt: °C	
PROJECT MANAGER: Steve Butcher	CONTACT PH: 02 4295 1352	Other comment:	
SAMPLER:	SAMPLER MOBILE:	RELINQUISHED BY: Robert	RECEIVED BY: Aneta
COC emailed to ALS? ( YES / NO)	EDD FORMAT (or default):	DATE/TIME: 13-6-19 14:45	DATE/TIME: 13-6-19 14:45
Email Reports to: steve.butcher@hanson.com.au		RELINQUISHED BY:	RECEIVED BY:
Email Invoice to: steve.butcher@hanson.com.au		DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) <small>Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).</small>							Additional Information	
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE <small>(refer to codes below)</small>	TOTAL BOTTLES	A04-3 <small>(Total Insoluble Solids, Ash, Combustibles)</small>								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	DDG 1	13-6-19 10:20	AIR	AG	1	✓								
2	DDG 2	↓ 10:35	AIR	AG	1	✓								
3	DDG 3	↓ 11:40	AIR	AG	1	✓								
<b>TOTAL</b>					<b>3</b>									

Environmental Division  
Wollongong  
Work Order Reference  
**EW1903504**

Telephone: 02 4221 3126

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

## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	: <b>EW1903504</b>	<b>Page</b>	: 1 of 2
<b>Client</b>	: HANSON CONSTRUCTION MATERIALS PTY LTD	<b>Laboratory</b>	: Environmental Division NSW South Coast
<b>Contact</b>	: MR STEVE BUTCHER	<b>Contact</b>	: Glenn Davies
<b>Address</b>	: BOOLLWARROO PDE SHELLHARBOUR NSW, AUSTRALIA 2529	<b>Address</b>	: 1/19 Ralph Black Dr, North Wollongong 2500 4/13 Geary Pl, North Nowra 2541 Australia NSW Australia
<b>Telephone</b>	: +61 02 4295 1355	<b>Telephone</b>	: 02 42253125
<b>Project</b>	: Bass Point Dust Monitoring	<b>Date Samples Received</b>	: 13-Aug-2019 14:45
<b>Order number</b>	: ----	<b>Date Analysis Commenced</b>	: 15-Aug-2019
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 21-Aug-2019 17:04
<b>Sampler</b>	: Robert DaLio		
<b>Site</b>	: ----		
<b>Quote number</b>	: WL/043/11 Bass Point Dust Monitoring		
<b>No. of samples received</b>	: 3		
<b>No. of samples analysed</b>	: 3		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

### *Signatories*

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW



### General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

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

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.  
 LOR = Limit of reporting  
 ^ = This result is computed from individual analyte detections at or above the level of reporting  
 @ = 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 is not held for results reported in g/m<sup>2</sup>.mth.
- Sampling completed as per FWI-EN010 Sampling of Dust Deposition Gauges.

### Analytical Results

Sub-Matrix: DEPOSITIONAL DUST (Matrix: AIR)				Client sample ID		DDG 1	DDG 2	DDG 3	---	---
						12/07/2019 - 13/08/2019	12/07/2019 - 13/08/2019	12/07/2019 - 13/08/2019		
Client sampling date / time						13-Aug-2019 10:20	13-Aug-2019 10:35	13-Aug-2019 11:40	---	---
Compound	CAS Number	LOR	Unit	EW1903504-001	EW1903504-002	EW1903504-003	---	---	---	---
				Result	Result	Result	---	---	---	---
<b>EA120: Ash Content</b>										
Ash Content	---	0.1	g/m <sup>2</sup> .month	0.3	11.6	3.5	---	---	---	---
Ash Content (mg)	---	1	mg	6	218	72	---	---	---	---
<b>EA125: Combustible Matter</b>										
Combustible Matter	---	0.1	g/m <sup>2</sup> .month	0.2	11.7	2.3	---	---	---	---
Combustible Matter (mg)	---	1	mg	3	221	47	---	---	---	---
<b>EA141: Total Insoluble Matter</b>										
Total Insoluble Matter	---	0.1	g/m <sup>2</sup> .month	0.5	23.3	5.8	---	---	---	---
Total Insoluble Matter (mg)	---	1	mg	9	439	119	---	---	---	---



### CHAIN OF CUSTODY

ALS Laboratory: please tick →

□ Sydney: 277 Woodpark Rd, Smithfield NSW 2178  
Ph: 02 8794 8555 E: samples\_sydney@alsenviro.com  
□ Newcastle: 5 Rosegum Rd, Warbrook NSW 2304  
Ph: 02 4968 9433 E: samples\_newcastle@alsenviro.com

□ Brisbane: 32 Strand St, Shiford QLD 4853  
Ph: 07 3243 7222 E: samples\_brisbane@alsenviro.com  
□ Townsville: 14-15 Deana Ct, Bohle QLD 4818  
Ph: 07 4796 0900 E: knowsville\_environmental@alsenviro.com

□ Melbourne: 2-4 Westall Rd, Springvale VIC 3171  
Ph: 03 8549 9500 E: samples\_melbourne@alsenviro.com  
□ Adelaide: 21 Birnie Rd, Pooraka SA 5095  
Ph: 08 8359 0890 E: adelaide@alsenviro.com

□ Perth: 10 Hod Way, Malaga WA 6060  
Ph: 08 9209 7655 E: samples\_perth@alsenviro.com  
□ Launceston: 27 Wellington St, Launceston TAS 7250  
Ph: 03 6331 2158 E: launceston@alsenviro.com

<b>CLIENT:</b> Hanson Construction Materials	<b>TURNAROUND REQUIREMENTS :</b> <input type="checkbox"/> Standard TAT (List due date): (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	FOR LABORATORY USE - ONLY TO BE FILLED IN													
<b>OFFICE:</b> PO Box 4022 Shellharbour NSW 2529	<input type="checkbox"/> Non Standard or urgent TAT (List due date):														
<b>PROJECT:</b> LVAS (PM10)	<b>ALS QUOTE NO.:</b>														
<b>ORDER NUMBER:</b>	<b>COC SEQUENCE NUMBER (Circle)</b> COC: <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table> OF: <table border="1"><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr></table>		1	2	3	4	5	6	7	1	2	3	4	5	6
1	2	3	4	5	6	7									
1	2	3	4	5	6	7									
<b>PROJECT MANAGER:</b> Steve Butcher	<b>CONTACT PH:</b> 02 4247 3900														
<b>SAMPLER:</b> Chelsea Flood	<b>SAMPLER MOBILE:</b> 0448 290 721														
<b>COC emailed to ALS? ( YES / NO)</b>	<b>EDD FORMAT (or default):</b>														
<b>Email Reports to (will default to PM if no other addresses are listed):</b> steve.butcher@hanson.com.au	<b>RELINQUISHED BY:</b> Chelsea	<b>RECEIVED BY:</b> <i>[Signature]</i>													
<b>Email Invoice to (will default to PM if no other addresses are listed):</b> steve.butcher@hanson.com.au	<b>DATE/TIME:</b> 30/08/2019 08:45	<b>DATE/TIME:</b> 30/08/2019 8:45													

**COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:** Please provide pre- and post-sampling filter paper weight on the report

LAB ID	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) <small>Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (fold filtered bottle required).</small>							Additional Information <small>Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.</small>	
	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE <small>(refer to codes below)</small>	TOTAL BOTTLES									
	47-125P6498610	9/08/2019	Filter		1	✓								
	47-125P6498611	15/08/2019	Filter		1	✓								
	47-125P6498612	21/08/2019	Filter		1	✓								
	47-125P6498613	27/08/2019	Filter		1	✓								
					<b>TOTAL</b>	0								

Environmental Division  
Wollongong  
Work Order Reference  
**EW1903758**

Telephone: 02 42253125

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



## CERTIFICATE OF ANALYSIS

<b>Work Order</b>	: <b>EW1903758</b>	<b>Page</b>	: 1 of 2
<b>Amendment</b>	: <b>1</b>	<b>Laboratory</b>	: Environmental Division NSW South Coast
<b>Client</b>	: <b>HANSON CONSTRUCTION MATERIALS PTY LTD</b>	<b>Contact</b>	: Glenn Davies
<b>Contact</b>	: MR STEVE BUTCHER	<b>Address</b>	: 1/19 Ralph Black Dr, North Wollongong 2500
<b>Address</b>	: BOOLLWARROO PDE SHELLHARBOUR NSW, AUSTRALIA 2529		: 4/13 Geary Pl, North Nowra 2541 Australia NSW Australia
<b>Telephone</b>	: +61 02 4295 1355	<b>Telephone</b>	: 02 42253125
<b>Project</b>	: LVAS	<b>Date Samples Received</b>	: 30-Aug-2019 09:31
<b>Order number</b>	: 4502621808	<b>Date Analysis Commenced</b>	: 06-Sep-2019
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 27-Sep-2019 11:45
<b>Sampler</b>	: CHELSEA FLOOD		
<b>Site</b>	: ----		
<b>Quote number</b>	: EN/333		
<b>No. of samples received</b>	: 4		
<b>No. of samples analysed</b>	: 4		



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.**

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This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW



### General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

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

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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.

- The variation in LOR for µg/m³ results is due to the variation in sample volumes
- Amendment (27/09/2019): This report has been amended as a result of misinterpretation of sample Dates. All analysis results are as per the previous report
- NATA accreditation is not held for results reported in µg/m³. Air volume data was provided by the client.

### Analytical Results

Sub-Matrix: FILTER (Matrix: AIR)				Client sample ID				
				47-125P6498610	47-125P6498611	47-125P6498612	47-125P6498613	----
				47-125P6498610	47-125P6498611	47-125P6498612	47-125P6498613	----
				09-Aug-2019 00:00	15-Aug-2019 00:00	21-Aug-2019 00:00	27-Aug-2019 00:00	----
Compound	CAS Number	LOR	Unit	EW1903758-001	EW1903758-002	EW1903758-003	EW1903758-004	-----
				Result	Result	Result	Result	---
<b>EA143: Particulates in Air - LVAFs</b>								
^ øPM10	----	14	µg/m³	36	29	28	30	----
PM10 (mass per filter)	----	100	µg/filter	147	119	114	122	----