

Monthly Air Quality Monitoring – January 2020
Bass Point Quarry

Licensee

HANSON CONSTRUCTION MATERIALS PTY LTD
LOCKED BAG 5260
PARRAMATTA NSW 2124

Premises Details

HANSON CONSTRUCTION MATERIALS PTY LTD
BOOLLWARROO PARADE
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](#)



Report Author: Chelsea Flood (Compliance Officer)
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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 PM₁₀ 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>^d Criterion</i> |
|--|-------------------------|-----------------------------------|
| Total suspended particulates (TSP) | Annual | ^a 90 µg/m ³ |
| Particulate matter < 10 µm (PM ₁₀) | Annual | ^a 30 µg/m ³ |

Table 5: Short Term Impact Assessment Criteria for Particulate Matter

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

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> |
|-----------------------------|-------------------------|---|---|
| ^c Deposited dust | Annual | ^b 2 g/m ² /month | ^a 4 g/m ² /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 NSW 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 PM₁₀. In addition, though not part of the Bass Point Quarry air quality monitoring program, regional background data for 24 hour PM₁₀ 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 | West, on the amenity bund | 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 ₁₀ | Beta Attenuation Monitor (BAM) | Continuous | Monthly |
| PM10-2 | West, on the amenity bund | PM ₁₀ | Low Volume Air Sampler (LVAS) | 1 in 6 day sampling | Monthly |



Property Border
 Extraction Boundary

Figure 1: Monitoring locations at the Bass Point Quarry. Air quality monitoring locations have been acronymised as follows: DDG1 – Dust Deposition Gauge 1; DDG2 – Dust Deposition Gauge 2; PM10-1 – Continuous PM₁₀ Monitor; PM10-2 – Low Volume PM₁₀ Sampler.

3. Monthly results

3.1. Particulate Matter – Particulate Matter < 10 µm (PM₁₀)

The PM10-2 (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).

Five samples were collected from PM10-2 during January 2020. All samples were above the 24 hour average PM₁₀ criterion of 50 µg/m³ (**Figure 2**). However, it is important to note that the regional Albion Park South weather station also recorded 24-hour average PM₁₀ greater than the 50 µg/m³ criterion on three of these dates (05.01.2020, 11.01.2020, 23.01.2020). It is speculated that air quality was more widely compromised on these sampling dates due to extraordinary or exceptional events. Detailed analysis of hourly wind data collected at PM10-1 (E-BAM) suggests that the exceedance on 17.01.2020 may be associated with site activities as the wind was predominantly southerly. Prevailing wind conditions on 29.01.2020 were east, east-north-east, and east-south-east, suggesting that the exceedance may not be associated with site activities. Earthmoving and haulage activities associated with the Shell Cove Boat Harbour Redevelopment project continue to occur in close proximity to the north-western site boundary, and it is believed that these activities are impacting the results obtained at PM10-2 (and at DDG-2; see **Section 3.3**).

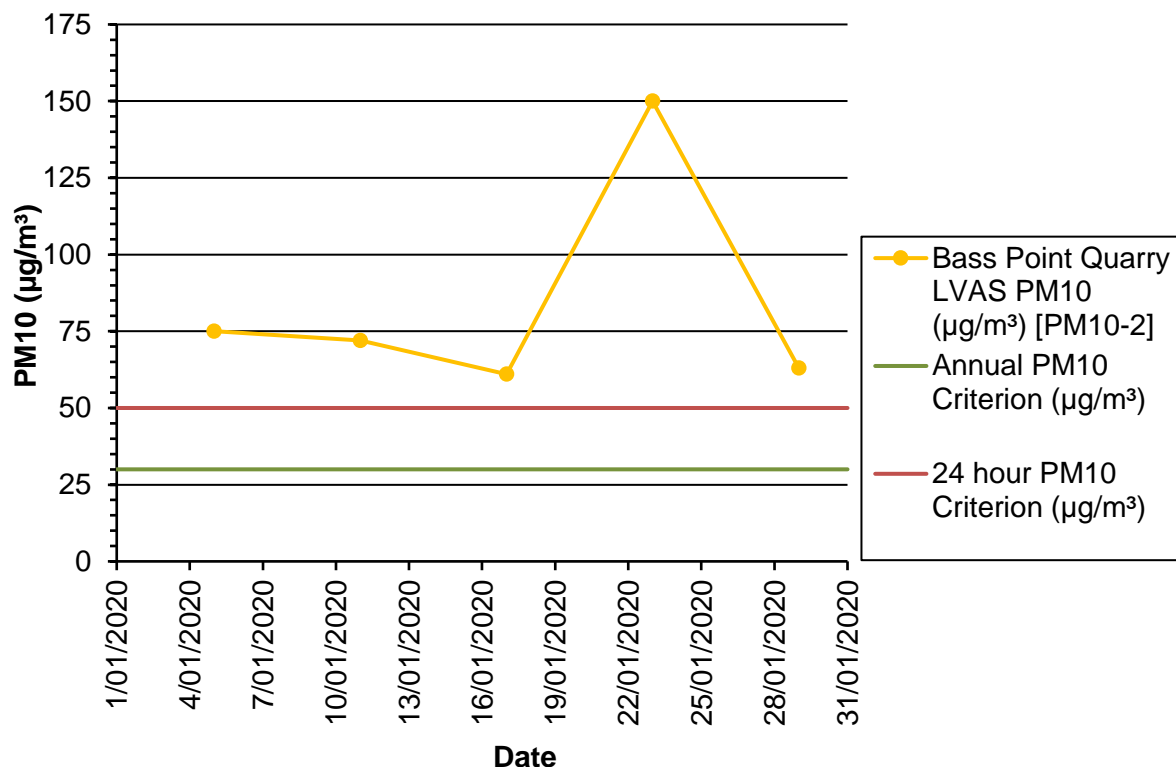


Figure 2: Twenty-four hour PM10 concentration (µg/m³) as measured at PM10-2 during January 2020, compared to the annual criterion and 24 hour criterion (µg/m³).

The 24 hour average PM₁₀ reading at Albion Park South AQMS was above the 50 µg/m³ criterion for 10 of the sampling dates during January 2020 (**Figure 3, Table 2**). It is speculated that the results on these dates were affected by the NSW bushfires, which would constitute an extraordinary or exceptional event as per the Ambient Air Quality National Environment Protection Measure (AAQ NEPM). This will not be confirmed until the OEHL release their annual air quality statement in mid-January 2021.

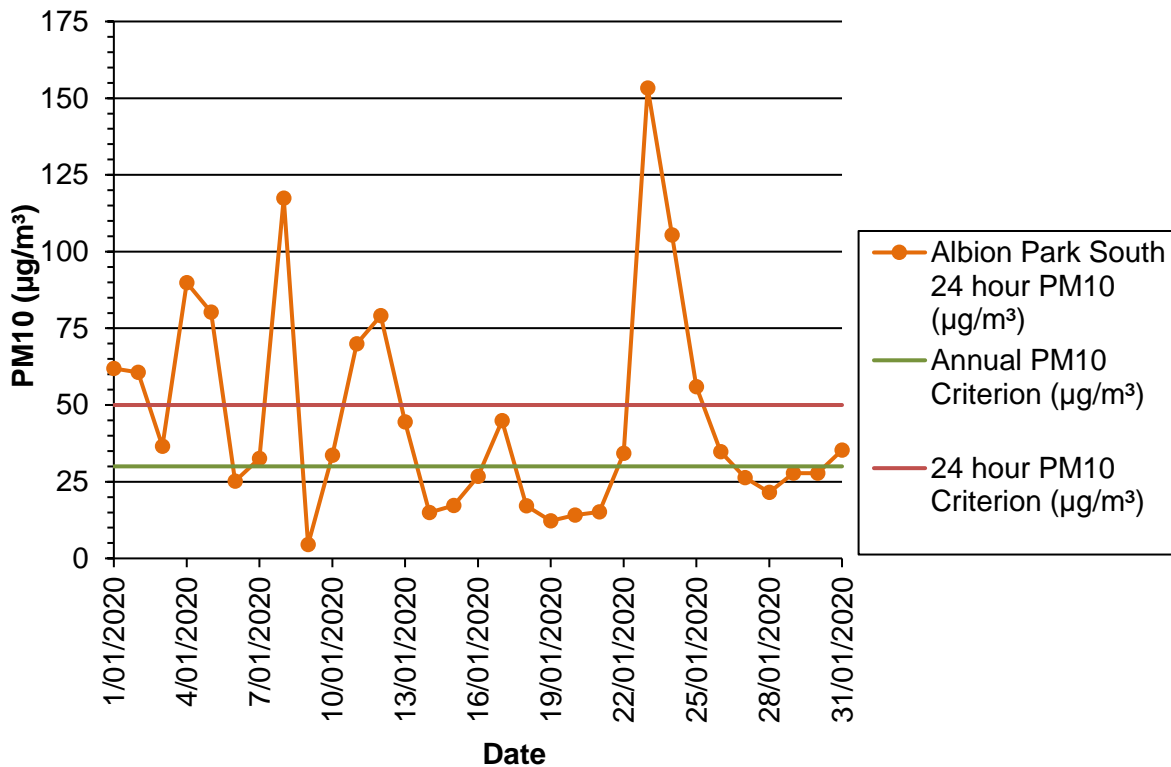


Figure 3: Twenty-four hour PM₁₀ concentration (µg/m³) as measured at Albion Park South AQMS during January 2020, compared to the annual criterion and 24 hour criterion (µg/m³).

Hanson are required to report on the annual average 24 hour PM₁₀ concentration for the identified periods: (i) calendar year, as part of the Environmental Management Annual Review, and; (ii) 15th June to 14th June, as part of the EPL Annual Return. Annual average PM₁₀ data is therefore not required as part of the January 2020 monthly report. However, as a management tool, Hanson have begun calculating the rolling annual average 24 hour PM₁₀ for the monthly air quality reports.

The rolling annual average 24 hour PM₁₀ for the PM10-2 site, as calculated using data up to and including January 2020, was 72.7 µg/m³. This is above the annual PM₁₀ criterion of 30 µg/m³. As such, Hanson will be undertaking a more detailed investigation into the PM₁₀ levels experienced at a relevant nearby residence or receiver, as is required under the site AQMP.

The rolling annual average 24 hour PM₁₀ from the OEHL Albion Park South AQMS, as calculated using data the 12 months up to and including January 2020, was 21.2 µg/m³. This is slightly more than two-thirds of the 30 µg/m³ annual limit as outlined in the Project Approval 08_0143.

As per the AQMP, the PM10-1 (E-BAM) monitoring site is located on-site and is significantly closer to the quarrying activities than the nearest sensitive receptors. An exceedance of the PM₁₀ 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 PM₁₀. Note that the E-BAM unit malfunctioned on 22.12.2019 and did not collect any data until 06.01.2020.

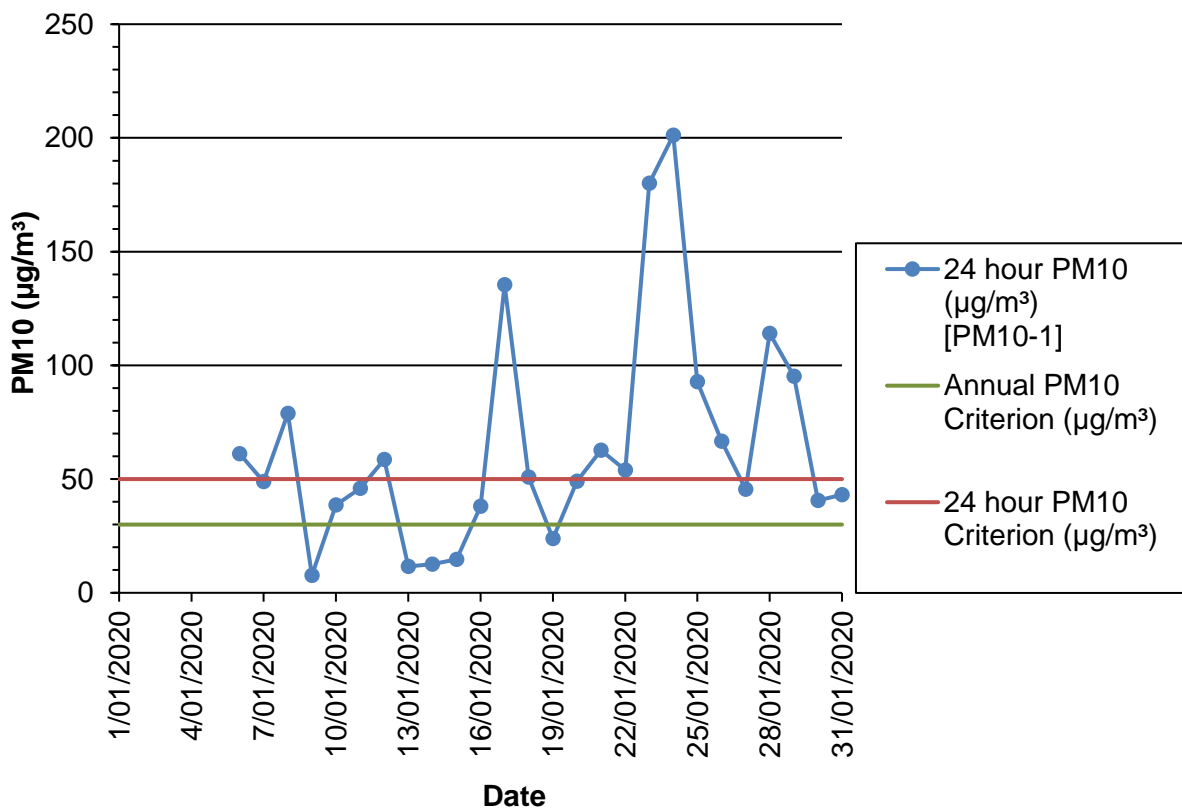


Figure 4: Twenty-four hour PM₁₀ concentration (µg/m³) as measured at PM10-1 during January 2020, compared to the annual PM₁₀ criterion and 24 hour PM₁₀ criterion (µg/m³).

Table 2: Monitoring results for Particulate Matter – PM₁₀ monitoring during January 2020. Prevailing wind conditions and climate data were measured at PM10-1. Apparent exceedances of the 24 hour PM₁₀ criteria are shaded red. Note that as previously discussed, PM10-1 is not used for compliance monitoring; exceedances of the 24 hour PM₁₀ criteria at this monitoring location are shaded orange.

| Date | 24 hour PM ₁₀ (µg/m ³) [PM10-1] | 24 hour PM ₁₀ (µg/m ³) [PM10-2] | 24 hour PM ₁₀ (µg/m ³) [Albion Park South] | 24 hour PM ₁₀ Criterion (µg/m ³) | Mean Wind Speed (m/s) | Mode Wind Direction (°) | Mean Atm. Temp. (°C) | Mean Relative Humidity (%) | Mean Bar. Pressure (mmHg) | Comments |
|------------|--|--|---|---|-----------------------|-------------------------|----------------------|----------------------------|---------------------------|--|
| 1/01/2020 | | | 62 | 50 | | | | | | PM10-1 malfunctioned on 22.12.2019. |
| 2/01/2020 | | | 61 | 50 | | | | | | |
| 3/01/2020 | | | 37 | 50 | | | | | | |
| 4/01/2020 | | | 90 | 50 | | | | | | |
| 5/01/2020 | | 75 | 80 | 50 | | | | | | Suspected exceptional event - NSW bushfires. |
| 6/01/2020 | 61 | | 25 | 50 | | | 25.9 | 61 | 762 | PM10-1 repaired, except for wind sensor. |
| 7/01/2020 | 49 | | 33 | 50 | | | 27.7 | 58 | 759 | |
| 8/01/2020 | 79 | | 117 | 50 | | | 26.4 | 54 | 761 | |
| 9/01/2020 | 8 | | 5 | 50 | | | 26.5 | 57 | 760 | |
| 10/01/2020 | 39 | | 34 | 50 | | | 27.9 | 51 | 754 | |
| 11/01/2020 | 46 | 72 | 70 | 50 | | | 25.3 | 50 | 761 | Suspected exceptional event - NSW bushfires. |
| 12/01/2020 | 59 | | 79 | 50 | | | 23.5 | 62 | 764 | |
| 13/01/2020 | 12 | | 45 | 50 | | | 24.7 | 57 | 762 | |
| 14/01/2020 | 13 | | 15 | 50 | | | 26.0 | 57 | 760 | |
| 15/01/2020 | 15 | | 17 | 50 | | | 26.9 | 59 | 755 | |
| 16/01/2020 | 38 | | 27 | 50 | | | | | | PM10-1 wind sensor repaired. |
| 17/01/2020 | 135 | 61 | 45 | 50 | 4.0 | S | 20.7 | 83 | 755 | Exceedance may be associated with site activities. |
| 18/01/2020 | 51 | | 17 | 50 | 5.2 | S | 20.8 | 84 | 755 | |
| 19/01/2020 | 24 | | 12 | 50 | 1.4 | SSW | 21.6 | 84 | 753 | |
| 20/01/2020 | 49 | | 14 | 50 | 1.4 | SSW | 22.3 | 86 | 750 | |
| 21/01/2020 | 63 | | 15 | 50 | 2.1 | ENE | 24.2 | 59 | 753 | |
| 22/01/2020 | 54 | | 34 | 50 | 3.4 | N | 23.6 | 84 | 754 | |
| 23/01/2020 | 180 | 150 | 153 | 50 | 3.7 | NNW | 27.6 | 68 | 748 | Suspected exceptional event - NSW bushfires. |
| 24/01/2020 | 201 | | 105 | 50 | 2.0 | SSE | 23.8 | 75 | 755 | |
| 25/01/2020 | 93 | | 56 | 50 | 2.6 | N | 24.3 | 85 | 758 | |
| 26/01/2020 | 67 | | 35 | 50 | 3.5 | N | 25.2 | 88 | 756 | |
| 27/01/2020 | 46 | | 26 | 50 | 3.4 | S | 24.4 | 81 | 758 | |
| 28/01/2020 | 114 | | 22 | 50 | 2.8 | SE | 24.9 | 84 | 757 | |
| 29/01/2020 | 95 | 63 | 28 | 50 | 2.7 | SSW | 24.4 | 69 | 760 | Exceedance may not be associated with site activities. |
| 30/01/2020 | 41 | | 28 | 50 | 4.9 | N | 23.8 | 79 | 760 | |
| 31/01/2020 | 43 | | 35 | 50 | 6.0 | N | 25.2 | 87 | 758 | |

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 PM₁₀ 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 January 2020 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 PM₁₀ data (as per the AQMP) for January 2020 (**Table 3**). The rolling annual average TSP is therefore 58.6 µg/m³; over half of the annual TSP criterion of 90 µg/m³ identified in Project Approval 08_0143 Schedule 3.

Table 3: Calculation of Rolling Annual Average TSP (µg/m³) for the month of January 2020.

| Rolling annual average 24 hour PM ₁₀ (µg/m ³) [Albion Park South] | PM ₁₀ to TSP ratio | Calculated rolling annual average TSP | Annual TSP criterion |
|--|-------------------------------|---------------------------------------|----------------------|
| 21.2 µg/m ³ | 36.2% | 58.6 µg/m ³ | 90 µg/m ³ |

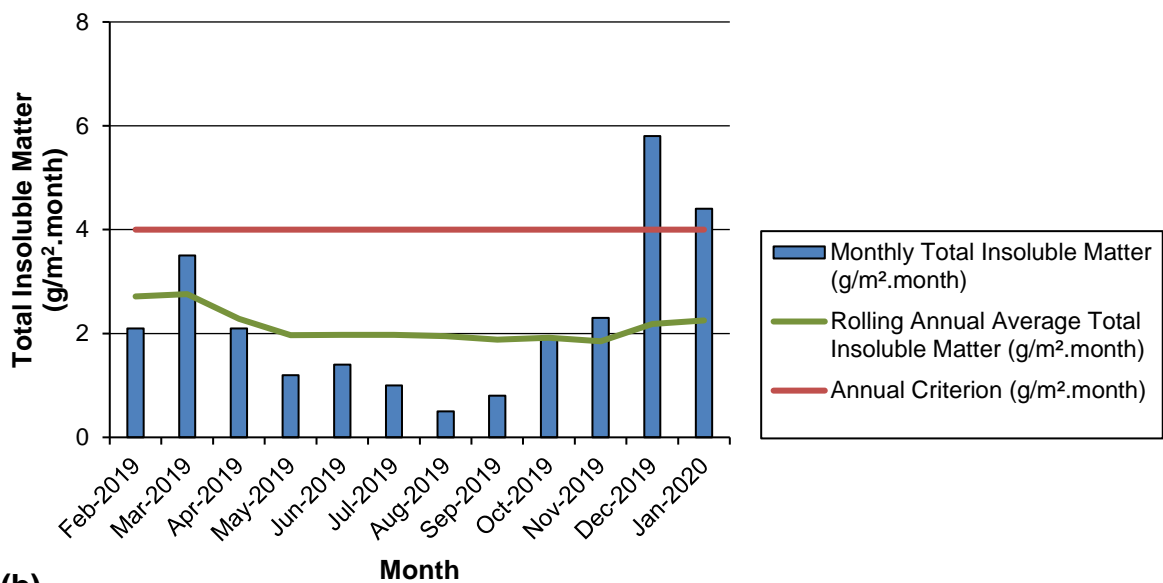
3.3. Dust Deposition Gauges

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 January 2020 indicate that dust deposition at DDG-1 and DDG-2 was greater than the annual criterion of 4 g/m².month identified in Project Approval 08_0143 Schedule 3 and EPL-2193 (**Table 4, Figure 5(a), Figure 5(b)**). Wind direction analysis suggests that sources external to the site may be at least partially attributable to these elevated results, due to the relative prevalence of northerly winds. In addition, DDG-2 is located in close proximity to earthworks and the associated haulage route for the Shell Cove Boat Harbour Redevelopment project, which may have impacted the results.

Table 4: Monthly Total Insoluble Matter ($\text{g/m}^2\cdot\text{month}$) measured at the two Bass Point Quarry Dust Deposition Gauges (DDGs) during the period 13/12/2019 to 14/01/2020 (i.e. January 2020), and calculated rolling annual average Total Insoluble Matter ($\text{g/m}^2\cdot\text{month}$).

| Site | Monthly Total Insoluble Matter ($\text{g/m}^2\cdot\text{month}$) | Rolling Annual Average Total Insoluble Matter ($\text{g/m}^2\cdot\text{month}$) | Comments |
|-------|--|---|---|
| DDG-1 | 4.4 | 2.3 | Results likely affected by external sources |
| DDG-2 | 6.5 | 9.5 | Results likely affected by Boat Harbour construction and external sources |

5(a)



5(b)

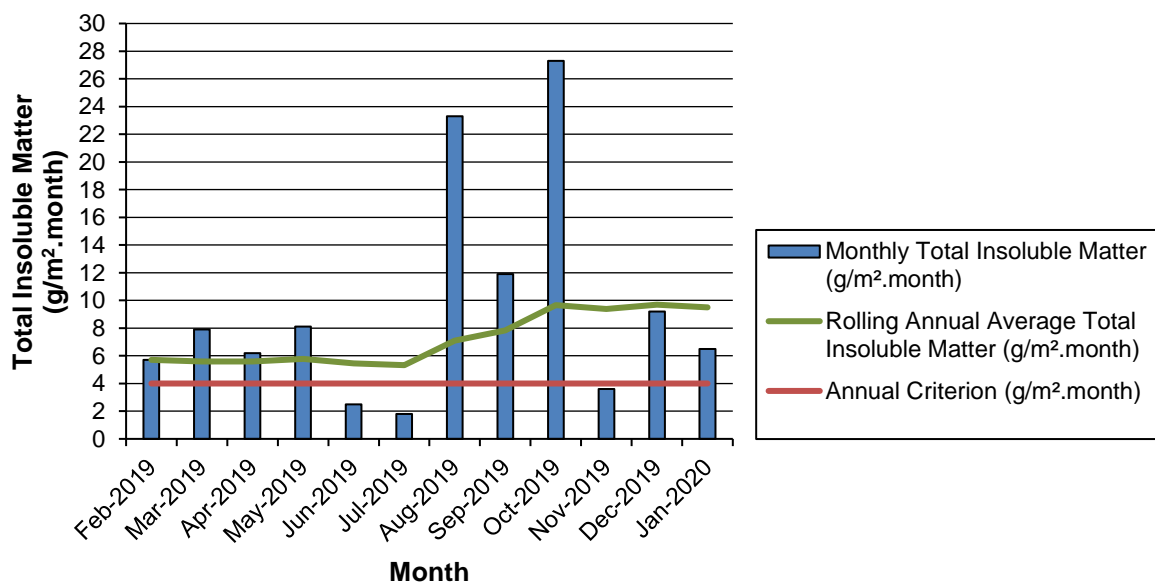


Figure 5: Total Insoluble Matter, rolling annual average, and annual criterion ($\text{g/m}^2\cdot\text{month}$) for the Bass Point Quarry as measured at (a) DDG-1, and; (b) DDG-2; during the 12-month period to January 2020.

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*

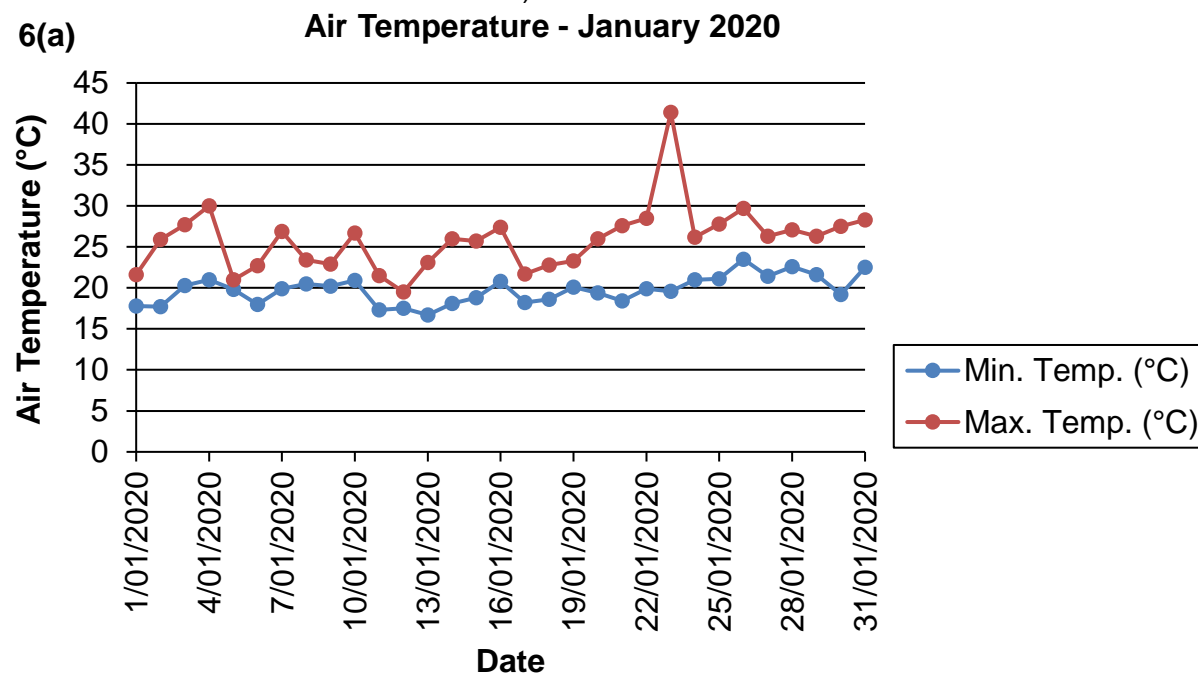
Table 5: Summary of representative meteorological data sourced from the BOM Kiama (Bombo Headland) AWS.

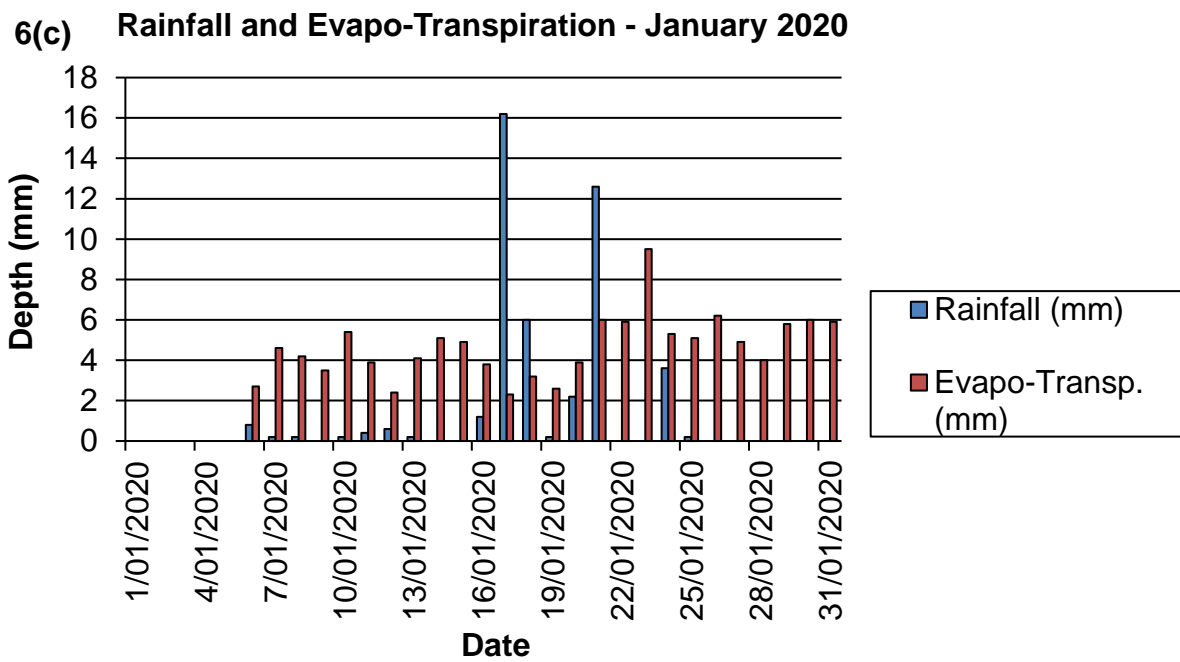
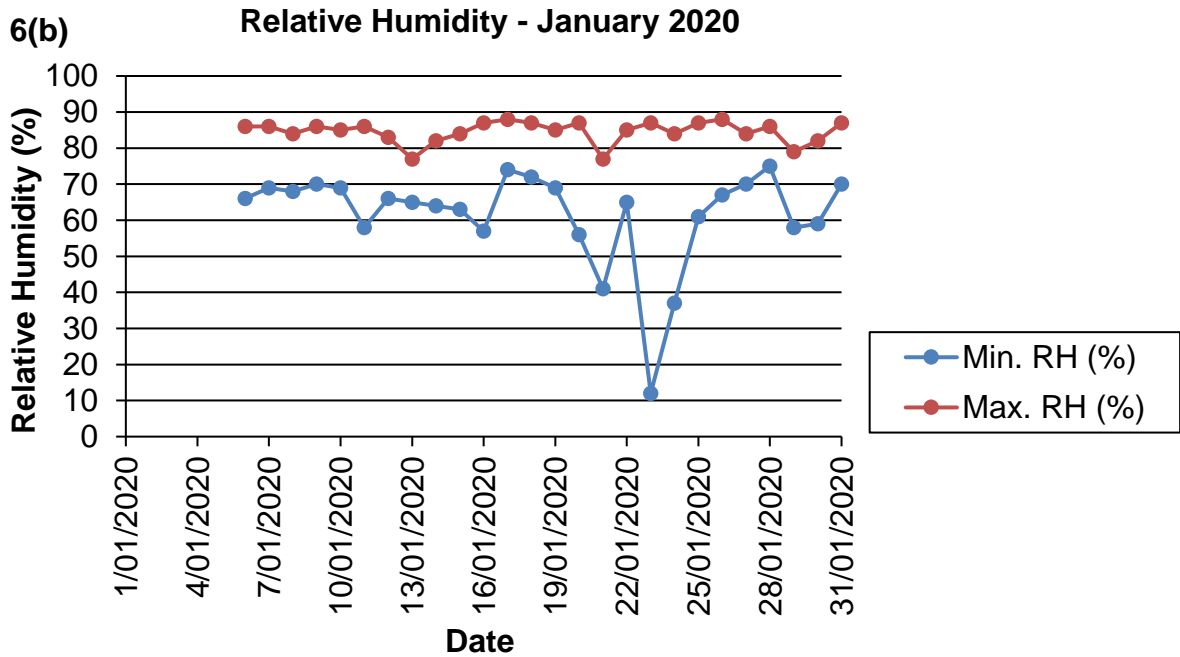
| Date | Min. Temp. (°C) | Max. Temp. (°C) | Evapo-Transp. (mm) | Rainfall (mm) | Min. RH (%) | Max. RH (%) | Direction of maximum wind gust | Speed of maximum wind gust (km/h) | Time of maximum wind gust | Average 10 m Wind Speed (m/sec) | Solar Radiation (MJ/sq m) |
|------------|-----------------|-----------------|--------------------|---------------|-------------|-------------|--------------------------------|-----------------------------------|---------------------------|---------------------------------|---------------------------|
| 1/01/2020 | 17.8 | 21.6 | | | | | S | 41 | 0:14 | | |
| 2/01/2020 | 17.7 | 25.9 | | | | | SSW | 31 | 23:31 | | |
| 3/01/2020 | 20.3 | 27.7 | | | | | N | 43 | 19:42 | | |
| 4/01/2020 | 21.0 | 30.0 | | | | | S | 100 | 19:32 | | |
| 5/01/2020 | 19.8 | 21.0 | | | | | S | 59 | 23:24 | | |
| 6/01/2020 | 18.0 | 22.7 | 2.7 | 0.8 | 66 | 86 | N | 33 | 22:07 | 3.16 | 9.53 |
| 7/01/2020 | 19.9 | 26.9 | 4.6 | 0.2 | 69 | 86 | S | 37 | 22:18 | 3.40 | 21.84 |
| 8/01/2020 | 20.5 | 23.4 | 4.2 | 0.2 | 68 | 84 | S | 43 | 9:15 | 6.24 | 18.34 |
| 9/01/2020 | 20.2 | 22.9 | 3.5 | 0.0 | 70 | 86 | SSE | 37 | 11:22 | 4.86 | 14.60 |
| 10/01/2020 | 20.9 | 26.7 | 5.4 | 0.2 | 69 | 85 | NNE | 48 | 11:18 | 5.33 | 26.51 |
| 11/01/2020 | 17.3 | 21.5 | 3.9 | 0.4 | 58 | 86 | S | 113 | 23:58 | 7.78 | 12.84 |
| 12/01/2020 | 17.5 | 19.5 | 2.4 | 0.6 | 66 | 83 | S | 37 | 9:09 | 4.97 | 5.42 |
| 13/01/2020 | 16.7 | 23.1 | 4.1 | 0.2 | 65 | 77 | SE | 26 | 10:31 | 2.63 | 20.91 |
| 14/01/2020 | 18.1 | 26.0 | 5.1 | 0.0 | 64 | 82 | NNE | 20 | 14:19 | 2.30 | 26.46 |
| 15/01/2020 | 18.8 | 25.7 | 4.9 | 0.0 | 63 | 84 | N | 35 | 19:31 | 3.28 | 24.18 |
| 16/01/2020 | 20.8 | 27.4 | 3.8 | 1.2 | 57 | 87 | S | 39 | 19:08 | 3.41 | 13.02 |
| 17/01/2020 | 18.2 | 21.7 | 2.3 | 16.2 | 74 | 88 | S | 57 | 6:00 | 8.12 | 3.46 |
| 18/01/2020 | 18.6 | 22.8 | 3.2 | 6.0 | 72 | 87 | S | 59 | 11:39 | 8.34 | 10.16 |
| 19/01/2020 | 20.1 | 23.3 | 2.6 | 0.2 | 69 | 85 | SSW | 35 | 1:00 | 2.15 | 10.35 |
| 20/01/2020 | 19.4 | 26.0 | 3.9 | 2.2 | 56 | 87 | SW | 46 | 13:58 | 1.95 | 17.42 |
| 21/01/2020 | 18.4 | 27.6 | 6.0 | 12.6 | 41 | 77 | WSW | 37 | 8:20 | 2.40 | 29.27 |
| 22/01/2020 | 19.9 | 28.5 | 5.9 | 0.0 | 65 | 85 | N | 37 | 12:54 | 3.60 | 29.95 |
| 23/01/2020 | 19.6 | 41.4 | 9.5 | 0.0 | 12 | 87 | NW | 56 | 15:12 | 4.65 | 20.80 |
| 24/01/2020 | 21.0 | 26.2 | 5.3 | 3.6 | 37 | 84 | S | 50 | 2:52 | 3.20 | 21.71 |
| 25/01/2020 | 21.1 | 27.8 | 5.1 | 0.2 | 61 | 87 | NNE | 33 | 15:42 | 3.56 | 23.74 |
| 26/01/2020 | 23.5 | 29.7 | 6.2 | 0.0 | 67 | 88 | S | 69 | 21:22 | 4.84 | 29.53 |
| 27/01/2020 | 21.4 | 26.3 | 4.9 | 0.0 | 70 | 84 | S | 54 | 23:32 | 4.89 | 23.42 |
| 28/01/2020 | 22.6 | 27.1 | 4.0 | 0.0 | 75 | 86 | S | 44 | 16:56 | 4.97 | 17.35 |
| 29/01/2020 | 21.6 | 26.3 | 5.8 | 0.0 | 58 | 79 | S | 41 | 1:08 | 4.41 | 27.46 |
| 30/01/2020 | 19.2 | 27.5 | 6.0 | 0.0 | 59 | 82 | N | 44 | 19:20 | 4.79 | 29.31 |
| 31/01/2020 | 22.5 | 28.3 | 5.9 | 0.0 | 70 | 87 | N | 41 | 18:28 | 5.71 | 29.31 |

| 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 | 19.8 | 25.9 | 4.7 | 1.7 | 62 | 85 | - | 47 | - | 4.42 | 19.88 |
| Lowest | 16.7 | 19.5 | 2.3 | 0.0 | 12 | 77 | NNE | 20 | 14:19 | 1.95 | 3.46 |
| Highest | 23.5 | 41.4 | 9.5 | 16.2 | 75 | 88 | S | 113 | 23:58 | 8.34 | 29.95 |
| Total | - | - | 121.2 | 44.8 | - | - | - | - | - | - | - |

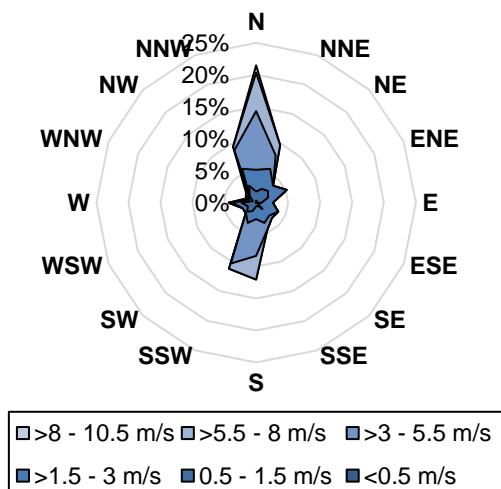
4.2. Monthly Weather Charts

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. Wind rose for data sourced from PM10-1 for (d) Wind Speed and Direction (note that data is from 17.01.2020 onwards due to PM10-1 malfunction).





6(d) Wind speed and direction - January 2020



Appendix 1
Chain of Custody & Laboratory Certificates



CHAIN OF CUSTODY

ALS Laboratory: please tick →

Sydney: 277 Woodpark Rd, Smithfield NSW 2176
Ph: 02 8704 8555 E: samples.sydney@alsenviro.com
Newcastle: 5 Riseagain Rd, Warabook NSW 2304
Ph: 02 4988 9433 E: samples.newcastle@alsenviro.com

Brisbane: 32 Shand St, Stafford QLD 4063
Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com
Townsville: 14 15 Deama Ct, Bokitja QLD 4818
Ph: 07 4756 0800 E: townsville.environmental@alsenviro.com

Melbourne: 2-4 Werrall Rd, Springvale VIC 3171
Ph: 03 8549 9800 E: samples.melbourne@alsenviro.com
Adelaide: 2-1 Burma Rd, Pooraka SA 5095
Ph: 08 8359 0830 E: adelaide@alsenviro.com

Perth: 10 Hot Way, Malaga WA 6090
Ph: 08 9200 7655 E: samples.perth@alsenviro.com
Launceston: 27 Wallington St, Launceston TAS 7250
Ph: 03 6331 2156 E: launceston@alsenviro.com

| | | | |
|--|--|--|---|
| CLIENT: Hanson Construction Materials | TURNAROUND REQUIREMENTS : <input type="checkbox"/> Standard TAT (List due date): | FOR LABORATORY USE ONLY (Circle) | |
| 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): | Quality Seal intact? Yes No N/A | Free ice / frozen ice bricks present upon receipt? Yes No N/A |
| PROJECT: Bass Point Dust Monitoring | ALS QUOTE NO.: WL/043/11 | Random Sample Temperature on Receipt: °C | Other comment: |
| ORDER NUMBER: | | | |
| PROJECT MANAGER: Steve Butcher | CONTACT PH: 02 4295 1352 | | |
| SAMPLER: | SAMPLER MOBILE: | RELINQUISHED BY: | RECEIVED BY: |
| COC emailed to ALS? (YES / NO) | EDD FORMAT (or default): | <i>Robert</i> | <i>[Signature]</i> |
| Email Reports to : steve.butcher@hanson.com.au | | DATE/TIME: | DATE/TIME: |
| Email Invoice to : steve.butcher@hanson.com.au | | 14.1.20 14:5 | 14/1/20 14:20 |

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) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required). | | | | | | | Additional Information | | |
|--------------|---|---------------|--------|---|--|--|--|--|--|--|--|------------------------|--|--|
| LAB ID | SAMPLE ID | DATE / TIME | MATRIX | TYPE & PRESERVATIVE (refer to codes below) | TOTAL BOTTLES | A043 (Total Insoluble Solids, Ash, Combustibles) | | | | | | | | Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc. |
| | DDG 1 | 14.1.20 11:00 | AIR | AG | 1 | ✓ | | | | | | | | |
| | DDG 2 | 9:50 | AIR | AG | 1 | ✓ | | | | | | | | |
| | DDG 3 | 10:30 | AIR | AG | 1 | ✓ | | | | | | | | |
| | | | | | TOTAL | 3 | | | | | | | | |

Environmental Division
Wollongong
Work Order Reference
EW2000131



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

Work Order : **EW2000131**
Client : **HANSON CONSTRUCTION MATERIALS PTY LTD**
Contact : **MR STEVE BUTCHER**
Address : **BOOLLWARROO PDE**
SHELLHARBOUR NSW, AUSTRALIA 2529

Telephone : **+61 02 4295 1355**
Project : **Bass Point Dust Monitoring**
Order number : **----**
C-O-C number : **----**
Sampler : **Robert DaLio**
Site : **----**
Quote number : **WL/043/11 Bass Point Dust Monitoring**
No. of samples received : **3**
No. of samples analysed : **3**

Page : **1 of 2**
Laboratory : **Environmental Division NSW South Coast**
Contact : **Glenn Davies**
Address : **1/19 Ralph Black Dr, North Wollongong 2500**
4/13 Geary Pl, North Nowra 2541
Australia NSW Australia

Telephone : **02 42253125**
Date Samples Received : **14-Jan-2020 14:01**
Date Analysis Commenced : **16-Jan-2020**
Issue Date : **22-Jan-2020 16:32**



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. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

| <i>Signatories</i> | <i>Position</i> | <i>Accreditation Category</i> |
|--------------------|-----------------------|--|
| Jennifer Targett | Laboratory Technician | Newcastle - Inorganics, Mayfield West, NSW |



General Comments

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

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

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

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

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

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

- Key :
- CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 - LOR = Limit of reporting
 - ^ = This result is computed from individual analyte detections at or above the level of reporting
 - ø = ALS is not NATA accredited for these tests.
 - ~ = Indicates an estimated value.

- Analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation is not held for results reported in g/m².mth.
- Sampling completed as per FWI-EN010 Sampling of Dust Depositon Gauges.

Analytical Results

Sub-Matrix: DEPOSITIONAL DUST
 (Matrix: AIR)

Client sample ID

| | | | | DDG 1 13/12/2019 - 14/01/2020 | DDG 2 13/12/2019 - 14/01/2020 | DDG 3 13/12/2019 - 14/01/2020 | ---- | ---- |
|--------------------------------------|------------|-----|-------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------|-------|
| Client sampling date / time | | | | 14-Jan-2020 11:00 | 14-Jan-2020 09:50 | 14-Jan-2020 10:30 | --- | --- |
| Compound | CAS Number | LOR | Unit | EW2000131-001 | EW2000131-002 | EW2000131-003 | ----- | ----- |
| | | | | Result | Result | Result | --- | --- |
| EA120: Ash Content | | | | | | | | |
| Ash Content | ---- | 0.1 | g/m ² .month | 3.5 | 5.7 | 5.9 | --- | --- |
| Ash Content (mg) | ---- | 1 | mg | 66 | 108 | 121 | --- | --- |
| EA125: Combustible Matter | | | | | | | | |
| Combustible Matter | ---- | 0.1 | g/m ² .month | 0.9 | 0.8 | 1.3 | --- | --- |
| Combustible Matter (mg) | ---- | 1 | mg | 16 | 14 | 26 | --- | --- |
| EA141: Total Insoluble Matter | | | | | | | | |
| Total Insoluble Matter | ---- | 0.1 | g/m ² .month | 4.4 | 6.5 | 7.2 | --- | --- |
| Total Insoluble Matter (mg) | ---- | 1 | mg | 82 | 122 | 147 | --- | --- |



CHAIN OF CUSTODY

ALS Laboratory: please tick →

Sydney: 277 Wondwrick Rd, Smithfield NSW 2176
Ph: 02 8784 8555 E: samples_sydney@alsenviro.com
 Newcastle: 5 Rossignol Rd, Warabrook NSW 2304
Ph: 02 4968 0433 E: samples_newcastle@alsenviro.com

Brisbane: 32 Shanti St, Stafford QLD 4053
Ph: 07 3243 7222 E: samples_brisbane@alsenviro.com
 Townsville: 14-15 Desima Ct, Bohle QLD 4818
Ph: 07 4786 0600 E: townsville_environmental@alsenviro.com

Melbourne: 2-4 Wrethall Rd, Springvale VIC 3171
Ph: 03 8549 9600 E: samples_melbourne@alsenviro.com
 Adelaide: 2-1 Burma Rd, Pooraka SA 5055
Ph: 08 8359 0890 E: adelaide@alsenviro.com

Perth: 10 Hoff Way, Malaga WA 6000
Ph: 08 9209 7855 E: samples_perth@alsenviro.com
 Launceston: 27 Wellington St, Launceston TAS 7250
Ph: 03 6331 2158 E: launceston@alsenviro.com

| | | | | | | | | | | | | | | | | |
|--|--|--|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| CLIENT: Hanson Construction Materials | TURNAROUND REQUIREMENTS : <input type="checkbox"/> Standard TAT (List due date): <small>(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)</small> | FOR LABORATORY USE ONLY: (Circle) Custody Seal Intact? Yes No N/A Free Ice / frozen ice bricks present upon receipt? Yes No N/A Random Sample Temperature on Receipt: °C Other comment: | | | | | | | | | | | | | | |
| OFFICE: PO Box 4022 Shellharbour NSW 2529 | <input type="checkbox"/> Non Standard or urgent TAT (List due date): | | | | | | | | | | | | | | | |
| PROJECT: LVAS (PM10) | ALS QUOTE NO.: | | | | | | | | | | | | | | | |
| ORDER NUMBER: | COC SEQUENCE NUMBER (Circle) 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 | 7 | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | | | | | | | | | | |
| PROJECT MANAGER: Steve Butcher | CONTACT PH: 02 4247 3900 | | | | | | | | | | | | | | | |
| SAMPLER: Chelsea Flood | SAMPLER MOBILE: 0448 290 721 | RELINQUISHED BY: Chelsea | | | | | | | | | | | | | | |
| COC emailed to ALS? (YES / NO) | EDD FORMAT (or default): | RECEIVED BY: [Signature] | | | | | | | | | | | | | | |
| Email Reports to (will default to PM if no other addresses are listed): steve.butcher@hanson.com.au | | DATE/TIME: 30/01/2020 11:30am | | | | | | | | | | | | | | |
| Email Invoice to (will default to PM if no other addresses are listed): steve.butcher@hanson.com.au | | DATE/TIME: 30/1/20 11:30 | | | | | | | | | | | | | | |

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

| 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 | LVAS PM10 | | | | | | | | |
| | 47-125P6498637 | 5/01/2020 | Filter | | 1 | ✓ | | | | | | | | |
| | 47-125P6498638 | 11/01/2020 | Filter | | 1 | ✓ | | | | | | | | |
| | 47-125P6498639 | 17/01/2020 | Filter | | 1 | ✓ | | | | | | | | |
| | 47-163D9094354 | 23/01/2020 | Filter | | 1 | ✓ | | | | | | | | |
| | 47-163D9094351 | 29/01/2020 | Filter | | 1 | ✓ | | | | | | | | |
| TOTAL | | | | | 0 | | | | | | | | | |

Environmental Division
Wollongong
Work Order Reference
EW2000446



Telephone : 02 42263126

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

| | | |
|---|---|--|
| Work Order : EW2000446 Client : HANSON CONSTRUCTION MATERIALS PTY LTD Contact : MR STEVE BUTCHER Address : BOOLLWARROO PDE SHELLHARBOUR NSW, AUSTRALIA 2529 Telephone : +61 02 4295 1355 Project : LVAS Order number : ---- C-O-C number : ---- Sampler : CHELSEA FLOOD Site : ---- Quote number : EN/333 No. of samples received : 5 No. of samples analysed : 5 | Page : 1 of 2 Laboratory : Environmental Division NSW South Coast Contact : Glenn Davies Address : 1/19 Ralph Black Dr, North Wollongong 2500 4/13 Geary Pl, North Nowra 2541 Australia NSW Australia Telephone : 02 42253125 Date Samples Received : 30-Jan-2020 12:11 Date Analysis Commenced : 06-Feb-2020 Issue Date : 07-Feb-2020 10:51 | |
|---|---|--|



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

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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

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| <i>Signatories</i> | <i>Position</i> | <i>Accreditation Category</i> |
|--------------------|-----------------------|--|
| Jennifer Targett | Laboratory Technician | Newcastle - Inorganics, Mayfield West, NSW |
| Jennifer Targett | Laboratory Technician | Newcastle, Mayfield West, NSW |



General Comments

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

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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.

- NATA accreditation is not held for results reported in µg/m³. Air volume data was provided by the client.
- EA143-LV: Reporting of 'Initial' and 'Final' weights to 0.0001mg not covered by scope of NATA accreditation.

Analytical Results

| Sub-Matrix: FILTER (Matrix: AIR) | | | | Client sample ID | | | | |
|--|------------|--------|-----------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | | | | 47-125P6498637 | 47-125P6498638 | 47-125P6498639 | 47-163D9094354 | 47-163D9094351 |
| | | | | 47-125P6498637 | 47-125P6498638 | 47-125P6498639 | 47-163D9094354 | 47-163D9094351 |
| | | | | 05-Jan-2020 00:00 | 11-Jan-2020 00:00 | 17-Jan-2020 00:00 | 23-Jan-2020 00:00 | 29-Jan-2020 00:00 |
| Compound | CAS Number | LOR | Unit | EW2000446-001 | EW2000446-002 | EW2000446-003 | EW2000446-004 | EW2000446-005 |
| | | | | Result | Result | Result | Result | Result |
| EA143: Particulates in Air - LVAFs | | | | | | | | |
| ^ ePM10 | ---- | 14 | µg/m³ | 75 | 72 | 61 | 150 | 63 |
| PM10 (mass per filter) | ---- | 100 | µg/filter | 301 | 284 | 242 | 578 | 246 |
| EA143: Total Suspended Particulates | | | | | | | | |
| Initial Weight | ---- | 0.0001 | mg | 140.3226 | 141.6332 | 140.3575 | 164.8524 | 162.8615 |
| Final Weight | ---- | 0.0001 | mg | 140.6236 | 141.9168 | 140.5996 | 165.4303 | 163.1077 |
| Low Volume Air-Sampling Parameters | | | | | | | | |
| ø Volume | ---- | 1 | L | 3990 | 3960 | 3970 | 3840 | 3920 |