

**Monthly Air Quality Monitoring – July 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 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 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 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                     | 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 <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             |





Property Border  
 Extraction Boundary

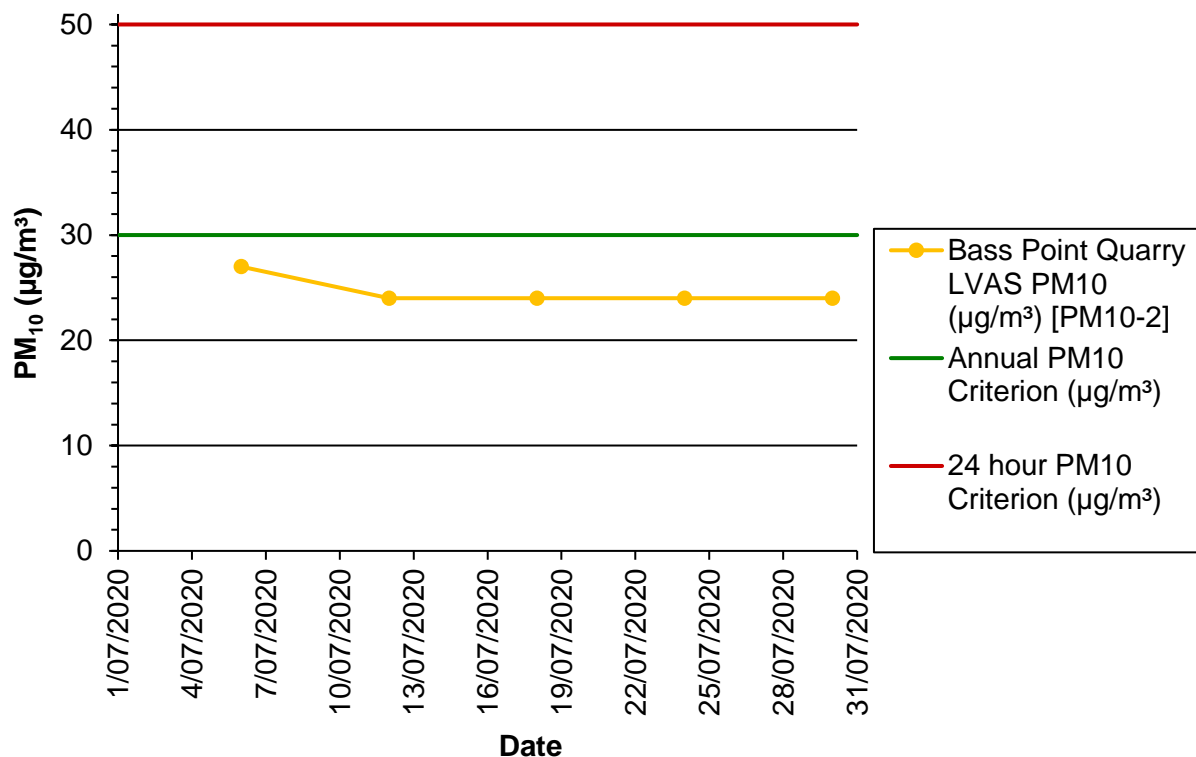
**Figure 1:** Monitoring locations at the Bass Point Quarry. Air quality monitoring locations have been acronymised as follows: DDG1 – Dust Deposition Gauge 1; DDG2 – Dust Deposition Gauge 2; PM10-1 – Continuous PM<sub>10</sub> Monitor; PM10-2 – Low Volume PM<sub>10</sub> Sampler.

### 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).

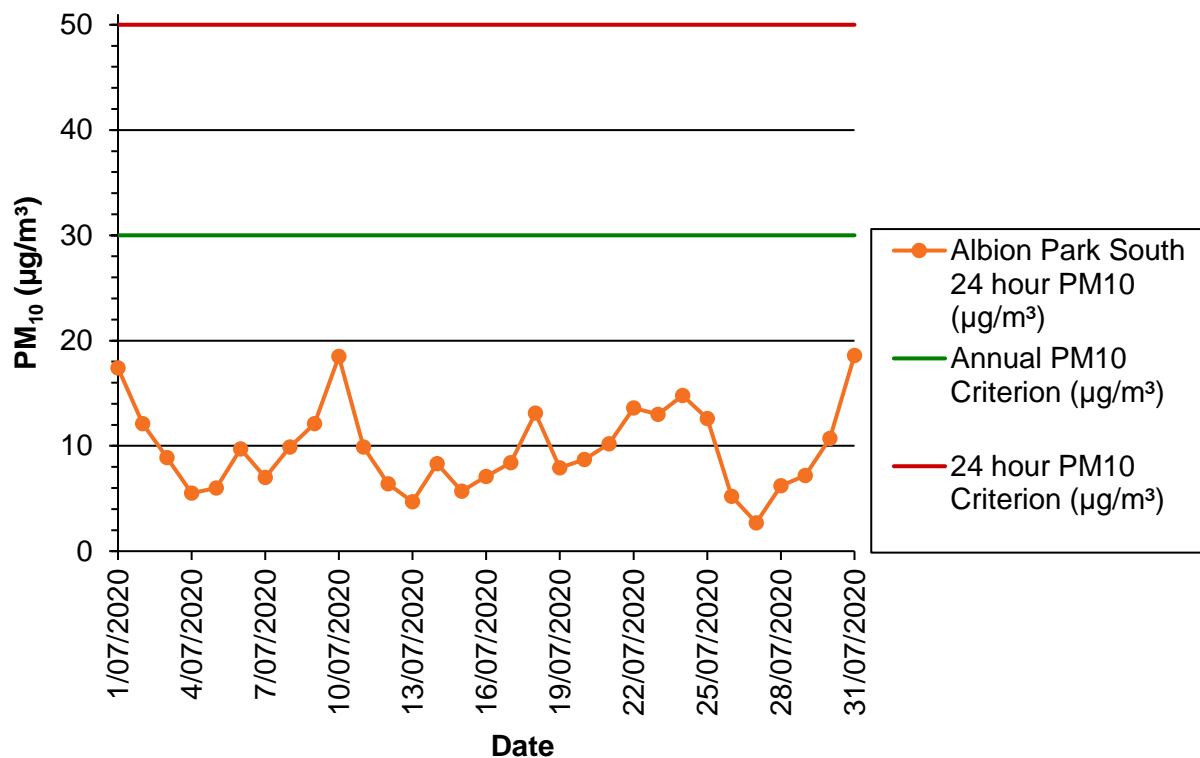
Five samples were collected during July 2020 (**Figure 2, Table 2**). All five samples were below the 24 hour average PM<sub>10</sub> criterion of 50 µg/m<sup>3</sup> and were hence compliant. Note that four of the samples (12/07/2020, 18/07/2020, 24/07/2020, and 30/07/2020) were below the limit of reporting (LOR) for the laboratory, i.e. smaller than the laboratory is permitted to report. In those cases, the limit of reporting has been graphed.



**Figure 2:** Twenty-four hour PM<sub>10</sub> concentration (µg/m<sup>3</sup>) as measured at PM<sub>10</sub>-2 during July 2020, compared to the annual criterion and 24 hour criterion (µg/m<sup>3</sup>).



The 24 hour average PM<sub>10</sub> reading at Albion Park South AQMS was below the 24 hour average PM<sub>10</sub> criterion of 50 µg/m<sup>3</sup> for all sampling dates during July 2020 (**Figure 3, Table 2**) and was hence compliant.



**Figure 3:** Twenty-four hour PM<sub>10</sub> concentration (µg/m<sup>3</sup>) as measured at Albion Park South AQMS during July 2020, 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. Annual average PM<sub>10</sub> data is therefore not required as part of the July 2020 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.

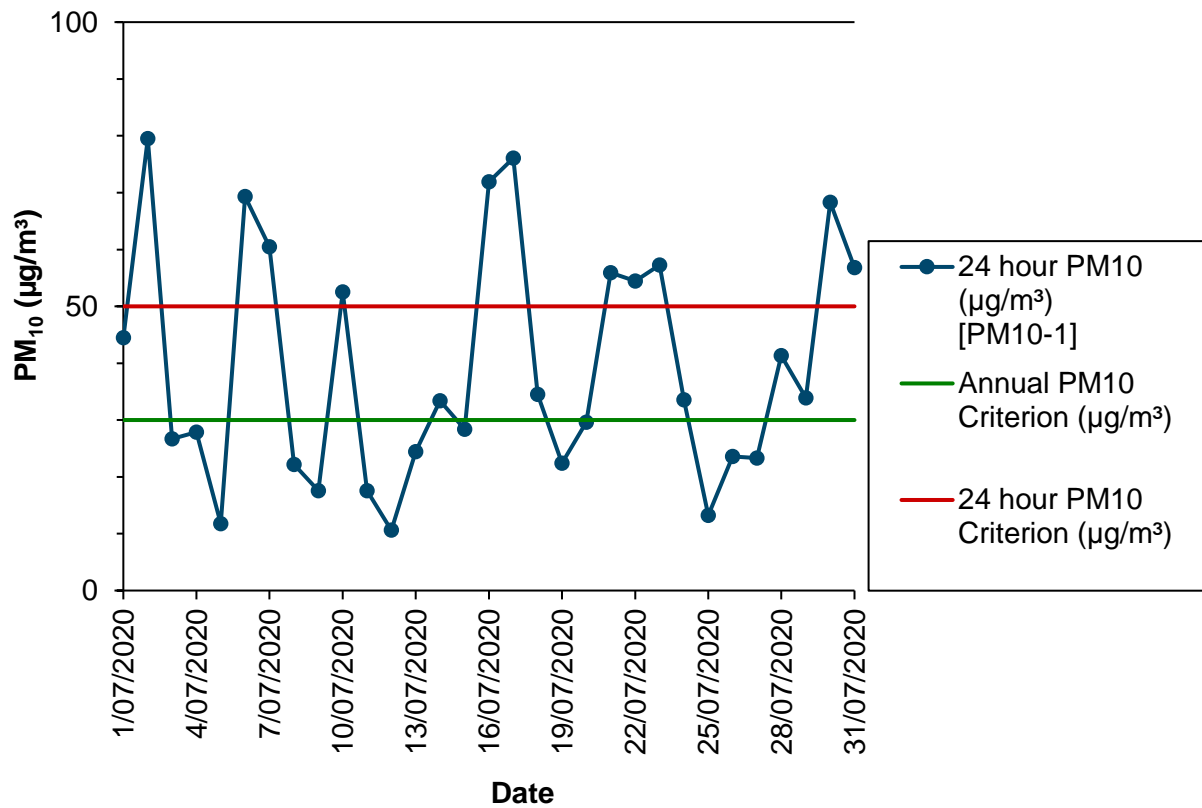
The rolling annual average 24 hour PM<sub>10</sub> for the PM10-2 site, as calculated using data up to and including July 2020, was 57.5 µg/m<sup>3</sup>. This is above the annual PM<sub>10</sub> criterion of 30 µg/m<sup>3</sup>. Hanson are undertaking a more detailed investigation into the PM<sub>10</sub> levels experienced at a relevant nearby residence/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 July 2020, was 21.6 µg/m<sup>3</sup>. This is slightly more 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 (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 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 July 2020, compared to the annual PM<sub>10</sub> criterion and 24 hour PM<sub>10</sub> criterion (µg/m<sup>3</sup>).

**Table 2:** Monitoring results for Particulate Matter – PM<sub>10</sub> monitoring during July 2020. 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> ) | Mean Wind Speed (m/s) | Mode Wind Direction (°) | Mean Atm. Temp. (°C) | Mean Relative Humidity (%) | Mean Bar. Pressure (mmHg) | Comments |
|------------|--|--|---|---|-----------------------|-------------------------|----------------------|----------------------------|---------------------------|----------|
| 1/07/2020  | 45   |  | 17.4  | 50  | 2.1                   | W                       | 15.7                 | 67                         | 762                       |          |
| 2/07/2020  | 80   |  | 12.1  | 50  | 3.9                   | NNW                     | 17.9                 | 57                         | 758                       |          |
| 3/07/2020  | 27   |  | 8.9   | 50  | 3.3                   | W                       | 13.1                 | 54                         | 761                       |          |
| 4/07/2020  | 28   |  | 5.5   | 50  | 3.2                   | SSW                     | 12.1                 | 53                         | 761                       |          |
| 5/07/2020  | 12   |  | 6.0   | 50  | 2.4                   | WSW                     | 13.6                 | 55                         | 763                       |          |
| 6/07/2020  | 69   | 27   | 9.7   | 50  | 2.0                   | SW                      | 13.7                 | 65                         | 767                       |          |
| 7/07/2020  | 60   |  | 7.0   | 50  | 2.4                   | SW                      | 12.7                 | 74                         | 769                       |          |
| 8/07/2020  | 22   |  | 9.9   | 50  | 1.8                   | SSW                     | 13.6                 | 79                         | 770                       |          |
| 9/07/2020  | 18   |  | 12.1  | 50  | 3.0                   | W                       | 13.5                 | 80                         | 769                       |          |
| 10/07/2020 | 53   |  | 18.5  | 50  | 1.4                   | W                       | 14.9                 | 80                         | 766                       |          |
| 11/07/2020 | 18   |  | 9.9   | 50  | 1.5                   | NW                      | 13.4                 | 83                         | 760                       |          |
| 12/07/2020 | 11   | <24  | 6.4   | 50  | 1.6                   | SW                      | 13.3                 | 76                         | 759                       |          |
| 13/07/2020 | 24   |  | 4.7   | 50  | 2.5                   | SSW                     | 12.9                 | 78                         | 760                       |          |
| 14/07/2020 | 33   |  | 8.3   | 50  | 7.3                   | SSW                     | 12.9                 | 85                         | 761                       |          |
| 15/07/2020 | 28   |  | 5.7   | 50  | 7.0                   | SSW                     | 12.7                 | 74                         | 761                       |          |
| 16/07/2020 | 72   |  | 7.1   | 50  | 6.0                   | SSW                     | 13.4                 | 62                         | 760                       |          |
| 17/07/2020 | 76   |  | 8.4   | 50  | 5.5                   | SSW                     | 13.4                 | 72                         | 762                       |          |
| 18/07/2020 | 35   | <24  | 13.1  | 50  | 2.0                   | SW                      | 13.9                 | 73                         | 763                       |          |
| 19/07/2020 | 22   |  | 7.9   | 50  | 2.5                   | WNW                     | 14.3                 | 62                         | 759                       |          |
| 20/07/2020 | 30   |  | 8.7   | 50  | 2.8                   | WSW                     | 14.0                 | 42                         | 760                       |          |
| 21/07/2020 | 56   |  | 10.2  | 50  | 2.5                   | WSW                     | 12.3                 | 55                         | 767                       |          |
| 22/07/2020 | 54   |  | 13.6  | 50  | 2.0                   | SSW                     | 13.9                 | 63                         | 767                       |          |
| 23/07/2020 | 57   |  | 13.0  | 50  | 1.8                   | SW                      | 14.3                 | 73                         | 766                       |          |
| 24/07/2020 | 34   | <24  | 14.8  | 50  | 2.6                   | SSW                     | 14.2                 | 82                         | 767                       |          |
| 25/07/2020 | 13   |  | 12.6  | 50  | 1.8                   | W                       | 14.7                 | 86                         | 766                       |          |
| 26/07/2020 | 24   |  | 5.2   | 50  | 2.1                   | S                       | 14.5                 | 98                         | 760                       |          |
| 27/07/2020 | 23   |  | 2.7   | 50  | 8.0                   | SSW                     | 14.7                 | 96                         | 747                       |          |
| 28/07/2020 | 41   |  | 6.2   | 50  | 6.0                   | SSW                     | 15.6                 | 84                         | 753                       |          |
| 29/07/2020 | 34   |  | 7.2   | 50  | 2.5                   | SW                      | 15.1                 | 68                         | 759                       |          |
| 30/07/2020 | 68   | <24  | 10.7  | 50  | 2.9                   | SW                      | 14.6                 | 67                         | 765                       |          |
| 31/07/2020 | 57   |  | 18.6  | 50  | 2.3                   | SW                      | 13.0                 | 62                         | 768                       |          |

### 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 July 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 PM<sub>10</sub> data (as per the AQMP) for July 2020 (**Table 3**). The rolling annual average TSP is therefore 59.5 µg/m<sup>3</sup>; 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 July 2020.

| 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 |
|--|-------------------------------|---------------------------------------|----------------------|
| 21.6 µg/m <sup>3</sup>   | 36.2%                         | 59.5 µg/m <sup>3</sup>                | 90 µg/m <sup>3</sup> |

### 3.3. Dust Deposition Gauges

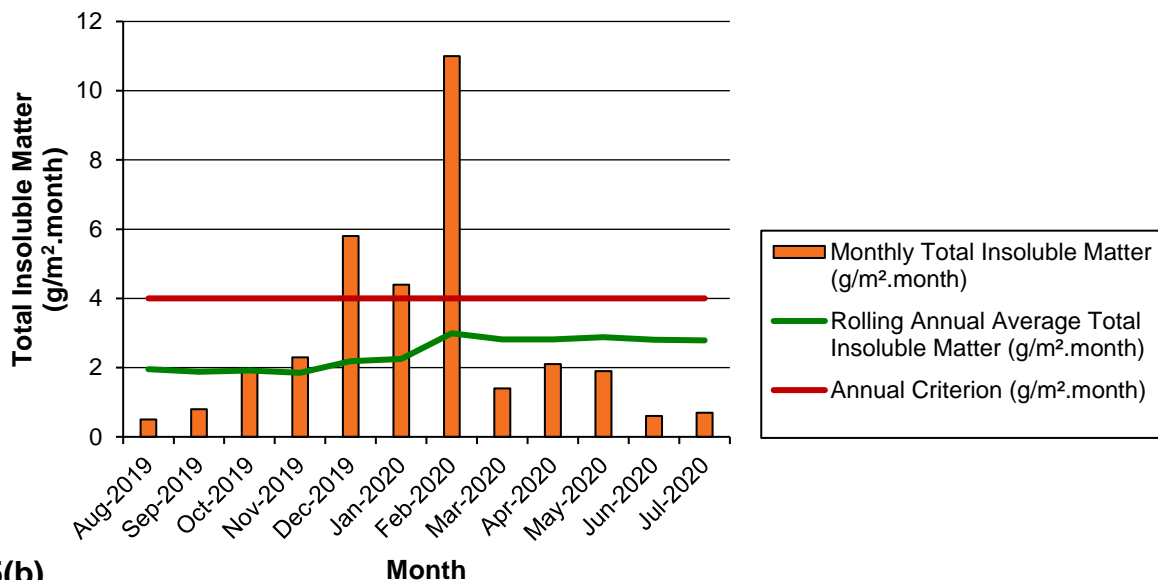
Monthly analyses of deposited dust samples collected at DDG-1 and DDG-2 are completed by NATA-accredited laboratory ALS Environmental. Monitoring results for the month of July 2020 indicate that dust deposition at DDG-1 was less than the annual criterion of 4 g/m<sup>2</sup>.month identified in Project Approval 08\_0143 Schedule 3 and EPL-2193 (**Table 4, Figure 5(a)**). Dust deposition at DDG-2 was equal to the annual criterion of 4 g/m<sup>2</sup>.month (**Table 4, Figure 5(b)**). The prevailing wind direction (**Figure 5(d)**) was southwest and south-southwest, which suggests that this high monitoring result at DDG-2 may be associated with the site (although not definitively). It is speculated that this result may be associated with ongoing earthworks associated with boat-harbour construction (i.e. not associated with the site), specifically, construction of a large earthen mound in close proximity to DDG-2.



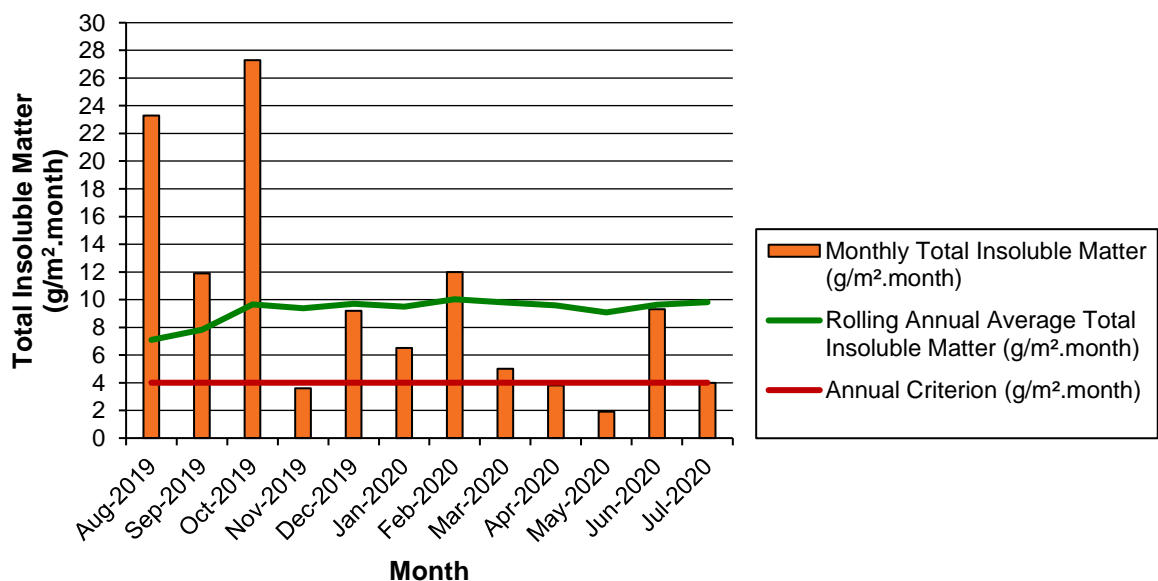
**Table 4:** Monthly Total Insoluble Matter ( $\text{g/m}^2\cdot\text{month}$ ) measured at the two Bass Point Quarry Dust Deposition Gauges (DDGs) during the period 15/06/2020 to 15/07/2020 (i.e. July 2020), and calculated rolling annual average Total Insoluble Matter ( $\text{g/m}^2\cdot\text{month}$ ).

| 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 | 0.7  | 2.8   |          |
| DDG-2 | 4.0  | 9.8   |          |

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 July 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.

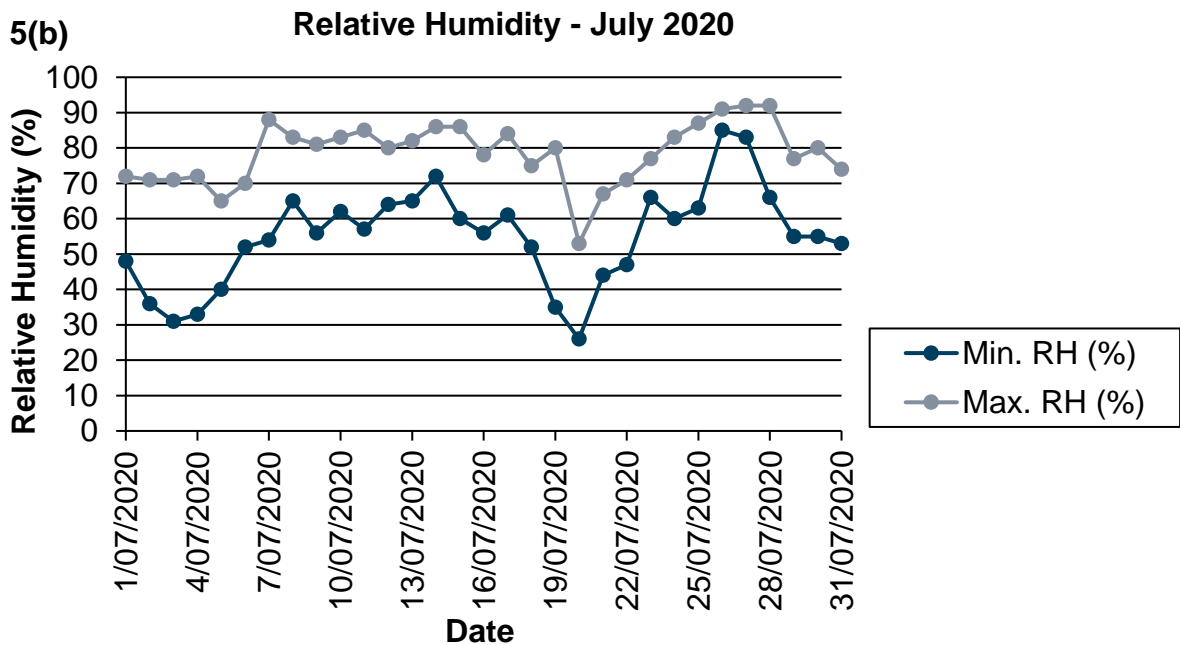
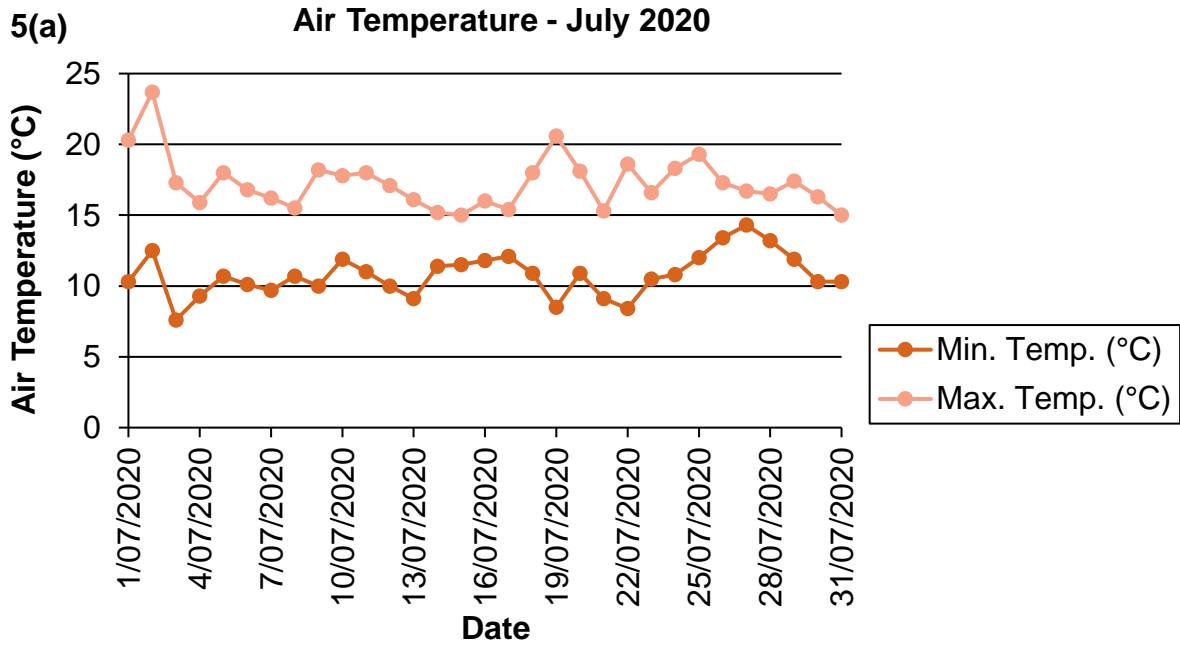
| Date       | Min. Temp. (°C) | Max. Temp. (°C) | Evapo-Transp. (mm) | Rainfall (mm) | Min. RH (%) | Max. RH (%) | Direction of maximum wind gust | Speed of maximum wind gust (km/h) | Time of maximum wind gust | Average 10 m Wind Speed (m/sec) | Solar Radiation (MJ/sq m) |
|------------|-----------------|-----------------|--------------------|---------------|-------------|-------------|--------------------------------|-----------------------------------|---------------------------|---------------------------------|---------------------------|
| 1/07/2020  | 10.3            | 20.3            | 1.7                | 0.0           | 48          | 72          | N                              | 22                                | 14:47                     | 1.92                            | 10.65                     |
| 2/07/2020  | 12.5            | 23.7            | 2.9                | 0.0           | 36          | 71          | SW                             | 41                                | 19:32                     | 3.43                            | 10.41                     |
| 3/07/2020  | 7.6             | 17.3            | 2.9                | 0.0           | 31          | 71          | WSW                            | 56                                | 12:14                     | 4.72                            | 10.76                     |
| 4/07/2020  | 9.3             | 15.9            | 2.7                | 0.6           | 33          | 72          | S                              | 50                                | 10:40                     | 4.60                            | 10.84                     |
| 5/07/2020  | 10.7            | 18.0            | 2.9                | 0.0           | 40          | 65          | WSW                            | 46                                | 5:38                      | 4.74                            | 10.89                     |
| 6/07/2020  | 10.1            | 16.8            | 1.9                | 0.0           | 52          | 70          | SSE                            | 24                                | 13:00                     | 3.04                            | 10.79                     |
| 7/07/2020  | 9.7             | 16.2            | 1.8                | 0.0           | 54          | 88          | SSW                            | 37                                | 16:16                     | 4.13                            | 8.49                      |
| 8/07/2020  | 10.7            | 15.5            | 1.3                | 3.8           | 65          | 83          | SSW                            | 28                                | 0:05                      | 2.46                            | 8.94                      |
| 9/07/2020  | 10.0            | 18.2            | 1.9                | 0.0           | 56          | 81          | NNE                            | 35                                | 15:19                     | 3.46                            | 11.03                     |
| 10/07/2020 | 11.9            | 17.8            | 1.2                | 0.0           | 62          | 83          | WNW                            | 15                                | 0:02                      | 1.43                            | 7.40                      |
| 11/07/2020 | 11.0            | 18.0            | 1.4                | 1.6           | 57          | 85          | W                              | 37                                | 16:56                     | 1.93                            | 8.63                      |
| 12/07/2020 | 10.0            | 17.1            | 1.6                | 4.6           | 64          | 80          | SSE                            | 33                                | 15:00                     | 2.92                            | 10.14                     |
| 13/07/2020 | 9.1             | 16.1            | 1.9                | 2.0           | 65          | 82          | SSW                            | 63                                | 23:47                     | 5.22                            | 10.65                     |
| 14/07/2020 | 11.4            | 15.2            | 2.0                | 11.4          | 72          | 86          | S                              | 87                                | 6:28                      | 11.67                           | 7.58                      |
| 15/07/2020 | 11.5            | 15.0            | 2.4                | 16.2          | 60          | 86          | SSW                            | 67                                | 14:46                     | 9.23                            | 8.65                      |
| 16/07/2020 | 11.8            | 16.0            | 2.9                | 0.6           | 56          | 78          | S                              | 67                                | 12:05                     | 9.32                            | 10.29                     |
| 17/07/2020 | 12.1            | 15.4            | 2.3                | 0.2           | 61          | 84          | SSW                            | 54                                | 9:38                      | 7.68                            | 9.66                      |
| 18/07/2020 | 10.9            | 18.0            | 1.8                | 1.2           | 52          | 75          | SSW                            | 28                                | 0:04                      | 2.42                            | 10.29                     |
| 19/07/2020 | 8.5             | 20.6            | 2.2                | 0.0           | 35          | 80          | WNW                            | 35                                | 16:58                     | 2.53                            | 9.17                      |
| 20/07/2020 | 10.9            | 18.1            | 3.6                | 0.0           | 26          | 53          | W                              | 48                                | 4:53                      | 4.70                            | 11.87                     |
| 21/07/2020 | 9.1             | 15.3            | 2.5                | 0.0           | 44          | 67          | WSW                            | 39                                | 0:23                      | 4.41                            | 11.91                     |
| 22/07/2020 | 8.4             | 18.6            | 1.8                | 0.0           | 47          | 71          | N                              | 22                                | 15:53                     | 2.02                            | 12.03                     |
| 23/07/2020 | 10.5            | 16.6            | 1.8                | 0.0           | 66          | 77          | SSE                            | 37                                | 14:13                     | 3.44                            | 11.86                     |
| 24/07/2020 | 10.8            | 18.3            | 2.0                | 0.0           | 60          | 83          | N                              | 39                                | 16:23                     | 3.44                            | 12.22                     |
| 25/07/2020 | 12.0            | 19.3            | 1.7                | 0.0           | 63          | 87          | NNE                            | 39                                | 16:25                     | 2.66                            | 9.71                      |
| 26/07/2020 | 13.4            | 17.3            | 1.1                | 6.8           | 85          | 91          | S                              | 72                                | 23:52                     | 4.43                            | 3.44                      |
| 27/07/2020 | 14.3            | 16.7            | 1.5                | 89.0          | 83          | 92          | SSW                            | 96                                | 13:51                     | 13.01                           | 4.95                      |
| 28/07/2020 | 13.2            | 16.5            | 2.2                | 76.2          | 66          | 92          | S                              | 78                                | 4:29                      | 10.21                           | 10.02                     |
| 29/07/2020 | 11.9            | 17.4            | 2.3                | 1.8           | 55          | 77          | SSW                            | 39                                | 11:34                     | 3.98                            | 12.62                     |
| 30/07/2020 | 10.3            | 16.3            | 2.3                | 0.0           | 55          | 80          | S                              | 41                                | 11:22                     | 4.68                            | 11.57                     |
| 31/07/2020 | 10.3            | 15.0            | 2.2                | 0.2           | 53          | 74          | SSW                            | 33                                | 8:27                      | 3.64                            | 12.78                     |

| 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    | 10.8            | 17.3            | 2.1                | 7.0           | 55          | 79          | -                              | 45                                | -                         | 4.76                            | 10.01                     |
| Lowest  | 7.6             | 15.0            | 1.1                | 0.0           | 26          | 53          | WNW                            | 15                                | 0:02                      | 1.43                            | 3.44                      |
| Highest | 14.3            | 23.7            | 3.6                | 89.0          | 85          | 92          | SSW                            | 96                                | 13:51                     | 13.01                           | 12.78                     |
| Total   | -               | -               | 64.7               | 216.2         | -           | -           | -                              | -                                 | -                         | -                               | -                         |



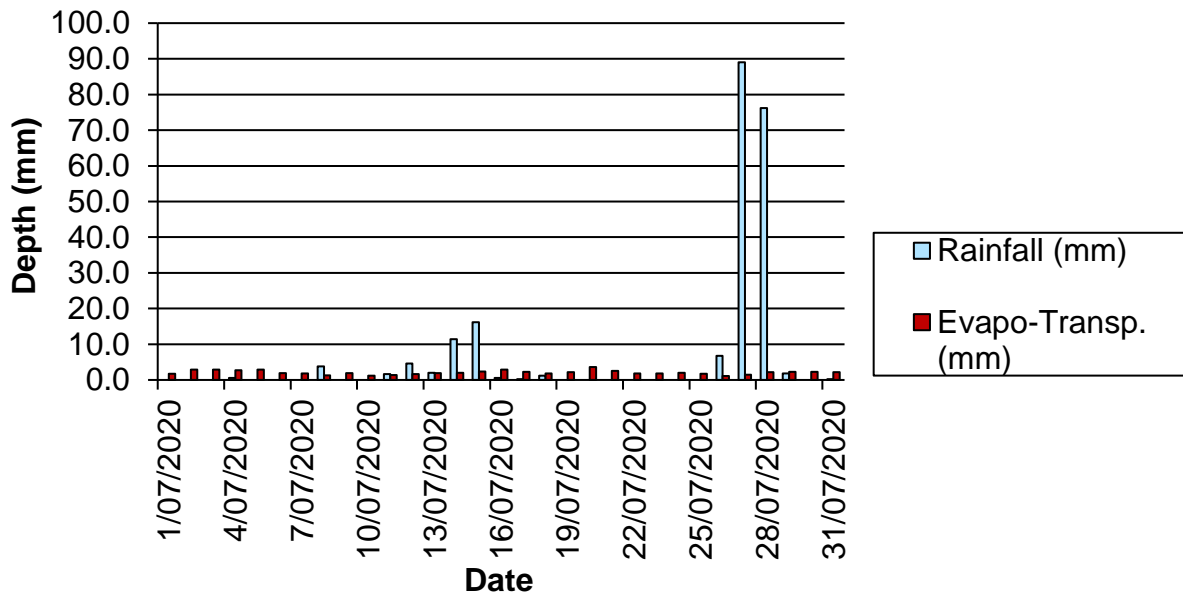
## 4.2. Monthly Weather Charts

**Figure 6:** Summary of representative meteorological data sourced from the BOM Kiama (Bombo Headland) AWS for **(a)** Air Temperature; **(b)** Relative Humidity; **(c)** Rainfall and Evapo-Transpiration; and, **(d)** Wind Speed and Direction. Note that wind speed and direction data was sourced from PM10-1.



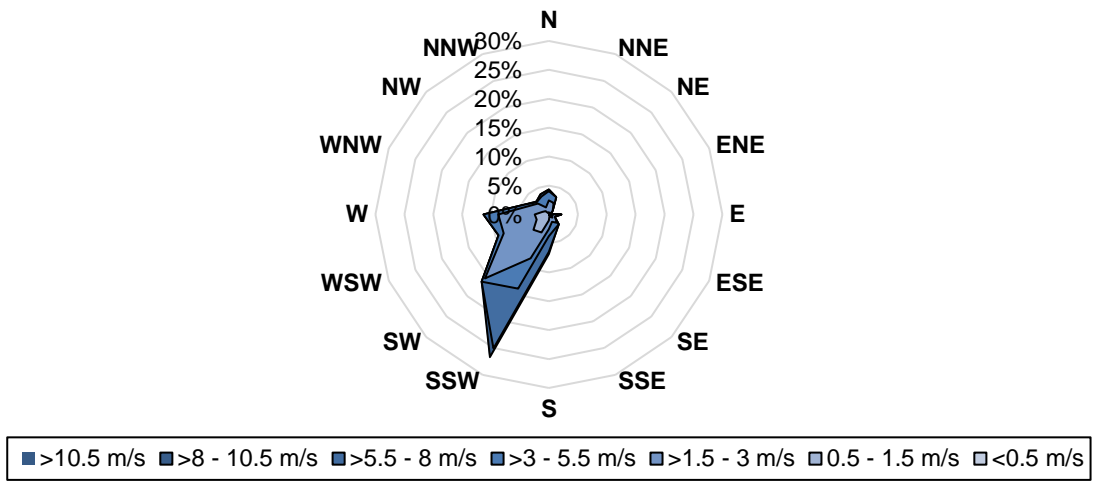
5(c)

**Rainfall and Evapo-Transpiration - July 2020**



5(d)

**Wind speed and direction - July 2020**



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





CHAIN OF CUSTODY

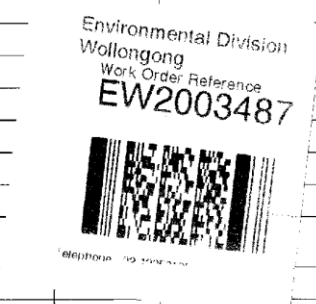
ALS Laboratory: please tick →

- Sydney, Brisbane, Melbourne, Perth, Adelaide, Launceston, Darwin

CLIENT: Hanson Construction Materials
OFFICE: PO Box 4022 Shellharbour NSW 2529
PROJECT: LVAS (PM10)
TURNAROUND REQUIREMENTS: Standard TAT (List due date)
FOR LABORATORY USE ONLY (Circle)
COC SEQUENCE NUMBER (Circle)
RECEIVED BY: Aneta
DATE/TIME: 1/8/20

COMMENTS/SPECIAL HANDLING

Table with columns: LAB ID, SAMPLE ID, DATE / TIME, MATRIX, TYPE & PRESERVATIVE, TOTAL BOTTLES, ANALYSIS REQUIRED, Additional Information. Includes 5 sample rows and a total row.



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 Solids; B = Unpreserved Bag.

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## CERTIFICATE OF ANALYSIS

|  |   |  |
|--|---|--|
| <b>Work Order</b> : EW2003487<br><b>Client</b> : HANSON CONSTRUCTION MATERIALS PTY LTD<br><b>Contact</b> : MR STEVE BUTCHER<br><b>Address</b> : BOOLLWARROO PDE<br>SHELLHARBOUR NSW, AUSTRALIA 2529<br><br><b>Telephone</b> : +61 02 4295 1355<br><b>Project</b> : LVAS<br><b>Order number</b> : 4502756414<br><b>C-O-C number</b> : ----<br><b>Sampler</b> : ----<br><b>Site</b> : ----<br><b>Quote number</b> : EN/333<br><b>No. of samples received</b> : 5<br><b>No. of samples analysed</b> : 5 | <b>Page</b> : 1 of 2<br><br><b>Laboratory</b> : Environmental Division NSW South Coast<br><b>Contact</b> : Glenn Davies<br><b>Address</b> : 1/19 Ralph Black Dr, North Wollongong 2500<br>4/13 Geary Pl, North Nowra 2541<br>Australia NSW Australia<br><br><b>Telephone</b> : 02 42253125<br><b>Date Samples Received</b> : 04-Aug-2020 11:09<br><b>Date Analysis Commenced</b> : 11-Aug-2020<br><b>Issue Date</b> : 13-Aug-2020 17:02 |   <p style="font-size: small; margin-top: 5px;">Accreditation No. 825<br/>Accredited for compliance with<br/>ISO/IEC 17025 - Testing</p> |
|--|---|--|

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



### General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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

- Analytical work for this work order will be conducted at ALS Newcastle.
- The variation in LOR for µg/m³ results is due to the variation in sample volumes
- NATA accreditation is not held for results reported in µg/m³. Air volume data was provided by the client.

### Analytical Results

| Sub-Matrix: FILTER<br>(Matrix: AIR)        |      |        |               | Client sample ID |                |                |                |                |
|--|------|--------|---------------|------------------|----------------|----------------|----------------|----------------|
| Client sampling date / time                |      |        |               | 47-163D9094371   | 47-163D9094370 | 47-163D9094372 | 47-163D9094373 | 47-163D9094374 |
| Compound                                   |      |        |               | 47-163D9094371   | 47-163D9094370 | 47-163D9094372 | 47-163D9094373 | 47-163D9094374 |
| CAS Number                                 | LOR  | Unit   | EW2003487-001 | EW2003487-002    | EW2003487-003  | EW2003487-004  | EW2003487-005  |                |
|  |      |        | Result        | Result           | Result         | Result         | Result         |                |
| <b>EA143: Particulates in Air - LVAFs</b>  |      |        |               |                  |                |                |                |                |
| ^ øPM10                                    | ---- | 14     | µg/m³         | 27               | <24            | <24            | <24            | <24            |
| PM10 (mass per filter)                     | ---- | 100    | µg/filter     | 110              | <100           | <100           | <100           | <100           |
| <b>EA143: Total Suspended Particulates</b> |      |        |               |                  |                |                |                |                |
| Initial Weight                             | ---- | 0.0001 | mg            | 163.9999         | 165.0826       | 163.8162       | 162.9215       | 161.7000       |
| Final Weight                               | ---- | 0.0001 | mg            | 164.1099         | 165.1363       | 163.9122       | 163.0202       | 161.7823       |
| <b>Low Volume Air-Sampling Parameters</b>  |      |        |               |                  |                |                |                |                |
| ø Volume                                   | ---- | 1      | L             | 4130             | 4090           | 4100           | 4120           | 4110           |



### CHAIN OF CUSTODY

ALS Laboratory: *please tick* →

Sydney: 277 Woodpark Rd, Smithfield NSW 2178  
Ph: 02 8784 9535 E: samples.sydney@alsenviro.com

Newcastle: 5 Rosegum Rd, Waratah NSW 2304  
Ph: 02 4968 9433 E: samples.newcastle@alsenviro.com

Brisbane: 32 Sherwin St, Stafford QLD 4053  
Ph: 07 3243 7222 E: samples.brisbane@alsenviro.com

Townsville: 14-15 Duama Ct, Bohle QLD 4818  
Ph: 07 4796 0600 E: townsville.airquality@alsenviro.com

Melbourne: 2-4 Wastall Rd, Springvale VIC 3171  
Ph: 03 8543 9600 E: samples.melbourne@alsenviro.com

Adelaide: 2-1 Burma Rd, Pottolka SA 5095  
Ph: 08 8359 0690 E: adelaide@alsenviro.com

Perth: 10 Hort Way, Malaga WA 6000  
Ph: 08 9239 7055 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):   |   | <b>FOR LABORATORY USE ONLY (Circle)</b><br>Custody Seal Intact? Yes No N/A<br>Free Ice / frozen ice bricks present upon receipt? Yes No N/A<br>Random Sample Temperature on Receipt: C<br>Other comment: |   |   |   |   |   |   |   |   |
| <b>OFFICE:</b> 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): |   |  |   |   |   |   |   |   |   |   |
| <b>PROJECT:</b> Bass Point Dust Monitoring          |   | <b>ALS QUOTE NO.:</b> WL/043/11  |   |  |   |   |   |   |   |   |   |   |
| <b>ORDER NUMBER:</b>                                |   |  |   | <b>COC SEQUENCE NUMBER (Circle)</b>  |   |   |   |   |   |   |   |   |
| <b>PROJECT MANAGER:</b> Steve Butcher               |   | <b>CONTACT PH:</b> 02 4295 1352  |   | 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>   |   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1   | 2 | 3  | 4 | 5  | 6 | 7 |   |   |   |   |   |   |
| <b>SAMPLER:</b>                                     |   | <b>SAMPLER MOBILE:</b>   |   | 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 |   |   |   |   |   |   |
| <b>COC emailed to ALS? ( YES / NO)</b>              |   | <b>EDD FORMAT (or default):</b>  |   | <b>RELINQUISHED BY:</b>  |   |   |   |   |   |   |   |   |
| Email Reports to : steve.butcher@hanson.com.au      |   |  |   | Roban L.<br>DATE/TIME: 15-7-20 13:55   |   |   |   |   |   |   |   |   |
| Email Invoice to : steve.butcher@hanson.com.au      |   |  |   | <b>RECEIVED BY:</b>  |   |   |   |   |   |   |   |   |
|   |   |  |   | Aneta<br>DATE/TIME: 15/7/20  |   |   |   |   |   |   |   |   |
|   |   |  |   | <b>RECEIVED BY:</b>  |   |   |   |   |   |   |   |   |
|   |   |  |   | DATE/TIME:   |   |   |   |   |   |   |   |   |

**COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:**

| ALS USE ONLY | SAMPLE DETAILS<br>MATRIX: Solid(S) Water(W) |               |        | CONTAINER INFORMATION  |               | ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price)<br><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<br><small>(refer to codes below)</small> | TOTAL BOTTLES | A04-3<br>(Total Insoluble Solids, Ash, Combustibles)   |  |  |  |  |  |  |                        | Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc. |
| 1            | DDG 1                                       | 15-7-20 11:55 | AIR    | AG   | 1             | ✓  |  |  |  |  |  |  |                        |  |
| 2            | DDG 2                                       | ↓ 10:02       | AIR    | AG   | 1             | ✓  |  |  |  |  |  |  |                        |  |
| 3            | DDG 3                                       | ↓ 10:15       | AIR    | AG   | 1             | ✓  |  |  |  |  |  |  |                        |  |
|              |   |               |        |  | <b>TOTAL</b>  | <b>3</b>   |  |  |  |  |  |  |                        |  |

Environmental Division  
Wollongong  
Work Order Reference  
**EW2003192**



Telephone: 02 4224 9126

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 Bisulfite 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 Solids; B = Unpreserved Bag.

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## CERTIFICATE OF ANALYSIS

|                                |   |                                |   |
|--------------------------------|---|--------------------------------|---|
| <b>Work Order</b>              | : <b>EW2003192</b>  | <b>Page</b>                    | : 1 of 2  |
| <b>Client</b>                  | : <b>HANSON CONSTRUCTION MATERIALS PTY LTD</b>                | <b>Laboratory</b>              | : Environmental Division NSW South Coast  |
| <b>Contact</b>                 | : <b>MR STEVE BUTCHER</b>                                     | <b>Contact</b>                 | : Glenn Davies  |
| <b>Address</b>                 | : <b>BOOLLWARROO PDE<br/>SHELLHARBOUR NSW, AUSTRALIA 2529</b> | <b>Address</b>                 | : <b>1/19 Ralph Black Dr, North Wollongong 2500<br/>4/13 Geary Pl, North Nowra 2541<br/>Australia NSW Australia</b> |
| <b>Telephone</b>               | : <b>+61 02 4295 1355</b>                                     | <b>Telephone</b>               | : <b>02 42253125</b>  |
| <b>Project</b>                 | : <b>Bass Point Dust Monitoring</b>                           | <b>Date Samples Received</b>   | : <b>15-Jul-2020 14:11</b>  |
| <b>Order number</b>            | : <b>4502749959</b>   | <b>Date Analysis Commenced</b> | : <b>17-Jul-2020</b>  |
| <b>C-O-C number</b>            | : <b>----</b>   | <b>Issue Date</b>              | : <b>23-Jul-2020 14:19</b>  |
| <b>Sampler</b>                 | : <b>Robert DaLio</b>   |                                |   |
| <b>Site</b>                    | : <b>----</b>   |                                |   |
| <b>Quote number</b>            | : <b>WL/043/11 Bass Point Dust Monitoring</b>                 |                                |   |
| <b>No. of samples received</b> | : <b>3</b>  |                                |   |
| <b>No. of samples analysed</b> | : <b>3</b>  |                                |   |



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



### General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

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

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

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

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

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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 work for this work order will be conducted at ALS Newcastle.
- 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<br>15/06/2020 -<br>15/07/2020 | DDG 2<br>15/06/2020 -<br>15/07/2020 | DDG 3<br>15/06/2020 -<br>15/07/2020 | ----  | ----  |
|--------------------------------------|------------|-----|-------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------|-------|
| Client sampling date / time          |            |     |                         | 15-Jul-2020 11:55                   | 15-Jul-2020 01:00                   | 15-Jul-2020 10:15                   | ----  | ----  |
| Compound                             | CAS Number | LOR | Unit                    | EW2003192-001                       | EW2003192-002                       | EW2003192-003                       | ----- | ----- |
|                                      |            |     |                         | Result                              | Result                              | Result                              | ---   | ---   |
| <b>EA120: Ash Content</b>            |            |     |                         |                                     |                                     |                                     |       |       |
| Ash Content                          | ----       | 0.1 | g/m <sup>2</sup> .month | 0.5                                 | 3.3                                 | 1.2                                 | ----  | ----  |
| Ash Content (mg)                     | ----       | 1   | mg                      | 9                                   | 59                                  | 22                                  | ----  | ----  |
| <b>EA125: Combustible Matter</b>     |            |     |                         |                                     |                                     |                                     |       |       |
| Combustible Matter                   | ----       | 0.1 | g/m <sup>2</sup> .month | 0.2                                 | 0.7                                 | 0.1                                 | ----  | ----  |
| Combustible Matter (mg)              | ----       | 1   | mg                      | 3                                   | 11                                  | 3                                   | ----  | ----  |
| <b>EA141: Total Insoluble Matter</b> |            |     |                         |                                     |                                     |                                     |       |       |
| Total Insoluble Matter               | ----       | 0.1 | g/m <sup>2</sup> .month | 0.7                                 | 4.0                                 | 1.3                                 | ----  | ----  |
| Total Insoluble Matter (mg)          | ----       | 1   | mg                      | 12                                  | 70                                  | 25                                  | ----  | ----  |