PHASE 2 MULGA EAST IRON ORE PROJECT

Ambient Air Quality Monitoring Program
Technical Report

Prepared for:

Hancock Prospecting Pty Ltd
c/o Strategen-JBS&G
Level 1, 50 Subiaco Square Rd
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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Hancock Prospecting Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
675.11414-R04-v2.0	10 September 2020	Mark Skoroszewski / Jason Shepherd	Kirsten Lawrence	Jason Shepherd
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EXECUTIVE SUMMARY

The Mulga East Iron Ore Project (the Project) is located within the Mulga Downs pastoral station in the Pilbara region, approximately 260 kilometre (km) from Port Hedland and 250 km from Newman. The Project may involve open cut mining, on-site ore processing, waste storage, workshops; access and service roads, and an airport.

In relation to the preparation of an Environmental Impact Assessment (EIA) for the development of the Project, a desktop data gap analysis undertaken for the Project by SLR (SLR document 675.11414-R02) proposed a 12-month ambient air quality monitoring program to address a lack of publicly-available, representative air quality monitoring data in the region.

The Department of Water and Environmental Regulation (DWER) confirmed during a meeting on 2 April 2019 that a 12-month a monitoring program was required to establish a robust baseline and that the proposed methodology was appropriate for the project.

SLR was engaged to undertake 12 months of baseline ambient air quality monitoring around the Mulga East proposed tenement, including continuous monitoring of PM_{10} concentrations at one location using a beta attenuation monitor and monthly monitoring of dust deposition rates at three locations using dust deposition gauges. This report summarises the monitoring data recorded by the ambient air quality monitoring program over the 12-month period from May 2019 to May 2020.

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Glossary

Abbreviation	Definition
AC	Ash content
AS	Australian Standard
BAM; EBAM	Beta attenuation monitor
BoM	Bureau of Meteorology
CM	Combustible matter
DDG	Dust deposition gauge
DWER	Department of Water and Environmental Regulation
EIA	Environmental Impact Assessment
EPAV	Environment Protection Authority Victoria
g/m^2/month	Grams per square metre per month
HPPL	Hancock Prospecting Pty Ltd
mm	Millimetres
NEPM	National Environmental Protection Measure
µg/m^3	Micrograms per cubic metre
PM_{10}	Particulate matter with an aerodynamic diameter less than 10 micron
SLR	SLR Consulting Australia Pty Ltd
USEPA	United States Environment Protection Agency

1 Introduction

The Mulga East Iron Ore Project (the Project) is located within the Mulga Downs pastoral station in the Pilbara region, approximately 260 km from Port Hedland and 250 km from Newman. The Project may include:

- A series of open cut mine pit voids, some of which will extend below the in-situ water table.
- An onsite ore processing plant, waste rock landforms, waste storage area or tailing storage facility.
- Mining infrastructure, including a rail load out facility, workshops, access and service roads.
- An accommodation camp and airport.
- A rail spur approximately 50 km in length from the existing Roy Hill Iron Ore rail line.

1.1 Background

In relation to the preparation of an Environmental Impact Assessment (EIA) for the development of the Project, a desktop data gap analysis undertaken for the Project by SLR (SLR document 675.11414-R02) recommended that a 12-month ambient air quality monitoring program be undertaken to address a lack of publicly-available, representative air quality monitoring data in the region.

The Department of Water and Environmental Regulation (DWER) confirmed during a meeting on 2 April 2019 that a 12-month a monitoring program was required to establish a robust baseline and that the proposed methodology was appropriate for the project.
SLR was engaged by Strategen-JBS&G, on behalf of Hancock Prospecting Pty Ltd (HPPL), to undertake 12 months of continuous monitoring for fine particulates (as particulate matter with an aerodynamic diameter less than 10 micron (PM_{10})) at one location and bi-monthly dust deposition at three locations around the Mulga East proposed tenement (the Project area, see Figure 1) before any earthworks / construction activities commence. SLR sited, installed and commissioned the monitoring equipment between 7 May 2019 and 9 May 2019 and performed monthly servicing, maintenance and reporting tasks since that time.

This report summarises the monitoring data recorded by the baseline air quality monitoring program over the 12-month period from May 2019 to May 2020.

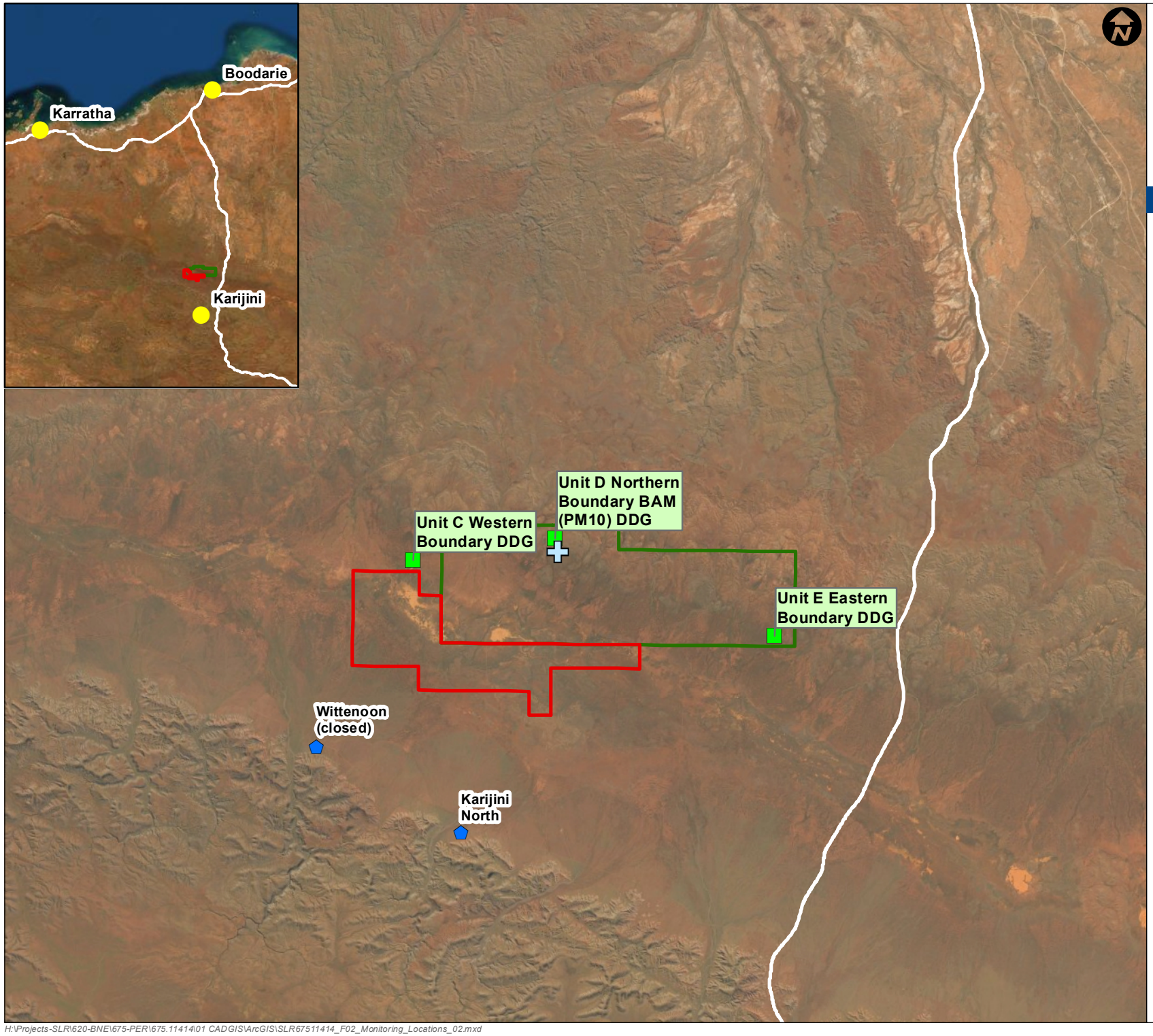
1.2 Scope

The following scope of work was performed by SLR as part of the 12-month baseline ambient air quality monitoring program:

- Assisted with the procurement of a solar powered beta attenuation mass monitor (EBAM) appropriate for continuous PM_{10} concentration monitoring (owned by HPPL).
- Handover of monitoring equipment, including EBAM, solar system and dust deposition gauges (DDGs) to HPPL's freight provider.
- Sited, installed and commissioned the EBAM instrument at the agreed monitoring location.
- Sited and installed the three DDGs at the agreed monitoring locations.
- Performed calibration and maintenance checks on the EBAM at 60-day intervals, including flow checks, tape changes, sensor calibrations and data downloads.

- Performed DDG sample change overs at 60-day intervals and sent the collected samples to a NATA-accredited testing laboratory for analysis.
- Sourced and reviewed publicly-available meteorological data from nearby Bureau of Meteorology (BoM) weather stations for the monitoring period.
- Analysed, validated and presented the meteorological and air quality monitoring data.

Due to instrument issues experienced between January 2020 and February 2020, the EBAM was removed from site on 9 May 2020 and returned to the manufacturer for assessment and repair. The instrument was not recommissioned until June 2020 and therefore no PM_{10} data was collected between 9 March 2020 and the end of the reporting period, 31 May 2020.



MULGA EAST

Monitoring Locations

FIGURE 1

LEGEND

- Air Quality Monitoring Locations
- Mulga Downs Exploration Camp
- Wittenoom Weather Station (closed)
- Meterology Station
- Malay Well Tenement (E472117)
- Mulga East Tenement (R47/122)

0 7.5 15 km

Coordinate System:	GDA 1994 MGA Zone 50
Scale:	1:400,000 at A4
Project Number:	675.11414
Date:	10-Sep-2020
Drawn by:	(PW)
Reviewed by:	(PW)

Data Source:
ESRI Basemaps

SLR

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2 Monitoring Locations

In consultation with Strategen-JBS&G, SLR deployed and commissioned an EBAM with solar power capability (due to the remoteness of the site) on the northern boundary of the Project area. SLR co-located one DDG with the EBAM and, cognisant of the prevailing wind directions (refer Section 5.4), one more DDG on each of the western and eastern boundaries of the Project area, as shown in Figure 1. All three monitoring sites met the siting requirements of AS/NZS 3580.1.1:2016 Methods for sampling and analysis of ambient air - Guide to siting air monitoring equipment. Further details are provided in Table 1.

Table 1 Monitoring Locations

SLR ID	JBS&G ID	Description	Location (UTM zone 50K)	Equipment	Photograph
1	Unit C	Western Boundary	645,659 m E; 7,554,495 m S	DDG	 View looking northeast
2	Unit D	Northern Boundary	656,687 m E; 7,556,191 m S	EBAM DDG	 View looking south towards Camp (1km away)
3	Unit E	Eastern Boundary	673,722 m E; 7,548,569 m S	DDG	 View looking south

3 Relevant Ambient Air Quality Criteria

3.1 PM_{10}

The National Environment Protection Council (NEPC) was established under the National Environment Protection Council Act 1994 with the primary function of developing National Environment Protection Measures (NEPMs) assessing and reporting on the implementation and effectiveness of the NEPMs in each State and Territory.

The National Environment Protection (Ambient Air Quality) Measure[1] (Air NEPM) contains standards for key pollutants that are required to be achieved nationwide, with due regard to population exposure, that are designed to protect human health and wellbeing. It is the intent of the Air NEPM that the criteria are applicable to the air quality likely to be experienced by the general population as a result of regional anthropogenic activity in urban environments. That is, the criteria are not applicable to locations that are strongly influenced, due to their proximity to, sources such as, road traffic, mining, industry etc, nor to locations strongly influenced by naturally occurring emissions or emission events, e.g. desert dust, bush-fires etc.

In Western Australia, the Air NEPM criteria (Table 2) are applied to sensitive receptors, defined as residences, hospitals, school and other places where people may congregate, including sporting and recreational venues. The remoteness, low population and the potential for ambient dust levels to be significantly impacted by naturally-occurring sources, means that these criteria are not strictly applicable to the Project area.

Table 2 Air NEPM Ambient Air Quality Standards for PM_{10}

Pollutant	Averaging period	Maximum concentration (µg/m^3)
PM_{10}	24 hours Annual	50 25

In Western Australia, air quality is governed by the Environmental Protection Act 1986 (EP Act) administered by the Department of Water and Environmental Regulation (DWER). Although DWER do not have generic PM_{10} criteria applicable to remote mining operations, it has previously accepted that the Air NEPM PM_{10} standard cannot be met in the Pilbara region, recognising that its arid climate between June and November and areas of low vegetative cover can lead to periodic dust events caused by wind erosion of exposed surfaces.

For example, The Port Hedland Air Quality and Noise Management Plan[2] for managing air quality impacts from Port Hedland port operations on nearby residential and commercial areas recommended the adoption of an interim air management criterion of 70 µg/m^3 (24-hour average) with 10 exceedances per year, as referenced in Ministerial Statement 740[3]. This criterion was also adopted in the Rio Tinto West Angelas Dust Dispersion Modelling Report[4] prepared to inform the application for environmental approval under Part V of the EP Act)[5].

Based on the above, this report adopts a criterion of 70 µg/m^3 (24-hour average) to assess the baseline PM_{10} data.

[1] National Environment Protection (Ambient Air Quality) Measure, Department of the Environment: National Environment Protection Council, Canberra.
[2] Port Hedland Dust Management Taskforce Report - Port Hedland Air Quality and Noise Management Plan, Government of Western Australia, Department of State Development, March 2010.
[3] Statement to Amend Conditions Applying to a Proposal (Pursuant to the Provisions of Section 46 of the Environmental Protection Act 1986) - Upgrade Dust Management at Finucane Island and Nelson Point, Port Hedland, Minister for the Environment WA, 1996.
[4] West Angelas Dust Dispersion Modelling – Deposits A, B, E, F, Awest, C, D, and G, Environmental Alliances Pty Ltd for Rio Tinto, November 2016.
[5] Environmental Protection Act (1986), Part V – Environmental regulation, Western Australia.

3.2 Deposited Dust

In the absence of a WA EPA guideline for deposited dust rates, guidelines from other state regulations have been sought. The EPA Victoria (EPAV) Protocol for Environmental Management - Mining and Extractive Industries[6] (Mining PEM) supports the interpretation of the State Environment Protection Policy (Air Quality Management) (SEPP(AQM)) and sets out the statutory requirements for the management of emissions to the air environment arising from activities undertaken at mining and extractives sites in Victoria. It is applicable to both expansions of existing developments and new developments.

The Mining PEM states that dust deposition rates, an indicator of the effectiveness of site management practices and the potential for off-site nuisance, should be monitored at the site boundary for most operations. The rate of dust deposition should not exceed 4 g/m^2/month (including background) and no more than 2 g/m^2/month above background). These criteria are also adopted in the NSW EPA "Approved Methods for the Modelling and Assessment of Air Pollutants in NSW"[7] and the Queensland Model Mining Conditions (although converted from g/m^2/month to mg/m^2/day)[8], and are widely used throughout the other states and territories in the absence of local guidelines.

[6] Protocol for Environmental Management - Mining and Extractive Industries, EPA Victoria Publication 1191, December 2007.
[7] Approved Methods for the Modelling and Assessment of Air Pollutants in NSW, NSW EPA, January 2017
[8] Model Mining Conditions, Queensland Department of Environment and Science, Effective March 2017

4 Monitoring Methodology

The methodologies and equipment used to undertake the baseline monitoring program are summarised in Table 2.

Table 3 Sampling Methodologies and Equipment

Parameter	Dust Deposition Rate	PM_{10} Concentration
Test method for sampling and analysis	AS/NZS 3580.10.1:2016 Methods for sampling and analysis of ambient air: Determination of particulate matter - Deposited matter - Gravimetric method	In general accordance [a] with AS/NZS 3580.9.11 Methods for sampling and analysis of ambient air: Determination of suspended particulate matter - PM_{10} beta attenuation monitors, as amended by Amdt 1:2009)
Equipment	Dust deposition gauge	(Met One E-BAM) A portable, real-time beta gauge comparable to US EPA methods for $PM_{2.5}$ and PM_{10} particulate measurements.
Sample media	Sample bottle	Filter paper roll
Sample period	AS/NZS 3580.10.1:2016 recommends 30 $\pm$ 2 days. However due to the remoteness of the site, a 60-day sampling period was adopted for the baseline monitoring program.	Continuous
SLR standard operating procedure	QMS 9470 Procedure Deposited Matter Gravimetric Method	QMS 9470 Form 45 BAM Calibration and Check Field Sheet

a The EBAM is not fully compliant with the Australian Standard (AS), however it has been shown to be comparable with AS compliant instruments and was preferred due to its capability to run on solar power. DWER endorsed the use of this instrument during a meeting on 2 April 2019.The distance (20 km) to the nearest sensitive receptor was also considered in relation to the practicability of the monitoring equipment (refer SLR document 675.11414-R02).

4.1 Calibration and QA Procedures

The calibration and operation of all monitoring equipment was done with reference to manufacturers' recommendations and in accordance with SLR standard operating procedures and relevant Australian Standards, as summarised in Table 3.

4.2 Data Averaging

Averaging of data has been calculated in accordance with the Air NEPM Technical Paper No. 5 – Data Collection and Handling[9] (hereafter, the Air NEPM TP No.5), which states:

> An average concentration can be valid only if it is based on at least 75% of the expected samples in the averaging period. This rule applies to all averaging periods, from the hourly concentrations that make up basic air quality data to annual averages.

[9] National Environment Protection (Ambient Air Quality Measure) Technical Paper No. 5: Data Collection and Handling, Department of the Environment: National Environment Protection Council, Canberra, 2001.

4.3 Data Capture Objective

For State compliance monitoring in accordance with the Air NEPM, the Air NEPM TP No.5 states that to demonstrate compliance with criteria:

> It is essential that data loss is kept to an absolute minimum. For representative monitoring data and for credible compliance assessment it is desirable to have data capture rates higher than 95%. 75% data availability is specified as an absolute minimum requirement for data completeness.
>
> To make a valid assessment of compliance for annual reporting, annual compliance statistics must be based on hourly (daily for PM_{10}) data that are at least 75% complete in each calendar quarter (in addition to an annual data availability of at least 75% based on valid hourly (daily for PM_{10}) data).

While this baseline ambient air quality monitoring program is not subject to the requirements of the Air NEPM in the absence of further guidance these data capture criteria have been used to inform the baseline ambient air quality monitoring program data capture objectives for 24-hour average PM_{10}, being:

- Annual (including each calendar quarter): >75% data capture.

5 Meteorology

This section presents a summary of the meteorological characteristics of the project area based on long-term data from an automatic weather station (AWS) operated by the Bureau of Meteorology (BoM) at Wittenoom (Station 05026, open 1949-2019), which was located approximately 40 km southwest of the Project area (see Figure 1). Long term meteorological data is available from this station for the following parameters:

- Temperature (°C)
- Rainfall (mm)
- Relative humidity (%)
- Wind speed (m/s) and wind direction (degrees).

Additional meteorological data was obtained from BoM's Karijini North AWS (Station 05098), which replaced the Wittenoom AWS when it was closed. This station is located approximately 20 km south of the Project area (also shown in Figure 1) and has data available from June 2019.

A meteorological station is also located at the on-site camp. SLR were engaged to install a 10 m tall meteorological mast in November 2019, to which the site's existing wind sensors were fitted. Analysis of the wind direction data however indicates issues with the equipment and therefor data from this station is not presented here.

A review of the long-term data available from the Wittenoom AWS is provided in the following sections. Data available from the Karijini North AWS is also presented.

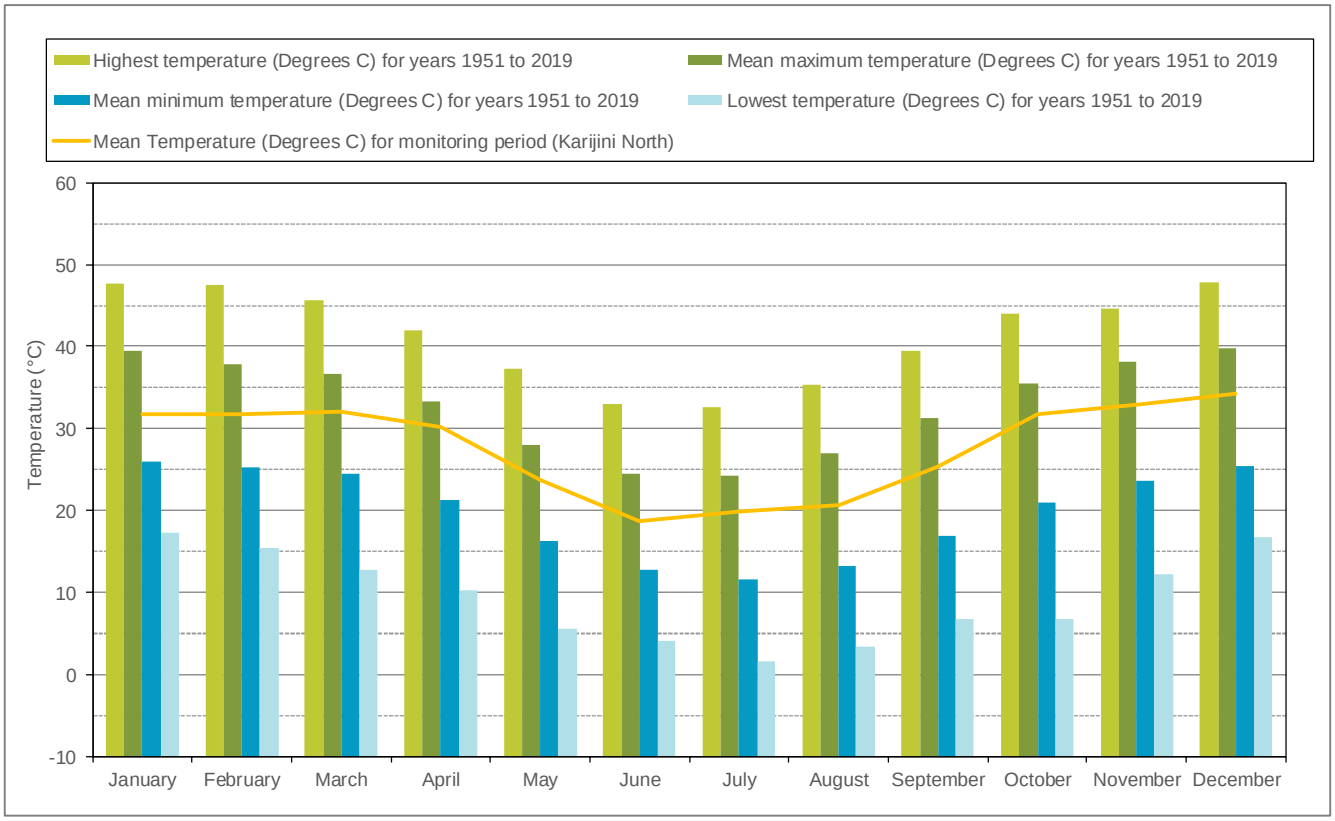
5.1 Temperature

Long-term temperature statistics from the Wittenoom AWS are summarised in Figure 2, and compared to data recorded by the Karijini North AWS during the baseline air quality monitoring period.

The long-term data shows that mean maximum temperatures range from approximately 24°C in the dry season (May to October) to 40°C in the wet season (November to April), while mean minimum temperatures range from approximately 11°C in the dry season to 26°C in the wet season. Maximum temperatures above 45°C and minimum temperatures less than 5°C have been recorded.

The plot shows that temperatures recorded in the area during the baseline ambient air quality monitoring program were within the range of the long-term averages, although they tended to the warmer end of the range for most of the year.

Figure 2 Temperature Data - Wittenoom (Long-Term) and Karijini North (Monitoring Period) AWS



5.2 Rainfall

Long-term rainfall statistics are summarised in Figure 3, and compared to data recorded by the Karijini North AWS during the baseline air quality monitoring period.

The long-term data recorded by the Wittenoom AWS show that rainfall varies significantly between the wet (November to April) and dry seasons (May to October). The highest rainfalls occur from December to March, with January recording the highest mean rainfall of 116 mm. The lowest rainfalls occur between April and November, with September recording the lowest mean rainfall of 2.9 mm. The highest monthly rainfall recorded over the time period examined was 470 mm, recorded in January 2012.

The total wet and dry season rainfalls recorded by the Karijini North AWS during the baseline air quality monitoring period are compared to the long term data from Wittenoom in Table 4. Tropical cyclone Damien occurred from 3 to 9 February 2020, however, while the monthly average rainfall for February 2020 was greater than the long-term averages for this month, the overall wet season rainfalls for the monitoring period were low compared to long term trends. Dry season rainfalls for the monitoring period were also significantly (70%) less than long term averages.

Figure 3 Long Term Rainfall Data – Wittenoom (Long-Term) and Karijini North (Monitoring Period) AWS

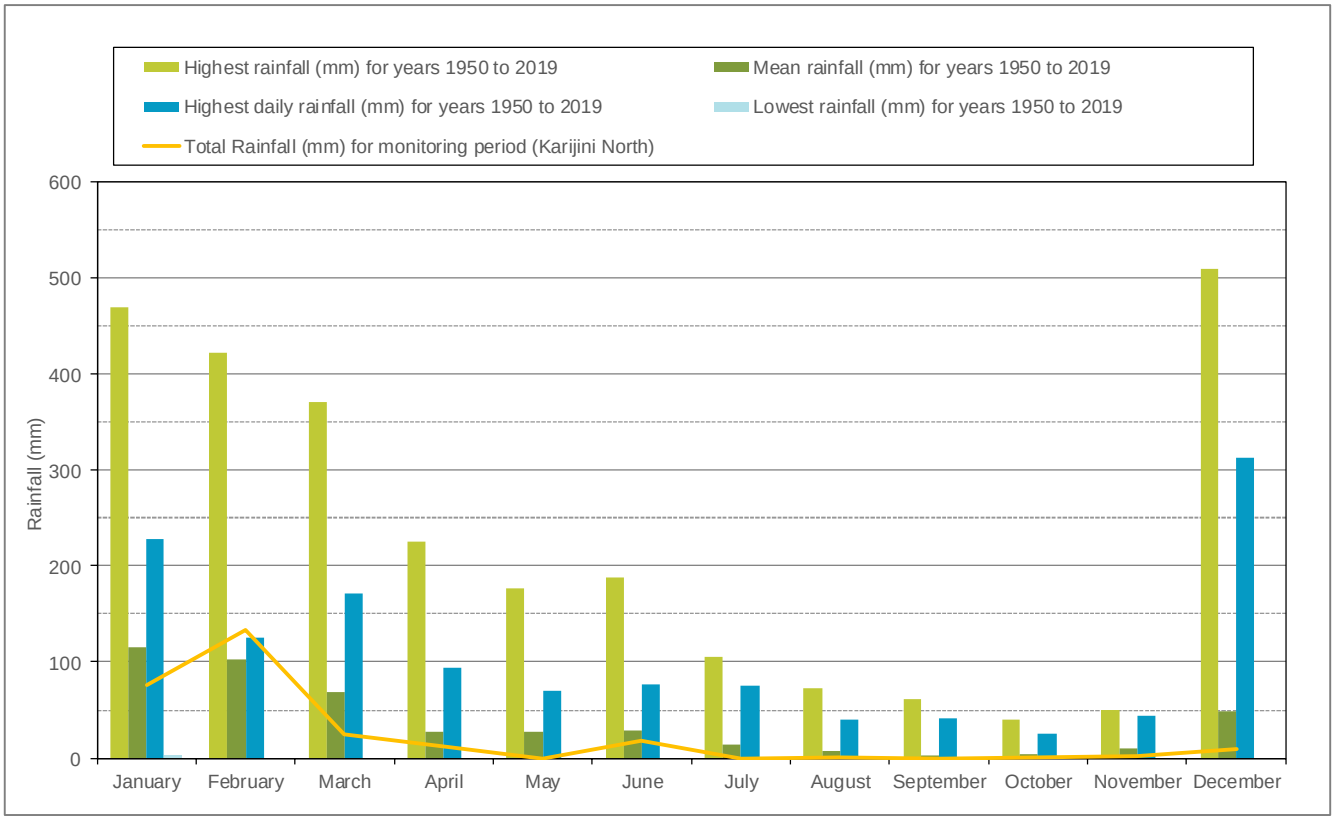


Table 4 Comparison of Wet and Dry Season Rainfall

Description	Wet Season (November - April)	Dry Season (May - October)
Long Term Average 1950 to 2019 (Wittenoom)	373 mm	84 mm
June 2019 to May 2020 (Karijini North)	257 mm	20 mm
Difference	116 mm	64 mm
Percentage Difference	-31%	-76%

5.3 Relative Humidity

Long-term humidity statistics (9:00 am and 3:00 pm monthly averages) are presented in Figure 4, and compared to data recorded by the Karijini North AWS during the baseline air quality monitoring period.

The long-term data shows that humidity levels are generally low throughout the year, as would be expected for the region. Morning humidity levels typically range from an average of around 23% late in the dry season to around 46% in the middle of the wet season. Afternoon humidity levels are lower, peaking at around 29% in the wet season and dropping to a low of 11% in the dry season.

During the monitoring period, both the 9:00 am and 3:00 pm relative humidity levels were generally lower than long term trends, reflective of the lower than average rainfalls recorded during this period (see Section 5.2). However relative humidity levels were higher or equal to long term averages for the months of January and February respectively.

Figure 4 Long Term Humidity Data - Wittenoom (Long-Term) and Karijini North (Monitoring Period) AWS

5.4 Wind

Local wind speed and direction influence the dispersion of air pollutants. Wind speed determines both the distance of downwind transport and the rate of dilution as a result of 'plume' stretching. Wind direction, and the variability in wind direction, determines the general path pollutants will follow and the extent of crosswind spreading. Surface roughness (characterised by features such as the topography of the land and the presence of buildings, structures and trees) affects the degree of mechanical turbulence, which also influences the rate of dispersion of air pollutants.

A wind rose shows the frequency of occurrence of winds by direction and strength. The bars correspond to the 16 compass points (degrees from north). The bar at the top of each wind rose diagram represents winds blowing from the north (i.e. northerly winds), and so on. The length of the bar represents the frequency of occurrence of winds from that direction, and the widths of the bar sections correspond to wind speed categories, the narrowest representing the lightest winds. Thus, it is possible to visualise how often winds of a certain direction and strength occur over the monitoring period.
Wind roses compiled from data recorded by the Karijini North AWS during the baseline air quality monitoring program are presented in Figure 5. The highest frequency of winds are those from the eastern and the south-southwestern quadrants. There is minimal change in the wind distribution between the wet and dry seasons.

Figure 5 Karijini North Wind Rose June 2019 to May 2020

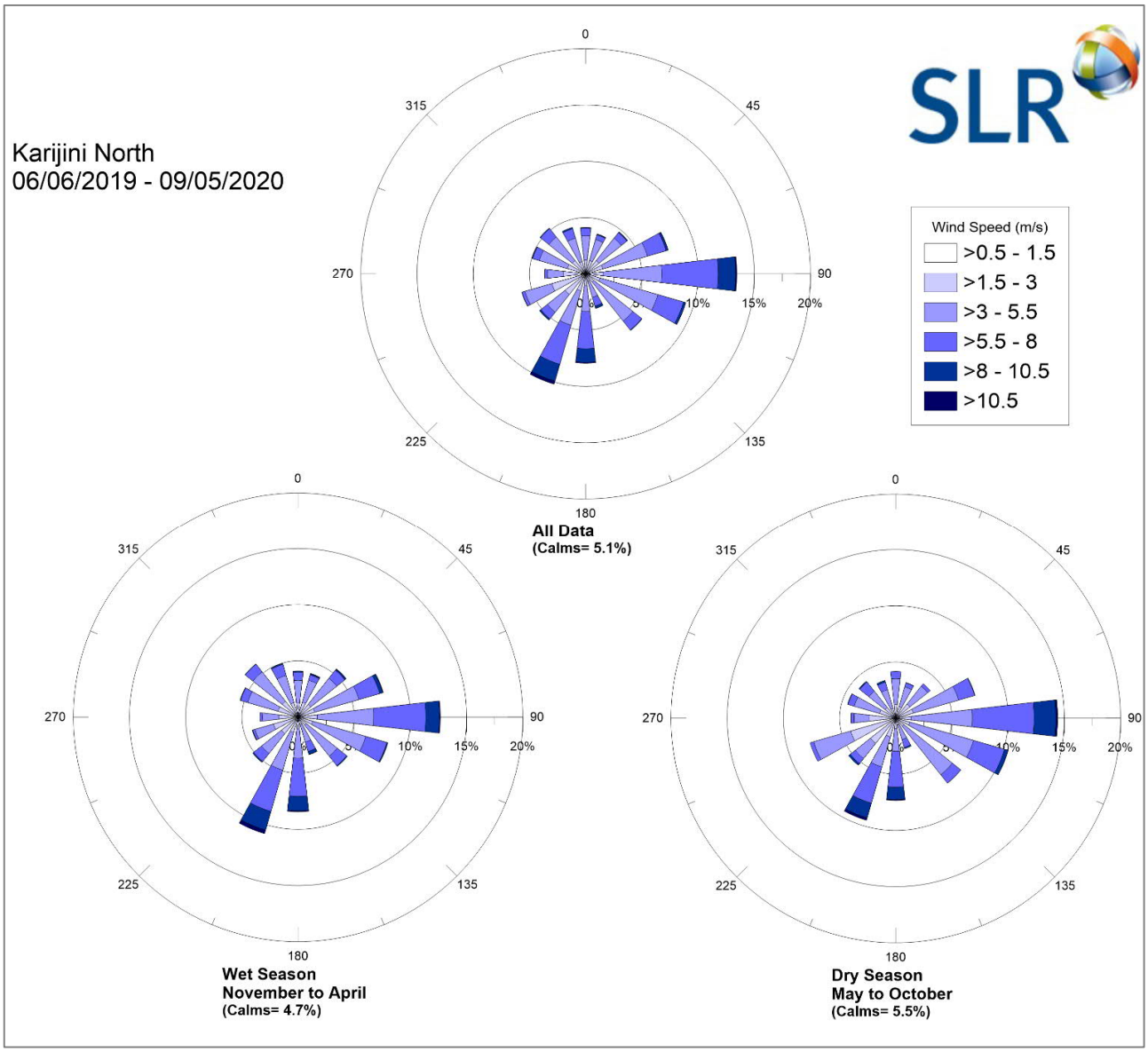
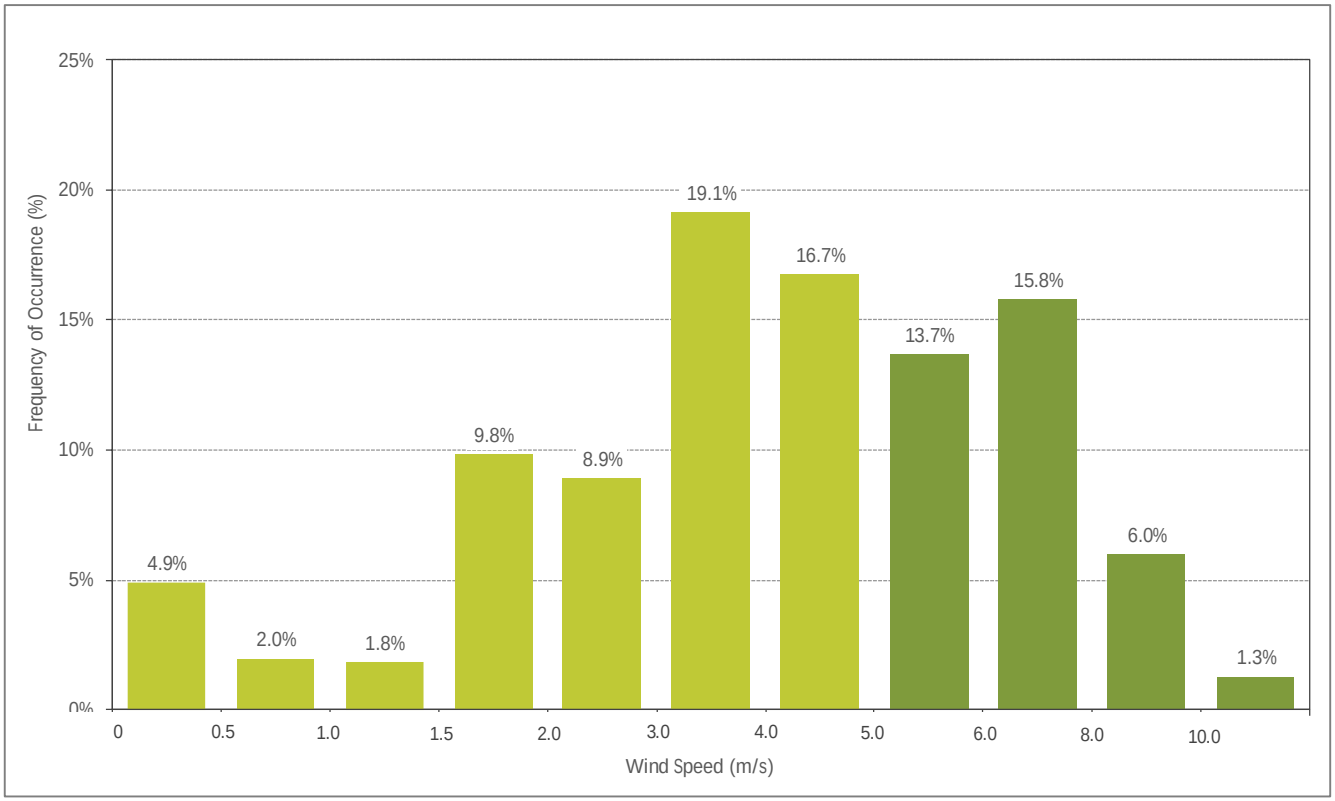


Figure 6 presents a windspeed distribution plot for the monitoring period and indicates that the wind speeds were above 5 m/s, the speed above which wind-erosion of exposed surfaces generally occurs, for approximately 37% of the time. The corresponding wet and dry season windspeed plots (not provided) indicate very similar distributions to this.

Figure 6 Karijini North Wind Speed Frequencies June 2019 to May 2020



Note: wind erosion of exposed surfaces is generally accepted to occur at windspeeds greater than 5 m/s, indicated here by the darker bars.

6 Monitoring Results

6.1 PM_{10}

Detailed PM_{10} monitoring results are provided in Appendix A and summarised below.

Table 5 provides summary statistics of the continuous PM_{10} monitoring data recorded over the period 9 May 2019 to 9 May 2020. As discussed in Section 1.2, no data is available after 9 March 2020 due to the EBAM unit being removed from site for servicing by the manufacturer to address reliability issues that occurred during January and February 2020, which also resulted in minor data losses as a result of removing the affected data (refer to data capture rates presented in Section 7.2).

The 24-hour average PM_{10} concentrations are presented as a time series plot in Figure 7. This plot illustrates the higher PM_{10} concentrations recorded during the wet season (November to April), particularly over November to January (inclusive), noting that there was significantly lower than average rainfall recorded during November and January (see Section 5.2). All concentrations recorded were below the adopted Project criterion of 70 µg/m^3 (see Section 3.1).

Table 5 Summary of PM_{10} Monitoring Data (9 May 2019 to 9 May 2020)

Monitoring Period		24-hour Average PM_{10} (µg/m^3)			Days above 70 µg/m^3 [a]
		Max	Average	70th	
2019	May	37.2	7.4	3.4	0
	June	17.6	4.6	5.1	0
	July	12.8	4.2	4.3	0
	August	13.5	6.7	7.5	0
	September	17.0	7.4	8.6	0
	October	18.3	9.6	10.5	0
	November	38.8	17.3	20.6	0
	December	62.0	20.4	22.3	0
2020	January	31.8	12.4	13.6	0
	February	23.8	12.9	14.2	0
	March	12.0 [b]	8.4 [b]	9.6	0[2]
	April	No data [b]			
	May	No data [b]			
All data [c]		62.0	10.1	11.9	0

a Adopted Project criterion of 70 µg/m^3 (24-hour average), as outlined in Section 3.1 of this report.

b Instrument flow faults occurring from January 2020 onwards, no data after 9 March 2020 when unit was removed from site.

c May 2019 to March 2020.

Figure 7 PM_{10} 24-hour Average May 2019 to May 2020

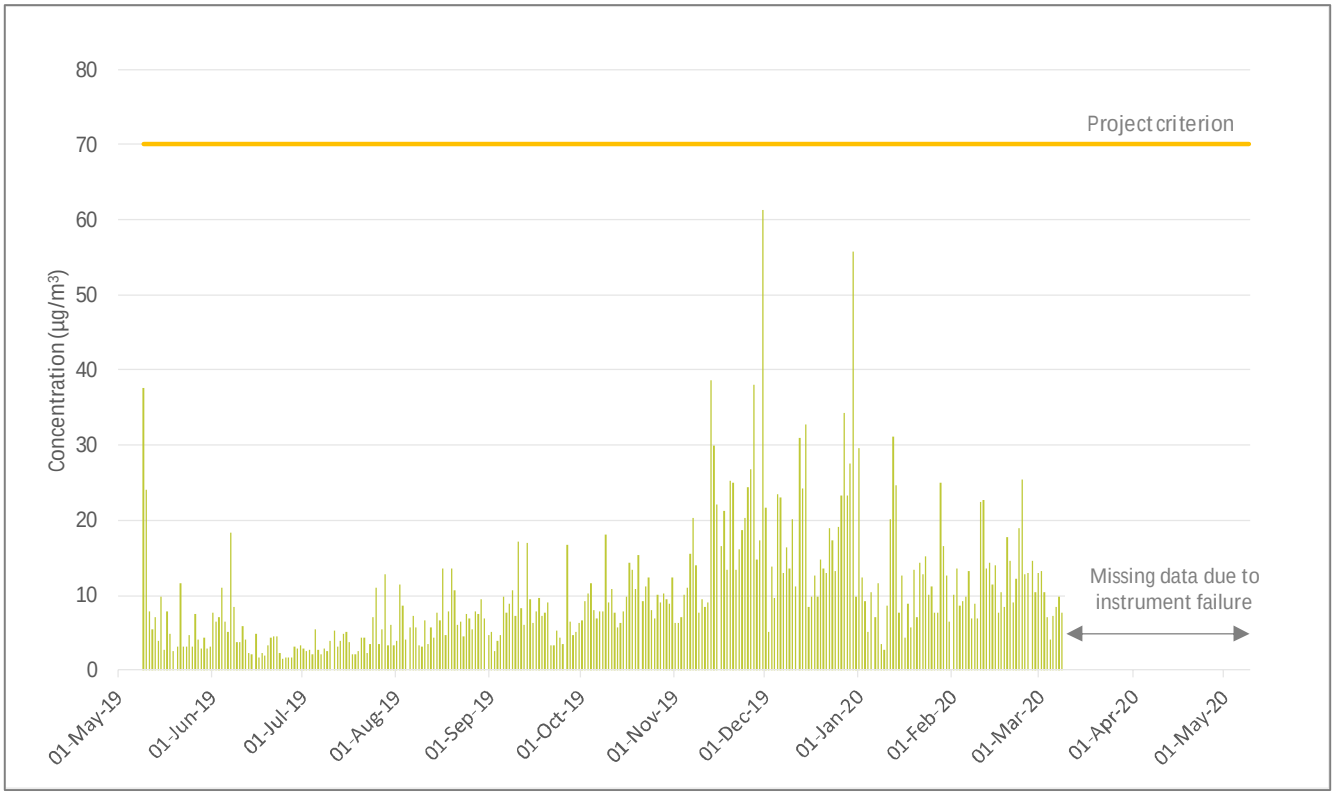
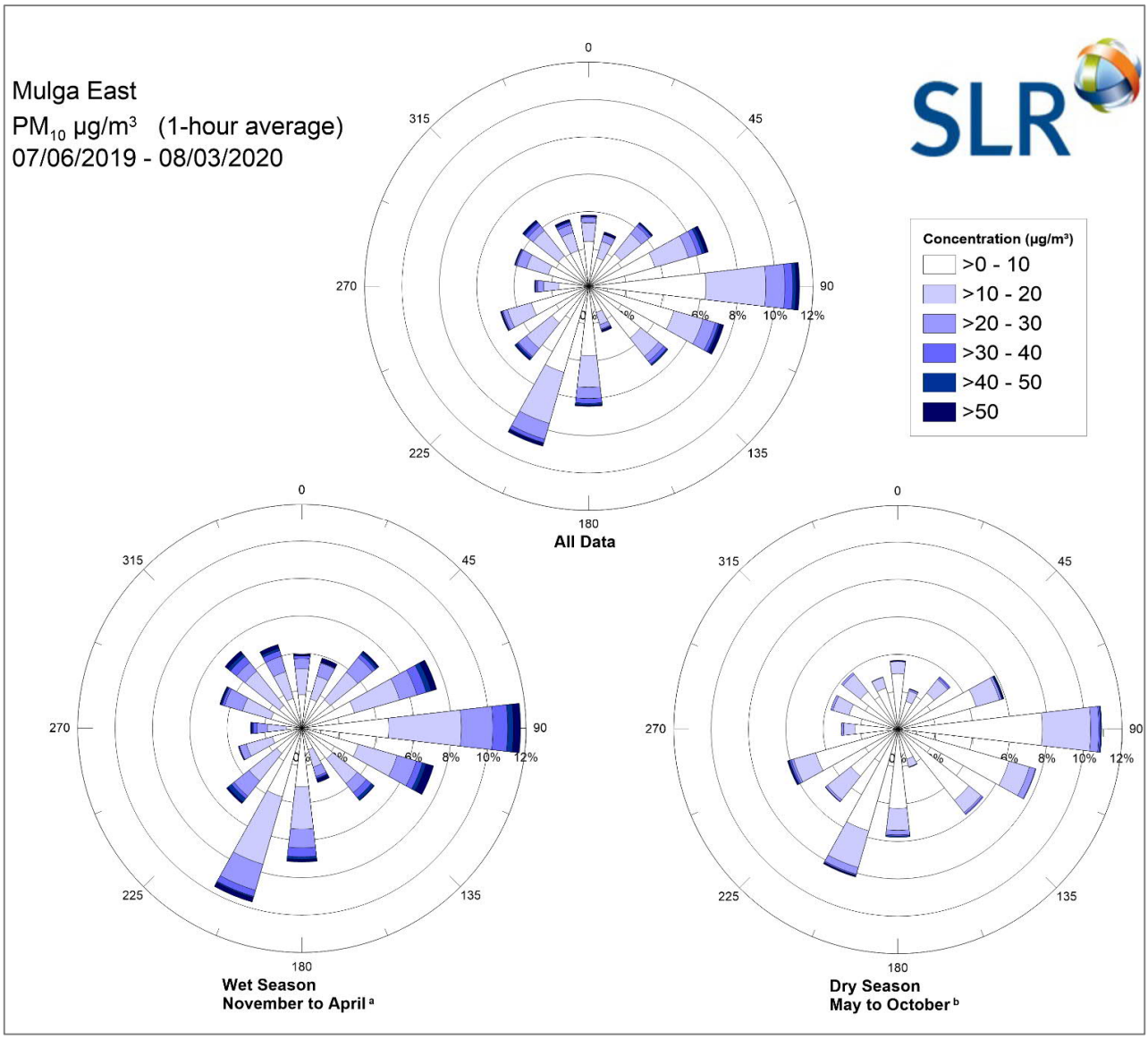


Figure 8 presents the 1-hour average PM_{10} data as pollution roses using wind speed and wind direction data from the Karijini North AWS, noting that meteorological data from Karijini North was not available prior to 7 June 2019, which limits the data presented in the pollution roses from 7 June 2019 to 9 March 2020. The pollution roses indicate that higher concentrations do not occur during particular wind directions (i.e. there is a similar concentration distribution within each petal). In particular the higher windspeeds from the eastern and southern quadrants (see Figure 5) do not result in a greater frequency of higher concentrations from these directions.

In addition to the lower than average rainfall recorded for the November 2019 to January 2020 period, the higher concentrations during this period may also be related to an increase in site activity noted to be occurring during the latter half of monitoring period.

Figure 8 Mulga East PM_{10} 1-Hour Pollution Roses - June 2019 to March 2020



a Based on available PM_{10} monitoring and meteorological data available between 1 November 2019 and 9 March 2020.

b Based on available PM_{10} monitoring and meteorological data available between 7 June 2019 and 31 October 2020.

6.2 Dust Deposition

The dust deposition monitoring results (insoluble solids) are provided in Table 6. The deposition rates recorded over each 60-day sampling period have been normalised to a monthly deposition rate (30 days) for direct comparison against the adopted Project criteria of 4 g/m^2/month (including background) and no more than 2 g/m^2/month above background).

Similar to the PM_{10} monitoring data, the measured dust deposition rates were highest during the start of the wet season, over November 2019 to January 2020. The highest average baseline dust deposition rate recorded over the three gauges of 2.1 g/m^2/month, which occurred during this period, results in the adopted Project criteria of 4 g/m^2/month including background and 2 g/m^2/month excluding background being approximately equivalent.

Table 6 Summary of Dust Deposition Results (Insoluble Solids)

Sample Date	Laboratory Reference	Unit C DDG (g/m^2/month)	Unit D DDG (g/m^2/month)	Unit E DDG (g/m^2/month)	Average (g/m^2/month)	Season
09-05-19 to 25-07-19	EN1905298	0.4	0.3	0.2	0.3	Dry
25-07-19 to 17-09-19	EN1906891	0.4	0.7	0.3	0.5	Dry
17-09-19 to 12-11-19	EN1908348	1.0	0.9	0.4	0.8	Both
12-11-19 to 15-01-20	EN2000600	2.5	2.4	1.3	2.1	Wet
15-01-20 to 13-03-20	EN2001884	1.3	0.8	1.3	1.1	Wet
Guideline [a]		4				

a Dust deposition rate is assessed as insoluble solids as defined by AS/NZS 3580.10.1:2016.

Laboratory test certificates are provided in Appendix C.

7 Data Validation and Data Capture

7.1 Data Validation

Data contained in this report has been validated against performance and calibration requirements for each monitoring method. Data has been removed from the validated dataset for periods where the instrument has not performed within specified performance limits (e.g. sample flow rate tolerance) and during periods where maintenance and calibration has been conducted. Details of calibrations records are provided in Appendix B.

7.2 Data Capture

The monthly PM_{10} data capture rates for the monitoring period are summarised in Table 7. For those periods where the PM_{10} monitor has been on site (ie prior to 9 March 2020), data capture has met the quarterly and annual objective of >75%.

Table 7 PM_{10} 24-Hour average Data Capture Rates (9 May 2019 to 9 May 2020)

Monitoring Period			Data Capture
2019	May	Q2 2019	96%
	June		100%
	July	Q3 2019	100%
	August		100%
	September		100%
	October	Q4 2019	100%
	November		100%
	December		100%
2020	January	Q1 2020	90% [a]
	February		97% [a]
	March		23% [a,b]
	April	Q2 2020	0% [b]
	May		0% [b]
12 Months			77% (91% May 2019 – February 2019 inclusive)

a Instrument flow faults occurring during January, February and March 2020.

b Instrument removed for maintenance 9 March 2020.

8 Discussion and Conclusions

The following conclusions can be made from the data presented in this report.

- No PM_{10} concentrations above the adopted 24-hour Project criterion of 70 µg/m^3 were recorded during the monitoring period, with a maximum concentration of 62 µg/m^3 measured on 1st December 2019.
- The measured dust deposition rates were highest during the start of the wet season, with an average baseline dust deposition rate recorded over the three gauges of 2.1 g/m^2/month recorded during November 2019 to January 2020. This background level would result in the adopted Project criteria of 4 g/m^2/month including background and 2 g/m^2/month excluding background being approximately equivalent.
- The pollution wind rose indicates that that high PM_{10} concentration levels under all wind directions. There was no indication of a correlation between PM_{10} concentration and windspeed or wind direction.
- Both PM_{10} concentrations and dust deposition rates were higher during the wet season than during the dry season. The higher concentrations recorded during the 2019/2020 wet season may be related to an increase in site activity noted to be occurring during the latter half of monitoring period and the low level of rainfall recorded compared to long term averages. It should also be noted that the dry season data is primarily derived from 2019 monitoring data. Dry season data for 2020 is yet to be captured and may be more representative of current site activity.
- Pump issues on the EBAM meant that only ten of twelve months of PM_{10} of data was able to be collected, however the 10 months of available data covers both wet and dry seasons and the monthly and annual data capture rates meet the capture objective of >75%.

APPENDIX A

Monitoring Results Tables

Table 8 E-BAM PM_{10} 24-hour Average Concentrations

Date	Concentration (ug/m^3)	Date	Concentration (ug/m^3)	Date	Concentration (ug/m^3)
10-May-2019	37.2	19-June-2019	1.8	29-July-2019	12.8
11-May-2019	24.0	20-June-2019	3.5	30-July-2019	3.3
12-May-2019	7.8	21-June-2019	4.5	31-July-2019	6.1
13-May-2019	5.6	22-June-2019	4.2	01-August-2019	3.3
14-May-2019	6.8	23-June-2019	4.2	02-August-2019	4.0
15-May-2019	3.9	24-June-2019	2.2	03-August-2019	11.9
16-May-2019	9.7	25-June-2019	2.0	04-August-2019	7.8
17-May-2019	3.2	26-June-2019	1.3	05-August-2019	4.5
18-May-2019	7.3	27-June-2019	2.0	06-August-2019	5.2
19-May-2019	5.3	28-June-2019	1.8	07-August-2019	7.5
20-May-2019	2.4	29-June-2019	2.7	08-August-2019	5.8
21-May-2019	3.0	30-June-2019	3.1	09-August-2019	3.1
22-May-2019	12.3	01-July-2019	3.3	10-August-2019	3.2
23-May-2019	2.5	02-July-2019	3.0	11-August-2019	6.4
24-May-2019	2.8	03-July-2019	2.0	12-August-2019	3.3
25-May-2019	4.4	04-July-2019	2.7	13-August-2019	6.0
26-May-2019	3.4	05-July-2019	2.7	14-August-2019	4.3
27-May-2019	7.5	06-July-2019	5.2	15-August-2019	8.3
28-May-2019	3.4	07-July-2019	2.9	16-August-2019	6.1
29-May-2019	3.2	08-July-2019	1.8	17-August-2019	13.4
30-May-2019	4.5	09-July-2019	2.9	18-August-2019	4.7
31-May-2019	3.0	10-July-2019	2.7	19-August-2019	8.3
01-June-2019	2.9	11-July-2019	3.5	20-August-2019	13.5
02-June-2019	7.8	12-July-2019	5.6	21-August-2019	10.5
03-June-2019	6.3	13-July-2019	3.0	22-August-2019	5.8
04-June-2019	8.1	14-July-2019	3.8	23-August-2019	6.0
05-June-2019	10.3	15-July-2019	5.1	24-August-2019	5.2
06-June-2019	6.3	16-July-2019	5.2	25-August-2019	7.5
07-June-2019	5.4	17-July-2019	3.5	26-August-2019	6.8
08-June-2019	17.6	18-July-2019	2.0	27-August-2019	5.1
09-June-2019	8.5	19-July-2019	2.5	28-August-2019	7.9
10-June-2019	3.4	20-July-2019	2.4	29-August-2019	7.5
11-June-2019	4.2	21-July-2019	4.3	30-August-2019	9.7
12-June-2019	5.3	22-July-2019	4.3	31-August-2019	6.6
13-June-2019	4.1	23-July-2019	2.4	01-September-2019	4.5
14-June-2019	2.4	24-July-2019	3.3	02-September-2019	5.0
15-June-2019	2.2	25-July-2019	7.5	03-September-2019	2.5
16-June-2019	5.0	26-July-2019	11.5	04-September-2019	4.1
17-June-2019	1.8	27-July-2019	3.3	05-September-2019	5.3
18-June-2019	2.0	28-July-2019	5.8	06-September-2019	9.3

Table 8 E-BAM PM_{10} 24-hour Average Concentrations continued...

Date	Concentration (ug/m^3)	Date	Concentration (ug/m^3)	Date	Concentration (ug/m^3)
07-September-2019	8.0	17-October-2019	9.3	26-November-2019	24.5
08-September-2019	9.6	18-October-2019	14.4	27-November-2019	27.9
09-September-2019	9.2	19-October-2019	13.6	28-November-2019	36.3
10-September-2019	7.8	20-October-2019	10.5	29-November-2019	14.9
11-September-2019	16.8	21-October-2019	15.3	30-November-2019	17.5
12-September-2019	8.4	22-October-2019	9.3	01-December-2019	62.0
13-September-2019	5.9	23-October-2019	11.5	02-December-2019	20.1
14-September-2019	17.0	24-October-2019	12.3	03-December-2019	5.1
15-September-2019	9.5	25-October-2019	8.3	04-December-2019	14.4
16-September-2019	6.1	26-October-2019	6.4	05-December-2019	9.4
17-September-2019	8.0	27-October-2019	10.5	06-December-2019	23.5
18-September-2019	9.3	28-October-2019	8.9	07-December-2019	23.2
19-September-2019	7.6	29-October-2019	10.4	08-December-2019	13.3
20-September-2019	7.5	30-October-2019	8.8	09-December-2019	16.1
21-September-2019	9.2	31-October-2019	8.7	10-December-2019	13.6
22-September-2019	3.7	01-November-2019	12.7	11-December-2019	19.5
23-September-2019	2.9	02-November-2019	5.9	12-December-2019	11.2
24-September-2019	5.5	03-November-2019	6.4	13-December-2019	31.9
25-September-2019	4.0	04-November-2019	7.0	14-December-2019	25.2
26-September-2019	4.0	05-November-2019	10.6	15-December-2019	30.2
27-September-2019	16.3	06-November-2019	10.6	16-December-2019	9.1
28-September-2019	6.3	07-November-2019	16.2	17-December-2019	10.2
29-September-2019	4.9	08-November-2019	20.0	18-December-2019	11.9
30-September-2019	4.9	09-November-2019	13.2	19-December-2019	10.1
01-October-2019	6.5	10-November-2019	7.5	20-December-2019	15.0
02-October-2019	6.9	11-November-2019	10.1	21-December-2019	13.4
03-October-2019	9.3	12-November-2019	7.9	22-December-2019	12.9
04-October-2019	9.9	13-November-2019	9.9	23-December-2019	19.4
05-October-2019	11.7	14-November-2019	38.8	24-December-2019	16.9
06-October-2019	8.0	15-November-2019	30.3	25-December-2019	13.5
07-October-2019	6.5	16-November-2019	21.8	26-December-2019	20.3
08-October-2019	8.1	17-November-2019	16.7	27-December-2019	22.1
09-October-2019	7.9	18-November-2019	20.9	28-December-2019	34.4
10-October-2019	18.3	19-November-2019	13.3	29-December-2019	22.3
11-October-2019	8.9	20-November-2019	25.5	30-December-2019	29.0
12-October-2019	10.8	21-November-2019	25.0	31-December-2019	54.0
13-October-2019	7.9	22-November-2019	13.4	01-January-2020	12.8
14-October-2019	5.5	23-November-2019	15.8	02-January-2020	27.0
15-October-2019	6.0	24-November-2019	18.8	03-January-2020	13.8
16-October-2019	8.4	25-November-2019	20.5	04-January-2020	8.4

Table 8 E-BAM PM_{10} 24-hour Average Concentrations continued...

Date	Concentration (ug/m^3)	Date	Concentration (ug/m^3)	Date	Concentration (ug/m^3)
05-January-2020	7.8	14-February-2020	14.8		
06-January-2020	7.5	15-February-2020	10.8		
07-January-2020	6.8	16-February-2020	14.2		
08-January-2020	12.0	17-February-2020	7.8		
09-January-2020	7.5	18-February-2020	10.3		
10-January-2020	-	19-February-2020	8.5		
11-January-2020	-	20-February-2020	17.9		
12-January-2020	20.4	21-February-2020	14.5		
13-January-2020	31.8	22-February-2020	9.3		
14-January-2020	8.0	23-February-2020	13.4		
15-January-2020	-	24-February-2020	18.8		
16-January-2020	11.8	25-February-2020	23.8		
17-January-2020	3.7	26-February-2020	13.0		
18-January-2020	8.5	27-February-2020	12.8		
19-January-2020	5.7	28-February-2020	14.4		
20-January-2020	13.7	29-February-2020	10.9		
21-January-2020	6.8	01-March-2020	12.0		
22-January-2020	15.8	02-March-2020	10.6		
23-January-2020	12.0	03-March-2020	-		
24-January-2020	15.3	04-March-2020	6.7		
25-January-2020	10.8	05-March-2020	5.0		
26-January-2020	10.4	06-March-2020	7.3		
27-January-2020	6.9	07-March-2020	8.1		
28-January-2020	8.2	08-March-2020	9.3		
29-January-2020	24.7				
30-January-2020	17.1				
31-January-2020	11.8				
01-February-2020	6.7				
02-February-2020	10.0				
03-February-2020	13.8				
04-February-2020	8.1				
05-February-2020	8.6				
06-February-2020	10.1				
07-February-2020	13.4				
08-February-2020	7.3				
09-February-2020	8.5				
10-February-2020	22.9				
11-February-2020	-				
12-February-2020	21.3				
13-February-2020	14.0				

APPENDIX B

EBAM Calibration and Maintenance Records

EBAM Calibration Records: 8 May 2019 – Michael Brecko & Danny Echeverri

Calibration/Checks Performed	Frequency	Criteria	Units	Result	Pass	Adjusted
Leak Check	Quarterly	< 0.60	L/min	0.2	Yes	NA
Temperature Sensor Check	Annual	±1 between EBAM and reference	ºC	0.2	Yes	NA
Pressure Sensor Check	Annual	±2 between EBAM and reference	kPa	0.4	Yes	NA
Volumetric Air Flow	Quarterly	16.7 L/min: 6% between EBAM and reference	%	0	Yes	NA
	Annual	High Set Point (16.5≤17.5≤18.5)	L/min	17.7	Yes	NA
		Low Set Point (13.2≤14.0≤14.8)	L/min	13.9	Yes	NA
		Current Set Point (15.7≤16.7≤17.7)	L/min	16.6	Yes	NA
Operating Precision Checks (Span Membrane Test)	Quarterly	-5% KO≤SF≤+5% KO (SF=0.965)	mg	0.943	Yes	NA
Operating Precision Checks (Zero Membrane Test)	Annual	-5% KO≤ZF≤+5% KO (ZF=0.350)	mg	0.358	Yes	NA
Zero Check	Annual	Sampling period >16	Hours	18.5	Yes	NA
		Average concentration over period (once stabilized) <2	µg/m^3	-0.9	Yes	NA
Vacuum Pump Check	Annual	Flow during test: 14.0 - 15.0	L/min	14.7	Yes	NA
		Vacuum during pump test @14.7 L/min Good: ≤ 417.1 Marginal: 417.1 – 441.3 Poor: ≥ 441.3	mmHg	370.6	Yes (good)	NA

EBAM Calibration Records: 25 July 2019 - Danny Echeverri

Calibration/Checks Performed	Frequency	Criteria	Units	Result	Pass	Adjusted
Leak Check	Quarterly	< 0.60	L/min	0.0	Yes	NA
Temperature Sensor Check	Annual	±1 between EBAM & Reference	ºC	1	Yes	NA
Pressure Sensor Check	Annual	±2 between EBAM & Reference	kPa	0.1	Yes	NA
Volumetric Air Flow	Quarterly	16.7 L/min: 6% between EBAM and reference	%	7.6	No	16.7
	Annual	High Set Point (16.5≤17.5≤18.5)	L/min	18.6	No	17.5
		Low Set Point (13.2≤14.0≤14.8)	L/min	15.1	No	14.0
		Current Set Point (15.7≤16.7≤17.7)	L/min	16.7	No	16.7
Operating Precision Checks (Span Membrane Test)	Quarterly	-5% KO≤SF≤+5% KO (SF=0.965)	mg	NA	NA	NA
Operating Precision Checks (Zero Membrane Test)	Annual	-5% KO≤ZF≤+5% KO (ZF=0.350)	mg	NA	NA	NA
Zero Check	Annual	Sampling period >16	Hours	NA	NA	NA
		Average concentration over period (once stabilized) <2	µg/m^3	NA	NA	NA
Vacuum Pump Check	Annual	Flow during test: 14.0 - 15.0	L/min	NA	NA	NA
		Vacuum during pump test Good: Marginal: Poor:	mmHg	NA	NA	NA

EBAM Calibration Records: 18 September 2019 - Danny Echeverri

Calibration/Checks Performed	Frequency	Criteria	Units	Result	Pass	Adjusted
Leak Check	Quarterly	< 0.60	L/min	0.5	Yes	NA
Temperature Sensor Check	Annual	±1 between EBAM & Reference	ºC	0.4	Yes	NA
Pressure Sensor Check	Annual	±2 between EBAM & Reference	kPa	0.3	Yes	NA
Volumetric Air Flow	Quarterly	16.7 L/min: 6% between EBAM and reference	%	3	Yes	NA
	Annual	High Set Point (16.5≤17.5≤18.5)	L/min	17.5	Yes	NA
		Low Set Point (13.2≤14.0≤14.8)	L/min	15.0	No	14.0
		Current Set Point (15.7≤16.7≤17.7)	L/min	16.5	Yes	NA
Operating Precision Checks (Span Membrane Test)	Quarterly	-5% KO≤SF≤+5% KO (SF=0.880)	mg	0.911	Passed	NA
Operating Precision Checks (Zero Membrane Test)	Annual	-5% KO≤ZF≤+5% KO (ZF=0.350)	mg	0.382	No	Adjusted
Zero Check	Annual	Sampling period >16	Hours	NA	NA	NA
		Average concentration over period (once stabilized) <2	µg/m^3	NA	NA	NA
Vacuum Pump Check	Annual	Flow during test: 14.0 - 15.0	L/min	14.5	Yes	NA
		Vacuum during pump test @14.5 L/min Good: ≤ 414.5 Marginal: 414.5 – 438.4 Poor: ≥ 438.4	mmHg	398.5	Yes (good)	NA

EBAM Calibration Records: 12 November 2019 - Danny Echeverri

Calibration/Checks Performed	Frequency	Criteria	Units	Result	Pass	Adjusted
Leak Check	Quarterly	< 0.60	L/min	0.2	Yes	NA
Temperature Sensor Check	Annual	±1 between EBAM & Reference	ºC	0.2	Yes	NA
Pressure Sensor Check	Annual	±2 between EBAM & Reference	kPa	0.5	Yes	NA
Volumetric Air Flow	Quarterly	16.7 L/min: 6% between EBAM and reference	%	0	Yes	NA
	Annual	High Set Point (16.5≤17.5≤18.5)	L/min	17.0	Yes	NA
		Low Set Point (13.2≤14.0≤14.8)	L/min	14.0	Yes	NA
		Current Set Point (15.7≤16.7≤17.7)	L/min	16.7	Yes	NA
Operating Precision Checks (Span Membrane Test)	Quarterly	-5% KO≤SF≤+5% KO (SF=0.880)	mg	0.893	Yes	NA
Operating Precision Checks (Zero Membrane Test)	Annual	-5% KO≤ZF≤+5% KO (ZF=0.350)	mg	0.338	Yes	NA
Zero Check	Annual	Sampling period >16	Hours	NA	NA	NA
		Average concentration over period (once stabilized) <2	µg/m^3	NA	NA	NA
Vacuum Pump Check	Annual	Flow during test: 14.0 - 15.0	L/min	14.4	Yes	NA
		Vacuum during pump test @14.4 L/min Good: ≤ 412.3 Marginal: 412.3 – 436.1 Poor: ≥ 436.1	mmHg	412.8	Yes (good)	NA

EBAM Calibration Records: 15 January 2020 - Danny Echeverri

Calibration/Checks Performed	Frequency	Criteria	Units	Result	Pass	Adjusted
Leak Check	Quarterly	< 0.60	L/min	0.4	Yes	NA
Temperature Sensor Check	Annual	±1 between EBAM & Reference	ºC	0.2	Yes	NA
Pressure Sensor Check	Annual	±2 between EBAM & Reference	kPa	0	Yes	NA
Volumetric Air Flow	Quarterly	16.7 L/min: 6% between EBAM and reference	%	0	Yes	NA
	Annual	High Set Point (16.5≤17.5≤18.5)	L/min	17.4	Yes	NA
		Low Set Point (13.2≤14.0≤14.8)	L/min	14.1	Yes	NA
		Current Set Point (15.7≤16.7≤17.7)	L/min	16.7	Yes	NA
Operating Precision Checks (Span Membrane Test)	Quarterly	-5% KO≤SF≤+5% KO (SF=0.880)	mg	0.901	Yes	NA
Operating Precision Checks (Zero Membrane Test)	Annual	-5% KO≤ZF≤+5% KO (ZF=0.350)	mg	0.321	No	Adjusted
Zero Check	Annual	Sampling period >16	Hours	NA	NA	NA
		Average concentration over period (once stabilized) <2	µg/m^3	NA	NA	NA
Vacuum Pump Check	Annual	Flow during test: 14.0 - 15.0	L/min	14.8	Yes	NA
		Vacuum during pump test @14.8 L/min Good: ≤ 419.3 Marginal: 419.3 – 443.5 Poor: ≥ 443.5	mmHg	417.8	Yes (good)	NA

EBAM Calibration Records: 3 Mar 2020 - Danny Echeverri

Calibration/Checks Performed	Frequency	Criteria	Units	Result	Pass	Adjusted
Leak Check	Quarterly	< 0.60	L/min	NA	NA	NA
Temperature Sensor Check	Annual	±1 between EBAM & Reference	ºC	NA	NA	NA
Pressure Sensor Check	Annual	±2 between EBAM & Reference	kPa	NA	NA	NA
Volumetric Air Flow	Quarterly	16.7 L/min: 6% between EBAM and reference	%	NA	NA	NA
	Annual	High Set Point (16.5≤17.5≤18.5)	L/min	NA	NA	NA
		Low Set Point (13.2≤14.0≤14.8)	L/min	NA	NA	NA
		Current Set Point (15.7≤16.7≤17.7)	L/min	NA	NA	NA
Operating Precision Checks (Span Membrane Test)	Quarterly	-5% KO≤SF≤+5% KO (SF=0.880)	mg	NA	NA	NA
Operating Precision Checks (Zero Membrane Test)	Annual	-5% KO≤ZF≤+5% KO (ZF=0.350)	mg	NA	NA	NA
Zero Check	Annual	Sampling period >16	Hours	NA	NA	NA
		Average concentration over period (once stabilized) <2	µg/m^3	NA	NA	NA
Vacuum Pump Check	Annual	Flow during test: 14.0 - 15.0	L/min	NA	NA	NA
		Vacuum during pump test @14.7 L/min Good: ≤ 417.1 Marginal: 417.1 – 441.3 Poor: ≥ 441.3	mmHg	NA	NA	NA

Note: Monitor in alarm with flow fault. Calibrations could not be conducted. Monitor removed from site for maintenance.

APPENDIX C

Certificates of Analysis

- EN1905298
- EN1906891
- EN1908348
- EN2000600
- EN2001884

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN1905298**	Page	: 1 of 2
Client	: **SLR Consulting Australia Pty Ltd**	Laboratory	: Environmental Division Newcastle
Contact	: Danny Echeverri	Contact	: Tyler Cachia
Address	: PO BOX 176 2/2 LINCOLN ST LANECOVE NSW, AUSTRALIA 1595	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
Telephone	: ----	Telephone	: +61 2 8784 8555
Project	: 675.11414.00000	Date Samples Received	: 31-Jul-2019 17:00
Order number	: 26675	Date Analysis Commenced	: 01-Aug-2019
C-O-C number	: ----	Issue Date	: 06-Aug-2019 18:10
Sampler	: Danny Echeverri		
Site	: ----		
Quote number	: EN/032/18 Primary work only BQ		
No. of samples received	: 3		
No. of samples analysed	: 3		

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.

Signatories	*Position*	*Accreditation Category*
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW

General Comments

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

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

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

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

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

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

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
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ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m².mth as sampling data was provided by the client.
- Sample exposure period is 77 days which is outside the typical exposure period of 30 +/- 2 days as per AS3580.10.1.

Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST** (Matrix: **AIR**)				Client sample ID	**Unit C DDG - 8762 09/05/19 - 25/07/19**	**Unit D DDG - 8763 09/05/19 - 25/07/19**	**Unit E DDG - 8764 09/05/19 - 25/07/19**	**----**	**----**
				Client sampling date / time	25-Jul-2019 00:00	25-Jul-2019 00:00	25-Jul-2019 00:00	----	----
Compound	CAS Number	LOR	Unit		**EN1905298-001**	**EN1905298-002**	**EN1905298-003**	**--------**	**--------**
					Result	Result	Result	----	----
EA120: Ash Content									
Ash Content	----	0.1	g/m².month		**0.2**	**0.3**	**0.2**	**----**	**----**
Ash Content (mg)	----	1	mg		**11**	**13**	**9**	**----**	**----**
EA125: Combustible Matter									
Combustible Matter	----	0.1	g/m².month		**0.2**	<0.1	<0.1	**----**	**----**
Combustible Matter (mg)	----	1	mg		**5**	**1**	<1	**----**	**----**
EA139: Total Soluble Matter									
Total Soluble Matter	----	0.1	g/m².month		**0.1**	**0.2**	**0.1**	**----**	**----**
Total Soluble Matter (mg)	----	1	mg		**6**	**10**	**4**	**----**	**----**
EA141: Total Insoluble Matter									
Total Insoluble Matter	----	0.1	g/m².month		**0.4**	**0.3**	**0.2**	**----**	**----**
Total Insoluble Matter (mg)	----	1	mg		**16**	**14**	**9**	**----**	**----**
EA142: Total Solids									
Total Solids	----	0.1	g/m².month		**0.5**	**0.5**	**0.3**	**----**	**----**
Total Solids (mg)	----	1	mg		**22**	**24**	**13**	**----**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN1906891**	Page	: 1 of 2
Client	: **SLR Consulting Australia Pty Ltd**	Laboratory	: Environmental Division Newcastle
Contact	: Danny Echeverri	Contact	: Tyler Cachia
Address	: PO BOX 176 2/2 LINCOLN ST LANECOVE NSW, AUSTRALIA 1595	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
Telephone	: ----	Telephone	: +61 2 8784 8555
Project	: Confidential 675.11414.00000	Date Samples Received	: 01-Oct-2019 17:00
Order number	: 27018	Date Analysis Commenced	: 03-Oct-2019
C-O-C number	: ----	Issue Date	: 09-Oct-2019 19:09
Sampler	: ----		
Site	: ----		
Quote number	: EN/032/18 Primary work only BQ		
No. of samples received	: 3		
No. of samples analysed	: 3		

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Accreditation No. 825
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- Analytical Results

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Signatories

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

Signatories	*Position*	*Accreditation Category*
Dianne Blane	Laboratory Coordinator (2IC)	Newcastle - Inorganics, Mayfield West, NSW

General Comments

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

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

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

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

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

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

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~ = Indicates an estimated value.

- Analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m².mth as sampling data was provided by the client.
- Sample exposure period is 54 days which is outside the typical exposure period of 30 +/- 2 days as per AS3580.10.1.

Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST** (Matrix: **AIR**)				Client sample ID	**Unit C DDG - 9029 25/07/19 - 17/09/19**	**Unit D DDG - 9030 25/07/19 - 17/09/19**	**Unit E DDG - 9031 25/07/19 - 17/09/19**	**----**	**----**
				Client sampling date / time	17-Sep-2019 14:30	17-Sep-2019 13:55	17-Sep-2019 15:15	----	----
Compound	CAS Number	LOR	Unit		**EN1906891-001**	**EN1906891-002**	**EN1906891-003**	**--------**	**--------**
					Result	Result	Result	----	----
EA120: Ash Content									
Ash Content	----	0.1	g/m².month		**0.3**	**0.4**	**0.2**	**----**	**----**
Ash Content (mg)	----	1	mg		**10**	**13**	**6**	**----**	**----**
EA125: Combustible Matter									
Combustible Matter	----	0.1	g/m².month		**0.1**	**0.3**	**0.1**	**----**	**----**
Combustible Matter (mg)	----	1	mg		**2**	**10**	**2**	**----**	**----**
EA139: Total Soluble Matter									
Total Soluble Matter	----	0.1	g/m².month		**0.2**	**0.5**	**0.1**	**----**	**----**
Total Soluble Matter (mg)	----	1	mg		**5**	**16**	**3**	**----**	**----**
EA141: Total Insoluble Matter									
Total Insoluble Matter	----	0.1	g/m².month		**0.4**	**0.7**	**0.3**	**----**	**----**
Total Insoluble Matter (mg)	----	1	mg		**12**	**23**	**8**	**----**	**----**
EA142: Total Solids									
Total Solids	----	0.1	g/m².month		**0.6**	**1.2**	**0.4**	**----**	**----**
Total Solids (mg)	----	1	mg		**17**	**39**	**11**	**----**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN1908348**	Page	: 1 of 2
Client	: **SLR Consulting Australia Pty Ltd**	Laboratory	: Environmental Division Newcastle
Contact	: Danny Echeverri	Contact	: Tyler Cachia
Address	: PO BOX 176 2/2 LINCOLN ST LANECOVE NSW, AUSTRALIA 1595	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
Telephone	: ----	Telephone	: +61 2 8784 8555
Project	: Confidential 675.11414.00000	Date Samples Received	: 25-Nov-2019 17:00
Order number	: 27271	Date Analysis Commenced	: 26-Nov-2019
C-O-C number	: QMS 9470	Issue Date	: 04-Dec-2019 10:46
Sampler	: ----		
Site	: ----		
Quote number	: EN/032/18 Primary work only BQ		
No. of samples received	: 3		
No. of samples analysed	: 3		

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- Analytical Results

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Signatories

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

Signatories	*Position*	*Accreditation Category*
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
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~ = Indicates an estimated value.

- Analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m².mth as sampling data was provided by the client.
- Sample exposure period is 56 days which is outside the typical exposure period of 30 +/- 2 days as per AS3580.10.1.
- No copper sulfate correction was applied to sample #1.

Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST** (Matrix: **AIR**)				Client sample ID	**Unit C DDG - 9181 17/09/2019-12/11/2019**	**Unit D DDG - 9182 17/09/2019-12/11/2019**	**Unit E DDG - 9183 17/09/2019-12/11/2019**	**----**	**----**
				Client sampling date / time	12-Nov-2019 14:40	12-Nov-2019 15:30	12-Nov-2019 12:00	----	----
Compound	*CAS Number*	*LOR*	*Unit*		**EN1908348-001**	**EN1908348-002**	**EN1908348-003**	**--------**	**--------**
					Result	Result	Result	----	----
EA120: Ash Content									
Ash Content	----	0.1	g/m².month		**0.8**	**0.7**	**0.4**	**----**	**----**
Ash Content (mg)	----	1	mg		**27**	**24**	**12**	**----**	**----**
EA125: Combustible Matter									
Combustible Matter	----	0.1	g/m².month		**0.2**	**0.2**	<0.1	**----**	**----**
Combustible Matter (mg)	----	1	mg		**5**	**6**	**1**	**----**	**----**
EA139: Total Soluble Matter									
Total Soluble Matter	----	0.1	g/m².month		**0.9**	**0.5**	**0.5**	**----**	**----**
Total Soluble Matter (mg)	----	1	mg		**30**	**15**	**16**	**----**	**----**
EA141: Total Insoluble Matter									
Total Insoluble Matter	----	0.1	g/m².month		**1.0**	**0.9**	**0.4**	**----**	**----**
Total Insoluble Matter (mg)	----	1	mg		**32**	**30**	**13**	**----**	**----**
EA142: Total Solids									
Total Solids	----	0.1	g/m².month		**1.9**	**1.4**	**0.9**	**----**	**----**
Total Solids (mg)	----	1	mg		**62**	**45**	**29**	**----**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN2000600**	Page	: 1 of 2
Client	: **SLR Consulting Australia Pty Ltd**	Laboratory	: Environmental Division Newcastle
Contact	: Danny Echeverri	Contact	:
Address	: PO BOX 176 2/2 LINCOLN ST LANECOVE NSW, AUSTRALIA 1595	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
Telephone	: ----	Telephone	: +61 2 4014 2500
Project	: Confidential 675.11414.00000	Date Samples Received	: 30-Jan-2020 17:00
Order number	: 27520	Date Analysis Commenced	: 03-Feb-2020
C-O-C number	: ----	Issue Date	: 05-Feb-2020 13:52
Sampler	: ----		
Site	: ----		
Quote number	: EN/032/18 Primary work only BQ		
No. of samples received	: 3		
No. of samples analysed	: 3		

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ISO/IEC 17025 - Testing

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Signatories

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Signatories	*Position*	*Accreditation Category*
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.

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~ = Indicates an estimated value.

- Analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m².mth as sampling data was provided by the client.
- Sample exposure period is 64 days which is outside the typical exposure period of 30 +/- 2 days as per AS3580.10.1.
- No copper sulfate correction was applied to samples.

Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST** (Matrix: **AIR**)			*Client sample ID*	**Unit C DDG - 9355 12/11/19 - 15/01/20**	**Unit D DDG - 9356 12/11/19 - 15/01/20**	**Unit E DDG - 9357 12/11/19 - 15/01/20**	**----**	**----**
			Client sampling date / time	15-Jan-2020 00:00	15-Jan-2020 00:00	15-Jan-2020 00:00	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EN2000600-001**	**EN2000600-002**	**EN2000600-003**	**--------**	**--------**
				Result	Result	Result	----	----
EA120: Ash Content								
Ash Content	----	0.1	g/m².month	**2.2**	**2.1**	**1.1**	**----**	**----**
Ash Content (mg)	----	1	mg	**84**	**81**	**40**	**----**	**----**
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m².month	**0.3**	**0.3**	**0.2**	**----**	**----**
Combustible Matter (mg)	----	1	mg	**10**	**8**	**9**	**----**	**----**
EA139: Total Soluble Matter								
Total Soluble Matter	----	0.1	g/m².month	**1.9**	**0.1**	**1.4**	**----**	**----**
Total Soluble Matter (mg)	----	1	mg	**70**	**3**	**53**	**----**	**----**
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m².month	**2.5**	**2.4**	**1.3**	**----**	**----**
Total Insoluble Matter (mg)	----	1	mg	**94**	**89**	**49**	**----**	**----**
EA142: Total Solids								
Total Solids	----	0.1	g/m².month	**4.4**	**2.5**	**2.7**	**----**	**----**
Total Solids (mg)	----	1	mg	**164**	**92**	**102**	**----**	**----**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN2001884**	Page	: 1 of 2
Client	: **SLR Consulting Australia Pty Ltd**	Laboratory	: Environmental Division Newcastle
Contact	: Danny Echeverri	Contact	:
Address	: PO BOX 176 2/2 LINCOLN ST LANECOVE NSW, AUSTRALIA 1595	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
Telephone	: ----	Telephone	: +61 2 4014 2500
Project	: Confidential 675.11414.00000	Date Samples Received	: 20-Mar-2020 17:00
Order number	: 27742	Date Analysis Commenced	: 24-Mar-2020
C-O-C number	: ----	Issue Date	: 30-Mar-2020 15:13
Sampler	: ----		
Site	: ----		
Quote number	: EN/032/18 Primary work only BQ		
No. of samples received	: 3		
No. of samples analysed	: 3		

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Signatories

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Signatories	*Position*	*Accreditation Category*
Jennifer Targett	Quality Coordinator	Newcastle - Inorganics, Mayfield West, NSW

General Comments

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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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~ = Indicates an estimated value.

- Analysis as per AS3580.10.1-2016. Samples passed through a 1mm sieve prior to analysis. NATA accreditation does not apply for results reported in g/m².mth as sampling data was provided by the client.
- Sample exposure period is 57 days which is outside the typical exposure period of 30 +/- 2 days as per AS3580.10.1.
- No copper sulfate correction was applied to sample #001.

Analytical Results

Sub-Matrix: **DEPOSITIONAL DUST** (Matrix: **AIR**)			*Client sample ID*	**Unit C DDG - 9520 15/01/20 - 12/03/20**	**Unit D DDG - 9521 15/01/20 - 12/03/20**	**Unit E DDG - 9522 15/01/20 - 12/03/20**	**----**	**----**
			Client sampling date / time	12-Mar-2020 12:30	12-Mar-2020 13:30	12-Mar-2020 17:30	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EN2001884-001**	**EN2001884-002**	**EN2001884-003**	**--------**	**--------**
				Result	Result	Result	----	----
EA120: Ash Content								
Ash Content	----	0.1	g/m².month	**0.9**	**0.7**	**0.9**	**----**	**----**
Ash Content (mg)	----	1	mg	**30**	**23**	**31**	**----**	**----**
EA125: Combustible Matter								
Combustible Matter	----	0.1	g/m².month	**0.4**	**0.1**	**0.4**	**----**	**----**
Combustible Matter (mg)	----	1	mg	**14**	**4**	**11**	**----**	**----**
EA139: Total Soluble Matter								
Total Soluble Matter	----	0.1	g/m².month	**3.6**	**0.9**	**1.8**	**----**	**----**
Total Soluble Matter (mg)	----	1	mg	**120**	**31**	**59**	**----**	**----**
EA141: Total Insoluble Matter								
Total Insoluble Matter	----	0.1	g/m².month	**1.3**	**0.8**	**1.3**	**----**	**----**
Total Insoluble Matter (mg)	----	1	mg	**44**	**27**	**42**	**----**	**----**
EA142: Total Solids								
Total Solids	----	0.1	g/m².month	**4.9**	**1.7**	**3.1**	**----**	**----**
Total Solids (mg)	----	1	mg	**164**	**58**	**101**	**----**	**----**

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