

**Mount Pleasant Operation  
Monthly Environmental Monitoring Report**

**February 2020**

## 1. Introduction

The Mount Pleasant Operation (MPO) is located in the Upper Hunter Valley of New South Wales, approximately three kilometres (km) north-west of Muswellbrook and approximately 50 km north-west of Singleton. The villages of Aberdeen and Kayuga are located 12 km north-northeast and 3 km north of the operations, respectively.

The purpose of this report is to provide a monthly update of monitoring data in accordance with the requirements of NSW Environmental Protection Licence (EPL) 20850, Section 66(6) of the *Protection of the Environment Operations Act 1997* (POEO Act) and the MPO Development Approval (DA 92/97).

**Table 1-1 – Mount Pleasant Operation**

<b>Name of Operation</b>	Mount Pleasant Operation
<b>Name of Licensee</b>	MACH Energy Australia Pty Ltd
<b>Environmental Protection Licence</b>	20850
<b>Project Approval</b>	DA 92/97
<b>Reporting Period Start Date</b>	1 February 2020
<b>Reporting Period End Date</b>	29 February 2020
<b>Date Data Received</b>	1 April 2020

To view MPO EPL 20850 or DA 92/97 in full please refer to the link below:

<https://machenergyaustralia.com.au/mount-pleasant/documentation/>

## 2. Monitoring Requirements

The MPO EPL 20850 specifically requires the monitoring of:

- 2 x Palas Fidas Air Quality Monitoring sites;
- Noise monitoring;
- Blast monitoring; and
- Meteorological monitoring.

Monitoring of sites not required by the EPL are carried out in accordance with MPO Environmental Monitoring Program (EMP) and Project Approval (DA 92/97).

All monitoring is undertaken by suitably qualified and experienced person(s).

The MPO Environmental Monitoring Network is shown in **Figure 2-1; Figure 2-2; Figure 2-3; Figure 2-4; and Figure 2-5.**

**Figure 2-1** shows MPO attended noise monitoring assessment groups and monitoring locations. **Figure 2-2** shows the MPO air quality monitoring network. **Figure 2-3** shows the MPO Blast Monitoring Locations. **Figure 2-4** shows the MPO groundwater monitoring network. **Figure 2-5** shows the MPO surface water monitoring network.

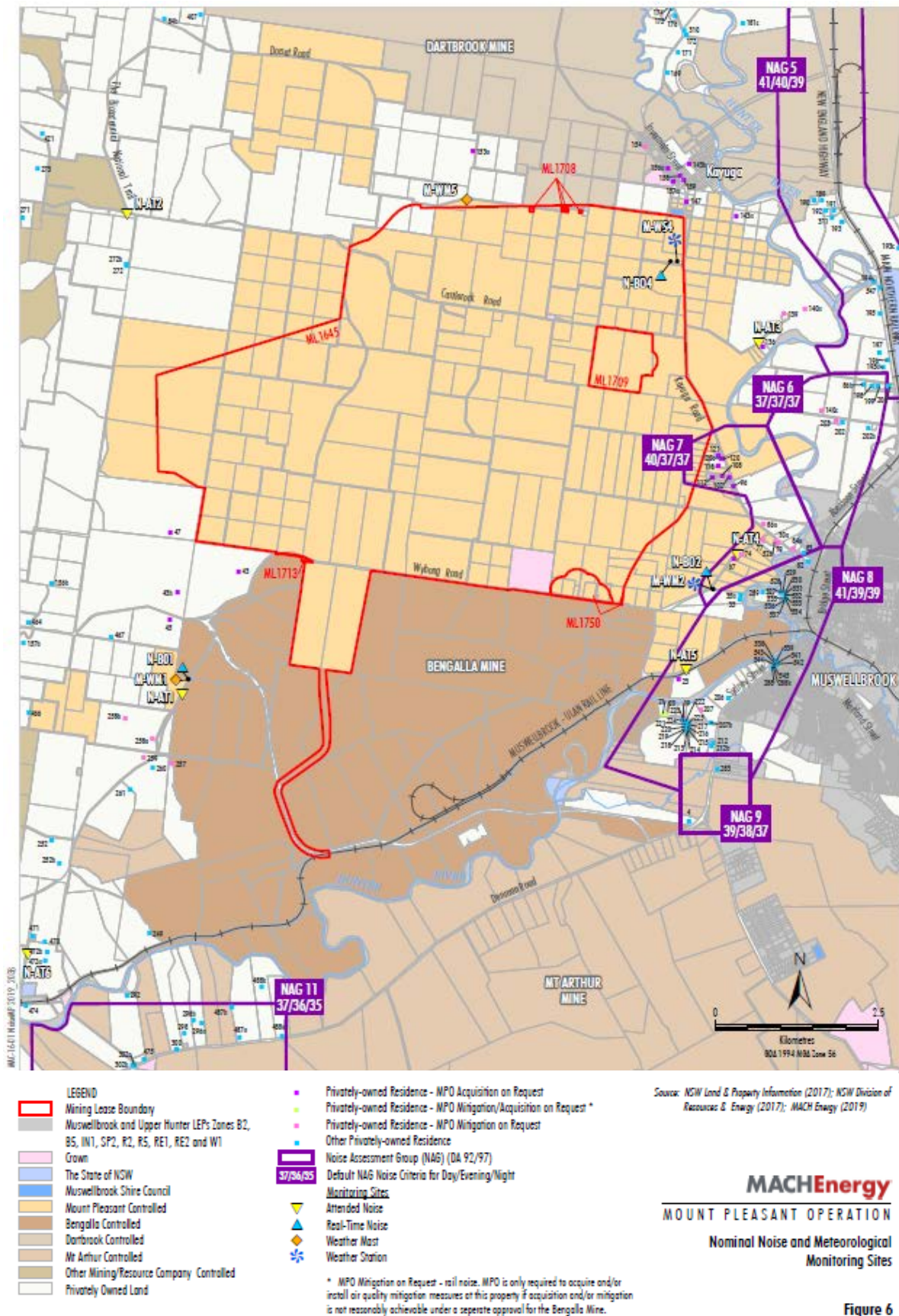


Figure 6

Figure 2-1 – MPO Attended Noise Monitoring Assessment Groups and Locations



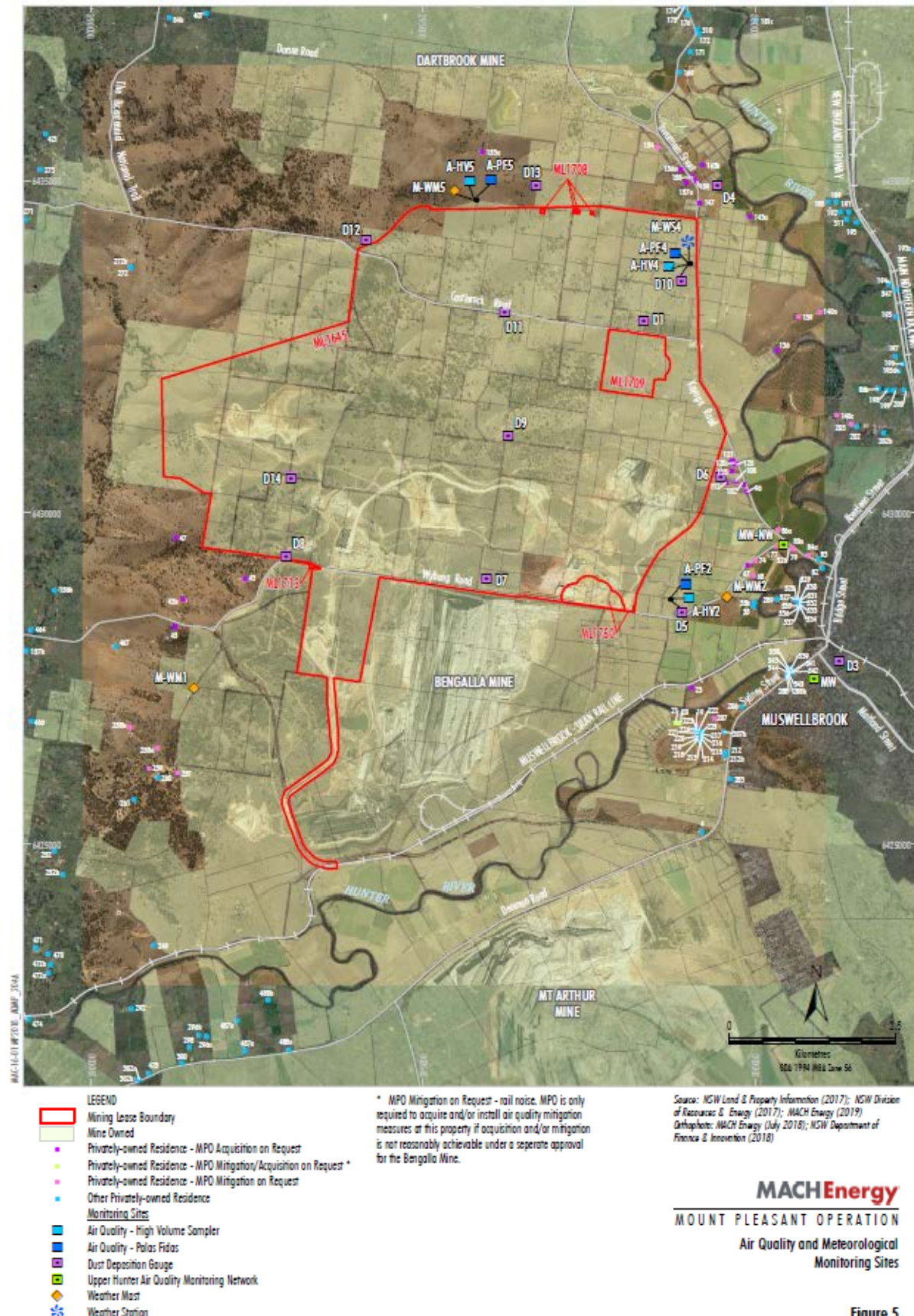
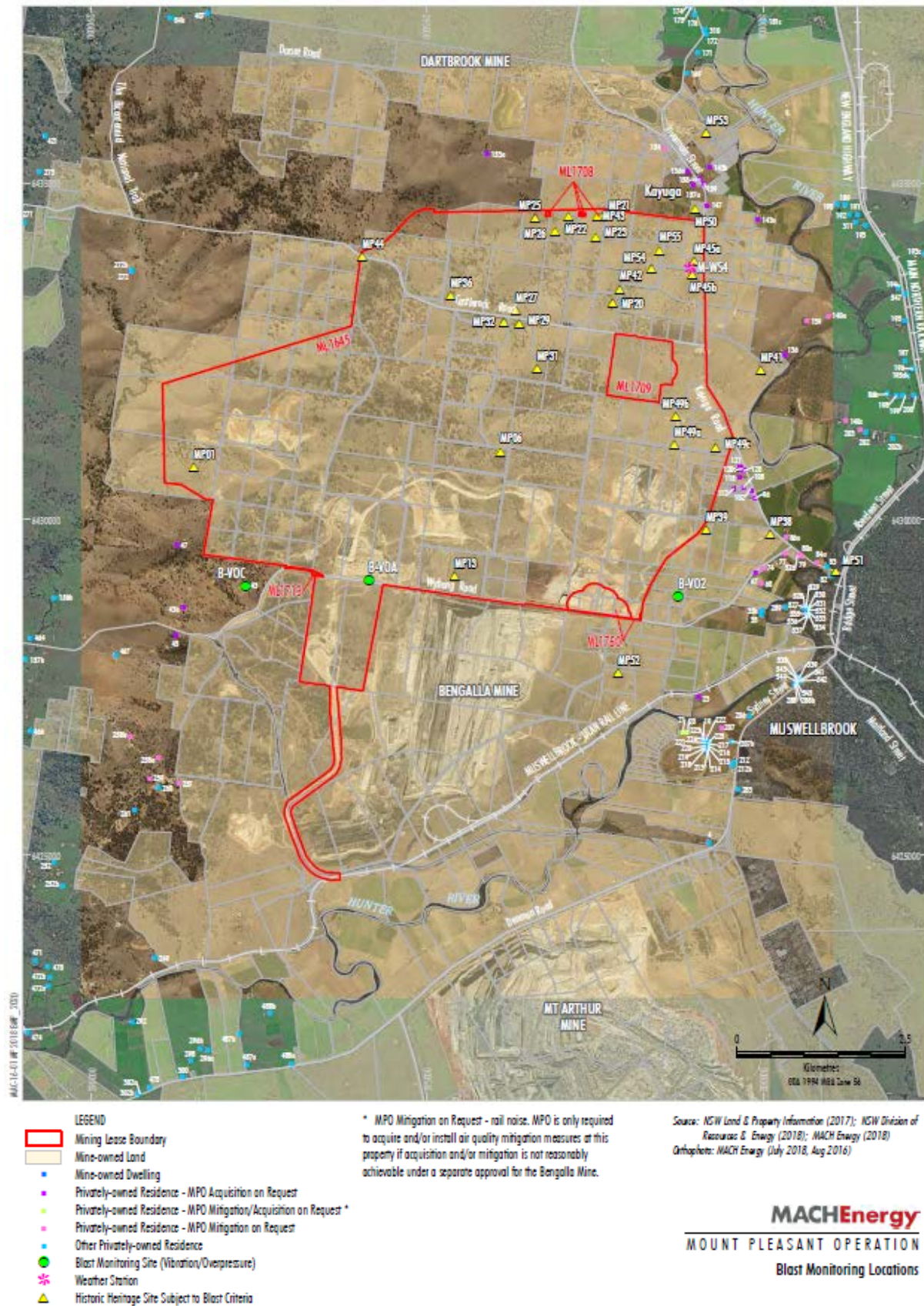


Figure 5

Figure 2-2 – MPO Air Quality and Meteorological Monitoring Network





**Figure 2-3 – MPO Blast Monitoring Locations**

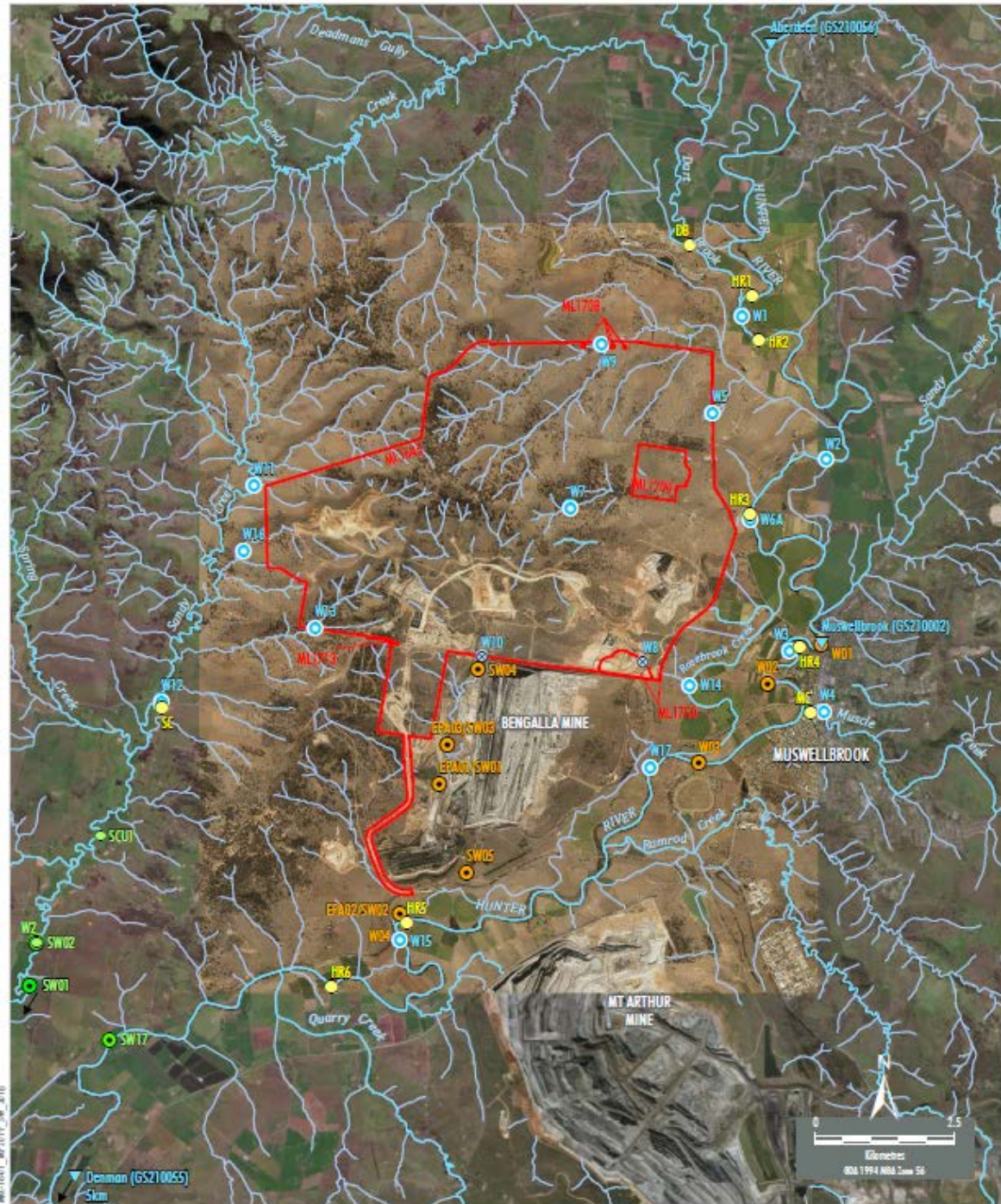
Figure 2



**MACHEnergy**  
MOUNT PLEASANT OPERATION  
Augmentations to the  
Groundwater Monitoring Network

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- LEGEND**
- Mining Lease Boundary
  - ▲ DPI Water Gauging Station
  - Mt Pleasant Monitoring
  - Surface Water Monitoring Site
  - ⊗ Historical Surface Water Monitoring Site
  - Stream Health Monitoring Site
  - Mangoola Monitoring
  - Surface Water Monitoring Site
  - Stream Health Monitoring Site
  - ⊗ Bengalla Monitoring
  - Surface Water Monitoring Site

Source: NSW Land & Property Information (2019); NSW Division of Resources & Energy (2019); NSW Department of Primary Industries - Water (2016); Bengalla Mining Company (2015); Mangoola Coal Operations Pty Ltd (2014)  
Orthophoto: MACH (Jul 2018); Esri, DigitalGlobe (2018)

**MACHEnergy**  
MOUNT PLEASANT OPERATION  
Surface Water and Stream Health  
Monitoring Sites

Figure 3

Figure 2-5 – MPO Surface Water Monitoring Network

### 3. Meteorological Monitoring

Weather data is measured continuously at the Kayuga Road (M-WS4) and the Wybong Road (M-WS2) meteorological station. In addition to air quality parameters, the weather stations also measure wind speed and direction, temperature (at 2 m and 10 m), solar radiation, relative humidity, rainfall, atmospheric pressure, and sigma theta.

The majority of meteorological data was captured at M-WS2 (>96.4%) during the February 2020 monitoring period, with the exception of temperature at 2m (72.1%) and solar radiation data loss (89.8%). The majority of meteorological data was captured at M-WS4 (>99.8%) during the February 2020 monitoring period.

During February 2020, there was 138.4mm and 131.4mm of rainfall recorded at M-WS2 and M-WS4, respectively.

### 4. Dust Depositional Monitoring

#### 4.1 Methodology

Dust deposition was monitored according to the OEH's Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (DECC 2007), which references Australian Standard (AS)/New Zealand Standard (NZS) 3580.10.1:2016 Methods for Sampling and Analysis of Ambient Air: Determination of particulate matter – Deposited matter – Gravimetric Method. The dust deposition monitoring network comprises of 13 dust deposition gauges (DDG). Details of the monitoring locations are shown in **Figure 2-2**.

DDG samples can be contaminated by a variety of means, notably by the presence of insects and bird droppings. Results for contaminated gauges were not included in the calculation of the annual averages as this would result in skewed or misleading results for the purpose of dust deposition assessment. The Australian Standard does not provide criteria for the determination of contamination of a DDG. A gauge sample is determined by AECOM to be contaminated only after reference to field observation sheets, historical monitoring location data, laboratory notes and results, prevailing atmospheric conditions and feedback from field technicians. For example, a gauge sample with a statistically abnormally high insoluble solids result, a low ash residue result (indicating a high level of organic matter) and field notation that bird droppings or insects were present is likely to be considered contaminated.

#### 4.2 Results

The dust deposition exposure period for all gauges commenced on 16 and 17 January 2020. Sample collection was undertaken on 18 and 20 February 2020 by AECOM with sample analysis performed by SRT, a NATA accredited laboratory. Results are summarised in **Table 4-1**. Annual rolling averages for February 2020 have been provided as an indication of annual performance between February 2019 – February 2020 and does not represent annual average results for 2020 as per Schedule 3, Condition 20 of DA 92/97.



**Table 4-1: Dust Depositional Results – February 2020**

Location	YTD Insoluble Solids (g/m <sup>2</sup> .month)	Insoluble Solids Annual Rolling Average (g/m <sup>2</sup> .month)
D1	4.4	2.8
D3a	5.7	*
D4	2.9	2.6
D5	4.0	3.8
D6	22.3 <sup>^</sup>	<b>9.4<sup>^</sup></b>
D7a <sup>1</sup>	7.3	<b>7.8</b>
D8	7.5	<b>5.8</b>
D9	4.5	<b>4.4</b>
D10	3.3	2.1
D11	3.8	3.1
D12	3.2	1.7
D13	6.1	3.9
D14	4.7	<b>4.4</b>
Criterion	-	4.0
<i>Note: Results in <b>bold</b> indicate an elevated measurement of adopted assessment criteria</i> <i>**Indicates result unavailable due to contaminated depositional dust gauges for YTD</i>		

**Note 1:** Site D7a is located within close proximity to the northern boundary of a neighbouring mining company's main pit and thus is heavily influenced by this. This site will continue to be monitored, however will not be used to assess compliance or to represent residential receivers in the area.

\* No data due to dust gauge removed due to site construction activities

<sup>^</sup> Elevated results due to earthworks in the vicinity of D6 commencing 13 January 2020 not subject to DA 92/97 or EPL 20850.

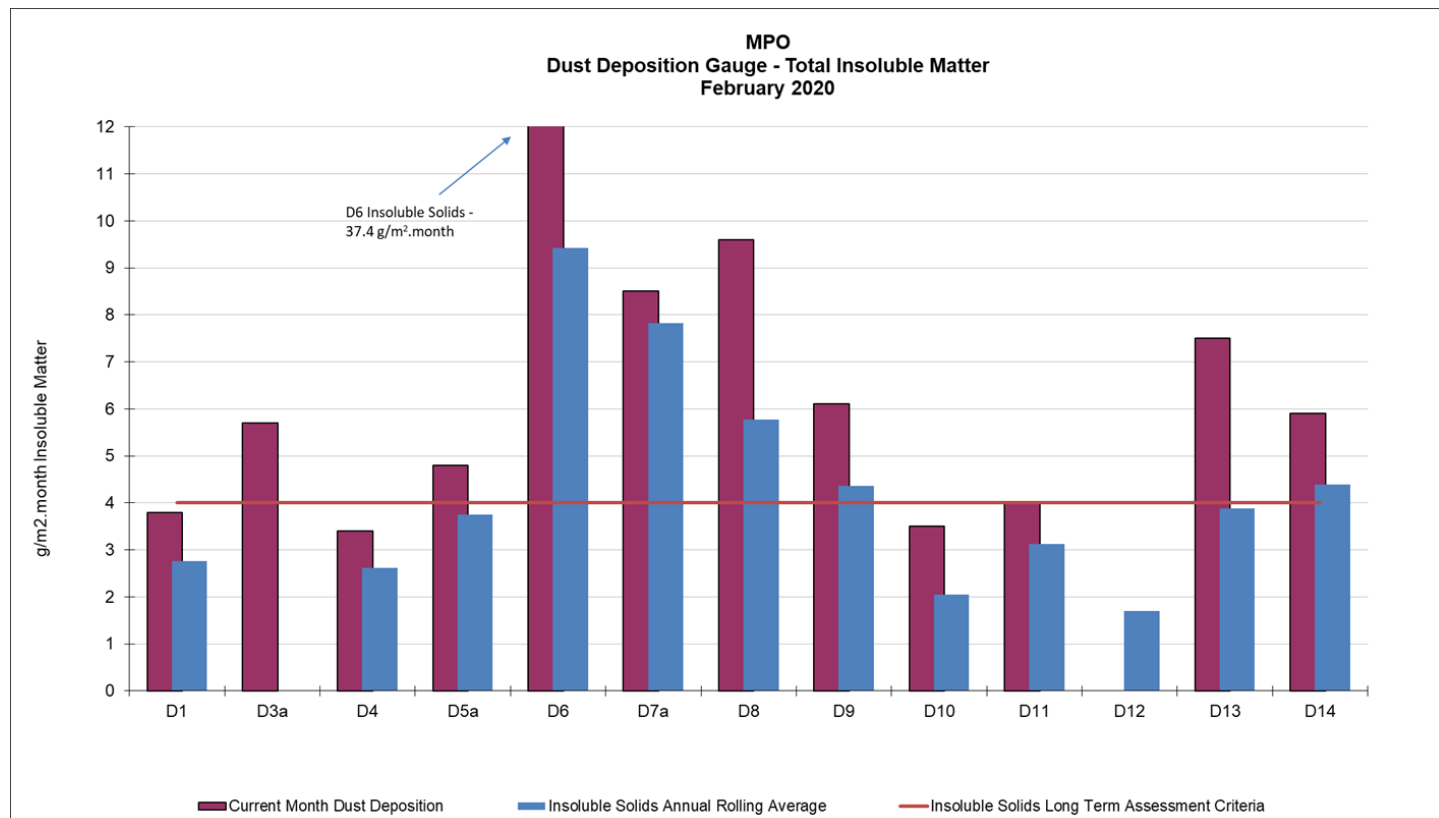
Contaminated results are not included in the 12 month rolling average. An elevated reading above the annual average criterion for dust deposition (insoluble solids) was recorded at site D6 (9.4 g/m<sup>2</sup>.month); D7a (7.8 g/m<sup>2</sup>.month); D8 (5.8 g/m<sup>2</sup>.month); D9 (4.4 g/m<sup>2</sup>.month) and D14 (4.4 g/m<sup>2</sup>.month).

Site D7a is located within close proximity to the northern boundary of a neighbouring mining operation and thus can be influenced by this site. D7a will continue to be monitored, however will not be used to assess compliance or to represent residential receivers in the area. Furthermore, there are no privately-owned receivers in the vicinity of D8 and D14. Whilst these

sites do not represent residence(s) on privately-owned land, they will continue to be monitored in accordance with the MPO Air Quality and Greenhouse Gas Management Plan (MACH Energy, 2019).

Field notes from the February sampling event noted that all the gauges contained insects. The results of D12 were determined to be contaminated and the result was not included in the annual rolling average.

**Figure 4-1** compares the monthly insoluble solids results to the annual averages for each dust gauge and the assessment criterion.



**Figure 4-1: MPO Dust Deposition Monthly Results and Annual Rolling Average – February 2020**

## 5. Total Suspended Particulates

All High Volume Air Samplers (HVAS) are run for 24 hours every six days in accordance with AM-15 of Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (DECC, 2007), referencing AS/NZS 3580.9.3:2015 Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – Total suspended particulate matter (TSP) - High volume sampler gravimetric method, for the monitoring of TSP.

Three TSP HVAS units are included in the MPO air quality monitoring network and are displayed in **Table 5-1** below. These units were commissioned in March 2017



**Table 5-1 Total suspended Particulate Monitoring Sites**

ID	Description
A-PF2	Reilly's
M-WS4	Kayuga Road Met Station
A-PF5	Athlone

### 5.1 Assessment Criteria

TSP is assessed against the guidelines defined in the EPA Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA 2016) and Project Approval DA 92/97. The DA 92/97 specifies an annual average criterion of 90  $\mu\text{g}/\text{m}^3$ .

### 5.2 Results

In February 2020 sample collection was undertaken by AECOM with sample analysis performed by SRT, a NATA accredited laboratory. TSP results for the monitoring period are provided in **Table 5-2**. Annual rolling averages for February 2020 have been provided as an indication of annual performance between February 2019 – February 2020 and do not represent annual average results for 2020 as per Schedule 3, Condition 20 of DA 92/97.

**Table 5-2 Total Suspended Particulate Monitoring Data – February 2020**

Run Date	Assessment Criterion	TSP $\mu\text{g}/\text{m}^3$		
		HVAS A-PF2	HVAS M-WS4	HVAS A-PF5
2/02/2020	-	109	57	78
8/02/2020	-	26	16	20
14/02/2020	-	55	48	59
20/02/2020	-	63	46	41
26/02/2020	-	23	14	15
Monthly Mean	-	55	36	43
<b>Annual Rolling Average</b>	<b>90</b>	<b>98</b>	61	67

Note: Results in **bold** indicate an elevated reading

### 5.3 Discussion

For the reporting period, the annual rolling average TSP data at all sites was below the annual average criterion of 90  $\mu\text{g}/\text{m}^3$ , with the exception of A-PF2 (98  $\mu\text{g}/\text{m}^3$ ).

## 6. Real Time Air Quality Monitoring

Continuous particulate matter less than 10  $\mu\text{m}$  ( $\text{PM}_{10}$ ) and particulate matter less than 2.5  $\mu\text{m}$  ( $\text{PM}_{2.5}$ ) monitoring was conducted by three Palas Fidas (one utilised for management only) units at MPO during February 2020.

The EPA identification numbers 1 and 2 refer to Palas Fidas units installed on Wybong Road (A-PF2) and Dorset Road (A-PF5), respectively. In addition, a third unit (A-PF4) is installed on Kayuga Road with data used for management purposes only.

Real time PM<sub>10</sub> and PM<sub>2.5</sub> annual rolling averages for February 2020 have been provided in Section 6.2 and 6.4 respectively, as an indication of annual performance between February 2019 – February 2020 and does not represent annual average results for 2020 as per Schedule 3, Condition 20 of DA 92/97.

## 6.1 PM<sub>10</sub> Results – 24 hour rolling average

There were no elevated PM<sub>10</sub> measurements reported at MPO throughout February 2020. There was an elevated measurement reported at the Muswellbrook NW monitor on 19 February in accordance with EPL 20850 for 'adverse dust conditions' (44 µg/m<sup>3</sup>) for the 24 hour rolling average. The Muswellbrook NW monitor was operational during all days of February 2020. During this period, approximately 36 total mining machinery hours were lost due to dust delays / shutdowns executed at MPO.

Real time PM<sub>10</sub> 24 hour rolling average results for February 2020 are presented in **Table 6-1**.

**Table 6-1: MPO Palas Fidas PM<sub>10</sub> Data – February 2020**

Date	A-PF2/EPA ID 1	A-PF4	A-PF5/EPA ID 2	Muswellbrook NW	Muswellbrook NW 24 Hour Average Limit (µg/m³)	A-PF2, A-PF4, A-PF5 24 Hour Average Limit (µg/m³)
	24 hour Average Result					
1/02/2020	38	29	22	42	44	50
2/02/2020	32	20	22	37	44	50
3/02/2020	30	24	23	33	44	50
4/02/2020	39	32	33	42	44	50
5/02/2020	22	17	26	25	44	50
6/02/2020	11	9	11	12	44	50
7/02/2020	6	6	8	5	44	50
8/02/2020	7	7	9	6	44	50
9/02/2020	7	6	-	6	44	50
10/02/2020	12	9	9	12	44	50
11/02/2020	16	13	15	20	44	50
12/02/2020	14	18	12	16	44	50
13/02/2020	12	10	11	13	44	50
14/02/2020	19	16	18	22	44	50
15/02/2020	19	14	14	24	44	50
16/02/2020	14	12	13	17	44	50
17/02/2020	11	8	10	9	44	50
18/02/2020	17	10	13	18	44	50
19/02/2020	41	37	28	54	44	50
20/02/2020	17	14	11	24	44	50
21/02/2020	18	14	11	22	44	50
22/02/2020	14	11	9	17	44	50
23/02/2020	14	12	9	15	44	50
24/02/2020	16	16	10	19	44	50

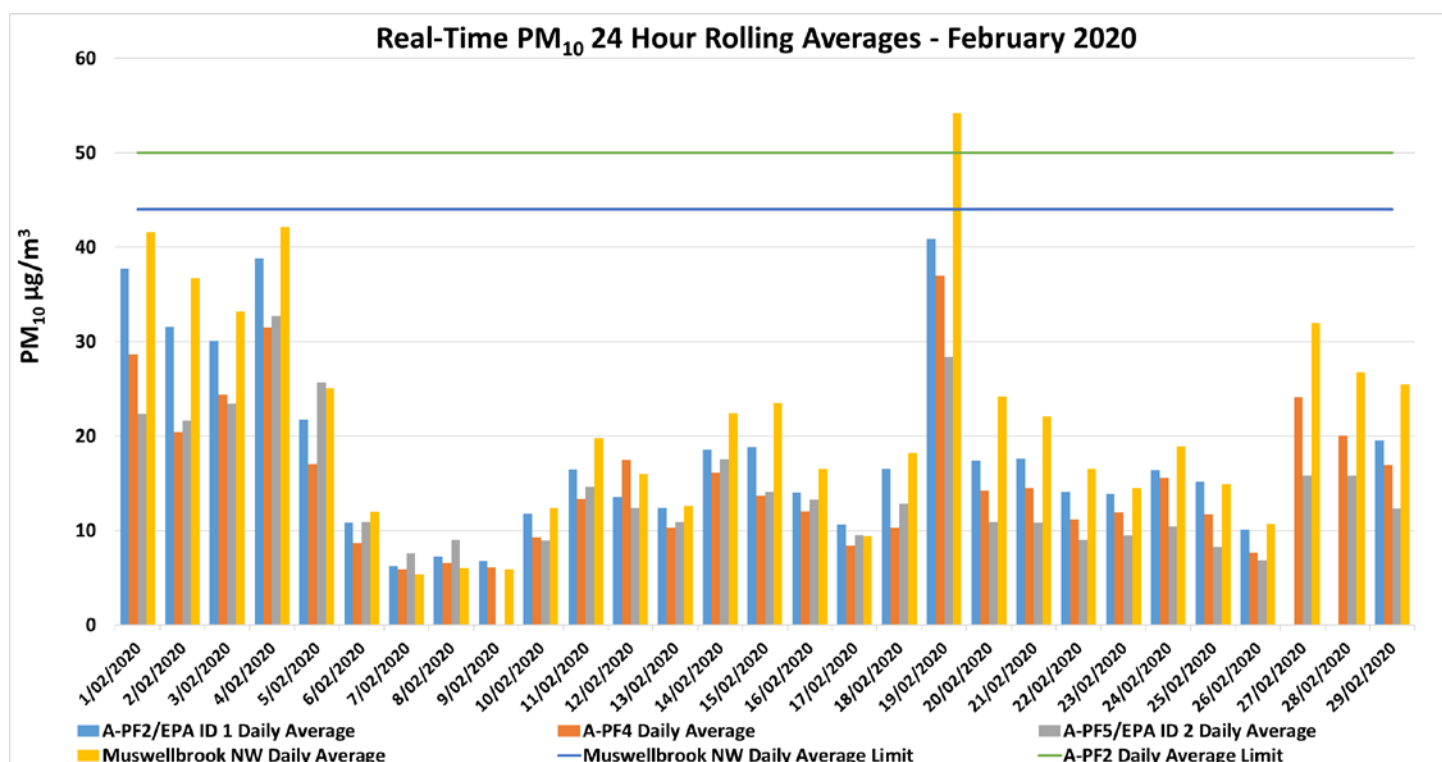


25/02/2020	15	12	8	15	44	50
26/02/2020	10	8	7	11	44	50
27/02/2020	-	24	16	32	44	50
28/02/2020	-	20	16	27	44	50
29/02/2020	20	17	12	26	44	50

**Note:** Results in bold indicate elevated readings during adverse weather conditions.

Results with “-” indicate dates where data was affected by maintenance or servicing (scheduled and unscheduled)

**Figure 6-1** below shows the results of real-time PM<sub>10</sub> 24 hour rolling average results at MPO air quality monitoring sites February 2020.

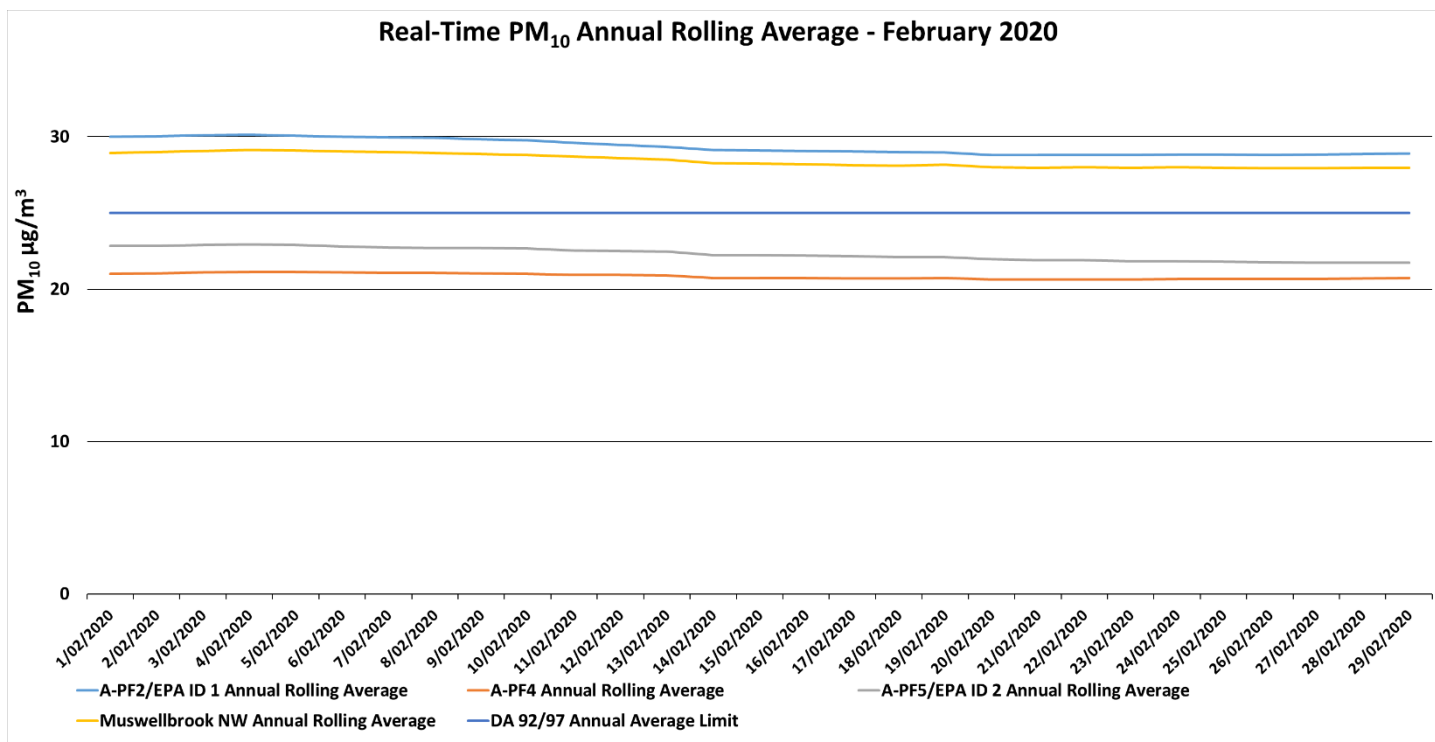


**Figure 6-1: Real-time PM<sub>10</sub> 24 hour rolling average results for February 2020.**

## 6.2 PM<sub>10</sub> Results – Annual rolling average

Elevated readings have been measured for the annual rolling average of PM<sub>10</sub> data collected since the amendment of the limit from 30 µg/m³ to 25 µg/m³ during approval of Modification 3 (MOD 3) of DA 92/97, dated 24 August 2018. Wider regional air quality events, including dust storms and bushfires, have contributed to elevated PM<sub>10</sub> levels.

Real time PM<sub>10</sub> annual rolling averages for February 2020 are presented in **Figure 6-2** below.



**Figure 6-2: Real-time PM<sub>10</sub> Annual Rolling average results for February 2020.**

### 6.3 PM<sub>2.5</sub> Results – 24 hour rolling average

There were no elevated PM<sub>2.5</sub> measurements reported throughout February 2020. Real time PM<sub>2.5</sub> 24 hour rolling average results for February 2020 are presented in **Table 6-2**.

**Table 6-2: MPO Palas Fidas PM<sub>2.5</sub> Data – February 2020**

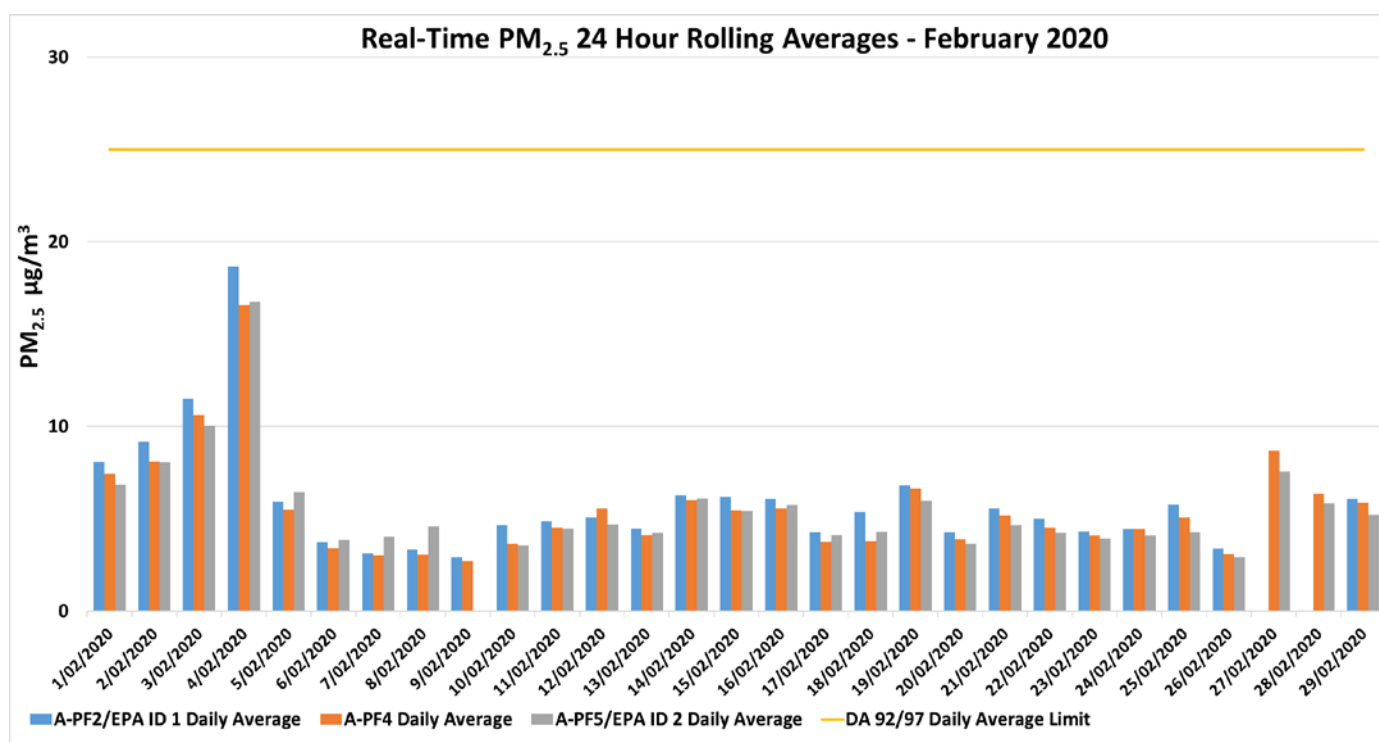
Date	A-PF2/EPA ID 1	A-PF4	A-PF5/EPA ID 2	A-PF2, A-PF4, A-PF5 24 Hour Average Limit (µg/m³)
	24 hour Average Result			
1/02/2020	8	7	7	25
2/02/2020	9	8	8	25
3/02/2020	11	11	10	25
4/02/2020	19	17	17	25
5/02/2020	6	5	6	25
6/02/2020	4	3	4	25
7/02/2020	3	3	4	25
8/02/2020	3	3	5	25
9/02/2020	3	3		25
10/02/2020	5	4	4	25
11/02/2020	5	5	4	25
12/02/2020	5	6	5	25
13/02/2020	4	4	4	25
14/02/2020	6	6	6	25
15/02/2020	6	5	5	25
16/02/2020	6	6	6	25



17/02/2020	4	4	4	25
18/02/2020	5	4	4	25
19/02/2020	7	7	6	25
20/02/2020	4	4	4	25
21/02/2020	6	5	5	25
22/02/2020	5	5	4	25
23/02/2020	4	4	4	25
24/02/2020	4	4	4	25
25/02/2020	6	5	4	25
26/02/2020	3	3	3	25
27/02/2020	-	9	8	25
28/02/2020	-	6	6	25
29/02/2020	6	6	5	25

**Note:** Results in **bold** indicate elevated readings during adverse weather conditions. Results with “-” indicate dates where data was affected by maintenance or servicing (scheduled and unscheduled)

Real time PM<sub>2.5</sub> 24 hour average results for February 2020 are presented in **Figure 6-3** below.



**Figure 6-3: Real-time PM<sub>2.5</sub> 24 hour rolling average results for February 2020.**

## 6.4 PM<sub>2.5</sub> Results - Annual rolling average

The requirement of annual rolling average of PM<sub>2.5</sub> data was incepted during MOD 3 of DA 92/97, dated 24 August 2018. Elevated readings have been measured for the annual rolling average of PM<sub>2.5</sub> data collected during February 2020. Wider regional air quality events, including dust storms and bushfires, have contributed to elevated PM<sub>2.5</sub> levels.

Real time PM<sub>2.5</sub> annual rolling averages for February 2020 are presented in **Figure 6-4** below.

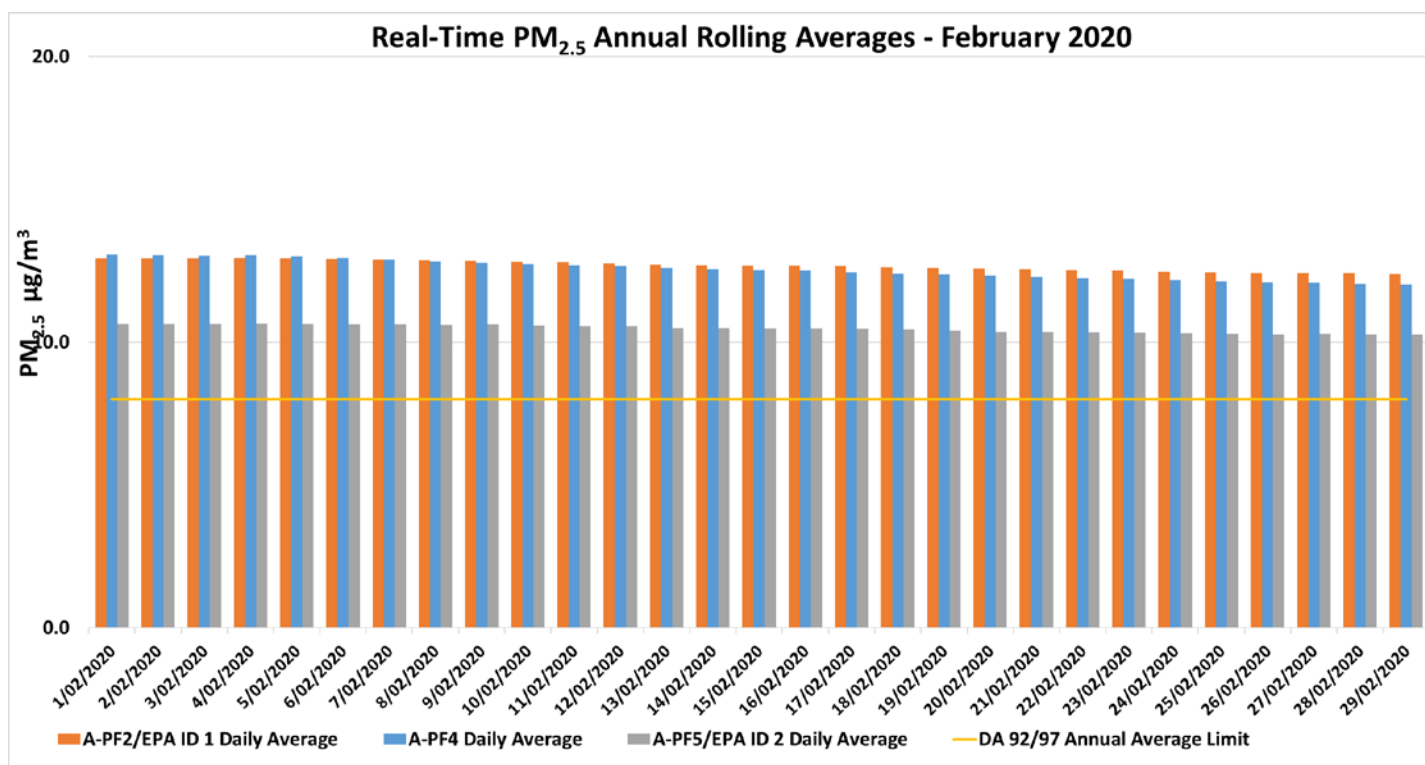


Figure 6-4: Real-time PM<sub>2.5</sub> Annual Rolling average results for February 2020.

## 7. Surface Water Monitoring

### 7.1 Methodology

Surface water quality is monitored at 15 sites on a monthly basis, with additional monitoring conducted if triggered by a rain event. A comprehensive suite of analysis is performed at these sites on a quarterly basis.

### 7.2 Assessment Criteria

Surface waters were assessed in accordance with site specific trigger values that have been developed using the ANZECC (2000) guidelines for sites that contain a minimum of two years of monthly data. Sites with insufficient data are assessed on default trigger values adopted from ANZECC (2000) guidelines.

### 7.3 Results

Monthly and rain event surface water monitoring was conducted by AECOM on 7 February 2020. Further rain event surface water monitoring was conducted by AECOM on 10 and 18 February 2020. Laboratory analysis was performed by SRT and SGS, both NATA accredited laboratories. Monthly monitoring results for pH, EC, TSS and TDS are presented in **Table 7-1**.

**Table 7-1 – MPO Monthly Surface Water Monitoring Results – 7 February 2020**

Station	pH	Electrical Conductivity (EC) (µs/cm) <sup>1</sup>	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W1	8.1	410	10	234
W2	^	^	^	^
W3	7.9	410	14	236
W4	7.4	1250	22	761
W5	*	*	*	*
W6A	8.0	410	12	238
W7	^	^	^	^
W9	*	*	*	*
W11	^	^	^	^
W12	8.1	7650	22	4730
W13	*	*	*	*
W14	*	*	*	*
W15	8.0	500	11	268
W16	7.8	135	2190	107**
W17	7.9	460	45	254

**Note:** Results in **bold** indicate elevated reading of adopted assessment criteria.

\*Dry or insufficient water to sample.

\*\* TDS result calculated due to high TSS containing colloidal clay particles which have interfered with the Laboratory TDS result.

^ Indicates no safe access due to wet weather conditions

<sup>1</sup> Results have been rounded in accordance with the In-house method Q4AN(EV)-332-WI3 (pH) and In-house method Q4AN(EV)-332-WI2 (EC).

Seven of the fifteen monitoring locations were found to be dry or were not safely accessible on 7 February 2020. All sites sampled were below or inside the trigger level values. An investigation will be triggered if this occurs for three consecutive sampling events in accordance MPO Water Management Plan (MACH Energy, 2019).

**Table 7-2 – MPO Monthly Surface Water Monitoring Results – 10 February 2020**

Station	pH	Electrical Conductivity (EC) (µs/cm) <sup>1</sup>	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W1	7.6	330	363	249
W2	^	^	^	^
W3	7.8	710	580	468
W4	7.3	710	7	424
W5	*	*	*	*
W6A	<b>7.6</b>	350	486	<b>282</b>
W7	^	^	^	^



Station	pH	Electrical Conductivity (EC) (µs/cm) <sup>1</sup>	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W9	*	*	*	*
W11	^	^	^	^
W12	8.3	6350	19	4240
W13	*	*	*	*
W14	*	*	*	*
W15	7.9	510	16	308
W16	7.6	200	1440	144**
W17	7.7	520	16	271

**Note:** Results in **bold** indicate elevated reading of adopted assessment criteria.

\*Dry or insufficient water to sample.

\*\* TDS result calculated due to high TSS containing colloidal clay particles which have interfered with the Laboratory TDS result.

^ Indicates no safe access due to wet weather conditions

<sup>1</sup> Results have been rounded in accordance with the In-house method Q4AN(EV)-332-WI3 (pH) and In-house method Q4AN(EV)-332-WI2 (EC).

Seven of the fifteen monitoring locations were found to be dry or were not safely accessible on 10 February 2020. All sites sampled were below or inside the trigger level values, with the exception of pH and TDS at W6A. An investigation will be triggered if this occurs for three consecutive sampling events in accordance MPO Water Management Plan (MACH Energy, 2019).

**Table 7-3 – MPO Monthly Surface Water Monitoring Results – 18 February 2020**

Station	pH	Electrical Conductivity (EC) (µs/cm) <sup>1</sup>	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W1	^	^	^	^
W2	^	^	^	^
W3	7.5	280	3010	154
W4	7.2	640	7	343
W5	*	*	*	*
W6A	<b>7.5</b>	290	<b>2210</b>	190
W7	^	^	^	^
W9	6.6	90	194	80**
W11	^	^	^	^
W12	7.8	900	72	448
W13	7.3	95	196	80**
W14	*	*	*	*
W15	7.4	280	3550	195**
W16	7.5	190	728	140**
W17	7.3	290	3260	202**

**Note:** Results in **bold** indicate elevated reading of adopted assessment criteria.

\*Dry or insufficient water to sample.

\*\* TDS result calculated due to high TSS containing colloidal clay particles which have interfered with the Laboratory TDS result.

^ Indicates no safe access due to wet weather conditions

<sup>1</sup> Results have been rounded in accordance with the In-house method Q4AN(EV)-332-WI3 (pH) and In-house method Q4AN(EV)-332-WI2 (EC).

Seven of the fifteen monitoring locations were found to be dry or were not safely accessible 18 February 2020. All sites sampled were below or inside the trigger level values, with the exception of pH and TSS at W6A. An investigation will be triggered if this occurs for three consecutive sampling events in accordance MPO Water Management Plan (MACH Energy, 2019).

## 8. Groundwater Monitoring

Due to above average rainfall in February 2020 and associated access issues, the quarterly groundwater monitoring was only conducted at sites WRA1L, WRA1U, WRA6L, MPBH3b, 6500F625 and Melody locations on 6 February 2020. Monitoring at the remaining locations will be completed in March 2020.

The quarterly groundwater monitoring was conducted on 6 February 2020. Water level results for the groundwater bores are presented in **Table 8-1**. The quarterly pH and EC results are presented in **Table 8-2** and **Table 8-3**, respectively.

**Table 8-1 - MPO Quarterly Groundwater Water Level Results**

Monitoring Location/ ID	Water Level Trigger Range		Current Month Water Level (DTW)	November 2019 Water Level (DTW)	August 2019 Water Level (DTW)	Triggered (Yes/No)
	80 <sup>th</sup> Percentile (DTW)	Trigger				
WRA1L	-	± 0.5m	6.37	6.10	5.92	-
WRA1U	-	± 0.5m		*	*	-
WRA6L	-	± 0.5m	2.82	2.98	2.55	-
MPBH3b	12.00	Dry	12.38	12.46	12.39	No
6500F625	-	± 0.5m	22.67	<b>22.23</b>	16.33	-
Melody	-	± 0.5m	<b>21.87</b>	<b>13.55</b>	12.75	-

\* Dry/insufficient water to sample

\*\* Bore appeared to be blocked

\*\*\* New site

- Trigger Levels are not applicable due to non-alluvial bore

**Note:** An investigation is triggered when the water levels in any **alluvial bores** exceed the 80th percentile and/ or trigger level. Results shown in **bold** indicate that the bore has exceeded the adopted assessment criterion for changes in standing water level of ± 0.5m from the previous measurement.

**Table 8-2 - MPO Quarterly Groundwater pH results**

Monitoring Location/ ID	pH Trigger Range		Current Month pH	Nov 2019 pH	Aug 2019 pH	Triggered (Yes/No)
	20 <sup>th</sup> Percentile	80 <sup>th</sup> Percentile				
WRA1L	6.0	8.5	7.0	7.3	7.1	No
WRA1U	6.0	8.5	*	*	*	-
WRA6L	6.0	8.5	6.9	7.6	7.0	No
MPBH3b	6.0	8.5	7.3	7.7	8.1	No
6500F625	6.0	8.5	6.9	7.0	7.1	No
Melody	6.0	8.5	7.1	7.3	7.1	No

\* Dry/insufficient water to sample

\*\* Bore appeared to be blocked

\*\*\* New site

- indicated no trigger limit identified

An investigation is triggered when pH values are recorded outside the baseline range (20<sup>th</sup> – 80<sup>th</sup> percentile) for three consecutive readings. Results outside this range are shown in **bold**.

Results have been rounded in accordance with the In-house method Q4AN(EV)-332-WI3 (pH) and In-house method Q4AN(EV)-332-WI2 (EC).

**Table 8-3 - MPO Quarterly Groundwater EC results**

Monitoring Location/ ID	EC Trigger Range	Current Month EC	Nov 2019 EC	Aug 2019 EC	Triggered (Yes/No)
	Maximum Beneficial Use Trigger				
WRA1L	7800	4300	3650	4400	No
WRA1U	^	*	*	*	-
WRA6L	7800	6650	6500	5600	No
MPBH3b	7800	4050	3950	3650	No
6500F625	7800	3630	3600	2850	No
Melody	^	1650	1300	940	-

\* Dry/insufficient water to sample

\*\* Bore appeared to be blocked

\*\*\* New site

^ indicated no trigger limit identified

An investigation is triggered when EC values recorded exceed the beneficial use quality range (as described in the GWMP) for three successive monitoring rounds. Results outside this range are shown in **bold**.

Results have been rounded in accordance with the In-house method Q4AN(EV)-332-WI3 (pH) and In-house method Q4AN(EV)-332-WI2 (EC).

Following the completion of the remainder of the February 2020 monitoring in March 2020, the next quarterly monitoring event is scheduled for May 2020.

## 9. Noise Monitoring

Attended noise monitoring was undertaken during the night period of 24 February 2020 at 6 monitoring locations as per the MPO Noise Management Plan (MACH Energy, 2019) in accordance with DA 92/97 and EPL 20850.



## 9.1 Results

The results for night time attended noise monitoring for noise generated by MPO in February 2020 against noise criteria is shown in **Table 9-1**; **Table 9-2**; and **Table 9-3**.

**Table 9-1 –  $L_{A1,1min}$  Generated by MPO: Attended Night Monitoring – 24 February 2020**

Location	Start Date and Time	Wind Speed m/s	Stability Class	Criterion dB	Criterion Applies <sup>1</sup>	MPO Only $L_{Aeq}$ dB <sup>2,4</sup>	Exceedance dB <sup>3,4</sup>
N-AT1	24/02/20 23:25	1.8	D	45	Yes	NM	Nil
N-AT2	24/02/20 22:00	2.1	D	45	Yes	25	Nil
N-AT3	24/02/20 22:59	2.6	F	45	No	30	NA
N-AT4	24/02/20 23:54	2.0	D	45	Yes	IA	Nil
N-AT5	24/02/20 23:30	1.8	D	45	Yes	IA	Nil
N-AT6	24/02/20 22:44	2.5	F	45	No	IA	NA

Notes:

- As per Condition L2.3 of EPL 20850, noise emission limits do not apply during wind speeds greater than 3m/s at 10m above ground level, or stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level, or stability category G temperature inversion conditions;
- Estimated or measured  $L_{A1,1minute}$  attributed to MPO;
- NA in exceedance column means meteorological conditions outside those specified in Condition L2.3 of EPL 20850 and thus criterion is not applicable; and
- Bold results indicate exceedance of criteria.

**Table 9-2 –  $L_{Aeq,15min}$  Generated by MPO: Attended Night Monitoring – 24 February 2020**

Location	Start Date and Time	Wind Speed m/s	Stability Class	Criterion dB	Criterion Applies <sup>1</sup>	MPO Only $L_{Aeq}$ dB <sup>2,4</sup>	Exceedance dB <sup>3,4</sup>
N-AT1	24/02/20 23:25	1.8	D	43	Yes	NM	Nil
N-AT2	24/02/20 22:00	2.1	D	36	Yes	22	Nil
N-AT3	24/02/20 22:59	2.6	F	41	No	<25	NA
N-AT4	24/02/20 23:54	2.0	D	42	Yes	IA	Nil
N-AT5	24/02/20 23:30	1.8	D	40	Yes	IA	Nil
N-AT6	24/02/20 22:44	2.5	F	35	No	IA	NA

Notes:

- As per Condition L2.3 of EPL 20850, noise emission limits do not apply during wind speeds greater than 3m/s at 10m above ground level, or stability category F temperature inversion conditions and wind

speeds greater than 2m/s at 10m above ground level, or stability category G temperature inversion conditions;

2. Estimated or measured  $L_{Aeq,15\text{minute}}$  attributed to MPO;
3. NA in exceedance column means meteorological conditions outside those specified in Condition L2.3 of EPL 20850 and thus criterion is not applicable; and
4. Bold results indicate exceedance of criteria.

**Table 9-3 –  $L_{Aeq,period}$  Cumulative Noise: Attended Night Monitoring – 24 February 2020**

Location	Start Date and Time	Cumulative Noise Criterion $L_{Aeq}$ dB	Measured Mining Only $L_{Aeq,period}$ dB <sup>1,2</sup>	Exceedance dB
N-AT1	24/02/20 23:25	40	33	Nil
N-AT2	24/02/20 22:00	40	Nil	Nil
N-AT3	24/02/20 22:59	40	Nil	Nil
N-AT4	24/02/20 23:54	40	Nil	Nil
N-AT5	24/02/20 23:30	40	Nil	Nil
N-AT6	24/02/20 22:44	40	Nil	Nil

Notes:

1. These are the results for MPO and all other mining sources. 15-minute measurements have been assumed to apply across the entire night period as a conservative measure and to represent “worst case” results; and
2. By definition, cumulative noise refers to two or more noise sources. If only one source of mining is audible, or if MPO is inaudible, the measured cumulative noise defined here is ‘Nil’.

The purpose of the noise monitoring is to quantify and describe the existing acoustic environment around the mining operation and compare results with relevant limits as per the Noise Management Plan (MACH Energy, 2019). Noise levels from MPO complied with noise limits at all monitoring locations during the February 2020 monitoring period.

## 10. Blast Monitoring

There were 5 blast events during February (a total of 11 blasts YTD). Results for February 2020 are presented in **Table 10-1**. All blast results during the February 2020 monitoring period were below the criteria in Schedule 3, Condition 10 of DA 92/97 and EPL 20850 and thus the MPO remains compliant in 2020 YTD.

**Table 10-1 – MPO Blast Monitoring Results – February 2020**

Date Fired	Time Fired	Vibration (mm/s) BVOA	Overpressure (dBL) BVOA	Vibration (mm/s) BVOC	Overpressure (dBL) BVOC	Vibration (mm/s) BVO2	Overpressure (dBL) BVO2
05/02/20	13:01	0.240	93.4	0.240	93.2	0.340	96.8
06/02/20	11:25	0.180	101	0.060	98.7	0.360	97.6
12/02/20	13:04	0.170	90.9	0.110	88.3	0.290	95.9
21/02/20	12:30	0.680	98.3	0.480	98.4	0.660	97.1
25/02/20	1:06	0.200	89.4	0.140	83	0.550	99.3