

**Mount Pleasant Operation  
Monthly Environmental Monitoring Report**

**November 2019**

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## 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 November 2019
<b>Reporting Period End Date</b>	30 November 2019
<b>Date Data Received</b>	20 December 2019

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 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 suitability 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.

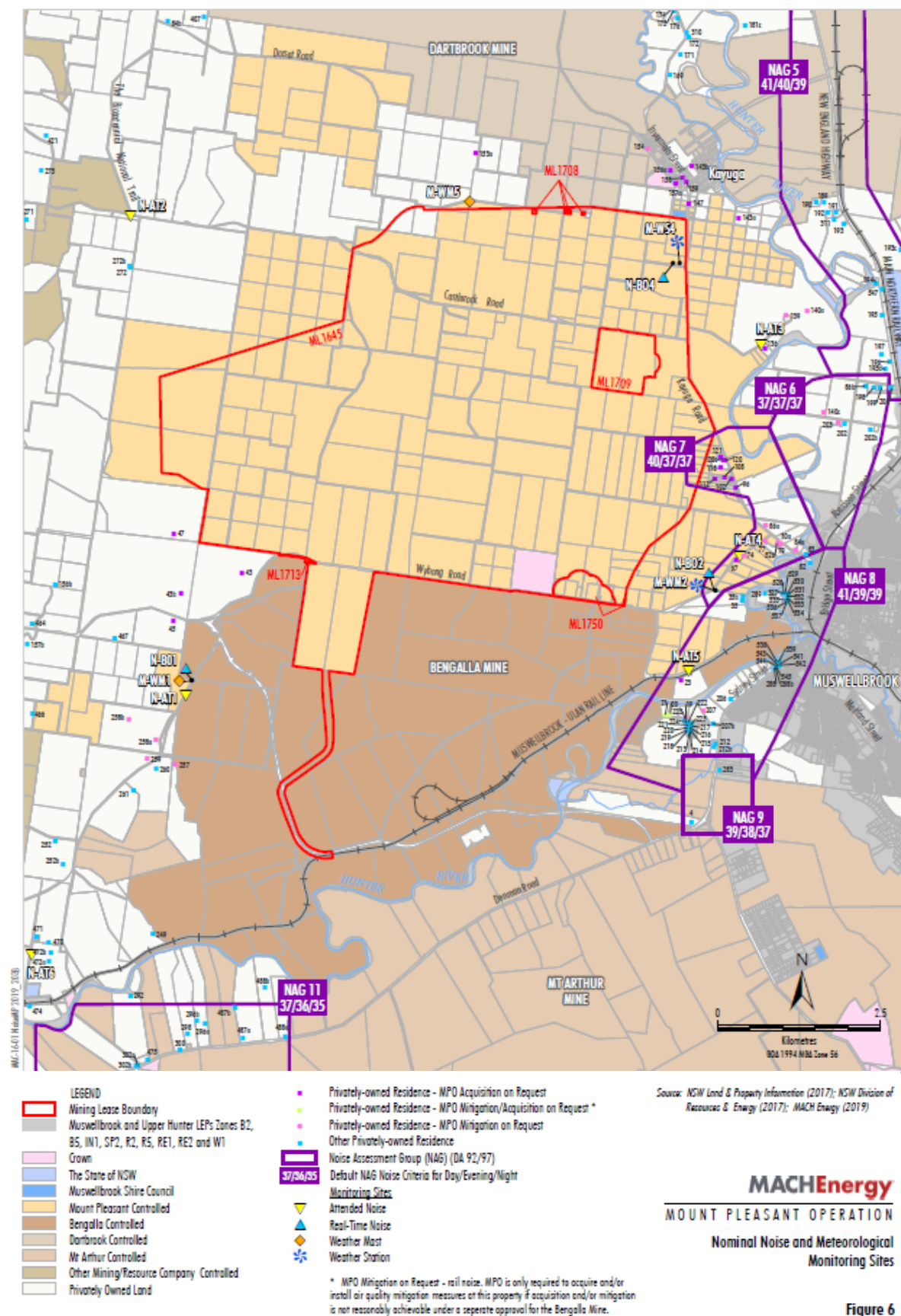


Figure 6

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



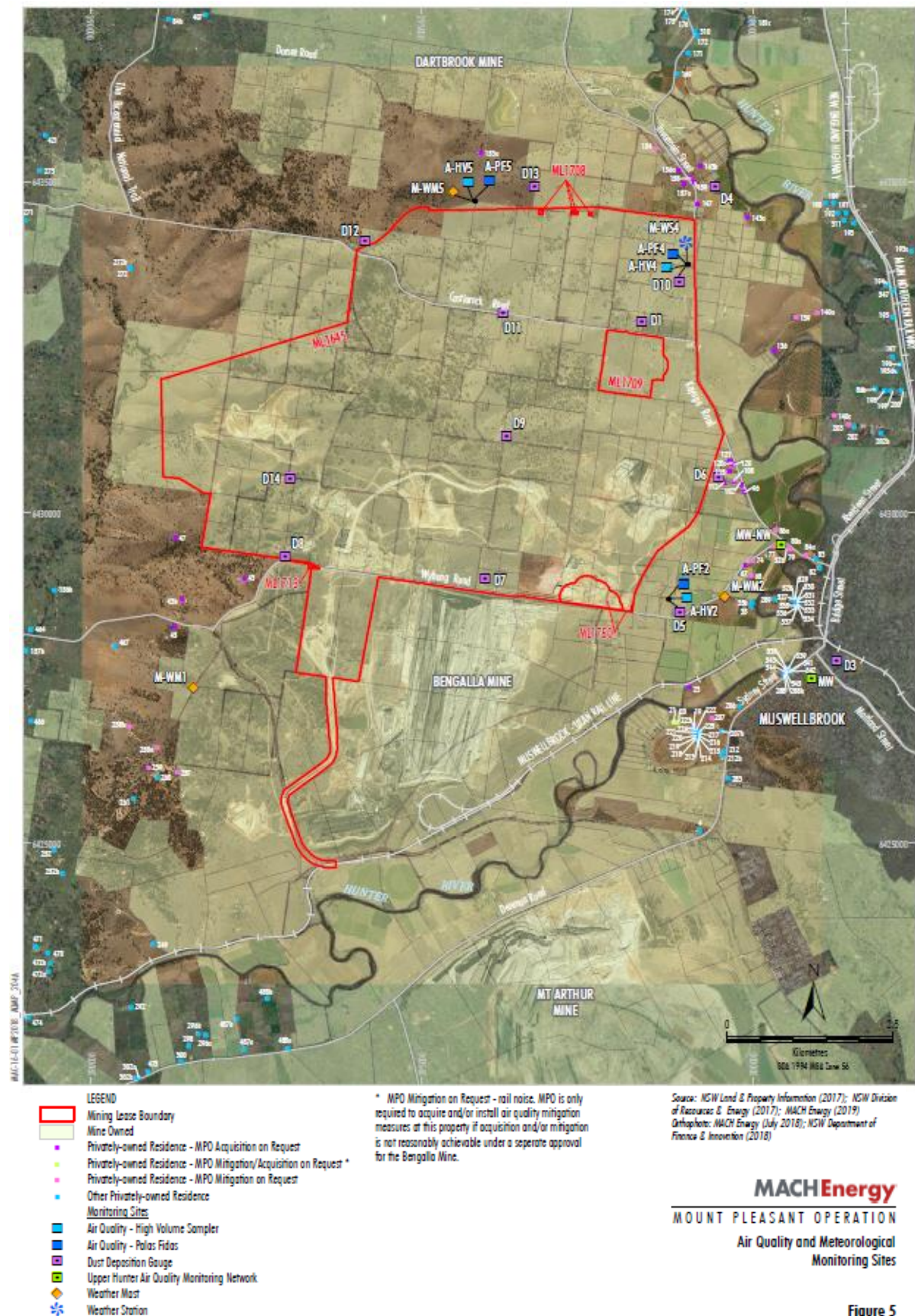
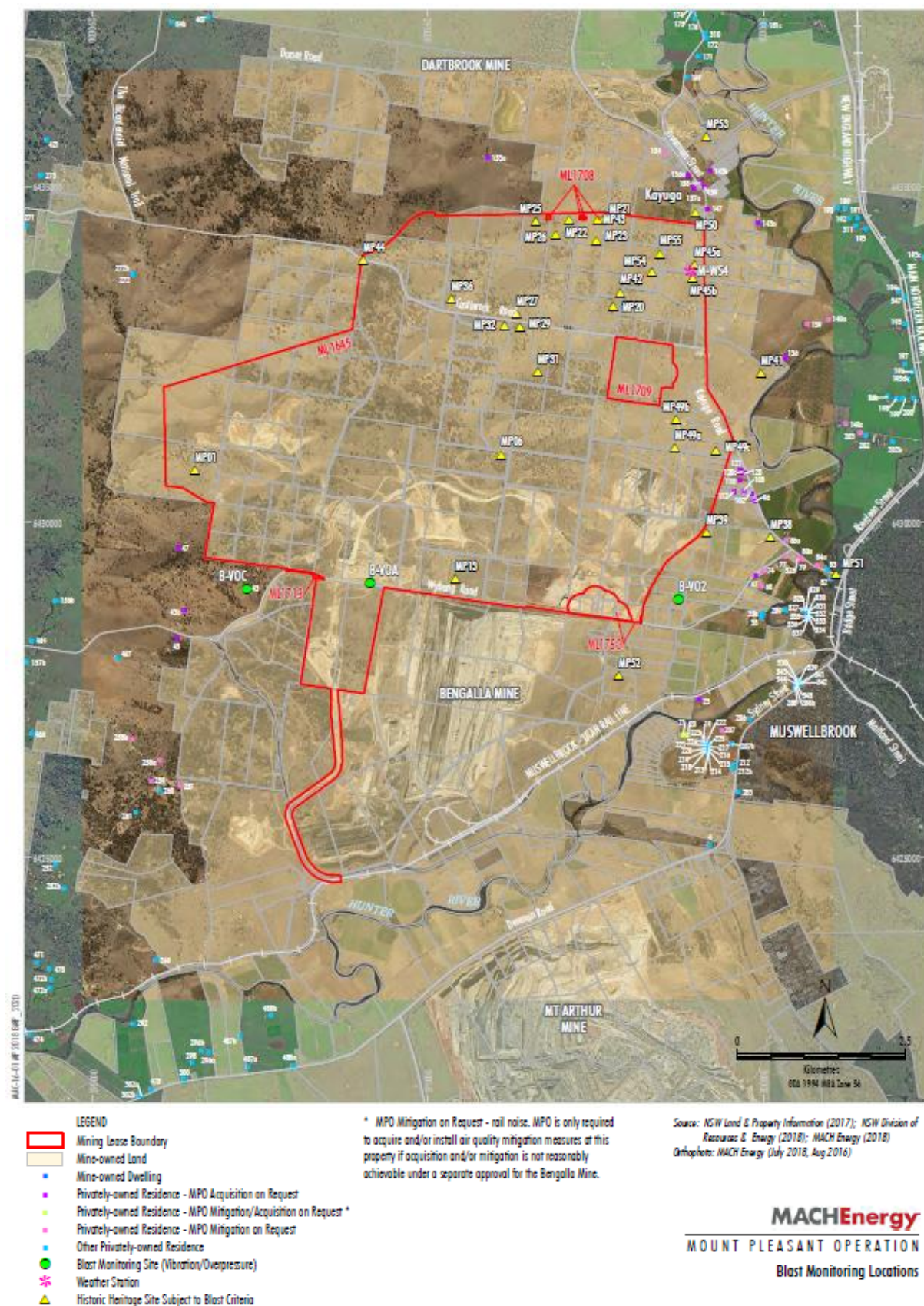


Figure 5

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





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

Figure 2



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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 (>99.6%) during the November 2019 monitoring period, with the exception of solar radiation data loss (91.3%) due to maintenance. The majority of meteorological data was captured at M-WS4 (>99.6%) during the November 2019 monitoring period.

There was 40.2mm of rainfall recorded at MPO during November 2019 (M-WS2).

### 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 17 October 2019. Sample collection was undertaken on 15 November 2019 by AECOM with sample analysis performed by SRT, a NATA accredited laboratory. Results are summarised in **Table 4-1**. Annual rolling averages for November 2019 have been provided as an indication of annual performance between November 2018 – November 2019 and do not represent annual average results for 2019 as per Schedule 3, Condition 20 of DA 92/97.

**Table 4-1: Dust Depositional Results – November 2019**

Location	YTD Insoluble Solids (g/m <sup>2</sup> .month)	Insoluble Solids Annual Rolling Average (g/m <sup>2</sup> .month)
D1	2.2	2.2
D3	3.6	3.6
D4	2.4	2.5
D5	3.2	3.2
D6	6.5	<b>6.2</b>
D7a <sup>1</sup>	7.7	<b>7.5</b>
D8	5.1	<b>5.0</b>
D9	4.1	4.0
D10	1.6	1.7
D11	3.0	3.1
D12	1.5	1.6
D13	2.9	3.3
D14	4.4	<b>4.3</b>
Criterion	-	4.0
<p><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></p>		

**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.

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 (6.2); D7a (7.5 g/m<sup>2</sup>.month); D8 (5.0 g/m<sup>2</sup>.month) and D14 (4.3 g/m<sup>2</sup>.month).

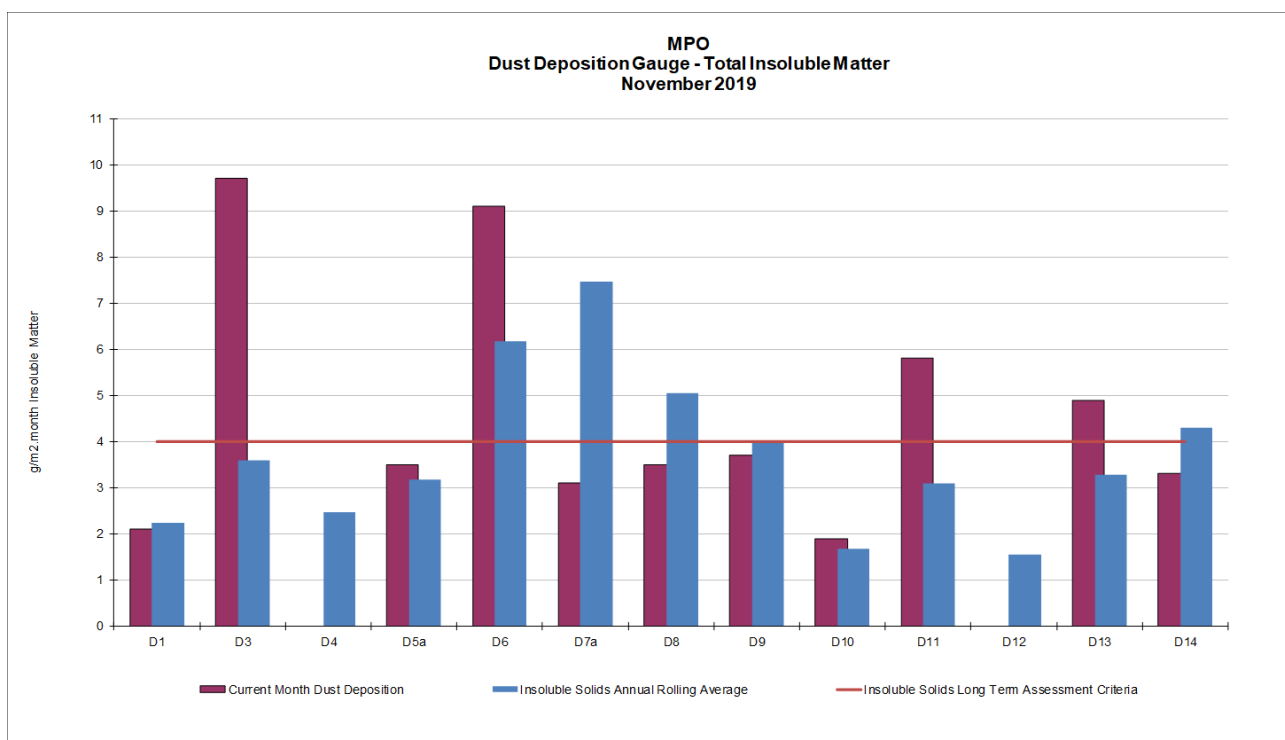
Site D7a is located within close proximity to the northern boundary of a neighbouring mining operation and thus can be influenced by this site. D7a will continue to be monitored, however will not be used to assess compliance or to represent residential receivers in the area. Furthermore, there are no privately-owned receivers in the vicinity of D8 and D14. Whilst these site does not represent residence(s) on privately-owned land, it will continue to be monitored in accordance with the MPO Air Quality and Greenhouse Gas Management Plan (MACH



Energy, 2019). An elevated annual rolling average reading was measured at D6 (6.2 g/m<sup>2</sup>.month) during November 2019.

Field notes from the November sampling event noted that all the gauges contained insects; 5 contained vegetation; and 3 contained bird droppings.

**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 Result and Annual Rolling Average – November 2019**

## 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 µg/m<sup>3</sup>.

## 5.2 Results

In November 2019 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 November 2019 have been provided as an indication of annual performance between November 2018 – November 2019 and do not represent annual average results for 2019 as per Schedule 3, Condition 20 of DA 92/97.

**Table 5-2 Total Suspended Particulate Monitoring Data – November 2019**

Run Date	Assessment Criterion	TSP µg/m <sup>3</sup>		
		HVAS A-PF2	HVAS M-WS4	HVAS A-PF5
4/11/2019	-	60	18	17
10/11/2019	-	125	54	48
16/11/2019	-	163	141	141
22/11/2019	-	222	153	180
28/11/2019	-	182	157	193
Monthly Mean	-	150	105	116
<b>Annual Rolling Average</b>	<b>90</b>	<b>93</b>	58	60

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 µg/m<sup>3</sup>, with the exception of A-PF2 (93 µg/m<sup>3</sup>).

## 6. Real Time Air Quality Monitoring

Continuous particulate matter less than 10 µm (PM<sub>10</sub>) and particulate matter less than 2.5 µm (PM<sub>2.5</sub>) monitoring was conducted by three Palas Fidas (one utilised for management only) units at MPO during November 2019.

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 November 2019 have been provided in Section 6.2 and 6.4 respectively, as an indication of annual performance between November 2018 – November 2019, and do not represent annual average results for 2019 as per Schedule 3, Condition 20 of DA 92/97.



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

There were elevated PM<sub>10</sub> measurements reported throughout November 2019. These elevated PM<sub>10</sub> levels on the aforementioned dates are suspected to be associated with wider regional air quality events, including dust storms and bushfires, and are not suspected to be an incremental increase as a result of mining operations at MPO.

There were elevated measurements reported at the Muswellbrook NW monitor in accordance with EPL 20850 for 'adverse dust conditions' (44 µg/m<sup>3</sup>) for the 24 hour rolling average throughout November 2019. The Muswellbrook NW monitor was operational during all days of November 2019. During this period, approximately 766 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 November 2019 are presented in **Table 6-1**.

**Table 6-1: MPO Palas Fidas PM<sub>10</sub> Data – November 2019**

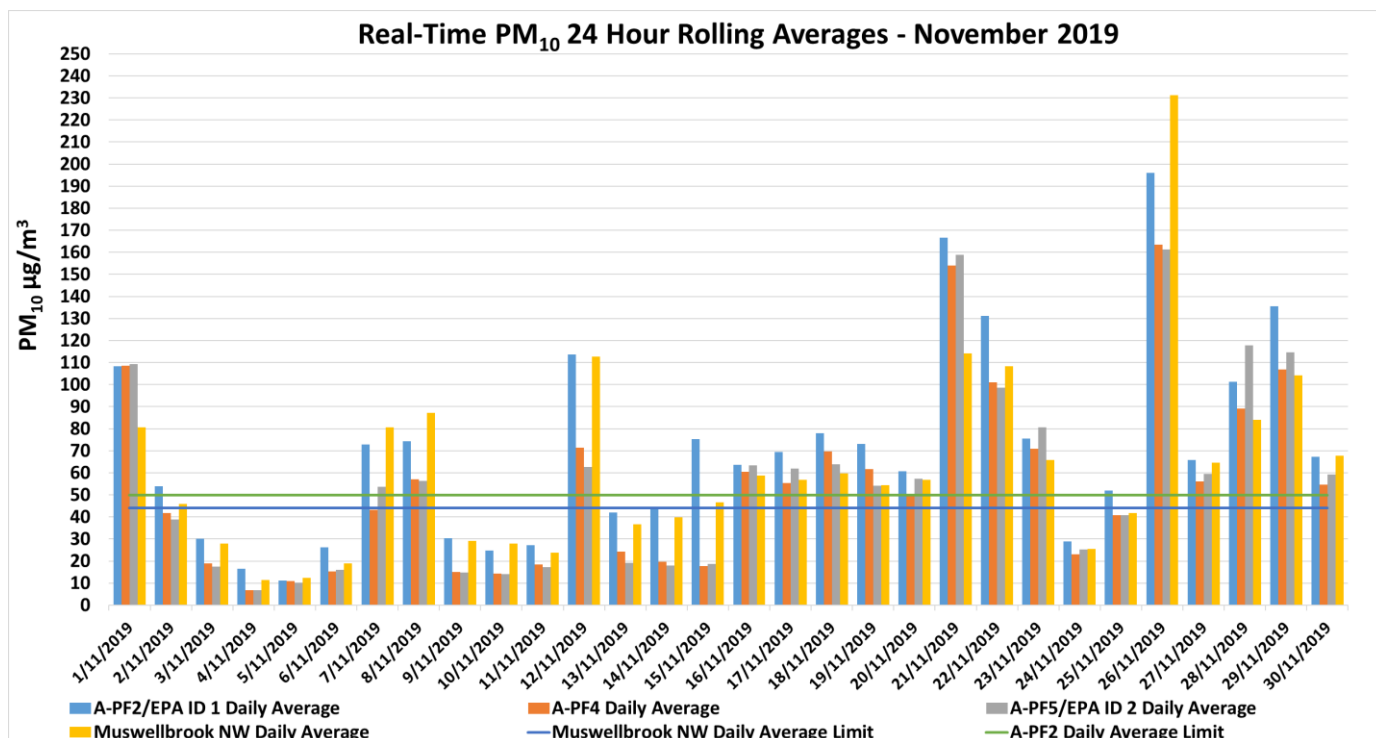
Date	A-PF2/EPA ID 1	A-PF4	A-PF5/EPA ID 2	Muswellbrook NW	Muswellbrook NW 24 Hour Average Limit (µg/m³)	A-PF2, A-PF4, A-PF5 24 Hour Average Limit (µg/m³)
	24 hour Average Result					
1/11/2019	108	109	109	81	44	50
2/11/2019	54	42	39	46	44	50
3/11/2019	30	19	17	28	44	50
4/11/2019	16	7	7	11	44	50
5/11/2019	11	11	10	12	44	50
6/11/2019	26	15	16	19	44	50
7/11/2019	73	43	54	81	44	50
8/11/2019	74	57	56	87	44	50
9/11/2019	30	15	15	29	44	50
10/11/2019	25	14	14	28	44	50
11/11/2019	27	19	17	24	44	50
12/11/2019	114	71	63	113	44	50
13/11/2019	42	24	19	37	44	50
14/11/2019	44	20	18	40	44	50
15/11/2019	75	18	19	47	44	50
16/11/2019	64	60	63	59	44	50
17/11/2019	69	55	62	57	44	50
18/11/2019	78	70	64	60	44	50
19/11/2019	73	62	54	54	44	50
20/11/2019	61	50	57	57	44	50
21/11/2019	167	154	159	114	44	50
22/11/2019	131	101	99	108	44	50
23/11/2019	76	71	81	66	44	50
24/11/2019	29	23	25	25	44	50
25/11/2019	52	41	41	42	44	50
26/11/2019	196	163	161	231	44	50
27/11/2019	66	56	60	65	44	50
28/11/2019	101	89	118	84	44	50

29/11/2019	<b>135</b>	<b>107</b>	<b>115</b>	<b>104</b>	44	50
30/11/2019	<b>67</b>	<b>55</b>	<b>59</b>	<b>68</b>	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 November 2019.



**Figure 6-1: Real-time PM<sub>10</sub> 24 hour rolling average results for November 2019.**

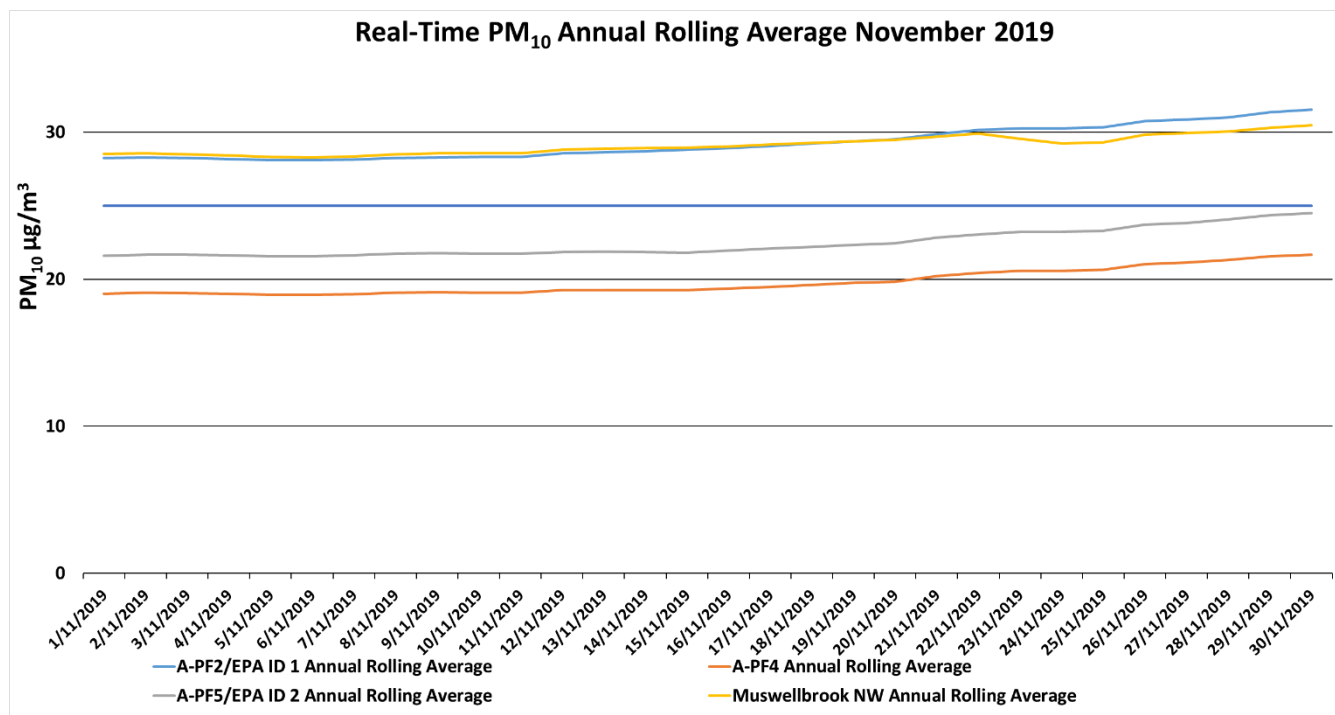
## 6.2 PM<sub>10</sub> Results – Annual rolling average

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, are suspected to have contributed to these elevated PM<sub>10</sub> levels, and as such this is not suspected to be an incremental increase as a result of mining operations at MPO.

Real time PM<sub>10</sub> annual rolling averages for November 2019 are presented in **Figure 6-2** below.





**Figure 6-2: Real-time PM<sub>10</sub> Annual Rolling average results for November 2019.**

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

There were elevated PM<sub>2.5</sub> measurements reported throughout November 2019. These high PM<sub>2.5</sub> levels on the aforementioned dates are suspected to be associated with wider regional air quality events, including dust storms and bushfires, and are not suspected to be an incremental increase as a result of mining operations at MPO.

Real time PM<sub>2.5</sub> 24 hour rolling average results for November 2019 are presented in **Table 6-2**.

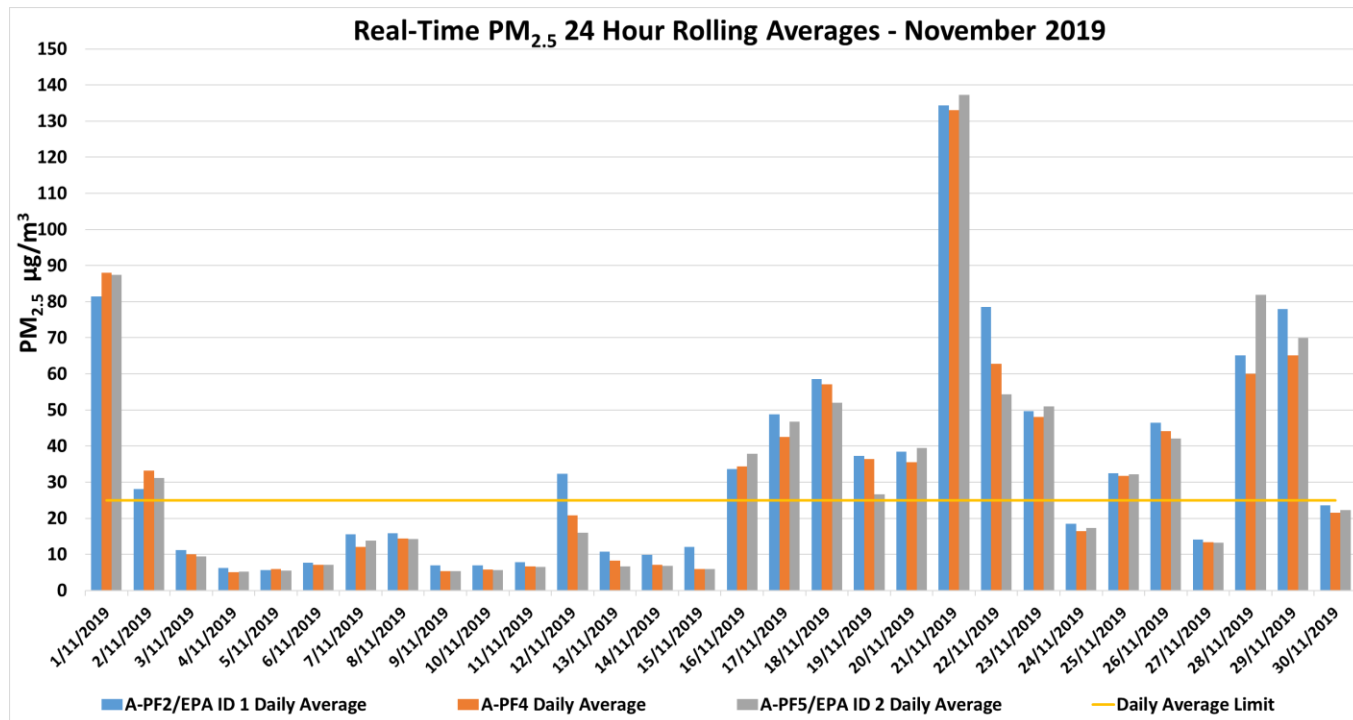
**Table 6-2: MPO Palas Fidas PM<sub>2.5</sub> Data – November 2019**

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			
1/11/2019	81	88	87	25
2/11/2019	28	33	31	25
3/11/2019	11	10	9	25
4/11/2019	6	5	5	25
5/11/2019	6	6	6	25
6/11/2019	8	7	7	25
7/11/2019	16	12	14	25
8/11/2019	16	14	14	25
9/11/2019	7	5	5	25
10/11/2019	7	6	6	25
11/11/2019	8	7	7	25
12/11/2019	32	21	16	25

13/11/2019	11	8	7	25
14/11/2019	10	7	7	25
15/11/2019	12	6	6	25
16/11/2019	<b>34</b>	<b>34</b>	<b>38</b>	25
17/11/2019	<b>49</b>	<b>43</b>	<b>47</b>	25
18/11/2019	<b>59</b>	<b>57</b>	<b>52</b>	25
19/11/2019	<b>37</b>	<b>36</b>	<b>27</b>	25
20/11/2019	<b>38</b>	<b>36</b>	<b>39</b>	25
21/11/2019	<b>134</b>	<b>133</b>	<b>137</b>	25
22/11/2019	<b>79</b>	<b>63</b>	<b>54</b>	25
23/11/2019	<b>50</b>	<b>48</b>	<b>51</b>	25
24/11/2019	18	16	17	25
25/11/2019	<b>32</b>	<b>32</b>	<b>32</b>	25
26/11/2019	<b>46</b>	<b>44</b>	<b>42</b>	25
27/11/2019	14	13	13	25
28/11/2019	<b>65</b>	<b>60</b>	<b>82</b>	25
29/11/2019	<b>78</b>	<b>65</b>	<b>70</b>	25
30/11/2019	24	22	22	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 November 2019 are presented in **Figure 6-3** below.



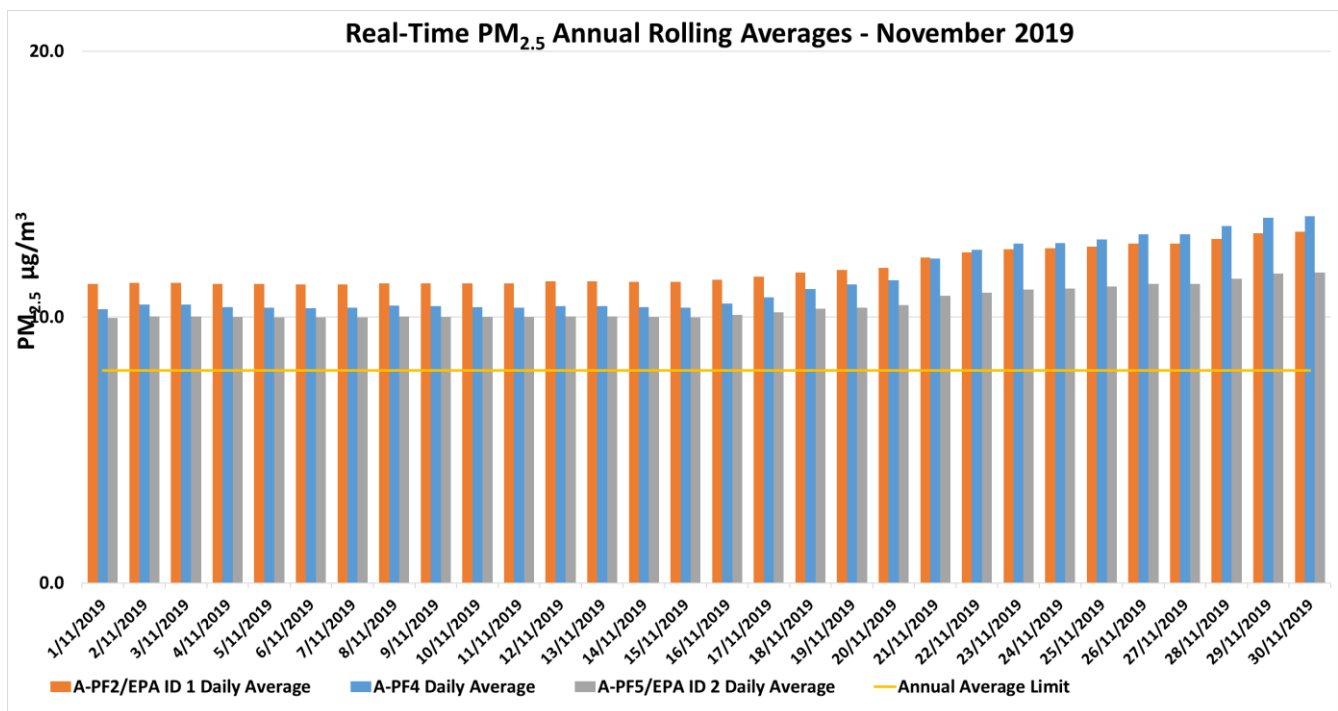
**Figure 6-3: Real-time PM<sub>2.5</sub> 24 hour rolling average results for November 2019.**

## 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 November 2019.

Wider regional air quality events, including dust storms and bushfires, are suspected to have contributed to these elevated PM<sub>2.5</sub> levels, and as such this is not suspected to be an incremental increase as a result of mining operations at MPO.

Real time PM<sub>2.5</sub> annual rolling averages for November 2019 are presented in **Figure 6-4** below.



**Figure 6-4: Real-time PM<sub>2.5</sub> Annual Rolling average results for November 2019.**

## 7. Surface Water Monitoring

### 7.1 Methodology

Surface water quality is monitored at 13 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 4 November 2019. 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 – 4 November 2019**

Station	pH	Electrical Conductivity (EC) (µs/cm) <sup>1</sup>	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W1	8.3	360	11	252
W2	Λ	Λ	Λ	Λ
W3	8.2	360	10	259
W4	7.6	1250	9	727
W5	*	*	*	*
W6A	8.2	360	11	244
W7	*	*	*	*
W9	*	*	*	*
W11	Λ	Λ	Λ	Λ
W12	7.9	7000	15	4100
W13	*	*	*	*
W14	*	*	*	*
W15	8.0	360	22	218

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

\*Dry or insufficient water to sample.

Λ 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).

Six of the thirteen monitoring locations were found to be dry or not safely accessible (W2) on 4 November 2019. All sites sampled were below or inside the trigger level values. An investigation will be triggered if samples are reported outside the trigger level values for three consecutive sampling events in accordance MPO Water Management Plan (MACH Energy, 2019).

## 8. Groundwater Monitoring

Quarterly groundwater monitoring was conducted on 1 November 2019. 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)	August 2019 Water Level (DTW)	Triggered (Yes/No)
	80 <sup>th</sup> Percentile (DTW)	Trigger			
WRA1L	-	± 0.5m	6.10	5.92	
WRA1U	-	± 0.5m	*	*	
WRA3L	-	± 0.5m	16.02	15.93	
WRA3U	-	± 0.5m	4.80	4.48	
WRA5L	-	± 0.5m	0.99	0.00	
WRA5U	-	± 0.5m	1.78	0.43	
WRA6L	-	± 0.5m	2.98	2.55	
WRA6U	-	± 0.5m	4.27	4.10	
MPBH1	9.71	10.70	9.69	10.00	No
MPBH2	12.20	14.20	12.51	12.47	No
MPBH3b	12.00	Dry	12.46	12.39	No
MPBH4	-	± 0.5m	12.40	12.38	
MPBH5	-	± 0.5m	*	*	
3500C500 (L)	-	± 0.5m	57.74	57.44	
3500C500 (S)	-	± 0.5m	26.09	26.05	
4500F000	-	± 0.5m	29.09	28.31	
5000D000	-	± 0.5m	97.89	90.85	
6500F500L	-	± 0.5m	52.96	52.86	
6500F500M	-	± 0.5m	54.58	54.48	
6500F500U	-	± 0.5m	*	*	
6500F625	-	± 0.5m	22.23	16.33	
Melody	-	± 0.5m	13.55	12.75	
7500F000	-	± 0.5m	36.33	36.21	

\* Dry/insufficient water to sample

\*\* Bore appeared to be blocked

\*\*\* New site

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	Aug 2019 EC	May 2019 EC	Triggered (Yes/No)
	20 <sup>th</sup> Percentile	80 <sup>th</sup> Percentile				
WRA1L	6.0	8.5	7.3	7.1	6.9	No
WRA1U	6.0	8.5	*	*	*	-
WRA3L	6.0	8.5	6.7	6.8	6.8	No
WRA3U	6.0	8.5	7.6	7.2	7.2	No
WRA5L	6.0	8.5	7.9	7.3	7.3	No
WRA5U	6.0	8.5	7.4	7.4	7.4	No
WRA6L	6.0	8.5	7.6	7.0	6.9	No
WRA6U	6.0	8.5	6.9	6.9	6.9	No
MPBH1	6.0	8.5	7.1	7.1	6.9	No
MPBH2	6.0	8.5	7.0	6.9	6.7	No
MPBH3b	6.0	8.5	7.7	8.1	7.5	No
MPBH4	6.0	8.5	7.0	7.0	6.8	No
MPBH5	6.0	8.5	*	*	*	-
3500C500 (L)	6.0	8.5	7.4	7.5	7.3	No
3500C500 (S)	6.0	8.5	7.2	7.0	7.0	No
4500F000	6.0	8.5	6.8	6.8	6.8	No
5000D000	6.0	8.5	6.9	6.9	6.9	No
6500F500L	6.0	8.5	7.4	7.5	7.1	No
6500F500M	6.0	8.5	7.3	7.3	7.1	No
6500F500U	6.0	8.5	*	*	*	-
6500F625	6.0	8.5	7.0	7.1	6.8	No
Melody	6.0	8.5	7.3	7.1	6.9	No
7500F000	6.0	8.5	7.8	7.8	7.6	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	Aug 2019 EC	May 2019 EC	Triggered (Yes/No)
	Maximum Beneficial Use Trigger				
WRA1L	7800	3650	4400	4150	No
WRA1U	^	*	*	*	-
WRA3L	22000	16600	16100	15800	No
WRA3U	22000	3600	6800	7200	No
WRA5L	7800	2900	2750	2700	No
WRA5U	7800	2900	2750	2450	No
WRA6L	7800	6500	5600	6050	No
WRA6U	22000	11200	10800	11000	No
MPBH1	800	480	450	450	No
MPBH2	930	850	800	810	No
MPBH3b	7800	3950	3650	3400	No
MPBH4	^	6150	5550	5200	-
MPBH5	^	*	*	*	-
3500C500 (L)	7800	4000	3950	4000	No
3500C500 (S)	7800	5000	4700	4600	No
4500F000	22000	9400	9300	9400	No
5000D000	800	<b>830</b>	<b>820</b>	790	No
6500F500L	7800	3900	3750	3500	No
6500F500M	7800	3050	3000	2800	No
6500F500U	7800	*	*	*	-
6500F625	7800	3600	2850	3150	No
Melody	^	1300	940	1000	No
7500F000	7800	6450	6350	6250	No

\* 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).

Groundwater monitoring site 5000D000 was outside of the EC triggers. An investigation will be triggered if this occurs for three consecutive sampling events in accordance MPO Water Management Plan (MACH Energy, 2019).

The next quarterly monitoring event is scheduled for February 2020.

## 9. Noise Monitoring

Attended noise monitoring was undertaken during the night period of 21 November 2019 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 November 2019 against noise criteria is shown in **Table 9-1**.

**Table 9-1 –  $L_{Aeq,15min}$  Generated by MPO Night-Time Monitoring – 21 November 2019**

Location	Start Date and Time	Wind Speed m/s	Stability Class	Criterion dB	Criterion Applies <sup>1</sup>	MPO Only $L_{Aeq}$ dB <sup>2,4,5</sup>	Exceedance dB <sup>3,4</sup>
N-AT1	21/11/19 23:48	2.4	D	43	Yes	<25	Nil
N-AT2	21/11/19 22:00	2.7	F	36	No	Inaudible	NA
N-AT3	21/11/19 23:00	2.8	D	35	Yes	33	Nil
N-AT4	21/11/19 23:56	2.4	D	42	Yes	34	Nil
N-AT5	21/11/19 23:32	2.5	D	40	Yes	37	Nil
N-AT6	21/11/19 22:38	2.1	D	35	Yes	Inaudible	Nil

Notes:

1. 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  $L_{Aeq,15minute}$  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;
4. Bold results indicate exceedance of criteria;

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 November 2019 monitoring period.

## 10. Blast Monitoring

There were 6 blasts during November (a total of 62 blasts YTD). Results for November 2019 are presented in **Table 10-1**. All blast results during the November 2019 monitoring period and YTD are compliant with EPL 20850 and DA 92/97.

**Table 10-1 – MPO Blast Monitoring Results – November 2019**

Date Fired	Time Fired	Vibration BVOA	Overpressure BVOA	Vibration BVOC	Overpressure BVOC	Vibration BVO2	Overpressure BV02
11/11/19	13:10	0.520 mm/s	907 DBL	0.260 mm/s	91.9 DBL	1.350 mm/s	101.7 DBL
14/11/19	13:45	0.510 mm/s	91.7 DBL	0.290 mm/s	101.5 DBL	1.520 mm/s	107.3 DBL
20/11/19	13:44	0.820 mm/s	101.9 DBL	0.830 mm/s	103.4 DBL	4.500 mm/s	106.4 DBL
20/11/19	13:44	0.180 mm/s	96.7 DBL	0.170 mm/s	102.9 DBL	0.340 mm/s	104.8 DBL
26/11/19	9:20	0.900 mm/s	99 DBL	0.250 mm/s	117.8 DBL	0.650 mm/s	110.7 DBL
29/11/19	12:06	1.180 mm/s	96 DBL	0.990 mm/s	95.2 DBL	5.110 mm/s	108.7 DBL