

**Mount Pleasant Operation
Monthly Environmental Monitoring Report**

November 2022

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

Name of Operation	Mount Pleasant Operation
Name of Licensee	MACH Energy Australia Pty Ltd
Environmental Protection Licence	20850
Project Approval	DA 92/97
Reporting Period Start Date	1 November 2022
Reporting Period End Date	30 November 2022
Date All Data Received	13 January 2023

Links to two key regulatory documents are provided here:

- [MACH Energy Environment Protection Licence EPL 20850; and](#)
- [Mount Pleasant Operation Development Application Approval DA 92/97.](#)

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 the following figures:

- **Figure 2-1** shows MPO attended noise monitoring locations and Noise Assessment Groups (NAGs);
- **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; and
- **Figure 2-5** shows the MPO Surface Water Monitoring network.

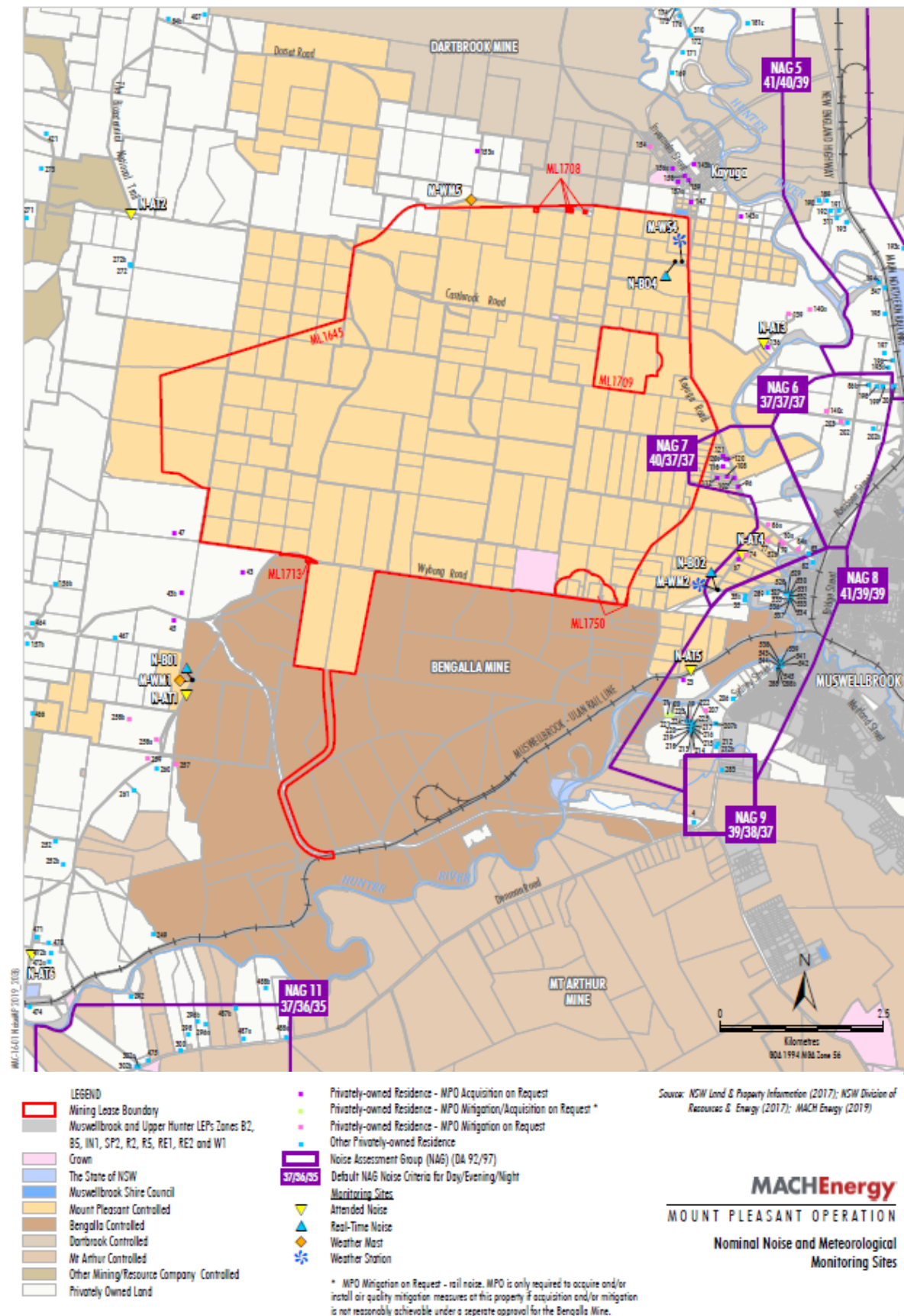


Figure 2-1 – MPO Attended Noise Monitoring Assessment Groups and Locations

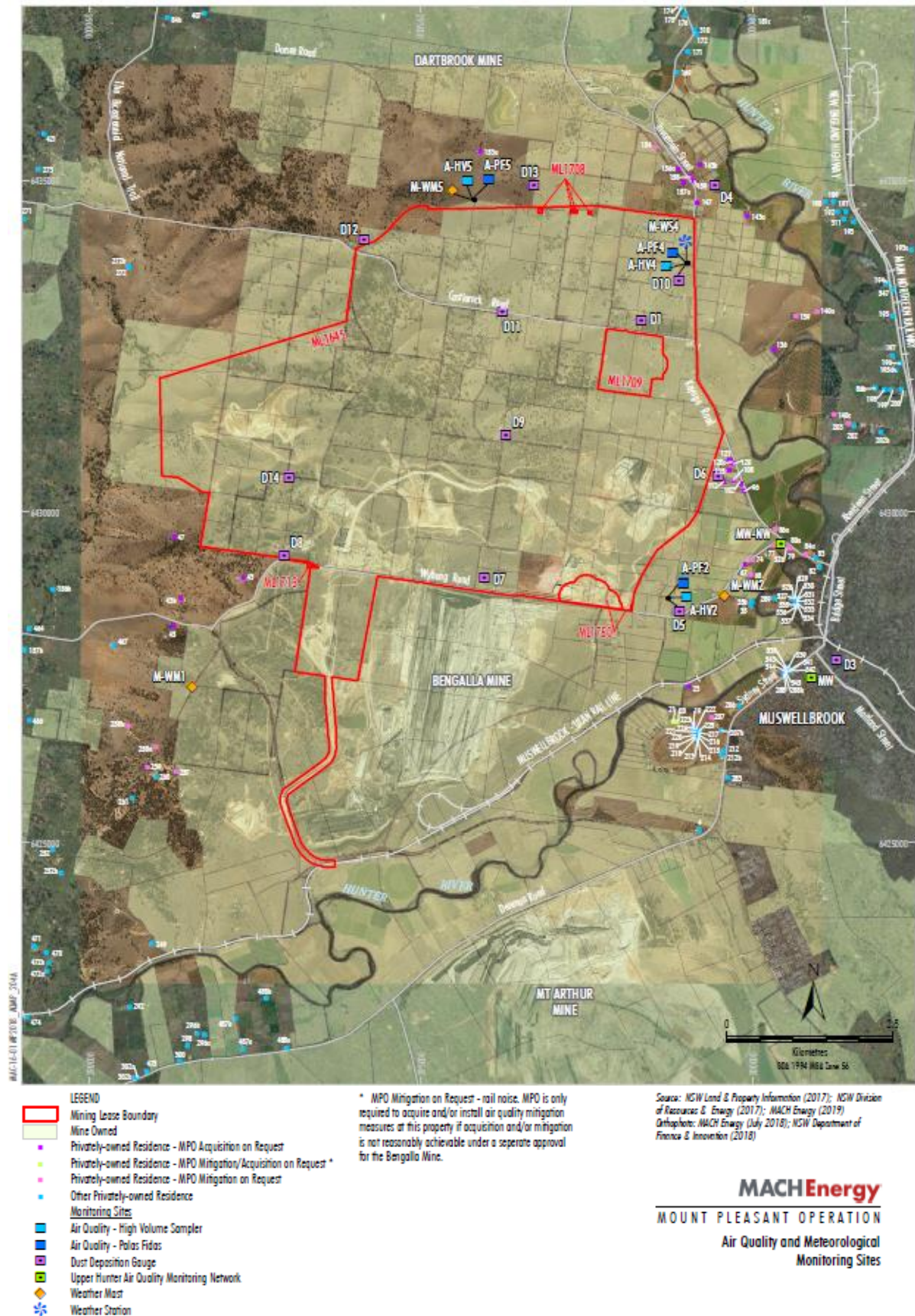


Figure 2-2 – MPO Air Quality and Meteorological Monitoring Network

MACHEnergy
MOUNT PLEASANT OPERATION
Augmentations to the
Groundwater Monitoring Network

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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 stations. In addition to air quality parameters (PM₁₀ and PM_{2.5}), the weather stations measure wind speed and direction, temperature (at 2 metres (m) and 10m), temperature inversion (using the sigma theta method), solar radiation, relative humidity, rainfall and atmospheric pressure.

The majority of meteorological data was captured at M-WS2 (>97.5%) during November 2022 (the monitoring period), with the exception of solar radiation parameters (92.4%). The majority of data for these meteorological parameters was captured at M-WS4 (>94.4%) during the monitoring period.

Throughout November 2022, there was 52.6mm and 60.2mm 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 gauges commenced on 17 October 2022. Sample collection was undertaken on 17 November 2022 by AECOM with sample analysis performed by ALS, a National Accreditation and Testing Authority (NATA) accredited laboratory. Results are summarised in **Table 4-1**. Annual rolling averages for November 2022 have been provided as an indication of performance between November 2021 – November 2022 and does not represent annual average results for 2022 as per Schedule 3, Condition 20 of DA 92/97.

Table 4-1: Dust Depositional Results – November 2022

Location	YTD Insoluble Solids (g/m ² .month)	Insoluble Solids Annual Rolling Average (g/m ² .month)
D1	2.1	2.2
D3*	-	-
D4	1.1	1.0
D5a	3.4	2.3
D6	2.1	1.5
D7b	4.7	6.4
D8	3.4	3.2
D9a	3.0	2.1
D10	0.8	0.9
D11	2.1	1.8
D12	0.6	0.6
D13	1.1	1.0
D14	2.4	2.8
<i>Criterion</i>	-	4

Notes:

Results in **bold** indicate an elevated measurement of adopted assessment criteria

* not in service.

Contaminated results, as described in Section 4.1, are not included in the 12-month rolling average. Site D7b is located within close proximity to the northern boundary of a neighbouring mining operation and thus can be influenced by this site. D7b 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 November sampling event noted that all the gauges contained insects with one gauge also containing bird droppings and another a spider. There was insufficient evidence of contamination in all depositional dust gauges to justify any being deemed contaminated. All November 2022 insoluble solid results were included in the annual rolling average calculations.

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

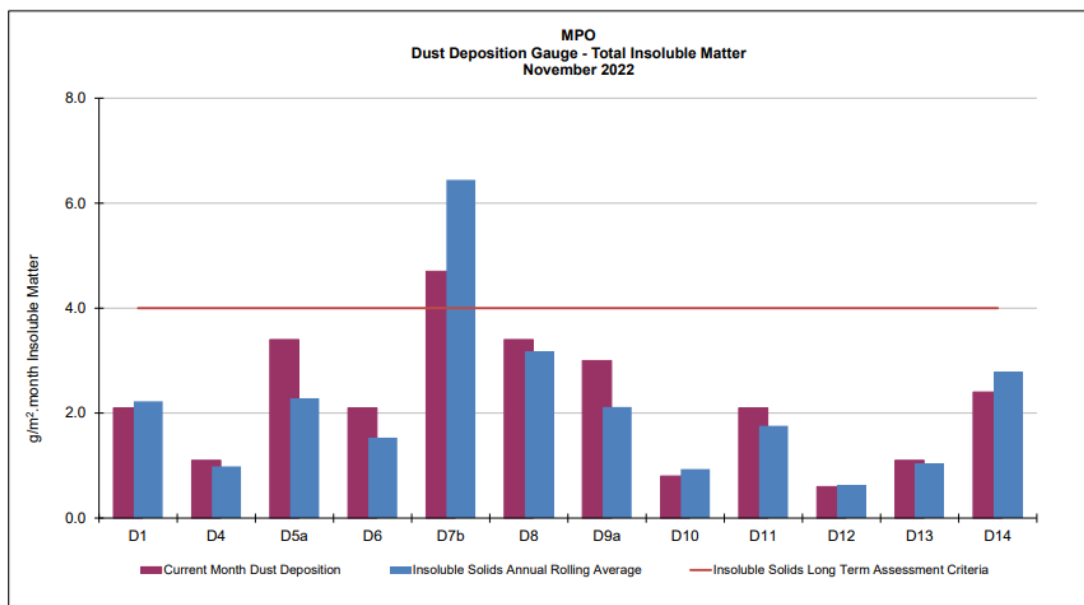


Figure 4-1: MPO Dust Deposition Monthly Results and Annual Rolling Average – November 2022

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 project contribution plus background criterion of 90 µg/m³.

5.2 Results

In November 2022, sample collection was undertaken by AECOM with sample analysis performed by ALS, a NATA accredited laboratory. TSP results for the monitoring period are provided in **Table 5-2**. Annual rolling averages for November 2022 have been provided as an indication of performance between November 2021 – November 2022 and do not represent annual average results for 2022 as per Schedule 3, Condition 20 of DA 92/97.

Table 5-2 Total Suspended Particulate Monitoring Data – November 2022

Run Date	Assessment Criterion	TSP $\mu\text{g}/\text{m}^3$		
		HVAS A-PF2	HVAS M-WS4	HVAS A-PF5
6/11/2022	-	31.2	35.2	43.8
12/11/2022	-	40.9	42.6	24.4
18/11/2022	-	50.3	48.0	65.0
24/11/2022	-	57.1	27.3	25.6
30/11/2022	-	42.7	34.9	59.1
Monthly Mean	-	44.4	37.6	43.6

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 $90 \mu\text{g}/\text{m}^3$.

6. Real Time Air Quality Monitoring

Continuous particulate matter less than $10 \mu\text{m}$ (PM_{10}) and particulate matter less than $2.5 \mu\text{m}$ ($\text{PM}_{2.5}$) monitoring was conducted by three Palas Fidas units (one utilised for management only) at MPO during November 2022.

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_{10} and $\text{PM}_{2.5}$ 12-month rolling averages for November 2022 have been provided in Section 6.2 and 6.4 respectively, as an indication of performance between November 2021 – November 2022 and do not represent annual average results for 2022 as per Schedule 3, Condition 20 of DA 92/97.

6.1 PM_{10} Results – 24 Hour Rolling Average

In accordance with the DA 92/97 limit of $50 \mu\text{g}/\text{m}^3$ for the 24 hour rolling average, there was no elevated readings measured for November 2022. Real time PM_{10} 24 hour rolling average results for November 2022 are presented in **Table 6-1**.

Table 6-1: MPO Palas Fidas PM₁₀ Data – November 2022

Date	A-PF2/EPA ID 1	A-PF4	A-PF5/EPA ID 2	Muswellbrook NW	Muswellbrook NW 24 Hour Average Limit (µg/m ³)	A-PF2, A-PF4, A-PF5 24 Hour Average Limit (µg/m ³)
	24 hour Average Result					
1/11/2022	12	7	-	7.3	44	50
2/11/2022	13	8	-	14.9	44	50
3/11/2022	10	8	-	14.9	44	50
4/11/2022	12	11	-	15.6	44	50
5/11/2022	13	11	-	13.7	44	50
6/11/2022	13	11	-	14.3	44	50
7/11/2022	14	13	-	15.1	44	50
8/11/2022	13	11	-	14.1	44	50
9/11/2022	14	11	-	15.2	44	50
10/11/2022	14	12	-	22.5	44	50
11/11/2022	22	14	-	18.3	44	50
12/11/2022	104	13	-	15.4	44	50
13/11/2022	20	15	-	18.6	44	50
14/11/2022	19	9	-	15.6	44	50
15/11/2022	16	7	-	16.1	44	50
16/11/2022	14	7	-	16.9	44	50
17/11/2022	-	8	-	15.0	44	50
18/11/2022	-	14	-	19.4	44	50
19/11/2022	12	11	-	15.6	44	50
20/11/2022	22	10	-	29.3	44	50
21/11/2022	21	9	-	32.3	44	50
22/11/2022	18	8	-	26.8	44	50
23/11/2022	17	7	-	22.6	44	50
24/11/2022	13	9	-	18.4	44	50
25/11/2022	18	-	-	20.5	44	50
26/11/2022	18	-	-	21.4	44	50
27/11/2022	22	-	-	27.6	44	50
28/11/2022	21	-	-	22.5	44	50
29/11/2022	23	-	-	24.7	44	50
30/11/2022	17	-	-	19.0	44	50

Notes:

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)

- Data capture affected by technical issue and equipment malfunction

Figure 6-1 below shows the results of real-time PM₁₀ 24 hour rolling average results at MPO air quality monitoring sites November 2022.

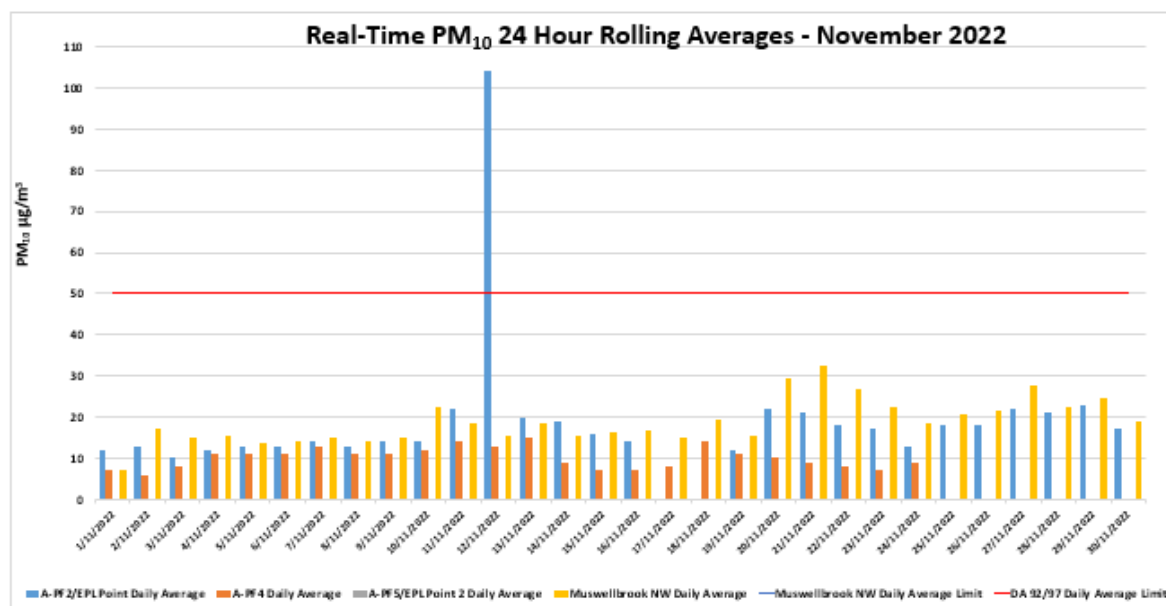
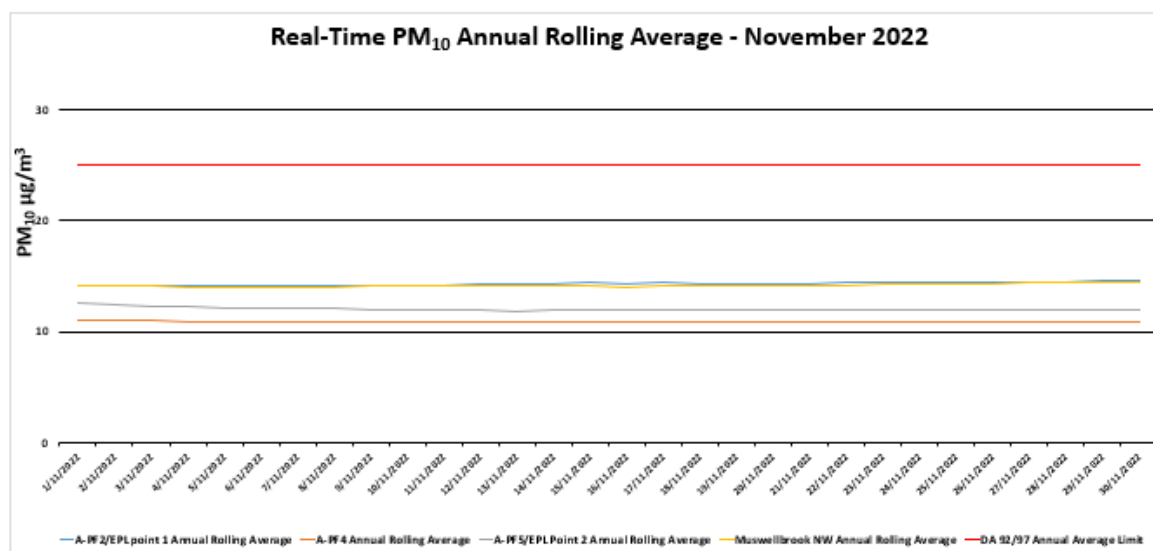


Figure 6-1: Real-time PM₁₀ Annual Rolling Average Results for November 2022.

6.2 PM₁₀ Results – Annual Rolling Average

There was no exceedance of the PM₁₀ annual rolling average reported at MPO during November 2022. Real time PM₁₀ annual rolling averages for November 2022 are presented in **Figure 6-2** below.



6.3 PM_{2.5} Results – 24 Hour Rolling Average

There were no exceedance of the PM_{2.5} annual rolling average reported at MPO during November 2022. Real time PM_{2.5} 24 hour rolling average results for November 2022 are presented in **Table 6-2**.

Table 6-2: MPO Palas Fidas PM_{2.5} Data – November 2022

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			
1/11/2022	3	3	-	25
2/11/2022	3	3	-	25
3/11/2022	3	3	-	25
4/11/2022	4	4	-	25
5/11/2022	5	4	-	25
6/11/2022	5	5	-	25
7/11/2022	5	5	-	25
8/11/2022	4	4	-	25
9/11/2022	4	4	-	25
10/11/2022	4	4	-	25
11/11/2022	6	4	-	25
12/11/2022	9	4	-	25
13/11/2022	9	6	-	25
14/11/2022	4	3	-	25
15/11/2022	4	3	-	25
16/11/2022	4	3	-	25
17/11/2022	-	3	-	25
18/11/2022	-	4	-	25
19/11/2022	4	4	-	25
20/11/2022	4	3	-	25
21/11/2022	4	3	-	25
22/11/2022	4	3	-	25
23/11/2022	4	3	-	25
24/11/2022	4	3	-	25
25/11/2022	6	-	-	25
26/11/2022	7	-	-	25
27/11/2022	6	-	-	25
28/11/2022	7	-	-	25
29/11/2022	7	-	-	25
30/11/2022	6	-	-	25

Notes:

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)

- Data capture affected by technical issue and equipment malfunction

There was no exceedance of the 24 hour average PM_{2.5} measurement reported in November 2022.

Real time PM_{2.5} 24 hour average results for November 2022 are presented in **Figure 6-3** below.

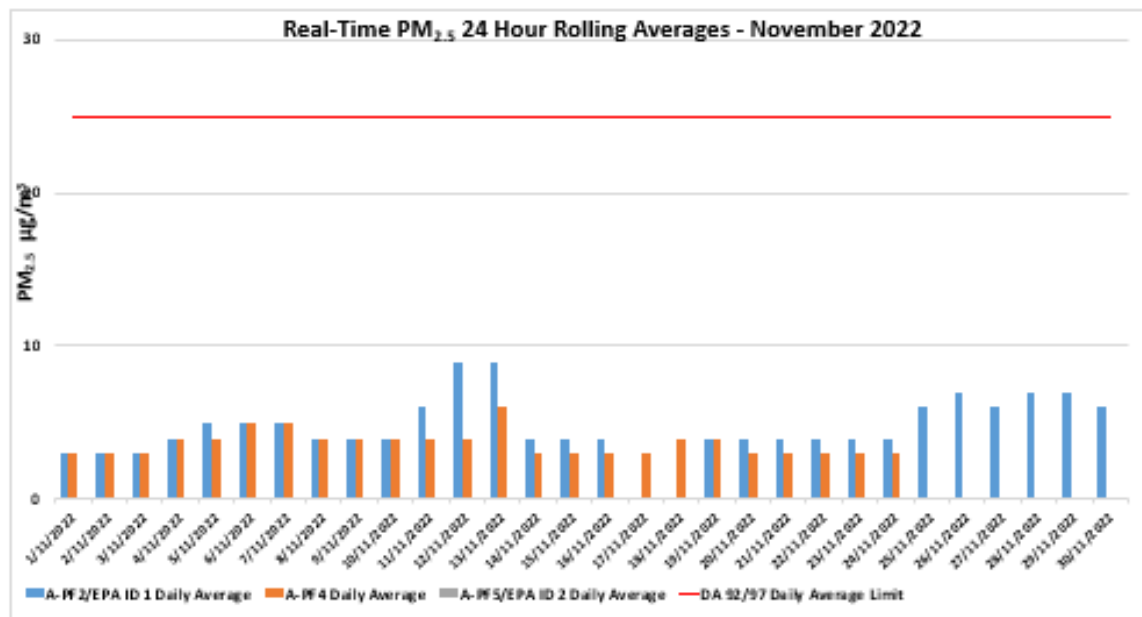


Figure 6-3: Real-time PM_{2.5} 24 hour Rolling Average Results for November 2022.

6.4 PM_{2.5} Results - Annual Rolling Average

There was no exceedance of the PM_{2.5} annual rolling average reported at MPO during November 2022. Real time PM_{2.5} annual rolling averages for November 2022 are presented in **Figure 6-4** below.

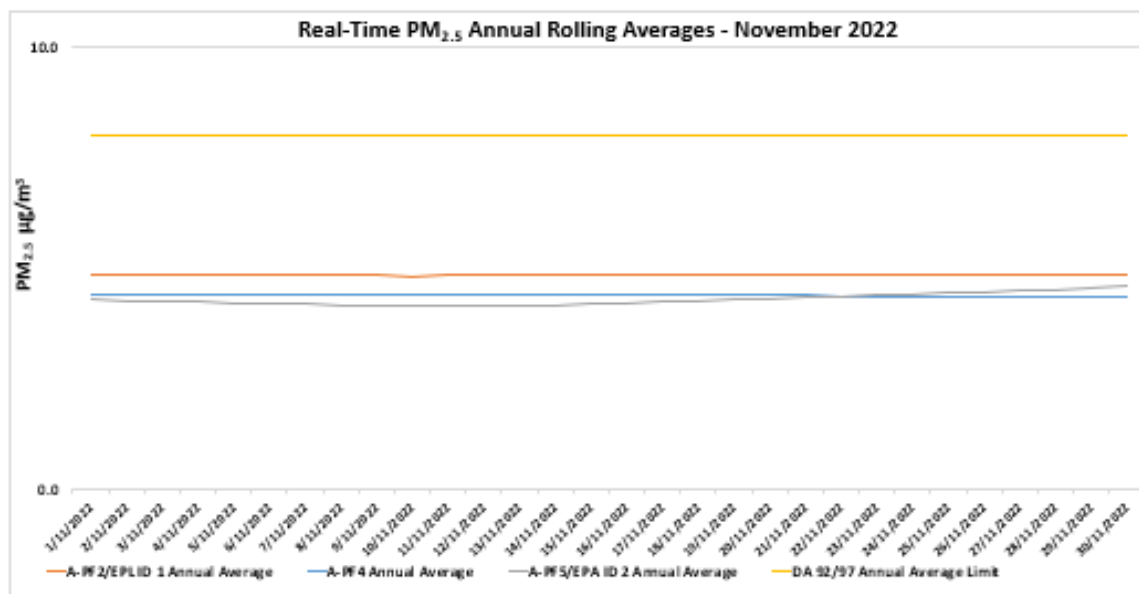


Figure 6-4: Real-time PM_{2.5} Annual Rolling Average Results for November 2022.

7. Surface Water Monitoring

7.1 Methodology

Surface water quality is monitored at 14 sites on a monthly basis, with additional monitoring conducted if triggered by a rain event. A more comprehensive suite of analysis is performed at these sites on a quarterly basis.

7.2 Assessment Criteria

Surface waters were assessed as per the *MPO Water Management Plan* (MACH Energy, 2019) 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

Surface water event monitoring was conducted by AECOM on 1 November 2022. Additional rain event monitoring occurred on 15 November 2022. Laboratory analysis was performed by ALS NATA accredited laboratory. Monthly monitoring results for pH, EC, TSS and Total Dissolved Solids (TDS) are presented in **Table 7-1** and **Table 7-2**.

Table 7-1 – MPO Monthly Surface Water Monitoring Results – 1 November 2022

Station	pH	Electrical Conductivity (EC) (µs/cm) ¹	Total Dissolved Solids (TDS) (mg/L)	Total Suspended Solids (TSS) (mg/L)
W1	7.5	320	223	321
W2	^	^	^	^
W3	7.8	350	235	274
W4	7.5	200	156	84
W5	7.2	65	36*	10
W6A	7.8	340	222	408
W9	7.4	160	93*	68
W11	^	^	^	^
W12	7.9	290	266*	237
W13	7.9	290	166*	237
W14	7.4	350	305	46
W15	7.8	380	260	92
W16	8.1	500	352	40
W17	8.0	320	205	207

Notes:

Results in **bold** indicate exceedances of adopted assessment criteria (refer **Table 7**).

^ Unsafe access

* Calculated result due to interference from fine colloidal material

¹ Results have been rounded in accordance with the In-house method Q4AN(EV)-332-WI2 (EC).

Table 7-2 – MPO Rain Event Surface Water Monitoring Results – 15 November 2022

Station	pH	Electrical Conductivity (EC) (µs/cm) ¹	Total Dissolved Solids (TDS) (mg/L)	Total Suspended Solids (TSS) (mg/L)
W1	7.9	310	216	151
W2	7.9	310	221	205
W3	7.9	300	214	230
W4	7.5	360	255	49
W5	6.9	55	32*	34
W6A	7.9	300	205	312
W9	7.5	470	377	23
W11	^	^	^	^
W12	8.0	670	414	68
W13	8.1	1100	650	34
W14	7.2	300	225	14
W15	7.7	290	230	268
W16	8.1	1950	1040	46
W17	7.9	280	210	327

Notes:

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

*Dry or insufficient water to sample.

^ Indicates no safe access due to wet weather conditions

** Calculated result due to interference from fine colloidal material

¹ Results have been rounded in accordance with the In-house method Q4AN(EV)-332-WI2 (EC).

During the November monthly monitoring, two sites – W2 and W11 - were unable to be accessed due to wet conditions. Sites W6A and W17 exceeded their respective TSS levels.

During the November rain event monitoring, one of the fourteen monitoring locations – site W11 - was unable to be accessed due to wet conditions. Site W9 exceeded its EC criteria and sites W2, W6A and W17 exceeded EC limits.

All other sites were within or below their respective trigger levels across the two monitoring events. An investigation is triggered if elevated measurements occur for three consecutive sampling events in accordance MPO Water Management Plan (MACH Energy, 2019) .

8. Groundwater Monitoring

Quarterly groundwater monitoring was conducted between 16 November and 28 November 2022 inclusive. 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		Nov 2022 Water Level (DTW)	Aug 2022 Water Level (DTW)	May 2022 Water Level (DTW)	Triggered (Yes/No)
	80 th Percentile (DTW)	Trigger				
WRA1L	-	>± 0.5m	0.00	0.00	0.03	
WRA1U	-	>± 0.5m	2.80	5.41	6.34	
WRA6L	-	>± 0.5m	0.60	0.63	0.85	
WRA6U	-	>± 0.5m	1.20	1.57	1.79	
MPBH1	9.71	10.70	8.39	8.89	9.77	No
MPBH2	12.20	14.20	10.70	11.19	11.27	No
MPBH3b	12.00	Dry (or 14.0m)	10.25	11.10	11.24	No
MPBH4	-	>± 0.5m	10.32	11.08	11.25	
MPBH5	-	>± 0.5m	*	*	8.83	
MPBH1-C	-	>± 0.5m	8.55	9.03	9.89	
MPBH1-HR	-	>± 0.5m	34.75	44.31	13.33	
MPBH2-C	-	>± 0.5m	11.00	11.50	11.57	
MPBH2-HR	-	>± 0.5m	11.18	11.89	19.82	
MPBH4-C	-	>± 0.5m	9.92	10.64	10.83	
MPBH4-HR	-	>± 0.5m	50.65	50.76	50.80	
MPBH5-C	-	>± 0.5m	10.50	11.10	10.99	
MPBH5-HR	-	>± 0.5m	10.48	11.89	11.01	
MPBH6	-	>± 0.5m	8.25	9.37	9.54	
MPBH6-C	-	>± 0.5m	10.44	10.97	11.27	
MPBH6-HR	-	>± 0.5m	9.54	10.61	10.74	
MPBH7	-	>± 0.5m	2.64	4.63	5.95	
MPBH7-C	-	>± 0.5m	10.47	12.13	15.00	
3500C500L	-	>± 0.5m	17.79	19.30	59.29	
3500C500S	-	>± 0.5m	17.39	18.88	24.16	
4500F000	-	>± 0.5m	23.84	26.12	29.15	
5000D000	-	>± 0.5m	115.23	114.95	115.07	
5000D000-R**	-	>± 0.5m	137.10	137.41	-	
5500D000	-	>± 0.5m	37.09	37.83	38.55	
6500F500L	-	>± 0.5m	52.86	53.33	53.72	
6500F500M	-	>± 0.5m	53.06	54.00	55.05	
6500F500U	-	>± 0.5m	30.38	32.36	34.50	
6500F625	-	>± 0.5m	12.14	^	^	
Melody	-	>± 0.5m	8.53	^	^	
7500F000	-	>± 0.5m	35.75	36.61	36.61	

* Dry/insufficient water to sample

** New site

^ Unsafe access

An investigation is triggered when the water levels in any alluvial bore falls below the 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		Nov 2022 pH	Aug 2022 pH	May 2022 pH	Triggered (Yes/No)
	Lower	Upper				
WRA1I	6.0	8.5	7.1	7.2	7.1	No
WRA1U			7.2	7.1	*	-
WRA6L			7.1	7.0	7.0	No
WRA6U			6.9	7.0	7.0	No
MPBH1			7.0	7.0	6.9	No
MPBH2			6.9	6.9	6.9	No
MPBH3b			7.1	7.4	7.2	No
MPBH4			7.0	7.1	6.9	No
MPBH5			*	*	*	-
MPBH1-C			8.7	8.5	8.1	No
MPBH1-HR			7.8	7.8	8.1	No
MPBH2-C			11.2	11.2	7.3	No
MPBH2-HR			8.3	8.4	7.3	No
MPBH4-C			7.8	7.9	7.5	No
MPBH4-HR			7.4	7.3	7.5	No
MPBH5-C			10.3	9.8	9.9	Yes
MPBH5-HR			7.5	7.5	7.4	No
MPBH6			7.1	7.1	7.1	No
MPBH6-C			7.8	7.4	7.8	No
MPBH6-HR			7.4	7.4	7.3	No
MPBH7			7.2	7.0	7.0	No
MPBH7-C			7.3	7.0	7.2	No
3500C500L			7.6	7.5	7.5	No
3500C500S			7.2	7.3	7.3	No
4500F000			6.9	6.8	6.8	No
5000D000-R**			7.9	7.7	-	-
5500D000			7.0	6.9	7.0	No
6500F500L			7.2	7.2	7.3	No
6500F500M			7.3	7.2	7.3	No
6500F500U			6.8	6.6	*	-
6500F625			7.0	^	^	-
Melody			7.0	^	^	-
7500F000			7.7	7.9	7.8	No

* Dry/insufficient water to sample

^ Unsafe Access

*** New site – results may not be representative of groundwater conditions at time of sampling due to ongoing well development

- 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 had a change in standing water level of $\pm 0.5\text{m}$ from the previous measurement.

Table 8-3 - MPO Quarterly Groundwater EC Results

Monitoring Location/ ID	Maximum Beneficial Use Trigger	Nov 2022 EC ¹	Aug 2022 EC ¹	May 2022 EC ¹	Triggered (Yes/No)
WRA1L	7800	2900	2650	2800	No
WRA1U	*	3250	900	***	
WRA6L	7800	6150	7200	7300	No
WRA6U	22000	8350	8150	8750	No
MPBH1	800	620	700	650	No
MPBH2	930	870	910	920	No
MPBH3b	7800	7200	6500	6650	No
MPBH4	*	5500	5700	5750	
MPBH5	*	***	***	***	
MPBH1-C	*	1550	1250	860	
MPBH1-HR	*	2000	1750	1750	
MPBH2-C	*	2150	1950	870	
MPBH2-HR	*	1800	1750	920	
MPBH4-C	*	4500	4400	3700	
MPBH4-HR	*	5700	5750	5550	
MPBH5-C	*	620	680	770	
MPBH5-HR	*	890	880	770	
MPBH6	*	1000	1050	1050	
MPBH6-C	*	6700	3250	7300	
MPBH6-HR	*	5200	5150	6300	
MPBH7	*	9950	11200	10300	
MPBH7-C	*	10900	10300	10300	
3500C500L	7800	3850	3600	3700	No
3500C500S	7800	4500	3450	2800	No
4500F000	22000	8450	7950	8450	No
5000D000-R**	*	4250	4250	-	
5500D000	7800	4300	4250	4450	No
6500F500L	7800	2950	3000	3850	No
6500F500M	7800	3100	3000	2950	No
6500F500U	7800	4750	4750	***	
6500F625	7800	4150	^	^	No
Melody	*	2850	^	^	
7500F000	7800	6450	6500	6300	No

* indicates no trigger limit identified

** New site

*** Dry/insufficient water to sample

^ Unsafe access

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**.

¹ Results have been rounded in accordance with the In-house method Q4AN(EV)-332-WI2 (EC).

9. Noise Monitoring

Attended noise monitoring was undertaken during the night period of 16/17 November 2022 at six (6) monitoring locations as per the *MPO Noise Management Plan* (MACH Energy, 2021) 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 2022 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 – 16/17 November 2022

Location	Start Date and Time	Wind Speed m/s	Stability Class	Criterion dB	Criterion Applies ¹	MPO Only L _{A1,1min} dB ^{2,4}	Exceedance dB ³
N-AT1	16/11/2022 23:31	0.6	F	45	Yes	IA	Nil
N-AT2	16/11/2022 22:00	1.8	D	45	Yes	30	Nil
N-AT3	16/11/2022 22:32	0.9	F	45	Yes	41	Nil
N-AT4	17/11/2022 00:11	0.8	E	45	Yes	58	13
N-AT4 ⁶	17/11/2022 00:42	1.3	D	45	Yes	61	16
N-AT5	16/11/2022 23:08	1.5	D	45	Yes	49	4
N-AT5 ⁶	16/11/2022 23:46	1.0	D	45	Yes	40	Nil
N-AT6	16/11/2022 23:08	1.5	D	45	Yes	IA	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_{A1,1minute} 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. IA = inaudible;
5. Bold results indicate exceedance of criteria; and
6. Remeasure

Table 9-2 – $L_{Aeq,15min}$ Generated by MPO: Attended Night Monitoring – 16/17 November 2022

Location	Start Date and Time	Wind Speed m/s	Stability Class	Criterion dB	Criterion Applies ¹	MPO Only L_{Aeq} dB ^{2,3}	Exceedance dB
N-AT1	16/11/2022 23:31	0.6	F	43	Yes	IA	Nil
N-AT2	16/11/2022 22:00	1.8	D	36	Yes	<25	Nil
N-AT3	16/11/2022 22:32	0.9	F	41	Yes	36	Nil
N-AT4	17/11/2022 00:11	0.8	E	42	Yes	40	Nil
N-AT4 ⁴	17/11/2022 00:42	1.3	D	42	Yes	40	Nil
N-AT5	16/11/2022 23:08	1.5	D	40	Yes	36	Nil
N-AT5 ⁴	16/11/2022 23:46	1.0	D	40	Yes	31	Nil
N-AT6	16/11/2022 23:08	1.5	D	35	Yes	IA	Nil

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 $L_{Aeq,15minute}$ attributed to MPO;
- IA = inaudible; and
- Remeasure.

Table 9-3 – $L_{Aeq,period}$ Cumulative Noise: Attended Night Monitoring – 16/17 November 2022

Location	Start Date and Time	Cumulative Noise Criterion L_{Aeq} dB	Measured Mining Only $L_{Aeq,period}$ dB ^{1,2}	Exceedance dB
N-AT1	16/11/2022 23:31	40	Nil	Nil
N-AT2	16/11/2022 22:00	40	Nil	Nil
N-AT3	16/11/2022 22:32	40	Nil	Nil
N-AT4	17/11/2022 00:11	40	40	Nil
N-AT4 ³	17/11/2022 00:42	40	40	Nil
N-AT5	16/11/2022 23:08	40	37	Nil
N-AT5 ³	16/11/2022 23:46	40	37	Nil
N-AT6	16/11/2022 23:08	40	Nil	Nil

Notes:

- 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
- By definition, cumulative noise refers to two or more noise sources. If only one other source of mining is audible, or if MPO is inaudible, the measured cumulative noise defined here is 'Nil'.
- Remeasure.

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 *MPO Noise Management Plan* (MACH Energy, 2021). Noise levels from MPO complied with noise limits at all monitoring locations during the monitoring period with the exception of $L_{A1,1min}$ measurements recorded at locations N-AT4 and N-AT5. Following the $L_{A1,1min}$ exceedances additional attended monitoring was commissioned.

10. Blast Monitoring

There were 13 blast events during November (a total of 85 blasts YTD). Results for November 2022 are presented in **Table 10-1**. All blast results during the November 2022 monitoring period were below the criteria in Schedule 3, Condition 10 of DA 92/97 and EPL 20850.

Table 10-1 – MPO Blast Monitoring Results – November 2022

Day & 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	Blast Fume Compliant
2/11/2022 Wednesday	14:16	0.60	107.6	0.45	107.5	0.54	106.2	Y
4/11/2022 Friday	14:34	0.39	111.3	0.16	97.5	0.27	99.1	Y
7/11/2022 Monday	12:58	0.64	95.7	0.32	86.1	0.46	93.5	Y
9/11/2022 Wednesday	12:14	0.94	101.0	0.51	99.4	0.82	91.7	Y
10/11/2022 Thursday	14:45	0.78	95.2	0.24	95.6	1.73	94.2	Y
15/11/2022 Tuesday	14:18	0.43	101.7	0.27	104.4	0.47	99.6	Y
16/11/2022 Wednesday	13:10	0.36	104.4	0.18	102.0	0.25	96.4	Y
18/11/2022 Friday	12:11	0.51	96.6	0.28	94.7	0.32	92.6	Y
22/11/2022 Tuesday	12:15	0.02	99.3	0.03	102.7	0.03	108.8	Y
23/11/2022 Wednesday	15:33	0.50	108.9	0.30	113.4	0.45	103.7	Y
25/11/2022 Friday	12:35	0.73	97.6	0.76	89.7	0.73	101.5	Y
Tuesday 29/11/2022	13:03	0.25	89.9	0.12	85.3	0.17	92.1	Y
Wednesday 30/11/2022	15:54	1.03	106.0	0.48	106.6	0.56	98.7	Y

END OF REPORT