

Mount Pleasant Operation Monthly Environmental Monitoring Report

February 2024

1. Introduction

The Mount Pleasant Operation (MPO) is located within 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)*, the MPO Development Approval (DA 92/97) and the MPO Development Consent (SSD 10418).

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 February 2024
Reporting Period End Date	29 February 2024
Date All Data Received	14 April 2024

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; and](#)
- [Mount Pleasant Operation Development Consent SSD 10418.](#)

2. Monitoring Requirements

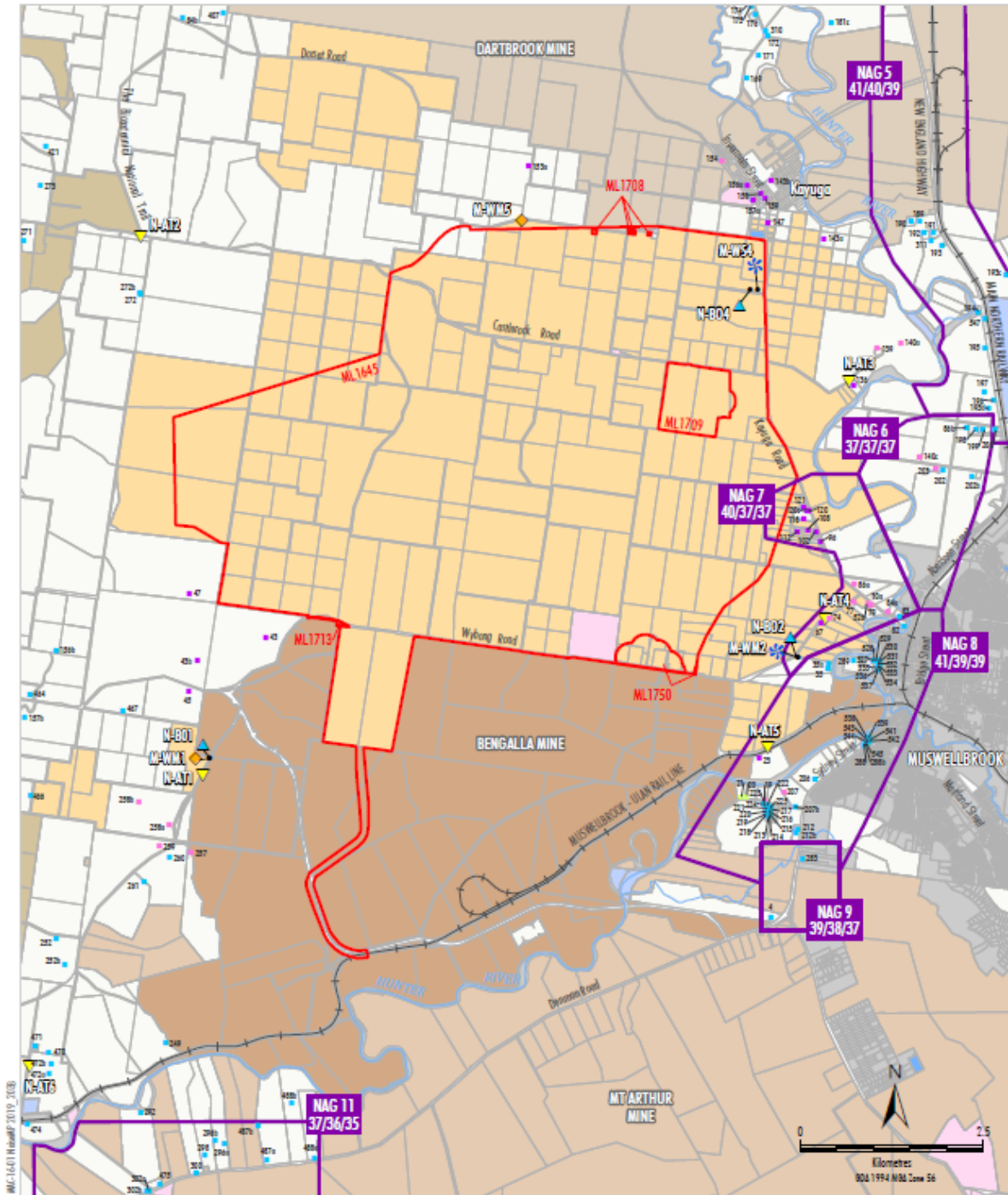
The MPO EPL 20850 specifically requires the monitoring of:

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

Monitoring of sites not required by the EPL are conducted in accordance with *MPO Environmental Monitoring Program (EMP)*, Project Approval (DA 92/97) and Development Consent (SSD 10418).

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.



LEGEND

- Mining Lease Boundary
- Muswellbrook and Upper Hunter LEPs Zones B2, B5, IN1, SP2, R2, R5, RE1, RE2 and W1
- Crown
- The State of NSW
- Muswellbrook Shire Council
- Mount Pleasant Controlled
- Bengalla Controlled
- Dartbrook Controlled
- Mt Arthur Controlled
- Other Mining/Resource Company Controlled
- Privately Owned Land

- Privately-owned Residence - MPO Acquisition on Request
- Privately-owned Residence - MPO Mitigation/Acquisition on Request *
- Privately-owned Residence - MPO Mitigation on Request
- Other Privately-owned Residence
- NAG 9 Noise Assessment Group (NAG) (DA 92/97)
- 37/36/35 Default NAG Noise Criteria for Day/Evening/Night

Monitoring Sites

- ▲ Attended Noise
- ▲ Real-Time Noise
- ◆ Weather Mast
- ✪ Weather Station

* MPO Mitigation on Request - rail noise. MPO is only required to acquire and/or install air quality mitigation measures at this property if acquisition and/or mitigation is not reasonably achievable under a separate approval for the Bengalla Mine.

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); MACH Energy (2019)

MACHEnergy
MOUNT PLEASANT OPERATION
Nominal Noise and Meteorological Monitoring Sites

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

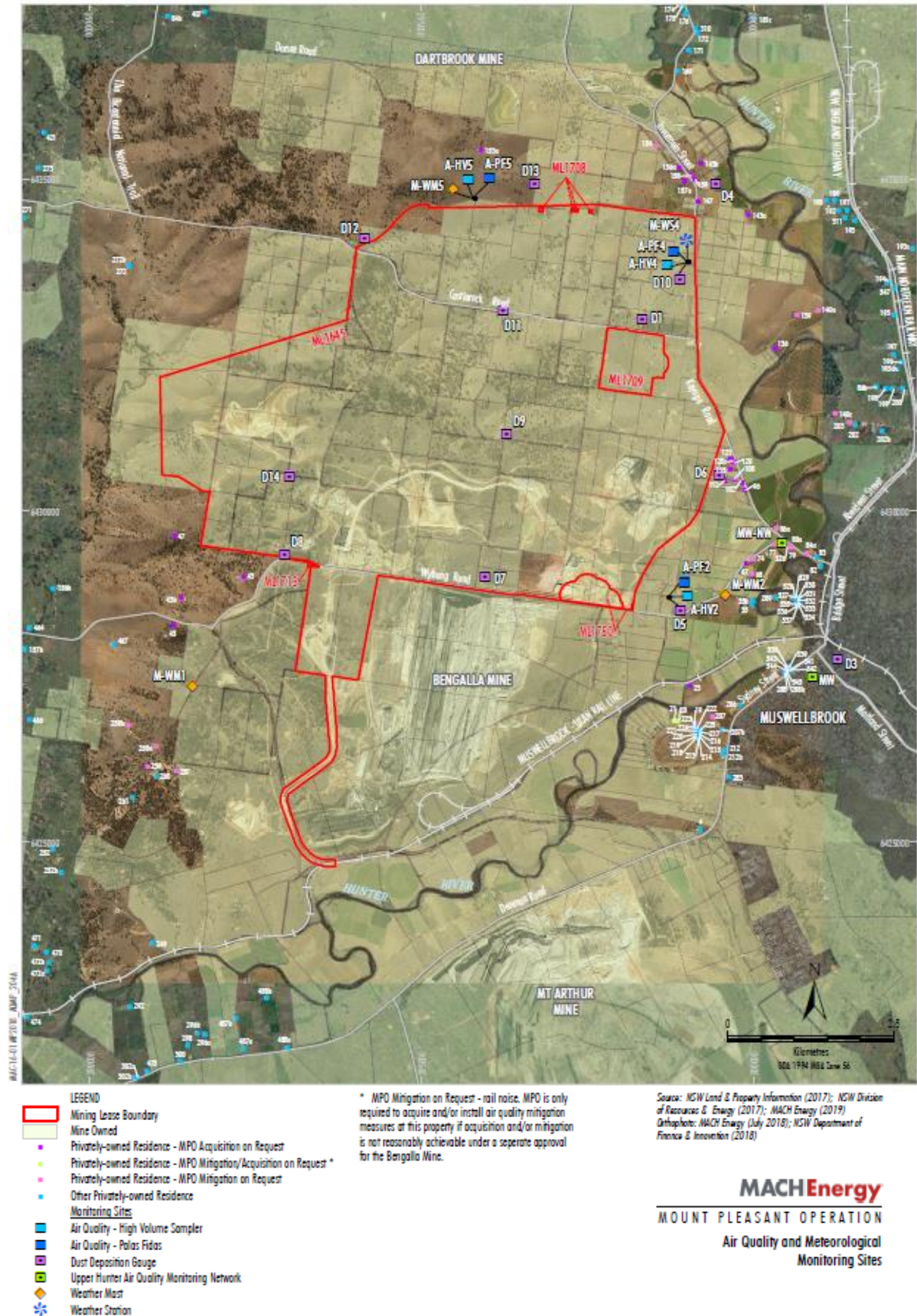
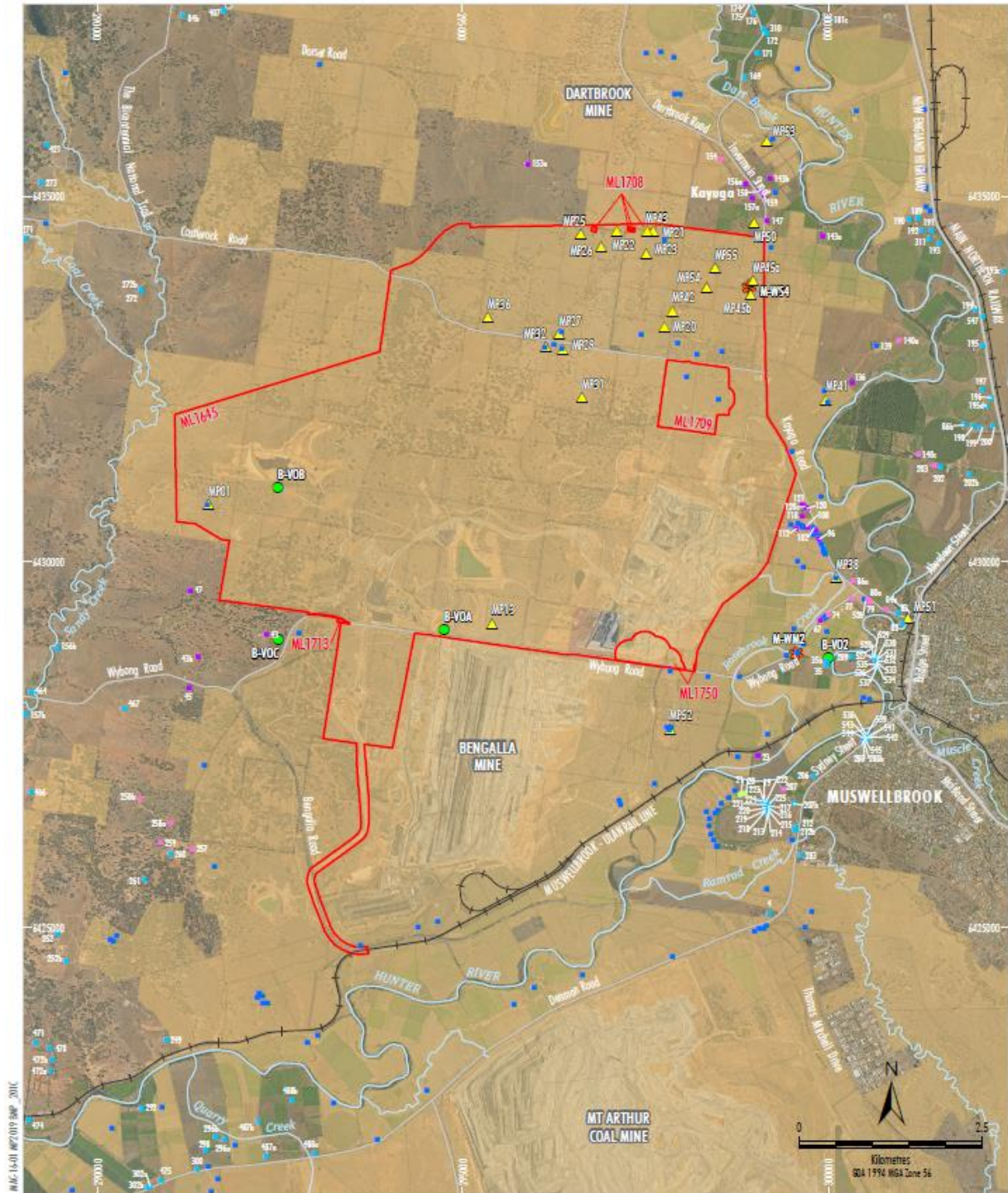


Figure 2-2 – MPO Air Quality and Meteorological Monitoring Network



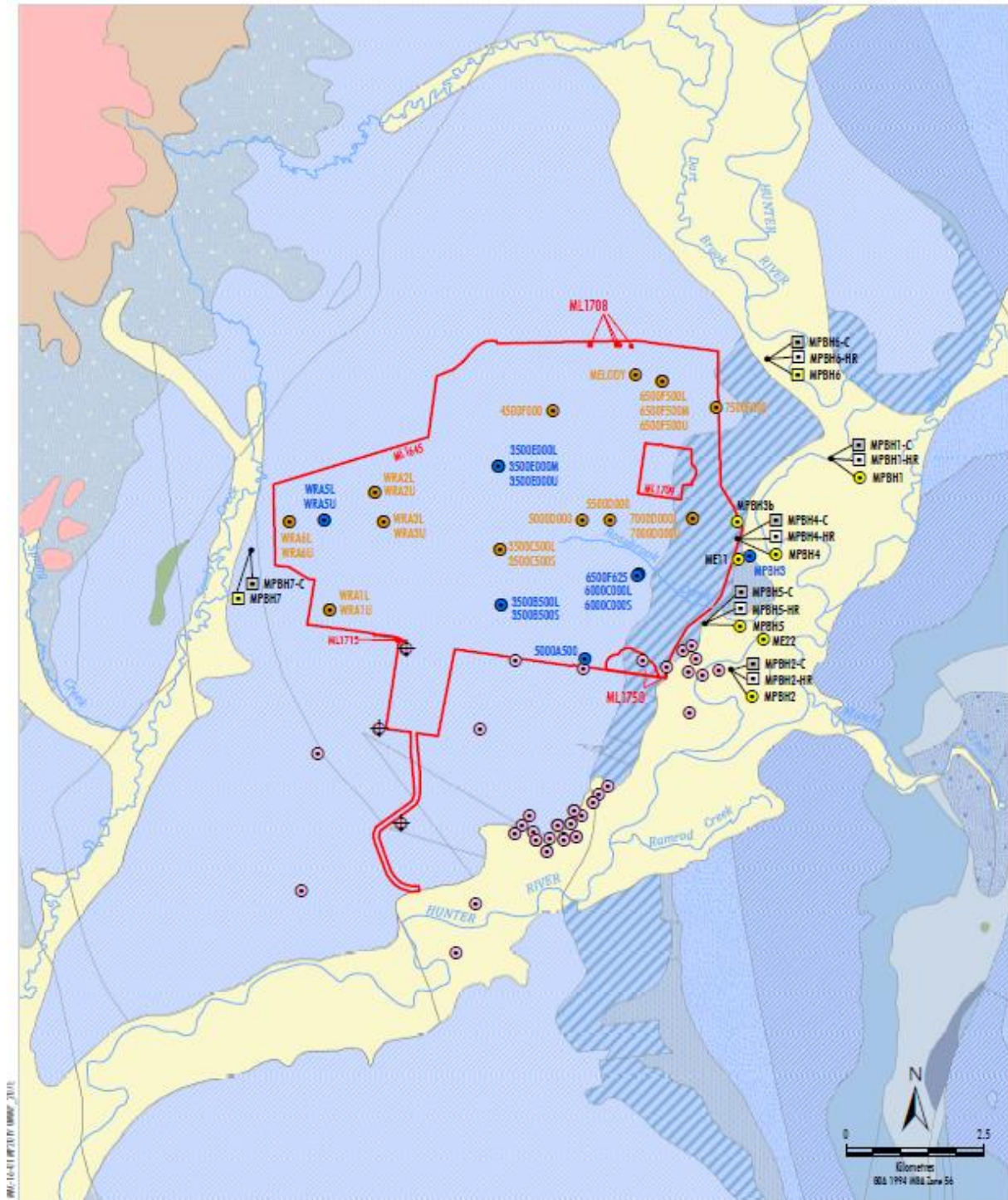
- LEGEND**
- Mining Lease Boundary
 - Mine-owned Land
 - Mine-owned Dwelling
 - Privately-owned Residence - MPO Acquisition on Request
 - Privately-owned Residence - MPO Mitigation/Acquisition on Request *
 - Privately-owned Residence - MPO Mitigation on Request
 - Other Privately-owned Residence
 - Blast Monitoring Site (Vibration/Overpressure)
 - ☼ Weather Station
 - ▲ Historic Heritage Site Subject to Blast Criteria

* MPO Mitigation on Request - rail noise. MPO is only required to acquire and/or install air quality mitigation measures at this property if acquisition and/or mitigation is not reasonably achievable under a separate approval for the Bengalla Mine.

Source: MACH Energy (2020); NSW Spatial Services (2019)
Orthophoto: MACH Energy (Jan 2020)

MACH Energy
MOUNT PLEASANT OPERATION
Blast Monitoring Locations

Figure 2-3 – MPO Blast Monitoring Locations



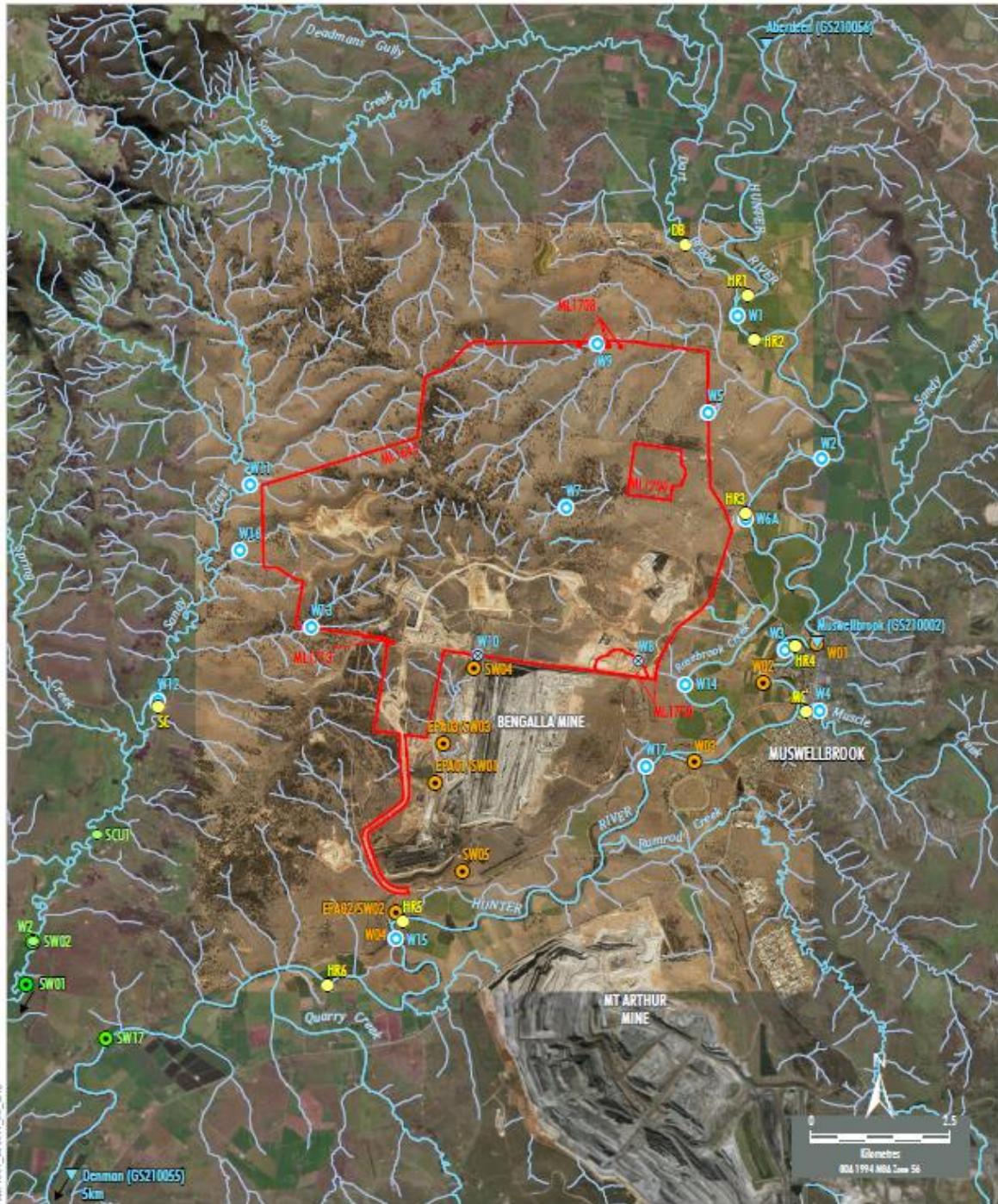
- LEGEND**
- ▭ Mining Lease Boundary
 - ▭ Mount Pleasant Monitoring
 - Standpipe
 - Standpipe - Alluvium
 - Standpipe - Historical
 - ▭ Planned Mount Pleasant Monitoring
 - ▭ Standpipe - Coal Seam
 - ▭ Standpipe - Interburden
 - ▭ Standpipe - Alluvium
 - Bengalla Monitoring
 - Standpipe
 - ⊕ Vibrating Wire Piezometer

Source: NSW Land & Property Information (2019); NSW Division of Resources & Energy (2019); MACH Energy (2019)

Note: Refer Figure 3 for geology legend

MACHEnergy
MOUNT PLEASANT OPERATION
Augmentations to the
Groundwater Monitoring Network

Figure 2-4 – MPO Groundwater Monitoring Network



- 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); Mangool Coal Operations Pty Ltd (2014)
 Orthophoto: MACH (Jul 2018); Esri, DigitalGlobe (2018)

MACH Energy
MOUNT PLEASANT OPERATION
 Surface Water and Stream Health
 Monitoring Sites

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.

Most meteorological data was captured at M-WS2 (>97.0%) during February 2024 (the monitoring period) except for particulate matter less than 10 µm (PM10) and particulate matter less than 2.5 µm (PM2.5) (8.1%). Majority of this data was collected at M-WS4 (99.2%).

Throughout February 2024, there was 56.8mm and 75.8mm 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. AECOM determines a gauge sample 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 an elevated level of organic matter) and field notation that bird droppings or insects were present is likely to be considered contaminated.

While the new SSD 10418 doesn't explicitly mention dust deposition gauges, there's a notable shift in regulations towards embracing high volume air sampler results and continuous air quality monitoring programs, with a specific focus on total particulate matter, PM10, and PM2.5. These modern monitoring techniques offer a more comprehensive approach to environmental surveillance, furnishing real-time data and insights into air quality conditions. By harnessing these advanced methods, MPO can ensure the implementation of robust monitoring practices, effectively supplanting the older dust deposition gauges. This transition from the previous development consent DA92/97 (which is yet to be surrendered due date as of February 2025) to SSD 10418 signifies a proactive measure towards upholding environmental compliance. Therefore, Dust Depositional Monitoring will continue to be included in monthly reporting as per DA92/97 up until surrender where it will be discontinued.

4.2 Results

The dust deposition exposure period for gauges commenced on 25 January 2024. Sample collection was undertaken on 26 February 2024 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 February 2024 have been provided as an indication of performance between February 2023 – February 2024 and does not represent annual average results for 2024 as per Schedule 3, Condition 20 of DA 92/97 and Schedule 2, Condition B28 of SSD 10418.

Table 4-1: Dust Depositional Results – February 2024

Location	YTD Insoluble Solids (g/m ² .month)	Insoluble Solids Annual Rolling Average (g/m ² .month)
D1	2.0	1.9
D3	1.8	1.9
D4	1.8	1.3
D5a	1.8	2.8
D6	1.9	2.4
D7b	5.6	7.6
D8	5.0	4.1
D9a	4.1	4.1
D10	1.3	1.1
D11	3.9	3.3
D12	1.5	1.0
D13	1.4	1.3
D14	2.6	3.3
Criterion	-	4

Notes:

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

* Insufficient monthly results to calculate annual average

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, D9 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. Dust gauges D7b and D9a were noted to be in close proximity to operational areas. All February 2024 insoluble solid results were included in the annual rolling average calculations. All other February 2024 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.

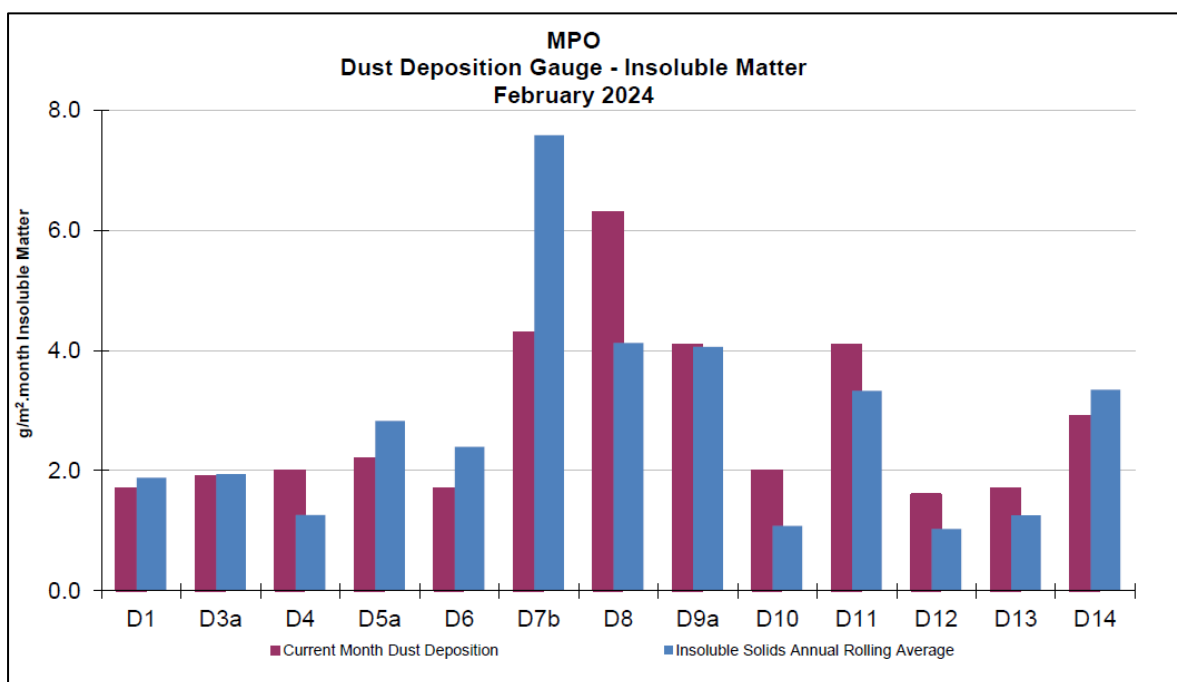


Figure 4-1: MPO Dust Deposition Monthly Results and Annual Rolling Average – February 2024

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

ID	Description
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), Project Approval DA 92/97 and Development Consent SSD 10418. The DA 92/97 and SSD 10418 both specify an annual average project contribution plus background criterion of 90 µg/m³.

5.2 Results

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 February 2024 have been provided as an indication of performance between February 2023 – February 2024 and do not represent annual average results for 2024 as per Schedule 3, Condition 20 of DA 92/97 and Schedule 2, Condition B28 of SSD 10418.

Table 5-2 Total Suspended Particulate Monitoring Data – February 2024

Run Date	Assessment Criterion	TSP µg/m ³		
		HVAS A-PF2	HVAS A-PF5	HVAS M-WS4
5/02/2024	-	89.4	69.1	55
11/02/2024	-	32.5	54.6	25
17/02/2024	-	43.8	58.1	37.6
23/02/2024	-	57.6	37.1	29.2
29/02/2024	-	57.3	68.7	54.4
*Monthly Mean	-	56.1	57.5	40.2
Annual Rolling Average	90	62	54	39

Notes:

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/m³.

6. Real Time Air Quality Monitoring

Continuous particulate matter less than 10 µm (PM₁₀) and particulate matter less than 2.5 µm (PM_{2.5}) monitoring was conducted by three Palas Fidas units (one utilised for management only) at MPO during February 2024.

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 PM₁₀ and PM_{2.5} 12-month rolling averages for February 2024 have been provided in Section 6.2 and 6.4 respectively, as an indication of performance during 2024 as per Schedule 3, Condition 20 of DA 92/97 and Schedule 2, Condition B28 of SSD 10418.

6.1 PM₁₀ Results – 24 Hour Rolling Average

In accordance with the DA 92/97 and SSD 10418 limit of 50 µg/m³ for the 24-hour daily average, there were no elevated readings in February 2024. Real time PM₁₀ 24 hour daily average results for February 2024 are presented in **Table 6-1**.

Table 6-1: MPO Palas Fidas PM₁₀ Data – February 2024

Date	A-PF2/EPA ID 1	A-PF4	A-PF5/EPA ID 2	Muswellbrook NW	A-PF2, A-PF4, A-PF5 24 Hour Average Limit (µg/m ³)
	24-hour Average Result				
1/02/2024	-	24	22	21.2	50
2/02/2024	-	23	20	26.6	50
3/02/2024	-	29	29	36.2	50
4/02/2024	-	31	28	31	50
5/02/2024	-	24	21	29.5	50
6/02/2024	-	23	18	18.6	50
7/02/2024	-	11	10	10.2	50
8/02/2024	-	14	14	16.7	50
9/02/2024	-	15	20	19.2	50
10/02/2024	-	13	13	14	50
11/02/2024	-	16	19	19.9	50
12/02/2024	-	14	18	17.7	50
13/02/2024	-	28	11	16.7	50
14/02/2024	-	18	13	22.5	50
15/02/2024	-	17	15	18.1	50
16/02/2024	-	13	15	13.5	50
17/02/2024	-	14	17	17.7	50
18/02/2024	-	16	14	17.7	50
19/02/2024	-	17	20	14.8	50
20/02/2024	-	12	12	11.1	50
21/02/2024	-	13	15	14.4	50
22/02/2024	-	21	19	18.9	50
23/02/2024	-	13	11	19.9	50
24/02/2024	-	13	14	13.7	50
25/02/2024	-	19	-	19.9	50
26/02/2024	-	21	-	26.5	50
27/02/2024	-	18	18	19.6	50
28/02/2024	35	22	-	24.6	50
29/02/2024	32	22	18	23.2	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)

Figure 6-1 below shows the results of real-time PM₁₀ 24 hour daily average results at MPO air quality monitoring sites February 2024.

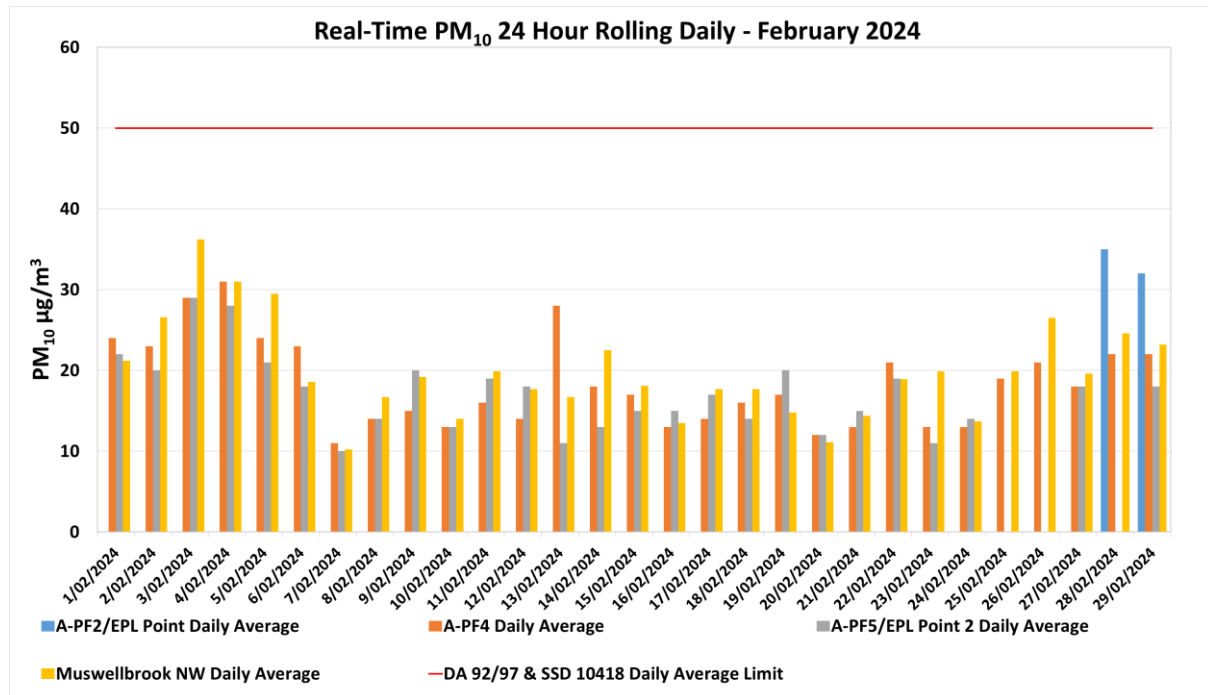


Figure 6-1: Real-time PM₁₀ 24 Daily Average Results for February 2024.

6.2 PM₁₀ Results – Annual Rolling Average

There was no exceedance of the PM₁₀ annual rolling average reported at MPO during February 2024. Real time PM₁₀ annual rolling averages during the reporting period are presented in Figure 6-2 below.

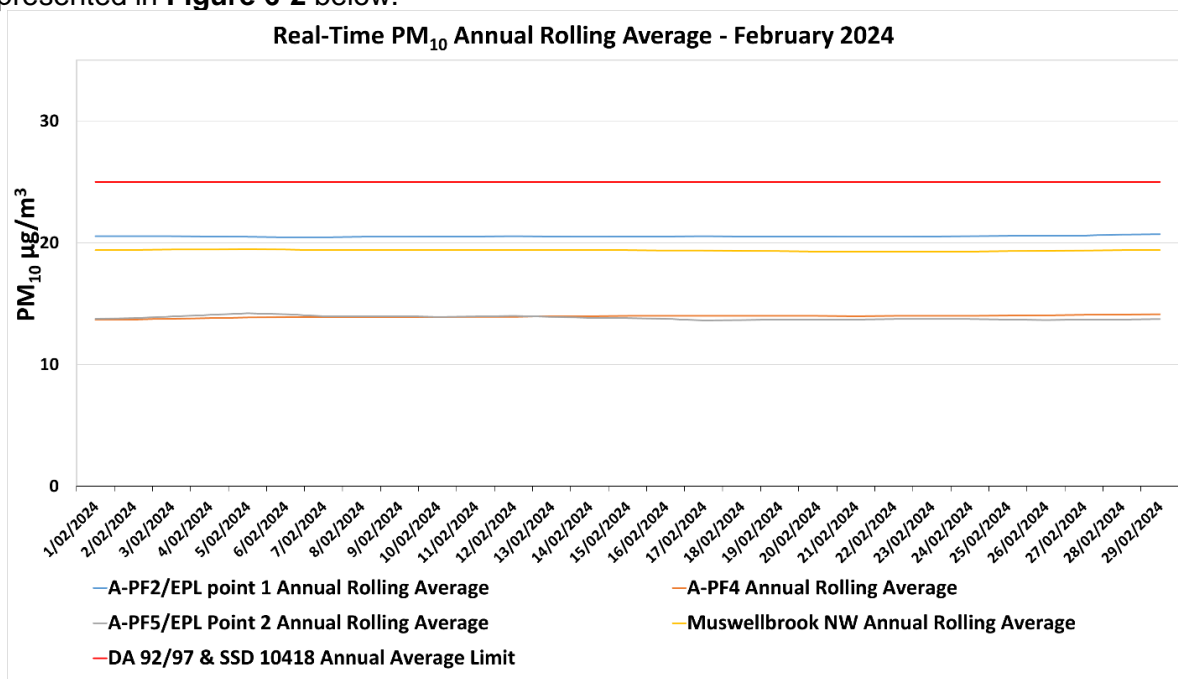


Figure 6-2: Real-time PM₁₀ Annual Rolling Average Results for February 2024.

6.3 PM_{2.5} Results – 24 Hour Daily Average

There was no exceedance of the PM_{2.5} annual rolling average reported at MPO during February 2024. Real time PM_{2.5} 24 hour rolling average results for February 2024 are presented in **Table 6-2**.

Table 6-2: MPO Palas Fidas PM_{2.5} Data – February 2023

Date	A-PF2/EPA ID 1	A-PF4	A-PF5/EPA ID 2	A-PF2, A-PF4, A-PF5 24 Hour Average Limit (µg/m ³)
	24-hour Average Result			
1/02/2024	-	9	7	25
2/02/2024	-	8	7	25
3/02/2024	-	11	10	25
4/02/2024	-	11	10	25
5/02/2024	-	9	7	25
6/02/2024	-	9	7	25
7/02/2024	-	5	5	25
8/02/2024	-	5	5	25
9/02/2024	-	5	5	25
10/02/2024	-	5	5	25
11/02/2024	-	7	7	25
12/02/2024	-	5	5	25
13/02/2024	-	5	3	25
14/02/2024	-	5	4	25
15/02/2024	-	8	7	25
16/02/2024	-	5	5	25
17/02/2024	-	4	4	25
18/02/2024	-	6	5	25
19/02/2024	-	7	6	25
20/02/2024	-	5	5	25
21/02/2024	-	6	6	25
22/02/2024	-	7	6	25
23/02/2024	-	5	4	25
24/02/2024	-	6	6	25
25/02/2024	-	7	-	25
26/02/2024	-	8	-	25
27/02/2024	-	9	8	25
28/02/2024	13	9	-	25
29/02/2024	11	7	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)

Real time PM_{2.5} 24-hour average results for February 2024 are presented in **Figure 6-3** below.

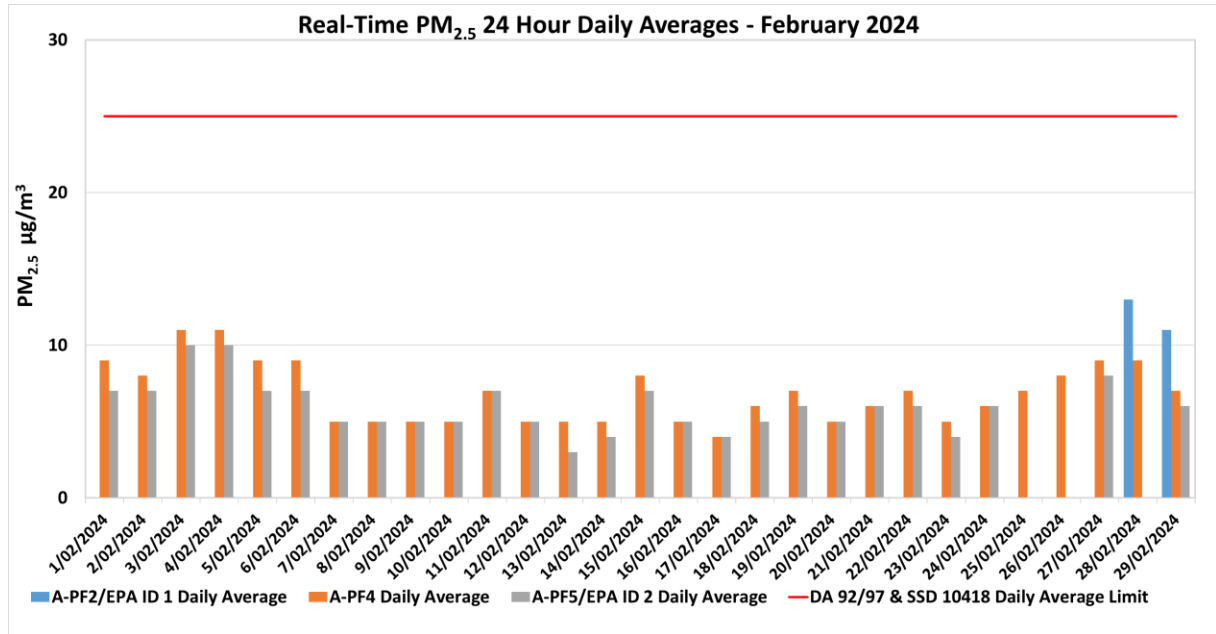


Figure 6-3: Real-time PM_{2.5} 24 hour Daily Average Results for February 2024.

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 February 2024. Real time PM_{2.5} annual rolling averages during the reporting period are presented in **Figure 6-4** below.

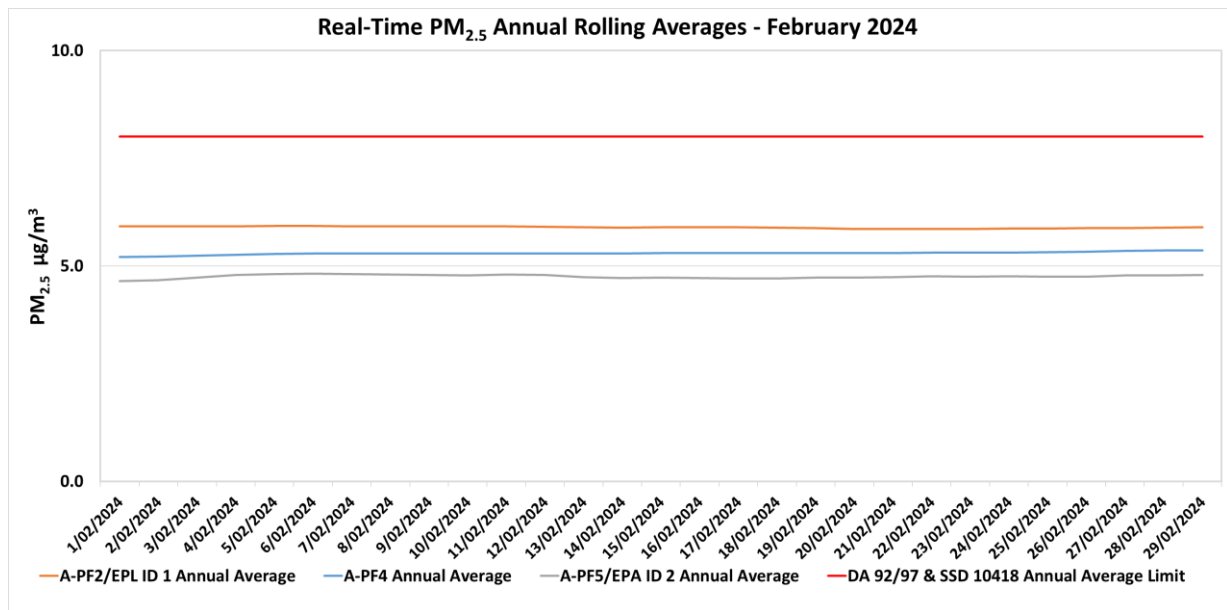


Figure 6-4: Real-time PM_{2.5} Annual Rolling Average Results for February 2024.

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, 2022) 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 monitoring was conducted by AECOM on 28 February 2024. 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**.

Table 7-1 – MPO Monthly Surface Water Monitoring Results – XX February 2024

Station	pH	Electrical Conductivity (EC) ($\mu\text{s}/\text{cm}$) ¹	Total Dissolved Solids (TDS) (mg/L)	Total Suspended Solids (TSS) (mg/L)
W1	8.2	430	260	17
W2	8.1	450	280	14
W3	8.1	480	260	20
W4	7.7	1650	1000	13
W5	*	*	*	*
W6A	^	^	^	^
W9	*	*	*	*
W11	8.3	4100	2300	< 5
W12	8.3	5150	3000	15
W13	*	*	*	*
W14	*	*	*	*
W15	8.2	560	330	31
W16	*	*	*	*
W17	8.1	480	250	14

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

*Dry or insufficient water to sample.

^ Unsafe access

¹ Results have been rounded in accordance with the In-house method Q4AN(EV)-332-W12 (EC).

During the February monitoring event, five (5) sites were dry or contained insufficient water to sample with one (1) site unsafe to access. All sites were within their respective EC, pH and TSS trigger levels.

An investigation is triggered if elevated measurements occur for three consecutive sampling events in accordance MPO Water Management Plan (MACH Energy, 2022).

8. Groundwater Monitoring

Quarterly groundwater monitoring was conducted between 14, 19 and 22 of February 2024. 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 2023 Water Level (DTW)	Aug 2023 Water Level (DTW)	May 2023 Water Level (DTW)	Triggered (Yes/No)
	80 th Percentile (DTW)	Trigger				
WRA1L	-	>± 0.5m	3.30	2.71	1.89	
WRA1U	-	>± 0.5m	*	*	*	
WRA6L	-	>± 0.5m	1.24	1.21	1.11	
WRA6U	-	>± 0.5m	2.05	2.19	2.17	
MPBH1	9.71	10.70	9.90	10.05	10.09	No
MPBH2	12.20	14.20	11.82	11.61	11.34	No
MPBH3b	12.00	Dry (or 14.0m)	12.18	12.11	11.96	No
MPBH4	-	>± 0.5m	12.15	12.08	11.88	
MPBH5	-	>± 0.5m	*	*	*	
MPBH1-C	-	>± 0.5m	10.08	10.21	36.09	
MPBH1-HR	-	>± 0.5m	25.59	29.72	10.21	
MPBH2-C	-	>± 0.5m	12.10	11.89	11.62	
MPBH2-HR	-	>± 0.5m	12.05	11.85	11.58	
MPBH4-C	-	>± 0.5m	11.67	11.59	11.45	
MPBH4-HR	-	>± 0.5m	50.68	50.70	50.98	
MPBH5-C	-	>± 0.5m	11.41	11.18	11.38	
MPBH5-HR	-	>± 0.5m	11.61	11.39	11.02	
MPBH6	-	>± 0.5m	10.14	10.05	9.84	
MPBH6-C	-	>± 0.5m	11.72	11.56	11.34	
MPBH6-HR	-	>± 0.5m	11.11	11.14	11.02	
MPBH7	-	>± 0.5m	6.45	6.25	6.02	
MPBH7-C	-	>± 0.5m	17.13	14.22	17.4	
3500C500L	-	>± 0.5m	25.44	24.94	24.23	
3500C500S	-	>± 0.5m	25.78	25.43	24.80	
4500F000	-	>± 0.5m	22.45	22.22	22.14	
5000D000	-	>± 0.5m	127.04	127.57	125.84	
5000D000-R**	-	>± 0.5m	138.77	138.33	138.08	
5500D000	-	>± 0.5m	40.26	39.83	39.51	
6500F500L	-	>± 0.5m	53.36	53.24	53.13	
6500F500M	-	>± 0.5m	53.83	53.65	53.48	
6500F500U	-	>± 0.5m	30.24	30.29	30.27	
6500F625	-	>± 0.5m	15.50	15.18	14.61	
Melody	-	>± 0.5m	13.07	12.96	12.70	
7500F000	-	>± 0.5m	36.00	35.80	35.57	

* Dry/insufficient water to sample

Results in **bold** indicate that the bore has exceeded the adopted assessment criterion for changes in standing water level from the previous measurement.

Table 8-2 - MPO Quarterly Groundwater pH Results

Monitoring Location/ ID	pH Trigger Range		Nov 2023 pH	Aug 2023 pH	May 2023 pH	Triggered (Yes/No)
	Lower	Upper				
WRA1L	6.0	8.5	7.1	7.1	7.2	
WRA1U			*	*	*	
WRA6L			6.9	7.0	7.0	
WRA6U			6.8	6.9	6.8	
MPBH1			6.9	6.7	6.9	No
MPBH2			6.9	6.9	6.9	No
MPBH3b			7.4	7.8	7.2	No
MPBH4			7.1	6.9	7.0	
MPBH5			*	*	*	
MPBH1-C			8.6	8.5	8.8	
MPBH1-HR			7.8	8.0	7.8	
MPBH2-C			10.7	11.1	11.1	
MPBH2-HR			7.5	8.5	8.2	
MPBH4-C			7.9	7.8	7.7	
MPBH4-HR			7.3	7.3	7.3	
MPBH5-C			10.3	9.7	9.6	
MPBH5-HR			7.6	7.5	7.6	
MPBH6			7.1	7.1	7.1	
MPBH6-C			7.7	7.1	7.3	
MPBH6-HR			7.4	7.3	7.3	
MPBH7			7.0	7.0	7.0	
MPBH7-C			7.0	7.1	7.2	
3500C500L			7.6	7.5	7.6	
3500C500S			6.9	6.9	6.9	
4500F000			6.8	6.8	6.8	
5000D000-R			7.5	7.5	7.6	
5500D000			7.0	6.9	6.9	
6500F500L			7.2	7.1	7.2	
6500F500M			7.3	7.2	7.2	
6500F500U			6.7	6.6	6.7	
6500F625	6.9	7.0	7.0			
Melody	6.9	6.9	7.0			
7500F000	7.8	7.7	7.8			

* Dry/insufficient water to sample

An investigation is triggered when pH values are recorded outside the baseline range (20th – 80th percentile). Results shown in **bold** are outside of this range.

Table 8-3 - MPO Quarterly Groundwater EC Results

Monitoring Location/ ID	Maximum Beneficial Use Trigger	Nov 2023 EC ¹	Aug 2023 EC ¹	May 2023 EC ¹	Triggered (Yes/No)
WRA1L	7800	3550	3200	3000	No
WRA1U	-	*	*	*	
WRA6L	7800	6150	6000	5900	No
WRA6U	22000	8500	8750	8150	No
MPBH1	800	610	710	690	No
MPBH2	930	1250	1200	1150	Yes
MPBH3b	7800	5700	5700	7000	No
MPBH4	-	5050	5700	5350	
MPBH5	-	*	*	*	
MPBH1-C	-	1400	1450	800	
MPBH1-HR	-	1600	1650	1550	
MPBH2-C	-	1750	1900	1750	
MPBH2-HR	-	1100	1600	1500	
MPBH4-C	-	5100	4950	4900	
MPBH4-HR	-	5700	5450	5500	
MPBH5-C	-	610	650	720	
MPBH5-HR	-	850	830	840	
MPBH6	-	1100	1150	1050	
MPBH6-C	-	5500	2650	3200	
MPBH6-HR	-	4950	4100	3600	
MPBH7	-	11200	12000	10100	
MPBH7-C	-	10400	10700	10300	
3500C500L	7800	4200	3800	3750	No
3500C500S	7800	12000	11500	10000	Yes
4500F000	22000	8450	8600	8650	No
5000D000-R	-	4400	4400	4300	
5500D000	7800	4400	4450	4450	No
6500F500L	7800	2850	3000	2950	No
6500F500M	7800	2900	3100	3150	No
6500F500U	7800	5400	5500	5450	No
6500F625	7800	4050	4000	3950	No
Melody	-	5450	5100	4800	
7500F000	7800	6300	6400	6300	No

* Dry/insufficient water to sample

- Indicates no trigger limit identified

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

During February 2024 monitoring event, site MPBH5 contained insufficient water to sample and fourteen (2) sites had changes in standing water level of greater than ± 0.5 m from the previous measurement. All monitoring locations were within the pH trigger limits except sites MPBH1-C, MPBH2-C and MPBH5-C. All monitoring locations were below their respective EC trigger limits except sites 3500C500S and MPBH2.

An investigation is triggered if elevated measurements occur for three consecutive sampling events in accordance MPO Water Management Plan (MACH Energy, 2022). The next quarterly ground water monitoring event is scheduled for May 2024.

9. Noise Monitoring

Attended noise monitoring was undertaken during the night period of 20/21 February 2024 at six (6) monitoring locations as per the [MPO Noise Management Plan](#) (MACH Energy, 2021) in accordance with DA 92/97, SSD 10418 and EPL 20850.

9.1 Results

The results for nighttime attended noise monitoring for noise generated by MPO in February 2024 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 – 20/21 February 2024

Location	Start Date and Time	MPO Only L _{A1,1min} dB ^{2,4}	Criterion dB	Wind Speed m/s	Criterion Applies ¹	Stability Class	Exceedance dB ³
N-AT1	21/02/2024 01:42	IA	45	2.3	Yes	E	No
N-AT2	20/02/2024 22:55	33	45	5.0	No	D	NA
N-AT3	20/02/2024 23:29	IA	45	5.1	No	D	NA
N-AT4	21/02/2024 00:00	IA	45	3.4	No	D	NA
N-AT5	21/02/2024 00:23	IA	45	2.4	Yes	D	No
N-AT6	21/02/2024 01:18	IA	45	1.7	Yes	E	No
N-AT7	20/02/2024 22:14	IA	45	4.3	No	E	NA
N-AT8	21/02/2024 00:51	39	45	2.4	Yes	D	No

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.
- IA = inaudible; and
- Bold results indicate exceedance of criteria.
- Monitoring at N-AT5 was unable to be conducted due to a road closure.

Table 9-2 – $L_{Aeq,15min}$ Generated by MPO: Attended Night Monitoring – 20/21 February 2024

Location	Start Date and Time	MPO Only $L_{A1,1min}$ dB ^{2,4}	Criterion dB	Wind Speed m/s	Criterion Applies ¹	Stability Class	Exceedance dB ³
N-AT1	21/02/2024 01:42	IA	37	2.3	Yes	E	No
N-AT2	20/02/2024 22:55	28	35	5.0	No	D	NA
N-AT3	20/02/2024 23:29	IA	40	5.1	No	D	NA
N-AT4	21/02/2024 00:00	IA	38	3.4	No	D	NA
N-AT5	21/02/2024 00:23	IA	37	2.4	Yes	D	No
N-AT6	21/02/2024 01:18	IA	35	1.7	Yes	E	No
N-AT7	20/02/2024 22:14	IA	37	4.3	No	E	NA
N-AT8	21/02/2024 00:51	34	40	2.4	Yes	D	No

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
- Bold results indicate exceedance of criteria.
- Monitoring at N-AT5 was unable to be conducted due to a road closure.

Table 9-3 – $L_{Aeq, period}$ Cumulative Noise: Attended Night Monitoring – 20/21 February 2024

Location	Start Date and Time	Cumulative Noise Criterion L_{Aeq} dB	Measured Mining Only $L_{Aeq, period}$ dB ^{1,2,3}	Exceedance dB
N-AT1	21/02/2024 01:42	40	IA	No
N-AT2	20/02/2024 22:55	40	28	NA
N-AT3	20/02/2024 23:29	40	IA	NA
N-AT4	21/02/2024 00:00	40	IA	NA
N-AT5	21/02/2024 00:23	40	IA	No
N-AT6	21/02/2024 01:18	40	IA	No
N-AT7	20/02/2024 22:14	40	IA	NA
N-AT8	21/02/2024 00:51	40	34	No

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'.
- NA in exceedance column means criterion was not applicable due to atmospheric conditions.
- Monitoring at N-AT5 was unable to be conducted due to a road closure.

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).

10. Blast Monitoring

There were 6 blast events during February (a total of 12 blasts YTD). Results for February 2024 are presented in **Table 10-1**. All blast results during this monitoring period were below the criteria stated in Schedule 3, Condition 10 of DA 92/97, Schedule 2; Condition B12 of SSD 10418; and L5 of EPL 20850.

Table 10-1 – MPO Blast Monitoring Results - February 2024

Day & Date Fired	Time Fired	BVOC Vibration (mm/s)	BVOC Overpressure (dBL)	BVO2 Vibration (mm/s)	BVO2 Overpressure (dBL)	Blast Fume Compliant
Thursday 01/02/2024	13:09	0.250	89.3	0.410	87.2	N
Wednesday 07/02/2024	11:20	0.440	88.2	0.410	88.8	N
Thursday 08/02/2024	13:02	0.210	92.2	0.120	101.3	N
Friday 16/02/2024	12:42	1.070	104.1	0.490	97.0	Y
Thursday 22/02/2024	13:36	0.970	91.8	0.650	92.0	N
Wednesday 28/02/2024	15:07	0.080	94.0	0.060	94.7	N

END OF REPORT