

**Mount Pleasant Operation
Monthly Environmental Monitoring Report**

February 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 February 2022 |
| Reporting Period End Date | 28 February 2022 |
| Date All Data Received | 7 April 2022 |

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:

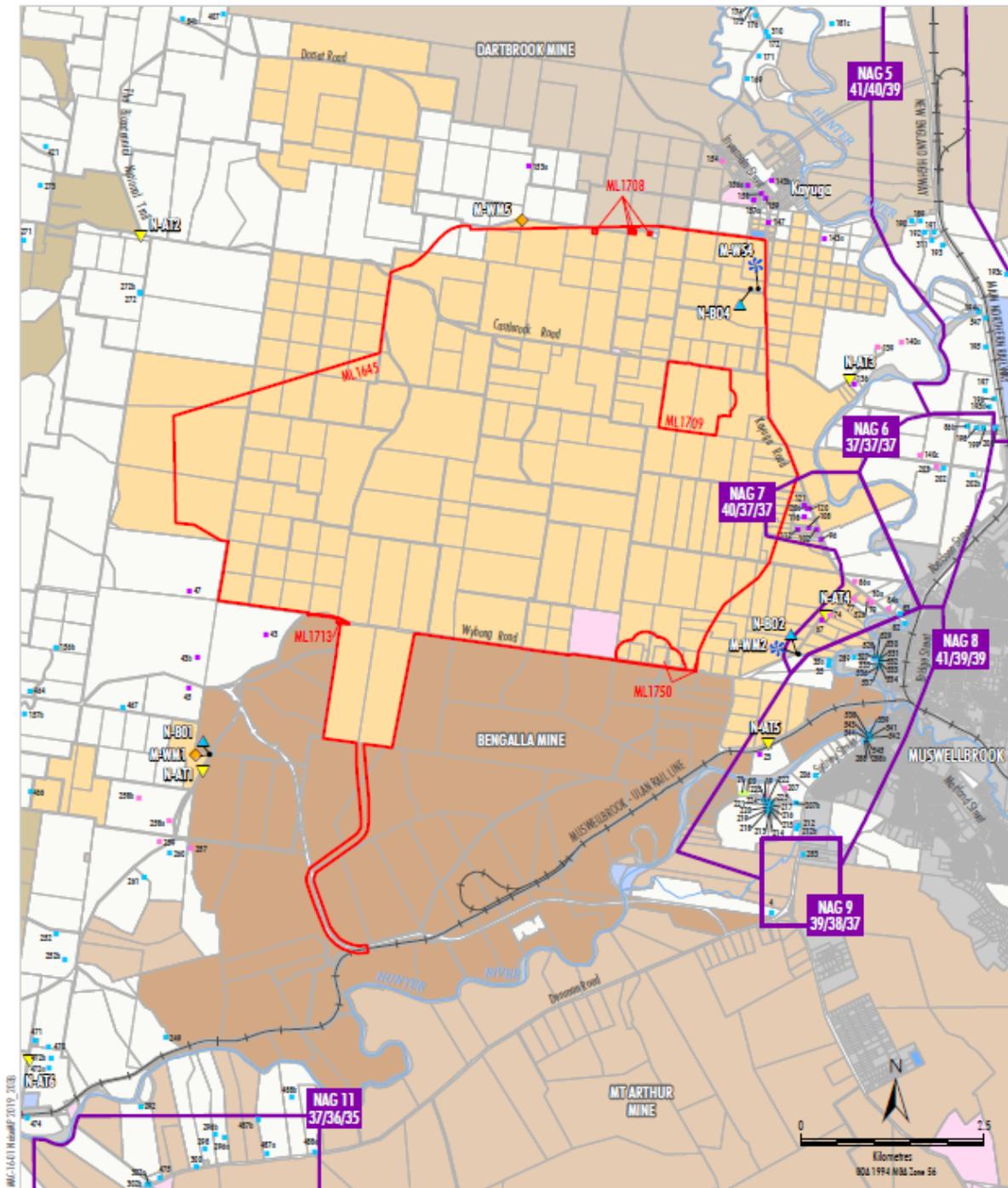
- 2 x Palas Fidas Air Quality Monitoring sites;
- Noise monitoring;
- Blast monitoring; and
- Meteorological monitoring.

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.



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 5
41/40/39 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.

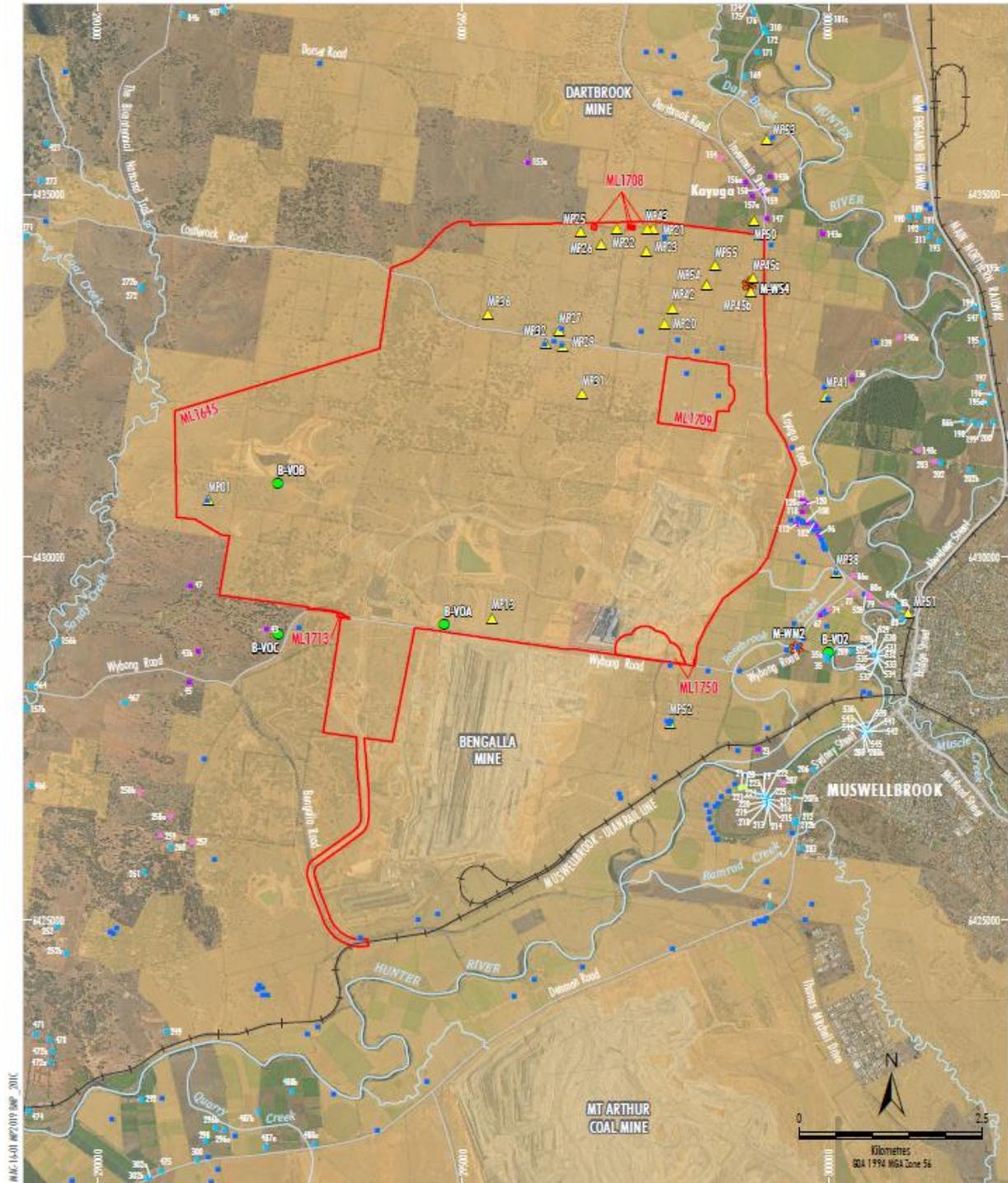
Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); MACH Energy (2019)

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



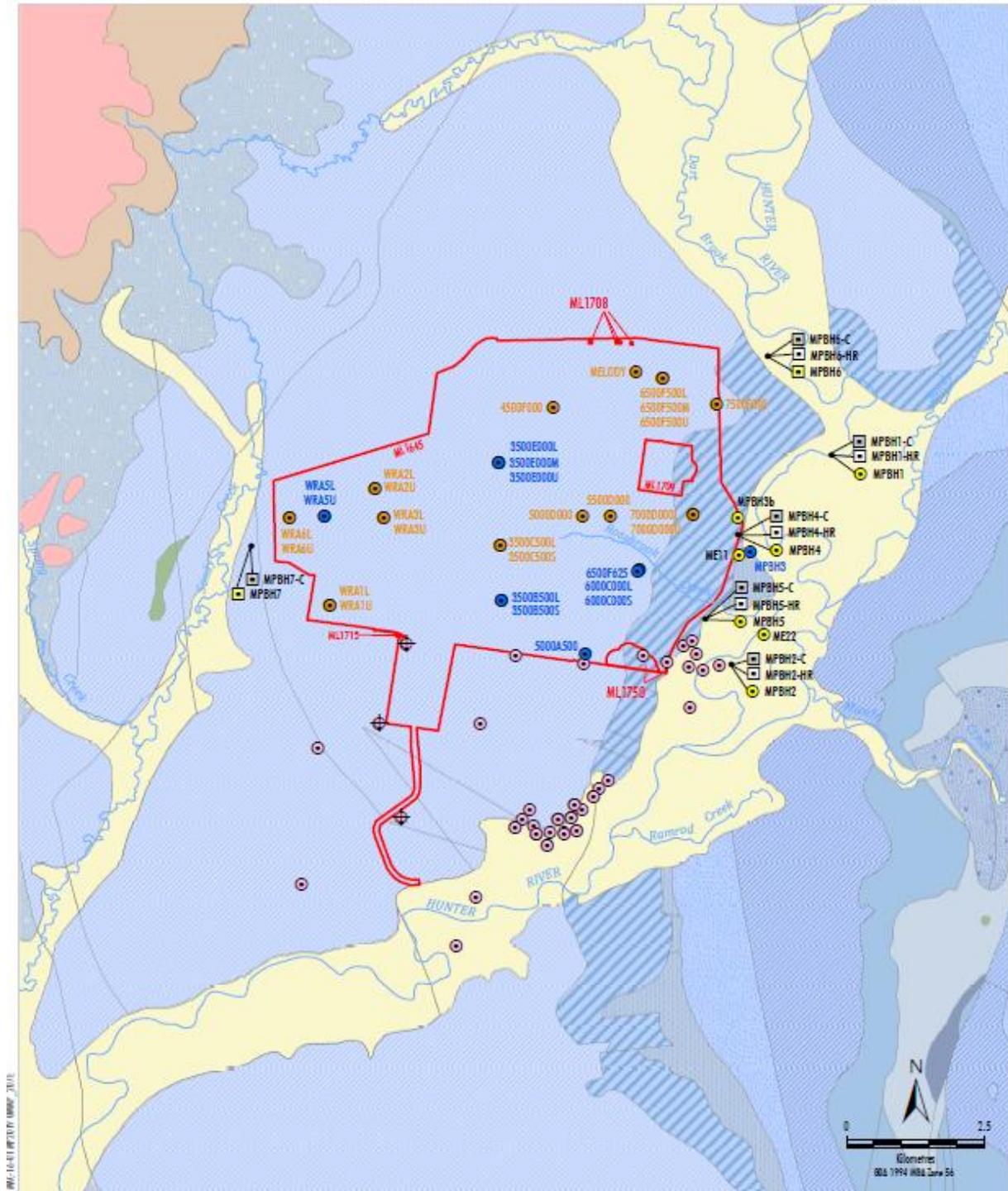
- LEGEND**
- Mining Lease Boundary
 - Mine-owned Land
 - Mine-owned Dwelling
 - Privately-owned Residence - MPO Acquisition on Request
 - Privately-owned Residence - MPO Mitigation/Acquisition on Request *
 - Privately-owned Residence - MPO Mitigation on Request
 - Other Privately-owned Residence
 - 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)

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MOUNT PLEASANT OPERATION
Blast Monitoring Locations

Figure 2-3 – MPO Blast Monitoring Locations



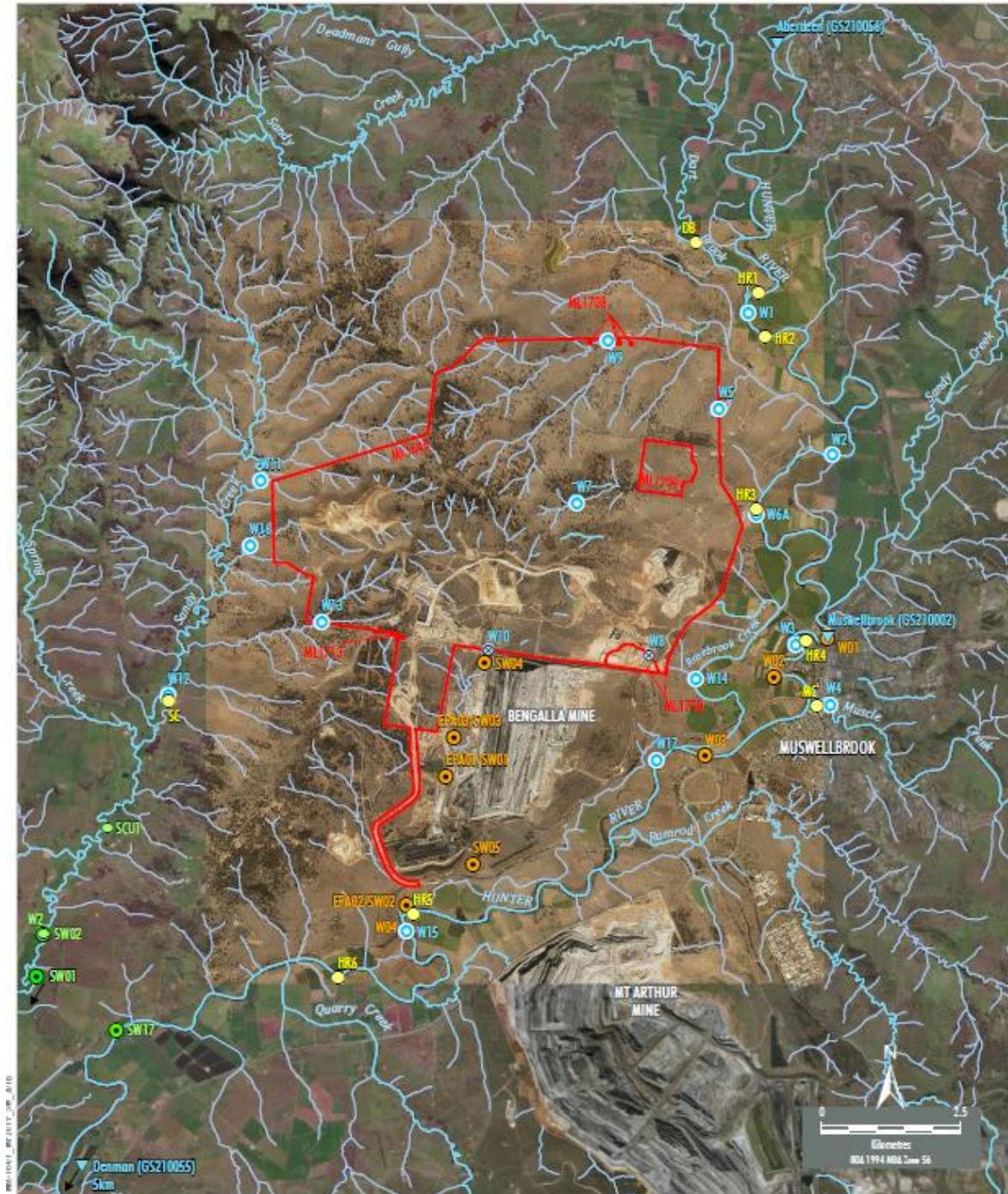
- LEGEND**
- Mining Lease Boundary
 - M Mount Pleasant Monitoring
 - Standpipe
 - Standpipe - Alluvium
 - Standpipe - Historical
 - M Planned Mount Pleasant Monitoring
 - Standpipe - Coal Seam
 - Standpipe - Interburden
 - Standpipe - Alluvium
 - B Bengalla Monitoring
 - Standpipe
 - ⊕ Vibrating Wire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

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

Note: Refer Figure 3 for geology legend

MACH Energy
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, the weather stations measure wind speed and direction (using the sigma theta method), temperature (at 2 m and 10 m), solar radiation, relative humidity, rainfall, atmospheric pressure.

The majority of meteorological data was captured at M-WS2 (>99.5%) during February 2022 (the monitoring period), with the exception of solar radiation and wind parameters (>73.9%). The majority of data for these meteorological parameters was captured at M-WS4 (>99.9%) during the monitoring period.

Throughout February 2022, there was 35.6mm and 44.6mm 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 January 2022. Sample collection was undertaken on 17 February 2022 by AECOM with sample analysis performed by ALS NATA accredited laboratory. Results are summarised in **Table 4-1**. Annual rolling averages for February 2022 have been provided as an indication of performance between February 2021 – February 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 – February 2022

| Location | YTD Insoluble Solids (g/m ² .month) | Insoluble Solids Annual Rolling Average (g/m ² .month) |
|------------------|--|---|
| D1 | 3.2 | 2.7 |
| D3a | 1.7 | 1.6 |
| D4 | 1.6 | 1.5 |
| D5 | 3.9 | 3.4 |
| D6 | 1.5 | 2.6 |
| D7b ¹ | 5.1 | 8.2 |
| D8 | 4.7 | 3.5 |
| D9a | 3.2 | 1.8 |
| D10 | 1.2 | 1.0 |
| D11 | 3.4 | 1.7 |
| D12 | 0.9 | 0.6 |
| D13 | 1.7 | 1.4 |
| D14 | 4.1 | 2.9 |
| <i>Criterion</i> | 3.2 | 2.7 |

Notes:

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

**Indicates result unavailable due to contaminated depositional dust gauges for YTD

*** annual rolling average not available as new site location

¹Site D7b is located within close proximity to the northern boundary of a neighbouring mining company's main pit and thus is influenced by activities there. 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 during construction activities

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 February sampling event noted that all the gauges contained insects, two gauges contained bird droppings and one gauge contained vegetation. Site D3a was unable to be accessed due to unsafe conditions.

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

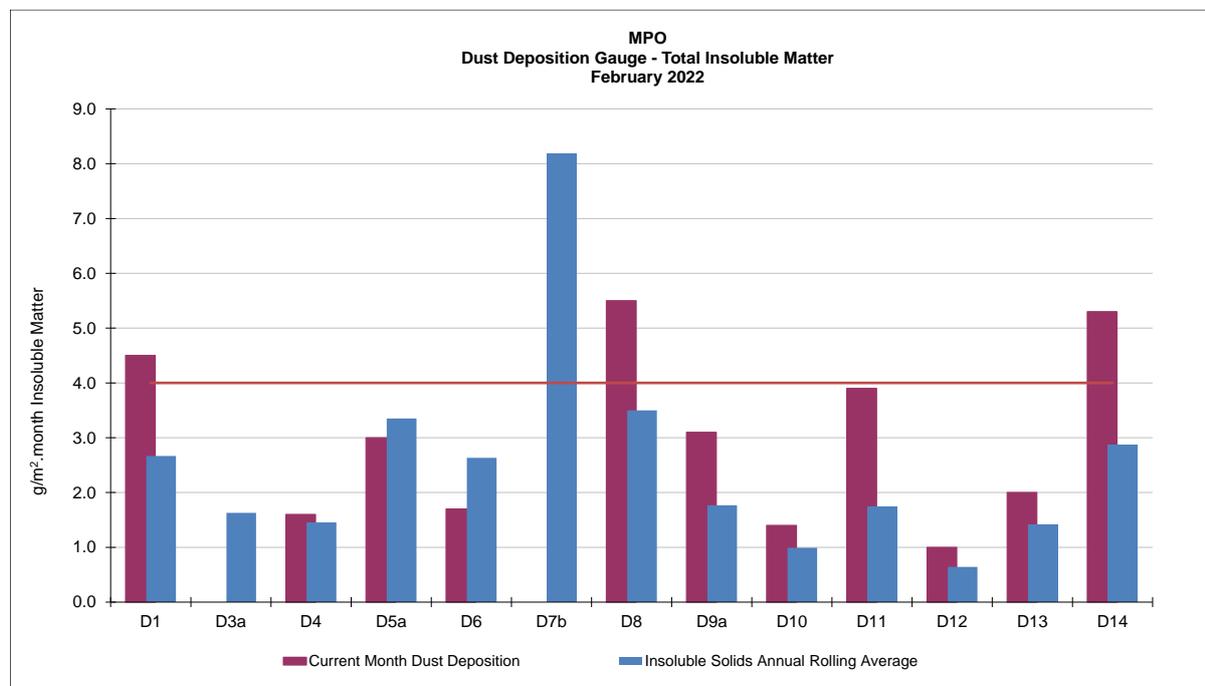


Figure 4-1: MPO Dust Deposition Monthly Results and Annual Rolling Average – February 2022

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 February 2022 sample collection was undertaken by AECOM with sample analysis performed by ALS NATA accredited laboratory. TSP results for the monitoring period are provided in **Table 5-2**. Annual rolling averages for February 2022 have been provided as an indication of performance between February 2021 – February 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 – February 2022

| Run Date | Assessment Criterion | TSP µg/m ³ | | |
|-------------------------------|----------------------|-----------------------|------------|------------|
| | | HVAS A-PF2 | HVAS M-WS4 | HVAS A-PF5 |
| 3/02/2022 | - | 36.2 | 64.2 | 33.6 |
| 9/02/2022 | - | 52.4 | 30.5 | 34.1 |
| 15/02/2022 | - | 56.4 | 63.9 | 49.9 |
| 21/02/2022 | - | 66.3 | 20.8 | 19.5 |
| 27/02/2022 | - | 29.6 | 43.9 | 23.3 |
| Monthly Mean | - | 48.2 | 44.7 | 32.1 |
| Annual Rolling Average | 90 | 49 | 29 | 28 |

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

1 Sample collected 24/01/2022 due to environmental influence (lawn mowing) on sampling date

2 Sample collected 1/02/2022 due to power outage on sampling date

3 Sample collected 1/02/2022 due to timer issues on sampling date

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 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 PM₁₀ and PM_{2.5} 12-month rolling averages for February 2022 have been provided in Section 6.2 and 6.4 respectively, as an indication of performance between February 2021 – February 2022 and do not represent annual average results for 2022 as per Schedule 3, Condition 20 of DA 92/97.

6.1 PM₁₀ Results – 24 hour rolling average

In accordance with the DA 92/97 limit of 50 µg/m³ for the 24 hour rolling average, there was an elevated reading measured on 17 February 2022. This elevated PM₁₀ measurement was not suspected to be an incremental increase as a result of mining operations at MPO. The Muswellbrook NW monitor was operational during all days of February. Real time PM₁₀ 24 hour rolling average results for February 2022 are presented in **Table 6-1**.

Table 6-1: MPO Palas Fidas PM₁₀ Data – February 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 | | | | | |
| 1/02/2022 | 26 | 8 | 13 | 24.4 | 44 | 50 |
| 2/02/2022 | 12 | 12 | 7 | 8.2 | 44 | 50 |
| 3/02/2022 | 17 | 11 | 12 | 14.8 | 44 | 50 |
| 4/02/2022 | 16 | 11 | 12 | 16.4 | 44 | 50 |
| 5/02/2022 | 15 | 11 | 11 | 13.7 | 44 | 50 |
| 6/02/2022 | 14 | 12 | 12 | 14.1 | 44 | 50 |
| 7/02/2022 | 14 | 13 | 11 | 14.1 | 44 | 50 |
| 8/02/2022 | 14 | 12 | 14 | 12.3 | 44 | 50 |
| 9/02/2022 | 17 | 20 | 11 | 16.6 | 44 | 50 |
| 10/02/2022 | 22 | 14 | 22 | 26.3 | 44 | 50 |
| 11/02/2022 | 14 | 15 | 12 | 16 | 44 | 50 |
| 12/02/2022 | 16 | 17 | 16 | 20.1 | 44 | 50 |
| 13/02/2022 | 17 | 20 | 19 | 20.1 | 44 | 50 |
| 14/02/2022 | 19 | 19 | 29 | 22 | 44 | 50 |
| 15/02/2022 | 20 | 22 | 26 | 22.5 | 44 | 50 |
| 16/02/2022 | 25 | 16 | - | 25 | 44 | 50 |
| 17/02/2022 | 20 | 15 | - | 22.1 | 44 | 50 |
| 18/02/2022 | 18 | 15 | 16 | 21.9 | 44 | 50 |
| 19/02/2022 | 17 | 14 | 18 | 18 | 44 | 50 |
| 20/02/2022 | 14 | 10 | 18 | 13.4 | 44 | 50 |

| | | | | | | |
|------------|----|----|----|------|----|----|
| 21/02/2022 | 20 | 15 | 9 | 17.4 | 44 | 50 |
| 22/02/2022 | 15 | 10 | 15 | 15.1 | 44 | 50 |
| 23/02/2022 | 11 | 9 | 10 | 10.5 | 44 | 50 |
| 24/02/2022 | 9 | 13 | 10 | 8 | 44 | 50 |
| 25/02/2022 | 14 | 11 | 15 | 14.8 | 44 | 50 |
| 26/02/2022 | 11 | 12 | 13 | 11.8 | 44 | 50 |
| 27/02/2022 | 13 | 10 | 14 | 16.4 | 44 | 50 |
| 28/02/2022 | 11 | 13 | 12 | 8.1 | 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)

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

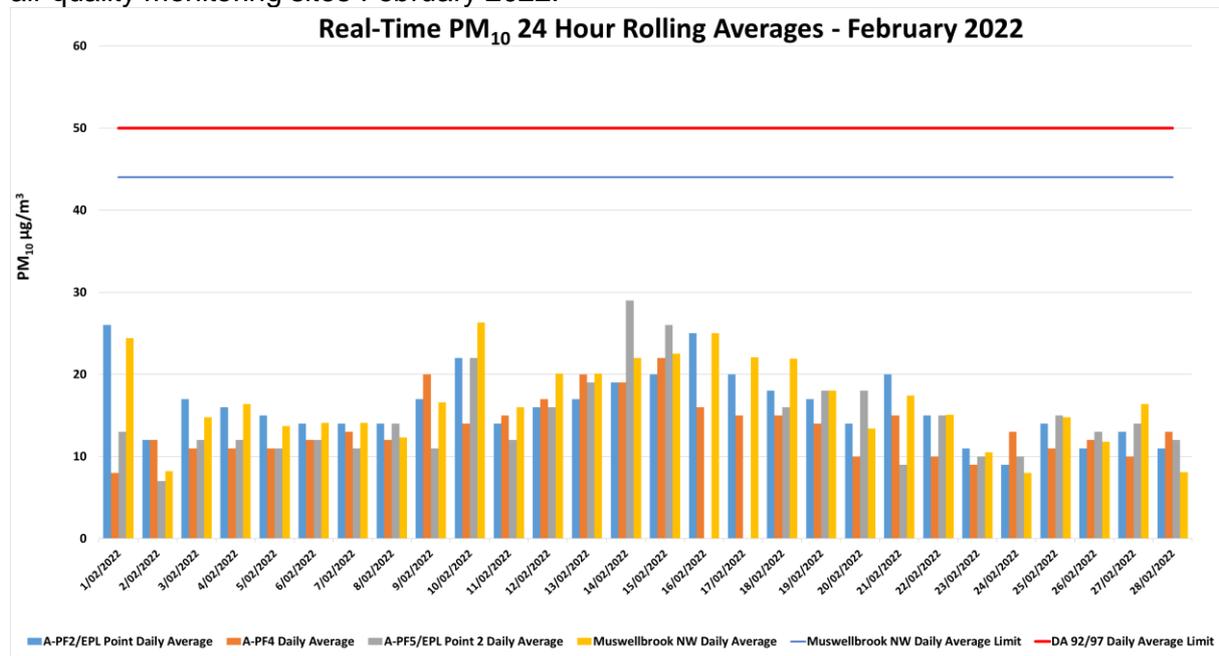


Figure 6-1: Real-time PM₁₀ 24 hour rolling average results for February 2022.

6.2 PM₁₀ Results – Annual rolling average

There were no elevated PM₁₀ measurements reported at MPO for the February 2022 annual rolling average. Real time PM₁₀ annual rolling averages for February 2022 are presented in **Figure 6-2** below.

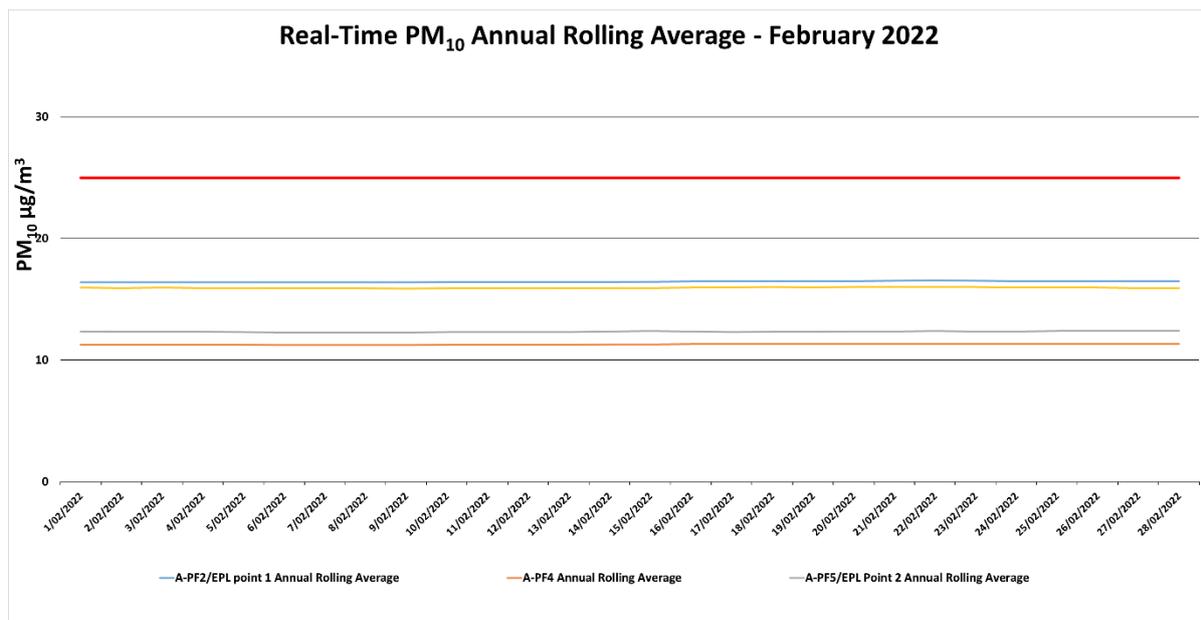


Figure 6-2: Real-time PM₁₀ Annual Rolling average results for February 2022.

6.3 PM_{2.5} Results – 24 hour rolling average

There were no elevated PM_{2.5} measurements reported throughout February 2022. Real time PM_{2.5} 24 hour rolling average results for February 2022 are presented in **Table 6-2**.

Table 6-2: MPO Palas Fidas PM_{2.5} Data – February 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/m ³) |
|------------|------------------------|-------|----------------|--|
| | 24 hour Average Result | | | |
| 1/02/2022 | 8 | 6 | 6 | 25 |
| 2/02/2022 | 4 | 3 | 3 | 25 |
| 3/02/2022 | 5 | 5 | 5 | 25 |
| 4/02/2022 | 5 | 4 | 5 | 25 |
| 5/02/2022 | 5 | 4 | 4 | 25 |
| 6/02/2022 | 5 | 5 | 5 | 25 |
| 7/02/2022 | 5 | 5 | 4 | 25 |
| 8/02/2022 | 4 | 4 | 5 | 25 |
| 9/02/2022 | 5 | 4 | 4 | 25 |
| 10/02/2022 | 5 | 5 | 4 | 25 |
| 11/02/2022 | 6 | 6 | 4 | 25 |
| 12/02/2022 | 5 | 5 | 5 | 25 |
| 13/02/2022 | 5 | 6 | 6 | 25 |
| 14/02/2022 | 6 | 6 | 7 | 25 |
| 15/02/2022 | 6 | 6 | 7 | 25 |
| 16/02/2022 | 7 | 7 | - | 25 |
| 17/02/2022 | 6 | 5 | - | 25 |
| 18/02/2022 | 6 | 5 | 4 | 25 |
| 19/02/2022 | 6 | 6 | 6 | 25 |

| | | | | |
|------------|---|---|---|----|
| 20/02/2022 | 5 | 5 | 5 | 25 |
| 21/02/2022 | 5 | 4 | 3 | 25 |
| 22/02/2022 | 5 | 6 | 5 | 25 |
| 23/02/2022 | 4 | 4 | 4 | 25 |
| 24/02/2022 | 4 | 3 | 4 | 25 |
| 25/02/2022 | 5 | 5 | 5 | 25 |
| 26/02/2022 | 5 | 5 | 5 | 25 |
| 27/02/2022 | 5 | 5 | 5 | 25 |
| 28/02/2022 | 4 | 4 | 4 | 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 2022 are presented in **Figure 6-3** below.

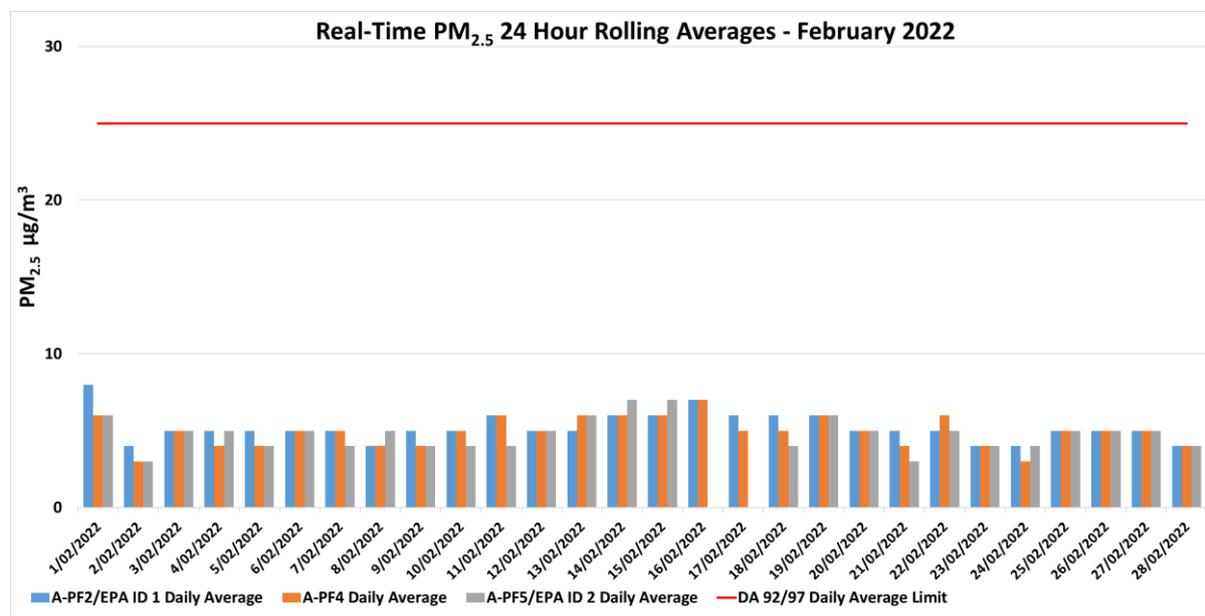


Figure 6-3: Real-time PM_{2.5} 24 hour rolling average results for February 2022.

6.4 PM_{2.5} Results - Annual rolling average

There were no elevated PM_{2.5} measurements reported at MPO for the February 2022 annual rolling average. Real time PM_{2.5} annual rolling averages for February 2022 are presented in **Figure 6-4** below.

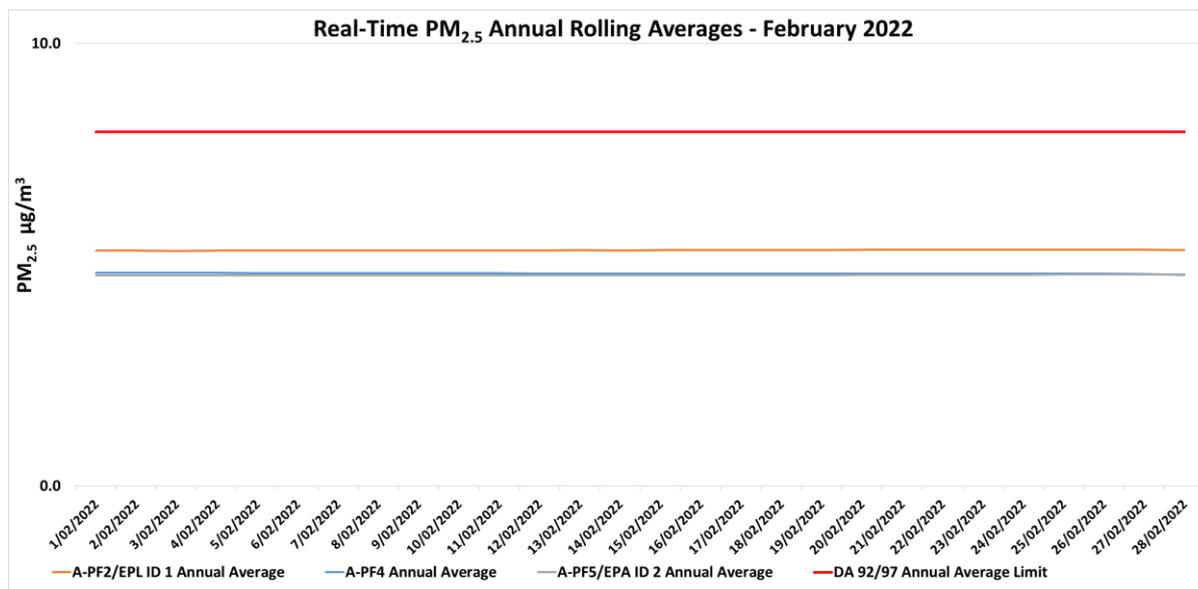


Figure 6-4: Real-time PM_{2.5} Annual Rolling average results for February 2022.

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 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 28 February 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**.

Table 7-1 – MPO Monthly Surface Water Monitoring Results – 28 February 2022

| Station | pH | Electrical Conductivity (EC) (µs/cm) ¹ | Total Suspended Solids (TSS) (mg/L) | Total Dissolved Solids (TDS) (mg/L) |
|---------|-----|---|-------------------------------------|-------------------------------------|
| W1 | 8.3 | 690 | 292 | 16 |
| W2 | 8.3 | 790 | 351 | 22 |
| W3 | ^ | ^ | ^ | ^ |
| W4 | 7.9 | 2100 | 1050 | 12 |
| W5 | * | * | * | * |

| Station | pH | Electrical Conductivity (EC) (µs/cm) ¹ | Total Suspended Solids (TSS) (mg/L) | Total Dissolved Solids (TDS) (mg/L) |
|---------|-----|---|-------------------------------------|-------------------------------------|
| W6A | 8.3 | 790 | 418 | 24 |
| W7 | * | * | * | * |
| W9 | ^ | ^ | ^ | ^ |
| W11 | 8.0 | 5300 | 2820 | 6 |
| W12 | * | * | * | * |
| W13 | * | * | * | * |
| W14 | 8.3 | 880 | 419 | 27 |
| W15 | * | * | * | * |
| W16 | 8.2 | 860 | 485 | 20 |
| W17 | ^ | ^ | ^ | ^ |

Notes:

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

*Dry or insufficient water to sample.

** Calculated result due to interference from fine colloidal material

^ Indicates no safe access due to wet weather conditions

¹ Results have been rounded in accordance with the In-house method Q4AN(EV)-332-W13 (pH) and In-house method Q4AN(EV)-332-W12 (EC).

During the February monthly monitoring, three of the fifteen monitoring location were found to be unsafe access and five sites were dry. Sites W2 and W6A exceeded their respective EC and TSS trigger levels. Sites W17 were outside there respective pH and EC levels. All other sites were within or below their respective pH and EC trigger levels. An investigation will be triggered if elevated measurements occur for three consecutive sampling events in accordance MPO Water Management Plan (MACH Energy, 2019). All other sites were below or inside the assessment trigger ranges.

8. Groundwater Monitoring

Quarterly groundwater monitoring was completed on 21, 22 and 23 February and 2 and 4 March 2022. 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) | Aug 2021 Water Level (DTW) | May 2021 Water Level (DTW) | Triggered (Yes/No) |
|-------------------------|-----------------------------------|---------|---------------------------------|----------------------------|----------------------------|--------------------|
| | 80 th Percentile (DTW) | Trigger | | | | |
| WRA1L | - | ± 0.5m | 1.08 | 3.04 | 2.73 | |
| WRA1U | - | ± 0.5m | * | * | * | |
| WRA3L | - | ± 0.5m | ^ | ^ | 10.05 | |
| WRA3U | - | ± 0.5m | ^ | ^ | 4.25 | |
| WRA6L | - | ± 0.5m | 1.08 | ^ | 1.19 | |
| WRA6U | - | ± 0.5m | 2.03 | ^ | 2.16 | |
| MPBH1 | 9.71 | 10.70 | 9.76 | 9.46 | 9.86 | No |

| Monitoring Location/ ID | Water Level Trigger Range | | Current Month Water Level (DTW) | Aug 2021 Water Level (DTW) | May 2021 Water Level (DTW) | Triggered (Yes/No) |
|-------------------------|-----------------------------------|----------------|---------------------------------|----------------------------|----------------------------|--------------------|
| | 80 th Percentile (DTW) | Trigger | | | | |
| MPBH2 | 12.20 | 14.20 | 11.49 | 12.53 | 12.50 | No |
| MPBH3b | 12.00 | Dry (or 14.0m) | 11.34 | 12.01 | 11.93 | No |
| MPBH4 | - | ± 0.5m | 11.31 | 11.84 | 11.91 | |
| MPBH5 | - | ± 0.5m | * | 8.83 | 8.83 | |
| MPBH1-C | - | ± 0.5m | 9.89 | 9.64 | 10.01 | |
| MPBH1-HR | - | ± 0.5m | 14.02 | 16.10 | 20.69 | |
| MPBH2-C | - | ± 0.5m | 11.80 | 12.83 | 12.80 | |
| MPBH2-HR | - | ± 0.5m | 22.96 | 36.90 | 43.96 | |
| MPBH4-C | - | ± 0.5m | 10.90 | 11.49 | 11.49 | |
| MPBH4-HR | - | ± 0.5m | 50.85 | 50.78 | 50.91 | |
| MPBH5-C | - | ± 0.5m | 11.44 | 12.47 | 12.45 | |
| MPBH5-HR | - | ± 0.5m | 11.38 | 12.37 | 12.37 | |
| MPBH6 | - | ± 0.5m | ^ | 10.17 | 10.18 | |
| MPBH6-C | - | ± 0.5m | ^ | 11.87 | 11.94 | |
| MPBH6-HR | - | ± 0.5m | ^ | 10.97 | 11.11 | |
| MPBH7 | - | ± 0.5m | 6.51 | 7.34 | 7.21 | |
| MPBH7-C | - | ± 0.5m | 15.25 | 18.76 | 18.83 | |
| 3500C500 (L) | - | ± 0.5m | 59.07 | 60.07 | 60.74 | |
| 3500C500 (S) | - | ± 0.5m | 24.32 | 25.45 | 25.54 | |
| 4500F000 | - | ± 0.5m | 31.22 | ^ | 30.45 | |
| 5000D000 | - | ± 0.5m | 113.14 | 118.13 | 117.36 | |
| 5500D000 | - | ± 0.5m | 39.28 | 40.46 | ^ | |
| 6500F500L | - | ± 0.5m | 53.66 | ^ | 53.41 | |
| 6500F500M | - | ± 0.5m | 55.05 | ^ | 54.86 | |
| 6500F500U | - | ± 0.5m | * | ^ | * | |
| 6500F625 | - | ± 0.5m | ^ | ^ | 22.79 | |
| Melody | - | ± 0.5m | ^ | ^ | 13.41 | |
| 7500F000 | - | ± 0.5m | 36.68 | 36.69 | 36.64 | |

* Dry/insufficient water to sample

** Bore appeared to be blocked

*** 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 ± 0.5m from the previous measurement.

Table 8-2 - MPO Quarterly Groundwater pH results

| Monitoring Location/ ID | pH Trigger Range | | Current Month pH | Nov 2021 Month pH | Aug 2021 pH | Triggered (Yes/No) |
|-------------------------|-----------------------------|-----------------------------|------------------|-------------------|-------------|--------------------|
| | 20 th Percentile | 80 th Percentile | | | | |
| WRA1I | 6.0 | 8.5 | 7.3 | 7.4 | 7.1 | No |
| WRA1U | 6.0 | 8.5 | * | * | * | No |
| WRA3L | 6.0 | 8.5 | ^ | ^ | 6.7 | No |
| WRA3U | 6.0 | 8.5 | ^ | ^ | 7.2 | No |
| WRA6L | 6.0 | 8.5 | 6.9 | ^ | 7.0 | No |
| WRA6U | 6.0 | 8.5 | 6.9 | ^ | 6.8 | No |
| MPBH1 | 6.0 | 8.5 | 6.9 | 6.9 | 6.9 | No |
| MPBH2 | 6.0 | 8.5 | 6.9 | 6.8 | 6.9 | No |
| MPBH3b | 6.0 | 8.5 | 7.3 | 7.4 | 7.9 | No |
| MPBH4 | 6.0 | 8.5 | 7.0 | 6.9 | 6.9 | No |
| MPBH5 | 6.0 | 8.5 | * | * | * | - |
| MPBH1-C*** | 6.0 | 8.5 | 8.7 | 7.4 | 8.2 | No |
| MPBH1-HR*** | 6.0 | 8.5 | 8.0 | 7.8 | 8.0 | No |
| MPBH2-C*** | 6.0 | 8.5 | 11.2 | 10.3 | 10.4 | No |
| MPBH2-HR*** | 6.0 | 8.5 | 8.4 | 8.5 | 8.2 | No |
| MPBH4-C*** | 6.0 | 8.5 | 8.4 | 8.3 | 7.6 | No |
| MPBH4-HR*** | 6.0 | 8.5 | 7.4 | 7.4 | 7.3 | - |
| MPBH5-C*** | 6.0 | 8.5 | 10.3 | 10.5 | 11.1 | No |
| MPBH5-HR*** | 6.0 | 8.5 | 7.6 | 7.5 | 7.5 | No |
| MPBH6*** | 6.0 | 8.5 | ^ | 7.1 | 7.1 | No |
| MPBH6-C*** | 6.0 | 8.5 | ^ | 7.7 | 7.9 | No |
| MPBH6-HR*** | 6.0 | 8.5 | ^ | 7.3 | 7.3 | No |
| MPBH7*** | 6.0 | 8.5 | 7.2 | 7.1 | 7.1 | No |
| MPBH7-C*** | 6.0 | 8.5 | 7.7 | 7.3 | 7.6 | No |
| 3500C500 (L) | 6.0 | 8.5 | 7.5 | 7.6 | 7.5 | No |
| 3500C500 (S) | 6.0 | 8.5 | 7.3 | 6.9 | 6.9 | No |
| 4500F000 | 6.0 | 8.5 | 6.8 | ^ | 6.8 | No |
| 5000D000 | 6.0 | 8.5 | ** | 8.0 | 7.6 | No |
| 5500D000 | 6.0 | 8.5 | 6.9 | 7.0 | ^ | No |
| 6500F500L | 6.0 | 8.5 | 7.4 | ^ | 7.4 | No |
| 6500F500M | 6.0 | 8.5 | 7.3 | ^ | 7.2 | No |
| 6500F500U | 6.0 | 8.5 | ^ | ^ | * | * |
| 6500F625 | 6.0 | 8.5 | ^ | ^ | 7.0 | No |
| Melody | 6.0 | 8.5 | ^ | ^ | 7.2 | No |
| 7500F000 | 6.0 | 8.5 | 7.8 | 7.7 | 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 $\pm 0.5m$ from the previous measurement.

Table 8-3 - MPO Quarterly Groundwater EC results

| Monitoring Location/ ID | EC Trigger Range | Current Month EC | Aug 2021 EC | May 2021 EC | Triggered (Yes/No) |
|-------------------------|--------------------------------|------------------|-------------|-------------|--------------------|
| | Maximum Beneficial Use Trigger | | | | |
| WRA1I | 7800 | 2900 | 2800 | 3650 | No |
| WRA1U | * | ** | ** | ** | - |
| WRA3L | 22000 | ^ | ^ | 16200 | No |
| WRA3U | 22000 | ^ | ^ | 5600 | No |
| WRA6L | 7800 | 5900 | ^ | 5850 | No |
| WRA6U | 22000 | 10200 | ^ | 10700 | No |
| MPBH1 | 800 | 630 | 490 | 480 | No |
| MPBH2 | 930 | 800 | 770 | 740 | No |
| MPBH3b | 7800 | 5600 | 5050 | 4800 | No |
| MPBH4 | * | 5800 | 6050 | 6250 | - |
| MPBH5 | * | ** | ** | ** | - |
| MPBH1-C | * | 1550 | 650 | 1250 | - |
| MPBH1-HR | * | 2000 | 1600 | 2000 | - |
| MPBH2-C | * | 1950 | 1250 | 1400 | - |
| MPBH2-HR | * | 1900 | 1800 | 1650 | - |
| MPBH4-C | * | 3800 | 3800 | 3550 | - |
| MPBH4-HR | * | 5750 | 5800 | 5850 | - |
| MPBH5-C | * | 640 | 600 | 640 | - |
| MPBH5-HR | * | 950 | 1050 | 1000 | - |
| MPBH6 | * | ^ | 1000 | 1100 | - |
| MPBH6-C | * | ^ | 7350 | 7350 | - |
| MPBH6-HR | * | ^ | 6100 | 6200 | - |
| MPBH7 | * | 13400 | 11900 | 13800 | - |
| MPBH7-C | * | 11300 | 11700 | 11200 | - |
| 3500C500 (L) | 7800 | 3800 | 3800 | 3750 | No |
| 3500C500 (S) | 7800 | 3450 | 1100 | 2500 | No |
| 4500F000 | 22000 | 8500 | ^ | 8550 | No |
| 5000D000 | 800 | *** | 4400 | 4000 | Yes |
| 5500D000 | 7800 | 4500 | 4500 | ^ | No |
| 6500F500L | 7800 | 3850 | ^ | 3900 | No |
| 6500F500M | 7800 | 2950 | ^ | 3000 | No |
| 6500F500U | 7800 | ** | ^ | ** | - |

| Monitoring Location/ ID | EC Trigger Range | Current Month EC | Aug 2021 EC | May 2021 EC | Triggered (Yes/No) |
|-------------------------|--------------------------------|------------------|-------------|-------------|--------------------|
| | Maximum Beneficial Use Trigger | | | | |
| 6500F625 | 7800 | ^ | ^ | 3850 | No |
| Melody | * | ^ | ^ | 1000 | No |
| 7500F000 | 7800 | 6350 | 6250 | 6350 | No |

* indicates no trigger limit identified

** 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

^ 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). 1 -

Investigation undertaken into elevated measurements at 5000D000 as per Groundwater Management Plan (MACH Energy, 2019) including suitably qualified hydrogeologist assessment; and amendment to Surface & Groundwater Trigger Response Plan (DA92/97-PA-35)

The were no elevated measurements during the February 2022 sampling event not previously reported. The next quarterly monitoring event is scheduled for May 2022.

9. Noise Monitoring

Attended noise monitoring was undertaken during the night period of 9/10 February 2022 at 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 February 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 – 9/10 February 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 ^{3,4} |
|----------|---------------------|----------------|-----------------|--------------|--------------------------------|--|------------------------------|
| N-AT1 | 09/02/2022 22:45 | 1.4 | F | 45 | Yes | <25 | Nil |
| N-AT2 | 09/02/2022 22:00 | 1.5 | E | 45 | Yes | IA | Nil |
| N-AT3 | 09/02/2022 22:31 | 2.6 | D | 45 | Yes | IA | Nil |
| N-AT4 | 09/02/2022 22:56 | 1.0 | F | 45 | Yes | 45 | Nil |
| N-AT5 | 09/02/2022 23:21 | 0.9 | E | 45 | Yes | 36 | Nil |
| N-AT6 | 09/02/2022 22:15 | 2.0 | E | 45 | Yes | <25 | 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 $L_{A1,1minute}$ 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; and
4. Bold results indicate exceedance of criteria.
5. IA indicates inaudible noise attributed to MPO.
6. Remeasure

Table 9-2 – $L_{Aeq,15min}$ Generated by MPO: Attended Night Monitoring – 9/10 February 2022

| Location | Start Date and Time | Wind Speed m/s | Stability Class | Criterion dB | Criterion Applies ¹ | MPO Only L_{Aeq} dB ^{2,4} | Exceedance dB ^{3,4} |
|----------|---------------------|----------------|-----------------|--------------|--------------------------------|--------------------------------------|------------------------------|
| N-AT1 | 09/02/2022 22:45 | 1.4 | F | 43 | Yes | <25 | Nil |
| N-AT2 | 09/02/2022 22:00 | 1.5 | E | 36 | Yes | IA | Nil |
| N-AT3 | 09/02/2022 22:31 | 2.6 | D | 41 | Yes | IA | Nil |
| N-AT4 | 09/02/2022 22:56 | 1.0 | F | 42 | Yes | 38 | Nil |
| N-AT5 | 09/02/2022 23:21 | 0.9 | E | 40 | Yes | 33 | Nil |
| N-AT6 | 09/02/2022 22:15 | 2.0 | E | 35 | Yes | <20 | 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; and
4. Bold results indicate exceedance of criteria.
5. Remeasure

Table 9-3 – $L_{Aeq,period}$ Cumulative Noise: Attended Night Monitoring – 9/10 February 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 | 09/02/2022 22:45 | 40 | Nil | Nil |
| N-AT2 | 09/02/2022 22:00 | 40 | Nil | Nil |
| N-AT3 | 09/02/2022 22:31 | 40 | Nil | Nil |
| N-AT4 | 09/02/2022 22:56 | 40 | Nil | Nil |
| N-AT5 | 09/02/2022 23:21 | 40 | Nil | Nil |
| N-AT6 | 09/02/2022 22:15 | 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 other 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 MPO Noise Management Plan (MACH Energy, 2021). Noise levels from MPO complied with noise limits at all monitoring locations during the monitoring period.

10. Blast Monitoring

There were 8 blast events during February (a total of 15 blasts YTD). Results for February 2022 are presented in **Table 10-1**. All blast results during the February 2022 monitoring period were below the criteria in Schedule 3, Condition 10 of DA 92/97 and EPL 20850 and therefore compliant.

Table 10-1 – MPO Blast Monitoring Results – February 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 |
|-------------------------|------------|--------------------------|----------------------------|--------------------------|----------------------------|--------------------------|----------------------------|----------------------|
| Wednesday 2/02/2022 | 1.15 | 0.650 | 100.7 | 0.330 | 94.9 | 0.550 | 98.4 | Y |
| Thursday 3/02/2022 | 12.57 | 0.020 | 94 | 0.010 | 98.6 | 0.010 | 77.9 | Y |
| Friday 4/02/2022 | 9.31 | 0.880 | 105.8 | 0.990 | 99.7 | 0.850 | 92.1 | Y |
| Friday 11/02/2022 | 14:20 | 0.180 | 97.8 | 0.150 | 86.3 | 0.510 | 105.4 | Y |
| Monday 14/02/2022 | 13:10 | 0.300 | 92.3 | 0.280 | 91.1 | 0.300 | 89.1 | Y |
| Wednesday 16/02/2022 | 13:31 | 0.310 | 101.4 | 0.300 | 90.4 | 0.520 | 93.6 | Y |
| Friday 18/02/2022 | 10:12 | 0.480 | 96.6 | 0.270 | 88.3 | 0.760 | 96.9 | Y |
| Friday 25/02/2022 | 9:40 | 0.690 | 100 | 0.530 | 99.6 | 0.800 | 95.3 | Y |

END OF REPORT