MACHEnergy

Mount Pleasant Operation

Monthly Environmental Monitoring Report

November 2020

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1. Introduction

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

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

Table 1-1 – Mount Pleasant Operation

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 2020
Reporting Period End Date	30 November 2020
Date All Data Received	22 December 2020

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

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

2. Monitoring Requirements

The MPO EPL 20850 specifically requires the monitoring of:

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

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

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

The MPO Environmental Monitoring Network is shown in the following figures**:**

- **Figure 2-1** shows MPO attended noise monitoring assessment groups and monitoring locations;
- **Figure 2-2** shows the MPO Air Quality Monitoring network;
- **Figure 2-3** shows the MPO Blast Monitoring Locations;
- **Figure 2-4** shows the MPO Groundwater Monitoring network; and
- **Figure 2-5** shows the MPO Surface Water Monitoring network.

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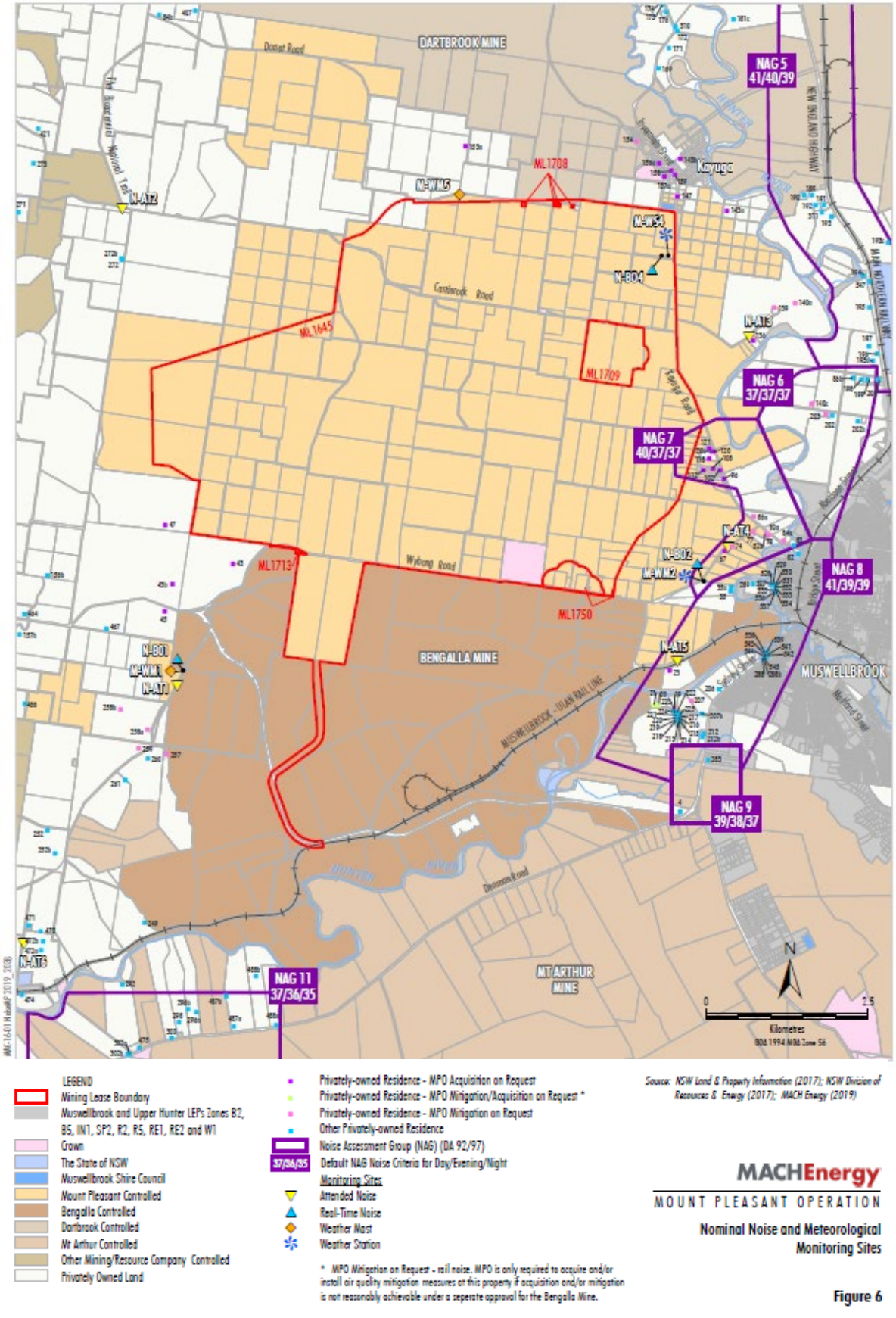

LEGEND
Mining Lease Boundary
Muswellbrook and Upper Hunter LEPs Zones B2, B5, IN1, SP2, R2, R5, RE1, RE2 and W1
Crown
The State of NSW
Muswellbrook Shire Council
Mount Pleasant Controlled
Bengalla Controlled
Dartbrook Controlled
Mt Arthur Controlled
Other Mining/Resource Company Controlled
Privately 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
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 seperate approval for the Bengalla Mine.

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

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MOUNT PLEASANT OPERATION
Nominal Noise and Meteorological Monitoring Sites

Figure 6

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

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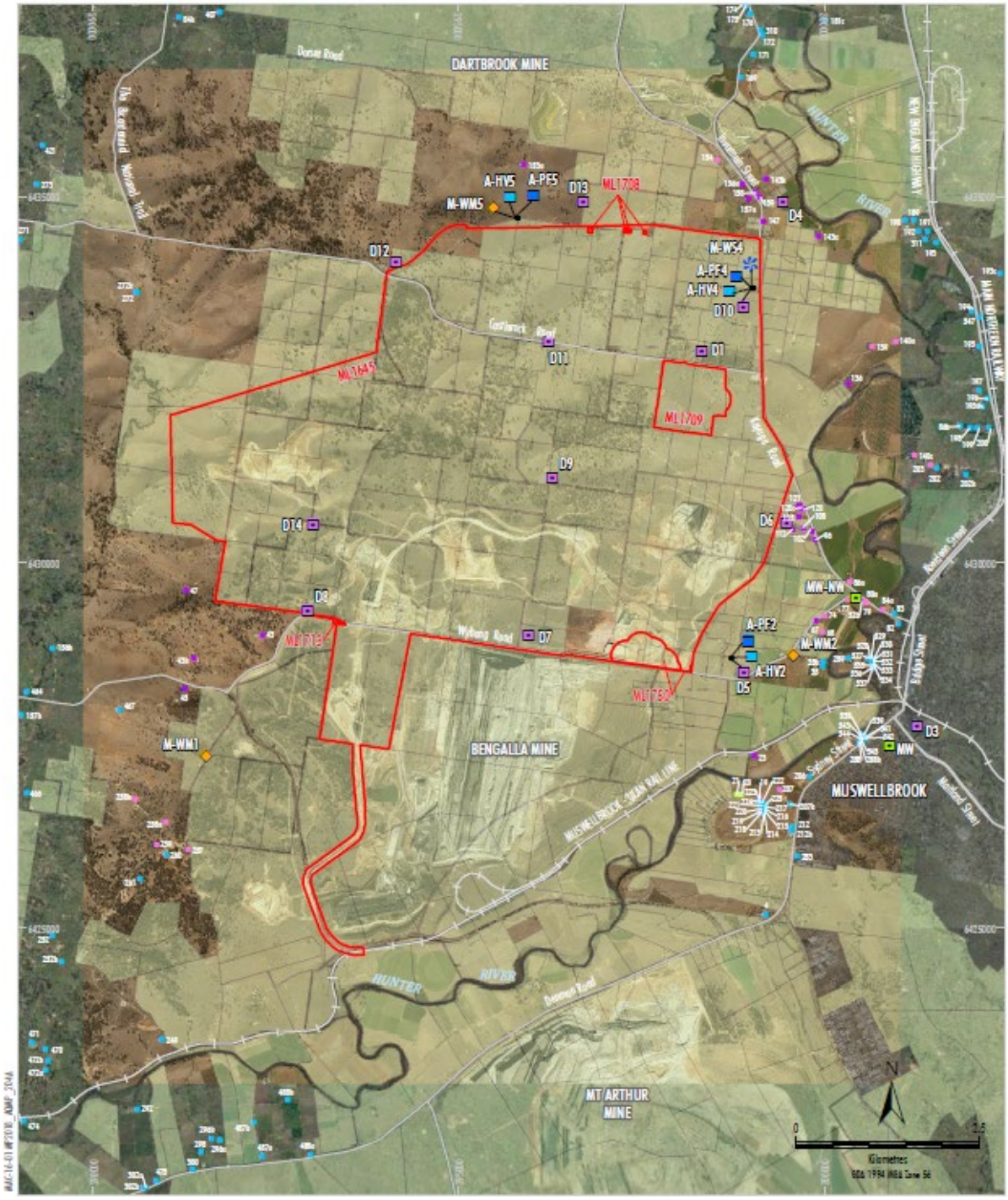

Figure 2-2 – MPO Air Quality and Meteorological Monitoring Network

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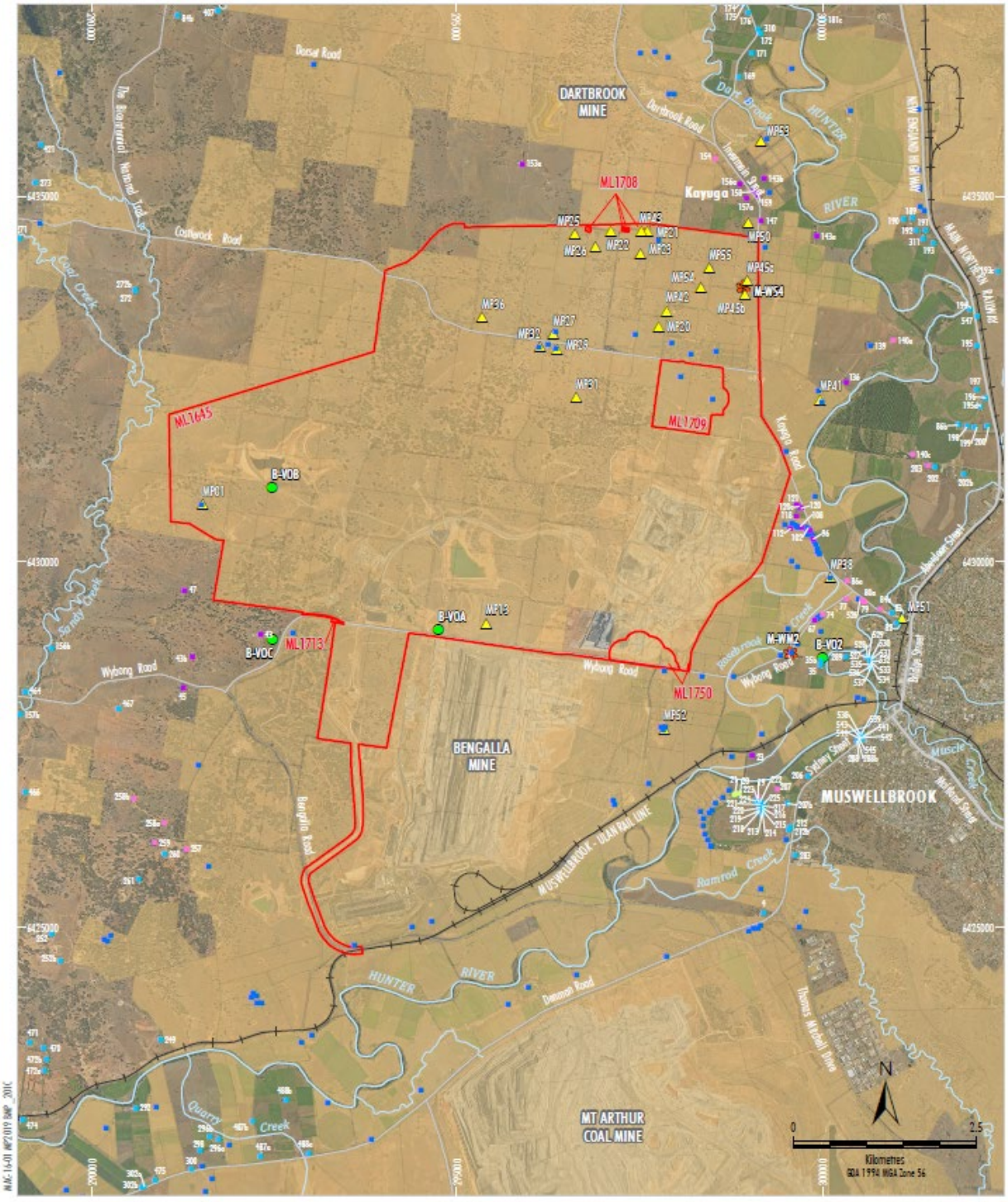

Figure 2-3 – MPO Blast Monitoring Locations

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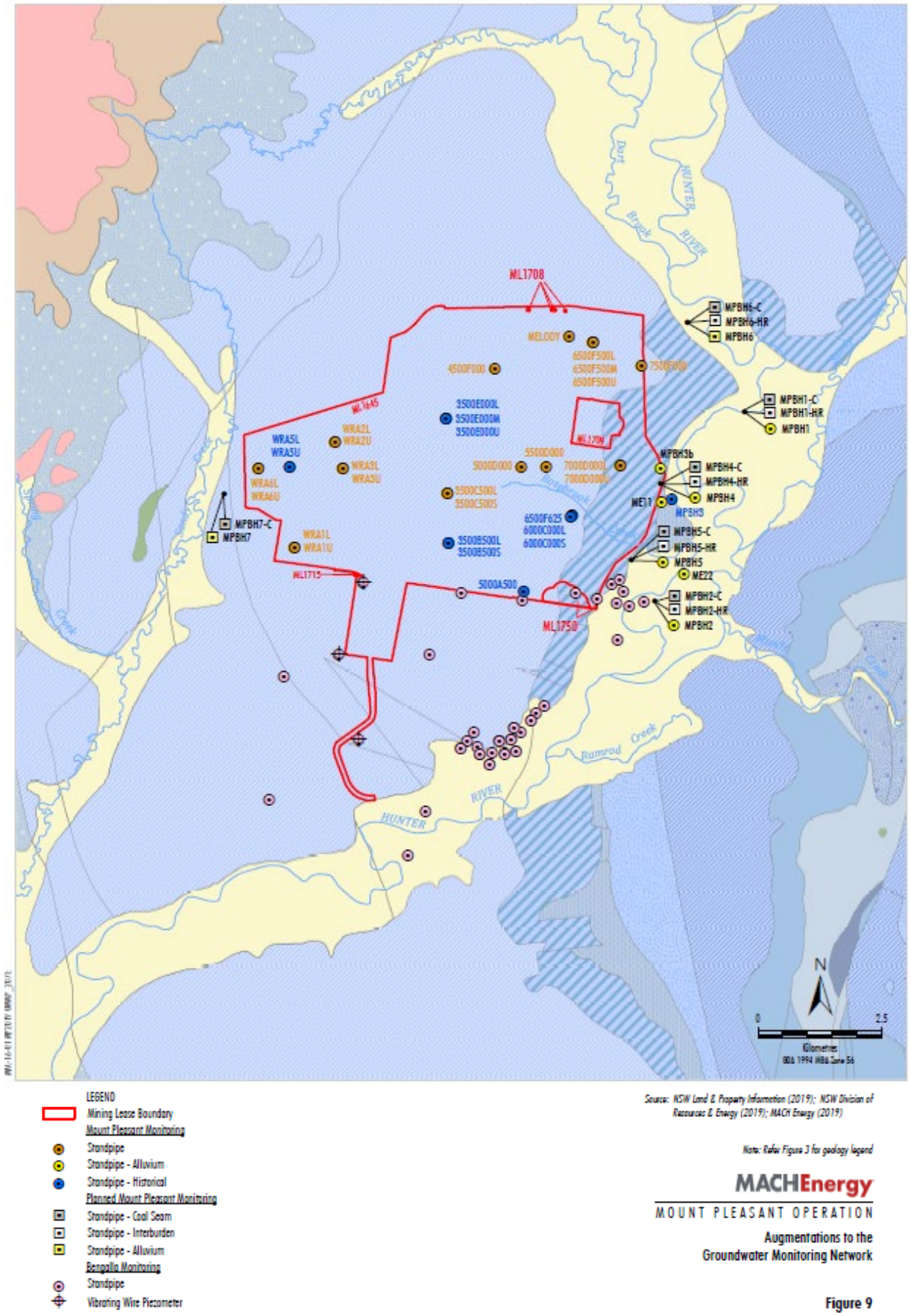

LEGEND

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

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MOUNT PLEASANT OPERATION

Augmentations to the Groundwater Monitoring Network

Figure 9

Figure 2-4 – MPO Groundwater Monitoring Network

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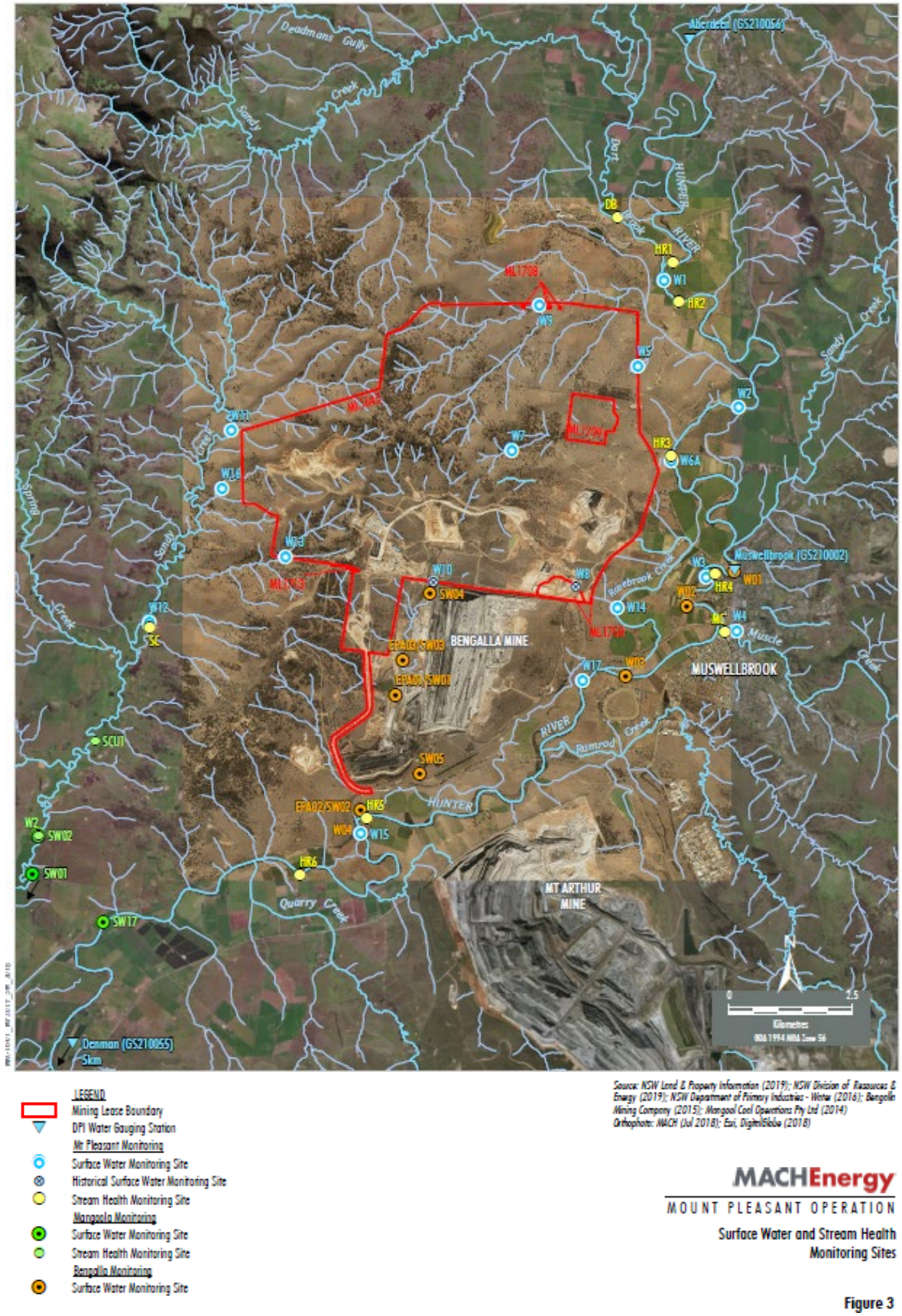

Figure 2-5 – MPO Surface Water Monitoring Network

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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, temperature (at 2 m and 10 m), solar radiation, relative humidity, rainfall, atmospheric pressure, and sigma theta.

The majority of meteorological data was captured at M-WS2 (>96.4%) during the November 2020 monitoring period, with the exception of solar radiation (83.9%). The majority of meteorological data was captured at M-WS4 (>99.5%) during the November 2020 monitoring period.

Throughout November 2020, there was 20.6.4 and 28.8mm 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. A gauge sample is determined by AECOM to be contaminated only after reference to field observation sheets, historical monitoring location data, laboratory notes and results, prevailing atmospheric conditions and feedback from field technicians. For example, a gauge sample with a statistically abnormally high insoluble solids result, a low ash residue result (indicating a high level of organic matter) and field notation that bird droppings or insects were present is likely to be considered contaminated.

4.2 Results

The dust deposition exposure period for all gauges commenced on 18 and 19 October 2020. Sample collection was undertaken on 18 November 2020 by AECOM with sample analysis performed by SRT, a NATA accredited laboratory. Results are summarised in **Table 4-1**. Annual rolling averages for November 2020 have been provided as an indication of performance between November 2019 – November 2020 and does not represent annual average results for 2020 as per Schedule 3, Condition 20 of DA 92/97.

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Table 4-1: Dust Depositional Results – November 2020

Location	YTD Insoluble Solids (g/m^2.month)	Insoluble Solids Annual Rolling Average (g/m^2.month)
D1	2.6	2.8
D3a	2.3	***
D4	2.9	3.0
D5	2.9	3.1
D6^	3.3	3.6
D7b[1]	5.9	***
D8	4.7	**4.7**
D9a	2.5	***
D10	1.5	1.7
D11	3.3	3.3
D12	2.2	2.2
D13	3.8	3.8
D14	3.3	3.3
Criterion	-	4
*Note: 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*		

Note [1]: *Site D7b is located within close proximity to the northern boundary of a neighbouring mining company's main pit and thus is heavily influenced by this. This site will continue to be monitored, however will not be used to assess compliance or to represent residential receivers in the area.*

** No data due to dust gauge removed during construction activities*

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

Contaminated results are not included in the 12 month rolling average. An elevated reading above the annual average criterion for dust deposition (insoluble solids) was recorded at site D8 (4.7 g/m2.month).

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

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in accordance with the MPO Air Quality and Greenhouse Gas Management Plan (MACH Energy, 2019).

Field notes from the November 2020 sampling event noted that all the gauges contained insects.

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

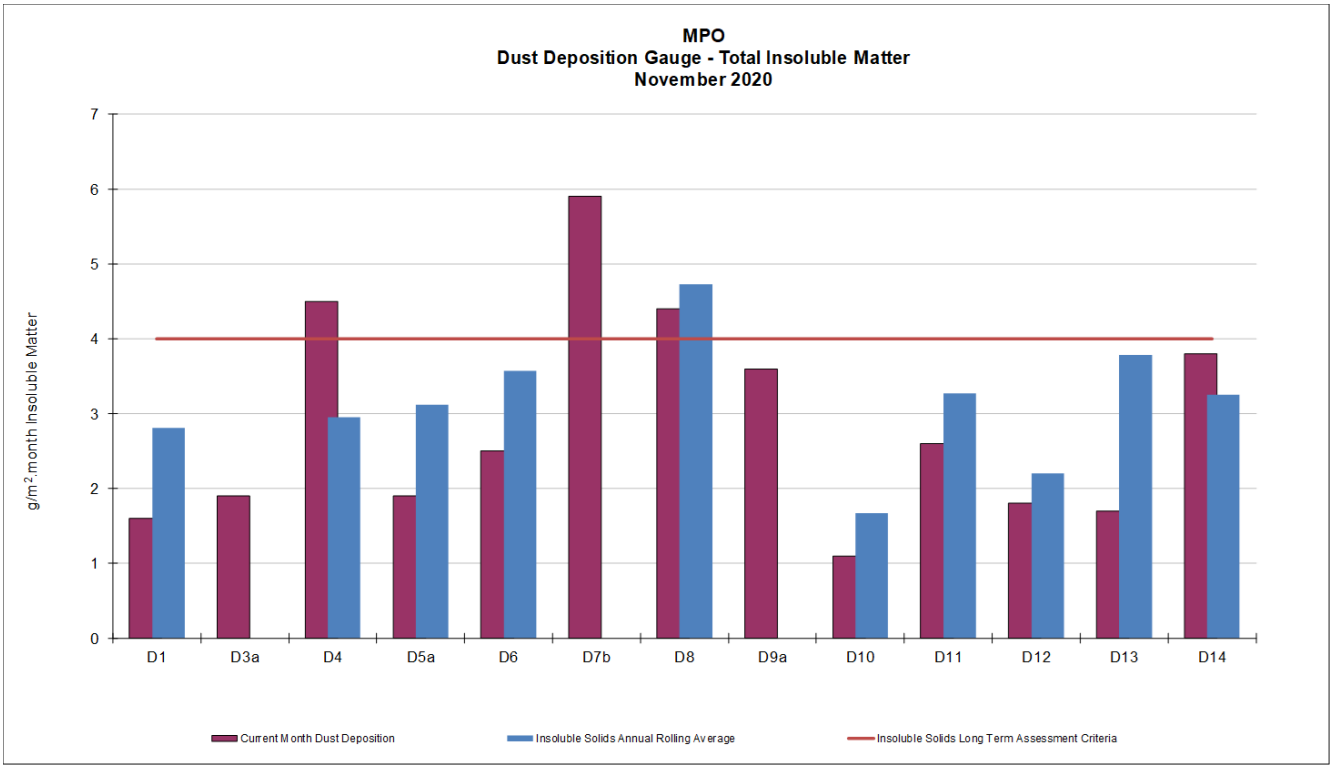

Figure 4-1: MPO Dust Deposition Monthly Results and Annual Rolling Average – November 2020

5. Total Suspended Particulates

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

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

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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/m^3.

5.2 Results

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

Table 5-2 Total Suspended Particulate Monitoring Data – November 2020

Run Date	Assessment Criterion	TSP µg/m^3		
		HVAS A-PF2	HVAS M-WS4	HVAS A-PF5
4/11/2020	-	54	39	33
10/11/2020	-	42	47	49
16/11/2020	-	79	38	30
22/11/2020	-	116	71	57
28/11/2020		93	55	50
Monthly Mean	-	77	50	44
Annual Rolling Average	**90**	68	45	47

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

5.3 Discussion

For the reporting period, the annual rolling average TSP data at all sites was below the annual average criterion of 90 µg/m^3.

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6. Real Time Air Quality Monitoring

Continuous particulate matter less than 10 µm (PM_{10}) and particulate matter less than 2.5 µm ($PM_{2.5}$) monitoring was conducted by three Palas Fidas (one utilised for management only) units at MPO during November 2020.

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

Real time PM_{10} and $PM_{2.5}$ 12-month rolling averages for November 2020 have been provided in Section 6.2 and 6.4 respectively, as an indication of performance between November 2019 – November 2020 and do not represent annual average results for 2020 as per Schedule 3, Condition 20 of DA 92/97.

6.1 PM_{10} Results – 24 hour rolling average

There were no elevated PM_{10} measurements reported throughout November 2020 with the exception of 27 and 29 November. The Muswellbrook NW monitor was operational during all days of November 2020, with the exception of 1 and 30 November. Real time PM_{10} 24 hour rolling average results for November 2020 are presented in **Table 6-1.**

Table 6-1: MPO Palas Fidas PM_{10} Data – November 2020

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					
1/11/2020	-	9	7	-	44	50
2/11/2020	-	17	13	18	44	50
3/11/2020	15	14	13	20	44	50
4/11/2020	18	14	11	21	44	50
5/11/2020	14	9	7	17	44	50
6/11/2020	12	13	11	14	44	50
7/11/2020	15	15	14	22	44	50
8/11/2020	12	10	9	15	44	50
9/11/2020	13	12	11	15	44	50
10/11/2020	14	14	13	18	44	50
11/11/2020	17	14	10	20	44	50
12/11/2020	27	19	13	30	44	50
13/11/2020	24	19	12	27	44	50
14/11/2020	18	20	9	18	44	50
15/11/2020	12	26	11	17	44	50
16/11/2020	25	20	11	31	44	50
17/11/2020	29	24	19	38	44	50
18/11/2020	23	19	17	28	44	50
19/11/2020	27	23	20	32	44	50
20/11/2020	29	27	20	33	44	50
21/11/2020	30	27	22	42	44	50
22/11/2020	37	30	18	41	44	50

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23/11/2020	29	15	9	26	44	50
24/11/2020	17	16	13	20	44	50
25/11/2020	19	14	13	21	44	50
26/11/2020	29	22	17	38	44	50
27/11/2020	34	30	22	**49**	44	50
28/11/2020	25	18	12	24	44	50
29/11/2020	**65**	27	17	**59**	44	50
30/11/2020	28	21	16	-	44	50

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

Figure 6-1 below shows the results of real-time PM_{10} 24 hour rolling average results at MPO air quality monitoring sites November 2020.

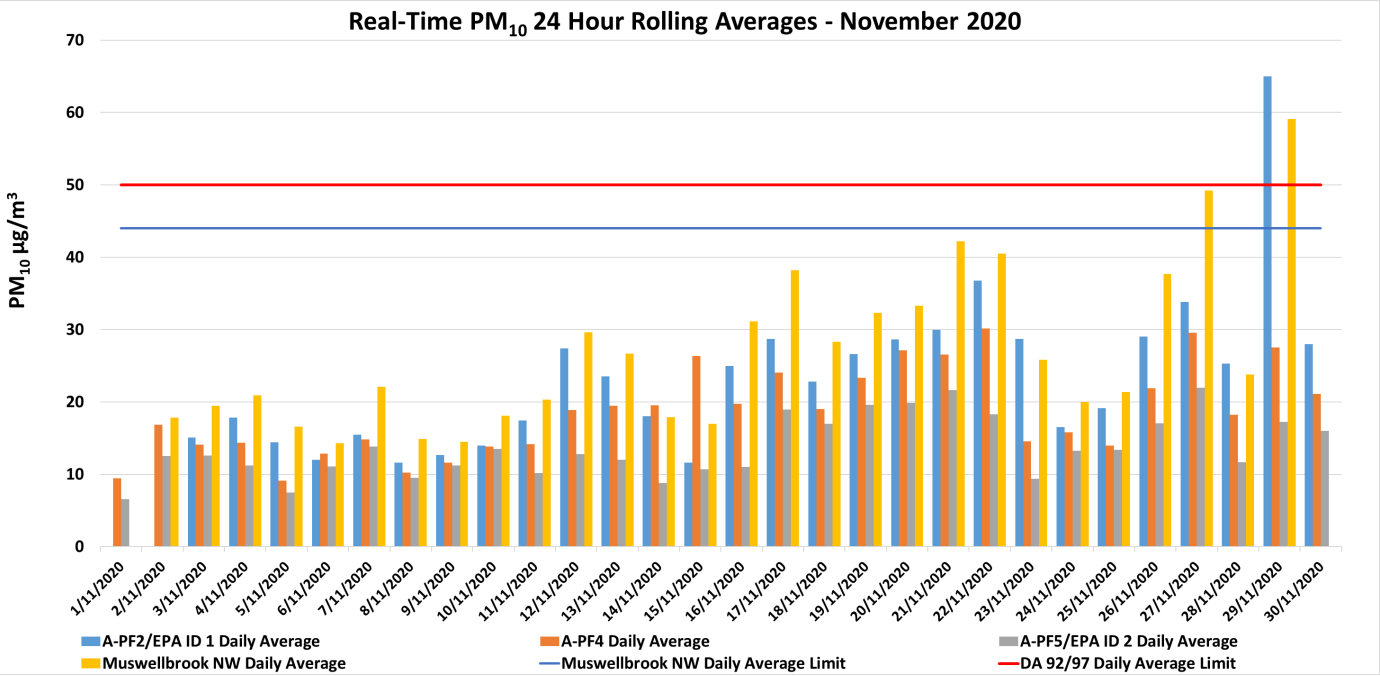

Figure 6-1: Real-time PM_{10} 24 hour rolling average results for November 2020.

6.2 PM_{10} Results – Annual rolling average

There were no elevated PM_{10} measurements reported at MPO for the November 2020 annual rolling average. Real time PM_{10} annual rolling averages for November 2020 are presented in **Figure 6-2** below.

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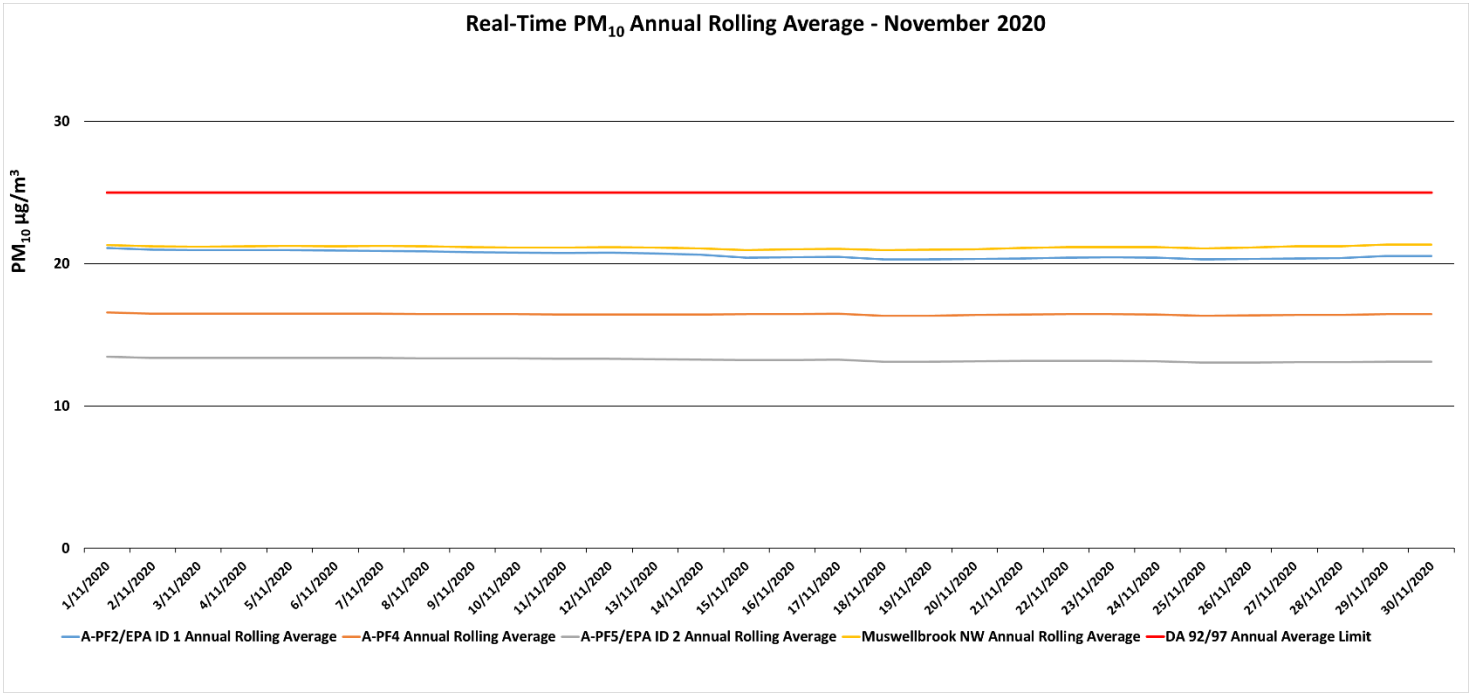

Figure 6-2: Real-time PM_{10} Annual Rolling average results for November 2020.

6.3 $PM_{2.5}$ Results – 24 hour rolling average

There were no elevated $PM_{2.5}$ measurements reported throughout November 2020. Real time $PM_{2.5}$ 24 hour rolling average results for November 2020 are presented in **Table 6-2.**

Table 6-2: MPO Palas Fidas $PM_{2.5}$ Data – November 2020

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

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18/11/2020	7	7	6	25
19/11/2020	7	7	6	25
20/11/2020	7	8	6	25
21/11/2020	12	12	8	25
22/11/2020	14	13	8	25
23/11/2020	8	6	4	25
24/11/2020	6	6	4	25
25/11/2020	5	5	4	25
26/11/2020	6	6	5	25
27/11/2020	11	11	8	25
28/11/2020	7	6	4	25
29/11/2020	11	7	5	25
30/11/2020	10	9	7	25

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

Real time $PM_{2.5}$ 24 hour average results for November 2020 are presented in **Figure 6-3** below.

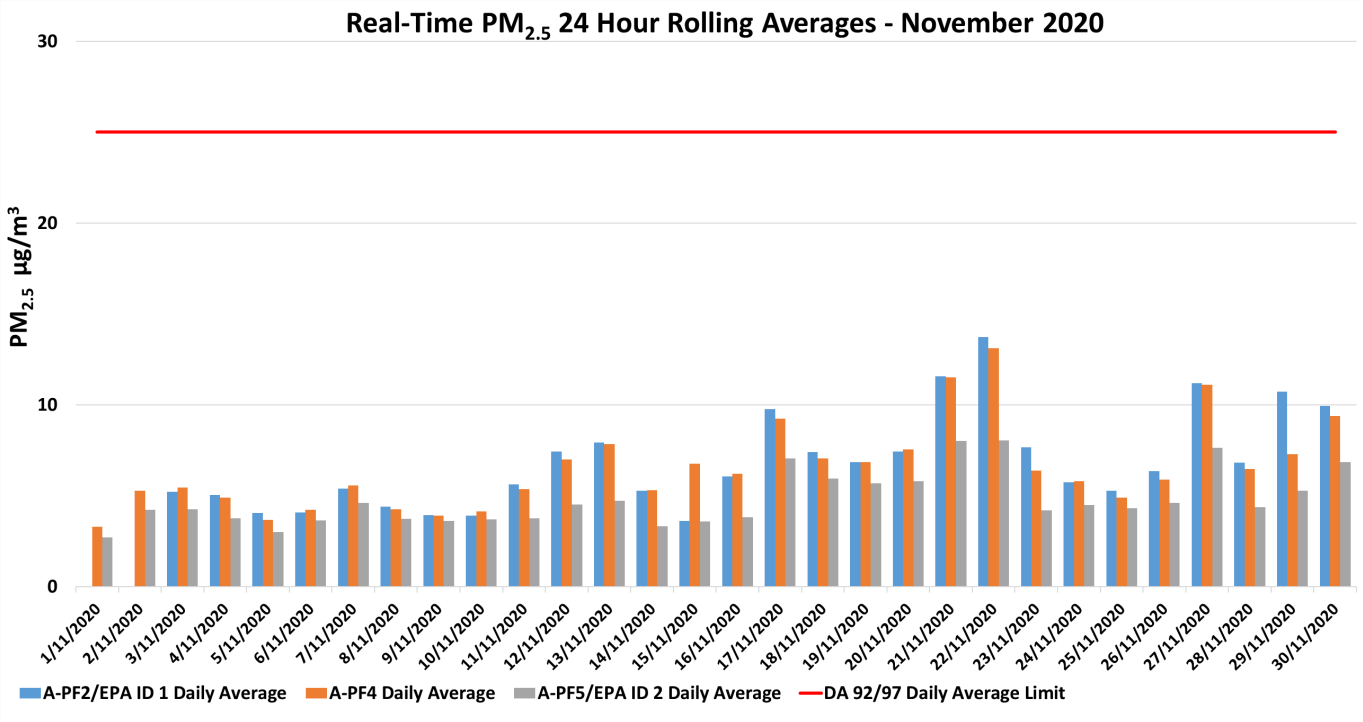

Figure 6-3: Real-time $PM_{2.5}$ 24 hour rolling average results for November 2020.

6.4 $PM_{2.5}$ Results - Annual rolling average

The requirement of the annual rolling average of $PM_{2.5}$ data was incepted during MOD 3 of DA 92/97, dated 24 August 2018. Elevated readings have been measured for the annual rolling average of $PM_{2.5}$ data collected during November 2020. Wider regional air quality events, including dust storms and bushfires in late 2019, have contributed to elevated annual rolling $PM_{2.5}$ average levels.

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Real time $PM_{2.5}$ annual rolling averages for November 2020 are presented in **Figure 6-4** below.

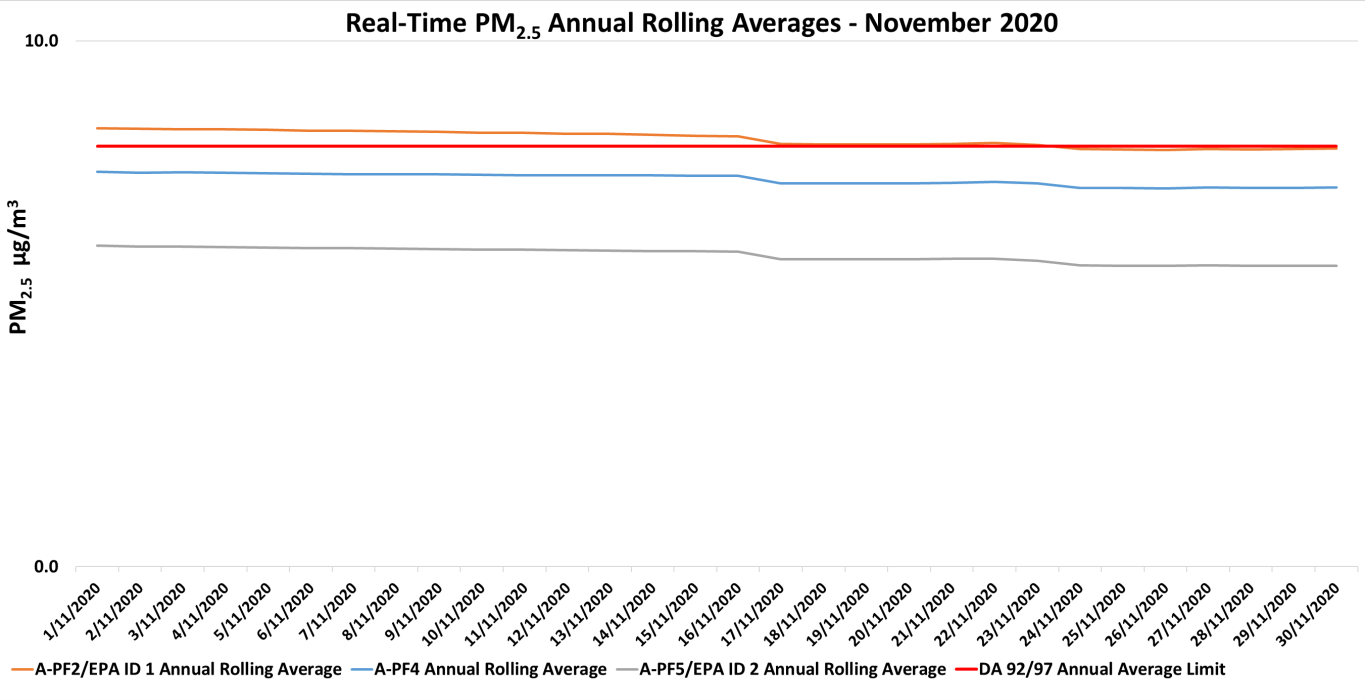

Figure 6-4: Real-time $PM_{2.5}$ Annual Rolling average results for November 2020.

7. Surface Water Monitoring

7.1 Methodology

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

7.2 Assessment Criteria

Surface waters were assessed 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

Monthly (annual analytical suite) and rain event surface water monitoring was conducted by AECOM on 26 November 2020. Laboratory analysis was performed by SRT which is a NATA accredited laboratory. Monthly monitoring results for pH, EC, TSS and TDS are presented in **Table 7-1**.

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Table 7-1 – MPO Monthly (Annual) Surface Water Monitoring Results – November 2020

Station	pH	Electrical Conductivity (EC) (µs/cm)[1]	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W1	^	^	^	^
W2	8.2	490	16	285
W3	7.9	**570**	18	368
W4	7.7	1500	<5	979
W5	*	*	*	*
W6A	8.3	**500**	**20**	312
W7	*	*	*	*
W9	*	*	*	*
W11	7.7	5500	12	3170
W12	7.7	6000	5	3510
W13	*	*	*	*
W14	*	*	*	*
W15	8.2	780	24	498
W16	*	*	*	*
W17	8.1	650	26	402

***Note**: Results in **bold** indicate elevated reading of adopted assessment criteria.*
**Dry or insufficient water to sample.*
*** TDS result calculated due to high TSS containing colloidal clay particles which have interfered with the Laboratory TDS result.*
^ Indicates no safe access due to wet weather conditions
[1] 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).
**** Calculated result due to interference from colloidal material interfering with laboratory result.*

Seven of the fifteen monitoring locations were found to be dry or were not safely accessible on 26 November 2020. All sites sampled were below or inside the trigger level values with the exception of W6A. An investigation into the elevated measurement will be triggered if this occurs for three consecutive sampling events in accordance MPO Water Management Plan (MACH Energy, 2019).

8. Groundwater Monitoring

The quarterly groundwater monitoring was conducted on 9 – 13, 27 and 30 November 2020. Water level results for the groundwater bores are presented in **Table 8-1**. The quarterly pH and EC results are presented in **Table 8-2** and **Table 8-3**, respectively.

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Table 8-1 - MPO Quarterly Groundwater Water Level Results

Monitoring Location/ ID	Water Level Trigger Range		Current Month Water Level (DTW)	August 2020 Water Level (DTW)	May 2020 Water Level (DTW)	Triggered (Yes/No)
	80th Percentile (DTW)	Trigger				
WRA1L	-	± 0.5m	3.72	4.94	6.11	
WRA1U	-	± 0.5m	*	*	*	
WRA3L	-	± 0.5m	13.27	14.02	**15.14**	
WRA3U	-	± 0.5m	4.36	3.76	4.41	
WRA5L	-	± 0.5m	0.00	0.00	0.00	
WRA5U	-	± 0.5m	1.15	0.84	0.65	
WRA6L	-	± 0.5m	1.49	1.33	**1.75**	
WRA6U	-	± 0.5m	2.95	3.37	3.84	
MPBH1	9.71	10.70	9.86	9.90	10.06	No
MPBH2	12.20	14.20	12.67	12.57	12.54	No
MPBH3b	12.00	Dry (0r 14.0m)	12.09	12.17	12.21	No
MPBH4	-	± 0.5m	12.13	12.19	12.31	
MPBH5	-	± 0.5m	*	*	*	
MPBH1-C***	-	± 0.5m	10.19	**	10.17	
MPBH1-HR***	-	± 0.5m	10.15	**	10.12	
MPBH2-C***	-	± 0.5m	13.01	**	12.87	
MPBH2-HR**	-	± 0.5m	12.90	**	12.84	
MPBH4-C***	-	± 0.5m	11.69	11.77	**11.90**	
MPBH4-HR***	-	± 0.5m	51.10	51.06	51.05	
MPBH5-C***	-	± 0.5m	12.39	12.35	**12.28****	
MPBH5-HR***	-	± 0.5m	12.50	12.46	12.39	
MPBH6***	-	± 0.5m	10.33	10.30	10.44	
MPBH6-C***	-	± 0.5m	12.62	12.62	12.69	
MPBH6-HR***	-	± 0.5m	11.16	11.06	11.22	
MPBH7***	-	± 0.5m	9.42	9.51	9.50	
MPBH7-C***	-	± 0.5m	18.88	18.74	19.02	
3500C500 (L)	-	± 0.5m	60.62	**53.36**	58.04	
3500C500 (S)	-	± 0.5m	25.75	25.86	26.08	
4500F000	-	± 0.5m	27.56	**28.97**	31.29	
5000D000	-	± 0.5m	107.54	**106.56**	**101.71**	
5500D000	-	± 0.5m	99.65	**86.56**	84.09	

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Monitoring Location/ ID	Water Level Trigger Range		Current Month Water Level (DTW)	August 2020 Water Level (DTW)	May 2020 Water Level (DTW)	Triggered (Yes/No)
	80th Percentile (DTW)	Trigger				
6500F500L	-	± 0.5m	53.17	53.08	53.07	
6500F500M	-	± 0.5m	54.71	54.67	54.85	
6500F500U	-	± 0.5m	*	*	*	
6500F625	-	± 0.5m	17.78	**14.39**	**15.11**	
Melody	-	± 0.5m	12.66	11.64	**11.49**	
7500F000	-	± 0.5m	36.53	36.42	36.44	

** 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	August 2020 pH	May 2020 pH	Triggered (Yes/No)
	20th Percentile	80th Percentile				
WRA1I	6.0	8.5	7.0	7.0	7.0	No
WRA1U	6.0	8.5	*	*	*	No
WRA3L	6.0	8.5	6.8	6.9	6.8	No
WRA3U	6.0	8.5	7.3	7.5	7.6	No
WRA5L	6.0	8.5	7.1	7.2	7.2	No
WRA5U	6.0	8.5	7.1	7.2	7.3	No
WRA6L	6.0	8.5	6.9	7.0	7.0	No
WRA6U	6.0	8.5	6.8	7.0	6.8	No
MPBH1	6.0	8.5	6.9	7.0	7.0	No
MPBH2	6.0	8.5	6.8	6.8	6.9	No
MPBH3b	6.0	8.5	7.9	8.2	7.6	No
MPBH4	6.0	8.5	6.9	6.8	6.9	No
MPBH5	6.0	8.5	*	*	*	-
MPBH1-C***	6.0	8.5	7.7	**	**8.8**	No
MPBH1-HR***	6.0	8.5	8.4	**	**8.8**	No
MPBH2-C***	6.0	8.5	10.8	**	**12.3**	Yes
MPBH2-HR***	6.0	8.5	8.9	**	**9.1**	Yes
MPBH4-C***	6.0	8.5	8.3	7.5	8.2	No
MPBH4-HR***	6.0	8.5	7.3	7.4	*	-
MPBH5-C***	6.0	8.5	11.0	**11.5**	**12.0**	Yes

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Monitoring Location/ ID	pH Trigger Range		Current Month pH	August 2020 pH	May 2020 pH	Triggered (Yes/No)
	20th Percentile	80th Percentile				
MPBH5-HR***	6.0	8.5	7.4	7.4	7.5	No
MPBH6***	6.0	8.5	7.0	7.0	7.0	No
MPBH6-C***	6.0	8.5	8.0	7.9	7.9	No
MPBH6-HR***	6.0	8.5	7.1	7.2	7.4	No
MPBH7***	6.0	8.5	7.3	7.3	7.3	No
MPBH7-C***	6.0	8.5	7.3	7.6	7.6	No
3500C500 (L)	6.0	8.5	7.6	7.5	7.3	No
3500C500 (S)	6.0	8.5	7.2	7.2	7.2	No
4500F000	6.0	8.5	6.9	6.8	6.8	No
5000D000	6.0	8.5	7.2	7.1	7.0	No
5500D000	6.0	8.5	7.2	7.1	7.2	-
6500F500L	6.0	8.5	7.6	7.4	7.4	No
6500F500M	6.0	8.5	7.5	7.2	7.3	No
6500F500U	6.0	8.5	*	*	*	*
6500F625	6.0	8.5	6.9	6.9	7.0	No
Melody	6.0	8.5	7.0	7.0	7.0	No
7500F000	6.0	8.5	7.9	7.9	7.7	No

** 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*
- indicated no trigger limit identified
*An investigation is triggered when pH values are recorded outside the baseline range (20th – 80th percentile) for three consecutive readings. Results outside this range are shown in **bold**.*
Results have been rounded in accordance with the In-house method Q4AN(EV)-332-WI3 (pH) and In-house method Q4AN(EV)-332-WI2 (EC).

Table 8-3 - MPO Quarterly Groundwater EC results

Monitoring Location/ ID	EC Trigger Range	Current Month EC	August 2020 EC	May 2020 EC	Triggered (Yes/No)
	Maximum Beneficial Use Trigger				
WRA1I	7800	3750	4150	4200	No
WRA1U	^	*	*	*	-
WRA3L	22000	15800	15900	16100	No
WRA3U	22000	3050	2350	3050	No
WRA5L	7800	4350	4050	3550	No
WRA5U	7800	4300	4000	3450	No
WRA6L	7800	6650	6800	6550	No
WRA6U	22000	10400	10300	10700	No
MPBH1	800	470	460	450	No

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Monitoring Location/ ID	EC Trigger Range Maximum Beneficial Use Trigger	Current Month EC	August 2020 EC	May 2020 EC	Triggered (Yes/No)
MPBH2	930	800	750	750	No
MPBH3b	7800	4000	4100	4150	No
MPBH4	^	6150	6200	6000	-
MPBH5	^	*	*	*	-
MPBH1-C***	^	740	**	1250	-
MPBH1-HR***	^	1400	**	1150	-
MPBH2-C***	^	1350	**	3800	-
MPBH2-HR***	^	980	**	1300	-
MPBH4-C***	^	3750	3450	3500	-
MPBH4-HR***	^	6100	6100	*	-
MPBH5-C***	^	1000	1150	1800	-
MPBH5-HR***	^	820	800	800	-
MPBH6***	^	1200	1300	1250	-
MPBH6-C***	^	6250	7250	6800	-
MPBH6-HR***	^	1900	1350	4900	-
MPBH7***	^	13500	14400	13700	-
MPBH7-C***	^	11000	9900	10400	-
3500C500 (L)	7800	4050	3950	3950	No
3500C500 (S)	7800	4800	4800	4800	No
4500F000	22000	8800	8800	9000	No
5000D000	800	**1250**	**970**	**910**	Yes
5500D000	7800	4600	4550	4150	No
6500F500L	7800	3850	3050	3850	No
6500F500M	7800	3050	3800	3050	No
6500F500U	7800	*	*	*	-
6500F625	7800	3550	3350	3400	No
Melody	^	1000	800	970	No
7500F000	7800	6350	6400	6350	No

** 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*
^ 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).

EC trigger limits in November 2020 were reached at groundwater bore 5000D000 which has been above the limit for three consecutive monitoring events. An investigation has been

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initiated regarding this in accordance with the MPO Groundwater Management Plan (MACH Energy, 2019). The next quarterly monitoring event is scheduled for February 2021.

9. Noise Monitoring

Attended noise monitoring was undertaken during the night period of 19 November 2020 at 6 monitoring locations as per the MPO Noise Management Plan (MACH Energy, 2019) in accordance with DA 92/97 and EPL 20850.

9.1 Results

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

Table 9-1 – $L_{A1,1min}$ Generated by MPO: Attended Night Monitoring – 19 November 2020

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	19/11/20 23:46	1.7	E	45	Yes	45	Nil
N-AT2	19/11/20 22:00	1.9	D	45	Yes	30	Nil
N-AT3	19/11/20 23:24	1.8	F	45	Yes	NM	Nil
N-AT4	20/11/20 00:27	1.7	E	45	Yes	IA	Nil
N-AT5	19/11/20 23:56	1.5	G	45	Yes	37	NA
N-AT6	19/11/20 22:44	2.0	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; and*
4. *Bold results indicate exceedance of criteria.*

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Table 9-2 – $L_{Aeq,15min}$ Generated by MPO: Attended Night Monitoring – 19 November 2020

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	19/11/20 23:46	1.7	E	43	Yes	<30	Nil
N-AT2	19/11/20 22:00	1.9	D	36	Yes	22	Nil
N-AT3	19/11/20 23:24	1.8	F	41	Yes	NM	Nil
N-AT4	20/11/20 00:27	1.7	E	42	Yes	IA	Nil
N-AT5	19/11/20 23:56	1.5	G	40	Yes	<30	NA
N-AT6	19/11/20 22:44	2.0	D	35	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 $L_{Aeq,15minute}$ 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.*

Table 9-3 – $L_{Aeq,period}$ Cumulative Noise: Attended Night Monitoring – 19 November 2020

Location	Start Date and Time	Cumulative Noise Criterion LAeq dB	Measured Mining Only $L_{Aeq,period}$ dB[1,2]	Exceedance dB
N-AT1	19/11/20 23:46	40	33	Nil
N-AT2	19/11/20 22:00	40	Nil	Nil
N-AT3	19/11/20 23:24	40	Nil	Nil
N-AT4	20/11/20 00:27	40	Nil	Nil
N-AT5	19/11/20 23:56	40	Nil	Nil
N-AT6	19/11/20 22:44	40	Nil	Nil

Notes:

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

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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, 2019). Noise levels from MPO complied with noise limits at all monitoring locations during the November 2020 monitoring period.

10. Blast Monitoring

There were 6 blast events during November (a total of 66 blasts YTD). Results for November 2020 are presented in **Table 10-1**. All blast results during the November 2020 monitoring period were below the criteria in Schedule 3, Condition 10 of DA 92/97 and EPL 20850 and thus the MPO remains compliant in 2020 YTD.

Table 10-1 – MPO Blast Monitoring Results – November 2020

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
Thursday 05/11/20	13:14	0.850	95.3	0.29	88.2	0.71	96.9	Y
Wednesday 11/11/20	13:00	0.27	100.1	0.11	94.1	0.30	98.4	Y
Tuesday 17/11/20	15:20	1.780	101.2	101.6	1.3	1.65	100.6	Y
Friday 20/11/20	12:00	0.008	102.0	0.06	94.2	0.210	94.2	Y
Thursday 26/11/20	12:06	1.240	97.4	0.38	88.2	0.47	107.7	Y
Friday 27/11/20	12:04	0.810	100.2	95.1	0.49	0.80	104.3	Y

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