Jellinbah Coal Mine

Mackenzie North Quarterly Air and Noise Report April – June 2024

PREPARED FOR
Jellinbah Mining Pty Ltd

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Abbreviations:

AARC	AARC Environmental Solutions Pty Ltd
AS	Australian Standard
AV	Adjustment Value
BAM	Beta-Attenuation Monitor
bg	background noise level
CV	Critical Value
dBA, dB(A)	Decibel measurement according to the "A"- weighted scale.
EA	Environmental Authority
EMM	EMM Consulting Pty Limited (EMM)
GDA94	Geodetic Datum of Australia 1994
Hz	Hertz
Jellinbah	Jellinbah Mining Pty Ltd
L_1	Noise level which is exceeded for 1% of the measurement period
L_{10}	Noise level which is exceeded for 10% of the measurement period
L_{90}	Noise level which is exceeded for 90% of the measurement period
L_{Aeq}	Equivalent continuous 'A-weighted' sound
L_{Amin}	Minimum 'A-weighted' noise level
$L_{A1,adj,15min}$	'A-weighted' noise level which is exceeded for 1% of the 15-minute measurement period
$L_{Aeq,adj,15min}$	Equivalent Continuous Sound Level recorded over the 15-minute measurement period
m/s	metres per second
mg/m^2/day	milligrams per square metre per day
ML	Mining Lease
NATA	National Association of Testing Authorities
PM_{10}	Particulate Matter with an aerodynamic diameter less than 10 micrometres (µm)
TARP	Trigger Action Response Plan

1 Executive summary

This quarterly analysis report for the Mackenzie North mine has assessed the air quality and noise monitoring data during the April to June 2024 monitoring period. Air quality data was collected between 11th March 2024 and 6th June 2024. Noise monitoring was not conducted for this monitoring program.

Jellinbah will continue to implement mitigation measures (where required) in response to elevated dust and noise levels, in accordance with environmental management plans, Dust Management and Noise Management TARP's.

1.1 Air quality monitoring

Jellinbah monitors PM_{10} dust impacts at sensitive receptors in real-time via the BAM unit. During this monitoring period, the BAM unit was located at Jellinbah 2 (April to May) and Scrubee (June) during the review period.

PM_{10} dust data from the BAM unit does not indicate any exceedance, remaining below the EA limit of 50 µg/m^3 during the monitoring period. Dust deposition analysis was also completed for this monitoring period via the dust deposition gauges set up at various locations surrounding Mackenzie North. The results showed dust levels for insoluble solids at sensitive receptor monitoring sites J3 and J6 were below the EA limit.

1.2 Noise monitoring

No noise monitoring occurred at the site during the April – June 2024 monitoring period. Monitoring is ongoing to investigate events where cumulative noise contribution from multiple surrounding mines exceeds the relevant limits for continuous periods. Attended monitoring is scheduled in August 2024.

Jellinbah will continue to implement mitigation measures (where required) in response to elevated noise levels, in accordance with the Noise Management TARP's.

2 Introduction

This report has been prepared by AARC Environmental Solutions (AARC) on behalf of Jellinbah Mining Pty Ltd (Jellinbah). The purpose of this report is to assess the quarterly air quality and noise monitoring data collected from monitoring locations in the vicinity of the Mackenzie North mining operations. The monitoring period for this quarterly assessment is between April and June 2024.

This report will investigate any instances where Environmental Authority (EA) limits or management plan criteria have been exceeded during the reporting period. It will also outline any recommendations, where required, for mitigation measures to prevent elevated dust and noise levels. The Air Quality and Noise Management Plans, prepared by AARC for Jellinbah, are the primary guiding reports for monitoring outside of the EA conditions (Schedule B: Air, and Schedule E: Noise and Vibration).

2.1 Project background

The Mackenzie North Mine is an extension of the Jellinbah Coal Mine project, north of the Mackenzie River. The Mackenzie North Mine consists of four mining leases (MLs): ML 70445, ML 70446, ML 70448, and ML 70449. The Mackenzie North Mine has replaced the production from the finished Jellinbah Plains pit, thus maintaining overall mine production rates at currently approved levels.

Activities that have occurred during the reporting period at the Mackenzie North Mine include:

- stripping and stockpiling of topsoil ahead of mining;
- overburden removal ahead of mining in the pit;
- mining of coal seams in pit;
- crushing and hauling of coal material; and
- progressive rehabilitation activities.

2.2 Sensitive receptors

Sensitive receptors are residences or commercial locations that have the potential to be impacted by air quality or noise impacts arising from the activities at Jellinbah Coal Mine. The key sensitive receptors for potential dust and noise emissions from Mackenzie North are listed in Table 1 and shown in Figure 1.

Table 1: List of Mackenzie North Sensitive Receptors

Name	Approximate Distance to Mackenzie North Mining Lease Area (km)	Easting (GDA94 Z55)	Northing (GDA94 Z55)
Jellinbah 1 (Old Jellinbah Homestead)	6	688715	7429754
Jellinbah 2 (Jellinbah Homestead)	8	697280	7439294
Tarcoola	10	704858	7434955
Scrubee	5	701434	7428272

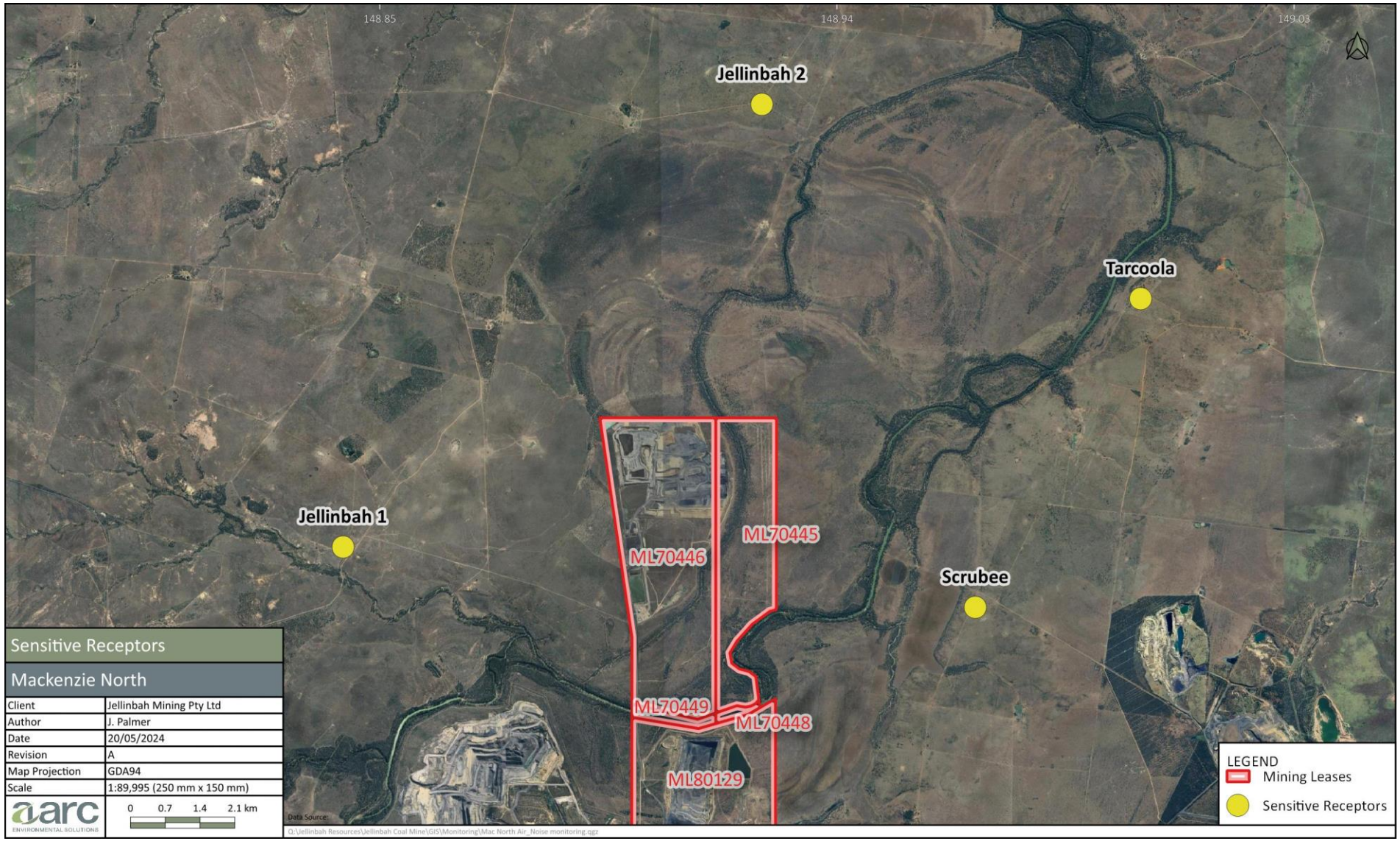

Figure 1: Mackenzie North sensitive receptors

3 Air quality monitoring

3.1 Beta-Attenuation Monitor (BAM)

3.1.1 Equipment and methodology

In late July 2020 Jellinbah commissioned and installed a solar-powered Beta-Attenuation Monitor (BAM) to monitor PM_{10} dust levels at sensitive receptors surrounding the Mackenzie North Mine. BAM units are considered a 'best-practice' methodology to undertake monitoring for PM_{10} dust and are considered more reliable than DustTrak units.

The BAM unit is solar-powered and mounted on a trailer to enable it to be moved regularly between the sensitive receptors. Using the BAM unit, Jellinbah can monitor PM_{10} dust levels in real-time via an online portal. The unit has alarms set up to notify key personnel when dust levels are approaching, or exceeding, the limits defined in the EA or when adverse meteorological conditions are encountered (i.e. high wind speeds and when the wind is blowing in the direction of a sensitive receptor).

During the review period spanning between April and June 2024, the scheduled locations of the BAM were at Jellinbah 2 (April and May) and Scrubee (June) in accordance with the monitoring schedule presented in Table 2.Table 2: BAM Monitoring Schedule

Month	Sensitive Receptor
January	Jellinbah 1
February	Jellinbah 1
March	Jellinbah 1
April	Jellinbah 2
May	Jellinbah 2
June	Scrubee
July	Scrubee
August	Tarcoola
September	Tarcoola
October	Jellinbah 2
November	Jellinbah 2
December	Jellinbah 1

The Air Quality Management Plan (AARC 2024) includes a proposed amendment to the BAM monitoring schedule based on a review of local prevailing wind directions and historical onsite and regional PM_{10} level monitoring. On the basis of the dominating easterly wind direction and the PM_{10} results, the recommended schedule includes rotationally moving the BAM unit at Jellinbah 1 and Jellinbah 2 sites as they are expected to be most affected by the mine. The periods at each location are as follows:

- September to February (Spring, Summer): Jellinbah 1 (west of mine)
- March to August (Autumn, Winter): Jellinbah 2 (north of mine)

The monitoring location may be modified in the future based on data collected, complaints received, or a change in prevailing meteorological conditions. The proposed schedule may be considered for future quarterly monitoring periods.

3.1.2 Meteorological station

Jellinbah operates a real-time meteorological station at Mackenzie North which records rainfall, temperature, wind direction and wind speed to identify periods when nearby sensitive receivers are at risk of elevated dust levels. Access to real-time meteorological data and having alarms set on the BAM unit means that Jellinbah can quickly alter operations (if required) to reduce the potential for impacts at sensitive receptors, in accordance with the dust management Trigger Action Response Plan (TARP). Rainfall recorded during the monitoring period is shown in Figure 2.

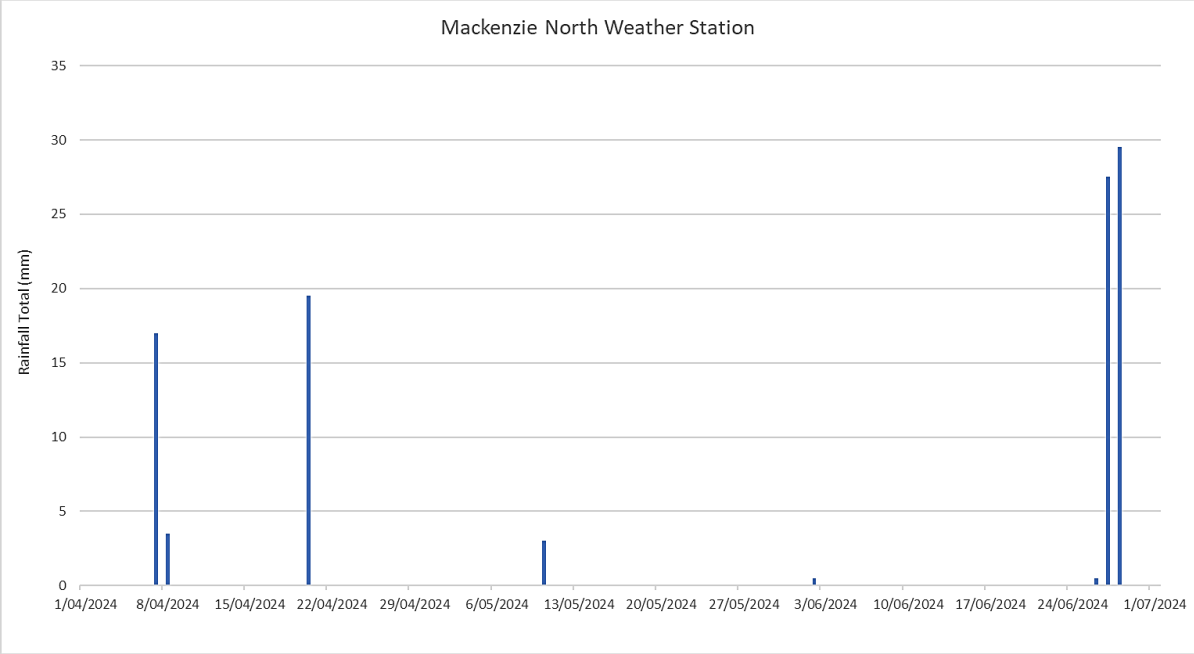

Figure 2: Daily rainfall (mm) from April to June 2024

3.1.3 PM_{10} monitoring results

As per EA condition B3, the concentration of particulate matter with an aerodynamic diameter of less than 10 micrometres (µm) (PM10) suspended in the atmosphere should not exceed 50 micrograms per cubic meter over a 24-hour averaging time at any sensitive receptor downwind of operations.

Monitoring data recorded from 1st April to 30th June is presented in Figure 3. Among the recorded data, the 24-hr average particulate matter concentrations ranged between 2.29 to 37.5 µg/m^3. During the monitoring period, the observed concentration levels have consistently remained below the EA limit of 50 µg/m^3, with no instances of exceedances being recorded.

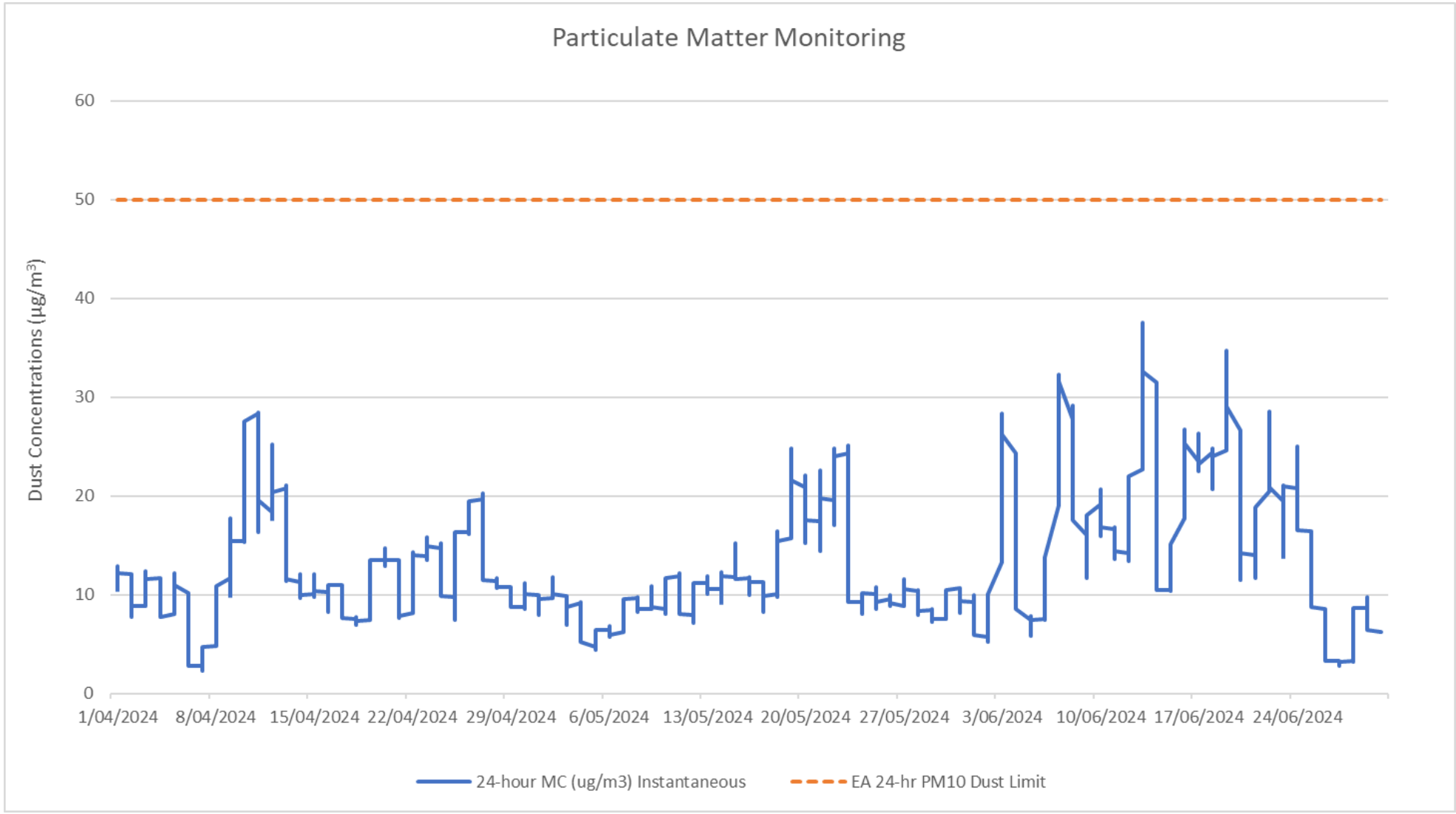

Figure 3: 24-hr average PM10 dust concentrations between April and June 2024

3.2 Dust deposition monitoring

3.2.1 Equipment and methodology

Dust deposition monitoring has been undertaken at various locations surrounding the Mackenzie North Mine since February 2018. The dust deposition monitoring program monitors Jellinbah's compliance with the EA, whereby Jellinbah must ensure that dust particulate emissions generated by mining activities do not exceed the limit specified in the EA (120 mg/m^2/day, averaged over one month) at any sensitive receptor.

The dust deposition gauges/bottles are intended to collect larger dust fall out particles than what is collected with the BAM unit. The dust deposition bottles are collected approximately every 30 days and sent to a NATA accredited laboratory, where the samples are analysed for ash content, combustible matter, total soluble matter, total insoluble matter, and total solids, in order to assist in determining the potential source of dust emissions.

It is worth noting that as the dust deposition bottles are sent off and analysed on a monthly basis, it is difficult to implement immediate mitigation measures in response to a single elevated level of dust deposition. Jellinbah is able to implement mitigation measures if it becomes apparent that dust deposition levels are significantly elevated upon receiving the previous month's data. This includes a review of the associated meteorological factors (such as wind direction) which may have since changed, potentially reducing the need for additional mitigation measures or significant changes to the current level of mitigation measures being applied.

Dust deposition monitoring locations surrounding Mackenzie North are listed in Table 3 and can be seen in Figure 4.

Table 3: Location of Mackenzie North dust deposition gauges

Site ID	Sensitive Receptor	**Easting (GDA94 Z55)**	**Northing (GDA94 Z55)**	**Description**
J2	-	696,930	7,434,336	Approximately 2km north of the Mackenzie North Mining Leases.
J3	Yes	688,933	7,429,662	Old Jellinbah Homestead (Jellinbah 1).
J4	-	691,714	7,429,806	Approximately 3km east of Old Jellinbah Homestead and J3.
J5	-	690,525	7,427,550	Approximately 3km south-east of Old Jellinbah Homestead and J3. Approximately 1km north of Curragh mine.
J6	Yes	697,497	7,439,274	Jellinbah Homestead (Jellinbah 2).
J7	-	699,159	7,429,044	Approximately 3km west of Scrubee (across Mackenzie River).
J8	-	696,412	7,429,438	Eastern side of Mackenzie River Anabranch (within the Mackenzie North Mining Leases (ML 70445).

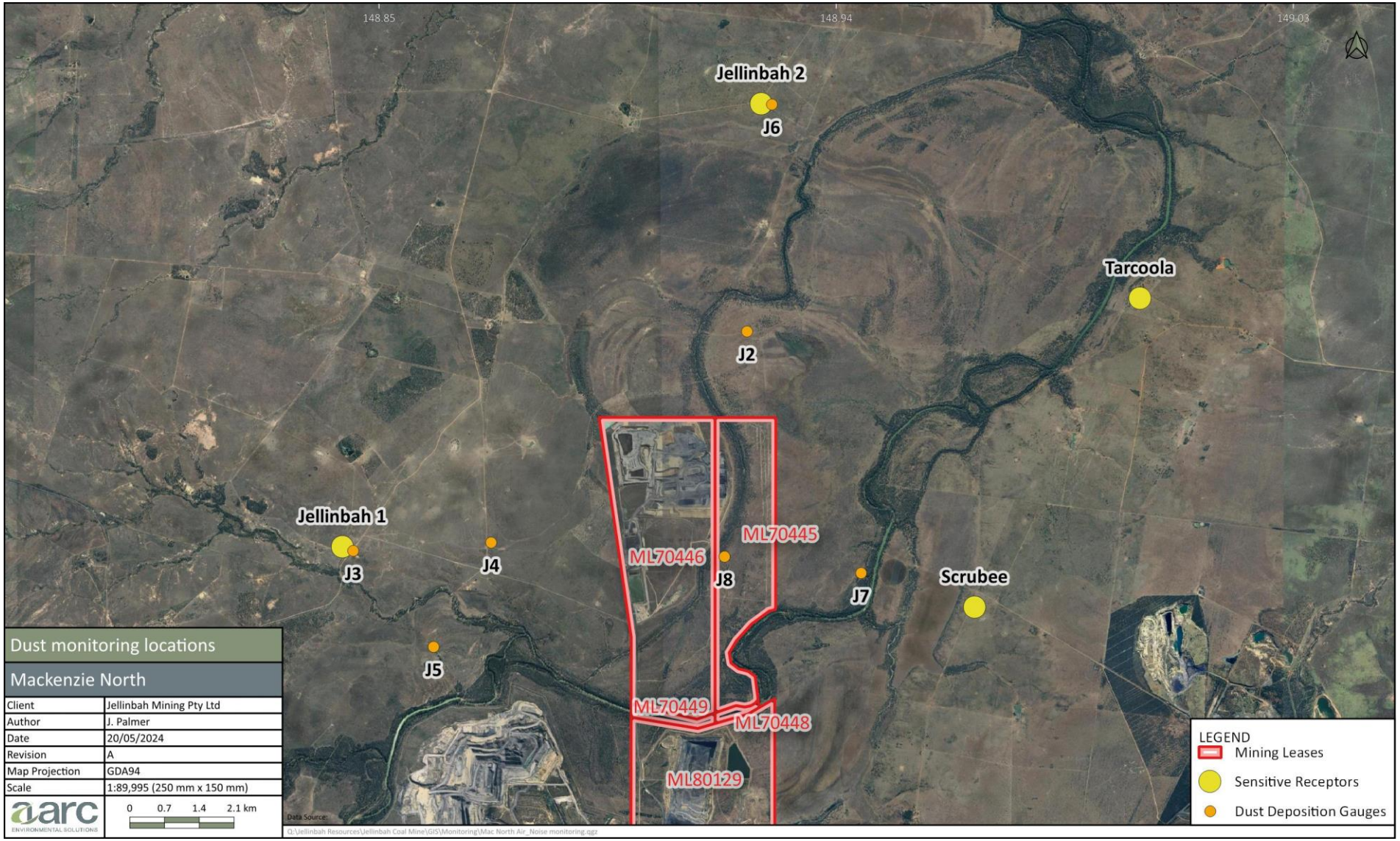

Figure 4: Mackenzie North dust deposition monitoring sites

3.2.2 Dust deposition monitoring results

Dust Deposition monitoring data collected for the locations in Table 3 during the reporting period can be seen in Figure 5.

Dust bottles are collected mid-month and the last collection was on 6th June 2024.

Dust deposition gauges J3 and J6 monitor dust impacts at sensitive receptors. Dust deposition results greater than the EA specified limit of 120 mg/m^2/day identified at monitoring locations J3 and J6, may require a management action. However, during the monitoring period, dust deposition gauges detected no dust impacts at sensitive receptors.

Dust deposition gauges J2, J4, J5, J7 and J8 are for interpretational purposes only and are not located at sensitive receptors. Elevated dust levels (>120 mg/m^2/day) at J2, J4, J5, J7 and J8 are not considered exceedance events.

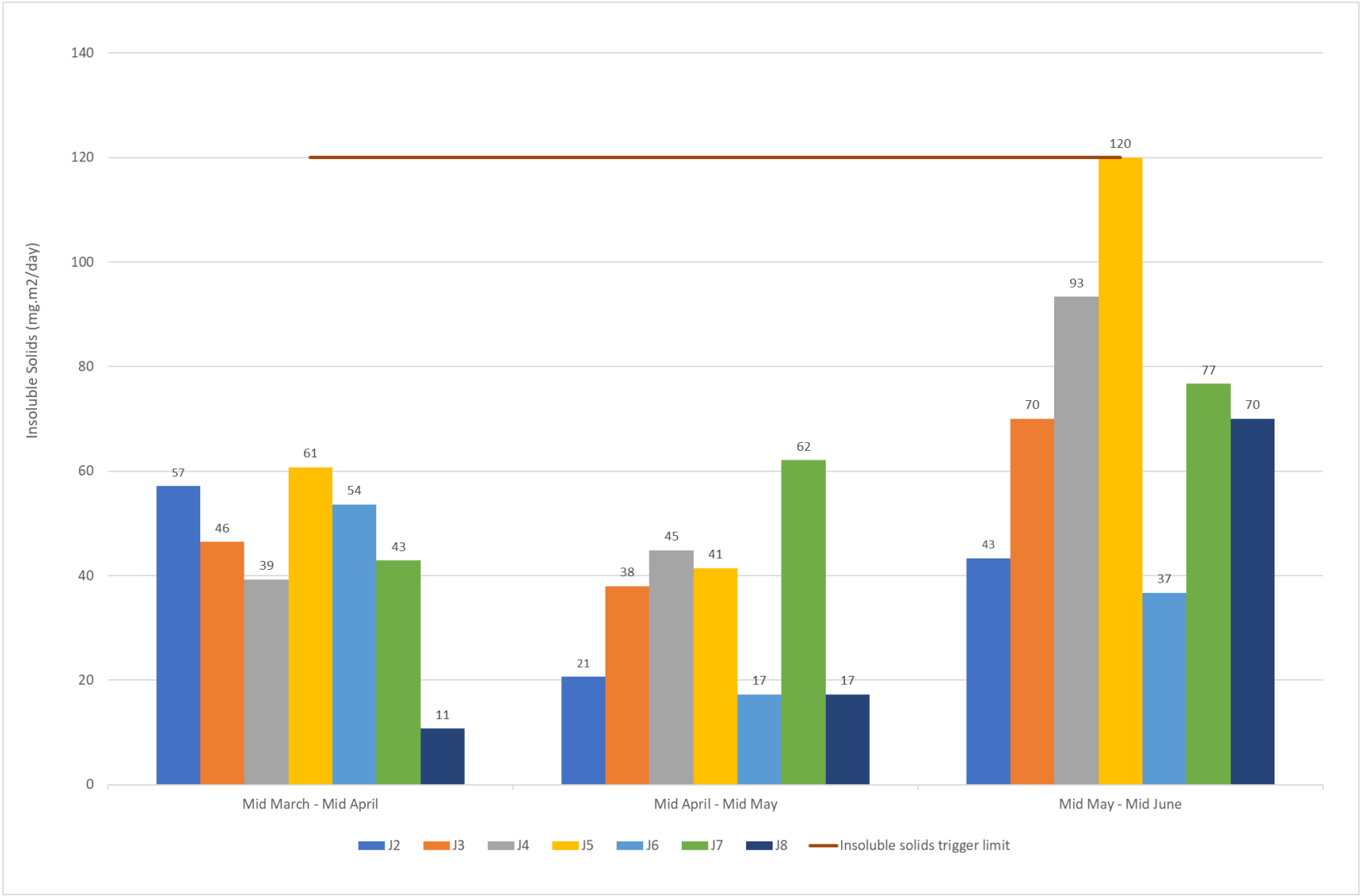

Figure 5: Dust deposition data recorded between the 11th of March 2024 and 6th of June 2024

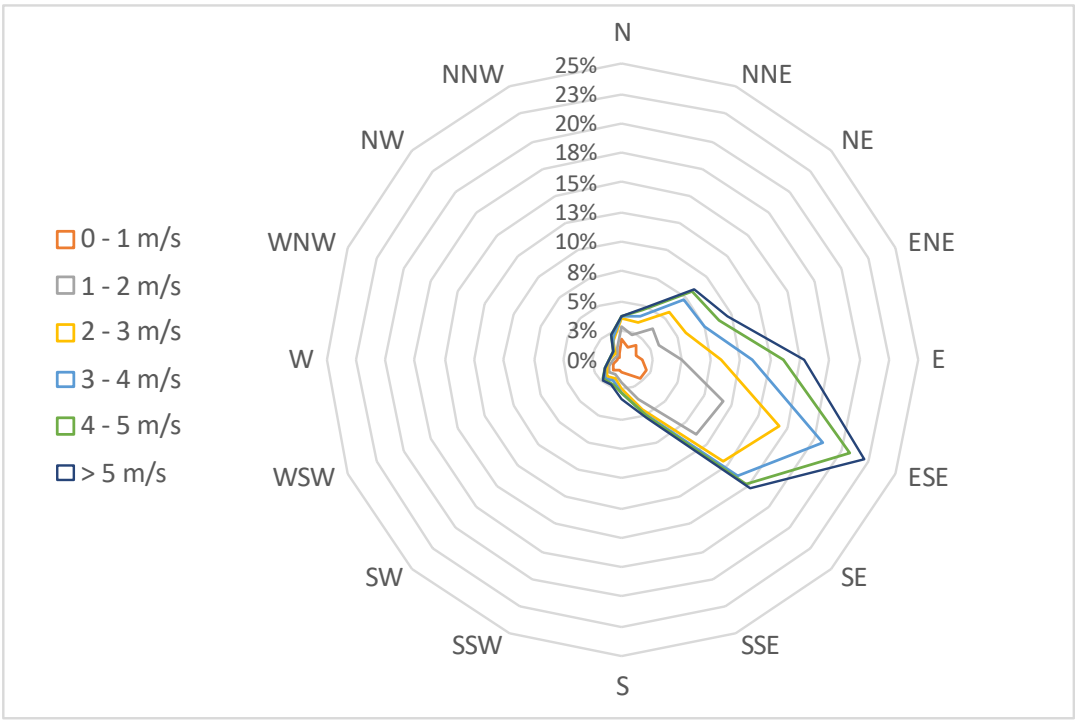

Figure 6: Wind rose graph from Jellinbah Mackenzie North station (April to June 2024).

Typically, in the event of an exceedance recorded at the sensitive receptor dust deposition gauges (J3 and J6), a wind rose is generated for the period of investigation. This wind rose displays wind direction, velocity and recurrence frequency during the period of exceedance. The wind rose in conjunction with the dust monitoring locations assists in interpretation of the data with respect to the likely contribution from activities at Mackenzie North.

Figure 6 presents the wind rose generated from data collected at Mackenzie North station for the monitoring period, for interpretational purposes only. As mentioned, no exceedances above the EA limit were recorded at sensitive receptor sites. Consequently, no further investigation is required. However, the prevailing wind direction of east-south-east to south-east aligns with the results in Figure 5 where sites J5 and J4 had the highest dust deposition levels.

4 Noise monitoring assessment

Noise monitoring was not conducted for the monitoring period April to June 2024 as it is a six-monthly exercise. The last noise monitoring was conducted on the night of 7th to 8th March 2024 by AARC for the January to March 2024 monitoring period. The purpose of this noise assessment was to determine compliance of the Mackenzie North Mine at Jellinbah Mine with EA noise limits, and the extent to which the mine operations contribute to noise levels in comparison to surrounding mines such as Curragh and Yarrabee.

Attended noise monitoring is next scheduled to be conducted in August 2024. As per the March 2024 measurements, it is considered that the upcoming monitoring period will consist of attended night-time monitoring at 4 nearby receptors, and an overnight unattended noise loggers near the neighbouring mines (as shown in Table 4 and Figure 7).

Table 4: Noise Monitoring Locations for January-March 2024 review period

#	Nearest receptor	Monitoring location	Coordinates (UTM)[1]	
			Easting (m)	Northing (m)
Sensitive locations				
A	Jellinbah 1 (Old Jellinbah Homestead)	Located beside the dirt track which merges with the dirt track between Jellinbah 1 and 2 sites. This site was chosen as representative of the homestead but removed from mechanical noise occurring at the homestead itself. Approximately 250 metres east of the homestead.	689016	7429800
B	Jellinbah 2 (Jellinbah Homestead)	Located beside the dirt track on the western side of the property, approximately 200 metres west of the nearest residence.	696996	7439286
C	Scrubee	Located on the northern side of an intersection of dirt tracks, approximately 400 metres east of the homestead.	701877	7428401
D	Tarcoola	Located on the southern side of an intersection of dirt tracks, approximately 850 metres south-east of the homestead.	705637	7434470
Additional monitoring locations				
L1	Curragh North Mine	Located in a triangular fenced site beside a dirt track, approximately 700 metres north of the Curragh North mine disturbance area. This site is accessed via a north-south track on the southern side of the dirt track between Mackenzie North mine and Jellinbah 1.	691165	7426631
L2	Yarrabee Mine	Located beside a bend in the dirt track leading to Scrubee homestead, approximately 900 metres west of the Yarrabee mine disturbance area.	703972	7426930

Note: 1: Recorded coordinates were indicated to be +/- 5 metres accuracy according to the phone GPS application

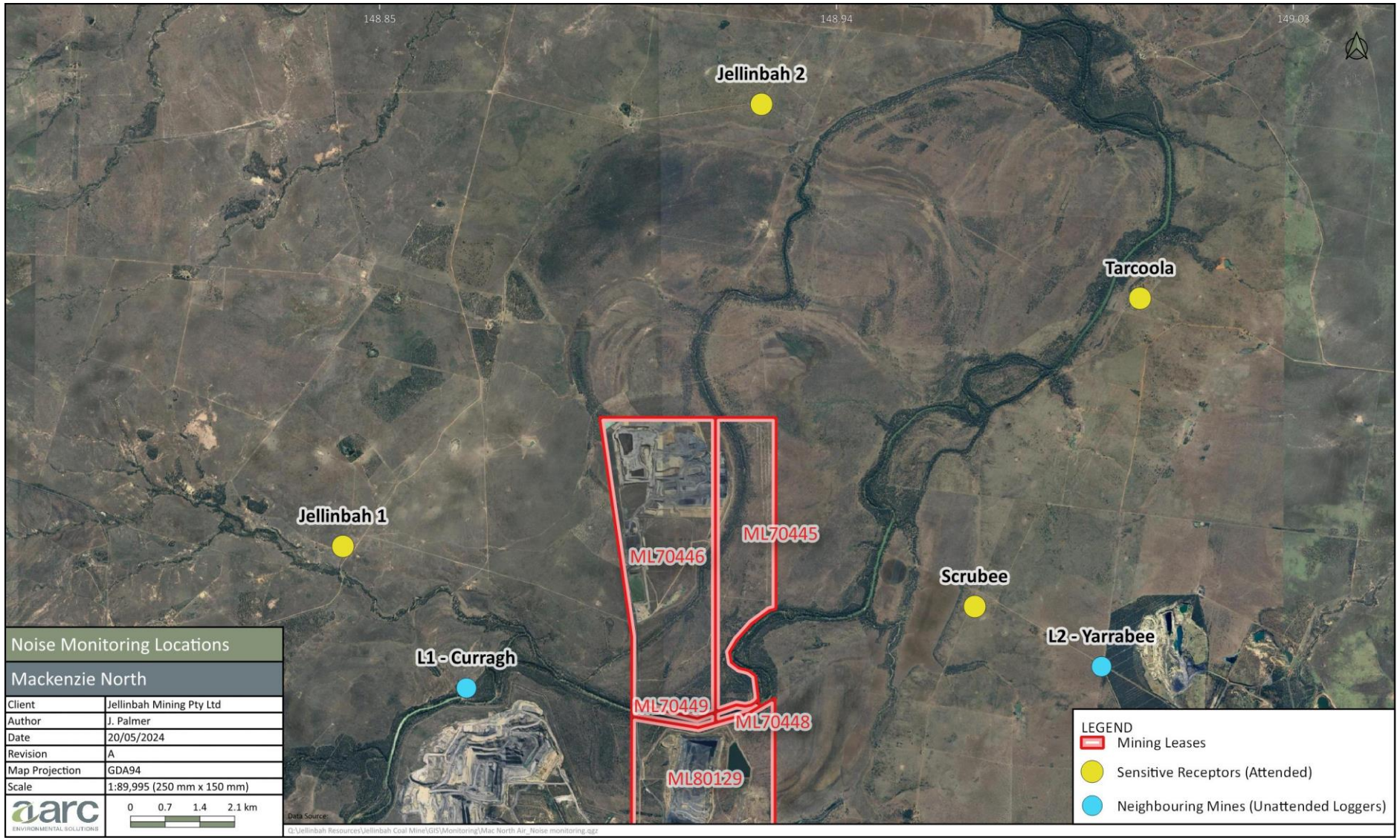

Figure 7: Mackenzie North noise monitoring site