Annual Noise Monitoring Assessment

Rawsonville Quarry
Rawsonville, NSW
October 2023

Prepared for: Regional Quarries Australia Pty Limited
October 2023
MAC231914-02RP1V1

Muller Acoustic Consulting

Document Information

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Prepared for: Regional Quarries Australia Pty Limited

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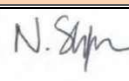
DOCUMENT ID	DATE	PREPARED	SIGNED	REVIEWED	SIGNED
MAC231914-02RP1V1	26 October 2023	Nicholas Shipman		Oliver Muller	

CONTENTS

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Regional Quarries Australia Pty Limited (Regional Quarries) to complete a Noise Monitoring Assessment (NMA) for the Rawsonville Quarry (the quarry), Rawsonville, NSW.

The NMA involved quantifying the noise contribution of the quarry by direct attended measurements to determine quarry noise emissions so that effective management and controls can be implemented where required. The monitoring has been conducted in general accordance with Conditions P1.2 and L3.1 to L3.7 of the Environmental Protection License (EPL) at three representative receiver locations. The EPL only requires noise monitoring (for a minimum duration of 1.5 hours over three consecutive days) on receipt of complaint or request from potentially affected resident. It is understood no complaints or requests have been received. This assessment has therefore been completed as part of an internal noise management initiative and does not form part of the noise monitoring program to address conditions of the EPL.

The assessment has been conducted in accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- NSW Environment Protection Authority (EPA's), Approved Methods for the measurement and analysis of environmental noise in NSW, 2022;
- Environment Protection Licence EPL 20469 (EPL);
- Standards Australia AS/NZS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications; and
- Standards Australia AS 1055:2018 - Acoustics - Description and measurement of environmental noise - General Procedures.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

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2 Environmental Protection License Noise Limits

Table 1 reproduces the operational noise limits for assessed receivers referenced from Conditions P1.2 and L3.1 of the EPL which have been adopted for this NMA and are consistent with historic EPL monitoring locations.

Table 1 Noise Limits, dBA

EPA Identification	Receiver[1]	Receiver Address	Day Period[2] LAeq(15min)[3]
P2	R6	94R Narromine Road, Dubbo, NSW, 2830	40
P3	R9	88R Narromine Road, Dubbo, NSW, 2830	
P4	Any other residential receiver	24R Rawsonville Road, Rawsonville, NSW, 2830	

Note 1: Receiver address refers to Condition P1.2 of the Rawsonville Quarry EPL #20469.

Note 2: Day – the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sunday and public holidays; Evening – the period from 6pm to 10pm; Night – the remaining periods.

Note 3: Criteria noise level refers to Condition L3.1 of the Rawsonville Quarry EPL #20469.

The subsequent conditions stated in Section L3 of the projects EPL (EPL #20469) are reproduced below.

L3.2 The location groups referred to in the table above are referred to in Table 1 of the "Rawsonville Quarry Extension Noise Assessment" prepared by Spectrum Acoustics (Report No. 631/07 dated March 2013).

L3.3 For the purpose of condition 3.1;

- *day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sunday and Public Holidays.*

L3.4 The noise limits set out in condition L3.1 apply under all meteorological conditions except for the following:

- *wind speeds greater than 3 metres/second at 10 metres above ground level;*
- *stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or*
- *stability category G temperature inversion conditions.*

L3.5 To determine compliance:

With the $L_{eq\ (15\ minute)}$ noise limits in condition L3.1, the noise measurement equipment must be located:

- *approximately on the property boundary where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or*
- *within 30 metres of a dwelling facade, but not closer than 3m, where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable; or*
- *within approximately 50 metres of the boundary of a national park or a nature reserve.*

With the noise limits in condition L3.1, the noise measurement equipment must be located:

- *at the most affected point at a location where there is no dwelling at the location; or*
- *at the most affected point within an area at a location prescribed by conditions L3.5(1) or L3.5(2).*

L3.6 A non-compliance of condition L3.1 will still occur where noise generated from the premises in excess of the appropriate limit is measured:

- *at a location other than an area prescribed by conditions L3.5 (1) and L3.5 (2); and/or*
- *at a point other than the most affected point at a location.*

L3.7 For the purposes of determining the noise generated at the premises the modification factors in section 4 of the NSW industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

3 Methodology

3.1 Locality

Rawsonville Quarry is located at 22L Rawsonville Road, adjoining the banks of the Macquarie River, within the locality of Rawsonville, NSW. Receivers in the locality surrounding the quarry are primarily rural/residential and for consistency the naming conventions for each receiver have been retained from Condition L3.1 of the EPL. The monitoring locations with respect to the quarry are presented in the locality plan shown in **Figure 1**.

3.2 Assessment Methodology

The attended noise survey was conducted in general accordance with the procedures described in Standards Australia AS 1055:2018, "Acoustics - Description and Measurement of Environmental Noise" and the EPL. Measurements were carried out using a Svantek Type 1, 971 noise analyser on Monday 9 October 2023. The acoustic instrumentation used carries appropriate and current NATA (or manufacturer) calibration certificates with records of all calibrations maintained by MAC as per Approved Methods for the measurement and analysis of environmental noise in NSW (EPA, 2022) and complies with AS/NZS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed ±0.5dBA.

Daytime measurements were of 15-minutes in duration. Where possible, throughout each survey the operator quantified the contribution of each significant noise source. Extraneous noise sources were excluded from the analysis to calculate the $LA_{eq(15min)}$ quarry noise contribution for comparison against the relevant EPL limit.

Prevailing meteorological conditions for the monitoring period were sourced from the nearest Bureau of Meteorology (BoM) station (Dubbo Airport AWS, NSW, no.65070). Results obtained during non-prevailing meteorological conditions (ie F Class Stability in conjunction with a 2m/s drainage or G Class Stability) are considered not applicable against the EPL criteria.

Where the quarry is inaudible, the contribution is estimated to be at least 10dBA below the ambient noise level.

0 100 200 300 400 500 m

N

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EPL Receiver Locations

Site Boundary

FIGURE 1

LOCALITY PLAN

MAC231914-02

Rawsonville Quarry

4 Results

The monitoring and assessment results are presented in individual tables for each assessment location.

4.1 Meteorological Conditions

Weather data for the NA was sourced from the nearest BoM Station (no. 65070) as well as operator measured conditions on-site of EPL nominated receiver locations. The data was used to determine prevailing meteorological conditions at the time of the attended measurements, which are presented in **Table 2**.

Table 2 Prevailing Meteorological Conditions

Date & Time	Bureau of Meteorology Station Dubbo Airport AWS, NSW (no. 65070)		Operator Measured Weather Monitoring Location (1.8m AGL)	
	Wind Direction	Wind (m/s)	Wind Direction	Wind (m/s)
09/10/2023 15:31	SSW	4.6	N	1.6
09/10/2023 16:15	W	4.6	N	1.0
09/10/2023 16:34	N	0.0	N	0.8

4.2 Assessment Results - Location P2

The results of the attended noise measurements at location P2 for the October 2023 survey are summarised in **Table 3** with the relevant EPL limits, the calculated quarry noise contribution and prevailing meteorological conditions at the time of each measurement.

Table 3 Operator-Attended Noise Survey Results – Location P2

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			EPL	Meteorology[1]	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}	Limit		
09/10/2023	16:05 (Day)	71	47	37	40	WD: N WS: 1.0m/s Rain: Nil	Birds 34-71 Traffic 34-44 Aircraft 34-62 Quarry Mobile Plant 34-38
Rawsonville Quarry $L_{Aeq(15min)}$ Contribution							36

Note 1: Meteorological data obtained from direct measurement by the operator.

4.3 Assessment Results - Location P3

The results of the attended noise measurements at location P3 for the October 2023 survey are summarised in **Table 4** with the relevant EPL limits, the calculated quarry noise contribution and prevailing meteorological conditions at the time of each measurement.

Table 4 Operator-Attended Noise Survey Results – Location P3

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			EPL Limit	Meteorology[1]	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}			
09/10/2023	16:34 (Day)	62	40	34	40	WD: N WS: 0.8m/s Rain: Nil	Traffic 32-38 Birds 32-62 Livestock <34 Quarry Mobile Plant 32-36 (3 minutes)
Rawsonville Quarry $L_{Aeq(15min)}$ Contribution							27

Note 1: Meteorological data obtained from direct measurement by the operator.

4.4 Assessment Results - Location P4

The results of the attended noise measurements at location P4 for the October 2023 survey are summarised in **Table 5** with the relevant EPL limits, the calculated quarry noise contribution and prevailing meteorological conditions at the time of each measurement.

Table 5 Operator-Attended Noise Survey Results – Location P4

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			EPL Limit	Meteorology[1]	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}			
09/10/2023	15:31 (Day)	63	40	31	40	WD: N WS: 1.6m/s Rain: Nil	Birds 31-63 Wind in vegetation 32-44 Traffic 29-31 Insects 29-33 Quarry Mobile Plant 30-32 (2 minutes)
Rawsonville Quarry $L_{Aeq(15min)}$ Contribution							22

Note 1: Meteorological data obtained from direct measurement by the operator.

5 Discussion

5.1 Discussion of Results - Location P2

Monitoring conducted on Monday 9 October 2023 identified that quarry mobile plant were audible during the assessment period at location P2. The estimated quarry contribution was measured at 36dBA, therefore quarry emissions remained below the relevant noise limit of 40dB $LA_{eq(15min)}$. Extraneous sources such as birds, traffic and aircraft were audible during the measurement period.

5.2 Discussion of Results - Location P3

Monitoring conducted on Monday 9 October 2023 identified that quarry mobile plant were audible during the assessment period at location P3. The estimated quarry contributions were measured at 27dBA, therefore quarry emissions remained below the relevant noise limit of 40dB $LA_{eq(15min)}$. Extraneous sources such as traffic, livestock and birds were audible during the measurement period.

5.3 Discussion of Results - Location P4

Monitoring conducted on Monday 9 October 2023 identified that quarry mobile plant were audible during the assessment period at location P4. The estimated quarry contributions were measured at 22dBA, therefore quarry emissions remained below the relevant noise limit of 40dB $LA_{eq(15min)}$. Extraneous sources such as birds, wind in vegetation, traffic and insects were audible during the measurement period.

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6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) on behalf of Regional Quarries Australia Pty Limited. The assessment was completed to provide annual monitoring data so that Rawsonville Quarry can actively quantify and manage site noise emissions.

Attended monitoring conducted on Monday 9 October 2023 identified that Rawsonville Quarry noise emissions were audible on several occasions during the attended measurement period. A review of monitoring data and operator attended observations determined that Rawsonville Quarry contributions remained below relevant limits during the monitoring period.

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Appendix A – Glossary of Terms

A number of technical terms have been used in this report and are explained in **Table A1**.

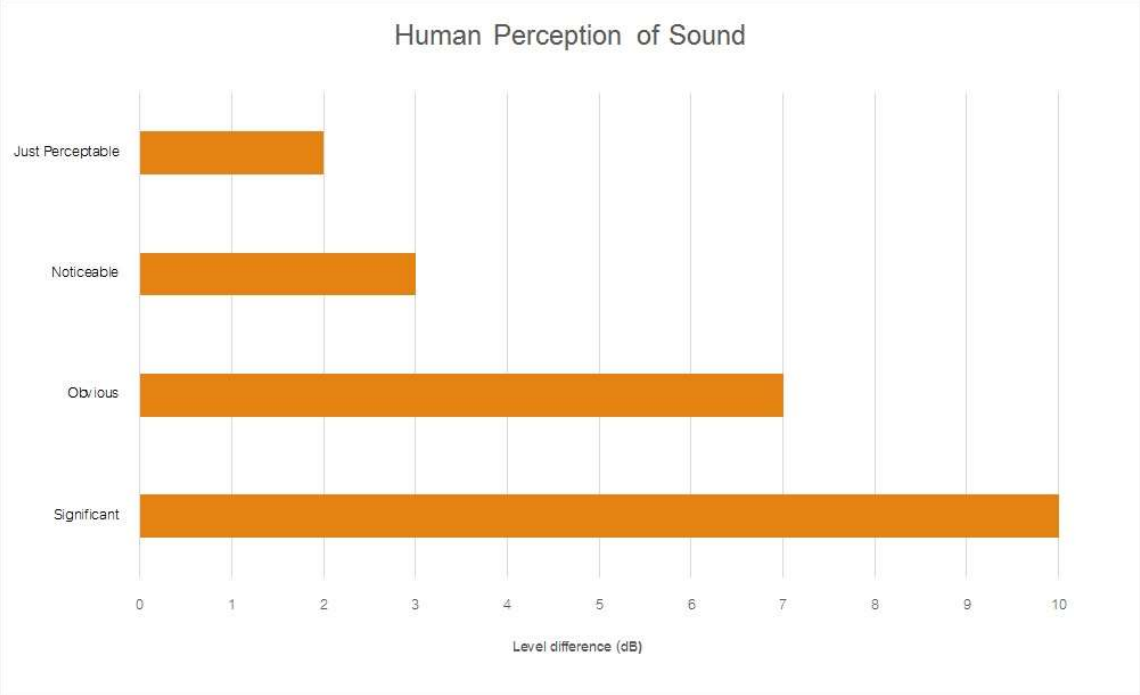
Table A1 Glossary of Acoustical Terms

Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured L90 statistical noise levels.
Ambient Noise	The total noise associated with a given environment. Typically, a composite of sounds from all sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to sound.
Background Noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is usually represented by the LA90 descriptor
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Z-weighted or decibels Linear (unweighted).
Extraneous Noise	Sound resulting from activities that are not typical of the area.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A sound level which is exceeded 10% of the time.
LA90	Commonly referred to as the background noise, this is the level exceeded 90% of the time.
LAeq	Represents the average noise energy or equivalent sound pressure level over a given period.
LAmax	The maximum sound pressure level received at the microphone during a measuring interval.
Masking	The phenomenon of one sound interfering with the perception of another sound. For example, the interference of traffic noise with use of a public telephone on a busy street.
RBL	The Rating Background Level (RBL) as defined in the NPI, is an overall single figure representing the background level for each assessment period over the whole monitoring period. The RBL, as defined is the median of ABL values over the whole monitoring period.
Sound power level (Lw or SWL)	This is a measure of the total power radiated by a source in the form of sound and is given by 10.log10 (W/Wo). Where W is the sound power in watts to the reference level of 10^{-12} watts.
Sound pressure level (Lp or SPL)	the level of sound pressure; as measured at a distance by a standard sound level meter. This differs from Lw in that it is the sound level at a receiver position as opposed to the sound 'intensity' of the source.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA	
Source	Typical Sound Pressure Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



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