

Noise Monitoring Assessment

Tinda Creek Quarry
Tinda Creek, NSW

April 2023



Document Information

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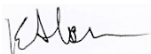

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by RW Corkery & Co Pty Limited (RWC) on behalf of Hy-Tec Industries Pty Ltd (Hy-Tec) to complete a Noise Monitoring Assessment (NMA) for the Tinda Creek Quarry, Tinda Creek, NSW (the project).

The monitoring has been conducted in accordance with the approved Tinda Creek Quarry Noise Management Plan and in general accordance with Conditions L3.1 and M5 of EPL#12007 (EPL).

The assessment was conducted in accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- NSW Environment Protection Authority (EPA's), Environment Protection Licence EPL#12007;
- NSW Environment Protection Authority (EPA's), Approved methods for the measurement and analysis of environmental noise in NSW, 2022;
- Umwelt Pty Ltd, Tinda Creek Quarry Noise Management Plan (NMP); and
- Australian Standard AS 1055:2018 - Acoustics - Description and measurement of environmental noise.

The assessment was undertaken on Thursday 13 April 2023 and forms part of the noise monitoring program to address conditions of EPL#12007 and the Noise Management Plan.

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

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2 Noise Criteria

Noise criteria for the project are outlined in NSW Environment Protection Authority (EPA's) Environment Protection Licence EPL#12007. The relevant sections from the EPL pertaining to noise are reproduced below:

L3 Noise Limits

L3.1 Noise generated at the premises that is measured at each noise monitoring point established under this licence must not exceed the noise levels specified in Column 4 of the table below for that point during the corresponding time periods specified in Column 1 when measured using the corresponding measurement parameters listed in Column 2.

Point 1			
<i>Time Period</i>	<i>Measurement parameter</i>	<i>Measurement frequency</i>	<i>Noise level dB(A)</i>
<i>All hours</i>	<i>LAeq (15 minute)</i>	-	35
<i>Night</i>	<i>Lmax OR LA1,1min</i>	-	45

L3.2 For the purpose of the table under Condition L3.1 "Night" has the same meaning as in the NSW Industrial Noise Policy (EPA, 2000).

M5 Noise monitoring

M5.1 To assess compliance with the noise limits specified within this licence, the licensee must undertake operator attended noise monitoring at each specified noise monitoring point in accordance with table below.

Point 1			
<i>Assessment Period</i>	<i>Minimum frequency in a reporting period</i>	<i>Minimum duration within assessment period</i>	<i>Minimum number of assessment period</i>
<i>All hours when in use</i>	<i>Yearly</i>	<i>1 hour</i>	<i>1 operation day</i>

M5.2 The licensee must undertake noise monitoring as directed by an authorised officer of the EPA.

M5.3 All noise monitoring required by this licence must be undertaken in accordance with Australian Standard AS 2659.1 - 1998: Guide to the use of sound measuring equipment - Portable sound level meters, or any revisions of that standard that may be made by Standards Australia, and the compliance monitoring guidance provided in the NSW Industrial Noise Policy.

R4 Other reporting conditions

Noise monitoring results

R4.1

a) The licensee must submit the results of any noise monitoring undertaken in accordance with the requirements of Condition M5.1 or Condition M5.2 to the EPA within three weeks of the noise monitoring being undertaken.

b) The noise monitoring results submitted to the EPA must include:

(i) a map of each noise monitoring location in relation to the noise source, including relevant distances;

(ii) an analysis of the noise monitoring results;

(iii) any detected exceedance of the noise limits specified in Condition L4.1;

(iv) details of any remedial action taken or proposed to be taken in relation to any exceedance of the noise limits specified in Condition L4.1;

(v) details of the prevailing meteorological conditions during the period when the noise monitoring was undertaken; and

(vi) confirmation that noise monitoring was/was not undertaken in accordance with Condition M5.3

3 Methodology

3.1 Locality

The project is located on Putty Road, Tinda Creek, NSW, approximately 67km north of Windsor, NSW. Receivers in the locality surrounding the project are primarily rural/residential. Putty Road is situated to the west of the site with the Yengo National Park bordering the site in all other directions.

3.2 Noise Monitoring Locations

Section M5.1 of the EPL specifies that noise monitoring is to be conducted for a minimum duration of one hour at the boundary of R1, (6255 Putty Road, Mellong, NSW) as detailed in Figure 6.1 of the Tinda Creek Noise Management Plan.

It should be noted that access to the property was not possible during the time of the noise measurements. Therefore, attended measurements were conducted at the boundary gate (NM1) of the property, as shown in **Figure 1**.

Following a request from the Department of Environment and Planning (DPE) on 20 January 2017, two additional near-field monitoring locations were selected to quantify project noise levels and limiting noise influence from Putty Road. The locations include a position adjacent to the dam, where a temporary water pump and generator is installed (Q1) and a second location adjacent to the main plant and loading areas (Q2). The noise levels monitored at these locations were used to quantify the overall sound power of the onsite operations, which was then used to calculate the noise contribution at surrounding noise sensitive receivers (ie R2 and R3).

The three monitoring locations, their MGA 56 coordinates and duration of measurement period are outlined in **Table 1** and are presented visually in the locality plan shown in **Figure 1**.

Table 1 Receiver Locations					
Receiver ID	Receiver Location	MGA56 Coordinates		Duration	Periods Monitored
		Easting	Northing		
R1	6255 Putty Road	284801	6329055	1 Hour	Morning Shoulder, Day
Q1	Dam Plant	285915	6328065	15 mins	Morning Shoulder, Day
Q2	Main Plant	285991	6327885	15 mins	Morning Shoulder, Day

3.3 Assessment Methodology

All noise surveys were conducted in general accordance with the procedures described in Australian Standard AS 1055:2018, "Acoustics - Description and Measurement of Environmental Noise" and the EPL. 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 ± 0.5 dBA.

Attended noise measurements were carried out using a Svantek Type 1, 971 noise analyser on Thursday 13 April 2023. Four noise measurements of 15 minutes in duration were conducted at NM1 (R1) monitoring location during the day and morning shoulder monitoring periods. Where possible, throughout each survey, the operator quantified the contribution of each significant noise source.

Additionally, unattended noise monitoring was conducted at nearfield locations for a period of one hour during the day and morning shoulder monitoring periods to quantify the noise emissions from the quarry. These measurements were carried out using Svantek Type 1, 977 noise analysers.

3.4 Operational Log

Transportation activities are approved to commence at 5.00am and work shifts including operation of processing equipment are approved to commence at 7am.




Maintenance activities are approved to be undertaken at any time if those activities are inaudible at all residential premises.

Morning shoulder measurements were conducted from 6am to 7am to capture the onsite loading and transportation operations. Daytime operations commenced at approximately 7am with the daytime monitoring conducted from 7.30am to 8.30am.



FIGURE 1
LOCALITY PLAN
REF: MAC180647



KEY	
	RECEIVER LOCATION
	NOISE MONITORING LOCATION
	PROJECT BOUNDARY



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4 Results

4.1 Morning Shoulder Results

Four attended noise measurements of 15-minutes in duration were completed during the morning shoulder assessment period at NM1 on Thursday 13 April 2023. **Table 2** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

Table 2 Operator-Attended Noise Survey Results – Morning Shoulder Period, Location NM1

Date	Time ¹ (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
13/04/2023	06:00	57	32	21	WD: SW	Birds 20-57
					WS: <0.1m/s	Site Inaudible
	06:15	67	45	19	Rain: Nil	
					WD: SW	Traffic 20-67
	06:30	65	39	19	WS: <0.1m/s	Birds 20-51
					Rain: Nil	Site Inaudible
06:45	65	46	25	WD: SW	Traffic 20-54	
				WS: <0.1m/s	Birds 20-65	
				Rain: Nil	Site Inaudible	
				WD: SW	Traffic 20-65	
				WS: <0.1m/s	Birds 20-50	
				Rain: Nil	Site – Water Pump 22-27	
Tinda Creek Contribution						<25

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Unattended noise monitoring was completed during the morning shoulder assessment period at Q1 and Q2 on Thursday 13 April 2023. **Table 3** presents the monitored 15-minute noise levels, noted on-site activities and meteorological conditions at the time of measurements.

Table 3 Unattended Noise Survey Results – Morning Shoulder Period, Location Q1 and Q2

Location	Date / Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Onsite Activities
		L _{Amax}	L _{Aeq}	L _{A90}		
Q1	13/04/2023	60	38	36	WD: SW	Vehicle movements and loading
Q2					WS: <0.1m/s	Generator noise
	06:30	48	40	39	Rain: Nil	30-60

4.2 Day Assessment Results

Four attended noise measurements of 15-minutes in duration were completed during the day assessment period at NM1 on Thursday 13 April 2023. **Table 4** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

Table 4 Operator-Attended Noise Survey Results – Day Period, Location NM1

Date	Time ¹ (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
13/04/2023	07:30	65	44	26	WD: SW	Traffic 20-65
					WS: <0.1m/s	Birds 20-44
					Rain: Nil	Aircraft 25-36
						Site Water Pump 23-27
	07:45	61	39	27	WD: SW	Traffic 20-61
				WS: <0.1m/s	Birds 20-51	
				Rain: Nil	Site – Water Pump 24-28	
	08:00	62	41	27	WD: SW	Traffic 20-62
WS: <0.1m/s					Birds 20-48	
					Rain: Nil	Site – Water Pump 24-28
	08:15	63	46	28	WD: SW	Traffic 20-63
					WS: <0.5m/s	Birds 20-45
					Rain: Nil	Site – Water Pump 24-28
						Site - Impacts 35-38
Tinda Creek Contribution						27

Note 1: Day – the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening – the period from 6pm to 10pm; Night – the remaining periods.

Unattended noise monitoring was completed during the day assessment period at Q1 and Q2 on Thursday 13 April 2023. **Table 5** presents the monitored 15-minute noise levels, noted on-site activities and meteorological conditions at the time of measurements.

Table 5 Unattended Noise Survey Results – Day Period, Location Q1 and Q2

Location	Date / Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Onsite Activities
		L _{Amax}	L _{Aeq}	L _{A90}		
Q1	13/04/2023	66	60	60	WD: SW	Vehicle movements and loading
					WS: 0.1m/s	Processing operations
Q2	08:00	74	58	49	Rain: Nil	Generator noise
						Temporary water pump
						52-74

5 Noise Compliance Assessment

5.1 Attended Noise Monitoring Compliance Assessment

The compliance assessment summary results for R1 are presented in **Table 6** for day and the morning shoulder assessment periods and compares project contributions against relevant criteria.

Table 6 Day and Morning Shoulder Noise Compliance Assessment			
Period	Quarry Noise Contribution	Quarry Noise Criteria	Compliant
	dB LAeq(15min)	dB LAeq(15min)	
Day	27	35	✓
Morning Shoulder	<25	35	✓

5.2 Calculated DPE Assessment Methodology

The dominant noise source observed on site during this measurement period was a temporary water pump and generator located near the Q1 logging location. The calculated sound power from these plant items was 113dBA when operating at full capacity or 101dBA when operating at a reduced capacity. At full capacity the cumulative sound power level for the site is 114 dBA.

The contribution at each of the receivers R1 to R3 has been calculated taking into account loss due to distance and topography. The quarry sound power level was propagated to the surrounding noise sensitive receivers, with the calculated received noise level presented in **Table 7** Results of the calculations generally correlate with the measured noise contributions from the project and therefore validate compliance.

Table 7 Calculated DPE Compliance Assessment					
Receiver	Quarry Sound Power dB	Distance to Receiver m	Distance attenuation dB	Attenuation due to Topography dB	Calculated Quarry Contribution dB LAeq(15min)
R1	114	2050	74	12	28
R2	114	2210	75	12	27
R3	114	2030	74	12	28

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6 Discussion and Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) for RW Corkery & Co Pty Limited on behalf of Hy-Tec Industries Pty Ltd for the Tinda Creek Quarry, Tinda Creek, NSW. The assessment was completed to assess the quarry's compliance with the relevant criteria outlined in EPL#12007 for the nominated residential receiver surrounding the quarry.

Operator attended noise monitoring was undertaken on Thursday 13 April 2023 at the nominated monitoring locations with quarry noise contributions compared against the relevant criteria.

The assessment has identified that noise emissions generated by Tinda Creek Quarry comply with relevant noise criteria specified in EPL#12007 at the assessed receiver location for both the morning shoulder and daytime monitoring periods.

Furthermore, the calculated noise contribution at two nearfield reference locations demonstrate that project noise contributions satisfy relevant criteria at R1, R2 and R3.

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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.

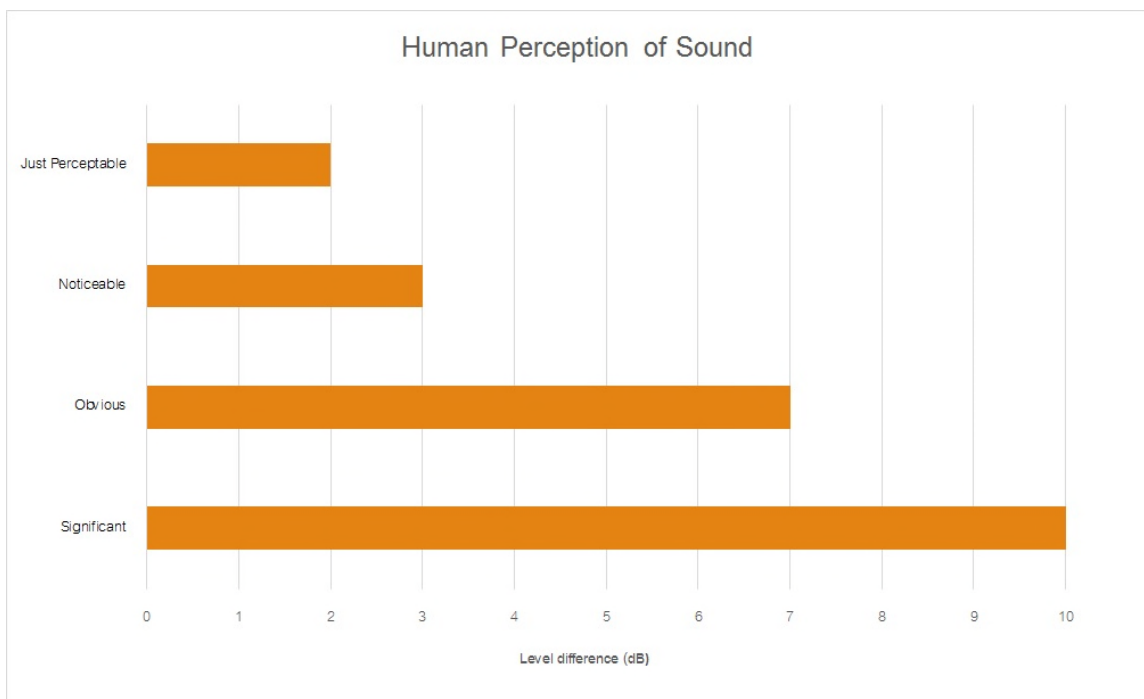
Table A1 Glossary of Acoustical Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI 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.
LAm _{ax}	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 (L _w or SWL)	This is a measure of the total power radiated by a source in the form of sound and is given by $10 \cdot \log_{10} (W/W_0)$. Where W is the sound power in watts to the reference level of 10^{-12} watts.
Sound pressure level (L _p or SPL)	the level of sound pressure; as measured at a distance by a standard sound level meter. This differs from L _w 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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