

Noise Monitoring Assessment

Tinda Creek Quarry
Tinda Creek, NSW

April 2020



Document Information

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Tinda Creek Quarry, Tinda Creek, NSW

April 2020

Prepared for: RW Corkery & Co Pty Ltd

Level 1, 12 Dangar Road

Brooklyn NSW 2083



Prepared by: Muller Acoustic Consulting Pty Ltd

PO Box 262, Newcastle NSW 2300

ABN: 36 602 225 132

P: +61 2 4920 1833

www.mulleracoustic.com

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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;
- Environment Protection Licence EPL#12007;
- 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 16 April 2020 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

2.1 Attended Noise Compliance

Section L3.1 of the Tinda Creek EPL, approved on 3 March 2017, outlines the applicable noise criteria for all privately owned residential receivers surrounding the project. The operating criteria specified in the EPL at all receivers is 35dB LAeq(15min) for all periods and 45dB LAmax during the night time period. **Table 1** presents the criteria for privately owned residential receivers surrounding the project, as outlined in the EPL.

Table 1 Noise Criteria		
Receiver	All Hours	Night (10pm to 7am)
	dB(A) LAeq(15min)	dB(A) LAmax
All privately owned residences	35	45

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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) 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 and a second location adjacent to the main plant. 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 2** and are presented visually in the locality plan shown in **Figure 1**.

Table 2 Receiver Locations					
Receiver ID	Receiver Location	MGA56 Coordinates		Duration	Periods Monitored
R1	6255 Putty Road	284801	6329055	1 Hour	Morning Shoulder, Day
Q1	Dam Plant	286026	6328048	15 mins	Morning Shoulder, Day
Q2	Main Plant	285987	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 current NATA calibration and complies with AS 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.

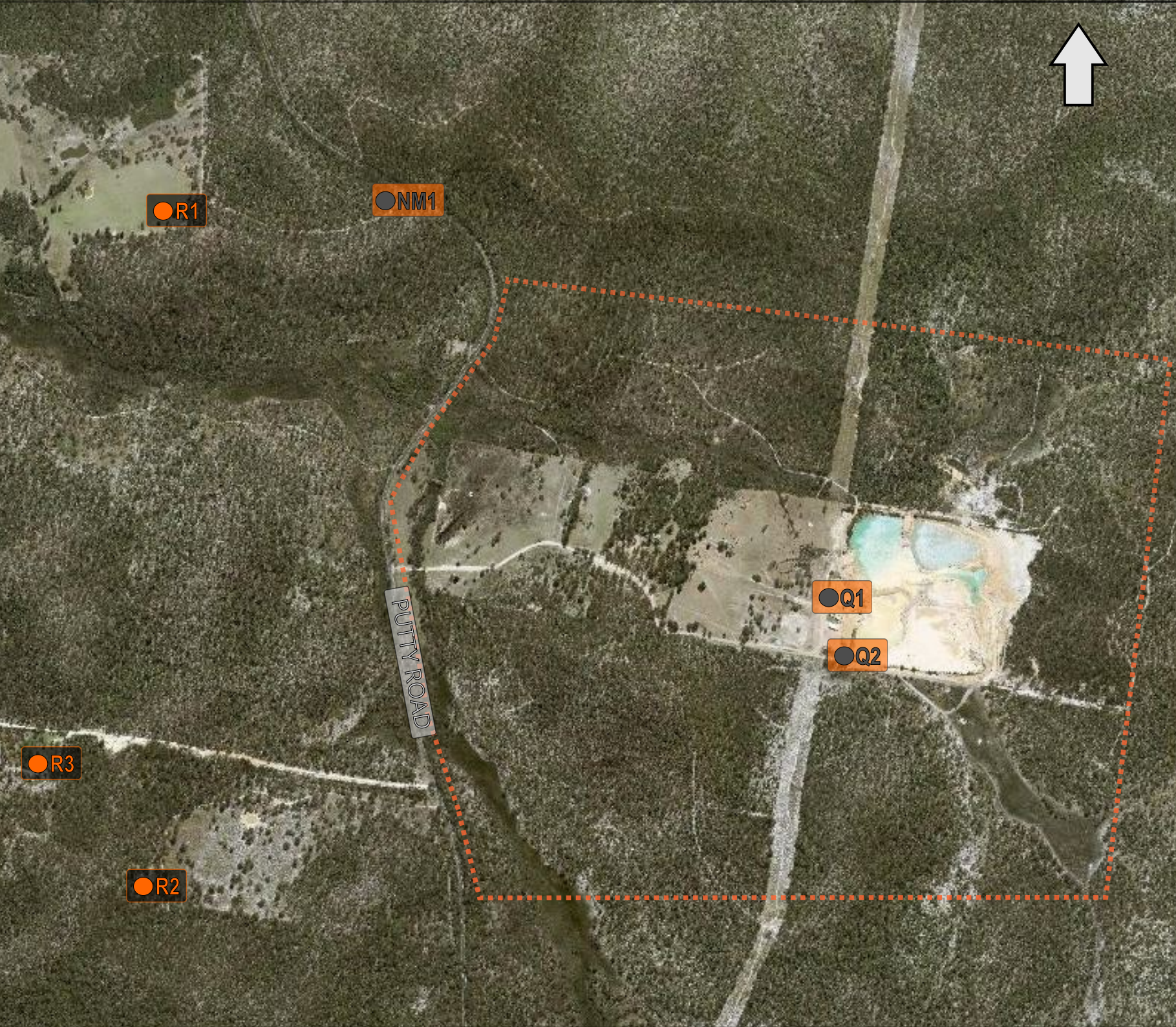
Attended noise measurements were carried out using a Svantek Type 1, 971 noise analyser on Thursday 16 April 2020. Four noise measurements of 15 minutes in duration were conducted at NM1 (R1) monitoring location during the day and morning shoulder monitoring periods. Where possible, throughout each survey, 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 and Svantek Type 1, 958 noise analysers.




3.4 Operational Log

Transportation activities commenced at 5:30am and work shifts including operation of processing equipment commenced at 7am on the day of the survey. 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 16 April 2020. **Table 3** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

Table 3 Operator-Attended Noise Survey Results – Morning Shoulder Period, Location NM1

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
16/04/2020	06:00	63	43	28	WD: NE WS: 0.5m/s Rain: Nil	Traffic 30-63 Birds 25-54 Wind 22-35 Site Hum/Site Vehicles <25
16/04/2020	06:15	64	42	28	WD: NE WS: 0.5m/s Rain: Nil	Traffic 30-64 Birds 26-59 Wind 23-36 Site Hum/Site Vehicles <25
16/04/2020	06:30	66	48	34	WD: NE WS: 1.0m/s Rain: Nil	Traffic 30-66 Birds 28-50 Wind 28-41 Site Hum/Site Vehicles <25
16/04/2020	06:45	73	52	34	WD: NE WS: 1.0m/s Rain: Nil	Traffic 30-73 Birds 27-53 Wind 27-41 Site Hum/Site Vehicles <25
Tinda Creek Quarry L _{Aeq} (15min) Contribution						<30

Unattended noise monitoring was completed during the morning shoulder assessment period at Q1 and Q2 on Thursday 16 April 2020. **Table 4** presents the monitored 15-minute noise levels, observed on-site activities (from audio recordings) and meteorological conditions at the time of measurements.

Table 4 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	16/04/2020	06:30	88	53	44	WD: NE WS: 0.5-1.0m/s	Vehicle Loading 35-88
Q2	16/04/2020	06:25	53	42	41	Rain: Nil	

4.2 Day Assessment Results

Four attended noise measurements of 15-minutes in duration were completed during the daytime assessment period at NM1 on Thursday 16 April 2020. **Table 5** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

Table 5 Operator-Attended Noise Survey Results – Day Period, Location NM1

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
16/04/2020	07:30	72	49	29	WD: NE WS: 1.0m/s Rain: Nil	Traffic 30-72 Birds 23-57 Wind 23-37 Site Hum/Site Vehicles <25
16/04/2020	07:45	74	50	31	WD: NE WS: 0.5m/s Rain: Nil	Traffic 30-74 Birds 24-53 Wind 23-39 Site Hum/Site Vehicles <25
16/04/2020	08:00	72	48	30	WD: NE WS: 0.5m/s Rain: Nil	Traffic 30-72 Birds 24-55 Wind 24-42 Site Hum/Site Vehicles <25
16/04/2020	08:15	71	47	30	WD: N WS: 1.0m/s Rain: Nil	Traffic 30-71 Birds 24-56 Wind 24-44 Site Hum/Site Vehicles <25
Tinda Creek Quarry L _{Aeq} (15min) Contribution						<30

Unattended noise monitoring was completed during the daytime assessment period at Q1 and Q2 on Thursday 16 April 2020. **Table 6** presents the monitored 15-minute noise levels, observed on-site activities (from audio recordings) and meteorological conditions at the time of measurements.

Table 6 Unattended Noise Survey Results – Day Period, Location Q1 and Q2

Location	Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
			L _{Amax}	L _{Aeq}	L _{A90}		
Q1	16/04/2020	8:00	72	66	61	WD: NE WS: 0.5-1.0m/s	Sand Processing Vehicle Loading
Q2	16/04/2020	8:10	77	63	57	Rain: Nil	Generator 54-77

5 Noise Compliance Assessment

5.1 Attended Noise Measurement Compliance Assessment

The compliance assessment summary results for R1 are presented in **Table 7** for day and morning shoulder assessment periods and compares project contributions against relevant criteria.

Table 7 Day and Morning Shoulder Noise Compliance Assessment

Period	Quarry Noise Contribution	Quarrying Noise Criteria	Compliant
	dB LAeq(15min)	dB LAeq(15min)	
Day	<30	35	✓
Morning Shoulder	<30	35	✓

5.2 Calculated DPE Assessment Methodology

From the noise measurements at monitoring location Q1 and Q2 the LAeq(15min) sound power of the quarry was calculated to be 107dBA. The contribution at each of the receivers R1 to R3 has been calculated taking into account loss due to distance and topography. This noise level was propagated to the surrounding noise sensitive receivers, with the calculated received noise level presented in **Table 8**. Results of the calculations generally align with the measured noise contributions from the project and therefore validate compliance.

Table 8 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	107	2050	74	12	21
R2	107	2210	75	12	20
R3	107	2030	74	12	21

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6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment 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 16 April 2020 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

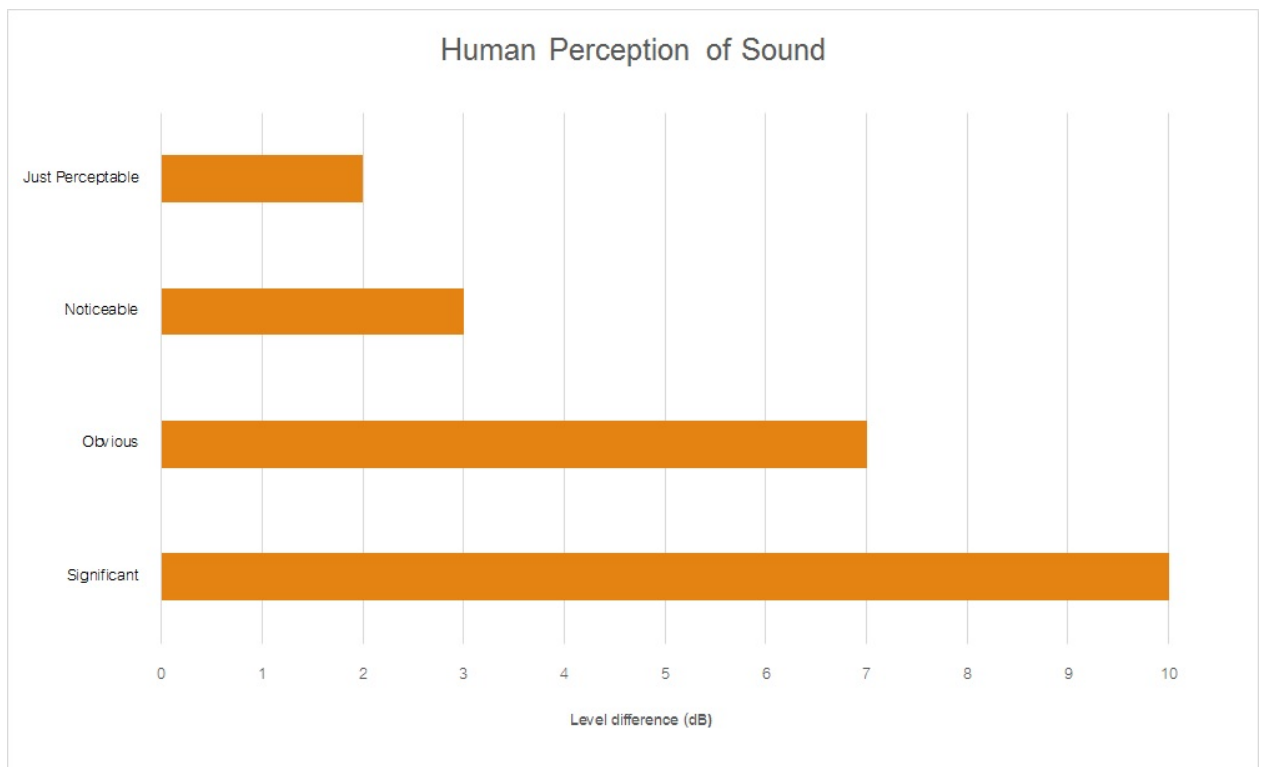
Table A1 provides a number of technical terms have been used in this report.

Table A1 Glossary of 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 LA90 statistical noise levels.
Ambient Noise	The noise associated with a given environment. Typically a composite of sounds from many 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 noise.
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 Linear or decibels Z-weighted.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
LA90	Commonly referred to as the background noise, this is the level exceeded 90 % of the time.
LAeq	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.
LAmx	The maximum root mean squared (rms) sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
Sound power level (LW)	This is a measure of the total power radiated by a source. The sound power of a source is a fundamental location of the source and is independent of the surrounding environment. Or a measure of the energy emitted from a source as sound and is given by: $= 10 \cdot \log_{10} (W/W_0)$ <p>Where: W is the sound power in watts and W₀ is the sound reference power at 10-12 watts.</p>

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 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



Muller Acoustic Consulting Pty Ltd
PO Box 262, Newcastle NSW 2300
ABN: 36 602 225 132
P: +61 2 4920 1833
www.mulleracoustic.com

