

Intended for  
**Holcim (Australia) Pty Ltd**

Document type  
**Report**

Date  
**January 2023**

Project number  
**318000911**

# **QUARTERLY NOISE MONITORING ASSESSMENT – QUARTER 4 2022 LYNWOOD QUARRY, MARULAN, NSW**

**QUARTERLY NOISE MONITORING ASSESSMENT –  
QUARTER 4 2022  
LYNWOOD QUARRY, MARULAN, NSW**

Ramboll  
Level 2, Suite 18 Eastpoint  
50 Glebe Road  
PO Box 435  
The Junction  
NSW 2291  
Australia

T +61 2 4962 5444  
<https://ramboll.com>

Project name **Quarterly Noise Monitoring Assessment for Lynwood Quarry – Quarter 4  
2022**  
Project no. **318000911**  
Recipient **Wayne Beattie**  
Document type **Report**  
Version **1**  
Date **24/01/2023**  
Prepared by **Jake Bourke, Nathalie Tomson**  
Checked by **Patrick Murray**  
Approved by **Greer Laing**  
Description **Data collected on 6 and 7 December 2022 for the quarterly period ending  
December 2022 at Marulan, NSW, as part of the noise monitoring program**

## CONTENTS

<b>Abbreviations and Definitions</b>	<b>2</b>
<b>1. Overview</b>	<b>3</b>
1.1 Project Driver	3
1.2 Site Location and Sensitive Receptors	3
<b>2. Noise Criteria</b>	<b>5</b>
<b>3. Methodology</b>	<b>6</b>
<b>4. Results and Discussion</b>	<b>7</b>
4.1 Location N1	7
4.2 Location N2	8
4.3 Location N3	9
4.4 Location N4	10
<b>5. Conclusion</b>	<b>11</b>
<b>6. References</b>	<b>12</b>
<b>Tables</b>	
Table 2-1: Monitoring locations and noise criteria	5
Table 4-1: Noise survey results and observations for Location N1	7
Table 4-2 Noise survey results and observations for Location N2	8
Table 4-3: Noise survey results and observations for Location N3	9
Table 4-4: Noise survey results and observations for Location N4	10

## ABBREVIATIONS AND DEFINITIONS

<b>Ambient Noise</b>	The all-encompassing noise within a given environment. It is the composite of sounds from many sources, both near and far.
<b>Background noise</b>	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is described using the LA90 descriptor (see below).
<b>dB</b>	Abbreviation for decibel, a measure of sound equivalent to 20 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure, and 10 times the logarithm of a given sound power to a reference power.
<b>dB(A)</b>	A measure of A-weighted sound levels. A Weighting is an adjustment made to the sound level measurement to approximate the response of the human ear.
<b>Extraneous noise</b>	Noise resulting from activities that are not typical of the area. Atypical activities may include construction, and traffic generated by holiday periods. Normal daily traffic is not extraneous noise.
<b>LA1</b>	The noise level, measured in dB(A), which is exceeded for 1 per cent of the measurement period.
<b>LA1(1min)</b>	The noise level, measured in dB(A), which is exceeded for 1 per cent of the time over a 1-minute measurement period, i.e., is exceeded for 0.6 seconds. This measure can approximate to the maximum noise level but may be less if there is more than 1 noise event during this 0.6 second period.
<b>LA10</b>	The noise level, measured in dB(A), which is exceeded for 10 per cent of the time.
<b>LA90</b>	The noise level, measured in dB(A), which is exceeded for 90 per cent of the time, referred to as the background noise level. This is considered to represent the background noise (see above).
<b>LAeq</b>	The level of noise equivalent to the energy average of noise levels occurring over a defined measurement period.
<b>LAeq (period)</b>	The average equivalent noise level, measured in dB(A), during a measurement period (e.g., 15-minute, day, evening, or night).
<b>LAm<sub>ax</sub></b>	The A-weighted sound pressure level that represents the maximum noise level measured over the time that a given sound is measured.
<b>NMA</b>	Noise Monitoring Assessment
<b>NMP</b>	Noise Management Plan

Source: Noise Guide for Local Government (NSW EPA, 2013)

# 1. OVERVIEW

## 1.1 Project Driver

Ramboll Australia Pty Ltd (Ramboll) has been commissioned by Holcim (Australia) Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for Lynwood Quarry (“the quarry”) at Marulan, NSW.

This NMA was done in accordance with the following documents:

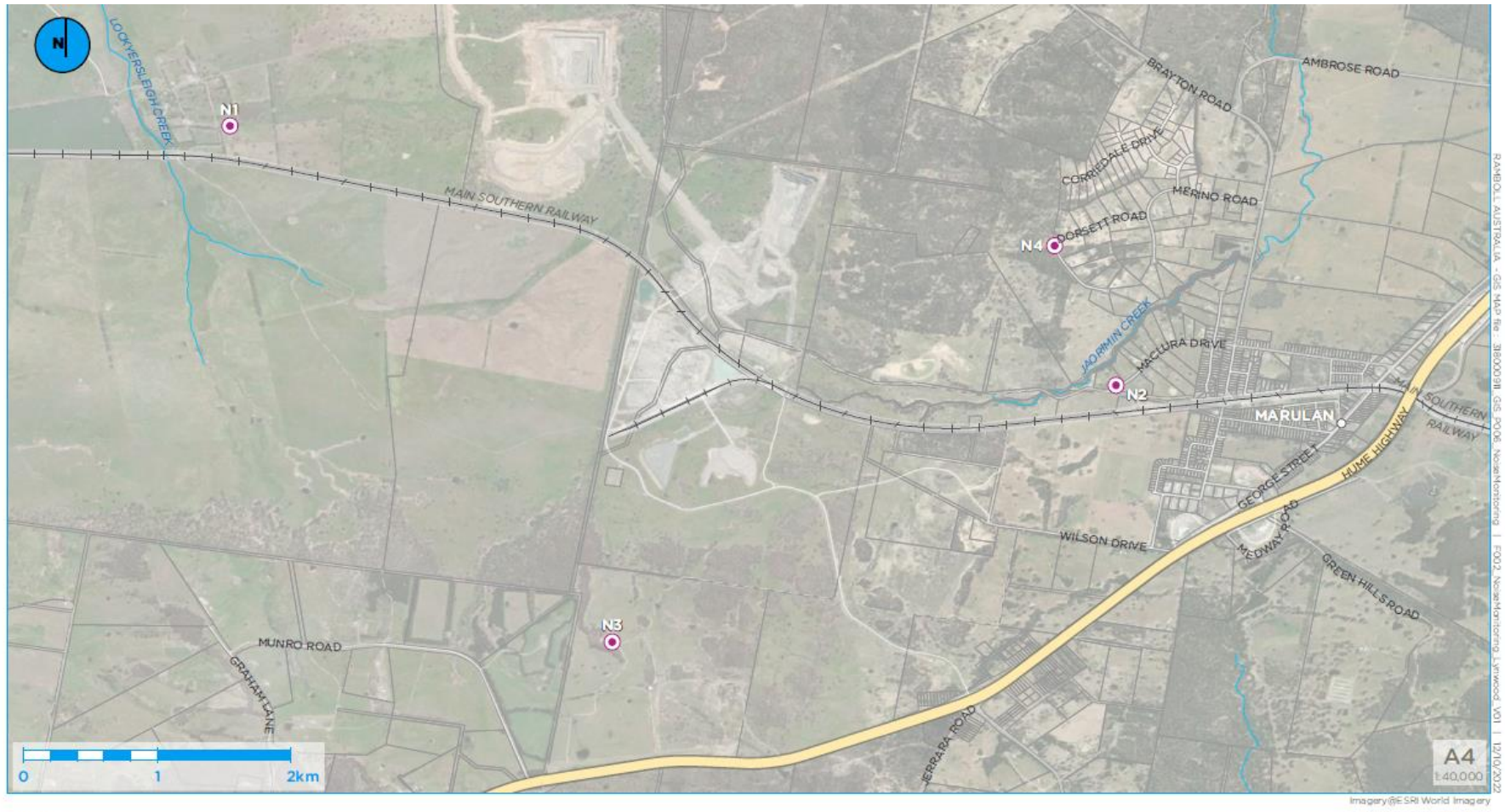
- Noise Policy for Industry (NPI) (NSW EPA, 2017).
- Lynwood Quarry Noise Management Plan (NMP) (Holcim Australia, 2019).
- Environment Protection Licence (EPL) number 12939 (NSW EPA, 2021).
- Development Consent DA 128-5-2005 (Minister for Planning, 2017).
- Australian Standard AS 1055:2018 Acoustics — Description and measurement of environmental noise (Standards Australia, 2018).
- IEC 60942 Ed. 3.0 b:2003 Electroacoustics - Sound calibrators (Standards Australia, 2003).

This NMA has been undertaken for the quarterly period October to December 2022, and forms part of the monitoring program to determine compliance with conditions of the Development Consent.

## 1.2 Site Location and Sensitive Receptors

The quarry is located at 278 Stoney Creek Road, approximately 4 km to the west of the Marulan railway station and town centre. Sensitive receptors surrounding the quarry are primarily rural and residential (to the west of the site). The Hume Highway is located to the east and south of the quarry. Highway traffic (Hume Highway) is a dominant noise source.

The monitoring locations with respect to the quarry and assessed receivers are presented in the locality plan in **Figure 1**.



**Legend**  
● Noise monitoring location

Figure 1 : Noise monitoring locations at Lynwood Quarry

Confidential

## 2. NOISE CRITERIA

Table 2-1 includes the applicable noise criteria outlined in the Development Consent and the EPL for the 16 residential receivers surrounding the quarry (L1-L16), and the four monitoring locations adopted from the NMP that are deemed representative and applicable for this NMA (N1-N4). It should be noted that N3 was only accessible during the day and evening; night monitoring was completed at nearby location NM3 but on reflection the location within the quarry boundary to deemed unsuitable.

**Table 2-1: Monitoring locations and noise criteria**

EPL ID	Receiver Description	Monitoring Locations		Day <sup>1</sup>	Evening <sup>2</sup>	Night <sup>3</sup>	Night <sup>3</sup>
		NMP ID	Address	L <sub>A</sub> eq (15min)	L <sub>A</sub> eq (15min)	L <sub>A</sub> eq (15min)	L <sub>A1</sub> (1min)
				dBA			
L1	West of the Granite Pit.	N1	1114 Carrick Road, Marulan	35	35	35	45
L2	Northeast of the site	-	-	35	35	35	45
L3	Northeast of the site	-	-	35	35	35	45
L4	East of the site in Marulan	-	-	35	37	35	46
L5	East of the site in Marulan	-	-	35	35	35	46
L6	East of the site in Marulan	N2	End of Maclura Drive, Marulan	35	37	36	46
L7	East of the site in Marulan	-	-	38	38	35	55
L8	East of the site in Marulan	-	-	39	38	36	55
L9	East of the site in Marulan	-	-	39	39	37	56
L10	Southeast of the site in Old Marulan	-	-	42	42	40	53
L11	South of the site	N3	Northern Boundary, 16038 Hume Highway, Marulan	35	35	36	47
L12	East of the site in Marulan	N4	Corner of Dorsett and Suffolk Road, Marulan	37	37	36	47
L13	East of the site in Marulan	-	-	40	38	37	47
L14	South of the site	-	-	35	35	35	47
L15	South of the site	-	-	35	35	35	47
L16	Northeast of the site	-	-	35	35	35	45

<sup>1</sup> 7 am-6 pm Monday to Saturday and 8 am-6 pm Sunday and public holidays  
<sup>2</sup> 6 pm-10 pm Monday to Sunday  
<sup>3</sup> 10 pm-7 am Monday to Saturday and 10 pm-8 am Sunday and public holidays

### 3. METHODOLOGY

The monitoring program was designed in accordance with the procedures described in Australian Standard AS 1055:2018 and the Approval Documents referenced in Section 1. The measurements were carried out using a RION Sound Level Meter NL-52 on Tuesday 6 December and Wednesday 7 December 2022. The acoustic instrumentation used carries current NATA calibration and complies with AS/NZS IEC 61672-1:2013/2002 class 1. Calibration of all instrumentation was checked prior to and following measurements using a Pulsar Acoustic Calibrator 105 which carried a current NATA calibration and complies with IEC 60942:2003. Drift in calibration did not exceed  $\pm 0.3$  dBA.

Attended noise monitoring was conducted for 15-minutes in duration during the day, evening and night periods over two days. Where possible, throughout each measurement the operator quantified the contribution of each significant noise source.

Where the quarry was not distinctly audible during the attended monitoring, the quarry contribution is estimated to be at least 10 dBA below the ambient noise level, as determined by the LA90, or estimated to be less than criteria value.



## 4. RESULTS AND DISCUSSION

### 4.1 Location N1

Noise monitoring at location N1 conducted on Tuesday 6 December 2022 and Wednesday 7 December 2022 resulted in inaudible noise during the day, evening, and night. The results and observations taken during the monitoring events at Location N1 are presented in **Table 4-1**.

The results meet the established noise criteria and indicate that noise emissions from Lynwood Quarry did not contribute to noise nuisance at the time of the monitoring. Extraneous noise sources measured included birds, barking dogs, children yelling, wind, rustling leaves, vehicles and a passing freight train.

**Table 4-1: Noise survey results and observations for Location N1**

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and LAeq (dBA)	Lynwood Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1(1min) Criteria (dBA)
		LAmx	LAeq	LA90						
06-12-22	7:31 (Day)	77	52	27	WD: n/a WS: 0 Rain: Nil	Birds Ute Dogs barking Children yelling Quarry inaudible	<35	35	n/a	n/a
06-12-22	19:52 (Evening)	73	54	40	WD: 270° WS: 3.6 m/s Rain: Nil	Dogs barking 49-70 Wind/rustling leaves 48-54 Quarry inaudible	<35	35	n/a	n/a
07-12-22	6:24 (Night)	77	61	32	WD: n/a WS: 0 Rain: Nil	Background 34 Birds 68 Freight train passing 65-76 Quarry inaudible	<35	35	<45	45

## 4.2 Location N2

Noise monitoring at location N2 conducted on Tuesday 6 December 2022 and Wednesday 7 December 2022 resulted in inaudible noise at night, with audible noise measured during the day and evening. The results and observations taken during the monitoring events at Location N2 are presented in Table 4-1.

The quarry was faintly audible during all periods. It was difficult to discern construction activities at this location from quarry activities during the day period. The quarry contribution was noted as below criteria when it was audible when construction activities ceased. The dominant noise source was motorway traffic. Extraneous noise sources measured included birds, earth moving construction, excavators, starting machinery, truck movement and motorway traffic.

**Table 4-2 Noise survey results and observations for Location N2**

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and LAeq (dBA)	Lynwood Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1(1min) Criteria (dBA)
		LAmx	LAeq	LA90						
06-12-22	10:06 (Day)	72	49	40	WD: 90° WS: 1.2 m/s Rain: Nil	Birds 51 Construction earth moving 46 Truck 72 Excavator 49 Machine starting 45 Motorway 44 Quarry faintly audible	<41 <sup>1</sup>	35	n/a	n/a
06-12-22	18:33 (Evening)	55	44	41	WD: 90° WS: 1.9 m/s Rain: Nil	Birds 44-45 Motorway traffic 43-48 Wind/rustling leaves 42-47 Car turning around 48 Quarry faintly audible	<37	37	n/a	n/a
07-12-22	5:29 (Night)	71	55	41	WD: n/a WS: 0 Rain: Nil	2 x Freight train passing 50-69 Birds 48-50 Road Quarry inaudible	<36	36	<46	46

<sup>1</sup> Noted that construction works adjacent to monitoring location confounded ability to isolate quarry noise from construction noise

### 4.3 Location N3

Noise monitoring at location N3 conducted on Tuesday 6 December 2022 and Wednesday 7 December 2022 resulted in inaudible noise during the day and evening. The location was unable to be accessed during the night period due to a locked gate, so measurements were completed at an intermediate monitoring location approximately 550m closer to the quarry within the site boundary. The results and observations taken during the monitoring events at Location N3 are presented in **Table 4-13**.

The quarry was audible during the night period, above the noise criteria, but the monitoring location used within the quarry boundary was deemed unsuitable given distance from nearest sensitive receiver (approximately 500 m) when compared to the nominated location. For future monitoring, access will be sought through the locked gate or an alternative publicly accessible location on Munro Road will be used. Extraneous noise sources measured included birds, motorway traffic, wind, and rustling leaves.

**Table 4-3: Noise survey results and observations for Location N3**

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and LAeq (dBA)	Lynwood Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1(1min) Criteria (dBA)
		LAmx	LAeq	LA90						
06-12-22	17:18 (Day)	63	45	42	WD: 180° WS: 1.1 m/s Rain: Nil	Birds 48-51 Motorway traffic 50-63 Quarry inaudible	<35	<35	n/a	n/a
06-12-22	18:00 (Evening)	56	47	44	WD: 180° WS: 1.1 m/s Rain: Nil	Motorway traffic/road 46-51 Wind/rustling leaves 47-50 Quarry inaudible	<35	<35	n/a	n/a

Location unable to be accessed for night monitoring (i.e. unexpected locked gate)

#### 4.4 Location N4

Noise monitoring at location N4 was conducted on Tuesday 6 December 2022 and Wednesday 7 December 2022 resulted in inaudible noise during the evening and night, with audible noise measured during the day. The results and observations taken during the monitoring events at location N2 are presented in **Table 4-1**.

These results meet the established noise criteria and indicate that noise emissions from Lynwood Quarry did not contribute to noise nuisance, where quarry contribution was noted. Extraneous noise sources measured included birds, aircraft, passing cars, motorway traffic, wind, rustling leaves and a passing train.

**Table 4-4: Noise survey results and observations for Location N4**

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and LAeq (dBA)	Lynwood Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1(1min) Criteria (dBA)
		LAmx	LAeq	LA90						
06-12-22	9:34 (Day)	63	42	33	WD: 180° WS: 1.1 m/s Rain: Nil	Birds 55 Motorway traffic 35 Car passing 57 Quarry plant audible	<37	37	n/a	n/a
06-12-22	19:15 (Evening)	67	45	39	WD: 270° WS: 1.8 m/s Rain: Nil	Motorway traffic 43-45 Aircraft 54 Car on gravel road 44 Cars passing 56-58 Wind/rustling leaves 46 Birds 43-45 Quarry inaudible	<37	37	n/a	n/a
07-12-22	5:50 (Night)	63	44	37	WD: n/a WS: 0 Rain: Nil	Birds 53 Motorway traffic 42-47 Train 50 Quarry inaudible	<36	36	<47	47

## 5. CONCLUSION

Monitoring was carried out on Tuesday 6 December 2022 and Wednesday 7 December 2022 at four locations selected as representative to the sensitive receptors at the surroundings to Lynwood Quarry. No audible noise above the noise criteria from quarry operations was recorded at any of the four locations during the day, evening, and night periods. It was difficult to discern quarry noise from sub-division construction noise in location N2 during the day period.

This noise monitoring assessment completed by Ramboll at the Holcim Lynwood Quarry, Marulan, NSW as a quarterly requirement of the NMP showed compliance to the relevant noise criteria.

## 6. REFERENCES

Holcim Australia (2019) *Lynwood Quarry, Noise Management Plan*.

Minister for Planning and Infrastructure (2005) 'Development Consent DA 128-5-2005, Lynwood Hard Rock Quarry, and associated infrastructure'.

NSW EPA (2021) Environment Protection Licence number 12939

NSW EPA (2013) *Noise Guide for Local Government*. Sydney NSW: NSW Environment Protection Authority. Available at: <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/noise/20130127nlg.pdf> (Accessed: 25 October 2022).

NSW EPA (2017) *Noise Policy for Industry (NPFI)*. Sydney NSW: NSW Environment Protection Authority. Available at: <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/noise/17p0524-noise-policy-for-industry.pdf> (Accessed: 25 October 2022).

Standards Australia (2018) *AS 1055:2018 Acoustics—Description and measurement of environmental noise*. Australian Standard. Available at: [https://infostore.saiglobal.com/preview/825367946534.pdf?sku=1131503\\_SAIG\\_AS\\_AS\\_2626154](https://infostore.saiglobal.com/preview/825367946534.pdf?sku=1131503_SAIG_AS_AS_2626154) (Accessed: 19 January 2023).

Standards Australia (2003) *AS 60942:2003 Electroacoustics - Sound calibrators*. Australian Standard.