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QUARTERLY NOISE MONITORING ASSESSMENT – QUARTER 4 2023 LYNWOOD QUARRY, MARULAN, NSW

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QUARTERLY NOISE MONITORING ASSESSMENT – QUARTER 4 2023
LYNWOOD QUARRY, MARULAN, NSW

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Description	**Data collected on 6, 7 and 8 December 2023 for the quarterly period ending December 2023 at Marulan, NSW, as part of the noise monitoring program**

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ABBREVIATIONS AND DEFINITIONS

Ambient Noise	The all-encompassing noise within a given environment. It is the composite of sounds from many sources, both near and far.
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 described using the LA90 descriptor (see below).
dB	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.
dB(A)	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.
Extraneous noise	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.
LA1	The noise level, measured in dB(A), which is exceeded for 1 per cent of the measurement period.
LA1(1min)	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.
LA10	The noise level, measured in dB(A), which is exceeded for 10 per cent of the time.
LA90	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).
LAeq	The level of noise equivalent to the energy average of noise levels occurring over a defined measurement period.
LAeq (period)	The average equivalent noise level, measured in dB(A), during a measurement period (e.g., 15-minute, day, evening, or night).
LAmax	The A-weighted sound pressure level that represents the maximum noise level measured over the time that a given sound is measured.
NMA	Noise Monitoring Assessment
NMP	Noise Management Plan
SPL	The Sound Pressure Level. Sound pressure is the fluctuation in air pressure, from the steady atmospheric pressure, created by sound. The sound pressure level is the sound pressure expressed on a decibel scale.

Source: Noise Guide for Local Government (NSW EPA, 2023)

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 (NPfI) (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 July to September 2023, 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**.

RAMBOLL AUSTRALIA - GIS MAP file: 318000911_GIS_P006_NoiseMonitoring | F002_NoiseMonitoring_Lynwood_V04 | 29/01/2024

Legend

- Noise monitoring location
- Residence/noise assessment location

Figure 1 : Noise monitoring locations at Lynwood Quarry

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 the original location of N3 (on the northern boundary of 16038 Hume Highway, Marulan) continues to be inaccessible and as such N3 has been relocated to a nearby residential receiver approximately 900 m to the west on Munro Road, Marulan (**Figure 1**) where all future monitoring will take place. This revised location is deemed representative and applicable for this NMA.

Table 2-1: Monitoring locations and noise criteria

EPL ID	Receiver Description	Monitoring Locations		Day[1]	Evening[2]	Night[3]	Night[3]
		NMP ID	Address	LAeq (15min)	LAeq (15min)	LAeq (15min)	LA1 (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	127 Munro Rd, Carrick	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

[1] 7 am–6 pm Monday to Saturday and 8 am–6 pm Sunday and public holidays

[2] 6 pm–10 pm Monday to Sunday

[3] 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 Wednesday 6, Thursday 7, and Friday 8 December 2023. 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 ±0.3 dBA.

Attended noise monitoring was conducted for 15-minutes in duration during the day, evening, and night periods over three 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.

4. RESULTS AND DISCUSSION

4.1 Location N1

Noise monitoring at location N1 was conducted on Wednesday 6, Thursday 7, and Friday 8 December 2023. Noise from the quarry was inaudible during the day, evening, and night monitoring periods, with the ambient noise environment dominated by birds, a barking dog, a cow, and children screaming. 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. The results and observations taken during the monitoring events at Location N1 are presented in **Table 4-1**.

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

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and SPL (dBA)	Lynwood Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1(1min) Criteria (dBA)
		LA1	LAeq	LA90						
08-12-23	7:42am to 7:57am (Day)	49.3	38.0	30.5	WD: n/a WS: 0 m/s Rain: Nil	Dog barking 33-36 Birds 33-60 Quarry inaudible	<21	35	n/a	n/a
07-12-23	6:05pm to 6:20pm (Evening)	49.3	38.2	28.1	WD: 357° WS: 0.8 m/s Rain: Nil	Dog barking 34-43 Birds 31-59 Children screaming nearby residence 27-32 Quarry inaudible	<18	35	n/a	n/a
06-12-23	6:09am to 6:24am (Night)	47.7	37.9	32.9	WD: n/a WS: 0 m/s Rain: Nil	Birds 33-61 Cow 38-44 Quarry inaudible	<23	35	<48[2]	45

[1] Measured LA1 was dominated by birds and a barking dog.

4.2 Location N2

Noise monitoring at location N2 was conducted on Wednesday 6, Thursday 7, and Friday 8 December 2023. Noise from the quarry was inaudible during the day, evening, and night monitoring periods, with the ambient noise environment dominated by motorway traffic, birds, dogs, and a passing train. 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. The results and observations taken during the monitoring events at Location N2 are presented in **Table 4-12**.

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

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and SPL (dBA)	Lynwood Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1(1min) Criteria (dBA)
		LA1	LAeq	LA90						
06-12-23	7:26am to 7:41am (Day)	48.3	40.4	35.9	WD: n/a WS: 0 m/s Rain: Nil	Background motorway 33-35 Birds 33-59 Quarry inaudible	<26	35	n/a	n/a
07-12-23	7:06pm to 7:21pm (Evening)	47.2	39.7	34.7	WD: n/a WS: 0 m/s Rain: Nil	Background motorway 31-33 Train horn 45 Train 47-49 Dogs 37-45 Quarry inaudible	<25	37	n/a	n/a
08-12-23	6:03am to 6:18am (Night)	57.9	46.1	39.9	WD: n/a WS: 0 m/s Rain: Nil	Background motorway 36-44 Birds 44-64 Quarry inaudible	<30	36	<58[1]	46

[1] Measured LA1 was dominated by background motorway traffic and birds.

4.3 Location N3

Noise monitoring at location N3 was conducted on Wednesday 6, Thursday 7, and Friday 8 December 2023. Noise from the quarry was inaudible during the day, evening, and night monitoring periods, with the ambient noise environment dominated by motorway traffic and birds. 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. The results and observations taken during the monitoring events at Location N3 are presented in **Table 4-13**.

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

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and SPL (dBA)	Lynwood Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1(1min) Criteria (dBA)
		LA1	LAeq	LA90						
06-12-23	10:09am to 10:24am (Day)	52.1	41.9	37.5	WD: n/a WS: 0 m/s Rain: Nil	Background motorway 35-37 Birds 37-60 Quarry inaudible	<28	35	n/a	n/a
07-12-23	7:36pm to 7:51pm (Evening)	48.7	41.6	36.9	WD: n/a WS: 0 m/s Rain: Nil	Background motorway 39-42 Birds 33-57 Quarry inaudible	<27	35	n/a	n/a
08-12-23	5:36am to 5:51am (Night)	57.9	47.4	37.8	WD: n/a WS: 0 m/s Rain: Nil	Background motorway 34-36 Birds 36-63 Quarry inaudible	<28	<36	<58[1]	47

[1] Measured LA1 was dominated by background motorway traffic and birds.

4.4 Location N4

Noise monitoring at location N4 was conducted on Wednesday 6 and Thursday 7 December 2023. Noise from the quarry was inaudible during the day, evening, and night monitoring periods, with the ambient noise environment dominated by motorway traffic, birds, barking dogs, and a trucks. 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. The results and observations taken during the monitoring events at location N4 are presented in **Table 4-1**.

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

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and SPL (dBA)	Lynwood Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1(1min) Criteria (dBA)
		LA1	LAeq	LA90						
06-12-23	7:02am to 7:13am (Day)	54.3	45.2	38.5	WD: n/a WS: 0 m/s Rain: Nil	Background motorway 36-39 Birds 36-63 Truck 48-55 Quarry inaudible	<29	37	n/a	n/a
07-12-23	6:40pm to 6:55pm (Evening)	44.9	36.0	29.5	WD: n/a WS: 0 m/s Rain: Nil	Background motorway 27-35 Birds 28-64 Dogs barking 30-32 Quarry inaudible	<20	37	n/a	n/a
06-12-23	6:45am to 7:00am (Night)	46.8	41.8	39.4	WD: n/a WS: 0 m/s Rain: Nil	Background motorway 35-37 Birds 35-58 Quarry inaudible	<29	36	<47	47

5. CONCLUSION

This NMA was completed by Ramboll at the Holcim Lynwood Quarry, Marulan, NSW as a quarterly requirement of the NMP. Monitoring was carried out on Wednesday 6, Thursday 7 and Friday 8 December 2023 at four locations selected as representative to the sensitive receptors at the surroundings to Lynwood Quarry. No audible noise from quarry operations was recorded at any of the four locations during the day, evening, and night periods. The LA1 quarry contribution also exceeded the LA1(1min) (dBA) criteria for all locations but it was noted that LA1 was dominated by birds, barking dogs and or road traffic at each location.

The results presented in this NMA show compliance with the relevant noise criteria at the Holcim Lynwood Quarry, Marulan, NSW, except for the night LA1 contributions at all locations.

6. REFERENCES

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