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# Dunloe Sand Quarry Quarterly Noise Monitoring Assessment

Quarter 1 2024



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# Dunloe Sand Quarry Quarterly Noise Monitoring Assessment

## Quarter 1 2024

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## 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
<b>SPL</b>	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 Dunloe Sands Quarry (“the quarry”) at Pottsville, NSW.

This NMA was done in accordance with the following documents:

- Noise Policy for Industry (NPfI) (NSW EPA, 2017).
- Dunloe Sand Quarry Noise Management Plan (NMP) (GHD, 2020).
- Environment Protection Licence (EPL) number 13077 (NSW EPA, 2020).
- Development Consent No. 06\_0030, MOD2 (NSW EPA, 2018)
- 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 January to March 2024, and forms part of the monitoring program to determine compliance with conditions of the Environmental Protection License (EPL).

## 1.2 Site Location and Sensitive Receptors

The quarry is approximately 2.5 km south of Pottsville, NSW, a town in the Northern Rivers region in Tweed Shire. Sensitive receptors surrounding the quarry are primarily rural and residential properties in coastal bushland with elevated and undulating topography.

Three monitoring locations have been selected as part of the NMA and in accordance with the EPL and are shown in **Table 1-1**.

**Table 1-1: Monitoring locations locality and sensitive receptors**

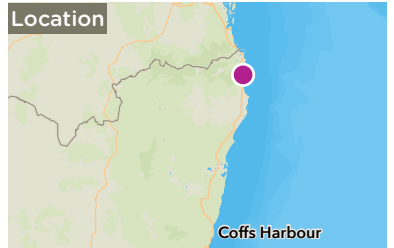
Monitoring Locations	Locality and Sensitive Receptors
R6	West of the quarry situated at a rural residential property at 157 Warwick Park Road.
R7	West of the quarry situated at a rural residential property at 129 Warwick Park Road.
R8	Northwest of the quarry situated at a rural residential property at 679 Pottsville Road.

The monitoring locations with respect to the quarry and assessed receivers are presented in the locality plan shown in **Figure 1**. It should be noted that while the NMP states monitoring locations be measured from the most affected points within surrounding residential property boundaries or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary, this has not been possible for this NMA due to access restrictions. Monitoring was completed at the property boundary of each location where accessible and in each case the property dwelling was approximately 40 to 100 metres from the boundary. This would have resulted in a conservative assessment as the monitoring locations were closer to the site.



RAMBOLL AUSTRALIA - GISMAP file - 318000911 GIS\_P006 NoiseMonitoring | F005 NoiseMonitoring\_Dunloe\_V03 | 29/01/2024

- Legend**
- Noise monitoring location
  - Property dwelling



**Figure 1: Noise monitoring locations at Dunloe Sands Quarry**

## 2. Noise Criteria

**Table 2-1** summarises the applicable noise criteria outlined in the NMP for residential receivers (R6, R7 and R8) surrounding the quarry. The noise criteria apply when the site is operational within the permitted operating hours Monday to Friday 7am - 5pm, Saturday 7am - 12pm with no operations on Sunday.

Compliance with the noise criteria below would also determine compliance with the noise limits outlined in the sites EPL (EPL 13077) which requires that the quarry’s noise contribution will not exceed 48 dB LAeq(15min) at any of the residential receivers.

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

Receiver	Monitoring Locations	Day <sup>1</sup>
		LAeq (15min)
		dB(A)
157 Warwick Park Road	R6	42
129 Warwick Park Road	R7	42
679 Pottsville Road	R8	48
All other residences		41
<sup>1</sup> 7 am–6 pm Monday to Saturday Note: no operations on Sundays and public holidays		

### 3. Methodology

The monitoring program was developed in accordance with the procedures described in *Australian Standard AS 1055:2018* and the Approval Documents referenced in Section 1. The measurements were completed using a RION Sound Level Meter NL-52 on Thursday 11 January 2024. The acoustic instrumentation used carried a current NATA calibration and that complied 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.

Each attended noise measurement was conducted for 15-minutes in duration at each monitoring location during the day period over one day. Where possible, throughout each measurement the operator(s) quantified the contribution of each significant noise source.

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

#### 3.1 Meteorology

Meteorology has an important influence on noise monitoring assessment. Where an onsite meteorological station with data recorded at 10m height has not been available, the nearest Bureau of Meteorology data has been adopted to inform this assessment and modelled using The Air Pollution Model (TAPM) to determine the atmospheric stability category as outline in **Table 3-1**.

**Table 3-1: Classification of Atmospheric Stability (NSW EPA, 2014)**

Stability Classification	Pasquill Stability Category	Ambient temperature change with height ( $^{\circ}\text{C}/100\text{m}$ )
Extremely unstable	A	$\Delta T \leq -1.9$
Moderately unstable	B	$-1.9 < \Delta T \leq -1.7$
Slightly unstable	C	$-1.7 < \Delta T \leq -1.5$
Neutral	D	$-1.5 < \Delta T \leq -0.5$
Slightly stable	E	$-0.5 < \Delta T \leq 1.5$
Moderately stable	F	$1.5 < \Delta T \leq 4.0$
Extremely stable	G	$\Delta T > 4.0$

The meteorological conditions recorded at the time of the noise monitoring were reviewed. The attended noise monitoring results presented in Section 4 were not found to be influenced by the following adverse meteorological conditions:

- During periods of rain or hail.
- Average wind speed at microphone height exceeding 5 m/s.
- Wind speeds greater than 3 m/s measured at 10 m above ground level.
- Temperature inversion conditions greater than  $3^{\circ}\text{C}/100\text{m}$ .



## 4. Results and Discussion

### 4.1 Location R6

Noise monitoring at location R6 was completed on Thursday 11 January 2024. The quarry was inaudible during the monitoring periods, and the ambient environment was dominated by insects, wind, trees, and passing cars. These results meet the noise criteria and indicate that noise emissions from Dunloe Sands Quarry did not contribute to noise nuisance during the monitoring period. The results and observations taken during the monitoring event at Location R6 are presented in **Table 4-1**.

**Table 4-1: Noise survey results and observations for Location R6**

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	BOM Station at 10m (ID 94592)	Apparent Noise Source, Description and SPL (dBA)	Dunloe Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)
		LAmx	LAeq	LA90					
11-01-24	2:29pm to 2:44pm (Day)	75.0	50.0	44.4	WD: 190° WS: 2.7 m/s Rain: Nil	WD: 122° WS: 3.1 m/s Rain: nil Stability Category: B <sup>1</sup>	Background insects/wind/trees 43-59 Passing cars (three) 61-75 Quarry inaudible	<34	42

<sup>1</sup> Modelled using TAPM to determine Stability Category.

### 4.2 Location R7

Noise monitoring at location R7 was completed on Thursday 11 January 2024. The quarry was inaudible during the monitoring periods, and the ambient environment was dominated by birds, insects, trees, and a passing car. These results meet the established noise criteria and indicate that noise emissions from Dunloe Sands Quarry did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location R7 are presented in **Table 4-2**.

**Table 4-2: Noise survey results and observations for Location R7**

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	BOM Station at 10m (ID 94592)	Apparent Noise Source, Description and SPL (dBA)	Dunloe Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>					
11-01-24	2:47pm to 3:02pm (Day)	70.5	56.5	45.0	WD: 190° WS: 1.3 m/s Rain: Nil	WD: 125° WS: 3.0 m/s Rain: nil Stability Category: B <sup>1</sup>	Background birds/insects/trees 44-60 Passing car (one) 70 Quarry inaudible	<35	42

<sup>1</sup> Modelled using TAPM to determine Stability Category.

#### 4.3 Location R8

Noise monitoring at location R8 conducted on Thursday 11 January 2024. The quarry was inaudible during the monitoring periods, and the ambient environment was dominated by insects, trees and passing cars on Pottsville Road. These results meet the established noise criteria and indicate that noise emissions from Dunloe Sands Quarry did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location R8 are presented in **Table 4-3**.

**Table 4-3: Noise survey results and observations for Location R8**

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	BOM Station at 10m (ID 94592)	Apparent Noise Source, Description and SPL (dBA)	Dunloe Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>					
11-01-24	1:59pm to 2:14pm (Day)	75.2	60.5	47.7	WD: 190° WS: 0.9 m/s Rain: Nil	WD: 122° WS: 3.1 m/s Rain: nil Stability Category: B <sup>1</sup>	Insects (occasional) 42-60 Passing cars (occasional) 62-75 Trees 45 Quarry inaudible	<38	48

<sup>1</sup> Modelled using TAPM to determine Stability Category.

## 5. Conclusion

This NMA was completed by Ramboll at the Holcim Dunloe Sands Quarry, Pottsville, NSW as a quarterly requirement of the NMP showed compliance with the relevant noise criteria. Monitoring was carried out on Thursday 11 January 2024 at three locations selected as representative to the sensitive receptors at the surroundings to Dunloe Sands Quarry. No audible quarry noise was recorded at any of the selected monitoring locations.

As monitoring was completed at the property boundary of each location and each property dwelling was approximately 40 to 100 metres from the boundary, it is recommended that permission from the property owners be sought to access their property to complete future noise monitoring within 30 metres of the property dwellings. The results presented in this NMA show compliance with the relevant noise criteria at the Holcim Dunloe Sands Quarry, Pottsville, NSW.

## 6. References

GHD (2020). Dunloe Sand Quarry Noise Management Plan.

NSW EPA (2018). Development Consent No. 06\_0030, MOD2 (November 2018)

NSW EPA (2020). Environment Protection Licence number 13077.

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).

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NSW EPA (2017) *Noise Policy for Industry (NPI)*. 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).

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