Holcim

Strength. Performance. Passion

ANNUAL REVIEW
1 January 2022 – 31 December 2022

Cooma Road Quarry

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SITE DETAILS

Name of operation	Cooma Road Quarry
Name of operator	Holcim (Australia) Pty Ltd
Development consent / project approval #	SSD 5109
Name of holder of development consent / project approval	Holcim (Australia) Pty Ltd
Annual review start date	1 January 2022
Annual review end date	31 December 2022

I, **David Manning**, certify that this audit report is a true and accurate record of the compliance status of the **COOMA ROAD QUARRY** for the period of **1 JANUARY 2022 – 31 DECEMBER 2022** and that I am authorised to make this statement on behalf of **HOLCIM (AUSTRALIA) PTY LTD**.

Note.

a) *The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual, $250,000.*

b) *The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or $22,000, or both).*

Name of authorised reporting officer	David Manning
Title of authorised reporting officer	Quarry Manager
Signature of authorised reporting officer	
Document Date	31/03/2023

1 STATEMENT OF COMPLIANCE

The statement of commitments for the 2022 reporting period for the Cooma Road Quarry is provided in **Table 1. Table 3** details the non-compliances at the Cooma Road Quarry identified within the 2022 reporting period, with the compliance status key provided in **Table 2**.

Table 1: Statement of Commitments

Were all conditions of the relevant approval(s) complied with?	
SSD 5109	No – See Table 3
EPL 1453	Yes

Table 2: DPE Compliance Status Key

Risk level	Colour code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-compliant	Non-compliance with: ● potential for serious environmental consequences, but is unlikely to occur; or ● potential for moderate environmental consequences, but is likely to occur
Low	Non-compliant	Non-compliance with: ● potential for moderate environmental consequences, but is unlikely to occur; or ● potential for low environmental consequences, but is likely to occur
Admin NC	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

Table 3: Non-Compliances of SSD 5109 for 2022

<table>
<tr><th>Relevant approval</th><th>Condition</th><th>Condition Description</th><th>Compliance Status</th><th>Section Addressed in Annual Review/Comment</th></tr>
<tr>
<td>SSD 5109</td>
<td>Air Quality Criteria</td>
<td>
Schedule 3 Condition 14 – Air Quality Criteria
<table>
<tr><th>Pollutant</th><th>Averaging Period</th><th>[d] Criterion</th></tr>
<tr><td>Total Suspended particulate (TSP)</td><td>Annual</td><td>[a]90 µm/m^3</td></tr>
<tr><td>Particulate matter < 10 µm (PM_{10})</td><td>Annual</td><td>[a] 30 µm/m^3</td></tr>
</table>
<table>
<tr><th>Pollutant</th><th>Averaging Period</th><th>[d] Criterion</th></tr>
<tr><td>Particulate matter < 10 µm(PM_{10})</td><td>24 hour</td><td>[a] 50 µm/m^3</td></tr>
</table>
<table>
<tr><th>Pollutant</th><th>Averaging Period</th><th>Maximum increase in deposited dust level</th><th>Maximum total deposited dust level</th></tr>
<tr><td>[c] Deposited dust</td><td>Annual</td><td>[b]2 g/m^2/month</td><td>[a] 4 g/m^2/month</td></tr>
</table>
Notes to Tables 4-6:
[a] Total impact (ie incremental increase in concentrations due to the development plus background concentrations due to all other sources);
[b] Incremental impact (ie incremental increase in concentration due to the development on its own);
[c] Deposited dust is to be assessed as insoluble solids as defined by Standards Australia AS/NZS 3850:10.1.2003 – Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method
[d] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by the Secretary in consultation with EPA.
</td>
<td>Low Risk
Non-Compliance</td>
<td>
Section 6.3 Air Quality
Deposited Dust Gauge 4 recorded an exceedance of 4.5 g/m2/month during annual averages throughout 2022 reporting. This is above performance criteria.
Cooma Rd also recorded 2 missed sampling dates during 2022 reporting period.
- 3 April 2022
- 9 April 2022
</td>
</tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
</table>

2 INTRODUCTION

Holcim (Australia) Pty Ltd (Holcim) operates the Cooma Road Quarry, a hard rock quarry located on Old Cooma Road in the Queanbeyan Local Government Area. The site operates under Development Consent (SSD 5109) approved by the New South Wales (NSW) Department of Planning & Infrastructure (now Department of Planning, Industry & Environment [DPE]) on 27 September 2013.

The site also operates in accordance with the Environmental Protection Licence (EPL) No. 1453 issued by the NSW Environment Protection Authority (EPA). A regional locality figure and aerial view of the site are outlined in **Figure 1** and **Figure 2** below.

Figure 1: Locality Map (Umwelt 2014)

Figure 2: Aerial view of the Cooma Road Quarry, located on Old Cooma Road, Queanbeyan

In accordance with Schedule 5 Condition 9 of the modified Development Consent the site is required to prepare an Annual Review of the site in accordance with the conditions provided in **Table 4**.

Table 4: Annual Review Requirements

Condition	Section addressed in Annual Review
By the end of March each year, or other timing as may be agreed by the Secretary, the Applicant must submit a report to the Department reviewing the environmental performance of the development to the satisfaction of the Secretary. This review must:	
a) describe the development (including rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year;	Section 5
b) include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, which includes a comparison of these results against: ● the relevant statutory requirements, limits or performance measures/criteria; ● requirements of any plan or program required under this consent; ● the monitoring results of previous years; and ● the relevant predictions in the documents listed in condition 2(a) of Schedule	Section 6, 7 and 9.3
c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;	Section 1
d) identify any trends in the monitoring data over the life of the development;	Section 6
e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and	Section 6

f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the development.	Section 12

This Annual Review has also been prepared in accordance with the *Annual Review Guideline: Post-approval requirements for State significance mining developments* (October 2015). This report documents the environmental performance of the quarry from 1 January to 31 December 2022.

2.1 Name and Contact Details

The key contact details for the site are outlined below:

Quarry Manager
David Manning
+61 429 791 390
Email: david.manning@holcim.com

Acting Environment Manager – NSW
Rob Townsend
Tel: (02) 9412 6600
Email: Rob.Townsend.ext@holcim.com

3 APPROVALS

The site operates under the following approvals listed in **Table 5**.

Table 5: Approvals for the Cooma Road Quarry Operations

Approval	Regulatory Authority
Development Consent SSD 5109	Department of Planning, Industry & Environment
EPL No. 1453	Environment Protection Authority
Water Approval No. 40WA413082	NSW Department of Industry - Water

Holcim holds **EPL 1453** which covers its activities at the Cooma Road Quarry. **Table 6** outlines these licensing limits. The EPL was varied by the EPA on 17 April 2018 enabling the site to receive **Virgin Excavated Natural Material (VENM)** to match Development Consent Modification approved in 2016. The second Modification of Development Consent SSD 5109 was approved on the 30 April 2019 by DPE.

Table 6: EPL Fee-Based Activity at the Cooma Road Quarry

Fee Based Activity	Scale
Crushing, grinding or separating	>500,000 T – 2,000,000 T processed
Land-based extractive activity	>500,000 T – 2,000,000T extracted, processed or stored

4 OPERATIONS SUMMARY

4.1 Exploration

No exploration occurred at the Cooma Road Quarry in the 2022 reporting period. There is proposed planning for 2023.

4.2 Land Preparation

No land preparation activities occurred at the Cooma Road Quarry in the 2022 reporting period.

Land preparation is proposed for 2023 to develop the Granite and Dacite pits.

4.3 Construction Activities

Construction activities undertaken in 2022 include the relocation of the existing workshop. There is proposed planning to extend the granite pit in the 2023 reporting period.

4.4 Quarry Operations

Development activities undertaken at the Cooma Road Quarry in 2022 included:

- Drill, Blast, Load and Haul Activities;
- Crushing, screening and stockpiling of product;
- Overburden removal and replacement in the southwest overburden dump;
- Maintenance of rehabilitation undertaken on the overburden dump in the south-western disturbance area; and
- Increasing the size of the Granite Pit.
- Recycling of clean concrete on site for re-use as product

All activities took place in accordance with the approved operating hours being 6am to 6pm, Monday to Saturday. These 6am-6pm timeframes applied to all operational activities where no crushing, screening or vehicle movements occurred after 6pm and before 6am.

Operating hours relating to Cooma Road are outlined in **Table 7.**

Table 7: Cooma Road Operating Hours

Activity	***Operating Hours***		
	Monday - Friday	***Saturday***	***Sunday and Public Holidays***
Primary Crushing, Laden Truck Movements	6 am – 6 pm	6 am – 6 pm	None
Construction Operations	7 am – 6 pm	8 am – 1 pm	
Unladen Truck Movements	6 am – 8 pm	6 am – 8 pm	
Other Operations	6 am – 10 pm	6 am – 10 pm	

Note: Maintenance activities may occur at any time provided they are inaudible at privately-owned residences.

Table 8 includes a summary of the operations undertaken during the reporting period against the Development Consent conditions regarding product transported from the Cooma Road Quarry, with the site well below the consent criteria.

Table 8: Total Product Distributed (Cooma Road Quarry)

Material	Approval Limit (Tonnes)	2018 Reporting Period (Tonnes)	2019 Reporting Period (Tonnes)	2020 Reporting Period (Tonnes)	2021 Reporting Period (Tonnes)	2022 Reporting Period (Tonnes)
Product Distributed - Total	1,500,000	735,978	803,272	1,105,376	1,066,320	899442

4.5 Next Reporting Period

- Ongoing extraction of the resource within the approved quarry pit area;
-
- Allowance to receive quarry materials from other sites for crushing and screening (as required) and then sale. Total product (including from both material quarried from the site and from materials imported to the site) will be maintained within the total production limit; Relocation of the existing workshop, truck parking and temporary stockpiles;
- Recycling of clean concrete on site for re-use as product.

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

5.1 DPE Actions from Previous Annual Review

Holcim submitted the 2021 Annual Review to the Major Projects Portal by 31st March 2022. Holcim did not receive a response from DPE.

5.2 Update on Proposed Actions from the Previous Annual Review

Table 9 outlines the actions proposed in the previous Annual Review (2021) for completion or commencement in 2022.

Table 9: Holcim Proposed Actions from 2021 Annual Review for the 2022 Reporting Period

Improvement Measure	Activities	Update for this Annual Review
Progressive Rehabilitation	The site will continue to progressively rehabilitate available areas.	There was no new rehabilitation during the 2022 reporting period.
Maintenance of rehabilitation	Continued maintenance of rehabilitation in the completed overburden dump in the south-western disturbance area including weed control as well as nest box monitoring.	Holcim engaged ecology to complete nest box monitoring. Weed control spraying was continued in the completed overburden dump rehab.
IEA Action Plan	The site will continue to close out recommendations from the 2021 IEA.	All audit actions have been closed out.
Biodiversity	Weed spraying will continue at site during the next Annual Review period. Implementation of the Rehabilitation Management Plan.	Spraying continued target weed species. on target weed species. Holcim continued implementation of the Rehabilitation Management Plan.

6 ENVIRONMENTAL PERFORMANCE

6.1 Meteorological Monitoring

A summary of monthly rainfall was retrieved from the Bureau of Meteorology (BOM) Station 070339. The Tuggeranong site uses meteorological results to inform daily operational activities, and to control potential impacts around noise and air quality. Results from this meteorological monitoring station for the report period are summarised in **Table 10**.

Table 10: 2022 Rainfall Observations

Monthly Rainfall (mm)												Total 2022
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
135.4	142.4	59.0	98.0	117.6	35.8	12.6	130.8	86.0	214.4	119.6	35.2	**1186.8**

6.2 Noise

6.2.1 EIS Predictions

The 2012 EIS stated that '*Modelling results indicate that under worst case operational and meteorological conditions, with the implementation of the noise management measures outlined above, the Project is predicted to result in an exceedance of the PSNLs at one privately owned residence located to the south-east of the Project area (N67) of up to 4dB during the daytime period. If the secondary crushing plant were to be operated during the evening under worst case meteorological conditions, this same residence could be expected to experience exceedances of up to 3dB during the evening period. Holcim is however committed not to operate the secondary crushing plant under such conditions, namely gradient winds from the north-east, thereby avoiding this potential impact.'*

6.2.2 Approved Criteria

The site has undertaken quarterly noise monitoring throughout 2022 in accordance with the Noise Management Plan. The Approved noise criteria from the Development Consent (Schedule 3 Condition 4) are provided in **Table 11.**

Table 11: Cooma Road Quarry Noise Criteria (SSD 5109)

Receiver	Morning Shoulder 6 – 7 am	Day 7 am – 6 pm	Evening 6 – 10 pm
	LAeq (15 min)	LAeq (15 min)	LAeq (15 min)
N1, N7, N8, N56, N59, N63, N64, N65	40	44	39
N67	36	41	35
All other receivers between N9 and N71 inclusive	36	38	35
All other receivers	35	35	35

Notes:

- *To locate the receivers referred in Table 1 refer to Appendix 5 of the Development Consent.*
- *After the first review on any EPL granted for this development under Section 78 of the POEO Act, nothing in this approval prevents the EPA from imposing stricter noise limits on the quarrying operations on site under the EPL.*

Appendix 9 of the Development Consent sets out the metrological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria. However, these criteria do not apply if the Applicant has a written agreement with the relevant landowner/s to generate higher noise levels, and the Applicant has advised the Department in writing of these terms of this agreement.

6.2.3 Key Environmental Performance

Quarterly attended noise monitoring was undertaken at the Cooma Road Quarry on the following dates:

- 19 January 2022;
- 20 April 2022;
- 28 September 2022; and
- 7 December 2022.

The compliance assessments for each monitoring location (N3, N8, N38, N60 and N67) are presented in **Table 12**.

Cooma Road Quarry was not operational in the evening period of the duration of 2022 and therefore satisfied the minimum noise criterion of 35dBA. Non-quarry contributors to the noise survey results included birds, dogs, traffic, and roadworks.

Table 12: Cooma Road Quarry Noise Results 2022

Assessment Period	Receiver No.	Quarrying Noise Criteria	Q1 19 January 2022		Q2 20 April 2022		Q3 28 September 2022		Q4 7 December 2022	
		$LAeq_{(15min)}$	Quarry Noise Contribution	Compliance	Quarry Noise Contribution	Compliance	Quarry Noise Contribution	Compliance	Quarry Noise Contribution	Compliance
Morning Shoulder	N3	35	31	✓	<35	✓	<35	✓	<35	✓
	N8	40	<40	✓	<40	✓	<40	✓	<40	✓
	N38	36	<36	✓	<36	✓	<36	✓	<36	✓
	N60	36	<36	✓	<36	✓	<36	✓	<36	✓
	N67	36	<30	✓	<36	✓	<36	✓	<36	✓
Daytime	N3	35	<30	✓	<35	✓	<35	✓	<35	✓
	N8	44	<40	✓	<44	✓	<44	✓	<44	✓
	N38	38	<38	✓	<38	✓	<38	✓	<38	✓
	N60	38	<38	✓	<38	✓	<38	✓	**<48**	✓
	N67	41	<30	✓	33	✓	<41	✓	<41	✓
Evening	N3	35	Quarry not operating	✓	Quarry not operating	✓	Quarry not operating	✓	Quarry not operating	✓
	N8	39	Quarry not operating	✓	Quarry not operating	✓	Quarry not operating	✓	Quarry not operating	✓
	N38	35	Quarry not operating	✓	Quarry not operating	✓	Quarry not operating	✓	Quarry not operating	✓
	N60	35	Quarry not operating	✓	Quarry not operating	✓	Quarry not operating	✓	Quarry not operating	✓
	N67	35	Quarry not operating	✓	Quarry not operating	✓	Quarry not operating	✓	Quarry not operating	✓

It should be noted that location N60 exceeded noise criteria during the daytime measurements during Q4 sampling. Extraneous noise sources measured during this time included heavy traffic including trucks and motorcycles. This was the dominant noise source due to the proximity of Old Cooma Road to the Quarry, however during the noise sampling, Cooma Road Quarry was inaudible. As such, these results meet the established noise criteria and indicate that noise emissions from Cooma Road Quarry did not contribute to noise nuisance, and were not responsible for the exceedance.

All monitoring results for quarterly noise assessments have been undertaken in accordance with the conditions of consent.

Long-term Trends:

Noise monitoring results were consistent with previous years and continued to meet the Development Consent criteria. The site continues to effectively manage noise.

6.2.4 Management Measures

Management measures relating to noise are outlined within the Cooma Road Quarry Noise Management Plan, these include:

- Defined operating hours;
- Work restrictions during the early morning shoulder period;
- Monitoring for noise and meteorological conditions;
- Broadband reversing beepers;
- Training of staff and contractors; and
- Controlled blasting activities.

6.2.5 Proposed Improvements

There are no proposed improvements to noise management.

6.3 Air Quality

6.3.1 EIS Predictions

A comprehensive Air Quality assessment was undertaken for the Project by Sinclair Knight Merz (SKM) for the 2012 EIS. The results of the predictive air quality modelling have identified that the Project will comply with the relevant air quality criteria at all nearby sensitive receiver locations under worst case operating conditions.

6.3.2 Approved Criteria

Depositional dust monitoring conducted at Cooma Road Quarry is compared with the monitoring criteria stipulated in Schedule 3, Condition 14 of SSD 5109 and reproduced in **Table 13.**

Table: Depositional Dust Criteria

Table 13: Long-term impact assessment criteria for Deposited Dust (from Development Consent)

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
[C] Deposited dust	Annual	[b] 2 g/m2/month	[a] 4 g/m^2/month

Notes to Tables 4-6:

- [a] Total impact (i.e., incremental increase in concentrations due to the development plus background concentrations due to all other sources);
- [b] Incremental impact (i.e., incremental increase in concentration due to the development on its own);
- [c] Deposited dust is to be assessed as insoluble solids as defined by Standards Australia AS/NZS 3850:10.1.2003 – Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method
- [d] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by the Secretary in consultation with EPA.

The site installed a **High Volume Sampling Unit (HVAS**) in late 2016 to monitor PM_{10} in accordance with the criteria stipulated in Schedule 3, Condition 14 of SSD 5109 and listed in **Table 14.** HVAS air quality monitoring at the site has been undertaken throughout 2022.

Table 14: TSP and PM_{10} Dust Criteria

Table 4: Long-term impact assessment criteria for Particulate Matter (from Development Consent)

Pollutant	Averaging Period	[d] Criterion
Total Suspended particulate (TSP)	Annual	[a] 90 µm/m^3
Particulate matter < 10 µm (PM10)	Annual	[a] 30 µm/m^3

Table 5: Short-term impact assessment criteria for Particulate Matter (from Development Consent)

Pollutant	Averaging Period	[d] Criterion
Particulate matter < 10 µm(PM_{10})	24 hour	[a] 50 µm/m^3

6.3.3 Key Environmental Performance

The main potential source of air emission contributions at the quarry is in the form of airborne dust, which can arise from activities such as quarrying, vehicle movements and crushing. To

minimise dust emissions associated with vehicle movements, Holcim continued to dampen haul roads and utilise the quarry's wheel wash facility.

6.3.3.1 Depositional Dust Monitoring

Depositional dust monitoring was undertaken at five depositional dust gauges at Cooma Road Quarry in 2022. Results for this monitoring are provided in **Table 15**.

Table 15: 2022 Dust Monitoring (Depositional Dust)

Date	Insoluble Solids (g/m^2/month)				
	DDG1	DDG2	DDG3	DDG4	DDG5
January 5, 2022	5.4	2.4	1.7	7.8	1.4
February 3, 2022	1.4	1.6	3.5	2.8	0.9
March 7, 2022	1.4	0.8	1.5	4	1.8
April 6, 2022	2.6	0.9	0.5	1	1.3
May 5, 2022	1.3	1.3	0.7	8.4	0.6
June 2, 2022	1.1	0.8	0.4	2.4	0.9
July 7, 2022	0.9	0.7	0.4	9.8	0.3
August 4, 2022	1.7	0.7	0.4	0.4	0.4
September 5, 2022	0.3	0.2	0.4	3.4	0.3
October 6, 2022	1.6	0.7	0.6	1.4	0.6
November 7, 2022	2.9	1.1	0.8	10*	0.6
December 7, 2022	5.3*	1.7	1.9	3.1	1.6
Annual Average	2.2	1.1	1.1	4.5	0.9

It should be noted that the results for DDG4 in November and DDG1 in December were impacted by organic matter from nearby flowering vegetation. A notification was sent to the NSW Department of Planning on both occasions and stated the following:

- Significant contribution of combustible matter (i.e. wind-blown vegetation, not dust related to Holcim operation) and this is likely due to flowering of surrounding vegetation.
- Given the expected ongoing contribution of combustible matter, the appropriateness of the location of the monitoring point will be reviewed as it may be seasonably unreliable in relation to the surrounding vegetation contributing significantly to combustible matter.

For the 2022 reporting period, DDG4 had an annual average of 4.5g/m2/month, which is above the performance criteria of 4g/m^2/month. This is deemed a non-compliance. The remaining annual averages for monitoring locations not impacted by organic matter were compliant with the consent criteria.

A summary of depositional dust trends between 2017 and 2022 are outlined in **Table 16**.

Table 16: Depositional Dust Trends

Dust Depositional Gauge	Monitoring Summary for Annual Review Period	Monitoring Results (Contamination Removed) (g/m^2/month)					
		2022	2021	2020	2019	2018	2017
DDG1	Insoluble Solids Reporting Period Average	2.2	2.6	3.6	**4.9**	3.8	3.1
	Max. Insoluble Solids	5.4	6.4	6.2	7.7	5.4	3.7
	Min. Insoluble Solids	0.3	2.5	0.5	2.8	1.9	2.1
DDG2	Insoluble Solids Reporting Period Average	1.1	2.1	1.9	2.2	1.7	1.8
	Max. Insoluble Solids	2.4	3.5	8.2	4.1	3.0	2.6
	Min. Insoluble Solids	0.2	1.2	0.9	1	0.7	0.9
DDG3	Insoluble Solids Reporting Period Average	1.1	1.3	1.9	2.1	1.5	0.8
	Max. Insoluble Solids	3.5	2.7	6.7	5	3.9	1.6
	Min. Insoluble Solids	0.4	0.5	0.6	0.3	0.5	0.4
DDG4	Insoluble Solids Reporting Period Average	**4.5**	3.7	2.1	3.6	**4.2**	2.1
	Max. Insoluble Solids	10	11.0	11.2	7.1	13.1	4.3
	Min. Insoluble Solids	0.4	0.4	0.2	1.7	0.3	0.8
DDG5	Insoluble Solids Reporting Period Average	0.9	2.0	1.5	2.0	2.2	2.0
	Max. Insoluble Solids	1.8	5.4	8.4	4.1	6.1	3.8
	Min. Insoluble Solids	0.3	0.5	0.2	0.6	0.5	0.7

6.3.3.2 PM_{10} Monitoring

Monitoring of PM_{10} was undertaken at the quarry for the first full year in 2017 after the HVAS was installed in late 2016. Results for 2022 PM_{10} monitoring are provided in **Table 17**.

Table 17: 2022 Dust Monitoring (PM10)

Sample Date	PM10 (µg/m3)	TSP (calculated)	PM_{10} 24-hour Compliance Status
January 2, 2022	5.8	13.92	Within Criteria
January 9, 2022	7	16.8	Within Criteria
January 15, 2022	10.8	25.92	Within Criteria
January 21, 2022	15.7	37.68	Within Criteria
January 27, 2022	10.8	25.92	Within Criteria
February 2, 2022	6.9	16.56	Within Criteria
February 8, 2022	9	21.6	Within Criteria
February 14, 2022	29.8	71.52	Within Criteria
February 20, 2022	12.5	30	Within Criteria
February 26, 2022	7.7	18.48	Within Criteria
March 4, 2022	5.2	12.48	Within Criteria (contamination)
March 10, 2022	17.3	41.52	Within Criteria
March 16, 2022	5	12	Within Criteria
March 22, 2022	17.6	42.24	Within Criteria
March 28, 2022	6.1	14.64	Within Criteria
April 3, 2022	NA	NA	Filter lost
April 9, 2022	NA	NA	Sample invalidated
April 15, 2022	12	28.8	Within Criteria
April 21, 2022	13.4	32.16	Within Criteria
April 27, 2022	1.3	3.12	Within Criteria
May 3, 2022	12.7	30.48	Within Criteria
May 9, 2022	6.3	15.12	Within Criteria
May 15, 2022	5.3	12.72	Within Criteria
May 21, 2022	5.3	12.72	Within Criteria
May 27, 2022	6.1	14.64	Within Criteria
June 2, 2022	5.9	14.16	Within Criteria
June 8, 2022	3.9	9.36	Within Criteria
June 14, 2022	7.9	18.96	Within Criteria
June 20, 2022	5.9	14.16	Within Criteria
June 26, 2022	4.5	10.8	Within Criteria

Sample Date	PM10 (µg/m3)	TSP (calculated)	PM_{10} 24-hour Compliance Status
July 2, 2022	2.3	5.52	Within Criteria
July 8, 2022	6.4	15.36	Within Criteria
July 14, 2022	5.3	12.72	Within Criteria
July 20, 2022	4.5	10.8	Within Criteria
July 26, 2022	6.1	14.64	Within Criteria
August 1, 2022	6.9	16.56	Within Criteria
August 7, 2022	3.3	7.92	Within Criteria
August 13, 2022	4.8	11.52	Within Criteria
August 19, 2022	4.8	11.52	Within Criteria
August 25, 2022	6.6	15.84	Within Criteria
August 31, 2022	7.6	18.24	Within Criteria
September 6, 2022	5.1	12.24	Within Criteria
September 12, 2022	6.9	16.56	Within Criteria
September 18, 2022	6.1	14.64	Within Criteria
September 24, 2022	5.7	13.68	Within Criteria
September 30, 2022	4.9	11.76	Within Criteria
October 6, 2022	3.5	8.4	Within Criteria
October 12, 2022	10.3	24.72	Within Criteria
October 18, 2022	9.2	22.08	Within Criteria
October 24, 2022	4	9.6	Within Criteria
October 20, 2022	7.7	18.48	Within Criteria
November 5, 2022	12.2	29.28	Within Criteria
November 11, 2922	12.8	30.72	Within Criteria
November 17, 2022	5.7	13.68	Within Criteria
November 23, 2022	6.5	15.6	Within Criteria
November 29, 2022	11.4	27.36	Within Criteria
December 5, 2022	18.6	44.64	Within Criteria
December 11 2022	15.9	39.75	Within Criteria
December 17 2022	8.4	21	Within Criteria
December 23 2022	13.8	34.5	Within Criteria
December 29 2022	14.1	35.25	Within Criteria

There were 61 sampling events recorded in the 2022 report period. There was no exceedance in the short term (24 hour) PM_{10} criterion of 50 $\mu g/m^3$.

Total Suspended Particulates (TSP) is also included in this report in **Table 17** as per the requirements of the Development Consent. These results have been calculated rather than directly measured through the monitoring program at Cooma Road, using a conversion factor per the Cooma Road Air Quality Management Plan and consistent with the region. There are no long-term records to compare these results.

The 2022 annual average for PM_{10} was 8.5 µg/m^3, compared to 11.6 µg/m^3 for 2021. A summary of average, minimum and maximum results from 2022 compared to results from previous years are outlined in **Table 18**.

Table 18: PM_{10} Monitoring Trends

Monitoring Summary for Annual Review Period	2022 Results (µg/m3)	2021 Results (µg/m^3)	2020 Results (µg/m3)	20219 Results (µg/m3)	2018 Results (µg/m3)	2017 Results (µg/m3)
PM_{10} Average	8.5	11.6	12.2	10.7	13.1	10.97
Max. PM_{10}	29.8	37.3	35.1	37	80.3	35.9
Min. PM_{10}	3.3	1.0	2.8	1.8	1	1.2

6.3.3.3 Long term Trends:

Depositional Dust

Holcim has monitored depositional dust on a monthly basis at five locations within the Cooma Road Quarry project area since 2001. Dust deposition data from the site shows that annual average dust deposition levels have remained below the Development Consent criteria of 4 g/m2/month except for gauge DDG4. Depositional dust levels at all gauges with the exception of DDG4 decreased in 2022 compared to the 2021 average. Monitoring results for 2022 remain consistent with long-term dust trends at Cooma Road Quarry.

PM10

PM10 results for 2022 are mostly consistent with previous years. There were no exceedances in 2022 results for 24-hour criteria.

The maximum PM10 result, was 29.8 µg/m3 has decreased when compared to previous years. The PM10 annual average for 2022 was below the criteria and consistent with previous years.

6.3.3.4 Comparison to EIS Predictions:

The results for annual average for depositional dust and PM_{10} were generally within the predicted limits of the EIS predictions.

There was one occasion where gauge DDG4 annual average was above deposited dust long-term impact assessment criteria. This was above the EIS predictions.

6.3.4 Management Measures

Mitigation measures relating to air quality are outlined within the Cooma Road Quarry Air Quality Management Plan (2019). The plan outlines the control measures implemented by Cooma Road Quarry to minimise the potential air quality impacts on the local community, including:

- Inspections;
- Defined operating hours;
- Application of water for dust suppression;
- Enclosure of plants and transfer points;
- Monitoring for air quality and meteorological conditions; and
- Training of staff and contractors.

6.3.5 Proposed Improvements

There are no further proposed improvements for Cooma Road Quarry in the next reporting period.

6.4 Blasting

6.4.1 EIS Predictions

The 2012 EIS found that air blast and ground vibration levels would comply with relevant vibration and air blast criteria at all sensitive residential receivers through ongoing management of blast design and size.

6.4.2 Approved Criteria

According to both EPL 1453 and SSD 5109, the overpressure level from blasting operations must not exceed 115 dB (L) for more than 5% of the total number of blasts, at any residences or nearby receiver, and must not exceed 120 dB (L) at any time.

Ground vibration must not exceed 5 mm/s for 5% of the total number of blasts over a period of 12 months and must not exceed 10 mm/s at the nearby receiver.

6.4.3 Key Environmental Performance

Table 19 outlines the blast monitoring results at the Cooma Road Quarry during the Annual Review period.

Table 19: 2022 Blast Monitoring Results

Date	Time	Heffernans House		Jerrabomberra		Compliance Status
		Overpressure (dBL)	Vibration (mm/s)	Overpressure (dBL)	Vibration (mm/s)	
2/02/2022	12:21	94.5	0.84	104	0.91	Compliant
01/03/2022	10:36	DNT	DNT	DNT	DNT	Compliant
08/04/2022	12:18	102.5	0.72	100.4	1.07	Compliant
22/04/2022	11:23	94.1	0.99	93.7	0.94	Compliant
22/04/2022	11:23	94.1	0.99	DNT	DNT	Compliant
02/05/2022	09:54	DNT	DNT	92.4	1.49	Compliant
18/05/2022	11:54	93.3	1.71	DNT	DNT	Compliant

22/05/2022	09:54	93.7	0.39	DNT	DNT	Compliant
03/06/2022	12:57	101.7	0.99	DNT	DNT	Compliant
24/06/2022	11:45	108.4	2.38	96.8	0.53	Compliant
26/07/2022	13:06	111	1.72	103.1	0.77	Compliant
02/08/2022	12:11	109.8	1.49	97.6	0.38	Compliant
08/08/2022	10:38	DNT	DNT	DNT	DNT	Compliant
26/08/2022	13:00	109.5	0.83	DNT	DNT	Compliant
2/9/22	12:10	112.1	1.3	106.8	0.82	Compliant
22/09/2022	13:16	106.8	1.1	102.8	0.92	Compliant
11/10/2022	12:10	91.8	0.72	96.1	2.14	Compliant
04/11/2022	13:51	102.5	0.72	110.8	1.8	Compliant
15/11/2022	14:25	108.9	1.2	89.8	0.69	Compliant

In summary:

- There were 19 blasts during 2022; and
- All blasts were compliant with the overpressure and vibration criteria.

Holcim alerts the nearest sensitive receivers within 24 hours of a proposed blast. This process is managed by the weighbridge staff who send a text message to the tenants the day before a planned blast is undertaken.

Long-term Trends:

Blasting levels from 2016 to 2022 measured at Heffernans House are compared in **Table 20**.

In 2016 there was a non-compliance relating to a blast result of 119.8 dBL. Zero non-compliances for blasting occurred in the subsequent years including this report period.

Table 20: Long-term Blasting Trends

Year	Heffernans House				
	Number of Blasts	Max. Overpressure (dBL)	Average Overpressure (dBL)	Max Vibration (mm/s)	Average Vibration (mm/s)
2016	9	119.8	102.6	1.98	0.88
2017	32	113.5	101.4	4.34	0.75
2018	16	113.5	102.8	3.55	0.98
2019	25	114.7	102.5	4.00	1.12
2020	29	114.7	104.8	3.0	1.1
2021	15	112.9	104.0	2.0	1.1
2022	19	112.1	102	2.38	1.1

Comparison to EIS Predictions:

The results for blasting in 2022 were within the predicted limits of the EIS.

6.4.4 Management Measures

Management measures relating to blasting are outlined within the Cooma Road Quarry Blast Management Plan. The Blast Management Plan provides a mechanism for assessing blast monitoring results against the relevant blast impact assessment criteria and outlines the control measures implemented as part of the continued operations of the quarry to minimise the potential for blast related impacts in the local community.

6.4.5 Proposed Improvements

Blast monitoring will continue in 2023 and all blasts will be reported in the Annual Review.

6.5 Traffic Management

6.5.1 EIS Predictions

The 2012 EIS predicted the increased traffic associated with the Project on the local road network to be satisfactory. On the wider network, the increase in traffic as a result of the Project was predicted to comprise a very small proportion of total traffic and be dispersed over a number of routes, resulting in relatively small increase in the overall traffic levels on these roads and intersections.

The Project was not predicted to have a negative impact on road safety.

The road upgrades were predicted to assist in managing/addressing future road safety issues associated with the overall future traffic growth on the road network, including the relatively small increase in traffic volumes due to the Project.

6.5.2 Approved Criteria

According to Schedule 2, Condition 13 of SSD 5109, for the life of the development, the Applicant must ensure that:

- No more than an average of 48 truck movements per hour occur collectively to and from the site on any day; and
- No more than 30 laden trucks per hour are dispatched from or received at the site collectively.

6.5.3 Key Environmental Performance

Holcim recorded daily truck movements and volumes transported throughout 2022. The site maintained compliance with the conditions for truck movements throughout 2022. A copy of the truck movements and transported quarry product recorded throughout 2022 are outlined in **Table 21.** A total of 969,026 tonnes of product was transported on and offsite during 2022. There were a higher number of truck movements in 2021 compared to 2020 due to lower tonnages being transported in 2022.

Table 21: Transport Tonnages 2022

Month	Transport Tonnages	Truck Movements
January	70435.95	2626
February	99509.16	3416
March	100790.2	3451
April	63782.57	2155
May	85252.14	2831
June	101828	3355
July	82728.62	2850
August	80224.66	2859
September	79133.32	2694
October	93971.92	3401
November	117714.6	4296
December	79247.66	2801
Total	969,026	44,899

6.5.4 Management Measures

Traffic and transport impacts are managed in accordance with the specific management measures and controls within the Cooma Road Quarry Transport Management Plan.

6.5.5 Proposed Improvements

Truck movements will continue to be monitored and recorded in the oncoming reporting period to ensure that they remain within the approved criteria.

6.6 Biodiversity

6.6.1 EIS Predictions

Consideration of the proposal under Section 5A of the *Environment Planning and Assessment Act 1979* (EPBC Act) determined there was unlikely to be any significant impacts to species or communities listed in NSW.

The Project is also considered unlikely to result in a significant impact on EPBC Act listed species and communities, or on migratory species.

6.6.2 Approved Criteria

There are no specific criteria associated with biodiversity management for the site. The approved quarrying plan has been designed to include a number of biodiversity impact mitigation factors and rehabilitation design factors.

6.6.3 Key Environmental Performance

There was no additional clearing in the 2022 reporting period which limited the site's impacts to biodiversity.

Weed spraying continued during the 2022 reporting period and total area sprayed in approximately (1.156km^2). Maintenance of trees planted in 2017 continued in this reporting period. Holcim continued to collect boulders and fallen timber to promote increased habitat complexity in the site rehabilitation areas.

55 new nest boxes were installed in 2021 . The following designs were installed in April 2021:

- 5 Large parrot nest boxes
- 16 Small parrot boxes
- 4 treecreeper nest boxes
- 8 Microbat nest boxes
- 9 Brushtail nest boxes
- 3 Ringtail nest boxe7
- 10 Squirrel glider nest boxes.

The 2022 winter survey demonstrates that since the 2021 winter survey, the nest boxes have shown an increase in usage, with 31 nest boxes showing signs of use, an increase of 21 boxes from the 10 boxes of 2021. Six nest boxes contained fauna, with a few containing multiple gliders, likely comprising families with young. Although current occupancy rates are low across the entire set of nest boxes, the increase in use observed during the current survey represents a relatively strong occupancy result only one year after installation.

Five nest boxes require maintenance, nest boxes 17, 27, 39 and 54 need removal of pest beehives and box #51 needs its lid resecured.

6.6.4 Management Measures

The ongoing management of the ecological values of the Project area are required to be conducted in accordance with the Cooma Road Quarry Rehabilitation Management Plan. The plan outlines the control measures to be implemented as part of the continued operations at the Cooma Road Quarry. This includes minimising the potential impacts on biodiversity as a result of quarrying activities as well as risks associated with unsuccessful post-quarrying rehabilitation.

6.6.5 Proposed Improvements

During the 2023 reporting period Holcim will:

- Continue to manage weed species on the site.
- Assess the need for feral animal control and implement a program if required, however there have been no feral animal sightings to date.
- Salvage fallen timber and boulders to promote increased habitat complexity in the rehabilitation areas.

6.7 Heritage (Aboriginal Archaeology and Historic Heritage)

6.7.1 EIS Predictions

6.7.1.1 Aboriginal Archaeology

The 2012 EIS and associated due diligence assessment found that due to the highly disturbed nature of the Project Area, the potential for subsurface Aboriginal artefacts in modified areas would be extremely low. No previously recorded sites were identified within the proposed disturbance area.

One isolated artefact, a silcrete broken flake (identified as Cooma Quarry 2), was located on the spur crest adjacent to the proposed infrastructure area. Holcim has committed that the Project will not impact on this site.

6.7.1.2 Historic Heritage

The known, locally listed, Moses Morley Kiln is the only heritage item/site to be identified within the Project Area.

The Historic Heritage Assessment conducted as part of the 2012 EIS determined the Project would not physically impact on the kiln and it would be very unlikely to impact on the identified heritage significance of the site.

The EIS did identify the potential for indirect impacts as the result of vibration associated with blasting and construction. Holcim implemented additional management measures for construction and blasting operations.

No other potential heritage items/sites were identified within the Project Area.

6.7.2 Approved Criteria

There are no specific criteria associated with heritage relating to the project. The process for managing any unexpected heritage items is outlined in the Heritage Management Plan.

6.7.3 Key Environmental Performance

There was no clearing performed during the reporting period. There were no issues relating to Aboriginal and historic heritage during the reporting period.

6.7.4 Management Measures

Heritage impacts will continue to be monitored in accordance with the Heritage Management Plan.

6.7.5 Proposed Improvements

As there have been no Aboriginal heritage items located to date, no improvements to management measures are proposed.

7 WATER MANAGEMENT

Water management at the Cooma Road Quarry is undertaken in accordance with the Water Management Plan. The 2014 Water Management Plan (Umwelt) (WMP) was updated and significantly altered in July 2019. The updated WMP was approved by DPE 12 August 2019.

7.1 EIS Predictions

Section 5.3 of the EIS (2012) assessed impacts to local water systems. The Project is expected to have a negligible impact on annual flow volumes in Barracks Creek compared to the currently approved impacts. The Project will not impact on annual flow volumes within Jerrabomberra Creek. The Project is primarily located within the boundary of the existing water management system. The construction and operation of the Project will be consistent with the existing Water Management Plan and associated erosion and sediment controls. Therefore, it is considered that there will be negligible impact on water quality in downstream surface water systems. As such it is considered that the Project will result in no changes to the currently approved impacts.

Given both rock types (granite and dacite) quarried at the Cooma Road Quarry are relatively stable with respect to groundwater quality, there is no concern regarding the potential for the quarried material to affect groundwater quality.

7.2 Approved Criteria

Holcim are required to monitor surface water quality during discharge events at the Cooma Road Quarry licensed discharge point (LDP), in accordance with the requirements of EPL 1453 (provided in **Table 23**)**.** These criteria only apply to water quality results when the site is discharging.

Table 23: Water Quality Criteria for the Cooma Road Quarry (EPL 1453) POINT 1

Pollutant	Units of Measure	100 percentile concentration limit
Oil and Grease	milligrams per litre	10
pH	pH	6.5-8.5
Total Suspended solids	milligrams per litre	50

7.3 Water Usage and Storage

Water storages utilised at the Cooma Road Quarry include:

- Extractive Area Sump;
- Granite Hole;
- Pump Dam;
- Sediment Interception Pond (SIP); and
- Discharge Pond

During this reporting period water has been used for use in crushing and screening and watering of haul roads. Water usage has continued to be recorded during this reporting period.

7.4 Surface Water Results

Holcim monitors surface water quality in Barracks Creek monthly.

All water monitoring results listed in **Table 24** are recorded from monitoring undertaken within the creek line, with there being no direct discharge to Barracks Creek in 2022.

Table 24: 2022 Water Monitoring Results (Barracks Creek)

Sample Date	Total Suspended Solids (mg/L)	pH	Oil and Grease	
			mg/L	Visual Inspection
January 5, 2022	24	8.46	5	Not Visible
February 2, 2022	5	8.2	9.8	Not Visible
March 7, 2022	23	8.3	5	Not Visible
April 6, 2022	5	8.3	5	Not Visible
May 5, 2022	5	**8.6**	**16**	Not Visible
June1, 2022	14	8.2	7	Not Visible
July 4, 2022	5	8.4	5	Not Visible
August 4, 2022	**160**	8.4	5	Not Visible
September 5, 2022	10	**9.2**	10	Not Visible
October 6, 2022	**89**	8	5	Not Visible
November 11, 2022	18	7.8	5	Not Visible
December 8, 2022	5	**8.7**	**12**	Not Visible
Average	30.25	8.4	7.5	N/A

The 2022 surface water monitoring results were generally compliant with EPL criteria.

Total suspended solids (TSS) were considerably below the criteria levels in 2022, with the exception of the August and October samples. The TSS results in August and October 2022 exceeded the criteria level. It should be noted that during the August 4 sampling date, a large rainfall event resulted in over 100mm of rain being recorded, further, on the October sampling date, over 20mm of rain was recorded.

Generally, pH was neutral and within the criteria range in 2022. pH values slightly exceeded the criteria level of 8.5 in May, September and December.

Oil and grease were higher than the EPL criteria in May and December of 2022, but samples remained non-visible. As there were no discharges from site during the reporting period, Cooma Road Quarry believe that these exceedances originate offsite and upstream of Barracks Creek sampling area.

There were no discharges into Barrack's Creek in 2022, therefore no non-compliances with Condition L2.4.

Long-term Trends:

A comparison of data between 2016 and 2022 indicated that results for pH, total oil and grease and suspended solids are generally within the EPL criteria. Previous exceedances included one result in 2016 and one result in 2017 for pH. There was a small increase in the average pH sampled in 2022 compared to previous years. Oil and grease levels were greater in 2022 than seen in previous years but less than the 2021 average. The average TSS reduced in 2022 compared to the 2021 average.

There were no discharge events in 2016-2022, therefore the EPL criteria are not relevant.

Table 25: Long-term Water Monitoring Barracks Creek

Year	pH Average	Oil and Grease Average (mg/L)	TSS Average (mg/L)
2016	7.4	<1	2.5
2017	7.5	<1	2.6
2018	7.5	<1	4.75
2019	7.5	<1	5.0
2020	7.7	5.58	53.08
2021	8.3	8.25	36.95
2022	8.4	7.5	30.25

Comparison to EIS Predictions:

There was no evidence of any detrimental impact from the Quarry on surface water. This is consistent with the EIS predictions.

7.5 Groundwater

Schedule 3, Condition 20 of the Consolidated Consent states that Holcim must implement a groundwater monitoring program that includes:

- baseline data of groundwater levels surrounding the development;
- groundwater assessment criteria based upon analysis of baseline data for groundwater,
- including trigger levels for investigating any potentially adverse groundwater impacts; and
- a program to monitor and/or validate the impacts of the development on groundwater resources;

Groundwater monitoring is required in accordance with the WMP.

A groundwater assessment by Coffey Geotechnics (2012) concluded that the operation of Cooma Road Quarry is not considered to have a significant impact on the regional groundwater resources, as:

- The quarry site is in a tight rock formation where no meaningful groundwater extractions can be attained;
- Quarrying activities do not impact on a viable aquifer;
- The volume of groundwater affected by the Cooma Road Quarry is limited to the exposed water table in the granite pit;
- Interaction of the granite pit with regional groundwater is very limited; and
- The maximum extraction depth will not be increased.

Cooma Road Quarry is committed to the following to establish a regular groundwater monitoring system:

- Drilling of MB01 and MB02 bores;
- Casing and installation of piezometer;
- Obtain quarterly land access to bores with neighbours for access to GW400534 and GW 416130 for monitoring;
- Add groundwater monitoring to contractors quarterly environmental monitoring program;
- Update the Water Management Plan accordingly; and
- Engage consultant over the 24 months to set trigger values based quarterly level monitoring.

The Cooma Road *Water Management Plan* (WMP) was revised in 2019 to include a groundwater monitoring program that will require monitoring to occur at four groundwater bores. In 2020, a groundwater assessment occurred to establish criteria for the WMP, with trigger levels to be set after 24 months of monitoring. This groundwater monitoring program was implemented in 2021, but 2022 will be the first full year of records.

A total of four bores were installed in early 2021. Quarterly groundwater monitoring commenced in June 2021 and continued in 2022 as per the previous Annual Review.

7.5.1 Groundwater Performance

Groundwater results for 2022 were compared to the trigger values in the Water Management Plan, outlined in **Table 26.**

Table 26: Interim Groundwater Quality Trigger Values (Water Management Plan)

Parameter	Unit	Trigger Values
pH	pH	6.5-8.5[1]
Electrical Conductivity (EC)	**µS/cm**	125-2200[1]
Total Dissolved Solids (TDS)	mg/L	600[2]

Notes

1. *Based on default triggers values for slightly to moderately disturbed lowland river systems for south ear Australia in the ANZEC 2000 Guidelines*
2. ***Based on Groundwater Assessment Cooma Road Quarry (Coffey,2012)***

Ground water monitoring continued at bores (GW400534 and GW416130) along with monitoring at the newly installed bores (MB01 and MB02) The monitoring results for 2022 are presented in **Table 27.**

Table 27: Groundwater Monitoring Results 2022

Sampling Period	Monitoring Location	pH	Total Dissolved Solids (TDS)	Electrical Conductivity (µS/cm)
Trigger		**6.5 – 8.5**	**600**	**125-2200**
Quarter 1 (2/02/2022)	**MB01**	6.5	656	1820
	MB02	6.7	357	557
	GW400534	6.9	586	1020
	GW416130	6.8	1160	916
Quarter 2 (1/06/2022)	**MB01**	6.7	631	665
	MB02	6.6	326	1730
	GW400534	6.9	426	510
	GW416130	7.1	1110	986
Quarter 3 (5/09/2022)	**MB01**	7.3	510	314
	MB02	7.6	204	430
	GW400534	7.4	280	1210
	GW416130	8	773	797

Sampling Period	Monitoring Location	pH	Total Dissolved Solids (TDS)	Electrical Conductivity (µS/cm)
Trigger		**6.5 – 8.5**	**600**	**125-2200**
Quarter 4 (5/09/2022)	**MB01**	7.3	591	932
	MB02	7.7	204	597
	GW400534	7.1	280	635
	GW416130	7.6	773	1530

All groundwater monitoring results for pH in 2022 were within the trigger levels.

TDS levels were greater than the trigger values for the majority of samples at all bores. TDS levels decreased in quarter 3 and quarter 4 of 2022.

Electrical conductivity levels were within the trigger values for all sampling events at all bores. It should be noted that electrical conductivity in quarter 4 was not recorded in the 2022 reporting period.

Because these trigger values are based on the ANZECC Guideline values, these exceedances are not considered to be non-compliances for the groundwater at site.

Holcim will continue to perform groundwater monitoring in 2023.

7.6 Water Take

Table 28 outlines the water take at the Cooma Road Quarry in 2022. The water take was within the limits of the water access licence requirement.

Table 28: 2022 Water Take

Water Licence Number	Entitlement	Water Usage During 2022	Water Usage During 2021	Water Usage During 2020	Water Usage During 2019	Water Usage During 2018	Water Usage During 2017
40SL27690	98 ML	16.49 ML	31ML	36ML	70ML	60ML	48ML

8 REHABILITATION AND LANDSCAPE MANAGEMENT

The site is required to undertake biodiversity and rehabilitation in accordance with their Project Approval.

Schedule 3, Condition 22

Rehabilitation Objectives

The Applicant must rehabilitate the site to the satisfaction of the Secretary. This rehabilitation must be generally consistent with the proposed rehabilitation strategy in the EIS and Appendix 7 and comply with the objectives in Table 7.

Table 29: Rehabilitation Objectives for Cooma Road Quarry (SSD 5109)

Feature	Objectives
Site (as a whole)	Safe, stable and non-polluting
Surface Infrastructure	To be decommissioned and removed (unless otherwise agreed with the Secretary)
Benched Quarry Walls	Landscaped and revegetated utilising native tree and understory species, ensuring that the tree canopy is restored and integrated with the surrounding canopy to minimise visual impacts
Quarry Pit Floors	Landscaped and revegetated utilising native flora species, above the anticipated final void water level
Other land affected by the development	Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of: - Native endemic species: ad - A landform consistent with Appendix 7 and the surrounding environment
Community	• Ensure public safety • Minimise the adverse socio-economic effects associated with the closure of the development

Note: Revegetation of existing and proposed industrial areas is not required

Schedule 3, Condition 23

Progressive Rehabilitation

The Applicant must rehabilitation the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim stabilisation measures must be implemented where reasonable and feasible to control dust emissions in disturbed areas that are not active and which are not ready to final rehabilitation.

Rehabilitation and biodiversity management strategies, procedures, controls and monitoring programs at the Cooma Road Quarry are undertaken in accordance with the Rehabilitation Management Plan. The Rehabilitation Management Plan is available on the Holcim Community Link website.

8.1 Rehabilitation Performance during the Reporting Period

There was no opportunity for rehabilitation to occur during 2022. Existing rehabilitation areas continue to be inspected and maintained. See **Table 30** for details of rehabilitation performance.

Table 30: Rehabilitation Performance in 2022

Guideline Requirement	Response
Extent of the operations and rehabilitation at completion of the reporting period	No rehabilitation completed. Inspections were completed of the rehabilitation areas.
Agreed post-rehabilitation land use	The final rehabilitation at the Cooma Road Quarry will consist of a woodland/grassland revegetation mix.
Key rehabilitation performance indicators	See Section 4 of the Rehabilitation Management Plan https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSD-5109-PA-6%2120200610T020620.912%20GMT.
Renovation or removal of buildings	Construction activities undertaken in 2022 include the relocation of the existing workshop. There is proposed planning to extend the granite pit in the 2023 reporting period.
Any other Rehabilitation Taken including: ● Exploration activities; ● Infrastructure; ● Dams; and ● The installation or maintenance of fences, bunds and any other works.	No rehabilitation completed in 2022 relating to exploration, infrastructure, or dams.
Any rehabilitation areas which have received formal sign off from the Resources Regulator	No rehabilitation has received signoff.
Variations to activities undertaken to those proposed (including why there were variations and whether the Resources Regulator was notified)	Rehabilitation activities were undertaken as per the Rehabilitation Management Plan.
Outcomes of trials, research projects and other initiatives.	No trials proposed or required.
Key issues that may affect successful rehabilitation	There are several potential issues that can affect rehabilitation including availability of material, seed stock, climatic events, and rehabilitation methodology.

8.2 Summary of Current Rehabilitation and Performance

A summary of the rehabilitation and disturbance status of Cooma Road Quarry is outlined in **Table 31** and **Figure 31**.

Table 31: Rehabilitation and Disturbance Status

Quarry Area Type	2018 (ha)	2019 (ha)	2020 (ha)	2021 (ha)	2022 (ha)	Proposed for 2023 (ha)
A. Total Quarry Footprint[1]	0	0	0	0	102	102
B. Total Active Disturbance[2]	71.5	71.5	71.5	71.5	71.5	88.9
C. Land Being Prepared for Rehabilitation[3]	0	0	0	0.5	0	1.15
D. Land Under Active Rehabilitation[4]	7.6	7.6	7.6	7.6	7.6	8.76
E. Completed Rehabilitation[5]	0	0	0	0	0	0

1 Total disturbance and rehabilitation.
2 Total disturbance within the Project Approval boundary
3 Rehabilitation that is being shaped in a phase of decommissioning, landform establishment and growth medium development.
4 rehabilitation under a phase of ecosystem and land use establishment or ecosystem and land use sustainability
5 This refers to rehabilitation that has been signed off from the DRG.

At the end of 2022 there was approximately 71.5 Ha of active disturbance and 7.6 Ha of active rehabilitation. There was no further disturbance or rehabilitation preparation activities done in 2022. Cooma Road Quarry is proposing to prepare 1.15 ha for rehabilitation for the next reporting period. Rehabilitation maintenance will be continued into 2023.

Rehabilitation monitoring continued in Winter in 2022.

8.3 Actions for the Next Reporting Period

The DPE 2015 *Annual Review Guidelines* require the Annual Review to outline the rehabilitation actions proposed during the next reporting period. These actions are detailed in **Table 32**.

Table 32: Rehabilitation and Closure Actions for the 2023 Reporting Period

Requirement	Site Comment
Describe the steps to be undertaken to progress agreement during next reporting period, where final rehabilitation outcomes have not yet been agreed between stakeholders	2 ha to be prepared for rehabilitation in 2023. The proposed area is still being finalized.
Outline proposed rehabilitation trials, research projects and other initiatives to be undertaken during next reporting period	No further trials are proposed.
Summary of rehabilitation activities proposed for next report period	The maintenance of existing and new rehabilitation will continue in 2023. Rehabilitation monitoring is to continue into 2023 in order to meet Condition 24 of Schedule 3 of the Development Consent.

A summary of the performance of environmental management measures and sampling results for 2022 are detailed in **Table 33**.

Table 33: Environmental Performance at Cooma Road Quarry in 2022

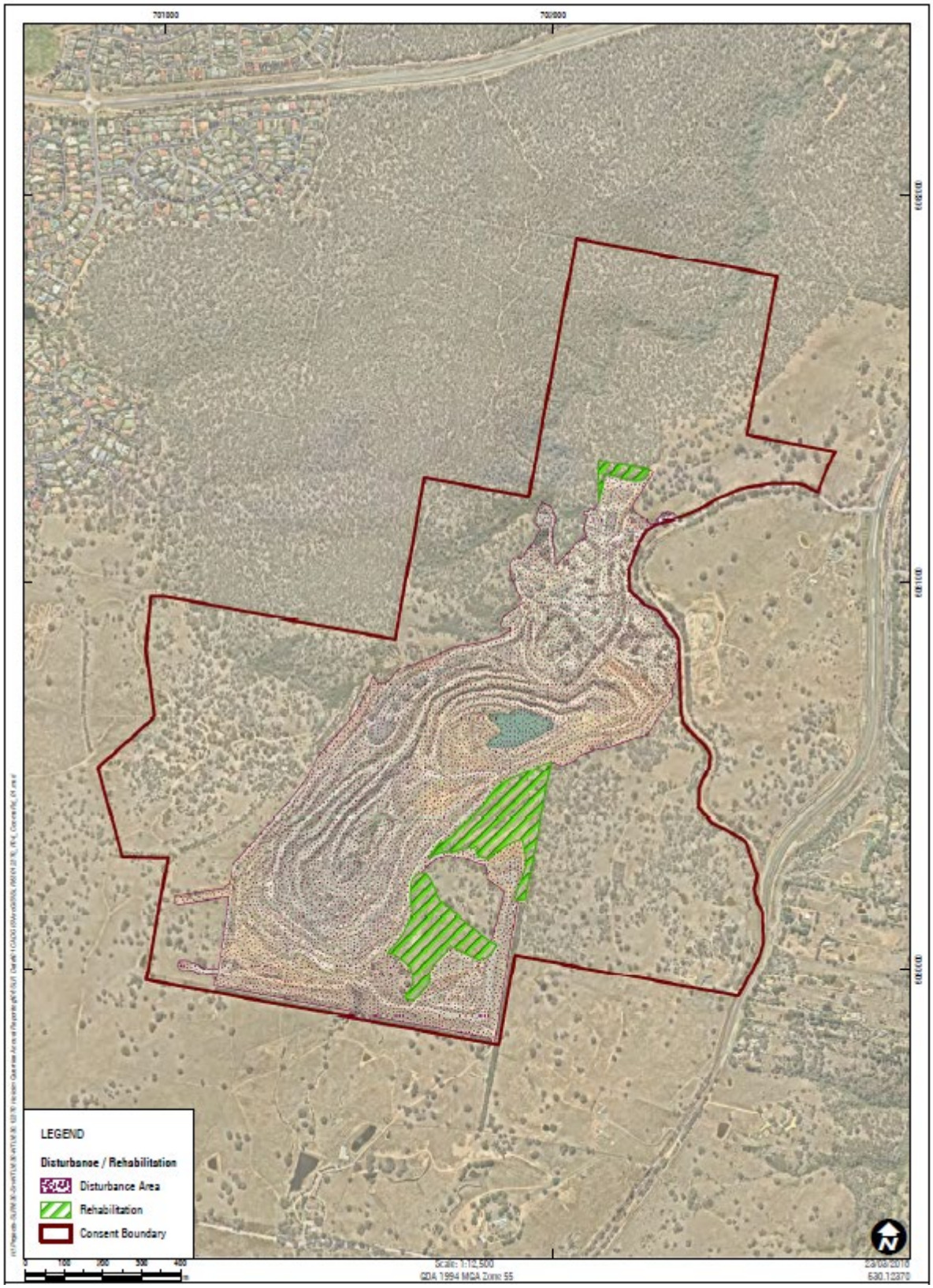

Figure 3: Current Disturbance and Rehabilitation

Aspect	Approval Criteria / EIS Prediction	Performance during the reporting period	Trend / key management implications	Implemented / proposed management actions
Noise	EIS predictions are all below development consent criteria.	Quarter 1- 4 monitoring has met the Development Consent Criteria.	Consistently meets criteria.	None Required.
Blasting	EIS predictions are all below development consent criteria.	Below criteria.	Below criteria from 2017 to 2022.	None required.
Air Quality	EIS predictions are all below development consent criteria.	Dust deposition results were generally within criteria of EPL, EIS and Development Consent. One exceedance recorded during annual reporting period at DDG4 Invalid sampling recorded at DDG4 in November and DDG1 in December. PM_{10} results has met the Development Consent Criteria.	Dust deposition was consistent with EIS and previous Annual Reviews. PM_{10} data was generally consistent with the previous period.	A notification was sent to the Department of Planning for both exceedances for gauge DD4. Holcim will continue to refine the implementation of the air quality monitoring program and air quality management measures.
Traffic Management	EIS predictions are all below development consent criteria.	Met the Development Consent Criteria.	Consistently meets criteria.	None required.
Water Management	EIS predictions are all below development consent criteria.	No discharge. Groundwater monitoring continued in 2022.	Surface water generally meets criteria. There were no discharge events during 2022. Groundwater quality was generally compliant with trigger values. TDS levels were higher than trigger levels in 2022.	Continued implementation of Water Management Plan.

Aspect	Approval Criteria / EIS Prediction	Performance during the reporting period	Trend / key management implications	Implemented / proposed management actions
Biodiversity	It is unlikely there will be any significant impacts to species or communities listed in NSW.	No additional impacts. Monitoring of nest boxes was completed in 2022.	Biodiversity monitoring has been consistent with the Rehabilitation Management Plan.	Continue implement the Rehabilitation Management Plan
Heritage	No predictions.	No impacts to Aboriginal Cultural Heritage or European Heritage.	Continued to be no impacts.	None Required.

9 WASTE MANAGEMENT

The waste streams at Cooma Road Quarry are categorised as:

- General waste
- Recyclables such as cardboard and paper
- Scrap steel
- Oils, greases, and filters.

There are three 2m^3 general waste bins and one 1.5m^3 recycling bin on site which are serviced weekly by contractors. Waste oil, grease, and associated filters are disposed of in a 44-gallon drum which is inspected monthly.

In 2019 Cooma Road Quarry became an accredited Smart Waste organisation. Cooma Road Quarry continues to demonstrate a commitment to improving the efficiency of their waste streams.

Cooma Road Quarry receives and processes waste concrete as per Schedule 2 Condition 14 of the Development Consent. This condition limits the intake of recycled concrete up to 10,000 tonnes per calendar year. The site is compliant with this condition due to receiving 3,491.77 tonnes of recycled concrete in 2022. This is less than the amount received and processed in 2021

10 COMMUNITY

10.1 Community Engagement Activities

Holcim has maintained community engagement measures during the reporting period by undertaking the following activities in accordance with Schedule 5 Condition 6 of the Development Consent:

- Maintenance of a website (containing publicly available documents);
- A telephone number, email and postal address (on the website) for community complaints and feedback;
- A copy of the Complaints Register is maintained on the company website; and
- All documents and items displayed on the website are regularly updated by Holcim staff.

Schedule 5 Condition 6 also requires the establishment and operation of a Community Consultative Committee (CCC) for Cooma Road Quarry. The Cooma Road Quarry CCC was established in May 2014.

CCC meetings were held in the reporting period on 22nd February 2022 and 29th November 2022.

Past community engagement activities have included open days, attendance at resident's association meetings and provision of materials for local projects. Whilst there were no community engagement days held in the reporting period, residents or groups are welcome to contact the Quarry to arrange tours.

In addition to the CCC, Holcim prepared a Community Engagement Plan in 2016 to establish two-way communication with the community. Holcim understands that an integral part of ensuring the continuing success of the quarry operations is the fostering of positive community relations through effective two-way communications and through the promotion of a positive public image.

The Cooma Road Quarry has an extensive program for engagement with the local Ngambri Land Council including employment of indigenous workers for maintenance and housekeeping activities, assistance in the start-up of a local native nursery and guidance on the establishment of a construction materials haulage company utilising indigenous workers.

10.2 Community Contributions

There were no specific community contributions in 2022.

10.3 Complaints

A complaint register is updated and published on the Holcim website quarterly. There were two complaints received regarding blasting during this reporting period in August and September, however both complaints were closed out. On both instances Holcim offed to place monitoring equipment, yet neither community member accepted this offer. Holcim will continue to do its best to minimise blasting disruptions.

All publicly listed information including this 2022 complaints register, incidents and contacts for locals in the community is available at http://www.holcim.com.au/cooma-road.html. Holcim continue to operate a community contact line.

11 INDEPENDENT AUDIT

The most recent Independent Environmental Audit (IEA) was undertaken by EMM Consulting Pty Ltd on behalf of Holcim in July 2021 as required in accordance with Schedule 5, Condition 10 of the Development Consent (SSD_5109) – MOD 1 for the quarry. This was the third IEA, with the previous IEA completed in 2017.

DPE acknowledged the 2021 IEA Report by letter on 22 August 2021. All actions were closed out by Cooma Road in the 2021 reporting period.

The next IEA is due to be conducted in 2024.

12 INCIDENTS AND NON-COMPLIANCE

Incidents and non-compliances at Cooma Road Quarry in 2022 are summarised in **Table 34**.

Table 34: Incidents and Non-Compliance at the Cooma Road Quarry During 2022

Date	Incident/Non-Compliance	Action/Comment
Annual Average	Air Quality Monitoring	DDG4 recorded an exceedance over performance criteria. Cooma Road will continue to monitor Air Quality.
November 2022	Air Quality Monitoring	DDG4 November 2022 result exceeded assessment criteria This has been recorded as an exceedance, however the site did not cause this exceedance. Refer to **Section 6.3** for details.
December 2022	Air Quality Monitoring	DDG1 December 2022 result exceeded assessment This has been recorded as an exceedance, however the site did not cause this exceedance. Refer to **Section 6.3** for details.
April 2022	Air Quality Monitoring	Cooma Road missed two samples during April. This has been recorded as a non-compliance. Cooma Road will continue to monitor Air Quality refer to **Section 6.3** for details

13 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

Proposed improvement actions for 2023 are noted in **Table 35**.

Table 35: Improvement Actions for 2023

Improvement Measure	Activities	Timeframe
Progressive Rehabilitation	The site will continue to progressively rehabilitate if any areas are available .	Ongoing
Maintenance of rehabilitation	Continued maintenance of rehabilitation in the completed overburden dump in the south-western disturbance area including weed control as well as nest box monitoring.	Ongoing.
Biodiversity	Weed spraying will continue at site during the next Annual Review period. Implementation of the Rehabilitation Management Plan.	Annually.

APPENDIX 1

COOMA ROAD QUARRY QUARTERLY NOISE MONITORING REPORTS 2022

Intended for
Holcim (Australia) Pty Ltd

Document type
Report

Date
January 2023

Project number
318000911

QUARTERLY NOISE MONITORING ASSESSMENT – QUARTER 4 2022 COOMA ROAD QUARRY, GOOGONG, NSW

RAMBOLL Bright ideas. Sustainable change.

QUARTERLY NOISE MONITORING ASSESSMENT – QUARTER 4 2022
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Project name	**Quarterly Noise Monitoring Assessment for Cooma Road Quarry – Quarter 4 2022**
Project no.	**318000911**
Recipient	**David Manning**
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 7 and 8 December 2022 for the quarterly period ending December 2022 at Googong, NSW, as part of the noise monitoring program**

Ramboll Australia Pty Ltd.
ACN 095 437 442
ABN 49 095 437 442

CONTENTS

Tables

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

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 Cooma Road Quarry ("the quarry") at Googong, NSW.

This NMA was done in accordance with the following documents:

- Noise Policy for Industry (NPI) (NSW EPA, 2017).
- Cooma Road Quarry Noise Management Plan (NMP) (Holcim Australia, 2019).
- Development Consent Application Number SSD_5109 (Minister for Planning and Infrastructure, 2013).
- 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 in Googong, approximately 6 kilometres south of Queanbeyan, NSW.

Sensitive receptors surrounding the quarry are primarily rural and residential properties in all directions. Old Cooma Road is located to the east of the quarry and passing road traffic is a dominate noise source for those receivers to the east of the quarry.

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

Table 1-1: Monitoring locations locality and sensitive receptors

Monitoring Locations	Locality and Sensitive Receptors
N3	West of the quarry situated on a rural property off Copperfield Place. This location represents residential and rural receivers to the west of the quarry.
N8	Northeast of the quarry along Tempe Crescent and is representative of residential receivers in that area.
N38	On Heights Road and is representative of the elevated residential receivers to the east of the quarry.
N60	At 501 Old Cooma Road and represents the residence adjacent to the quarry access road.
N67	Situated on a rural property at 732 Old Cooma Road to the south of the quarry. This is representative of rural and residential receivers to the south, with direct line of site into the quarry pit

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

Figure 1 : Noise monitoring locations at Cooma Road Quarry

2. NOISE CRITERIA

Table 2-1 brings the applicable noise criteria outlined in the Development Consent for the residential receivers surrounding the quarry (N1–N71), and the five monitoring locations adopted from the NMP that are deemed representative and applicable for this NMA (N3, N8, N38, N60, and N67).

Table 2-1: Monitoring locations and noise criteria

Receiver[1]	**Monitoring Locations**	**Morning Shoulder[2]**	**Day[3]**	**Evening[4]**
		Laeq (15min)	Laeq (15min)	Laeq (15min)
		dB(A)		
N1, N7, N8, N56, N57, N59, N63, N64, N65	N8	40	44	39
N67	N67	36	41	35
All other receivers between N9 and N71 inclusive	N60, N38	36	38	35
All other receivers	N3	35	35	35

[1] Refer to the Development Consent and/or the NMP for receiver locations on the map

[2] 6 am–7 am Monday to Saturday

[3] 7 am–6 pm Monday to Saturday

[4] 6 pm–10 pm Monday to Saturday

Note: no operations on Sundays and public holidays

3. METHODOLOGY

The monitoring program was created 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 7 December and Thursday 8 December 2022. The acoustic instrumentation implemented 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 also 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 two days. 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 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 N3

Noise monitoring at location N3 conducted on Wednesday 7 December 2022 and Thursday 8 December 2022 resulted in inaudible quarry noise during morning shoulder and daytime measurements. The quarry was not operational during the evening measurement period. These results meet the established noise criteria and indicate that noise emissions from Cooma Quarry did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location N3 are presented in Table 4-1.

Extraneous noise sources measured included birds, highway traffic, wind, trees rustling, motorcycles and a passing Ute. Highway traffic from Old Cooma Road was the dominant noise source.

Table 4-1: Noise survey results and observations for Location N3

Date	Time (hrs)	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and LAeq (dBA)	Cooma Road Quarry LAeq(15min) Contribution	LAeq(15min) Criteria
		LAmax	LAeq	LA90				
08-12-22	5:24[1] (Morning Shoulder)	66	40	33	WD: n/a WS: 0 Rain: Nil	Highway traffic 40 Birds 38 Quarry inaudible	<35	35
07-12-22	17:38 (Day)	78	55	43	WD: 180° WS: 0.7 m/s Rain: Nil	Birds Wind Ute passing 78 Motorcycles 75 Trees rustling Quarry inaudible	<35	35
07-12-22	19:52 (Evening)	72	45	39	WD: n/a WS: 0 Rain: Nil	Highway traffic 40-42 Quarry inaudible	<35	35

[1] Monitoring completed outside of morning shoulder period. Unable to complete all five locations during 6am and 7am. Alternative arrangements (e.g. multiple days of monitoring) will be made for subsequent quarterly monitoring events so all locations are completed between 6am and 7am.

4.2 Location N8

Noise monitoring at location N8 conducted on Wednesday 7 December 2022 and Thursday 8 December 2022 resulted in inaudible quarry noise during morning shoulder and daytime measurements. The quarry was not operational during the evening measurement period. These results meet the established noise criteria and indicate that noise emissions from Cooma Quarry did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location N8 are presented in Table 4-2.

Extraneous noise sources measured included birds and highway traffic, with highway traffic from Old Cooma Road being the dominant noise source.

Table 4-2: Noise survey results and observations for Location N8

Date	Time (hrs)	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and LAeq (dBA)	Cooma Road Quarry LAeq(15min) Contribution	LAeq(15min) Criteria
		LAmax	LAeq	LA90				
08-12-22	5:48[1] (Morning Shoulder)	77	51	43	WD: n/a WS: 0 Rain: Nil	Highway traffic 48-53 Birds Quarry inaudible	<40	40
08-12-22	7:40 (Day)	65	52	48	WD: 280° WS: 0.6 m/s Rain: Nil	Highway traffic 48-53 Birds Quarry inaudible	<44	44
07-12-22	18:08 (Evening)	75	52	48	WD: 180° WS: 0.4 m/s Rain: Nil	Highway traffic 52-55 Music 52 Quarry inaudible	<39	39

[1] Monitoring completed outside of morning shoulder period. Unable to complete all five locations during 6am and 7am. Alternative arrangements will be made for subsequent quarterly monitoring events so all locations are completed between 6am and 7am.

4.3 Location N38

Noise monitoring at location N38 conducted on Wednesday 7 December 2022 and Thursday 8 December 2022 resulted in inaudible quarry noise during morning shoulder and daytime measurements. The quarry was not operational during the evening measurement period. These results meet the established noise criteria and indicate that noise emissions from Cooma Quarry did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location N38 are presented in Table 4-3.

Extraneous noise sources measured included a passing truck, highway traffic, birds, a loud passing car, wind, and rustling leaves. Highway traffic from Old Cooma Road being the dominant noise source.

Table 4-3: Noise survey results and observations for Location N38

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and LAeq (dBA)	Cooma Road Quarry LAeq(15min) Contribution	LAeq(15min) Criteria
		LAmax	LAeq	LA90				
08-12-22	6:07 (Morning Shoulder)	82	57	48	WD: 180ª WS: 0.7 m/s Rain: Nil	Highway traffic 46-55 Truck passing 77 Birds Quarry inaudible	<36	36
08-12-22	7:58 (Day)	76	52	45	WD: 145ª WS: 0.6 m/s Rain: Nil	Highway traffic Passing car 65 Quarry inaudible	<38	38
07-12-22	18:30 (Evening)	74	58	53	WD: 280° WS: 2.6 m/s Rain: Nil	Highway traffic 55-60 Wind 60 Rustling trees Quarry inaudible	<43 [1]	35

[1] Quarry not audible, heavy traffic dominating noise environment

4.4 Location N60

Noise monitoring at location N60 conducted on Wednesday 7 December 2022 and Thursday 8 December 2022 resulted in inaudible quarry noise during morning shoulder and daytime measurements. The quarry was not operational during the evening measurement period. These results meet the established noise criteria and indicate that noise emissions from Cooma Quarry did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location N60 are presented in Table 4-4.

Extraneous noise sources measured included heavy highway traffic including trucks and motorcycles. This was the dominant noise source due to the proximity of Old Cooma Road to the quarry.

Table 4-4: Noise survey results and observations for Location N60

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and LAeq (dBA)	Cooma Road Quarry LAeq(15min) Contribution	LAeq(15min) Criteria
		LAmax	LAeq	LA90				
08-12-22	6:44 (Morning Shoulder)	90	74	60	WD: n/a WS: 0 Rain: Nil	Highway traffic 50-80 Heavy highway traffic 70-85 Trucks on highway Quarry inaudible	<36	36
08-12-22	8:36 (Day)	102	72	58	WD: n/a WS: 0 Rain: Nil	Heavy highway traffic 70-97 Motorcycle 80 Quarry inaudible	<48 [2]	38
07-12-22	19:13 (Evening)	80	63	- [1]	WD: 0° WS: 2.7 m/s Rain: Nil	Highway traffic 40-73 Quarry inaudible	<35	35

[1] L90 not collected during monitoring period

[2] Day period dominated by heavy traffic noise

4.5 Location N67

Noise monitoring at location N67 conducted on Wednesday 7 December 2022 and Thursday 8 December 2022 resulted in inaudible quarry noise during morning shoulder and daytime measurements. The quarry was not operational during the evening measurement period. These results meet the established noise criteria and indicate that noise emissions from Cooma Quarry did not contribute to noise nuisance. The results and observations taken during the monitoring events at Location N67 are presented in Table 4-5.

Extraneous noise sources measured included birds, highway traffic and police sirens. Highway traffic from Old Cooma Road was the dominant noise source.

Table 4-5: Noise survey results and observations for Location N67

Date	Time	Descriptor (dBA)			Meteorology	Apparent Noise Source, Description and LAeq (dBA)	Cooma Road Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)
		LAmax	LAeq	LA90				
08-12-22	6:27 (Morning Shoulder)	78	53	- [1]	WD: n/a WS: 0 Rain: Nil	Birds Highway traffic 40-45 Quarry inaudible	<36	36
08-12-22	8:18 (Day)	62	51	- [1]	WD: n/a WS: 0 Rain: Nil	Birds 52 Highway traffic 48-57 Quarry inaudible	<41	41
07-12-22	18:54 (Evening)	59	48	45	WD: n/a WS: 0 Rain: Nil	Highway traffic 5 Police sirens 70 Quarry inaudible	<35	35

[1] L90 not recorded

5. CONCLUSION

Monitoring was carried out on Tuesday 6 December 2022 and Wednesday 7 December 2022 at five locations selected as representative to the sensitive receptors at the surroundings to Cooma Road Quarry. No audible quarry noise was recorded at any of the selected monitoring locations.

This NMA 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) *Cooma Road Quarry, Noise Management Plan*.

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Noise Monitoring Assessment

Cooma Road Quarry, Googong, NSW
Quarter 3 Ending September 2022.

Prepared for: Holcim (Australia) Pty Ltd
October 2022
MAC180611-03RP17

Muller Acoustic Consulting

Document Information

Noise Monitoring Assessment

Cooma Road Quarry, Googong, NSW

Quarter 3 Ending September 2022

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CONTENTS

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Holcim (Australia) Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for Cooma Road Quarry the 'quarry', Googong, NSW.

The monitoring has been conducted in accordance with the quarry Noise Management Plan and in general accordance with Development Consent (SSD-5109); at five representative monitoring locations. This assessment has been undertaken for the quarterly period ending September 2022 and forms part of the annual noise monitoring program for the quarry.

The assessment has been conducted in accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- Cooma Road Quarry, Noise Management Plan (NMP), 2014;
- Development Consent SSD-5109; and
- Australian Standard AS 1055:2018 - Acoustics - Description and measurement of environmental noise.

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

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2 Noise Criteria

Schedule 3, Condition 4 of the Cooma Road Quarry Development Consent, approved on 27 September 2013, outlines the applicable noise criteria for residential receivers N1 – N71 surrounding the quarry and are presented in **Table 1**.

Table 1 Noise Criteria

Receivers	Morning Shoulder 6am – 7am	Day 7am – 6pm	Evening 6pm – 10pm
	dB $L_{Aeq(15min)}$	dB $L_{Aeq(15min)}$	dB $L_{Aeq(15min)}$
N1, N7, N8, N56, N57, N59, N63, N64, N65	40	44	39
N67	36	41	35
All other Receivers between N9 and N71 inclusive	36	38	35
All other Receivers	35	35	35

Note: 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.

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3 Methodology

3.1 Locality

The quarry is located in Googong, NSW approximately 13km south east of Canberra, ACT. The quarry is bounded primarily by rural and residential properties in all directions, with noise from passing road traffic on Old Cooma Road dominating the acoustic environment for receivers to the east of the quarry. The monitoring locations with respect to the quarry and assessed receivers are presented in the locality plan shown in **Figure 1**.

3.2 Noise Monitoring Locations

Five monitoring locations have been selected as part of the NMA and in accordance with the Development Consent.

Location N3 is to the west of the quarry situated on a rural property off Copperfield Place. This location represents residential and rural receivers to the west of the quarry.

Location N8 is to the north east of the quarry along Tempe Crescent and is representative of residential receivers in that area.

Location N38 is on Heights Road and is representative of the elevated residential receivers to the east of the quarry.

Location N60 is at 501 Old Cooma Road and represents the residence adjacent to the quarry access road.

Location N67 is situated on a rural property at 732 Old Cooma Road to the south of the quarry. This is representative of rural and residential receivers to the south, with direct line of site into the quarry pit.

3.3 Assessment Methodology

Attended 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. Measurements were carried out using a Svantek Type 1, 971 noise analyser from Wednesday 28 September 2022 to Thursday 29 September 2022. 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 ±0.5dBA.

Noise measurements were of 15-minutes in duration and where possible, throughout each survey the operator quantified the contribution of each significant noise source. One measurement was conducted at each monitoring location during the day, evening and morning shoulder periods.

Extraneous noise sources were excluded from the analysis to calculate the $L_{Aeq(15min)}$ quarry noise contribution for comparison against the relevant criteria.

Where the quarry is inaudible, the contribution is estimated to be at least 10dBA below the ambient noise level.

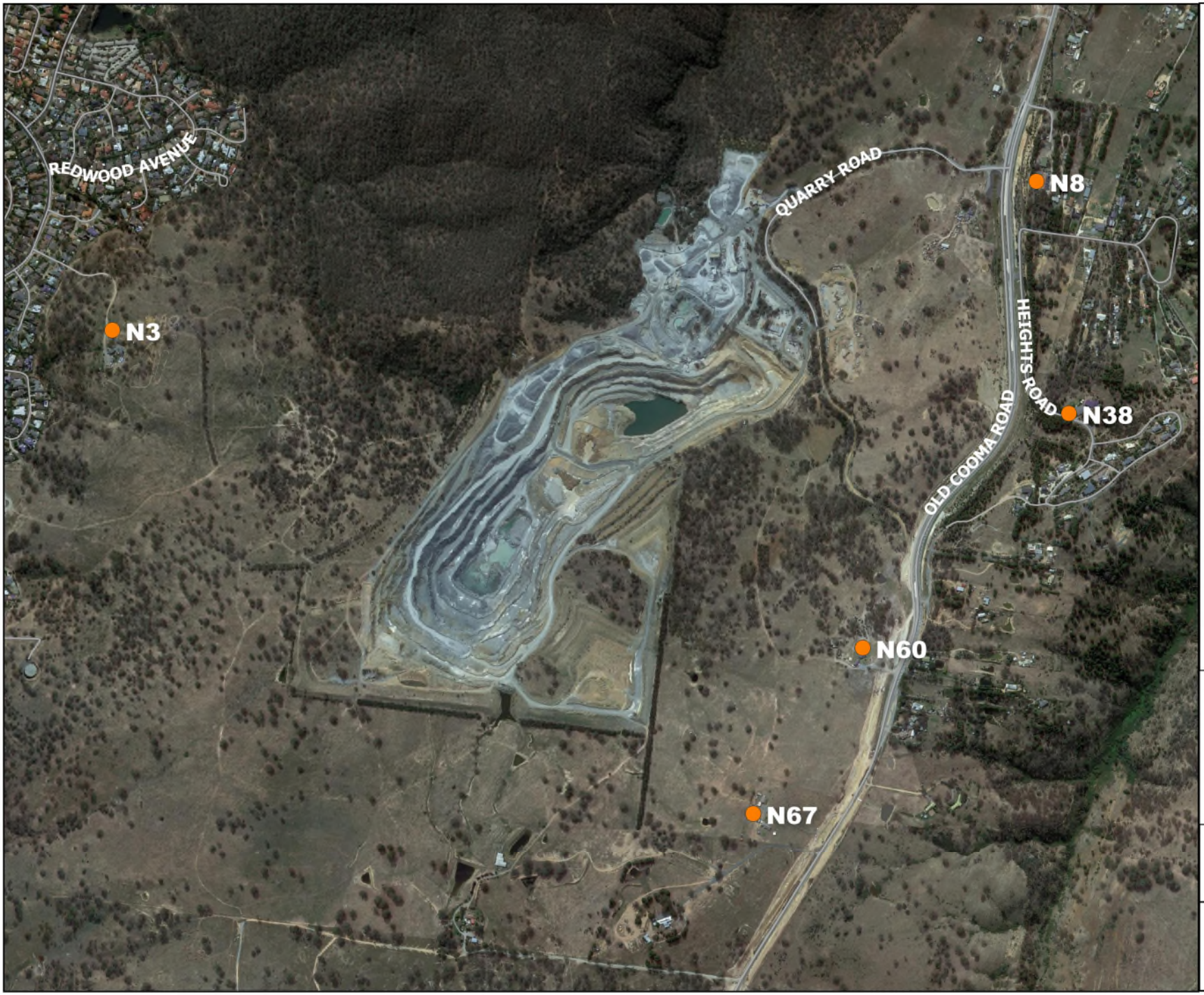

FIGURE 1

Site Locality

MAC180611-03

Holcim Cooma Road Quarry

KEY

Noise Monitoring Locations

0 100 200 300 400 500 m

N

MAC
Muller Acoustic Consulting

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4 Results

4.1 Assessment Results - Location N3

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N3 for the NMA are presented in **Table 2**.

Table 2 Operator-Attended Noise Survey Results – Location N3

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
28/09/2022	06:44 (Morning Shoulder)	58	42	37	WD: SW WS: 1.5m/s Rain: Nil	Wind 34-44 Traffic 31-46 Birds 31-51 Aircraft 35-58 Quarry – Excavator <30-33 (barely to just audible 50% measurement)
Cooma Road Quarry $L_{Aeq(15min)}$ Contribution						<35
28/09/2022	12:26 (Day)	55	36	29	WD: SW WS: 0.5m/s Rain: Nil	Traffic 26-38 Birds 25-40 Aircraft 35-55 Quarry – Excavator 25-30 (barely to just audible 50% measurement) Quarry – Haul Trucks 30-41 (4 Movements, 20-30 seconds each)
Cooma Road Quarry $L_{Aeq(15min)}$ Contribution						<35
28/09/2022	18:14 (Evening)	60	43	33	WD: SW WS: 0.5m/s Rain: Nil	Birds 30-51 Traffic 30-38 Aircraft 30-60 Quarry Inaudible
Cooma Road Quarry $L_{Aeq(15min)}$ Contribution						Quarry not operating

Note: 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.

4.2 Assessment Results - Location N8

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N8 for the NMA are presented in **Table 3**.

Table 3 Operator-Attended Noise Survey Results – Location N8

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
29/09/2022	06:39 (Morning Shoulder)	66	57	51	WD: SW WS: 1.0m/s Rain: Nil	Traffic 46-66 Birds 40-52 Quarry Inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<40
28/09/2022	11:05 (Day)	74	57	49	WD: SW WS: 0.5m/s Rain: Nil	Traffic 40-74 Birds 37-61 Quarry Inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<44
28/09/2022	19:54 (Evening)	68	50	40	WD: SW WS: 0.5m/s Rain: Nil	Traffic 35-68 Insects 36-40 Dogs Barking 50-63 Quarry Inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					Quarry not operating

Note: 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.

4.3 Assessment Results - Location N38

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N38 for the NMA are presented in **Table 4**.

Table 4 Operator-Attended Noise Survey Results – Location N38

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
29/09/2022	06:20 Morning Shoulder)	76	56	48	WD: W WS: 0.5m/s Rain: Nil	Traffic 45-76 Birds 40-73 Quarry Inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<36
28/09/2022	10:46 (Day)	74	53	43	WD: S WS: 0.5m/s Rain: Nil	Traffic 38-69 Birds 35-74 Quarry Inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<38
28/09/2022	19:36 (Evening)	73	49	41	WD: S WS: 0.5m/s Rain: Nil	Traffic 38-65 Insects 35-38 Emergency Siren 50-73 Quarry Inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					Quarry not operating

Note: 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.

4.4 Assessment Results - Location N60

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N60 for the NMA are presented in **Table 5**.

Table 5 Operator-Attended Noise Survey Results – Location N60

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
29/09/2022	06:00 (Morning Shoulder)	92	64	48	WD: W WS: 0.5m/s Rain: Nil	Traffic 41-92 Birds 40-67 Quarry Vehicles Enter/Exit Site <40-60 (8 movements, 10 seconds each)
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<36
28/09/2022	11:59 (Day)	77	57	48	WD: S WS: 0.5m/s Rain: Nil	Traffic 37-77 Birds 35-62 Quarry – Vehicles Enter/Exit Site 40-62 (2 movements, 10-15 seconds each)
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<38
28/09/2022	18:42 (Evening)	63	54	48	WD: S WS: 0.5m/s Rain: Nil	Traffic 43-63 Insects 40-60 Quarry Inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					Quarry not operating

Note: 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.

4.5 Assessment Results - Location N67

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N67 for the NMA are presented in **Table 6**.

Table 6 Operator-Attended Noise Survey Results – Location N67

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
28/09/2022	06:07 (Morning Shoulder)	64	40	35	WD: SW WS: 0.5m/s Rain: Nil	Insects 32-37 Traffic 30-42 Birds 30-64 Quarry Inaudible
Cooma Road Quarry $L_{Aeq(15min)}$ Contribution						<36
28/09/2022	11:31 (Day)	56	41	34	WD: SW WS: 0.5m/s Rain: Nil	Birds 30-49 Aircraft 35-56 Quarry – Excavator 31-36 (just audible to audible >75% measurement) Quarry – Drill 30-40 (5-8 minute total duration) Quarry – Haul Trucks 30-42 (5 movements, 20 -30 seconds each) Quarry Impacts 40-47 (Multiple 1-2 second durations)
Cooma Road Quarry $L_{Aeq(15min)}$ Contribution						<41
28/09/2022	19:08 (Evening)	64	48	42	WD: SW WS: 0.5m/s Rain: Nil	Insects 40-45 Aircraft 40-64 Quarry Inaudible
Cooma Road Quarry $L_{Aeq(15min)}$ Contribution						Quarry not operating

Note: 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.

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5 Discussion

5.1 Discussion of Results - Location N3

Quarry noise was audible during daytime and morning shoulder measurements. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB $L_{Aeq(15min)}$.

Quarry noise sources included excavator operation and haul truck movements. Extraneous noise sources audible during the survey included wind in trees, aircraft, traffic and birds.

5.2 Discussion of Results - Location N8

Noise levels were dominated by generally constant traffic on Old Cooma Road during all measurements. Quarry noise was inaudible during breaks in traffic for daytime period and morning shoulder period with quarry noise contributions estimated to satisfy the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening noise limit of 39dB $L_{Aeq(15min)}$.

Extraneous noise sources audible during the survey included traffic, birds, insects and dogs barking.

5.3 Discussion of Results - Location N38

Noise levels were dominated by generally constant traffic on Old Cooma Road during all measurements. Quarry noise was inaudible during breaks in traffic for daytime and morning shoulder periods. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB $L_{Aeq(15min)}$.

Extraneous noise sources audible during the survey included traffic insects, birds and emergency vehicle sirens.

5.4 Discussion of Results - Location N60

Noise levels were dominated by generally constant traffic on Old Cooma Road during all measurements. Quarry noise was audible for daytime and morning shoulder periods with quarry noise contributions estimated to satisfy the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB $LA_{eq(15min)}$.

Quarry noise sources included vehicles entering and exiting site. Extraneous noise sources audible during the survey included traffic, insects and birds.

5.5 Discussion of Results - Location N67

Quarry noise emissions were audible during the daytime measurements and inaudible during morning shoulder measurement. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria. It is noted that the quarry was not operational during the evening period, therefore satisfying the evening noise limit of 35dB $LA_{eq(15min)}$.

Quarry noise sources included excavator operations, haul truck movements, rock drilling and general impact noise. Extraneous noise included traffic, birds, insects and aircraft.

6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) for Holcim (Australia) Pty Ltd at the Cooma Road Quarry, Googong, NSW. The assessment was completed to assess the quarry's compliance with the relevant noise criteria outlined in their Development Consent for residential receivers surrounding the quarry.

Attended monitoring was undertaken from Wednesday 28 September 2022 to Thursday 29 September 2022 at five representative monitoring locations. The assessment has identified that noise emissions generated by Cooma Road Quarry were generally audible at three locations and complies with relevant noise criteria specified in the Development Consent at all assessed residential receivers for the quarterly period ending September 2022.

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Appendix A - Glossary of Terms

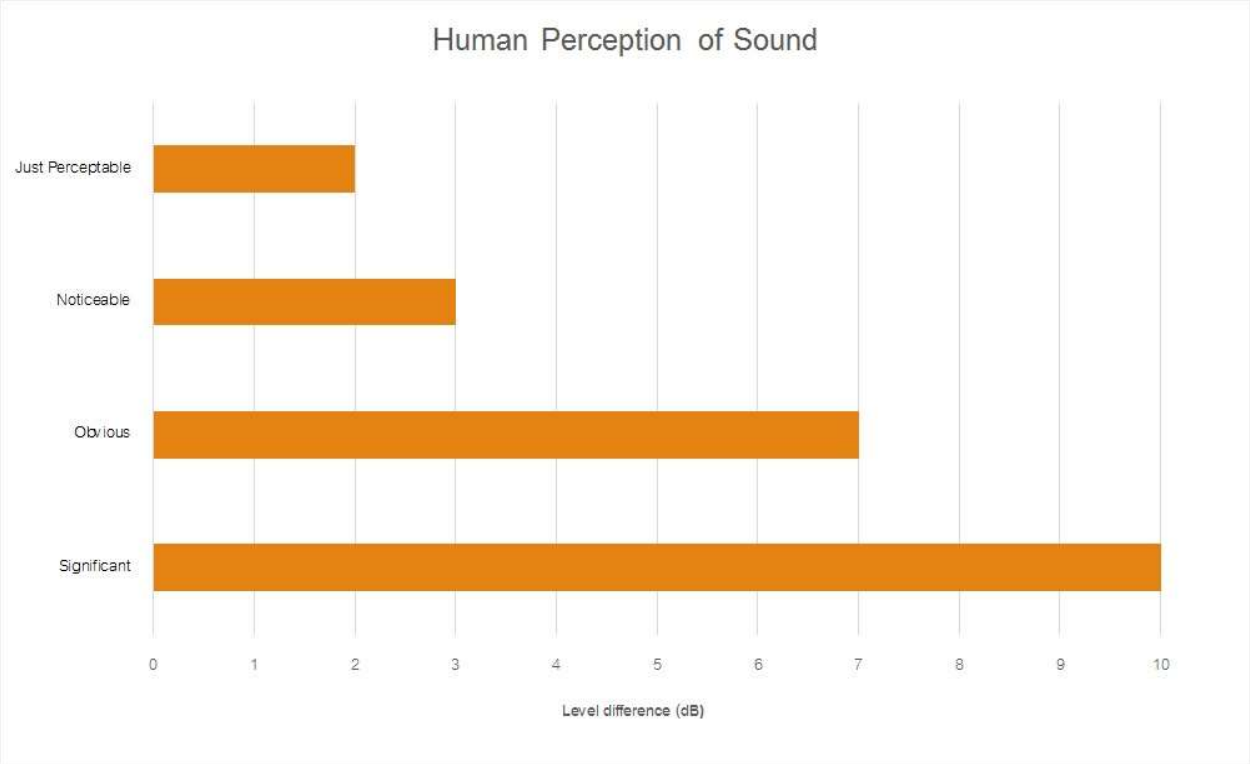
Table A1 provides a number of technical terms have been used in this report.

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.
Adverse Weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
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.
LAmax	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.log10 (W/Wo) Where : W is the sound power in watts and Wo is the sound reference power at 10-12 watts.

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



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MAC
Muller Acoustic Consulting

Noise Monitoring Assessment

Cooma Road Quarry, Googong, NSW
Quarter 2 Ending June 2022.

Prepared for: Holcim (Australia) Pty Ltd
May 2022
MAC180611-03RP16

Muller Acoustic Consulting

Document Information

Noise Monitoring Assessment

Cooma Road Quarry, Googong, NSW

Quarter 2 Ending June 2022

Prepared for: Holcim (Australia) Pty Ltd

Prepared by: Muller Acoustic Consulting Pty Ltd
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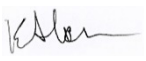
Document ID	Date	Prepared By	Signed	Reviewed By	Signed
MAC180611-03RP16	9 May 2022	Kristian Allen		Rod Linnett	

CONTENTS

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Holcim (Australia) Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for Cooma Road Quarry the 'quarry', Googong, NSW.

The monitoring has been conducted in accordance with the quarry Noise Management Plan and in general accordance with Development Consent (SSD-5109); at five representative monitoring locations. This assessment has been undertaken for the quarterly period ending June 2022 and forms part of the annual noise monitoring program for the quarry.

The assessment has been conducted in accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- Cooma Road Quarry, Noise Management Plan (NMP), 2014;
- Development Consent SSD-5109; and
- Australian Standard AS 1055:2018 - Acoustics - Description and measurement of environmental noise.

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

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2 Noise Criteria

Schedule 3, Condition 4 of the Cooma Road Quarry Development Consent, approved on 27 September 2013, outlines the applicable noise criteria for residential receivers N1 – N71 surrounding the quarry and are presented in **Table 1**.

Table 1 Noise Criteria

Receivers	Morning Shoulder 6am – 7am	Day 7am – 6pm	Evening 6pm – 10pm
	dB $L_{Aeq(15min)}$	dB $L_{Aeq(15min)}$	dB $L_{Aeq(15min)}$
N1, N7, N8, N56, N57, N59, N63, N64, N65	40	44	39
N67	36	41	35
All other Receivers between N9 and N71 inclusive	36	38	35
All other Receivers	35	35	35

Note: 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.

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3 Methodology

3.1 Locality

The quarry is located in Googong, NSW approximately 13km south east of Canberra, ACT. The quarry is bounded primarily by rural and residential properties in all directions, with noise from passing road traffic on Old Cooma Road dominating the acoustic environment for receivers to the east of the quarry. The monitoring locations with respect to the quarry and assessed receivers are presented in the locality plan shown in **Figure 1**.

3.2 Noise Monitoring Locations

Five monitoring locations have been selected as part of the NMA and in accordance with the Development Consent.

Location N3 is to the west of the quarry situated on a rural property off Copperfield Place. This location represents residential and rural receivers to the west of the quarry.

Location N8 is to the north east of the quarry along Tempe Crescent and is representative of residential receivers in that area.

Location N38 is on Heights Road and is representative of the elevated residential receivers to the east of the quarry.

Location N60 is at 501 Old Cooma Road and represents the residence adjacent to the quarry access road.

Location N67 is situated on a rural property at 732 Old Cooma Road to the south of the quarry. This is representative of rural and residential receivers to the south, with direct line of site into the quarry pit.

3.3 Assessment Methodology

Attended 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. Measurements were carried out using a Svantek Type 1, 971 noise analyser from Wednesday 20 April 2022 to Thursday 21 April 2022. 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 ±0.5dBA.

Noise measurements were of 15-minutes in duration and where possible, throughout each survey the operator quantified the contribution of each significant noise source. One measurement was conducted at each monitoring location during the day, evening and morning shoulder periods.

Extraneous noise sources were excluded from the analysis to calculate the $LA_{eq(15min)}$ quarry noise contribution for comparison against the relevant criteria.

Where the quarry is inaudible, the contribution is estimated to be at least 10dBA below the ambient noise level.

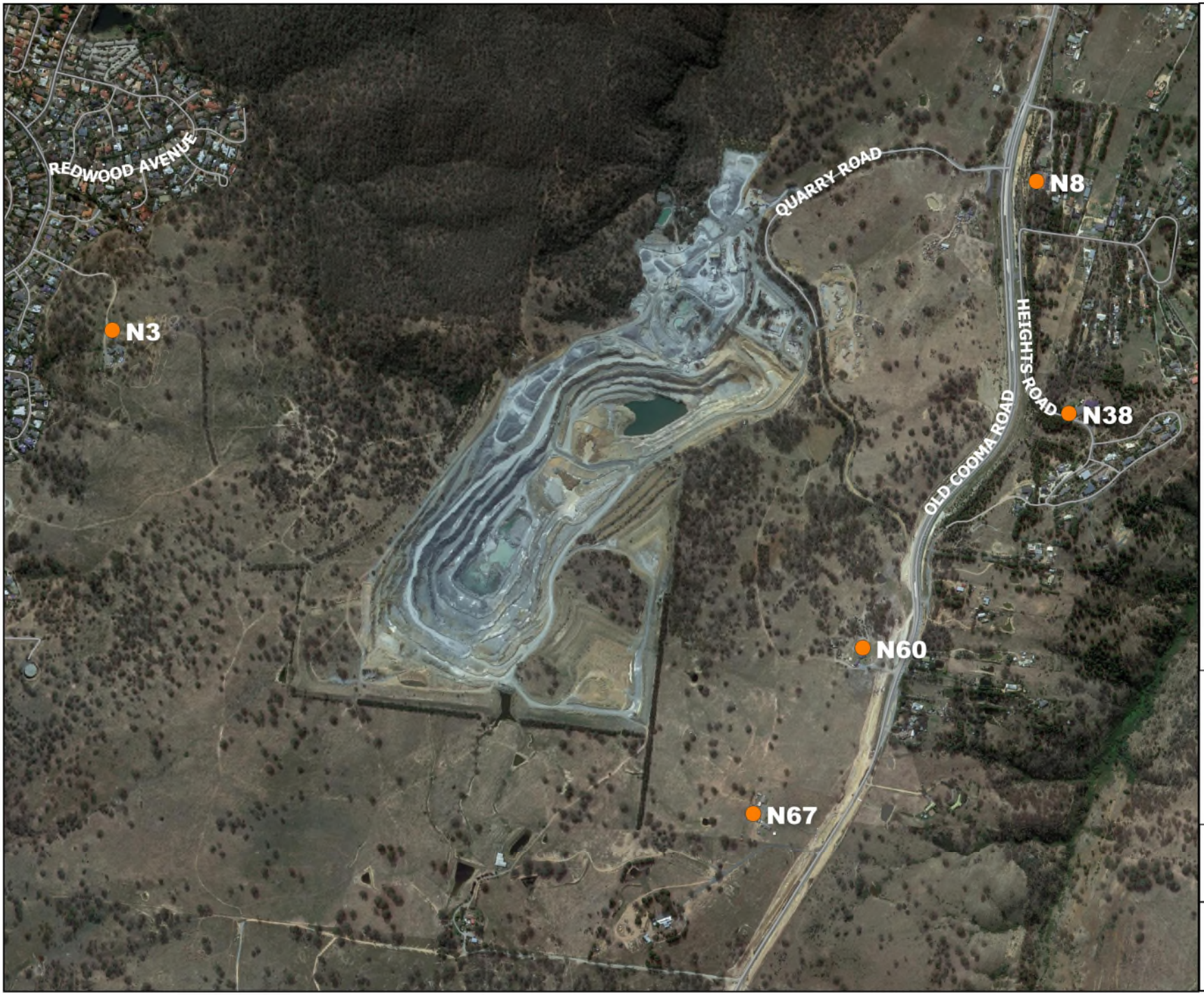

FIGURE 1

Site Locality

MAC180611-03

Holcim Cooma Road Quarry

KEY

Noise Monitoring Locations

0 100 200 300 400 500 m

N

MAC
Muller Acoustic Consulting

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4 Results

4.1 Assessment Results - Location N3

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N3 for the NMA are presented in **Table 2**.

Table 2 Operator-Attended Noise Survey Results – Location N3

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
20/04/2022	06:37 (Morning Shoulder)	51	42	40	WD: SW WS: 0.5m/s Rain: Nil	Traffic 38-46 Birds 35-51 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<35
20/04/2022	08:38 (Day)	58	44	39	WD: SW WS: 0.5m/s Rain: Nil	Insects 37-41 Traffic 34-43 Birds 34-52 Aircraft 34-58 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<35
20/04/2022	18:01 (Evening)	49	41	37	WD: SE WS: <0.5m/s Rain: Nil	Insects 35-40 Traffic 32-49 Birds 32-45 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					Quarry not operating

Note: 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.

4.2 Assessment Results - Location N8

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N8 for the NMA are presented in **Table 3**.

Table 3 Operator-Attended Noise Survey Results – Location N8

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
21/04/2022	06:41 (Morning Shoulder)	69	55	48	WD: SW WS: 0.5m/s Rain: Nil	Traffic 39-69 Birds 36-54 Quarry – trucks enter/exit site <36-45 (4 movements, 10-15 seconds each)
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<40
20/04/2022	09:25 (Day)	66	53	46	WD: SW WS: <0.5m/s Rain: Nil	Traffic 37-66 Birds 34-54 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<44
20/04/2022	19:32 (Evening)	70	50	38	WD: SE WS: 0.5m/s Rain: Nil	Traffic 33-70 Dogs barking 40-63 Aircraft 30-44 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					Quarry not operating

Note: 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.

4.3 Assessment Results - Location N38

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N38 for the NMA are presented in **Table 4**.

Table 4 Operator-Attended Noise Survey Results – Location N38

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
21/04/2022	06:23 (Morning Shoulder)	61	50	43	WD: SW WS: 0.1m/s Rain: Nil	Traffic 37-61 Birds <35 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<36
20/04/2022	09:06 (Day)	80	58	47	WD: SW WS: <0.5m/s Rain: Nil	Dog barking 45-71 Traffic 38-80 Birds 35-51 People 40-50 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<38
20/04/2022	19:14 (Evening)	70	48	38	WD: SW WS: 0.5m/s Rain: Nil	Traffic 30-70 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					Quarry not operating

Note: 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.

4.4 Assessment Results - Location N60

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N60 for the NMA are presented in **Table 5**.

Table 5 Operator-Attended Noise Survey Results – Location N60

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
21/04/2022	06:02 (Morning Shoulder)	74	59	44	WD: SW WS: 0.1m/s Rain: Nil	Traffic 37-74 Birds 38-50 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<36
20/04/2022	09:44 (Day)	79	63	49	WD: SW WS: 0.5m/s Rain: Nil	Traffic 41-79 Birds 38-50 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<38
20/04/2022	18:55 (Evening)	76	57	41	WD: SE WS: 0.5m/s Rain: Nil	Traffic 32-76 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					Quarry not operating

Note: 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.

4.5 Assessment Results - Location N67

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N67 for the NMA are presented in **Table 6**.

Table 6 Operator-Attended Noise Survey Results – Location N67

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
20/04/2022	06:03 (Morning Shoulder)	56	41	37	WD: SW WS: 1.5m/s Rain: Nil	Wind 35-49 Traffic 32-40 Birds 32-56 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<36
20/04/2022	10:07 (Day)	56	41	36	WD: SW WS: 1.0m/s Rain: Nil	Birds 31-52 Traffic 33-39 Insects 33-36 Aircraft 35-56 Quarry – machinery <31-42 (6-8 minute total duration)
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					33
20/04/2022	18:32 (Evening)	49	39	35	WD: SE WS: 1.0m/s Rain: Nil	Insects 33-39 Wind 30-43 Traffic 30-38 Aircraft 35-49 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					Quarry not operating

Note: 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.

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5 Discussion

5.1 Discussion of Results - Location N3

Quarry noise was just inaudible during daytime and morning shoulder measurements. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB $LA_{eq(15min)}$.

Extraneous noise sources audible during the survey included wind in trees, insects, aircraft, traffic and birds.

5.2 Discussion of Results - Location N8

Noise levels were dominated by generally constant traffic on Old Cooma Road during all measurements. Quarry noise was inaudible during breaks in traffic for daytime period and audible for short periods during morning shoulder period with quarry noise contributions estimated to satisfy the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening noise limit of 39dB $LA_{eq(15min)}$.

Quarry noise sources included heavy vehicles entering and exiting site. Extraneous noise sources audible during the survey included traffic, birds, aircraft and dogs barking.

5.3 Discussion of Results - Location N38

Noise levels were dominated by generally constant traffic on Old Cooma Road during all measurements. Quarry noise was inaudible during breaks in traffic for daytime and morning shoulder periods. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB $LA_{eq(15min)}$.

Extraneous noise sources audible during the survey included dogs barking, people talking, traffic and birds.

5.4 Discussion of Results - Location N60

Noise levels were dominated by generally constant traffic on Old Cooma Road during all measurements. Quarry noise was inaudible during breaks in traffic for daytime and morning shoulder periods with quarry noise contributions estimated to satisfy the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB $LA_{eq(15min)}$.

Extraneous noise sources audible during the survey included traffic and birds.

5.5 Discussion of Results - Location N67

Quarry noise emissions were audible during the daytime measurements and inaudible during morning shoulder measurement. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria. It is noted that the quarry was not operational during the evening period, therefore satisfying the evening noise limit of 35dB $LA_{eq(15min)}$.

Quarry noise sources included general machinery noise. Extraneous noise included traffic, birds, wind in trees, insects and aircraft.

6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) for Holcim (Australia) Pty Ltd at the Cooma Road Quarry, Googong, NSW. The assessment was completed to assess the quarry's compliance with the relevant noise criteria outlined in their Development Consent for residential receivers surrounding the quarry.

Attended monitoring was undertaken from Wednesday 20 April 2022 to Thursday 21 April 2022 at five representative monitoring locations. The assessment has identified that noise emissions generated by Cooma Road Quarry were generally audible at two locations and complies with relevant noise criteria specified in the Development Consent at all assessed residential receivers for the quarterly period ending June 2022.

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Appendix A - Glossary of Terms

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

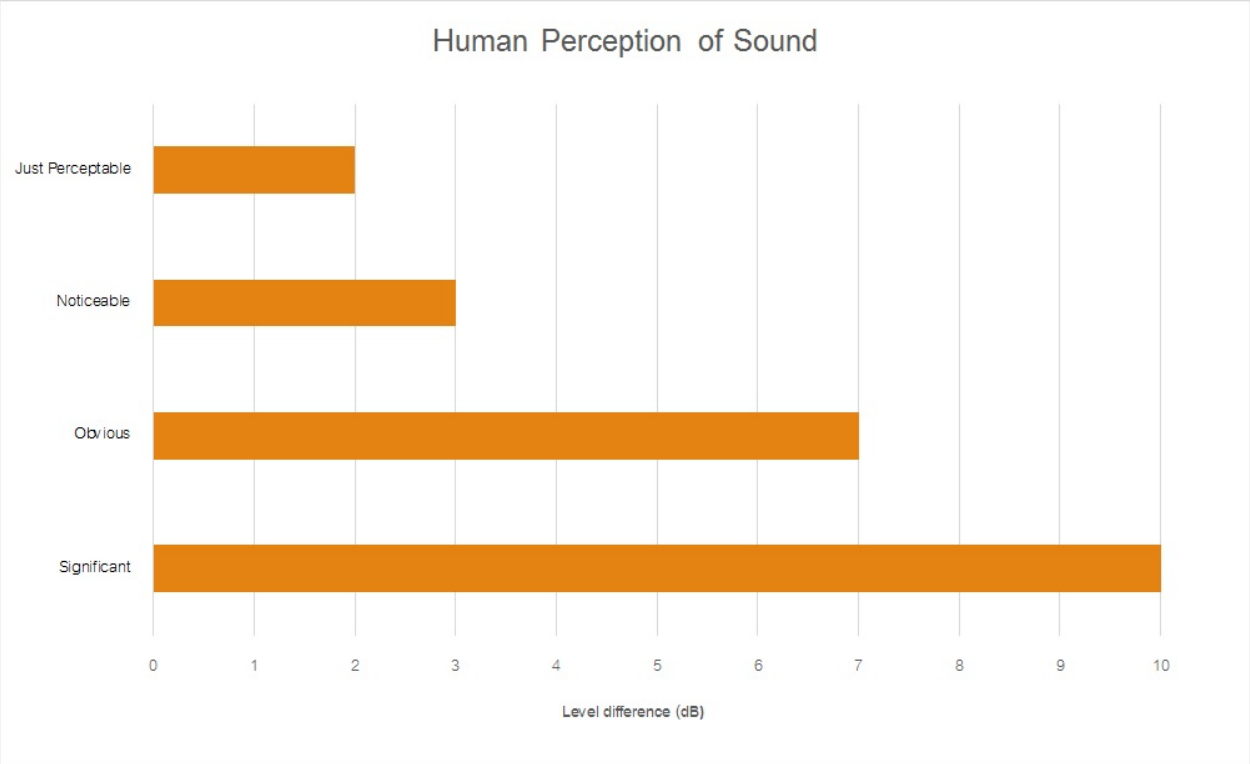
Table A1 Glossary of Terms

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.
Adverse Weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
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.
LAmax	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.log10 (W/Wo) Where : W is the sound power in watts and Wo is the sound reference power at 10-12 watts.

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



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Muller Acoustic Consulting

Noise Monitoring Assessment

Cooma Road Quarry, Googong, NSW
Quarter 1 Ending March 2022.

Prepared for: Holcim (Australia) Pty Ltd
February 2022
MAC180611-03RP15

Muller Acoustic Consulting

Document Information

Noise Monitoring Assessment

Cooma Road Quarry, Googong, NSW

Quarter 1 Ending March 2022

Prepared for: Holcim (Australia) Pty Ltd

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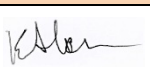
Document ID	Status	Date	Prepared By	Signed	Reviewed By	Signed
MAC180611-03RP15	Final	3 February 2022	Kristian Allen		Oliver Muller	

CONTENTS

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Holcim (Australia) Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for Cooma Road Quarry the 'quarry', Googong, NSW.

The monitoring has been conducted in accordance with the quarry Noise Management Plan and in general accordance with Development Consent (SSD-5109); at five representative monitoring locations. This assessment has been undertaken for the quarterly period ending March 2022 and forms part of the annual noise monitoring program for the quarry.

The assessment has been conducted in accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- Cooma Road Quarry, Noise Management Plan (NMP), 2014;
- Development Consent SSD-5109; and
- Australian Standard AS 1055:2018 - Acoustics - Description and measurement of environmental noise.

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

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2 Noise Criteria

Schedule 3, Condition 4 of the Cooma Road Quarry Development Consent, approved on 27 September 2013, outlines the applicable noise criteria for residential receivers N1 – N71 surrounding the quarry and are presented in **Table 1**.

Table 1 Noise Criteria

Receivers	Morning Shoulder 6am – 7am	Day 7am – 6pm	Evening 6pm – 10pm
	dB $L_{Aeq(15min)}$	dB $L_{Aeq(15min)}$	dB $L_{Aeq(15min)}$
N1, N7, N8, N56, N57, N59, N63, N64, N65	40	44	39
N67	36	41	35
All other Receivers between N9 and N71 inclusive	36	38	35
All other Receivers	35	35	35

Note: 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.

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3 Methodology

3.1 Locality

The quarry is located in Googong, NSW approximately 13km south east of Canberra, ACT. The quarry is bounded primarily by rural and residential properties in all directions, with noise from passing road traffic on Old Cooma Road dominating the acoustic environment for receivers to the east of the quarry. The monitoring locations with respect to the quarry and assessed receivers are presented in the locality plan shown in **Figure 1**.

3.2 Noise Monitoring Locations

Five monitoring locations have been selected as part of the NMA and in accordance with the Development Consent.

Location N3 is to the west of the quarry situated on a rural property off Copperfield Place. This location represents residential and rural receivers to the west of the quarry.

Location N8 is to the north east of the quarry along Tempe Crescent and is representative of residential receivers in that area.

Location N38 is on Heights Road and is representative of the elevated residential receivers to the east of the quarry.

Location N60 is at 501 Old Cooma Road and represents the residence adjacent to the quarry access road.

Location N67 is situated on a rural property at 732 Old Cooma Road to the south of the quarry. This is representative of rural and residential receivers to the south, with direct line of site into the quarry pit.

3.3 Assessment Methodology

Attended 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. Measurements were carried out using Svantek Type 1, 971 noise analysers from Wednesday 19 January 2022 to Thursday 20 January 2022. 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 ±0.5dBA.

Noise measurements were of 15-minutes in duration and where possible, throughout each survey the operator quantified the contribution of each significant noise source. One measurement was conducted at each monitoring location during the day, evening and morning shoulder periods.

Extraneous noise sources were excluded from the analysis to calculate the $LA_{eq(15min)}$ quarry noise contribution for comparison against the relevant criteria.

Where the quarry is inaudible, the contribution is estimated to be at least 10dBA below the ambient noise level.

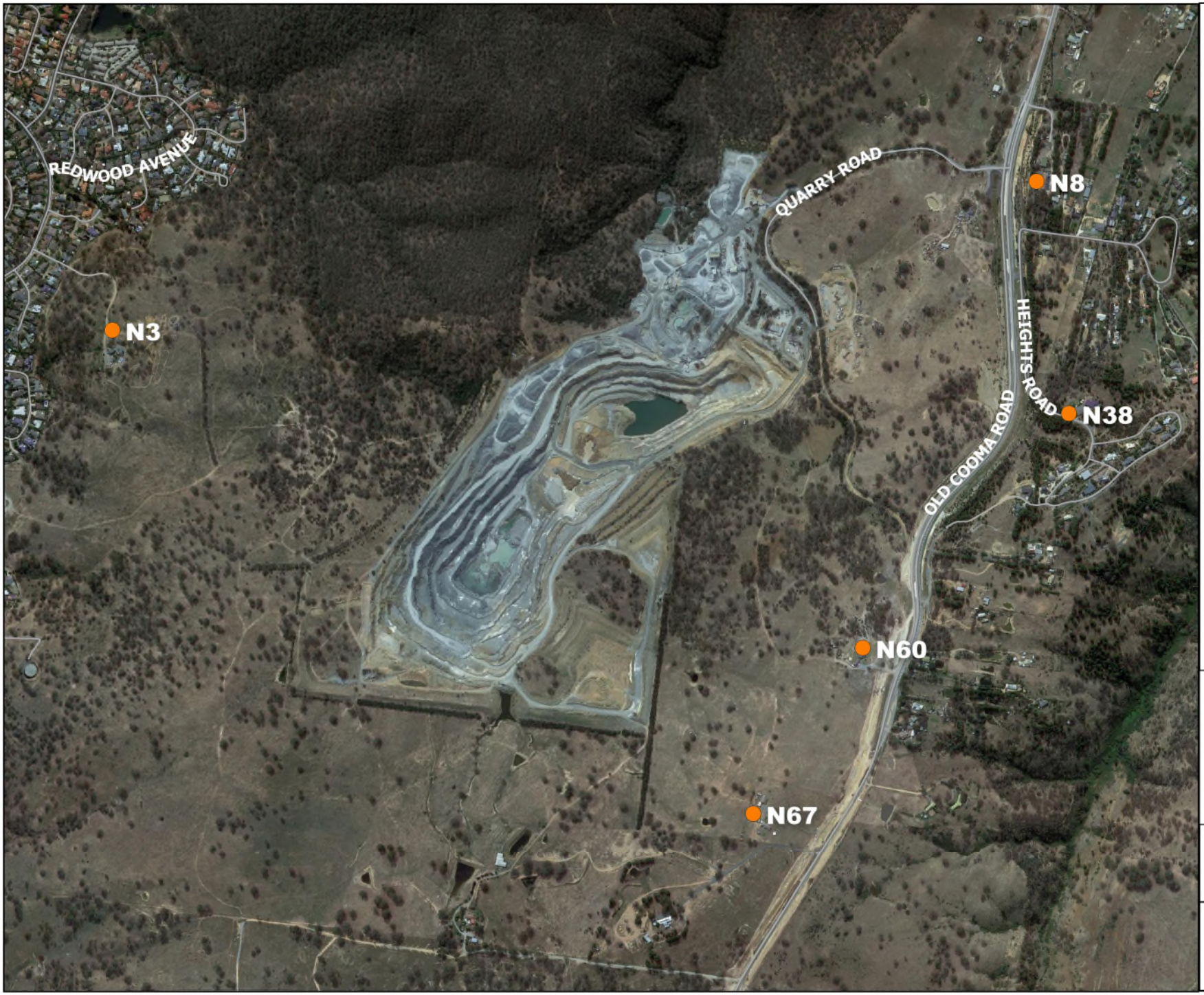

FIGURE 1

Site Locality

MAC180611-03

Holcim Cooma Road Quarry

KEY

Noise Monitoring Locations

0 100 200 300 400 500 m

N

MAC
Muller Acoustic Consulting

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4 Results

4.1 Assessment Results - Location N3

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N3 for the NMA are presented in **Table 2**.

Table 2 Operator-Attended Noise Survey Results – Location N3

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
19/01/2022	06:40 (Morning Shoulder)	62	40	34	WD: SE WS: 1.0m/s Rain: Nil	Wind 31-43 Birds 28-49 Aircraft 35-62 Traffic 31-35 Quarry – Machinery 28-36 (audible <50% measurement) Quarry – Reverse Alarms 28-33 (multiple 3-5 second durations)
Cooma Road Quarry $L_{Aeq(15min)}$ Contribution						31
19/01/2022	08:09 (Day)	64	43	34	WD: SE WS: 1.0m/s Rain: Nil	Birds 30-49 Aircraft 35-64 Wind 31-39 Traffic 30-35 Quarry – Machinery <30 (just audible <50% measurement)
Cooma Road Quarry $L_{Aeq(15min)}$ Contribution						<30
19/01/2022	18:30 (Evening)	60	46	41	WD: SE WS: 3.0m/s Rain: Nil	Wind 37-60 Birds 35-51 Quarry inaudible
Cooma Road Quarry $L_{Aeq(15min)}$ Contribution						Quarry not operating

Note: 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.

4.2 Assessment Results - Location N8

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N8 for the NMA are presented in **Table 3**.

Table 3 Operator-Attended Noise Survey Results – Location N8

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
20/01/2022	06:38 (Morning Shoulder)	77	55	47	WD: SE WS: 1.0m/s Rain: Nil	Traffic 40-67 Birds 37-53 Dogs 60-77 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<40
19/01/2022	09:53 (Day)	68	53	45	WD: SE WS: 1.5m/s Rain: Nil	Wind 37-48 Traffic 40-68 Birds 37-49 Insects <35 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<40
19/01/2022	20:05 (Evening)	66	48	38	WD: SE WS: 1.5m/s Rain: Nil	Traffic 34-66 Birds 31-50 Wind 31-48 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					Quarry not operating

Note: 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.

4.3 Assessment Results - Location N38

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N38 for the NMA are presented in **Table 4**.

Table 4 Operator-Attended Noise Survey Results – Location N38

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
20/01/2022	06:19 (Morning Shoulder)	60	48	42	WD: SE WS: 1.0m/s Rain: Nil	Traffic 37-60 Birds 34-54 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<36
19/01/2022	09:25 (Day)	74	54	44	WD: S WS: 1.5m/s Rain: Nil	Wind 37-44 Traffic 40-74 Birds 37-51 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<38
19/01/2022	19:45 (Evening)	70	49	41	WD: SE WS: 2.5m/s Rain: Nil	Traffic 34-70 Birds 34-51 Wind 37-58 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					Quarry not operating

Note: 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.

4.4 Assessment Results - Location N60

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N60 for the NMA are presented in **Table 5**.

Table 5 Operator-Attended Noise Survey Results – Location N60

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
20/01/2022	06:00 (Morning Shoulder)	77	60	45	WD: S WS: 0.5m/s Rain: Nil	Traffic 37-77 Birds 34-45 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<36
20/01/2022	09:07 (Day)	77	61	50	WD: SE WS: 1.0m/s Rain: Nil	Traffic 43-77 Birds 40-56 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<38
19/01/2022	18:57 (Evening)	78	60	52	WD: SE WS: 2.0m/s Rain: Nil	Traffic 47-78 Wind 45-55 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					Quarry not operating

Note: 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.

4.5 Assessment Results - Location N67

The monitored noise level contributions and observed meteorological conditions for each assessment period at Location N67 for the NMA are presented in **Table 6**.

Table 6 Operator-Attended Noise Survey Results – Location N67

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L_{Amax}	L_{Aeq}	L_{A90}		
19/01/2022	06:10 (Morning Shoulder)	51	42	39	WD: SW WS: 2.0m/s Rain: Nil	Wind 38-51 Birds 35-43 Distant traffic 35-40 Aircraft 35-51 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<30
19/01/2022	08:59 (Day)	64	43	37	WD: S WS: 1.5m/s Rain: Nil	Wind 34-48 Birds 31-64 Distant traffic 31-38 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					<30
19/01/2022	19:21 (Evening)	55	46	40	WD: SE WS: 3.0m/s Rain: Nil	Wind 37-55 Birds 34-48 Quarry inaudible
	Cooma Road Quarry $L_{Aeq(15min)}$ Contribution					Quarry not operating

Note: 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.

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5 Discussion

5.1 Discussion of Results - Location N3

Quarry noise was just audible during daytime and morning shoulder measurements. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB $LA_{eq(15min)}$.

Quarry noise sources included heavy machinery and reverse alarms. Extraneous noise sources audible during the survey included wind in trees, aircraft, traffic and birds.

5.2 Discussion of Results - Location N8

Noise levels were dominated by generally constant traffic on Old Cooma Road during all measurements. Quarry noise was inaudible during breaks in traffic for daytime and morning shoulder periods with quarry noise contributions estimated to satisfy the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening noise limit of 39dB $LA_{eq(15min)}$.

Extraneous noise sources audible during the survey included wind in trees, traffic, birds, insects and dogs barking.

5.3 Discussion of Results - Location N38

Noise levels were dominated by generally constant traffic on Old Cooma Road during all measurements. Quarry noise was inaudible during breaks in traffic for daytime and morning shoulder periods. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB $LA_{eq(15min)}$.

Extraneous noise sources audible during the survey included wind in trees, traffic and birds.

5.4 Discussion of Results - Location N60

Noise levels were dominated by generally constant traffic on Old Cooma Road during all measurements. Quarry noise was inaudible during breaks in traffic for daytime and morning shoulder periods with quarry noise contributions estimated to satisfy the relevant morning shoulder and daytime criteria. The quarry was not operational during the evening period therefore satisfying the evening criteria of 35dB $LA_{eq(15min)}$.

Extraneous noise sources audible during the survey included traffic, wind in trees and birds.

5.5 Discussion of Results - Location N67

Quarry noise emissions were inaudible during the daytime and morning shoulder measurement. Quarry noise contributions were estimated to satisfy the relevant morning shoulder and daytime criteria. It is noted that the quarry was not operational during the evening period, therefore satisfying the evening noise limit of 35dB $LA_{eq(15min)}$.

Extraneous noise included traffic, birds, wind in trees and aircraft.

6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) for Holcim (Australia) Pty Ltd at the Cooma Road Quarry, Googong, NSW. The assessment was completed to assess the quarry's compliance with the relevant noise criteria outlined in their Development Consent for residential receivers surrounding the quarry.

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A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.
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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.
LAmax	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.log10 (W/Wo) Where : W is the sound power in watts and Wo is the sound reference power at 10-12 watts.

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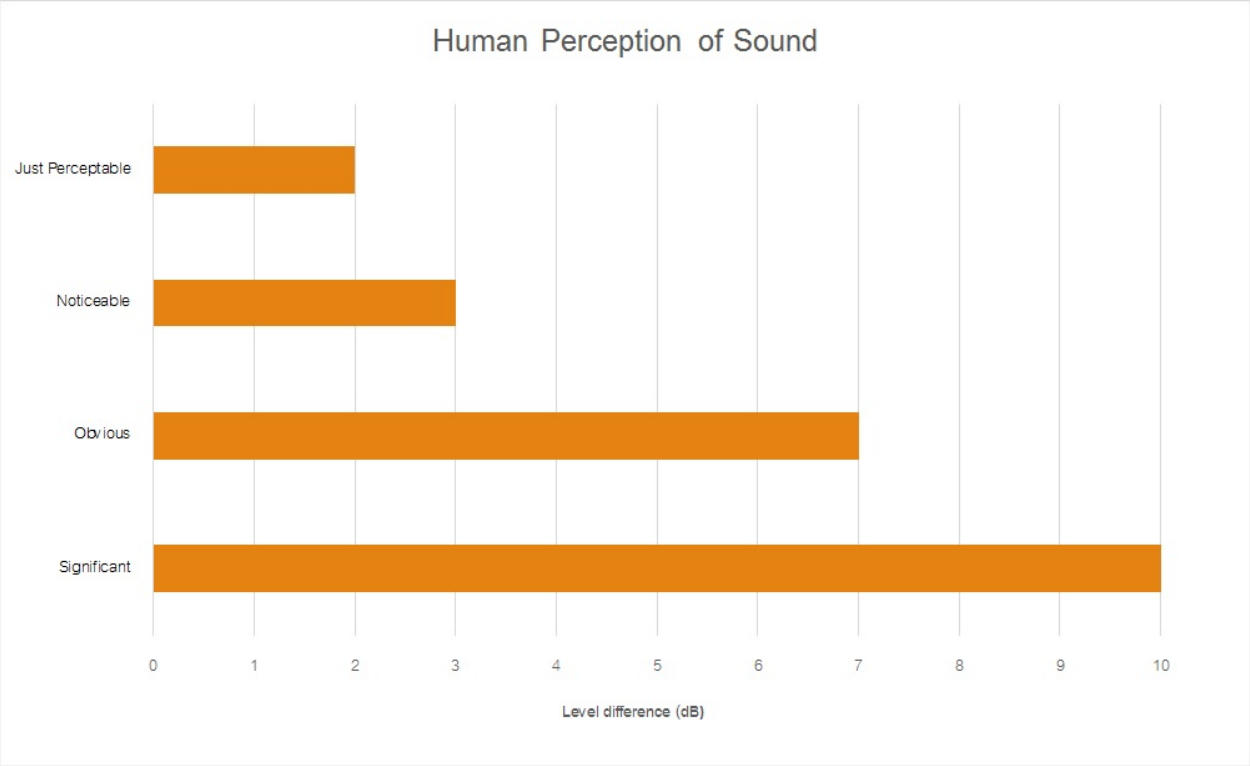
Figure A1 – Human Perception of Sound



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