TEVEN QUARRY

2025 Annual Review

Site Details

Organisation	Holcim (Australia) Pty Ltd
Project	Teven Quarry
Developmental consent / project approval #	SSD 6422
Document Title	Annual Review 2025
Document Revision	A
Author	IEMA
Project Identifier	HOL04-006
Annual review start date	1 January 2025
Annual review end date	31 December 2025

I, **Matt Kelly,** certify that this audit report is a true and accurate record of the compliance status of the **TEVEN QUARRY** for the period of **1 JANUARY 2025 – 31 DECEMBER 2025** 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 9.42 of the Environmental Planning and Assessment Act 1979 (NSW). Section 9.42(1) provides that a person must not include false or misleading information in, 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. A contravention of this provision constitutes a Tier 3 offence under the Act (a maximum penalty: in the case of a corporation is $1 million; and for an individual is $250,000).*

b) *The Crimes Act 1900 (NSW) contains other offences relating to false and misleading information: Section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); and Sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or 200 penalty units, or both).*

Name of authorised reporting officer	Matt Kelly
Title of authorised reporting officer	Quarry Manager
Signature of authorised reporting officer	
Document Date	30 March 2026

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Tables

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Appendices

1 Statement of Compliance

The Statement of Compliance for the Teven Quarry for the 2025 reporting period is provided in **Table 1**. The Compliance Status Key, outlined in **Table 2**, explains the risk levels and definitions used to classify non-compliances. **Table 3** lists the non-compliances associated with SSD 6422 for 2025.

No compliance action was undertaken during the reporting period.

Table 1: Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
SSD 6422	No
EPL 3293	No

Table 2: 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.
Administrative non-compliance	Administrative 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: 2025 Summary of Non-Compliances

<table>
<tr><th>Relevant Approval</th><th>Condition</th><th>Condition Description</th><th>Compliance Status</th><th>Comments</th><th>Section Addressed in Annual Review</th></tr>
<tr>
<td>SSD 6422</td>
<td>Schedule 3, Condition 4</td>
<td>
Noise Impact Assessment Criteria

The Applicant shall ensure that the noise generated by the development does not exceed the criteria in Table 2 at any residence on privately-owned land.
Table 2: Noise criteria dB(A)
<table>
<tr><th>Receiver</th><th>Day
dB(A) ($L_{Aeq(15\ min)}$)</th><th>Evening
dB(A) ($L_{Aeq(15\ min)}$)</th></tr>
<tr><td>R3, R4, R13, R15, R16, R17, R18, R20</td><td>38</td><td>35</td></tr>
<tr><td>All other residences</td><td>37</td><td>35</td></tr>
</table>
Note: Receiver locations are shown on the figure in Appendix 4.
Noise generated by the development is to be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy. Appendix 5 sets out the meteorological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria.

However, the noise criteria in Table 2 do not apply if the Applicant has an agreement with the relevant landowner to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

In the event that the studio outbuilding, certified as Complying Development under the provisions of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 by Techton Building Services on 16 April 2015, is constructed on Lot 3 DP 703181, the Applicant shall ensure that the noise generated by the development does not exceed a criterion of 55 dB(A) Leq (period) when measured external to the façade of the outbuilding, when it is in use.
</td>
<td>Non-Compliance</td>
<td>Routine attended noise monitoring recorded two moderate exceedances of the LAeq(15 min) criterion at NM4: 42 dB LAeq(15 min) on 14 August 2025 (5 dB above criterion; Q3) and 40 dB LAeq(15 min) on 12 November 2025 (3 dB above criterion; Q4), in consecutive monitoring periods. NSW Planning recommended considering the Ramboll Australia Pty Ltd (Ramboll) (24 October 2025) mitigation measures and providing an update in the next Annual Review. Holcim has committed to an independent noise assessment to confirm sources and implement actions to restore compliance. Notification</td>
<td>Section 6.2</td>
</tr>
</table>

<table>
<tr><th>Relevant Approval</th><th>Condition</th><th>Condition Description</th><th>Compliance Status</th><th>Comments</th><th>Section Addressed in Annual Review</th></tr>
<tr><td>EPL 3293</td><td>L4.2</td><td>Noise generated at the premises that is measured at each noise monitoring point established under this licence must not exceed the noise levels specified in Column 4 of the table below for that point during the corresponding time periods specified in Column 1 when measured using the corresponding measurement parameters listed in Column 2.
POINT 2
<table><tr><th>Time period</th><th>Measurement parameter</th><th>Measurement frequency</th><th>Noise level dB(A)</th></tr><tr><td>Day</td><td>Day-LAeq (15 minute)</td><td>Yearly</td><td>37</td></tr><tr><td>Evening</td><td>Evening-LAeq(15 minute) (6pm-10pm Mon.-Sun.)</td><td>Yearly</td><td>35</td></tr></table>
Note: Noise sensitive locations means buildings used as a residence, hospital, school, childcare centre, places of public worship and nursing homes. A noise sensitive location includes the land within 30m of the building.</td><td>Non-Compliance</td><td>of the exceedance was received on 23 December 2025 during the end-of-year shutdown, contributing to a delay in reporting.</td><td></td></tr>
<tr><td>SSD 6422</td><td>Schedule 3 Condition 11</td><td>The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria in Table 4 at any residence on privately-owned land.
Table 4: Air quality criteria
<table><tr><th>Pollutant</th><th>Averaging Period</th><th colspan="2">Criterion</th></tr><tr><td>Particulate matter < 10 µm (PM_{10})</td><td>Annual</td><td colspan="2">[a,d] 30 µg/m^3</td></tr><tr><td>Particulate matter < 10 µm (PM_{10})</td><td>24 hour</td><td colspan="2">[b] 50 µg/m^3</td></tr><tr><td>Total suspended particulates (TSP)</td><td>Annual</td><td colspan="2">[a,d] 90 µg/m^3</td></tr><tr><td>[c] Deposited dust</td><td>Annual</td><td>[b] 2 g/m^2/month</td><td>[a,d] 4 g/m^2/month</td></tr></table>
Notes for Table 4:
a. Cumulative impact (ie increase in concentrations due to the development plus background concentrations due to all other sources).
b. Incremental impact (ie incremental increase in concentrations due to the development on its own, with zero allowable exceedances of the criteria over the life of the development).
c. Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: 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, or any other activity agreed to by the Secretary.
e. "Reasonable and feasible avoidance and mitigation measures" includes, but is not limited to, the operational requirements in conditions 12 and 13 to develop and implement a air quality management system that ensures operational responses to the risks of exceedance of the criteria.</td><td></td><td>Holcim were non-compliant with this condition on 4 occasions during the monitoring period. Two non-compliances were deemed to be likely results of adjacent agricultural operations, one non-compliance was attributed to a blackout due to Cyclone Alfred, and another was a result of a laboratory contractor losing a sample in transit.</td><td>Section 6.3.3.</td></tr>
</table>

Relevant Approval	Condition	Condition Description	Compliance Status	Comments	Section Addressed in Annual Review
EPL 3293	L5.3	*The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed:* *a) 5 mm/s for more than 5% of the total number of blasts carried out on the premises during each reporting period; and* *b) 10 mm/s at any time.* *At any point within 1 metre of any affected residential property or other sensitive noise location.*	Non-Compliance	A blast on 29 July 2025 was measured at 5.15 mm/s, as there were only 8 blasts in the reporting period, this blast represented >5% of all blasts in the reporting period. Therefore, this single blast has caused an exceedance against the total blasts criteria (no more than 5% of blasts to exceed 5 mm/s) under condition L5.3 of the EPL. Holcim in turn notified the Department.	**Section 6.4.3**

2 Introduction

Holcim (Australia) Pty Ltd (Holcim) operates the Teven Quarry, a hard rock quarry located on Stokers Lane in the Ballina Shire Local Government Area in northern New South Wales (NSW) (refer to **Figure 1**). The site operates under Development Consent (SSD 6422 as modified) approved by the Department on 15 July 2015.

The site also operates in accordance with Environment Protection Licence (EPL) No. 3293 issued by the NSW Environmental Protection Authority (EPA).

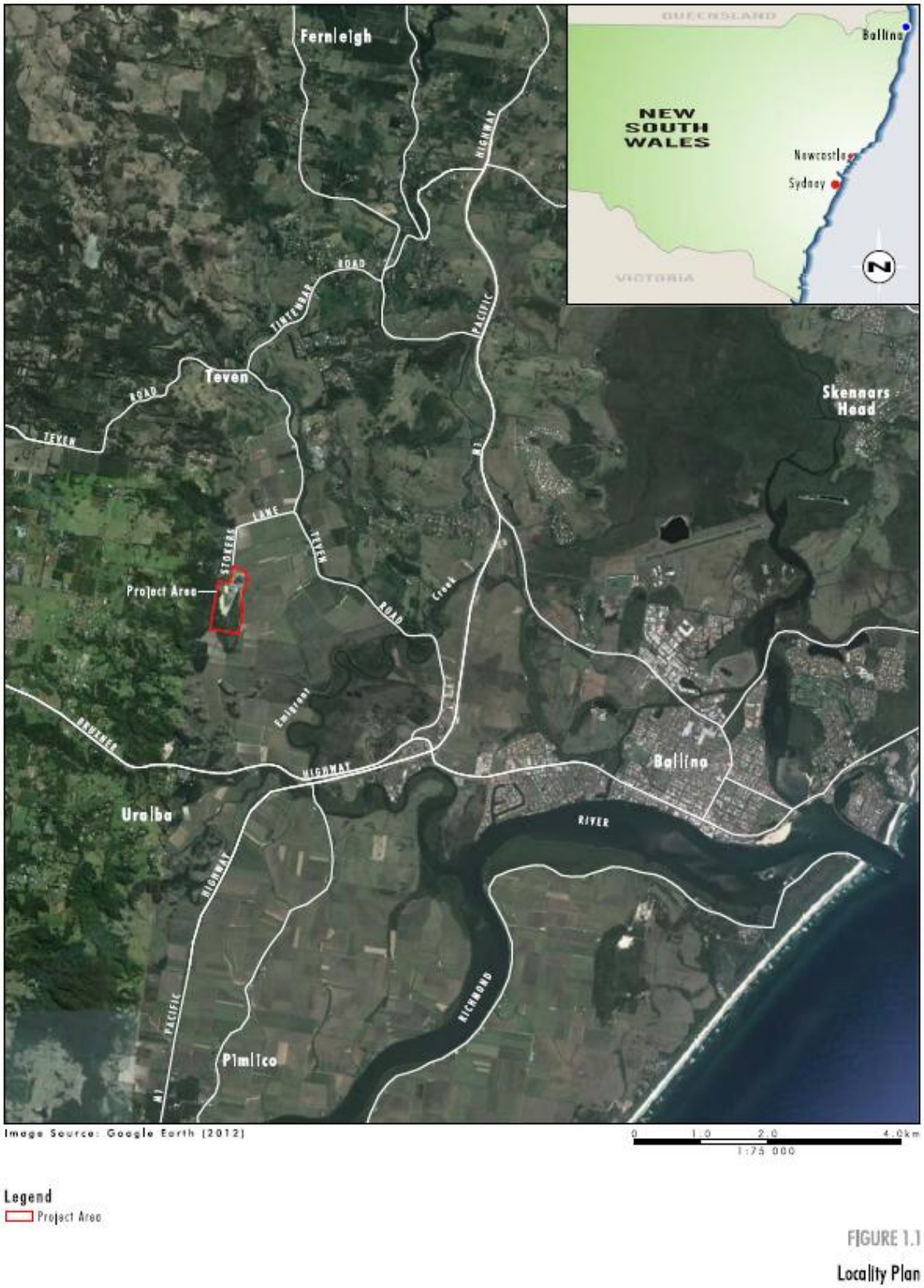

Figure 1: Site Location and Layout (Umwelt, 2014)

In accordance with Schedule 5, Condition 4 of the modified Development Consent the site is required to undertake 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, the Applicant shall review 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 4 and 7**
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 EIS.	**Section 0 and 6.8**
c. identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;	**Section 1 and 0**
d. identify any trends in the monitoring data over the life of the development;	**Section 0 and 6.8**
e. identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and	**Section 0**
f. describe what measures will be implemented over the current calendar year to improve the environmental performance of the development.	**Section 13**

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 site from 1 January 2025 to 31 December 2025.

2.1 CONTACT DETAILS

The key contact details for the site are outlined below:

Quarry Manager

Matt Kelly
Mob: 0429 790 895
Email: matt.kelly@holcim.com

Area Manager Aggregates – NSW North

Chris Hamilton
Work: +61 2 6656 8620
Mob: +61 429 790 213
Email: chris.s.hamilton@holcim.com

Environment Manager – NSW

Dozie Egeonu
Mob: +61 429 557 493
Email: dozie.egeonu@holcim.com

3 Approvals

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

Table 5: Approvals for Teven Quarry Operations

Approval	Regulatory Authority
SSD 6422	NSW DPHI
EPL No. 3293	NSW EPA

Holcim holds EPL 3293 which covers its activities at the Teven Quarry. **Table 6** outlines these licensing limits.

Table 6: EPL Fee-Based Activity at the Teven Quarry

Fee Based Activity	Scale (tonnes/T)
Extractive activities	>100,000 – 500,000 T annually extracted or processed

4 Operations Summary

4.1 EXPLORATION

There was no exploration undertaken within the reporting period.

4.2 LAND PREPARATION

Stripping of topsoil and overburden was carried out along the western boundary within the extraction limit boundary, see **Figure 2**.

4.3 CONSTRUCTION ACTIVITIES

There were no construction activities during the reporting period.

4.4 QUARRY OPERATIONS

Operational activities undertaken at Teven Quarry during the reporting period included:

- Stripping of topsoil and overburden within the existing approved extraction limit boundary.
- Drill, blast, load, and haul activities; and
- Crushing, screening, and stockpiling of product.

A list of the permissible operating hours under Schedule 3 Condition 1 is outlined below in **Table 7**. All activities took place within the approved operating hours in 2025.

Table 7: Operating Hours

Activity	Permissible Hours
Extraction operations, processing operations, and overburden management	7 am to 6 pm Monday to Friday; 7 am to 4 pm Saturday; and At no time on Sundays or public holidays.
Blasting	10 am to 3 pm Monday to Friday; and At no time on Sundays or public holidays.
Loading and dispatch, stockpile management, and maintenance of plant and equipment	7 am to 10 pm Monday to Friday; 7 am to 4 pm Saturdays; and At no time on Sundays or public holidays.

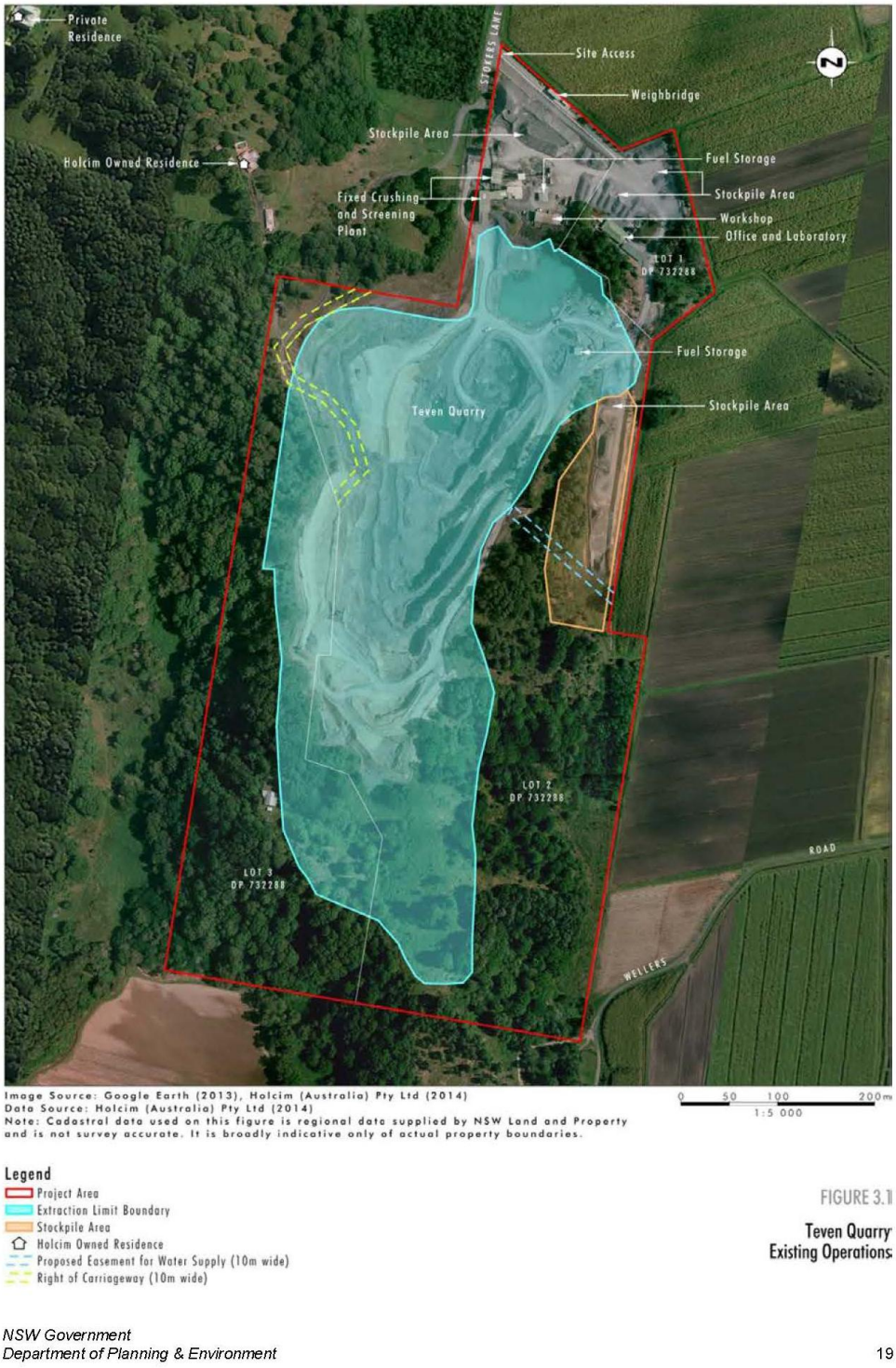

Figure 2 Teven Quarry Existing Operations (DPE, 2014)

Table 8 presents the total product distributed from the Quarry during the reporting period, along with data from previous years and a forecast for 2026, compared against the annual Development Consent approval limit.

Table 8: Total Annual Product Distributed

Year	Product Distributed Total (Tonnes)	Approval Limit (Tonnes)
2018	372,640	500,000
2019	458,679	
2020	292,701	
2021	299,713	
2022	295,018	
2023	292,110	
2024	261,688	
2025	286,374	
2026 Forecast	323,851	

Schedule 2, Condition 18 states that the applicant shall provide quarry production data to Division of Resources and Energy (DRE) and include a copy of this information in the annual review. **Table 9** details the 2024-2025 annual return extractives data provided to the DRE. Note that this data will not align with this annual review due to using the Annual Return reporting period.

Table 9: 2024-2025 Extractive Annual Return data

Product	Quantity[1] (tonnes)
Aggregates	291,851
Soil / Fill	65,185
Total	**357,063**

Notes: [1]Quantity has been rounded

4.5 NEXT REPORTING PERIOD

Development activities proposed to be carried out at Teven Quarry in 2026, include:

- Stripping of topsoil and overburden within the existing approved extraction limit boundary.
- Drill, blast, load, and haul activities; and
- Continuation of crushing, screening, and stockpiling of product.

5 Actions Required from the Previous Annual Review

5.1 ACTIONS FROM THE 2024 ANNUAL REVIEW – DPE ACTIONS

Holcim submitted the 2024 Annual Review to the Major Projects Portal on 01 April 2025. Holcim received a response from the DPE on 15 April 2025 which is shown in **Table 10.**

Table 10: 2024 Annual Review Response

DPE Response	Holcim Comment
NSW Planning has reviewed the 2024 Annual Review and considers it to generally satisfy the reporting requirements of the Consent and the NSW Planning Annual Review Guideline (October 2015)	Holcim will continue to meet its obligations under the Consent and applicable guidelines

5.2 ACTIONS FROM THE 2024 ANNUAL REVIEW – HOLCIM PROPOSED ACTIONS FOR 2025

Table 11 provides an update on Holcim Proposed Actions for 2025.

Table 11: Update on Holcim Proposed Actions for 2025

Improvement Measure	Activities	2025 Actions
Biodiversity	Weed spraying will continue at site during the next reporting period.	Weed spraying was conducted during the reporting period.
Air Quality	Maintain a HVAS monitoring program which meets Developmental Consent requirements	Air quality monitoring was undertaken in line with the *Air Quality Management Plan*
Water sampling	Complete water sampling for at least the parameters pH, Total Suspended Solids, and Oil and grease	Surface water quality monitoring was undertaken in line with the *Water Management Plan*.
Groundwater Assessment	Holcim will continue to monitor the quarry void for groundwater seepage to ensure that groundwater quantities remain negligible.	Groundwater monitoring was undertaken in accordance with the *Water Management Plan* during the reporting period.

6 Environmental Performance

6.1 METEOROLOGICAL MONITORING

This report uses 2025 rainfall and temperature data from the Bureau of Meteorology's Ballina Airport station, approximately 5 kilometres (km) southeast of the site to provide a summary for the period. These meteorological results are presented in **Table 12**.

Table 12: Meteorological Monitoring Results 2025 (Ballina Airport AWS, station 058198)

Month	Total Rainfall (mm)	Minimum Temperature (°C)	Maximum Temperature (°C)
January	127	15.2	35.6
February	101	16.7	31.0
March	420.4	16.7	30.5
April	240.8	13.0	29.6
May	257.0	10.0	26.1
June	169.8	5.0	24.5
July	156.2	4.3	24.0
August	312.4	4.9	28.4
September	17.2	6.6	27.9
October	97.6	8.4	37.9
November	86.6	10.9	32.7
December	75.0	13.1	33.1
Annual TOTAL	2061		

Annual rainfall experienced at Teven Quarry during the 2025 reporting period was 2061 millimetres (mm). This was a decrease of 193.2 mm from the previous 2024 reporting period.

6.2 NOISE

6.2.1 EIS Predictions

The 2014 EIS found that the Project was not predicted to exceed the project specific noise levels at any privately owned residences surrounding the Project Area, with the exception of Receiver 9. Receiver 9 has since been purchased by Holcim.

Road traffic noise levels were predicted to increase at some receivers whilst decreasing at others, with the criteria proposed in the EIS predicted to be met.

6.2.2 Approved Criteria

In accordance with Schedule 3, Condition 5(c) of SSD 6422, the Applicant shall: carry out noise monitoring (at least every 3 months) to determine whether the development is complying with the relevant conditions of this consent.'

Approved noise criteria from the Development Consent are outlined in **Table 13**.

Table 13: Noise Criteria for Teven Quarry (SSD 6422)

Receiver	Day dB(A) ($L_{Aeq(15\ min)}$)	Evening dB(A) ($L_{Aeq(15\ min)}$)
R3, R4, R13, R15, R16, R17, R18, R20	38	35
All other residences	37	35

6.2.3 Key Environmental Performance

Quarterly noise monitoring was undertaken 2025 in accordance with the requirements of Schedule 3, Condition 4. Monitoring was completed by Ramboll on the following dates:

- Q1 monitoring – 10 February and 17 March, 2025
- Q2 monitoring – 13 and 14 May 2025
- Q3 monitoring – 14 August 2025; and
- Q4 monitoring – 12 November 2025.

The Quarterly noise monitoring results are shown in **Table 14**. Copies of the quarterly noise monitoring reports for 2025 are attached as **Appendix A**.

Table 14: Noise Compliance Assessment for Teven Quarry

Assessment Period	Receiver No.	Monitoring Location	Quarrying Noise Criteria	Q1		Q2		Q3		Q4	
			$LAeq_{(15min)}$	Quarry Noise Contribution	Compliance	Quarry Noise Contribution	Compliance	Quarry Noise Contribution (LAeq(15min))	Compliance	Quarry Noise Contribution	Compliance
Day	R2	NM3	37	<30	✓	<30	✓	<27	✓	<30	✓
	R3/R4	NM2	38	<37	✓	<29	✓	<32	✓	<34	✓
	R7	NM1	37	**<38[1, 2]**	✓	<28	✓	<26	✓	<30	✓
	R10	NM4	37	<37	✓	<37[3,4,5]	✓	**<42[3,6,7,8]**	×	**<40[3,7,9]**	×
	R14	NM5	37	<30	✓	<31	✓	<37	✓	<33	✓
Evening	R2	NM3	35	Not operational	✓	Not operational	✓	Not operational	✓	Not operational	✓
	R3/R4	NM2	35	Not operational	✓	Not operational	✓	Not operational	✓	Not operational	✓
	R7	NM1	35	Not operational	✓	Not operational	✓	Not operational	✓	Not operational	✓
	R10	NM4	35	Not operational	✓	Not operational	✓	Not operational	✓	Not operational	✓
	R14	NM5	35	Not operational	✓	Not operational	✓	Not operational	✓	Not operational	✓

Notes:

Values in bold indicate exceedances where quarry noise was audible.

Monday to Saturday; Day 7am to 6pm; Evening 6pm to 10pm; Night 10pm to 7am. On Sundays and Public Holidays, Day 8am to 6pm; Evening 6pm to 10pm; Night 10pm to 8am.

[1] Measured LA90 value of 47.6 was dominated by flora and fauna so unable to separate extraneous noise from Holcim noise but estimated be less than 38 dBA at the assessment location.

[2] Negligible exceedance (NPfI 2017 – Table 4.1)

[3] Monitoring was completed close to Stokers Lane at the entrance to the residence as to not disturb the resident, which places the attended noise monitoring location in direct line-of-sight of the quarry rather than near the sensitive receptor, i.e., the resident.

[4] Machine rumblings/trees/wind/insects 45-50, Quarry audible

[5] An estimated quarry contribution of 46 LA90 dBA was adopted for distance correction to receiver using NEL calculations in Appendix 1 of 2025 Q2 Noise Monitoring Report

[6] An estimated quarry contribution of 51 LAeq dBA was adopted for distance correction to receiver using Noise Emission Level calculations in Appendix 1 of 2025 Q3 Noise Monitoring Report

[7] Moderate exceedance (NPfI 2017 – Table 4.1).

[8] Wind, trees, insects 46-52, Holcim Quarry rumblings 49-51, Truck passing 58-61, Aircraft 58-69, Quarry audible

[9] An estimated quarry contribution was calculated using SEL calculations in Appendix 1 of 2025 Q4 Noise Monitoring Report.

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During the reporting period, quarry-related noise was generally inaudible at the majority of monitoring locations. The ambient environment was typically dominated by natural and community sources, including flora and fauna, barking dogs, aircraft movements, and road traffic/vehicles.

Q1 recorded one negligible (as defined by Table 4.1 of the Noise Policy for Industry (NPfI)) exceedance of less than 1 dB above the criterion (LAeq,15 min < 38 dB) on 17 March 2025 at monitoring location NM1. During this period, quarry noise was assessed as inaudible, with ambient conditions dominated by extraneous sources including wind, vegetation movement, and cicadas.

Routine attended noise monitoring identified two moderate exceedances of the applicable LAeq(15 min) noise criterion at monitoring location NM4, as follows

- Q3 (14 August 2025): 42 dB LAeq (15 min), representing an exceedance of 5 dB above the criterion.
- Q4 (12 November 2025): 40 dB LAeq (15 min), representing an exceedance of 3 dB above the criterion

In response to the Q3 exceedance, NSW Planning recommended Holcim consider the mitigation strategies outlined in the Ramboll report (24 October 2025) and requested an update on monitoring and mitigation in the next Annual Review. Following the Q4 exceedance (second moderate exceedance at NM4 in consecutive monitoring periods), Holcim advised that an independent noise assessment will be undertaken to confirm the noise source(s), with recommendations to be implemented to mitigate future noise emissions and return results to compliance at NM4. Holcim notes it was notified of the exceedance on 23 December during the end-of-year shutdown period, contributing to a delay in reporting.

Accordingly, the Q3 and Q4 results recorded at NM4 represent a non-compliance with the project noise criteria in Table 2 of Schedule 3, Condition 4 (Noise Impact Assessment Criteria) of the Development Consent.

Long-term Trends

The quarry has generally remained compliant since routine monitoring commenced in 2017; however, NM4 has been the recurring location where exceedances have been recorded in previous years. These exceedances have typically been associated with changes in loading quantities and plant operating conditions, and periods where reduced stockpile volumes diminished the effectiveness of stockpiles as an acoustic barrier between the quarry and NM4.

Comparison to EIS Predictions

All monitoring results, except for the two exceedances at NM4 during Q3 and Q4 monitoring, were in accordance with EIS predictions.

6.2.4 Management Measures

Noise impacts are managed in accordance with the specific management strategies, procedures, controls, and monitoring programs within the Teven Quarry Noise Management Plan (NMP).

6.2.5 Proposed Improvements

Holcim will continue to work with Ramboll to improve the preparation and review of noise monitoring datasheets and reports to ensure exceedances are identified and communicated in a timely manner and that timely operational responses can be considered. In response to the consecutive moderate exceedances at NM4 in Q3 and Q4, Holcim will progress an independent noise assessment to confirm

the source(s) of noise and inform any further management or mitigation measures, as required. Holcim will also trial live noise monitoring to support rapid identification of operational noise spikes and undertake an occupational noise assessment to help characterise key on-site noise sources.

6.3 AIR QUALITY

6.3.1 EIS Predictions

The 2014 EIS predicted that the change in air quality impacts due to the Project when compared to existing approved operations was predicted to be negligible, with the results for all scenarios predicted to be very similar.

The Project is predicted to comply with the relevant air quality criteria at all nearby sensitive receiver locations under worst case operating conditions, with the exception of 24-hour average PM_{10} concentrations at two nearby sensitive receiver locations - Receiver 9 and Receiver 6. This exceedance is due to the combined effect of Teven Quarry activities and maximum background levels. Receiver 9 has since been purchased by Holcim. If, on any day, the background levels were average rather than at maximum levels, then no property would be predicted to experience 24-hour average PM_{10} concentrations above the criteria.

6.3.2 Approved Criteria

Air quality monitoring criteria stipulated in Schedule 3, Condition 11 of SSD 6422 is presented in **Table 15**.

Table 15: Air Quality Monitoring Criteria (SSD 6422)

Pollutant	*Averaging Period*	*Criterion*	
Particulate matter < 10 µm (PM_{10})	Annual	[a,d] 30 µg/m^3	
Particulate matter < 10 µm (PM_{10})	24 hour	[b] 50 µg/m^3	
Total suspended particulates (TSP)	Annual	[a,d] 90 µg/m^3	
[c] Deposited dust	Annual	[b] 2 g/m^2/month	[a,d] 4 g/m^2/month

Notes tor Table 4:

a. *Cumulative impact (ie increase in concentrations due to the development plus background concentrations due to all other sources).*
b. *Incremental impact (ie incremental increase in concentrations due to the development on its own, with zero allowable exceedances of the criteria over the life of the development).*
c. *Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: 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, or any other activity agreed to by the Secretary.*
e. *"Reasonable and feasible avoidance and mitigation measures" includes, but is not limited to, the operational requirements in conditions 12 and 13 to develop and implement a air quality management system that ensures operational responses to the risks of exceedance of the criteria.*

6.3.3 Key Environmental Performance

PM_{10} Monitoring

Schedule 3, Condition 11 (PM_{10})

In 2025, dust monitoring was undertaken using a High-Volume Air Sampler (HVAS) to monitor particulate matter (PM_{10}). PM_{10} monitoring results for 2025 are provided in **Table 16**. A conversion factor outlined in the Air Quality Management Plan was used to calculate the actual monitoring result to derived TSP result.

Table 16: 2025 Dust Monitoring (PM10)

Sample Date	PM_{10} (µg/m3)	TSP (µg/m3)	24-hour PM_{10} Criterion
	Actual Result	Calculated Result	
02/01/2025	3.4	9.7	Compliant
08/01/2025	6.6	18.9	Compliant
14/01/2025	11.8	33.7	Compliant
20/01/2025	29.4	84.0	Compliant
26/01/2025	31.5	90.0	Compliant
01/02/2025	31.1	88.9	Compliant
07/02/2025	11.1	31.7	Compliant
13/02/2025	26.2	74.9	Compliant
19/02/2025	26.3	75.1	Compliant
25/02/2025	11.9	34.0	Compliant
03/03/2025	**51.3**	146.6	Non-compliant[1]
09/03/2025	-	-	Non-compliant[2]
15/03/2025	5.3	15.1	Compliant
21/03/2025	36	102.9	Compliant
27/03/2025	8.9	25.4	Compliant
02/04/2025	9.1	26.0	Compliant
08/04/2025	22.2	63.4	Compliant
14/04/2025	6.1	17.4	Compliant
20/04/2025	24.9	71.1	Compliant
26/04/2025	34.7	99.1	Compliant
02/05/2025	12.6	36.0	Compliant
08/05/2025	11.4	32.6	Compliant
14/05/2025	28.7	82.0	Compliant
20/05/2025	9.6	27.4	Compliant
26/05/2025	22.7	64.9	Compliant
01/06/2025	9.6	27.4	Compliant
07/06/2025	6.9	19.7	Compliant
13/06/2025	5.0	14.3	Compliant
19/06/2025	8.4	24.0	Compliant
25/06/2025	8.5	24.3	Compliant

Sample Date	PM_{10} (µg/m3)	TSP (µg/m3)	24-hour PM_{10} Criterion
	Actual Result	Calculated Result	
01/07/2025	10.8	30.9	Compliant
07/07/2025	7.6	21.7	Compliant
13/07/2025	18.9	54.0	Compliant
19/07/2025	15.2	43.4	Compliant
25/07/2025	10.9	31.1	Compliant
31/07/2025	8.2	23.4	Compliant
06/08/2025	14.3	40.9	Compliant
12/08/2025	4.6	13.1	Compliant
18/08/2025	11.2	32.0	Compliant
24/08/2025	22.1	63.1	Compliant
30/08/2025	10.8	30.9	Compliant
05/09/2025	18.4	52.6	Compliant
11/09/2025	2.3	6.6	Compliant
17/09/2025	-	-	Non-Compliant[3]
23/09/2025	9.3	26.6	Compliant
29/09/2025	5.5	15.7	Compliant
05/10/2025	35	100.0	Compliant
11/10/2025	38.3	109.4	Compliant
17/10/2025	15.8	45.1	Compliant
23/10/2025	37.6	107.4	Compliant
29/10/2025	38.6	110.3	Compliant
04/11/2025	31.5	90	Compliant
10/11/2025	11.7	33.4	Compliant
16/11/2025	24	68.6	Compliant
22/11/2025	31.9	91.1	Compliant
28/11/2025	**51.1**	146.0	Non-Compliant[4]
04/12/2025	2.2	6.3	Compliant
10/12/2025	8.0	22.9	Compliant
16/12/2025	<1	<1	Compliant
22/12/2025	30	85.7	Compliant
28/12/2025	14	40.0	Compliant
Minimum	<1	<1	
Maximum	51.3	146.6	
Average	17.8	50.5	

Notes:
*Exceedances above the criterion are in **bold**.*
[1]Exceedance due to agricultural activity on adjacent farmland
[2]Missed sampling due to Blackout caused by Cyclone Alfred
[3]Sample filter was lost by lab
[4]Exceedance likely due to agricultural activity on adjacent farmland.
.

There were 59 sampling events for PM_{10} and TSP in 2025; the majority were within the approved criteria.

The HVAS monitoring unit recorded a marginal exceedance of 51.3 µg/m³ on 3 March 2025 (1.3 µg/m³ above the 50 µg/m³ criterion). The department was notified on 1 April 2025 along with a figure showing the PM10 monitor and its proximity to adjacent farmland. The exceedance was attributed to stripping activities on adjacent farmland outside of the project boundary. The same correspondence also advised that the HVAS was non-operational on 9 March 2025 leading to missed sample. This was due to a blackout associated with Cyclone Alfred.

On 8 October 2025, HVAS samples were collected from Holcim by an environmental contractor, this included the sample for 17 September 2025. The sample filter paper was subsequently lost by the lab when transiting the sample to their facility in Melbourne. The lab provided a report acknowledging the loss of sample and has taken preventative action to prevent reoccurrence including additional training in sample handling, and investigating sample bags with better visibility.

On 5 January 2026, Holcim was advised that the 28 November 2025 sample returned a result of 51.1 µg/m³, marginally exceeding the site's 24-hour criterion of 50 µg/m³. The subsequent investigation determined the exceedance was caused by agricultural activities on neighbouring land, outside Holcim's operational control. The department was notified on 6 January 2026. The sample was sent for further analysis with a report received 29 January 2026, stating XXX

The PM_{10} 2025 average was 17.8 µg/m³. This is significantly below the annual criteria of 30 µg/m3 and compliant with the Development Consent. This 2025 average is slightly higher than the 2024 average of 12.4 µg/m3. The PM_{10} annual average for 2025 was significantly less than for 2019 and 2018, which were 32.4 µg/ m3 and 28.6 µg/ m3, respectively.

The annual average for derived TSP was 50.5 µg/ m3 which is significantly below the annual criteria of 90 µg/ m3 and meets conditions of the Development Consent.

While the annual averages for both PM_{10} and TSP meet the conditions of the Development Consent, Teven Quarry has recorded a low-risk non-compliance in sampling frequency as a result of the missed sampling. Given the compliant results obtained for the vast majority of the reporting period which were significantly below criteria, this is considered low risk. During the 2026 monitoring period, Teven will continue to monitor in accordance with the Development Consent.

Depositional Dust Monitoring

Condition 11, Schedule 3 (Dust Deposition)

Depositional dust continued to be monitored at three depositional dust gauges at Teven Quarry throughout 2025. Results for this monitoring are provided in **Table 17.**

Table 17: 2025 Dust Monitoring (Depositional Dust)

Sample Period	Insoluble Solids DDG1 (g/m^2/month)	Insoluble Solids DDG2 (g/m^2/month)	Insoluble Solids DDG3 (g/m^2/month)
January	invalid[1]	0.8	0.2
February	0.7	1.7	0.6
March	1.3[2]	**3.4**[3]	0.3[4]
April	1.1	1.4	1.4
May	0.1	2.2	0.6
June	0.2	0.4	**4.4**
July	1.2	0.7	0.6
August	**4.2**	0.2	0.1
September	1.2	1.4	1.3
October	1.1	1.4	0.9
November	**5.9**	2.7	1.7
December	0.9	2.7	0.8
Annual Average	1.63	1.42	1.15
Result	Within Criteria	Within Criteria	Within Criteria

Notes:
*Exceedances above the monthly criterion are in **bold***
Invalidated samples were excluded from the annual average
[1] Sample invalidated - funnel missing upon collection. Potential sign of tampering.
[2] Sample exposed for 35 days as Cyclone Alfred prevented collection and replacement of bottle due to site closure and safety concerns. Result has been averaged by the sampling period, in days, in accordance with AS3580.10.1.6
[3]Sample exposed for 35 days as Cyclone Alfred prevented collection and replacement of bottle due to site closure and safety concerns. High rainfall associated with Cyclone Alfred also resulted in sample loss due to sample bottle/funnel overflowing so sample result (insoluble solids of 3.4 g/m2/month) has been invalidated.
[4] Sample exposed for 35 days as Cyclone Alfred prevented collection and replacement of bottle due to site closure and safety concerns. High rainfall associated with Cylcone Alfred also resulted in sample loss due to sample bottle/funnel overflowing so sample result (insoluble solids of 0.3 g/m2/month) has been invalidated.

The complete monitoring program was undertaken during the reporting period. DDG1, DDG2, and DDG 3 were within the annual average criteria of 4 g/m^2/month.

The yearly comparison of depositional dust monitoring data at Teven Quarry from 2019 to 2025 is presented below in **Table 18**.

Table 18: Yearly Comparison of Depositional Dust Data (g/m/2/month)

Dust Depositional Gauge	Monitoring Summary for Reporting Period	2019	2020	2021	2022	2023	2024	2025
DDG1	Insoluble Solids Reporting Period Average	1.3	1.97	1.04	1.03	1.15	1.3	1.63
	Max. Insoluble Solids	3.9	5.2	4.8	1.0	3.6	6.6	5.9
	Min. Insoluble Solids	0.1	0.5	0.1	0.1	0.2	0.1	0.1
DDG2	Insoluble Solids Reporting Period Average	2.8	2.85	1.02	0.92	1.3	2.0	1.42
	Max. Insoluble Solids	5.5	2.9	3.7	1.4	3	3.8	2.7
	Min. Insoluble Solids	0.6	2.8	0.2	0.2	0.4	0.1	0.2
DDG3	Insoluble Solids Reporting Period Average	1.5	1.41	0.88	0.78	0.67	1.2	1.15
	Max. Insoluble Solids	3.8	0.1	2.5	1.6	2.8	3.7	4.4
	Min. Insoluble Solids	0.1	3.6	0.2	0.1	3	0.1	0.1

Long-term Trends

Trends analysis for depositional dust results in 2025 has found that depositional dust levels generally remained consistent compared to previous years.

The 2025 annual average for PM_{10} remains below long-term criteria. This is consistent with previous years apart from DDG2 2019 and 2020 averages, which were above criteria. Deposition results from the reporting period found no exceedance.

Comparison to EIS Predictions

Majority of the air quality monitoring data was within EIS predictions.

Key historical contributions to PM_{10} exceedances are bushfires and nearby agricultural activity such as cutting of cane and slashing. Previous laboratory analysis indicates outside dust sources are the major contributor to dust levels at DDG1 and DDG2.

6.3.4 Management Measures

Teven Quarry is committed to implementing reasonable and feasible avoidance and mitigation measures and to continue to investigate ways to minimise any air quality impacts from the quarry. Air quality management measures implemented at Teven Quarry are detailed in the Air Quality Management Plan (AQMG) dated May 5 and approved by DPHI (then DPE) on May 25, 2022.

6.3.5 Proposed Improvements

Holcim is committed to improving air quality management at Teven Quarry will continue to implement the site's AQMP.

6.4 BLASTING

6.4.1 EIS Predictions

The 2014 EIS found that the Project could 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

Blasting was undertaken at Teven Quarry throughout the 2025 reporting period in accordance with the conditions of EPL No. 3293. The criteria for blasting at the site as per the EPL are detailed in **Table 19**.

Table 19: Blast Monitoring Criteria from EPL 3293

Blasting	
L5.1	Blasting operations at the premises may only take place between 10:00 to 15:00 Monday to Friday. (Where a blast failure has occurred or there are compelling safety reasons, the EPA may permit a blast to occur outside the above hours. The licensee must provide prior written notice of any such blast to the EPA by contacting 131 555).
L5.2	The airblast overpressure level from blasting operations in or on the premises must not exceed:

	a) 115 dB (Lin Peak) for more than 5% of the total number of blasts during each reporting period; and b) 120 dB (Lin Peak) at any time. At any point within 1 metre of any affected residential property or other sensitive noise location.
L5.3	The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed: a) 5 mm/s for more than 5% of the total number of blasts carried out on the premises during each reporting period; and b) 10 mm/s at any time. At any point within 1 metre of any affected residential property or other sensitive noise location.
L5.4	All sensitive receivers are to be given at least 24 hours' notice when blasting is to be undertaken.
L5.5	To determine compliance with condition(s) L4.2 and L4.3: a) Airblast overpressure level and ground vibration peak particle velocity must be measured at the most affected residence or noise sensitive location that is not owned by the licensee or subject to a private agreement between the owner of the residence or noise sensitive location and the licensee as to an alternative airblast overpressure level and/or ground vibration peak particle velocity for all blasts carried out in or on the premises; and b) Instrumentation used to measure the airblast overpressure level and ground vibration peak particle velocity must meet the requirements of the current Australian Standard.
L5.6	The licensee must report any exceedance of the licence blasting limits to the EPA within 24 hours of the exceedance becoming known to the licensee or to one of the licensee's employees or agents.

In accordance with Schedule 3, Condition 1 of the Development Consent, blasting is to be undertaken between 10am and 3pm Monday to Friday, with no blasting to occur on Sundays or public holidays.

Blast monitoring results for 2025 are displayed in **Table 20.**

Table 20: 2025 Blast Monitoring Results

Location	Description	Upper Limit Criteria	Date							
			31/01/2025	24/03/2025	04/06/2025	29/07/2025	19/09/2025	20/10/2025	21/11/2025	12/12/2025
Residence on Wellers Rd	Over Pressure - dB (Lin Peak)	120	101.9	107.5	102.8	105.50	106.4	105.5	110.9	107.8
	Ground Vibration - (mm/s)	10	3.1	3.33	1.11	**5.15**	2.03	3.68	2.42	3.84
Site Entrance, Stokers Lane	Over Pressure - dB (Lin Peak)	120	107.50	106.5	DNT	114.4	DNT	106.6	112.8	108
	Ground Vibration - (mm/s)	10	0.43	0.42	0.55	0.89	DNT	0.99	0.49	0.42

Note: DNT = Did Not Trigger due to vibration levels below monitors detection threshold.
*Note: **Bold** values indicate an exceedance of the relevant criteria.*

Long-term Trends

From 2015 – 2025 the blasting levels have generally been within the EPL criteria. Long-term blast results are provided in **Table 21**. These show long-term consistency for overpressure results. In 2025, the average overpressure and vibration levels were slightly higher than those recorded in 2024.

Table 21: Long-term Blasting Trends

Year	Number of blasts	No. of blasts below vibration or overpressure trigger level	Max. Overpressure (dBL)	Average Overpressure (dBL)	Max Vibration (mm/s)	Average Vibration (mm/s)
2015	14	10	113.1	109.3	0.66	0.44
2016	12	7	112.1	109.6	0.45	0.37
2017	15	8	114.0	106.9	0.5	0.33
2018	12	11	114.1	112.4	0.05	0.05
2019	11	11	NT	NT	NT	NT
2020	12	7	109.3	106.2	1.9	0.9
2021	10	0	117.50	108.28	4.99	2.07
2022	10	10	114.7	107.76	3.07	1.58
2023	10	9	116.5	107.82	2.08	1.30
2024	10	10	112.2	102.28	2.89	1.0
2025	8	8	114.4	107.4	5.15	1.92

Note: NT = Not Triggered.

6.4.3 Comparison to EIS Predictions

During the 2025 reporting period, Teven Quarry conducted 8 blasts, all of which complied with the established criteria of 10 mm/s at any time.

A blast on 29 July 2025 was measured at 5.15 mm/s, as there were only 8 blasts in the reporting period, this blast represented >5% of all blasts in the reporting period. Therefore, this single blast has caused an exceedance against the total blasts criteria (no more than 5% of blasts to exceed 5 mm/s) under condition L5.3 of the EPL.

An investigation of the exceedance was conducted by Orica and a report prepared, dated 30 July 2025, detailing the findings. The investigation found that the blast was appropriately designed, based on historical data, to produce ground vibration of less than 4.5 mm/s at the receiver. It was determined that vibration results were likely exacerbated by saturated ground conditions at the monitoring location from recent rainfall. The blast monitor was buried in the saturated ground and not placed on its usual block as the block could not be found. A larger diameter drill hole for the blast was also identified as a possible contributing factor. The report was provided to DPHI on 6 August 2025.

6.4.4 Management Measures

Blast emission related impacts (vibration and air blast) are managed in accordance with the specific measures within the Teven Quarry Blast Management Plan (2021).

6.4.5 Proposed Improvements

The following recommendations are proposed to mitigate ground vibration, following the investigation report regarding the 29 July 2025 exceedance:

- Install a rigid concrete plinth to place vibration monitors on to ensure consistent coupling.
- If not feasible, relocate monitors closer to the quarry and apply iterative Peak Particle Velocity (i.e. ground vibration levels) prediction models.
- Conduct a site law review to optimise monitor placement and timing strategies.

Holcim will continue to monitor vibration levels and consider the installation of a rigid monitoring plinth if there are further issues with ground vibration readings.

6.5 TRAFFIC MANAGEMENT

6.5.1 EIS Predictions

The 2014 EIS assessment of traffic impacts associated with the Project found that impacts on the road network and principal intersections would be satisfactory and there was no requirement to upgrade the roads or intersections surrounding the site once minor improvements to Route 1 were undertaken.

A review of road safety conducted as part of the EIS recommended prioritising the use of Route 1 for product transport and recommended a number of minor improvements to Route 1 to improve the safety for nighttime haulage, including centre line marking, reflectors, and maintenance of existing guard rails at locations along Route 1. Holcim has implemented these recommendations.

6.5.2 Approved Criteria

According to Development Consent SSD 6422 the site is required to monitor transport in accordance with the following requirements:

Schedule 2, Condition 9: *The Applicant will not dispatch more than 73 laden trucks from the site per day, averaged over the total number of dispatch days in any calendar month.*

Schedule 3, Condition 23: *The Applicant shall keep accurate records of all laden truck movements to and from the site (hourly, daily, weekly, monthly, and annually) and publish a summary of records on its website every 6 months.*

6.5.3 Key Environmental Performance

Teven Quarry performed daily monitoring of truck movements throughout 2025 to ensure compliance with movements and volume requirements discussed above. A copy of these monitoring results has been included in **Table *22***.

Table 22: Average Truck Movements for 2025

Month	Total Truck Movements	Active days	Average Laden Truck Movement per active day[1]
January	962	25	37
February	1690	24	69
March	938	26	34
April	1029	23	44
May	1298	25	46
June	1137	24	45
July	1205	28	42
August	1053	26	39
September	1325	26	48
October	1217	26	45
November	1692	25	66
December	1170	25	45
Total	14716	303	47

*Note exceedances are listed in **bold***

1. Laden truck movements are half of total truck movements.

Long Term Trends

A review of Teven Quarry truck transport data from 2015 to 2024 shows that average daily laden truck movements did not exceed the approved limit maximum of 73 laden trucks from the site per day, averaged over the total number of dispatch days in any calendar month.

Since the 2021 reporting period the annual average has been consistent with the EIS predictions.

6.5.4 Management Measures

Traffic and transport impacts are managed in accordance with the specific management strategies, procedures, controls, and monitoring programs within the Teven Quarry Transport Management Plan (TMP), which was approved by DPE on 20/05/2021. As per Condition 4(b) of Schedule 5, Holcim have reviewed the transport data against the TMP and have found it meets the approved requirements.

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

The 2014 EIS found the Project is unlikely to result in a significant change to the existing noise, dust and water runoff impacts of Teven Quarry, therefore it is considered that any indirect impacts to ecology that occur will be minor and will be consistent with the existing approved impacts. The results of the impact assessments under the Environmental Planning and Assessment Act (EP&A Act) and the Environment Protection and Biodiversity Conservation Act (EPBC Act) conclude that the indirect impacts of the Project are unlikely to have a significant impact on any threatened flora or fauna species, migratory fauna species, endangered population or threatened ecological communities listed under the Threatened Species Conservation Act (TSC Act) and/or the EPBC Act.

6.6.2 Approved Criteria

There are no specific criteria associated with biodiversity management for the site.

6.6.3 Key Environmental Performance

Teven Quarry continued weed spraying in 2025. Minor clearing occurred on 1 September 2025 within the existing extraction area, with a ground disturbance permit completed and pre-clearance surveys conducted by Arbor Ecological, and mitigations employed in accordance with the Biodiversity and Rehabilitation Management Plan.

In December 2025, Holcim engaged Arbor Ecological to undertake the annual rehabilitation monitoring across site. See **Appendix B** for the full report. The findings of this report are:

- Good growing conditions have prevailed since monitoring commenced in 2021 with generally regular rainfall in the subtropical climate. Regular high rainfall during 2025 has continued to provide good growing conditions
- Rehabilitation works in 2025 were concentrated early and late in the year due to persistently wet conditions during the first half of 2025 (including Cyclone Alfred) and limited availability of suitably qualified bush regenerators. Activities built on prior efforts within these plant communities, focusing on continued primary weed control and follow-up works extending to and beyond previously treated edges.eWeed control remains the priority to promote natural regeneration of plant communities.
- Rehabilitation zones are separated from the approved extraction area and remain unaffected by direct or indirect environmental impacts associated with extraction activities.
- Rainforest and Brushbox communities where rehabilitation works continue to be conducted are mostly in moderate condition and on track to achieve rehabilitation provided rehabilitation works continue.

- Small (<6 centimetres (cm)) and medium (6 cm to 12 cm) sized hollow openings observed in mature Brushbox and Camphor Laurel. Two hollow branch spouts on a Giant Water Gum/ Rose Satinash on the edge of the rainforest community
- Dense exotic grassland in relatively open areas adjoining forest vegetation offers good habitat for a range of birdlife, frogs and some mammals.
- Qualified and experienced bush regenerators continued to undertake weed control throughout the year using industry best practice methods for weed control and chemical handling.

No feral animal management occurred in the reporting period.

6.6.4 Management Measures

Teven Quarry implemented biodiversity management measures from its updated Biodiversity and Rehabilitation Management Plan (2021). The main procedures include:

- Weed management;
- Habitat reinstatement;
- Pre-clearance permit process; and
- Bushfire management.

6.6.5 Proposed Improvements

Weed spraying will continue at site during the next reporting period. There are no additional proposed improvements for the next reporting period.

6.7 HERITAGE (ABORIGINAL ARCHAEOLOGY AND HISTORIC)

6.7.1 EIS Predictions

Aboriginal Archaeology

No known Aboriginal cultural heritage sites occur within or in close proximity to the Teven Quarry Project Area. Given the terrain and history of extensive clearing, grazing, and quarrying, the area is considered to have low archaeological potential.

No known items or places of Aboriginal heritage significance are located in or within 50 metres of the Project Area. As such, the potential for impacts on items of Aboriginal cultural heritage is limited to indirect impacts such as from blasting or runoff.

Historic heritage

No known items of historic heritage significance occur within the Teven Quarry Project Area.

No historic heritage sites were found to be located within or in close proximity to the Project Area. The closest heritage item was located approximately three kilometres to the southeast in Alstonville, a sufficient distance to not experience or be impacted by indirect impacts associated with the Project.

6.7.2 Approved Criteria

There are no specific criteria associated with heritage relating to the quarry.

6.7.3 Key Environmental Performance

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

6.7.4 Management Measures

As stated in Schedule 3, Condition 26, If during the course of operations, Holcim becomes aware of any previously unknown Aboriginal archaeological material, all works likely to affect the material or site will cease immediately and Office of Environment and Heritage (OEH) (or relevant contemporary department), relevant Aboriginal stakeholders and a suitably qualified archaeologist will be consulted to determine an appropriate course of action prior to the recommencement of work at the site.

6.7.5 Proposed Improvements

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

6.8 WATER MANAGEMENT

6.8.1 EIS Predictions

Surface Water

The 2014 EIS stated the Project will not result in any changes to the quarry water management system or associated water management measures. The only potential changes that could result in surface water impacts as a result of the Project are associated with the change in water demands e.g. requirement to use more water for dust suppression or processing.

Groundwater

The results of the hydrogeological assessment conducted during preparation of the 2014 EIS indicate that the local and regional groundwater table is located below the current and proposed elevation of the Teven Quarry pit floor. The quarry has been extracted to its maximum depth of 4 metres above the Australian Height Datum (mAHD) without any evidence of groundwater inflows. For this reason, the assessment concludes that the Project will have a negligible impact on groundwater levels, groundwater quality, groundwater receptors, groundwater dependent ecosystems and groundwater users in the local area.

6.8.2 Approved Criteria

Holcim are required to monitor water quality from discharge events at the Teven Quarry licensed discharge points, in accordance with the requirements of EPL 3293 (refer to **Table 23** and **Table 24**).

Table 23: Water Monitoring Criteria (Teven Quarry EPL 3293) – LDP001

Pollutant	Units of measurement	100 percentile concentration limits
Oil and Grease	Visible	Nil

pH	pH	6.5 – 8.5
Total Suspended Solid (TSS)	Milligrams per litre	50

Table 24: Discharge Sampling Measurement Requirements (Teven Quarry EPL 3293)

Pollutant	Units of measurement	Frequency	Sampling method
Oil and Grease	Visible	Special Frequency 1	Visual inspection
pH	pH		No method specified
Total Suspended Solid (TSS)	Milligrams per litre		Grab sample

Note: Special Frequency 1 means sampling any discharge, whether controlled or otherwise, which has not occurred from rainfall exceeding 82.5mm over any consecutive 5-day period.

In addition to these surface water requirements, the site has been requested by the NSW DPHI to undertake an assessment of groundwater (should the requirement be triggered) based on the condition below:

Schedule 3 Condition 19

In the event that groundwater in excess of negligible quantities is intersected during extraction activities, the Applicant shall undertake a hydrogeological investigation, in consultation with NOW, to the satisfaction of the Secretary.

*The investigation must report on groundwater sources, levels, yield, and quality; identify any risks to groundwater users or groundwater dependent ecosystems and propose recommended management measures. The Applicant must implement reasonable and feasible management measures to the satisfaction of the Secretary.*sTeven Quarry is currently operating above the groundwater table. No groundwater seepage into the quarry void has been recorded. The quarry will continue to visually monitor the void for groundwater seepage and a detailed assessment will be undertaken in accordance with Schedule 19 Condition 3 of the Development Consent should groundwater in excess of negligible quantities be intercepted. During the reporting period this was not required.

6.8.3 Water Useage and Storage

Clean upstream catchment runoff is diverted away from the quarry and conveyed to the cane field drains which flow to Maguire's Creek and Emigrant Creek. Runoff from disturbed areas within the quarry operations are managed within the water management system, with this outlined in the Water Management Plan.

The Teven Quarry water management system has two dams/storages, the Main Dam, and the Pit Dam. Runoff within the quarry pit is managed in the primary siltation storage (Pit Dam), from which surplus water is pumped to the main silt retention storage (Main Dam) at the northern end of the quarry. The quarry water management system is designed to maximise sedimentation of pit runoff on site, prior to reuse on site or discharge via the licensed discharge point.

6.8.4 Surface Water Results

Table 25 summarises the water quality results during discharge events at LDP001. During the reporting period, LDP001 discharged 13 times in January, March, May, June, and August. A copy of the full data is included in **Appendix C.**

Table 25: Summary of Water Quality Data at Teven Quarry – 2025

Location/ Frequency	Lower Limit	Upper Limit	Unit	Description	2025 Minimum	2025 Maximum	2025 Average	2024 Average	2023 Average	2022 Average
LDP001 Wet Weather Discharge - Special Frequency 1	6.5	8.5	pH	pH	7.0	7.44	7.28	7.2	7.62	7.5
	N/A	50	mg/L	Suspended Solids	1	16	5.85	2.1	32	3.4
	N/A	10	mg/L	Total Oil & Grease	0	0	0	0	0.0	0.0

There were no exceedances in pH and suspended solids criteria. Monitoring data at LDP001 in 2025 met the EPL criteria. This is consistent with EIS predictions.

No other discharges were recorded on site during the 2025 reporting period.

6.8.5 Groundwater Results

Groundwater monitoring was not undertaken during the 2025 reporting period, as there is no consent requirement. As per Schedule 3 Condition 19 of the Development Consent, if groundwater in excess of negligible quantities is intersected during extraction activities, Holcim will undertake a hydrogeological investigation, in consultation with Department of Industry Water, to the satisfaction of the Secretary.

There are no groundwater trends or comparisons to EIS predictions.

6.8.6 Water Take

There was no water take during the reporting period.

6.8.7 Proposed Improvements

Holcim will continue to implement the Water Management Plan.

7 Rehabilitation

7.1 REHABILITATION PERFORMANCE DURING THE REPORTING PERIOD

The site is required to undertake biodiversity and rehabilitation in accordance with the conditions from SSD-6422.

27. The Applicant shall rehabilitate the site to the satisfaction of the Secretary. This rehabilitation must be generally consistent with the rehabilitation strategy in the EIS and the conceptual final landform in Appendix 2, and must comply with the objectives in Table 5.

Table 5: Biodiversity and Rehabilitation objectives

Feature	***Objective***
Site (as a whole)	• Safe, stable and non-polluting • Final landform integrated with surrounding natural landforms as far as is reasonable and feasible, and designed to minimise the visual impacts of the development when viewed from surrounding land • Restored with native, endemic vegetation
Surface Infrastructure	• Decommissioned and removed, unless the Secretary agrees otherwise
Quarry Benches	• Landscaped and vegetated using native tree and understorey species
Quarry Pit Floor	• Landscaped and revegetated using native tree and understorey species, above the final anticipated void water level

Progressive Rehabilitation

28. The Applicant shall rehabilitate 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 for final rehabilitation.

Note: It is accepted that parts of the site that are progressively rehabilitated may be subject to further disturbance in future.

See **Table 26** for details of rehabilitation performance against the requirements outlined in Section 8 of the *Annual Review Guideline* under the *Post approval requirements for State Significant Mining developments 2015*.

Table 26: Rehabilitation Performance in 2025

Guideline Requirement	Response
Extent of the operations and rehabilitation at completion of the reporting period	No rehabilitation was completed in 2025 at the site as there was no opportunity for progressive rehabilitation due to ongoing operations.
Agreed post-rehabilitation land use	The final landform will be integrated with the surrounding landform through the sowing of target flora species representative of surrounding vegetation communities.

Guideline Requirement	Response
Key rehabilitation performance indicators	See Section 7.02 of the Biodiversity and Rehabilitation Management Plan.
Renovation or removal of buildings	There were no renovations or removal of buildings in 2025.
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 2025 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 Biodiversity and Rehabilitation Management Plan.
Outcomes of trials, research projects and other initiatives.	No trials proposed.
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.

7.2 SUMMARY OF CURRENT REHABILITATION AND PERFORMANCE

A summary of the rehabilitation and disturbance status of Teven Quarry is outlined in **Table 27**, unchanged from the previous year.

Table 27: Rehabilitation and Disturbance Status per Reporting Period

Quarry Area Type	2020	2021	2022	2023	2024	2025	2026
	Actual (ha)						Forecast
A. Total Quarry Footprint[1]	17.1	17.1	17.1	17.1	17.1	17.1	17.1
B. Total Active Disturbance[2]	17.1	17.1	17.1	17.1	17.1	17.1	17.1
C. Land Being Prepared for Rehabilitation[3]	0	0	0	0	0	0	0
D. Land Under Active Rehabilitation[4]	0	0	0	0	0	0	0
E. Completed Rehabilitation[5]	0	0	0	0	0	0	0

Notes: [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 2025 there was approximately 17.1 Ha of active disturbance. This area remains consistent with previous years given that the open pit is active and does not yet present an opportunity for progressive rehabilitation to occur. There was no active rehabilitation at Teven Quarry during the 2025 reporting period.

Holcim undertakes annual rehabilitation monitoring of the Quarry, as detailed in **Section 0**.

7.3 ACTIONS FOR 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 28**.

Table 28: Rehabilitation and Closure Actions for the 2025 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.	Progressive rehabilitation will be performed once areas become available for rehabilitation. No areas are anticipated to become available during 2025.
Outline proposed rehabilitation trials, research projects and other initiatives to be undertaken during next reporting period.	No proposed rehabilitation trials.
Summary of rehabilitation activities proposed for next reporting period.	Holcim will assess opportunities to perform progressive rehabilitation.

8 Summary of Environmental Performance

A summary of the performance of environmental management measures and sampling results for the 2025 reporting period are detailed in **Table 29**.

Table 29: Environmental Performance at Teven Quarry in 2025

Aspect	Approval Criteria / EIS Prediction	Performance during 2025 reporting period	Trend / key management implications	Implemented / proposed management actions
Meteorological	Development Consent	Within criteria. Continuous meteorological data collected from BOM station.	Meteorological data collected at the site. Inspections done on the site station for maintenance.	None required.
Noise	EIS predictions are all below Development Consent criteria.	Routine attended noise monitoring identified two moderate exceedances of the applicable LAeq(15 min) noise criterion at monitoring location NM4, as follows • Q3 (14 August 2025): 42 dB LAeq (15 min), representing an exceedance of 5 dB above the criterion. • Q4 (12 November 2025): 40 dB LAeq (15 min), representing an exceedance of 3 dB above the criterion Q1 recorded one negligible exceedance of less than 1 dB above the criterion (LAeq,15 min < 38 dB) on 17 March 2025 at monitoring location NM1	Noise monitoring results were generally compliant with the applicable criteria; however, two consecutive moderate exceedances were recorded at monitoring location NM4.	Holcim will progress an independent noise assessment to confirm the source(s) of noise and inform any further management or mitigation measures, as required. Holcim will also trial live noise monitoring to support rapid identification of operational noise spikes and undertake an occupational noise assessment to help characterise key on-site noise sources
Blasting	EIS predictions are all below Development Consent criteria.	Teven recorded a total of 8 blasts during the reporting period. All blasts were within criteria of 10 mm/s. One blast was measured at 5.15 mm/s, which represented >5% of blasts in the reporting period which is non-compliant with EPL 3293 condition L5.3.	2025 averages were mostly consistent with long-term trends.	Continue monitoring blast events, and consider changes to blast hole design and the monitoring point if elevated readings reoccur.

Aspect	Approval Criteria / EIS Prediction	Performance during 2025 reporting period	Trend / key management implications	Implemented / proposed management actions
Air Quality	EIS predictions are all below Development Consent criteria.	There were two exceedances of the relevant criteria in March and November, with investigations finding both to be likely results of nearby agricultural practices. There were an additional 2 missed monitoring events. A March event was missed due to a blackout caused by Cyclone Alfred, and a September event missed due to the sample being lost in transit by a laboratory contractor.	In 2025, PM_{10} was generally consistent with long term data. Depositional dust monitoring continued in 2025.	Teven will continue to undertake management measures in line with the Air Quality Management Plan.
Traffic Management	EIS predictions are all below Development Consent criteria.	Within criteria.	Consistently meets criteria.	None required.
Biodiversity	No proposed impacts. No Development Consent criteria.	As per criteria. No biodiversity issues identified. Holcim to continue to carry out weed and feral animal management as necessary.	No long-term negative trends.	None required. Teven will continue to implement the Biodiversity and Rehabilitation Management Plan.
Heritage	No proposed impacts. No Development Consent criteria.	As per criteria. No Heritage impacts were identified during the reporting period.	No issues have been identified in recent years.	None required.
Water Management	EIS predictions are all below Development consent criteria.	2025 discharges were within monitoring criteria	Consistently meets criteria.	None required.
Rehabilitation and Landscape Management	No proposed impacts. No Development Consent criteria.	As per criteria. Site is still operational, with progressive rehabilitation to occur once practicable. No issues identified.	No long-term negative trends.	None required.

9 Waste Management

9.1 WASTE STREAMS

Waste streams produced at Teven Quarry are categorised as:

- Waste oil, filters, grease cartridges;
- Scrap metal;
- Tyres;
- Office paper and general rubbish;
- Silt (from aggregate washing); and
- Waste water from amenities and office.

9.2 WASTE MANAGEMENT

All waste generated by Teven Quarry is managed by way of Council collection services, via licensed waste contractors or onsite treatment. No on-site disposal of general waste occurs. Teven Quarry is committed to reducing, reusing, and recycling wastes prior to disposal.

Key components of waste management are:

- All waste oil is collected and stored in containers within a covered and bunded area and is removed from the site by an appropriately licensed contractor as required;
- All oil filters are separately stored and returned to the manufacturer for reuse by appropriately licensed contractor;
- Scrap metal is deposited into a dedicated skip bin for periodic collection and recycling (approximately every three months) by an appropriately licenced contractor;
- Diesel fuel is stored within a self-bunded, above-ground tank and all refuelling are undertaken on a hardstand area which drains to an oil/water separator (refer waste oil disposal);
- Silt is captured in on-site silt control structures and is periodically removed and placed/stored in the product stockpile area or overburden materials for use;
- All waste tyres are removed by the supplier of replacement tyres;
- All paper/cardboard (1 x 3m^3 bin) and general waste (2 x 3m^3 bin) originating from the office and amenities buildings, as well as packaging from routine equipment is placed in the appropriate skips for collection by Council or a licensed contractor for disposal/ recycling at an appropriate waste management facility every month; and
- Wastewater from amenities is treated and disposed of via an on-site septic tank with absorption trenches/pump out.

Holcim will advise the Department once approval to operate the on-site wastewater amenities is received from Council.

10 Community

10.1 COMMUNITY ENGAGEMENT ACTIVITIES

Holcim has maintained community engagement measures during the reporting period by undertaking the following activities:

- Maintenance of a website containing publicly available documents as required by approvals;
- 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.

10.2 COMPLAINTS

A copy of the complaints register, as well as all publicly listed information including contacts for locals in the community is publicly available on the Teven Quarry webpage in accordance with the Development Consent requirements (https://www.holcim.com.au/teven).

There was one community complaint recorded during the 2025 reporting period, which has been summarised in **Table 30** below.

Table 30: Community complaints received during 2025 reporting period

Date	Description	Outcome
24/04/2025	A neighbour from Wellers Rd complained about not being notified prior to collection of depositional dust gauge from inside property land. Environmental consultant travelled along the side of the crop and left deep wheel ruts as the area as it was very wet.	Holcim has formalised a landowner notification and access protocol for consultant visits to Wellers Rd. Consultants are required to contact landowners prior to any site entry; if landowners cannot be reached, consultants may only enter when escorted by Holcim personnel.

There were no complaints in 2017, three complaints in 2018, one complaint in 2019, three complaints in 2020, three complaints in 2021, one in 2022, none in 2023, and two in 2024.

11 Independent Audit

An Independent Environmental Audit was completed in August 2025. The IEA found:

In total, 154 conditions of the Consent and EPL were assessed as part of this IEA. Of the 154 conditions, 105 were found to be compliant, 10 were non-compliant, and 39 were not triggered. Based on this audit, the Site has a 94% compliance rating.

And concluded:

The Holcim Teven Quarry project is being implemented with a good standard of environmental management. The project is compliant with the vast majority of its approval and operational requirements, and the project has a good standing with regulators and the community. The Proponent is resourcing the project well and has highly capable personnel overseeing operations and environmental management.

An action plan was prepared by Holcim in response to recommendations within the IEA. **Table 31** provides the recommendations provided by the auditors.

The next IEA is due in August 2028.

Table 31: IEA Recommendations and Response

Condition of Consent	Requirement	Findings	Recommendation	Recommendation Detail
SSD 6422				
Schedule 3 Condition 4	The Applicant shall ensure that the noise generated by the development does not exceed the criteria in Table 2 at any residence on privately-owned land. Noise generated by the development is to be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy. Appendix 5 sets out the meteorological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria. However, the noise criteria in Table 2 do not apply if the Applicant has an agreement with the relevant landowner to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement. In the event that the studio outbuilding, certified as Complying Development under the provisions of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 by Tech ton Building Services on 16 April 2015, is constructed on Lot 3 DP 703181,	2022 Q3 and Q4 - noise levels compliant, but audible on several occasions at receivers. Exceedance in Q1 2022 is outside audit period. MAC methodology ok and consistent with NMP and Consent. Not compliant with EPL R2 period (discussed further below in relation to the NMP) and EPL. 2023 Q1 - "During noise monitoring at location NM4 during the day period, the quarry was audible from the production area above the established noise criteria." The noise monitoring report does not draw a clear conclusion regarding noise compliance at this location. It describes the contribution of the Quarry as being above noise limits using the LA1sec criterion but does not present a predicted LAeq15 minute criterion. The report is unclear but as written suggests and exceedance. NM5 location not relevant as it is not a residence. 2023 Q2 - site and road noise compliant. 2023 Q3 - noise exceedance at location NM4 (43 and 44 dB). Monitoring at NM4 was	Rec 1	Continue monitoring noise and consider the need for further mitigation of noise impacts if a trend of exceedance attributable to the Project emerges.

Condition of Consent	Requirement	Findings	Recommendation	Recommendation Detail
	the Applicant shall ensure that the noise generated by the development does not exceed a criterion of 55 dB(A) Lea (period) when measured external to the façade of the outbuilding, when it is in use.	completed at the gate of the residence, in direct line-of-sight of the quarry and subsequently, noise emission level calculations were required to estimate quarry contribution, and it is acknowledged that this methodology has limitations. 2023 Q4 - Compliant. Predicted quarry noise at NM4 was at the limit (but not exceeding). 2024 - Various exceedances of criteria were reported, but the exact contributions were not able to be quantified in many instances. Quarry noise was often noted as being inaudible but limitations in predicting the quarry noise contribution leads the reports to provide values that give the appearance of an exceedance due to the quarry. 2024 Q2 - there was an exceedance at NM4 of 43 dB which was the only exceedance attributed to the quarry in that year. The monitoring report suggests options for noise mitigation for the Site. 2025 - Exceedance in Q1 at location N1 (<38 dB). Although this is within the 2 dB 'leeway' given in the NPfI and no other exceedances.		
Schedule 3	The Applicant shall ensure that blasting on site does not cause any exceedance of the criteria in	Section 6.4 of the 2022-2024 Annual Reviews report that blasting activities were compliant	Rec 2	Continue monitoring blasts and follow blasting contractor recommendations

Condition of Consent	Requirement	Findings	Recommendation	Recommendation Detail
Condition 7	Table 3. However, these criteria do not apply if the Applicant has a written agreement with the relevant owner to exceed the limits in Table 3, and the Applicant has advised the Department in writing of the terms of this agreement.	with the criteria on all occasions except for one blast on 1 August 2023 and one in 2023. There are no negotiated agreements in place with receivers that establish other criteria. There was also a blast exceedance of the vibration criterion in July 2025 that was reported to EPA and DPHI. Orica is subcontracted to conduct blasts and all data is uploaded via the BlastIQ system.		for location of blast holes and sequence timing. Continue monitoring and if further exceedances occur, consider the need to modify blasting methodology.
Schedule 3 Condition 31	Within 3 months of each Independent Environmental Audit (see condition 8 of Schedule 5), the Applicant shall review, and if necessary revise, the sum of the Conservation and Rehabilitation Bond to the satisfaction of the Secretary. This review must consider the: (a) effects of inflation; (b) likely cost of rehabilitating the site (taking into account the likely surface disturbance over the next 3 years of the development); and (c) performance of the implementation of the rehabilitation of the site to date.	The 2022 IEA report was dated 2 March 2023. That is the latest date which could be taken as the completion of the audit. Departmental correspondence confirms that the rehabilitation bond review documentation was received on 26 July 2023, which is almost 5 months following the IEA.	Rec 3	Within 3 months of the next IEA, Proponent may seek an extension of time from the Department to submit the review, due to the amount of time necessary to prepare it.
Schedule 5 Condition 10	Within 6 weeks of the completion of this audit, or as otherwise agreed by the Secretary, the Applicant shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in	Completion of the audit is taken to be the date on which the site inspection occurred. For the 2022 audit, the site inspection was 4 August 2022. The 2022 IEA report was dated 2 March 2023, which is approximately 7	Rec 4	Future IEAs to be prepared and submitted within the 6 week timeframe, or the audit team is to write to the Department and seek an extension, setting out the reasons as to why an

Condition of Consent	Requirement	Findings	Recommendation	Recommendation Detail
	the audit report, including a timetable for the implementation of any measures proposed to address the recommendations in the report.	months following the completion of the audit. No documentation regarding extension of time was sighted by the audit team.		extension should be granted.
EPL 3293				
L5.2	The airblast overpressure level from blasting operations in or on the premises must not exceed: a) 115 dB (Lin Peak) for more than 5% of the total number of blasts during each reporting period; and b) 120 dB (Lin Peak) at any time. At any point within 1 metre of any affected residential property or other sensitive noise location.	Blasting activities were compliant with the overpressure criteria on all occasions except for one blast on 1 August 2023. There are no negotiated agreements in place with receivers that establish other criteria. Orica is subcontracted to conduct blasts and all data is uploaded via the BlastIQ system.	-	Refer to Rec 2
L5.3	The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed: a) 5 mm/s for more than 5% of the total number of blasts carried out on the premises during each reporting period; and b) 10 mm/s at any time. At any point within 1 metre of any affected residential property or other sensitive noise location.	There was also a blast exceedance of the vibration criterion in July 2025 that was reported to EPA and DPHI.	-	Refer to Rec 2
O4.7	Each sedimentation basin must have a marker (the "sedimentation basin marker") that identifies the upper level of the sediment storage zone.	The audit team has been provided with photos and correspondence that show a red painted concrete block as the sediment basin marker. The marker does not contain water heights or any markings that would allow it to be readily	Rec 5	Install appropriate depth and freeboard marker that can be seen above the highest standing water level in the dam.

Condition of Consent	Requirement	Findings	Recommendation	Recommendation Detail
		identified as a sediment basin depth marker.		
M1.3	The following records must be kept in respect of any samples required to be collected for the purposes of this licence: a) the date(s) on which the sample was taken; b) the time(s) at which the sample was collected; c) the point at which the sample was taken; and d) the name of the person who collected the sample.	The particulate monitoring is considered to comply with these requirements, as the samples are taken by the device and not 'sampled' by an individual. The requisite information is available regarding the person/contractor responsible for installation and maintenance of the unit. Noise monitoring data complies with these requirements. Water monitoring data for the site does include the sampler name (on SRAs issued by the Lab). The audit team understands that requisition forms (Chain of custody forms) issued to the lab do have sample time on them, but they are not routinely saved by the Site and were not available for the audit team to review as part of this audit, so recording of the time of sampling could not be verified.	Rec 6	Ensure that all water samples obtained include the time the sample was obtained.
M8.1	To assess compliance with the noise limits specified within this licence, the licensee must undertake operator attended noise monitoring at each specified noise monitoring point in accordance with the table below.	During the audit period, noise monitoring at location R2 was conducted for a total of 1.5 hours, comprising four sessions per operational day instead of the six sessions outlined in the Noise Management Plan (NMP). The NMP specifies that noise assessments at R2 should include six 15-minute sessions per operating day, totaling 1.5	Rec 7	Subsequent noise monitoring reports are to be revised to ensure that the minimum duration of measurements taken at location R2 (NM3) is 1.5 hours (6 sessions) on at least one monitoring day during the licence year.

Condition of Consent	Requirement	Findings	Recommendation	Recommendation Detail
		hours. However, it is noted that the Environment Protection Licence (EPL) only mandates annual monitoring. In contrast, the Proponent conducts monitoring at R2 for one hour per day, four times a year—amounting to four hours annually. This exceeds the minimum requirement set by the EPL. For example, in Q2 2023, attended noise monitoring was carried out over two days, with two 15-minute sessions during the day and two during the evening at each location. While this approach aligns with the NMP in terms of timing, it results in only four 15-minute sessions at the EPA-licensed monitoring point, rather than the six sessions specified.		

Note: Not all non-compliances and recommendations are relevant to this Annual Review reporting period.

Holcim is in the process of addressing all recommendations contained in the IEA.

12 Incidents and Non-Compliances

See **Table 32** for a summary of incidents and non-compliances within the 2025 reporting period.

Table 32: Summary of Incidents and Non-Compliances

Approval	Condition	Incident or Non-Compliance	Action
SSD 6422	Schedule 3, Condition 4	Routine attended noise monitoring identified two moderate exceedances of the applicable LAeq(15 min) noise criterion at monitoring location NM4. Exceedances were as follows: • Q3 (14 August 2025): 42 dB LAeq(15 min), representing an exceedance of 5 dB above the criterion. • Q4 (12 November 2025): 40 dB LAeq(15 min), representing an exceedance of 3 dB above the criterion	Holcim will continue to work with Ramboll to improve the preparation and review of noise monitoring datasheets and reports to ensure exceedances are identified and communicated in a timely manner and that timely operational responses can be considered. In response to the consecutive moderate exceedances at NM4 in Q3 and Q4, Holcim will progress an independent noise assessment to confirm the source(s) of noise and inform any further management or mitigation measures, as required. Holcim will also trial live noise monitoring to support rapid identification of operational noise spikes and undertake an occupational noise assessment to help characterise key on-site noise sources
SSD 6422	Schedule 3 Condition 11	Holcim were non-compliant with this condition on 4 occasions during the monitoring period. Two non-compliances were deemed to be likely results of adjacent agricultural operations, one non-compliance was attributed to a blackout due to Cyclone Alfred, and another was a result of a laboratory contractor losing a sample in transit.	Holcim will continue to work with external contractors to ensure proper process are in place for sample handling.
EPL 3293	L5.3	A blast on 29 July 2025 was measured at 5.15 mm/s, as there were only 8 blasts in the reporting period, this blast represented >5% of all blasts in the reporting period. Therefore, this single blast has caused an exceedance against the total blasts criteria (no more than 5% of blasts to exceed 5 mm/s) under condition L5.3 of the EPL. Holcim in turn notified the Department.	An investigation into the blast exceedance was commissioned by Holcim. It found saturated ground, a different diameter blast hole, and a change in blast monitoring set-up could be contributing factors to the elevated readings. Holcim will continue to monitor blasts and consider changes to the monitoring site and/or blast design if elevated readings reoccur.

13 Activities to be Completed in the Next Reporting Period

Holcim staff will undertake the following works and improvement measures and projects at Teven Quarry in 2025 to ensure compliance with the Development Consent and EPL 3293, and to ensure that effective environmental management controls are in place and operating in accordance with the requirements of the Development Consent. **Table 33** outlines proposed actions for 2025.

Table 33: Improvement Actions for 2025

Improvement Measure	Activities
Quarry Operations	Continue in line with quarry development plan and approved management plans
Air Quality	Investigate the replacement of the PM_{10} HVAS with a real time (live) dust monitor
Noise	Trial a live noise monitoring system to enable rapid response to operational noise spikes, and undertake an occupational noise assessment to identify and quantify all significant on-site noise sources

Appendix A – 2025 Quarterly Noise Monitoring Reports

Intended for
Holcim (Australia) Pty Ltd

Document type
Report

Date
May 2025

Teven Quarry Quarterly Noise Monitoring Assessment

Quarter 1 2025

RAMBOLL

Bright ideas.
Sustainable change.

Teven Quarry Quarterly Noise Monitoring Assessment

Quarter 1 2025

Project name	**NSW Environmental Monitoring 2024-2025**
Project no.	**318001800**
Recipient	**Matt Kelly**
Document type	**Report**
Version	**1**
Date	**05/05/2025**
Prepared by	**Jake Bourke, Brodie Wood**
Checked by	**Arnold Cho**
Approved by	**Gavan Butterfield**
Description	**Data collected on 10 February 2025 and 17 March 2025 for Teven Quarry during Quarter 1 2025 in Teven, NSW, as part of the noise monitoring program**

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Abbreviations and Definitions

	Description
ΔT	Vertical Temperature Difference, i.e. the measured difference in ambient temperature between two elevations on the same tower. It is defined as the upper-level temperature measurement minus the lower-level temperature measurement.
°	Degree
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).
C	Celcius
CCAM	Conformal Cubic Atmospheric Model
CSIRO	Commonwealth Scientific and Industrial Research Organisation
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.
EPA	Environment Protection Authority
EPL	Environment Protection Licence
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.
m	Metre
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.
NATA	National Association of Testing Authorities
NMA	Noise Monitoring Assessment
NMP	Noise Management Plan
NPfI	Noise Policy for Industry 2017

	Description
NSW	New South Wales
s	Second
SPL	The Sound Pressure Level. Sound pressure is the fluctuation in air pressure, from the steady atmospheric pressure, created by sound. The sound pressure level is the sound pressure expressed on a decibel scale.
TAPM	The Air Pollution Model

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

1. Overview

1.1 Project Driver

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

This NMA was done in accordance with the following documents:

- Noise Policy for Industry (NPfI) (NSW EPA, 2017)
- Teven Quarry Noise Management Plan (NMP) (Holcim Australia, 2021)
- Environment Protection Licence (EPL) number 3293 (NSW EPA, 2021)
- Development Consent Application Number SSD_6422 (Minister for Planning and Environment, 2015)
- Australian Standard AS 1055:2018 Acoustics—Description and measurement of environmental noise (Standards Australia, 2018)
- Australian Standard AS/NZS IEC 61672.1:2019 Electroacoustics – Sound level meters, Part 1: Specifications (Standards Australia and Standards New Zealand, 2019)
- IEC 60942:2017 Electroacoustics - Electroacoustics – Sound calibrators (International Standard, 2017).

This NMA has been undertaken in accordance with the NMP for the quarterly period January to March 2025 and forms part of the monitoring program to determine compliance with conditions of the Development Consent.

1.2 Site Location and Sensitive Receivers

The quarry is in Teven, NSW, approximately 7 km west of Ballina. Sensitive receivers surrounding the quarry are primarily rural and residential properties in coastal bushland with elevated and undulating topography. Five monitoring locations have been selected as part of the NMA and in accordance with the EPL and Development Consent and are shown in **Table 1-1**.

Table 1-1: Monitoring locations locality and sensitive receptors

Monitoring Locations	Nearest Receiver	Locality and Sensitive Receivers
NM1	R7	West of the quarry situated at a rural residential property at the end of Leadbeatters Lane
NM2	R3/R4	East of the quarry situated at a rural residential property on Teven Road
NM3	R2	South of the quarry situated at a rural residential property at the end of Wellers Road
NM4	R10	North of the quarry situated at a rural residential property adjacent the site off Stokers Lane
NM5	R14	Northeast of the quarry situated at a rural residential property of Teven Road

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

Imagery@ESRI World Imagery

Legend

- Noise monitoring location
- Residential receiver location

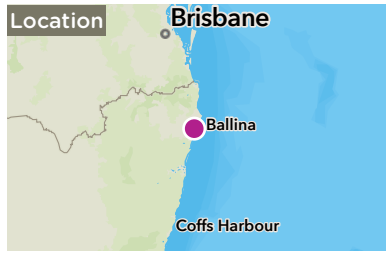

Figure 1 : Noise monitoring locations at Teven Quarry

2. Noise Criteria

Table 2-1 summaries the applicable onsite noise criteria outlined in the NMP and Development Consent for residential receivers (NM1, NM2, NM3, NM4, NM5) surrounding the quarry.

Table 2-1: Monitoring locations and noise criteria

Receivers	Monitoring Locations	Day[1]	Evening[2]
		LAeq (15min)	LAeq (15min)
		dB(A)	
R3, R4, R13, R15, R16, R17, R18, R20	NM2	38	35
All other receivers	NM1, NM3, NM4, NM5	37	35

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

[2] 6 pm–10 pm Monday to Sunday

3. Methodology

The monitoring program was developed in accordance with the procedures described in *Australian Standard AS 1055:2018* and the Approval Documents referenced in Section 1. The measurements were completed using a RION Sound Level Meter NL-52 on Monday 10 February and Monday 17 March 2025. The acoustic instrumentation used carries current National Association of Testing Authorities (NATA) calibration and complies with *AS/NZS IEC 61672-1:2019 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 60942:2017. Drift in calibration did not exceed ±0.3 dBA.

Attended noise monitoring was conducted for 15-minute periods at each monitoring location over three days. As per the NMP, two sets of measurements were completed during the day, and two sets of measurements were completed during the evening, at each monitoring location. It is noted that the quarry was not operational during the evening periods, however, monitoring was conducted as per requirements of the EPL. 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.

3.1 Meteorological conditions

Meterology has an important influence on noise monitoring assessment. An onsite meterological station with data recorded at 10m height has been used to adopt wind direction, wind speed and rain data to inform this assessment. Temperature data has been adopted from the Commonwealth Scientific and Industrial Research Organisation (CSIRO) Conformal Cubic Atmospheric Model (CCAM) and modelled using The Air Pollution Model (TAPM) to determine the atmospheric category as outline in **Table 3-1**.

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

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

As stated in the Development Consent, the noise criteria in Table 2-1 applies under all meteorological conditions except the following:

- Wind speeds greater than 3m/s at 10m above ground level
- Temperature inversion conditions between 1.5°C and 3°C/100m and wind speed greater than 2m/s at 10m above ground level
- Temperature inversion conditions greater than 3°C/100m.

Appendix 5 of the Development Consent also specifies that except for wind speed at microphone height, the data to be used for determing meterological conditons shall be that recorded by a suitable meteorological station operating in the vicinity of the site.

4. Results and Discussion

4.1 Location NM1

Noise monitoring at location NM1 was conducted on Monday 10 February 2025 and Monday 17 March 2025 with results presented in **Table 4-1**. The quarry was inaudible at NM1 during the day. The quarry was not operational during the evening. Measured predominant ambient noise sources included flora and fauna, aircraft, dog barking, passing vehicles and an aircraft. The results satisfy the established noise criteria and indicate that noise emissions from Teven Quarry did not contribute to noise nuisance at the time of the monitoring (see Footnotes 2 and 3 below).

Table 4-1: Noise survey results and observations for Location NM1

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (at 10m)	Apparent Noise Source, Description and SPL (dBA)	Teven Quarry LAeq(15min) Contribution	LAeq(15min) Criteria (dBA)
		LAmax	LAeq	LA90					
17-03-25	3:28pm to 3:43pm (Day)	66.2	52.6	44.9	WD: 16° WS: 3.2 m/s Rain: Nil	WD: NW WS: 8 m/s Rain: Nil Stability Category: D[1]	Background wind/trees/insects 41-60 Car 60-62 Dogs barking 51-53 Aircraft 50-64 Quarry inaudible	<35	37
17-03-25	3:44pm to 3:59pm (Day)	65	54.7	47.6	WD: 16° WS: 3.2 m/s Rain: Nil	WD: NW WS: 8 m/s Rain: Nil Stability Category: D[1]	Wind/trees/insects/cicadas 41-60 Quarry inaudible	<38[2,3]	37
10-02-25	6:00pm to 6:15pm (Evening)	66.2	51.8	42.0	WD: n/a WS: 0 m/s Rain: Nil	WD: S WS: 9 m/s Rain: Nil Stability Category: E[1]	Insects/cicadas/trees/birds 38-66 Quarry not operational	n/a[4]	35
10-02-25	6:16pm to 6:31pm (Evening)	84.5	59.3	29.0	WD: n/a WS: 0 m/s Rain: Nil	WD: S WS: 9 m/s Rain: Nil Stability Category: E[1]	Insects/cicadas/trees/birds 37-61 Polaris passing 54-84 Quarry not operational	n/a[4]	35

[1] Temperature data sourced from CSIRO CCAM and modelled using TAPM to determine Stability Category.

[2] Measured LA90 value of 47.6 was dominated by flora and fauna so unable to separate extraneous noise from Holcim noise but estimated be less than 38 dBA at the assessment location.

[3] Negligible exceedance (NPfI 2017 – Table 4.1)

[4] Quarry not operational.

4.2 Location NM2

Noise monitoring at location NM1 was conducted on Monday 10 February 2025 and Monday 17 March 2025 with results presented in **Table 4-2**. The quarry was inaudible at NM2 during the day. The quarry was not operational during the evening. The ambient noise environment was dominated by flora, fauna and passing cars on Teven Road. The results satisfy the established noise criteria and indicate that noise emissions from Teven Quarry did not contribute to noise nuisance at the time of the monitoring.

Table 4-2: Noise survey results and observations for Location NM2

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (at 10m)	Apparent Noise Source, Description and SPL (dBA)	Teven Quarry LAeq(15min) Contribution	LAeq(15min) Criteria (dBA)
		LAmax	LAeq	LA90					
17-03-25	4:17pm to 4:32pm (Day)	81.4	61.6	45.3	WD: 26° WS: 3.2 m/s Rain: Nil	WD: NW WS: 8 m/s Rain: Nil Stability Category: D[1]	Background wind/trees/insects/birds 44-55 Passing cars 71-81 Quarry inaudible	<35	38
17-03-25	4:39pm to 4:54pm (Day)	85.3	61.5	46.5	WD: 26° WS: 3.2 m/s Rain: Nil	WD: NW WS: 8 m/s Rain: Nil Stability Category: D[1]	Background wind/trees/insects/birds 44-55 Passing cars 71-81 Quarry inaudible	<37	38
10-02-25	7:55pm to 8:10pm (Evening)	85.3	59.5	33.6	WD: n/a WS: 0 m/s Rain: Nil	WD: S WS: 1.5 m/s Rain: Nil Stability Category: E[1]	Background motorway hum/insects/cicadas 33-45 Cars passing 64-85 Aircraft 44-50 Quarry not operational	n/a[2]	35
10-02-25	8:12pm to 8:27pm (Evening)	82.6	56.2	34.7	WD: n/a WS: 0 m/s Rain: Nil	WD: SE WS: 1 m/s Rain: Nil Stability Category: E[1]	Background motorway hum/insects/cicadas 34-41 Cars passing 60-82 Quarry not operational	n/a[2]	35

[1] Temperature data sourced from CSIRO CCAM and modelled using TAPM to determine Stability Category.

[2] Quarry not operational.

4.3 Location NM3

Noise monitoring at location NM1 was conducted on Monday 10 February 2025 and Monday 17 March 2025 with results presented in **Table 4-3**. The quarry was inaudible at NM3 during the day. The quarry was not operational during the evening. The ambient noise environment was dominated by flora, fauna and background motorway. The results satisfy the established noise criteria and indicate that noise emissions from Teven Quarry did not contribute to noise nuisance at the time of the monitoring.

Table 4-3: Noise survey results and observations for Location NM3

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (at 10m)	Apparent Noise Source, Description and SPL (dBA)	Teven Quarry LAeq(15min) Contribution	LAeq(15min) Criteria (dBA)
		LAmax	LAeq	LA90					
17-03-25	4:59pm to 5:14pm (Day)	51.5	41.6	39.7	WD: 16° WS: 2.3 m/s Rain: Nil	WD: WNW WS: 8 m/s Rain: Nil Stability Category: D[1]	Background wind/trees/insects 40-50 Quarry inaudible	<30	37
17-03-25	5:15pm to 5:30pm (Day)	49.9	41.4	39	WD: 16° WS: 2.3 m/s Rain: Nil	WD: WNW WS: 8 m/s Rain: Nil Stability Category: D[1]	Background wind/trees/insects 40-50 Quarry inaudible	<29	37
10-02-25	8:32pm to 8:47pm (Evening)	56.5	53.7	44.8	WD: n/a WS: 0 m/s Rain: Nil	WD: ESE WS: <1 m/s Rain: Nil Stability Category: E[1]	Background motorway hum/insects/cicadas 42-57 Quarry not operational	n/a[2]	35
10-02-25	8:48pm to 9:03pm (Evening)	54.5	46.9	43.9	WD: n/a WS: 0 m/s Rain: Nil	WD: ESE WS: <1 m/s Rain: Nil Stability Category: E[1]	Background motorway hum/insects/cicadas 41-57 Quarry not operational	n/a[2]	35

[1] Temperature data sourced from CSIRO CCAM and modelled using TAPM to determine Stability Category.

[2] Quarry not operational.

4.4 Location NM4

Noise monitoring at location NM1 was conducted on Monday 10 February 2025 and Monday 17 March 2025 with results presented in **Table 4-4**. The quarry was inaudible at NM4 during the day. Holcim vehicles entering and exiting the site were observed and measured during both day periods. As these were offsite vehicle movements they did not constitute as a contributor to the quarry contribution. The quarry was not operational during the evening period. The ambient noise environment was dominated by background motorway hum, flora and fauna, aircraft and a passing car. The results satisfy the established noise criteria and indicate that noise emissions from Teven Quarry did not contribute to noise nuisance at the time of the monitoring.

Table 4-4: Noise survey results and observations for Location NM4

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (at 10m)	Apparent Noise Source, Description and SPL (dBA)	Teven Quarry LAeq (15min) Contribution	LAeq (15min) Criteria (dBA)
		LAmax	LAeq	LA90					
17-03-25	2:04pm to 2:19am (Day)	75.2	55.9	46.9	WD: 16° WS: 3.2 m/s Rain: Nil	WD: WNW WS: 9 m/s Rain: Nil Stability Category: C[1]	Trees/wind/insects 48-56 Trucks passing 60-74 Quarry inaudible	<37	37
17-03-25	2:20pm to 2:35pm (Day)	82.8	53.2	48.1	WD: 16° WS: 3.2 m/s Rain: Nil	WD: WNW WS: 9 m/s Rain: nil Stability Category: C[1]	Trees/wind/insects 48-69 Trucks passing 54-60 Quarry inaudible	<29[2,3]	37
10-02-25	7:20pm to 7:35pm (Evening)	61.4	52.0	38.5	WD: n/a WS: 0 m/s Rain: Nil	WD: S WS: 3.5 m/s Rain: Nil Stability Category: E[1]	Background motorway hum/cicadas/insects/birds 36-61 Aircraft 40-43 Passing car 44-51 Quarry not operational	n/a[4]	35
10-02-25	7:36pm to 7:51pm (Evening)	72	55.5	39.8	WD: n/a WS: 0 m/s Rain: Nil	WD: S WS: 2 m/s Rain: Nil Stability Category: E[1]	Background motorway hum/cicadas/insects/birds 36-61 Quarry not operational	n/a[4]	35

[1] Temperature data sourced from CSIRO CCAM and modelled using TAPM to determine Stability Category.

[2] Measured LA90 value of 48.1 was dominated by trees, wind and insects and road traffic so unable to estimate contribution for quarry at assessment location.

[3] Monitoring was completed close to Stokers Lane at the entrance to the residence as to not disturb the resident, which places the attended noise monitoring location in direct line-of-sight of the quarry rather than near the sensitive receptor, i.e., the resident. Subsequently an estimated quarry contribution of 38 LAeq dBA was adopted for distance correction to receiver using noise emission level (NEL) calculations in Appendix 1.

[4] Quarry not operational.

Location NM5

Noise monitoring at location NM1 was conducted on Monday 10 February 2025 and Monday 17 March 2025 with results presented in **Table 4-5**. The quarry was inaudible at NM5 during the day. The quarry was not operational during the evening. The ambient noise environment was dominated flora, fauna and a passing tractor. The results satisfy the established noise criteria and indicate that noise emissions from Teven Quarry did not contribute to noise nuisance at the time of the monitoring.

Table 4-5: Noise survey results and observations for Location NM5

Date	Time (hrs)	Descriptor (dBA)			Meteorology (Handheld at microphone height)	Onsite Met Station (at 10m)	Apparent Noise Source, Description and SPL (dBA)	Teven Quarry LAeq(15min) Contribution	LAeq(15min) Criteria
		LAmax	LAeq	LA90					
17-03-25	2:39pm to 2:54pm (Day)	68	38	40.2	WD: 16° WS: 3.2 m/s Rain: Nil	WD: WNW WS: 9 m/s Rain: Nil Stability Category: C[1]	Background wind/trees/insects/birds 60-65 Passing tractor 60-65 Quarry inaudible	<30	37
17-03-25	2:56pm to 3:09pm (Day)	71.7	48.5	39	WD: 16° WS: 3.2 m/s Rain: Nil	WD: NW WS: 8.5 m/s Rain: Nil Stability Category: C[1]	Background wind/trees/insects/birds 60-65 Passing tractor 60-65 Quarry inaudible	<29	37
10-02-25	6:45pm to 7:00pm (Evening)	68.4	45.1	37.3	WD: 60° WS: 1.9 m/s Rain: Nil	WD: S WS: 8 m/s Rain: Nil Stability Category: E[1]	Insects/cicadas/trees/wind/birds 37-58 Quarry not operational	n/a[2]	35
10-02-25	7:00pm to 7:15pm (Evening)	59.4	45.0	38.9	WD: 60° WS: 1.9 m/s Rain: Nil	WD: S WS: 5 m/s Rain: Nil Stability Category: E[1]	Insects/cicadas/trees/wind/birds 37-59 Quarry not operational	n/a[2]	35

[1] Temperature data sourced from CSIRO CCAM and modelled using TAPM to determine Stability Category.

[2] Quarry not operational

5. Conclusion

This NMA completed by Ramboll at the Holcim Teven Quarry, Teven, NSW as a quarterly requirement of the NMP. Noise monitoring was completed on Monday 10 February and Monday 17 March 2025 at five locations selected as representative to the sensitive receptors at the surroundings to Teven Quarry.

No audible noise from quarry operations was observed at any of the five locations during the day and evening periods. The results presented in this NMA show compliance with the relevant noise criteria at the Holcim Teven Quarry, Teven, NSW.

It is noted that at NM1, the site noise contribution is estimated to be up to 38 dBA during one day period. This indicates that the noise criteria were exceeded by 1 dB which is however deemed negligible when considered against Table 4.1 of the NPfI. It should also be noted that the noise environment during the night-time noise monitoring was affected by extraneous noise sources whilst the site was inaudible. Therefore, it can be concluded that the exceedance was not caused by the site operation.

6. References

Holcim Australia (2021) *Teven Quarry, Noise Management Plan*.

International Electrotechnical Commission *IEC 60942:2017 Electroacoustics – Sound calibrators*

Minister for Planning and Environment (2015) 'Development Consent SSD_6422, Teven Quarry Project'.

NSW EPA (2021) Environment Protection Licence number 3293.

NSW EPA (2013) *Noise Guide for Local Government*. Sydney NSW: NSW Environment Protection Authority

NSW EPA (2014) Discussion Paper. Validation of Inversion Strength Estimation Method.

NSW EPA (2017) *Noise Policy for Industry (NPfI)*. Sydney NSW: NSW Environment Protection Authority.

Standards Australia (2018) *AS 1055:2018 Acoustics—Description and measurement of environmental noise*. Australian Standard.

Standards Australia and Standards New Zealand (2019) *AS/NZS IEC 61672.1:2019 Electroacoustics—Sound level meters, Part 1: Specifications*. Australian/New Zealand Standard.

Appendix 1

Noise Emission Level Calculation

Project No: 318001800
Client Name: Holcim Australia Pty Ltd
Project Name: NSW Environmental Monitoring
Project Site: Teven Quarry
5/05/2025

Noise Emission Level Calculation

RAMBOLL

NM4 day monitoring period (1:25PM to 1:40PM)

Site contribution corrected for distance from monitoring location to receiver

Noise source	Quarry contribution
Estimated site contribution (LAeq) at monitoring location (dBA)	38.0
Approx. distance from monitoring location to site (m)	310
Approx. distance from site to receiver (m)	500
Distance corrected site contribution at receiver (LAeq dBA)	**33.8**
Estimated additional attenuation (vegetation & ground absorption)	5
Estimated site contribution at receiver (dBA)	**28.8**

Intended for
Holcim (Australia) Pty Ltd

Document type
Report

Date
August 2025

Teven Quarry Quarterly Noise Monitoring Assessment

Quarter 2 2025

RAMBOLL

Bright ideas.
Sustainable change.

Teven Quarry Quarterly Noise Monitoring Assessment

Quarter 2 2025

Project name	**NSW Environmental Monitoring 2024-2025**
Project no.	**318001800**
Recipient	**Matt Kelly**
Document type	**Report**
Version	**1**
Date	**12/08/2025**
Prepared by	**Jake Bourke, Brodie Wood**
Checked by	**Arnold Cho**
Approved by	**Gavan Butterfield**
Description	**Data collected on 13 May 2025 and 14 May 2025 for Teven Quarry during Quarter 2 2025 in Teven, NSW, as part of the noise monitoring program**

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Abbreviations and Definitions

	Description
ΔT	Vertical Temperature Difference, i.e. the measured difference in ambient temperature between two elevations on the same tower. It is defined as the upper-level temperature measurement minus the lower-level temperature measurement.
°	Degree
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).
C	Celcius
CCAM	Conformal Cubic Atmospheric Model
CSIRO	Commonwealth Scientific and Industrial Research Organisation
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.
EPA	Environment Protection Authority
EPL	Environment Protection Licence
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.
m	Metre
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.
NATA	National Association of Testing Authorities
NMA	Noise Monitoring Assessment
NMP	Noise Management Plan
NPfI	Noise Policy for Industry 2017

	Description
NSW	New South Wales
s	Second
SPL	The Sound Pressure Level. Sound pressure is the fluctuation in air pressure, from the steady atmospheric pressure, created by sound. The sound pressure level is the sound pressure expressed on a decibel scale.
TAPM	The Air Pollution Model

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

1. Overview

1.1 Project Driver

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

This NMA was done in accordance with the following documents:

- Noise Policy for Industry (NPfI) (NSW EPA, 2017)
- Teven Quarry Noise Management Plan (NMP) (Holcim Australia, 2021)
- Environment Protection Licence (EPL) number 3293 (NSW EPA, 2021)
- Development Consent Application Number SSD_6422 (Minister for Planning and Environment, 2015)
- Australian Standard AS 1055:2018 Acoustics—Description and measurement of environmental noise (Standards Australia, 2018)
- Australian Standard AS/NZS IEC 61672.1:2019 Electroacoustics – Sound level meters, Part 1: Specifications (Standards Australia and Standards New Zealand, 2019)
- IEC 60942:2017 Electroacoustics - Electroacoustics – Sound calibrators (International Electrotechnical Commission, 2017).

This NMA has been undertaken in accordance with the NMP for the quarterly period April to June 2025 and forms part of the monitoring program to determine compliance with conditions of the Development Consent.

1.2 Site Location and Sensitive Receivers

The quarry is in Teven, NSW, approximately 7 km west of Ballina. Sensitive receivers surrounding the quarry are primarily rural and residential properties in coastal bushland with elevated and undulating topography. Five monitoring locations have been selected as part of the NMA and in accordance with the EPL and Development Consent and are shown in **Table 1-1**.

Table 1-1: Monitoring locations locality and sensitive receptors

Monitoring Locations	Nearest Receiver	Locality and Sensitive Receivers
NM1	R7	West of the quarry situated at a rural residential property at the end of Leadbeatters Lane
NM2	R3/R4	East of the quarry situated at a rural residential property on Teven Road
NM3	R2	South of the quarry situated at a rural residential property at the end of Wellers Road
NM4	R10	North of the quarry situated at a rural residential property adjacent the site off Stokers Lane
NM5	R14	Northeast of the quarry situated at a rural residential property of Teven Road

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

Imagery@ESRI World Imagery

Legend

- Noise monitoring location
- Residential receiver location

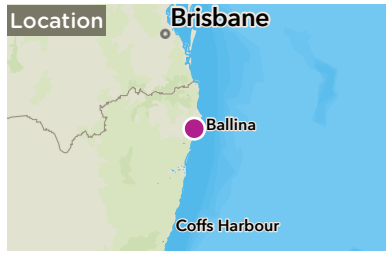

Figure 1 : Noise monitoring locations at Teven Quarry

2. Noise Criteria

Table 2-1 summaries the applicable onsite noise criteria outlined in the NMP and Development Consent for residential receivers (NM1, NM2, NM3, NM4, NM5) surrounding the quarry.

Table 2-1: Monitoring locations and noise criteria

Receivers	Monitoring Locations	Day[1]	Evening[2]
		LAeq (15min)	LAeq (15min)
		dB(A)	
R3, R4, R13, R15, R16, R17, R18, R20	NM2	38	35
All other receivers	NM1, NM3, NM4, NM5	37	35

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

[2] 6 pm–10 pm Monday to Sunday

3. Methodology

The monitoring program was developed in accordance with the procedures described in *Australian Standard AS 1055:2018* and the Approval Documents referenced in Section 1. The measurements were completed using a RION Sound Level Meter NL-52 on Tuesday 13 May and Wednesday 14 May 2025. The acoustic instrumentation used carries current National Association of Testing Authorities (NATA) calibration and complies with *AS/NZS IEC 61672-1:2019 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 60942:2017. Drift in calibration did not exceed ±0.3 dBA.

Attended noise monitoring was conducted for 15-minute periods at each monitoring location over two days. As per the NMP, two sets of measurements were completed during the day, and two sets of measurements were completed during the evening, at each monitoring location. It is noted that the quarry was not operational during the evening periods, however, monitoring was conducted as per requirements of the EPL. 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.

3.1 Meteorological conditions

Meterology has an important influence on noise monitoring assessment. An onsite meterological station with data recorded at 10m height has been used to adopt wind direction, wind speed and rain data to inform this assessment. Temperature data has been adopted from the Commonwealth Scientific and Industrial Research Organisation (CSIRO) Conformal Cubic Atmospheric Model (CCAM) and modelled using The Air Pollution Model (TAPM) to determine the atmospheric category as outline in **Table 3-1**.

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

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

As stated in the Development Consent, the noise criteria in Table 2-1 applies under all meteorological conditions except the following:

- Wind speeds greater than 3m/s at 10m above ground level
- Temperature inversion conditions between 1.5°C and 3°C/100m and wind speed greater than 2m/s at 10m above ground level
- Temperature inversion conditions greater than 3°C/100m.

Appendix 5 of the Development Consent also specifies that except for wind speed at microphone height, the data to be used for determing meterological conditons shall be that recorded by a suitable meteorological station operating in the vicinity of the site.

4. Results and Discussion

4.1 Location NM1

Noise monitoring at location NM1 was conducted on Tuesday 13 May 2025 and Wednesday 14 May 2025 with results presented in **Table 4-1**. The quarry was inaudible at NM1 during the day. The quarry was not operational during the evening. Measured predominant ambient noise sources included background traffic, insects, cicadas, birds, llamas and passing cars. The results satisfy the established noise criteria and indicate that noise emissions from Teven Quarry did not contribute to noise nuisance at the time of the monitoring.

Table 4-1: Noise survey results and observations for Location NM1

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (at 10m)	Apparent Noise Source, Description and SPL (dBA)	Teven Quarry LAeq(15min) Contribution	LAeq(15min) Criteria (dBA)
		LAmax	LAeq	LA90					
13-05-25	4:13pm to 4:28pm (Day)	54.6	42.8	37.5	WD: n/a WS: 0 m/s Rain: Nil	WD: SSW WS: 2.5 m/s Rain: Nil Stability Category: E[1]	Background traffic/insects/cicadas/birds 37-46 Llama 47-48 Birds 50-54 Quarry inaudible	<28	37
13-05-25	4:31pm to 4:46pm (Day)	49	42	36.3	WD: n/a WS: 0 m/s Rain: Nil	WD: SSW WS: 2.5 m/s Rain: Nil Stability Category: E[1]	Background traffic/birds/insects/cicadas 35-46 Bird 40-45 Quarry inaudible	<26	37
14-05-25	6:03pm to 6:18pm (Evening)	52.4	49	45.2	WD: n/a WS: 0 m/s Rain: Nil	WD: WNW WS: 0 m/s Rain: Nil Stability Category: E[1]	Background traffic/insects/cicadas 48-52 Quarry not operational	n/a[2]	35
14-05-25	6:19pm to 6:34pm (Evening)	60.3	46	44.3	WD: n/a WS: 0 m/s Rain: Nil	WD: WNW WS: 0 m/s Rain: Nil Stability Category: E[1]	Background traffic/insects/cicadas 44-50 Passing car 56-60 Quarry not operational	n/a[2]	35

[1] Temperature data sourced from CSIRO CCAM and modelled using TAPM to determine Stability Category.

[2] Quarry not operational.

4.2 Location NM2

Noise monitoring at location NM2 was conducted on Tuesday 13 May 2025 and Wednesday 14 May 2025 with results presented in **Table 4-2**. The quarry was inaudible at NM2 during the day. The quarry was not operational during the evening. The ambient noise environment was dominated by flora, fauna, power tools, automotive noise from residence and passing cars on Teven Road. The results satisfy the established noise criteria and indicate that noise emissions from Teven Quarry did not contribute to noise nuisance at the time of the monitoring.

Table 4-2: Noise survey results and observations for Location NM2

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (at 10m)	Apparent Noise Source, Description and SPL (dBA)	Teven Quarry LAeq(15min) Contribution	LAeq(15min) Criteria (dBA)
		LAmax	LAeq	LA90					
13-05-25	1:53pm to 2:08pm (Day)	74.2	61	39.4	WD: 165° WS: 0.9 m/s Rain: Nil	WD: W WS: 2 m/s Rain: Nil Stability Category: E[1]	Wind/trees/insects/motor from residence backyard 50-52 Cars passing 80-84 Power tools 60-65 Birds 50-56 Quarry inaudible	<29	38
13-05-25	2:10pm to 2:25pm (Day)	68.3	58.3	37.1	WD: 165° WS: 0.9 m/s Rain: Nil	WD: W WS: 2 m/s Rain: Nil Stability Category: E[1]	Wind/trees/insects/motor from residence backyard 50-52 Power tools 59-62 Car passing 68-81 Quarry inaudible	<27	38
14-05-25	8:14pm to 8:29pm (Evening)	56.9	54.5	38.3	WD: n/a WS: 0 m/s Rain: Nil	WD: NNW WS: 0.5 m/s Rain: Nil Stability Category: E[1]	Background traffic/insects/cicadas 38-40 Car passing 57-82 Quarry not operational	n/a[2]	35
14-05-25	8:30pm to 8:45pm (Evening)	43.7	39.8	38.6	WD: n/a WS: 0 m/s Rain: Nil	WD: NNW WS: 1 m/s Rain: Nil Stability Category: E[1]	Background traffic/insects/cicadas/frogs 38-40 Aircraft 40-44 Quarry not operational	n/a[2]	35

[1] Temperature data sourced from CSIRO CCAM and modelled using TAPM to determine Stability Category.

[2] Quarry not operational.

4.3 Location NM3

Noise monitoring at location NM3 was conducted on Tuesday 13 May 2025 and Wednesday 14 May 2025 with results presented in **Table 4-3**. The quarry was inaudible at NM3 during the day. The quarry was not operational during the evening. The ambient noise environment was dominated by flora, fauna and background traffic. The results satisfy the established noise criteria and indicate that noise emissions from Teven Quarry did not contribute to noise nuisance at the time of the monitoring.

Table 4-3: Noise survey results and observations for Location NM3

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (at 10m)	Apparent Noise Source, Description and SPL (dBA)	Teven Quarry LAeq(15min) Contribution	LAeq(15min) Criteria (dBA)
		LAmax	LAeq	LA90					
13-05-25	1:14pm to 1:29pm (Day)	57	45	40	WD: 168° WS: 1.5 m/s Rain: Nil	WD: W WS: 2 m/s Rain: Nil Stability Category: E[1]	Wind/trees/insects 42-50 Birds 50-55 Quarry inaudible	<30	37
13-05-25	1:31pm to 1:46pm (Day)	53.3	43	39.5	WD: 168° WS: 1.5 m/s Rain: Nil	WD: WNW WS: 2 m/s Rain: Nil Stability Category: E[1]	Wind/trees/insects/birds 42-47 Quarry inaudible	<30	37
14-05-25	8:51pm to 9:06pm (Evening)	62.1	56.1	48.6	WD: n/a WS: 0 m/s Rain: Nil	WD: NNW WS: 1 m/s Rain: Nil Stability Category: E[1]	Background traffic/insects/frogs/cicadas 50-60 Quarry not operational	n/a[2]	35
14-05-25	9:07pm to 9:22pm (Evening)	63.2	55.5	45.6	WD: n/a WS: 0 m/s Rain: Nil	WD: N WS: 1.5 m/s Rain: Nil Stability Category: E[1]	Background traffic/insects/frogs/cicadas 50-60 Quarry not operational	n/a[2]	35

[1] Temperature data sourced from CSIRO CCAM and modelled using TAPM to determine Stability Category.

[2] Quarry not operational.

4.4 Location NM4

Noise monitoring at location NM4 was conducted on Tuesday 13 May 2025 and Wednesday 14 May 2025 with results presented in **Table 4-4**. The quarry was audible at NM4 during the day. The quarry was not operational during the evening period. The ambient noise environment was dominated by flora, fauna, aircraft and background traffic. The results satisfy the established noise criteria and indicate that noise emissions from Teven Quarry did not contribute to noise nuisance at the time of the monitoring (see Footnotes 2, 3 and 4 below).

Table 4-4: Noise survey results and observations for Location NM4

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (at 10m)	Apparent Noise Source, Description and SPL (dBA)	Teven Quarry LAeq (15min) Contribution	LAeq (15min) Criteria (dBA)
		LAmax	LAeq	LA90					
13-05-25	2:33pm to 2:48pm (Day)	59.2	48.2	45.5	WD: 158° WS: 0.5 m/s Rain: Nil	WD: W WS: 2.5 m/s Rain: Nil Stability Category: E[1]	Machine rumblings/trees/wind/insects 45-50 Quarry audible	<37[2,3]	37
13-05-25	2:50pm to 3:05pm (Day)	56	46.6	42.3	WD: 158° WS: 0.5 m/s Rain: Nil	WD: W WS: 2.5 m/s Rain: Nil Stability Category: E[1]	Machine rumblings/trees/wind/insects 45-51 Quarry audible	<33[2,4]	37
14-05-25	7:01pm to 7:16pm (Evening)	55.1	50	44.7	WD: n/a WS: 0 m/s Rain: Nil	WD: n/a WS: <1 m/s Rain: Nil Stability Category: E[1]	Background traffic/insects/cicadas 44-54 Quarry not operational	n/a[5]	35
14-05-25	7:18pm to 7:33pm (Evening)	56.9	49.6	43.1	WD: n/a WS: 0 m/s Rain: Nil	WD: n/a WS: <1 m/s Rain: Nil Stability Category: E[1]	Background traffic/insects/cicadas 43-55 Aircraft 50-56 Quarry not operational	n/a[5]	35

[1] Temperature data sourced from CSIRO CCAM and modelled using TAPM to determine Stability Category.

[2] Monitoring was completed close to Stokers Lane at the entrance to the residence as to not disturb the resident, which places the attended noise monitoring location in direct line-of-sight of the quarry rather than near the sensitive receptor, i.e., the resident.

[3] An estimated quarry contribution of 46 LA90 dBA was adopted for distance correction to receiver using NEL calculations in **Appendix 1**.

[4] An estimated quarry contribution of 42 LA90 dBA was adopted for distance correction to receiver using NEL calculations in **Appendix 1**.

[5] Quarry not operational.

Location NM5

Noise monitoring at location NM1 was conducted on Tuesday 13 May 2025 and Wednesday 14 May 2025 with results presented in **Table 4-5**. The quarry was inaudible at NM5 during the day. The quarry was not operational during the evening. The ambient noise environment was dominated flora, fauna, background traffic, motorcycles and aircrafts. The results satisfy the established noise criteria and indicate that noise emissions from Teven Quarry did not contribute to noise nuisance at the time of the monitoring.

Table 4-5: Noise survey results and observations for Location NM5

Date	Time (hrs)	Descriptor (dBA)			Meteorology (Handheld at microphone height)	Onsite Met Station (at 10m)	Apparent Noise Source, Description and SPL (dBA)	Teven Quarry LAeq(15min) Contribution	LAeq(15min) Criteria
		LAmax	LAeq	LA90					
13-05-25	3:11pm to 3:26pm (Day)	62.1	43.9	40.7	WD: 130° WS: 2.9 m/s Rain: Nil	WD: W WS: 3.5 m/s Rain: Nil Stability Category: E[1]	Background traffic/wind/trees/insects/birds 40-47 Aircraft 48-56 Bird 60-62 Quarry inaudible	<31	37
13-05-25	3:41pm to 3:56pm (Day)	58.8	42.7	39.9	WD: 130° WS: 2.9 m/s Rain: Nil	WD: W WS: 3 m/s Rain: Nil Stability Category: E[1]	Background traffic/wind/trees/insects/birds 40-43 Birds 47-56 Quarry inaudible	<30	37
14-05-25	7:39pm to 7:54pm (Evening)	61.7	49.2	45.8	WD: n/a WS: 0 m/s Rain: Nil	WD: n/a WS: <1 m/s Rain: Nil Stability Category: E[1]	Background traffic/insects/cicadas 44-48 Motorbike 47-53 Passing car 48-54 Quarry not operational	n/a[2]	35
14-05-25	7:55pm to 8:10pm (Evening)	55.6	51.1	50.2	WD: n/a WS: 0 m/s Rain: Nil	WD: n/a WS: <1 m/s Rain: Nil Stability Category: E[1]	Background traffic/insects/cicadas 44-50 Bird 50-54 Passing car 51-54 Quarry not operational	n/a[2]	35

[1] Temperature data sourced from CSIRO CCAM and modelled using TAPM to determine Stability Category.

[2] Quarry not operational

5. Conclusion

This NMA completed by Ramboll at the Holcim Teven Quarry, Teven, NSW as a quarterly requirement of the NMP. Noise monitoring was completed on Tuesday 13 May 2025 and Wednesday 14 May 2025 at five locations selected as representative to the sensitive receptors at the surroundings to Teven Quarry.

No audible noise from quarry operations was observed at locations NM1, NM2, NM3 and NM5 during the day periods. Quarry noise was audible at location NM4 during the day monitoring periods where the quarry was audible with machinery. The quarry was not operational during the evening monitoring periods.

The results presented in this NMA show compliance with the relevant noise criteria at the Holcim Teven Quarry, Teven, NSW.

6. References

Holcim Australia (2021) *Teven Quarry, Noise Management Plan*.

International Electrotechnical Commission *IEC 60942:2017 Electroacoustics – Sound calibrators*

Minister for Planning and Environment (2015) 'Development Consent SSD_6422, Teven Quarry Project'.

NSW EPA (2021) Environment Protection Licence number 3293.

NSW EPA (2013) *Noise Guide for Local Government*. Sydney NSW: NSW Environment Protection Authority

NSW EPA (2014) Discussion Paper. Validation of Inversion Strength Estimation Method.

NSW EPA (2017) *Noise Policy for Industry (NPfI)*. Sydney NSW: NSW Environment Protection Authority.

Standards Australia (2018) *AS 1055:2018 Acoustics—Description and measurement of environmental noise*. Australian Standard.

Standards Australia and Standards New Zealand (2019) *AS/NZS IEC 61672.1:2019 Electroacoustics—Sound level meters, Part 1: Specifications*. Australian/New Zealand Standard.

Appendix 1

Noise Emission Level Calculations

Project No: 318001800
Client Name: Holcim Australia Pty Ltd
Project Name: NSW Environmental Monitoring
Project Site: Teven Quarry
12/08/2025

Noise Emission Level Calculations

NM4 day monitoring period (2:33PM to 2:48PM)

Site contribution corrected for distance from monitoring location to receiver

Noise source	Quarry contribution
Estimated site contribution (LAeq) at monitoring location (dBA)	46.0
Approx. distance from monitoring location to site (m)	310
Approx. distance from site to receiver (m)	500
Distance corrected site contribution at receiver (LAeq dBA)	**41.8**
Estimated additional attenuation (vegetation & ground absorption)	5
Estimated site contribution at receiver (dBA)	**36.8**

NM4 day monitoring period (2:50PM to 3:05PM)

Site contribution corrected for distance from monitoring location to receiver

Noise source	Quarry contribution
Estimated site contribution (LAeq) at monitoring location (dBA)	42.0
Approx. distance from monitoring location to site (m)	310
Approx. distance from site to receiver (m)	500
Distance corrected site contribution at receiver (LAeq dBA)	**37.8**
Estimated additional attenuation (vegetation & ground absorption)	5
Estimated site contribution at receiver (dBA)	**32.8**

Intended for
Holcim (Australia) Pty Ltd

Document type
Report

Date
October 2025

Teven Quarry Quarterly Noise Monitoring Assessment

Quarter 3 2025

RAMBOLL

Bright ideas.
Sustainable change.

Teven Quarry Quarterly Noise Monitoring Assessment
Quarter 3 2025

Project name	**NSW Environmental Monitoring 2024-2025**
Project no.	**318001800**
Recipient	**Matt Kelly**
Document type	**Report**
Version	**1**
Date	**24/10/2025**
Prepared by	**Brodie Wood**
Checked by	**Arnold Cho, Jake Bourke**
Approved by	**Gavan Butterfield**
Description	**Data collected on 14 August 2025 for Teven Quarry during Quarter 3 2025 in Teven, NSW, as part of the noise monitoring program**

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Abbreviations and Definitions

	Description
ΔT	Vertical Temperature Difference, i.e. the measured difference in ambient temperature between two elevations on the same tower. It is defined as the upper-level temperature measurement minus the lower-level temperature measurement.
°	Degree
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).
C	Celcius
CCAM	Conformal Cubic Atmospheric Model
CSIRO	Commonwealth Scientific and Industrial Research Organisation
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.
EPA	Environment Protection Authority
EPL	Environment Protection Licence
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.
m	Metre
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.
NATA	National Association of Testing Authorities
NMA	Noise Monitoring Assessment
NMP	Noise Management Plan
NPfI	Noise Policy for Industry 2017
NSW	New South Wales
s	Second
SPL	The Sound Pressure Level. Sound pressure is the fluctuation in air pressure, from the steady atmospheric pressure, created by sound. The sound pressure level is the sound pressure expressed on a decibel scale.
TAPM	The Air Pollution Model

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

1. Overview

1.1 Project Driver

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

This NMA was done in accordance with the following documents:

- Noise Policy for Industry (NPfI) (NSW EPA, 2017)
- Teven Quarry Noise Management Plan (NMP) (Holcim, 2021)
- Environment Protection Licence (EPL) number 3293 (NSW EPA, 2021)
- Development Consent Application Number SSD_6422 (Minister for Planning and Environment, 2015)
- Australian Standard AS 1055:2018 Acoustics—Description and measurement of environmental noise (Standards Australia, 2018)
- Australian Standard AS/NZS IEC 61672.1:2019 Electroacoustics – Sound level meters, Part 1: Specifications (Standards Australia and Standards New Zealand, 2019)
- International Electrotechnical Commission (IEC) 60942:2017 Electroacoustics - Electroacoustics – Sound calibrators (IEC, 2017).

This NMA has been undertaken in accordance with the NMP for the quarterly period July to September 2025 and forms part of the monitoring program to determine compliance with conditions of the Development Consent.

1.2 Site Location and Sensitive Receivers

The quarry is in Teven, NSW, approximately 7 km west of Ballina. Sensitive receivers surrounding the quarry are primarily rural and residential properties in coastal bushland with elevated and undulating topography. Five monitoring locations have been selected as part of the NMA and in accordance with the EPL and Development Consent and are shown in **Table 1-1**.

Table 1-1: Monitoring locations locality and sensitive receptors

Monitoring Location	Nearest Receiver	Locality and Sensitive Receivers
NM1	R7	West of the quarry situated at a rural residential property at the end of Leadbeatters Lane
NM2	R3/R4	East of the quarry situated at a rural residential property on Teven Road
NM3	R2	South of the quarry situated at a rural residential property at the end of Wellers Road
NM4	R10	North of the quarry situated at a rural residential property adjacent the site off Stokers Lane
NM5	R14	Northeast of the quarry situated at a rural residential property of Teven Road

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

Legend

- Noise monitoring location
- Residential receiver location

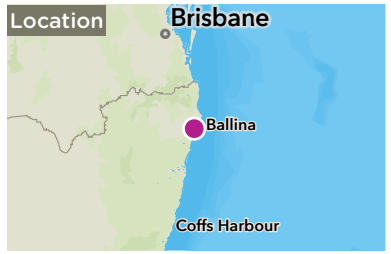

Figure 1 : Noise monitoring locations at Teven Quarry

2. Noise Criteria

Table 2-1 summaries the applicable onsite noise criteria outlined in the NMP and Development Consent for residential receivers (NM1, NM2, NM3, NM4, NM5) surrounding the quarry.

Table 2-1: Monitoring locations and noise criteria

Receivers	Monitoring Locations	Day[1]	Evening[2]
		LAeq (15min)	LAeq (15min)
		dB(A)	
R3, R4, R13, R15, R16, R17, R18, R20	NM2	38	35
All other receivers	NM1, NM3, NM4, NM5	37	35

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

[2] 6 pm–10 pm Monday to Sunday

3. Methodology

The monitoring program was developed in accordance with the procedures described in *Australian Standard AS 1055:2018* and the Approval Documents referenced in Section 1. The measurements were completed using a RION Sound Level Meter NL-52 on Thursday 14 August 2025. The acoustic instrumentation used carries current National Association of Testing Authorities (NATA) calibration and complies with *AS/NZS IEC 61672-1:2019 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 60942:2017. Drift in calibration did not exceed ±0.3 dBA.

Attended noise monitoring was conducted for 15-minute periods at each monitoring location over two days. As per the NMP, two sets of measurements were completed during the day, and two sets of measurements were completed during the evening, at each monitoring location. It is noted that the quarry was not operational during the evening periods, however, monitoring was conducted as per requirements of the EPL. 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.

3.1 Meteorological conditions

Meterology has an important influence on noise monitoring assessment. An onsite meterological station with data recorded at 10m height has been used to adopt wind direction, wind speed and rain data to inform this assessment. Temperature data has been adopted from the Commonwealth Scientific and Industrial Research Organisation (CSIRO) Conformal Cubic Atmospheric Model (CCAM) and modelled using The Air Pollution Model (TAPM) to determine the atmospheric category as outline in **Table 3-1**.

Table 3-1: Classification of atmospheric stability (NSW EPA, 2014)

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

As stated in the Development Consent, the noise criteria in Table 2-1 applies under all meteorological conditions except the following:

- Wind speeds greater than 3m/s at 10m above ground level
- Temperature inversion conditions between 1.5°C and 3°C/100m and wind speed greater than 2m/s at 10m above ground level
- Temperature inversion conditions greater than 3°C/100m.

Appendix 5 of the Development Consent also specifies that except for wind speed at microphone height, the data to be used for determing meterological conditons shall be that recorded by a suitable meteorological station operating in the vicinity of the site.

4. Results and Discussion

4.1 Location NM1

Noise monitoring at location NM1 was conducted on Thursday 14 August 2025 with results presented in **Table 4-1**. The quarry was inaudible at NM1 during the day. The quarry was not operational during the evening. Measured predominant ambient noise sources included background traffic, passing cars, wind, flora, fauna and aircraft. The results satisfy the established noise criteria and indicate that noise emissions from Teven Quarry did not contribute to noise nuisance at the time of the monitoring.

Table 4-1: Noise survey results and observations for Location NM1

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (at 10m)	Apparent Noise Source, Description and SPL (dBA)	Teven Quarry LAeq(15min) Contribution	LAeq(15min) Criteria (dBA)
		LAmax	LAeq	LA90					
14-08-25	8:31am to 8:46am (Day)	68.3	45.4	35.5	WD: 240° WS: 2 m/s Rain: Nil	WD: ENE WS: 0 m/s Rain: Nil Stability Category: E[1]	Birds, trees, wind, distant road noises 36-53 Louder birds 60-63 Cars passing 40-44 Quarry inaudible	<26	37
14-08-25	8:48am to 9:03am (Day)	56.1	36.1	33.3	WD: 240° WS: 2 m/s Rain: Nil	WD: ENE WS: 0 m/s Rain: Nil Stability Category: E[1]	Birds, trees, wind, distant road noises 36-53 Louder birds 60-63 Cars passing 40-45 Quarry inaudible	<23	37
14-08-25	9:11pm to 9:26pm (Evening)	47.5	34.3	29.3	WD: n/a WS: 0 m/s Rain: Nil	WD: NNE WS: 1 m/s Rain: Nil Stability Category: E[1]	Insects, frogs, trees 27-38 Quarry not operational	n/a[2]	35
14-08-25	9:26pm to 9:41pm (Evening)	48.1	36.1	30.7	WD: n/a WS: 0 m/s Rain: Nil	WD: NNE WS: 1.5 m/s Rain: Nil Stability Category: E[1]	Insects, frogs, trees 27-38 Aircraft 40-46 Quarry not operational	n/a[2]	35

[1] Temperature data sourced from CSIRO CCAM and modelled using TAPM to determine Stability Category.

[2] Quarry not operational.

4.2 Location NM2

Noise monitoring at location NM2 was conducted on Thursday 14 August 2025 results presented in **Table 4-2**. The quarry was inaudible at NM2 during the day. The quarry was not operational during the evening. The ambient noise environment was dominated by flora, fauna, thunder, noise from residence, aircraft and passing cars on Teven Road. The results satisfy the established noise criteria and indicate that noise emissions from Teven Quarry did not contribute to noise nuisance at the time of the monitoring.

Table 4-2: Noise survey results and observations for Location NM2

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (at 10m)	Apparent Noise Source, Description and SPL (dBA)	Teven Quarry LAeq(15min) Contribution	LAeq(15min) Criteria (dBA)
		LAmax	LAeq	LA90					
14-08-25	10:03am to 10:18am (Day)	86.6	61.9	41.5	WD: 210° WS: 2.8 m/s Rain: Nil	WD: WNW WS: 1 m/s Rain: Nil Stability Category: E[1]	Birds, rumblings from residents 44-52 Cars passing 70-85 Aircraft 50-56 Quarry inaudible	<32	38
14-08-25	10:25am to 10:40am (Day)	70.5	49.9	42.4	WD: 210° WS: 2.8 m/s Rain: Nil	WD: WNW WS: 1 m/s Rain: Nil Stability Category: E[1]	Birds, rumblings from residents 44-53 Cars passing 70-85 Loud bird 60-68 Thunder 60-64 Quarry inaudible	<32	38
14-08-25	8:07pm to 8:22pm (Evening)	82.9	57.4	34.8	WD: n/a WS: 0 m/s Rain: Nil	WD: NNE WS: 1.5 m/s Rain: Nil Stability Category: E[1]	Trees, background traffic, birds, insects, people talking 37-40 Car passing 60-82 Quarry not operational	n/a[2]	35
14-08-25	8:33pm to 8:48pm (Evening)	489.3	61.8	36.3	WD: n/a WS: 0 m/s Rain: Nil	WD: NNE WS: 1 m/s Rain: Nil Stability Category: E[1]	Background traffic, insects, residents TV 36-40 Car passing 60-88 Quarry not operational	n/a[2]	35

[1] Temperature data sourced from CSIRO CCAM and modelled using TAPM to determine Stability Category.

[2] Quarry not operational.

4.3 Location NM3

Noise monitoring at location NM3 was conducted on Thursday 14 August 2025 with results presented in **Table 4-3**. The quarry was inaudible at NM3 during the day. The quarry was not operational during the evening. The ambient noise environment was dominated by flora, fauna, background traffic and aircraft. The results satisfy the established noise criteria and indicate that noise emissions from Teven Quarry did not contribute to noise nuisance at the time of the monitoring.

Table 4-3: Noise survey results and observations for Location NM3

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (at 10m)	Apparent Noise Source, Description and SPL (dBA)	Teven Quarry LAeq(15min) Contribution	LAeq(15min) Criteria (dBA)
		LAmax	LAeq	LA90					
14-08-25	10:53am to 11:08am (Day)	61.4	43	36.8	WD: 210° WS: 2.3 m/s Rain: Nil	WD: WNW WS: 1 m/s Rain: Nil Stability Category: E[1]	Birds, trees, wind, insects 37-44 Aircraft 45-50 Eastern whipbird 58-62 Quarry inaudible	<27	37
14-08-25	11:10am to 11:25am (Day)	59.7	42.1	37.3	WD: 210° WS: 2.3 m/s Rain: Nil	WD: WNW WS: 1 m/s Rain: Nil Stability Category: E[1]	Birds, trees, wind, insects 37-44 Aircraft 45-50 Eastern whipbird 58-60 Quarry inaudible	<27	37
14-08-25	6:01pm to 6:16pm (Evening)	55.1	42.6	40.9	WD: n/a WS: 0 m/s Rain: Nil	WD: NW WS: 2.5 m/s Rain: Nil Stability Category: E[1]	Background traffic, insects, frogs, birds 40-44 Quarry not operational	n/a[2]	35
14-08-25	6:17pm to 6:32pm (Evening)	49.3	41.8	40	WD: n/a WS: 0 m/s Rain: Nil	WD: NW WS: 2.5 m/s Rain: Nil Stability Category: E[1]	Background traffic, insects, frogs, birds 40-44 Quarry not operational	n/a[2]	35

[1] Temperature data sourced from CSIRO CCAM and modelled using TAPM to determine Stability Category.

[2] Quarry not operational.

4.4 Location NM4

Noise monitoring at location NM4 was conducted on Thursday 14 August 2025 with results presented in **Table 4-4**. The quarry was audible at NM4 during the day. The quarry was not operational during the evening period. The ambient noise environment was dominated by flora, fauna, aircrafts, trucks passing, and background traffic. The results satisfy the established noise criteria and indicate that noise emissions from Teven Quarry did not contribute to noise nuisance at the time of the monitoring, except for the day period (see Footnotes 2, 3 and 4 below).

Table 4-4: Noise survey results and observations for Location NM4

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (at 10m)	Apparent Noise Source, Description and SPL (dBA)	Teven Quarry LAeq (15min) Contribution	LAeq (15min) Criteria (dBA)
		LAmax	LAeq	LA90					
14-08-25	11:37am to 11:52am (Day)	69.6	52.8	47.1	WD: 180° WS: 2.9 m/s Rain: Nil	WD: NW WS: 3 m/s Rain: Nil Stability Category: E[1]	Wind, trees, insects 46-52 Holcim Quarry rumblings 49-51 Truck passing 58-61 Aircraft 58-69 Quarry audible	<42[2,3,4]	37
14-08-25	11:59am to 12:14am (Day)	63.1	50.9	46.9	WD: 180° WS: 2.9 m/s Rain: Nil	WD: NW WS: 3.5 m/s Rain: Nil Stability Category: E[1]	Wind, trees, insects 46-52 Holcim Quarry rumblings 49-51 Truck passing 58-69 Aircraft 51-59 Quarry audible	<42[2,3,4]	37
14-08-25	7:21pm to 7:36pm (Evening)	51.8	37.1	35.5	WD: n/a WS: 0 m/s Rain: Nil	WD: N WS: 1 m/s Rain: Nil Stability Category: E[1]	Background traffic, insects, cicada, frogs 35-37 Quarry not operational	n/a[5]	35
14-08-25	7:37pm to 7:52pm (Evening)	45.8	36.4	35	WD: n/a WS: 0 m/s Rain: Nil	WD: NNW WS: 1 m/s Rain: Nil Stability Category: E[1]	Background traffic, insects, cicada, frogs 34-38 Quarry not operational	n/a[5]	35

[1] Temperature data sourced from CSIRO CCAM and modelled using TAPM to determine Stability Category.

[2] Monitoring was completed close to Stokers Lane at the entrance to the residence as to not disturb the resident, which places the attended noise monitoring location in direct line-of-sight of the quarry rather than near the sensitive receptor, i.e., the resident.

[3] An estimated quarry contribution of 51 LAeq dBA was adopted for distance correction to receiver using NEL calculations in **Appendix 1**.

[4] Moderate exceedance (NPfI 2017 – Table 4.1).

[5] Quarry not operational.

Location NM5

Noise monitoring at location NM1 was conducted on Thursday 14 August 2025 with results presented in **Table 4-5**. The quarry was audible at NM5 during the day. The quarry was not operational during the evening. The ambient noise environment was dominated flora, fauna, quarry rumblings, background traffic, motorcycles and aircrafts. The results satisfy the established noise criteria and indicate that noise emissions from Teven Quarry did not contribute to noise nuisance at the time of the monitoring.

Table 4-5: Noise survey results and observations for Location NM5

Date	Time (hrs)	Descriptor (dBA)			Meteorology (Handheld at microphone height)	Onsite Met Station (at 10m)	Apparent Noise Source, Description and SPL (dBA)	Teven Quarry LAeq(15min) Contribution	LAeq(15min) Criteria
		LAmax	LAeq	LA90					
14-08-25	9:22am to 9:37am (Day)	52.5	39.7	36.9	WD: 24° WS: 2.5 m/s Rain: Nil	WD: S WS: 0 m/s Rain: Nil Stability Category: E[1]	Trees, wind, birds, insects, cicadas 38-42 Holcim Quarry rumblings 34-36 Car passing 44-46 Quarry audible	<37	37
14-08-25	9:49am to 10:04am (Day)	55.5	39.1	35.6	WD: 24° WS: 2.5 m/s Rain: Nil	WD: ENE WS: 0.5 m/s Rain: Nil Stability Category: E[1]	Trees, wind, birds, insects, cicadas 38-45 Holcim Quarry rumblings 34-36 Car passing 44-46 Thunder 50-51 Quarry audible	<36	37
14-08-25	6:42pm to 6:57pm (Evening)	46.8	40	39.1	WD: n/a WS: 0 m/s Rain: Nil	WD: NW WS: 1 m/s Rain: Nil Stability Category: E[1]	Insects, cicadas, background traffic 40-42 Quarry not operational	n/a[2]	35
14-08-25	6:58pm to 7:13pm (Evening)	43.2	39.9	38.9	WD: n/a WS: 0 m/s Rain: Nil	WD: N WS: 1 m/s Rain: Nil Stability Category: E[1]	Insects, cicadas, background traffic 39-42 Quarry not operational	n/a[2]	35

[1] Temperature data sourced from CSIRO CCAM and modelled using TAPM to determine Stability Category.

[2] Quarry not operational.

5. Conclusion

This NMA completed by Ramboll at the Holcim Teven Quarry, Teven, NSW as a quarterly requirement of the NMP. Noise monitoring was completed on Thursday 14 August 2025 at five locations selected as representative of the sensitive receptors surrounding Teven Quarry.

Audible noise identified as emitted from the quarry was recorded during the day monitoring periods at NM4 and NM5. The results presented in this NMA show compliance with the relevant noise criteria at the Holcim Teven Quarry, Teven, NSW, except for NM4 which exceeded the criteria by up to 5 dBA during both day periods.

These exceedances are considered 'moderate' in the NPfI (NSW EPA, 2017). As no exceedances, determined to be attributed by Holcim, have been recorded since the third quarter of 2023 and the second quarter of 2024, it is recommended that the following 'best management practice' (BMP) be considered to reduce noise emissions from quarry operations in the future.

- using quieter plant that can complete the required task.
- restricting movement of trucks on ridgelines and exposed haul routes where their noise can propagate over a wide area, especially at night.
- scheduling the use of noisy equipment at the least-sensitive time of day.
- siting noisy equipment behind structures that act as barriers, or at the greatest distance from the noise-sensitive area; or orienting the equipment so that noise emissions are directed away from any sensitive areas, to achieve the maximum attenuation of noise.
- where there are several noisy pieces of equipment, scheduling operations so they are used separately rather than concurrently.
- keeping equipment well-maintained and operating it in a proper and efficient manner
- employing 'quiet' practices when operating equipment such as positioning idling trucks in appropriate areas.
- running staff-education programs and regular toolbox talks on the effects of noise and the use of quiet work practices.

When BMP is not effective to achieve the required noise reduction by itself, the 'best available technology economically achievable' (BATEA) approach can then be considered. Examples include:

- using equipment with efficient muffler design.
- using quieter engines, such as electric instead of internal combustion.
- fitting and maintaining noise reduction packages on plant and equipment.
- using efficient enclosures for noise sources.
- using high-pressure hydraulic systems to split rock, instead of hydraulic or pneumatic hammers.
- damping or lining metal trays or bins.

If applicable, exceedances of the noise criteria in the next round of noise monitoring will be verified and discussed further with Holcim.

6. References

Holcim. (2021). *Teven Quarry Noise Management Plan.*

IEC. (2017). *International Electrotechnical Commission. 60942:2017 Electroacoustics - Sound calibrators.*

Minister for Planning and Environment. (2015). *Development Consent SSD_6422, Teven Quarry Project.*

NSW EPA. (2014). *Discussion Paper. Validation of Inversion Strength Estimation Method.*

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

NSW EPA. (2021). *Environment Protection Licence number 3293.*

Standards Australia. (2018). *AS 1055:2018 Acoustics—Description and measurement of environmental noise.*

Standards Australia and Standards New Zealand. (2019). *AS/NZS IEC 61672.1:2019 Electroacoustics—Sound level meters, Part 1: Specifications.*

Appendix 1

Noise Emission Level Calculations

Project No: 318001800
Client Name: Holcim Australia Pty Ltd
Project Name: NSW Environmental Monitoring
Project Site: Teven Quarry
24/10/2025

Noise Emission Level Calculations

NM4 day monitoring period (2:33PM to 2:48PM)

Site contribution corrected for distance from monitoring location to receiver

Noise source	Quarry contribution
Estimated site contribution (LAeq) at monitoring location (dBA)	51.0
Approx. distance from monitoring location to site (m)	310
Approx. distance from site to receiver (m)	500
Distance corrected site contribution at receiver (LAeq dBA)	**46.8**
Estimated additional attenuation (vegetation & ground absorption)	5
Estimated site contribution at receiver (dBA)	**41.8**

NM4 day monitoring period (2:50PM to 3:05PM)

Site contribution corrected for distance from monitoring location to receiver

Noise source	Quarry contribution
Estimated site contribution (LAeq) at monitoring location (dBA)	51.0
Approx. distance from monitoring location to site (m)	310
Approx. distance from site to receiver (m)	500
Distance corrected site contribution at receiver (LAeq dBA)	**46.8**
Estimated additional attenuation (vegetation & ground absorption)	5
Estimated site contribution at receiver (dBA)	**41.8**

Intended for
Holcim (Australia) Pty Ltd

Document type
Report

Date
December 2025

Teven Quarry Quarterly Noise Monitoring Assessment

Quarter 4 2025

RAMBOLL

Bright ideas.
Sustainable change.

Teven Quarry Quarterly Noise Monitoring Assessment

Quarter 4 2025

Project name	**NSW Environmental Monitoring 2024-2025**
Project no.	**318001800**
Recipient	**Matt Kelly**
Document type	**Report**
Version	**1**
Date	**23/12/2025**
Prepared by	**Brodie Wood**
Checked by	**Arnold Cho, Jake Bourke**
Approved by	**Gavan Butterfield**
Description	**Data collected on 12 November 2025 for Teven Quarry during Quarter 4 2025 in Teven, NSW, as part of the noise monitoring program**

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Abbreviations and Definitions

	Description
ΔT	Vertical Temperature Difference, i.e. the measured difference in ambient temperature between two elevations on the same tower. It is defined as the upper-level temperature measurement minus the lower-level temperature measurement.
°	Degree
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).
C	Celcius
CCAM	Conformal Cubic Atmospheric Model
CSIRO	Commonwealth Scientific and Industrial Research Organisation
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.
EPA	Environment Protection Authority
EPL	Environment Protection Licence
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.
m	Metre
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.
NATA	National Association of Testing Authorities
NMA	Noise Monitoring Assessment
NMP	Noise Management Plan
NPfI	Noise Policy for Industry 2017
NSW	New South Wales
s	Second
SPL	The Sound Pressure Level. Sound pressure is the fluctuation in air pressure, from the steady atmospheric pressure, created by sound. The sound pressure level is the sound pressure expressed on a decibel scale.
TAPM	The Air Pollution Model

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

1. Overview

1.1 Project Driver

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

This NMA was done in accordance with the following documents:

- Noise Policy for Industry (NPfI) (NSW EPA, 2017)
- Teven Quarry Noise Management Plan (NMP) (Holcim, 2021)
- Environment Protection Licence (EPL) number 3293 (NSW EPA, 2021)
- Development Consent Application Number SSD_6422 (Minister for Planning and Environment, 2015)
- Australian Standard AS 1055:2018 Acoustics—Description and measurement of environmental noise (Standards Australia, 2018)
- Australian Standard AS/NZS IEC 61672.1:2019 Electroacoustics – Sound level meters, Part 1: Specifications (Standards Australia and Standards New Zealand, 2019)
- International Electrotechnical Commission (IEC) 60942:2017 Electroacoustics - Electroacoustics – Sound calibrators (IEC, 2017).

This NMA has been undertaken in accordance with the NMP for the quarterly period October to December 2025 and forms part of the monitoring program to determine compliance with conditions of the Development Consent.

1.2 Site Location and Sensitive Receivers

The quarry is in Teven, NSW, approximately 7 km west of Ballina. Sensitive receivers surrounding the quarry are primarily rural and residential properties in coastal bushland with elevated and undulating topography. Five monitoring locations have been selected as part of the NMA and in accordance with the EPL and Development Consent and are shown in **Table 1-1**.

Table 1-1: Monitoring locations locality and sensitive receptors

Monitoring Location	Nearest Receiver	Locality and Sensitive Receivers
NM1	R7	West of the quarry situated at a rural residential property at the end of Leadbeatters Lane
NM2	R3/R4	East of the quarry situated at a rural residential property on Teven Road
NM3	R2	South of the quarry situated at a rural residential property at the end of Wellers Road
NM4	R10	North of the quarry situated at a rural residential property adjacent the site off Stokers Lane
NM5	R14	Northeast of the quarry situated at a rural residential property of Teven Road

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

Legend

- Noise monitoring location
- Residential receiver location

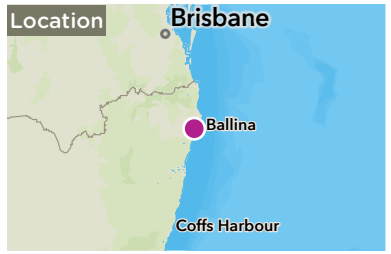

Figure 1 : Noise monitoring locations at Teven Quarry

2. Noise Criteria

Table 2-1 summaries the applicable onsite noise criteria outlined in the NMP and Development Consent for residential receivers (NM1, NM2, NM3, NM4, NM5) surrounding the quarry.

Table 2-1: Monitoring locations and noise criteria

Receivers	Monitoring Locations	Day[1]	Evening[2]
		LAeq (15min)	LAeq (15min)
		dB(A)	
R3, R4, R13, R15, R16, R17, R18, R20	NM2	38	35
All other receivers	NM1, NM3, NM4, NM5	37	35

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

[2] 6 pm–10 pm Monday to Sunday

3. Methodology

The monitoring program was developed in accordance with the procedures described in *Australian Standard AS 1055:2018* and the Approval Documents referenced in Section 1. The measurements were completed using a RION Sound Level Meter NL-52 on Wednesday 12 November 2025. The acoustic instrumentation used carries current National Association of Testing Authorities (NATA) calibration and complies with *AS/NZS IEC 61672-1:2019 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 60942:2017. Drift in calibration did not exceed ±0.3 dBA.

Attended noise monitoring was conducted for 15-minute periods at each monitoring location over two days. As per the NMP, two sets of measurements were completed during the day, and two sets of measurements were completed during the evening, at each monitoring location. It is noted that the quarry was not operational during the evening periods, however, monitoring was conducted as per requirements of the EPL. 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.

3.1 Meteorological conditions

Meterology has an important influence on noise monitoring assessment. An onsite meterological station with data recorded at 10m height has been used to adopt wind direction, wind speed and rain data to inform this assessment. Temperature data has been adopted from the Commonwealth Scientific and Industrial Research Organisation (CSIRO) Conformal Cubic Atmospheric Model (CCAM) and modelled using The Air Pollution Model (TAPM) to determine the atmospheric category as outline in **Table 3-1**.

Table 3-1: Classification of atmospheric stability (NSW EPA, 2014)

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

As stated in the Development Consent, the noise criteria in Table 2-1 applies under all meteorological conditions except the following:

- Wind speeds greater than 3m/s at 10m above ground level
- Temperature inversion conditions between 1.5°C and 3°C/100m and wind speed greater than 2m/s at 10m above ground level
- Temperature inversion conditions greater than 3°C/100m.

Appendix 5 of the Development Consent also specifies that except for wind speed at microphone height, the data to be used for determing meterological conditons shall be that recorded by a suitable meteorological station operating in the vicinity of the site.

4. Results and Discussion

4.1 Location NM1

Noise monitoring at location NM1 was conducted on Wednesday 12 November 2025 with results presented in **Table 4-1**. The quarry was inaudible at NM1 during the day. The quarry was not operational during the evening. Measured predominant ambient noise sources included background traffic, passing cars, wind, flora and fauna. The results satisfy the established noise criteria and indicate that noise emissions from Teven Quarry did not contribute to noise nuisance at the time of the monitoring.

Table 4-1: Noise survey results and observations for Location NM1

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (at 10m)	Apparent Noise Source, Description and SPL (dBA)	Teven Quarry LAeq(15min) Contribution	LAeq(15min) Criteria (dBA)
		LAmax	LAeq	LA90					
12-11-25	9:29am to 9:44am (Day)	59.9	43.7	39.2	WD: 175° WS: 2.8 m/s Rain: Nil	WD: NW WS: 4 m/s Rain: Nil Stability Category: F[1]	Background traffic, wind, trees, birds 43-58 Quarry inaudible	<29	37
12-11-25	9:50am to 10:05am (Day)	60.8	45.1	40	WD: 175° WS: 2.8 m/s Rain: Nil	WD: NW WS: 4 m/s Rain: Nil Stability Category: F[1]	Background traffic, wind, trees, birds, cicadas 44-57 Quarry inaudible	<30	37
12-11-25	6:04pm to 6:19pm (Evening)	59.5	38	34.4	WD: 110° WS: 0.8 m/s Rain: Nil	WD: SW WS: 0 m/s Rain: Nil Stability Category: E[1]	Wind, trees, birds, insects, cicadas 35-37 Car passing 40-45 bird 50-54 Quarry not operational	n/a[2]	35
12-11-25	6:21pm to 6:36pm (Evening)	56.9	40.3	34.5	WD: 110° WS: 0.8 m/s Rain: Nil	WD: SW WS: 0 m/s Rain: Nil Stability Category: E[1]	Wind, trees, birds, insects, cicadas 35-40 Car passing 40-48 Quarry not operational	n/a[2]	35

[1] Temperature data sourced from CSIRO CCAM and modelled using TAPM to determine Stability Category.

[2] Quarry not operational.

4.2 Location NM2

Noise monitoring at location NM2 was conducted on Wednesday 12 November 2025 results presented in **Table 4-2**. The quarry was inaudible at NM2 during the day. The quarry was not operational during the evening. The ambient noise environment was dominated by included background traffic, wind, flora and fauna and passing cars on Teven Road. The results satisfy the established noise criteria and indicate that noise emissions from Teven Quarry did not contribute to noise nuisance at the time of the monitoring.

Table 4-2: Noise survey results and observations for Location NM2

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (at 10m)	Apparent Noise Source, Description and SPL (dBA)	Teven Quarry LAeq(15min) Contribution	LAeq(15min) Criteria (dBA)
		LAmax	LAeq	LA90					
12-11-25	1:13pm to 1:28am (Day)	84.6	58.8	44.4	WD: 161° WS: 2.8 m/s Rain: Nil	WD: NW WS: 6 m/s Rain: Nil Stability Category: F[1]	Wind, trees, birds, insects 47-52 Cars passing 50-62 bird whistle 60-82 Quarry inaudible	<34	38
12-11-25	1:36pm to 1:51pm (Day)	86.3	59.7	44.4	WD: 161° WS: 2.8 m/s Rain: Nil	WD: W WS: 3 m/s Rain: Nil Stability Category: F[1]	Wind, trees, birds, insects, cicadas 40-48 Cars passing 72-86 plover 60-65 Quarry inaudible	<34	38
12-11-25	8:08pm to 8:23pm (Evening)	77.6	49.8	39.9	WD: n/a WS: 0 m/s Rain: Nil	WD: n/a WS: 0 m/s Rain: Nil Stability Category: E[1]	Background traffic, insects, cicadas 40-43 Passing cars 45-77 Quarry not operational	n/a[2]	35
12-11-25	8:25pm to 8:40pm (Evening)	81.4	52.4	39.4	WD: n/a WS: 0 m/s Rain: Nil	WD: n/a WS: 0 m/s Rain: Nil Stability Category: E[1]	Background traffic, insects, cicadas 40-43 Passing car 54 - 81 Quarry not operational	n/a[2]	35

[1] Temperature data sourced from CSIRO CCAM and modelled using TAPM to determine Stability Category.

[2] Quarry not operational.

4.3 Location NM3

Noise monitoring at location NM3 was conducted on Wednesday 12 November 2025 with results presented in **Table 4-3**. The quarry was inaudible at NM3 during the day. The quarry was not operational during the evening. The ambient noise environment was dominated by flora, fauna and background traffic. The results satisfy the established noise criteria and indicate that noise emissions from Teven Quarry did not contribute to noise nuisance at the time of the monitoring.

Table 4-3: Noise survey results and observations for Location NM3

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (at 10m)	Apparent Noise Source, Description and SPL (dBA)	Teven Quarry LAeq(15min) Contribution	LAeq(15min) Criteria (dBA)
		LAmax	LAeq	LA90					
12-11-25	8:29am to 8:44am (Day)	53.3	41.5	39.7	WD: 172° WS: 2.8 m/s Rain: Nil	WD: NW WS: 4 m/s Rain: Nil Stability Category: F[1]	Background traffic, trees, wind, birds, insects 40-46 Quarry inaudible	<30	37
12-11-25	8:47am to 9:02am (Day)	55.9	41.5	38.3	WD: 172° WS: 2.8 m/s Rain: Nil	WD: NW WS: 4 m/s Rain: Nil Stability Category: F[1]	Background traffic, trees, wind, birds, insects 39-49 Quarry inaudible	<28	37
12-11-25	8:44pm to 8:59pm (Evening)	50	43.1	41.8	WD: n/a WS: 0 m/s Rain: Nil	WD: n/a WS: 0 m/s Rain: Nil Stability Category: E[1]	Background traffic, insects, cicadas 43-47 Quarry not operational	n/a[2]	35
12-11-25	9:01pm to 9:16pm (Evening)	49.7	43.5	41.5	WD: n/a WS: 0 m/s Rain: Nil	WD: n/a WS: 0 m/s Rain: Nil Stability Category: E[1]	Background traffic, insects, cicadas 43-47 Quarry not operational	n/a[2]	35

[1] Temperature data sourced from CSIRO CCAM and modelled using TAPM to determine Stability Category.

[2] Quarry not operational.

4.4 Location NM4

Noise monitoring at location NM4 was conducted on Wednesday 12 November 2025 with results presented in **Table 4-4**. The quarry was audible at NM4 during the day. The quarry was not operational during the evening period. The ambient noise environment was dominated by flora, fauna, trucks passing, site machinery and background traffic. The results satisfy the established noise criteria and indicate that noise emissions from Teven Quarry did not contribute to noise nuisance at the time of the monitoring, except for the day period (see Footnotes 2, 3 and 4 below).

Table 4-4: Noise survey results and observations for Location NM4

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (at 10m)	Apparent Noise Source, Description and SPL (dBA)	Teven Quarry LAeq (15min) Contribution	LAeq (15min) Criteria (dBA)
		LAmax	LAeq	LA90					
12-11-25	11:44am to 11:59am (Day)	62.9	50.7	43.4	WD: 166° WS: 2.8 m/s Rain: Nil	WD: NW WS: 5 m/s Rain: Nil Stability Category: F[1]	Wind, trees, birds, conveyor 49-59 (consistent) Truck passing 54-62 Quarry audible	<40[2,3,4]	37
12-11-25	12:16pm to 12:31pm (Day)	60.9	47.5	42.1	WD: 166° WS: 2.8 m/s Rain: Nil	WD: NW WS: 7 m/s Rain: Nil Stability Category: F[1]	Wind, trees, birds, insects, cicadas, loader 42-45 Wind gusts 47-50 Louder birds 45-51 Water truck 46-54 (once for 7 mins) Quarry audible	<35[2,3]	37
12-11-25	7:31pm to 7:46pm (Evening)	59.1	55.2	40	WD: n/a WS: 0 m/s Rain: Nil	WD: n/a WS: 0 m/s Rain: Nil Stability Category: E[1]	Background traffic, insects, cicadas 46-58 Kookaburra 59 Quarry not operational	n/a[5]	35
12-11-25	7:48pm to 8:03pm (Evening)	58.6	48.3	41.3	WD: n/a WS: 0 m/s Rain: Nil	WD: n/a WS: 0 m/s Rain: Nil Stability Category: E[1]	Background traffic, insects, cicadas 42-58 Quarry not operational	n/a[5]	35

[1] Temperature data sourced from CSIRO CCAM and modelled using TAPM to determine Stability Category.

[2] Monitoring was completed close to Stokers Lane at the entrance to the residence as to not disturb the resident, which places the attended noise monitoring location in direct line-of-sight of the quarry rather than near the sensitive receptor, i.e., the resident.

[3] An estimated quarry contribution was calculated using SEL calculations in Appendix 1. The result of the SEL calculation was then adopted for distance correction to receiver using NEL calculations in **Appendix 1**.

[4] Moderate exceedance (NPfI 2017 – Table 4.1).

[5] Quarry not operational.

4.5 Location NM5

Noise monitoring at location NM1 was conducted on Wednesday 12 November 2025 with results presented in **Table 4-5**. The quarry was inaudible at NM5 during the day. The quarry was not operational during the evening. The ambient noise environment was dominated flora, fauna, passing cars and aircrafts. The results satisfy the established noise criteria and indicate that noise emissions from Teven Quarry did not contribute to noise nuisance at the time of the monitoring.

Table 4-5: Noise survey results and observations for Location NM5

Date	Time (hrs)	Descriptor (dBA)			Meteorology (Handheld at microphone height)	Onsite Met Station (at 10m)	Apparent Noise Source, Description and SPL (dBA)	Teven Quarry LAeq(15min) Contribution	LAeq(15min) Criteria
		LAmax	LAeq	LA90					
12-11-25	10:36am to 11:01am (Day)	61.8	47.6	43.3	WD: 164° WS: 2.8 m/s Rain: Nil	WD: NW WS: 3 m/s Rain: Nil Stability Category: F[1]	Wind, trees, birds, insects 45-58 Quarry inaudible	<33	37
12-11-25	11:04am to 11:19am (Day)	61	47.6	42.5	WD: 164° WS: 2.8 m/s Rain: Nil	WD: NW WS: 2 m/s Rain: Nil Stability Category: F[1]	Wind, trees, birds, insects 45-52 Strong wind gusts 54-60 Quarry inaudible	<33	37
12-11-25	6:54pm to 7:09pm (Evening)	53.3	38.5	35.5	WD: 100° WS: 0.8 m/s Rain: Nil	WD: n/a WS: 0 m/s Rain: Nil Stability Category: E[1]	Background traffic, insects, cicadas, birds 36-40 Passing car 45-50 Quarry not operational	n/a[2]	35
12-11-25	7:10pm to 7:25pm (Evening)	52.2	44.3	38.4	WD: 100° WS: 0.8 m/s Rain: Nil	WD: n/a WS: 0 m/s Rain: Nil Stability Category: E[1]	Background traffic, insects, cicadas, birds 36-40 Power tools 40-45 Aircraft 42-51 Quarry not operational	n/a[2]	35

[1] Temperature data sourced from CSIRO CCAM and modelled using TAPM to determine Stability Category.

[2] Quarry not operational.

5. Conclusion

This NMA completed by Ramboll at the Holcim Teven Quarry, Teven, NSW as a quarterly requirement of the NMP. Noise monitoring was completed on Wednesday 12 November 2025 at five locations selected as representative of the sensitive receptors surrounding Teven Quarry.

Audible noise identified as emitted from the quarry was recorded during the day monitoring periods at NM4. The results presented in this NMA show compliance with the relevant noise criteria at the Holcim Teven Quarry, except for NM4 which exceeded the criteria by up to 3 dBA for one day period.

This exceedance is considered 'moderate' in the NPfI (NSW EPA, 2017). Subsequently, potential specific recommended noise management measures are as follows:

- Keeping equipment well-maintained and operating it in a proper and efficient manner. Regular maintenance prevents vibrations and rattling noises.
- Running staff-education programs and regular toolbox talks on the effects of noise and the use of quiet work practices – this is a typical measure for most industries.
- Loading techniques and considering height of material falling from the loader into the trucks during loading.
- Using 'smart' or broadband reversing alarms instead of tonal alarms, if not already.
- Using efficient enclosures for noise sources, e.g., the crushers and screeners which can contribute to the noise during loading activities.

For more significant noise reduction, permanent noise barriers or enclosures are recommended along the northern boundary of the site. These structures are lined with sound-absorbing materials and can reduce noise emissions more effectively than stockpiled material.

If applicable, exceedances of the noise criteria in the next round of noise monitoring will be verified and discussed further with Holcim.

6. References

Holcim. (2021). *Teven Quarry Noise Management Plan.*

IEC. (2017). *International Electrotechnical Commission. 60942:2017 Electroacoustics - Sound calibrators.*

Minister for Planning and Environment. (2015). *Development Consent SSD_6422, Teven Quarry Project.*

NSW EPA. (2014). *Discussion Paper. Validation of Inversion Strength Estimation Method.*

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

NSW EPA. (2021). *Environment Protection Licence number 3293.*

NSW EPA. (2023). *Noise Guide for Local Government.*

Standards Australia. (2018). *AS 1055:2018 Acoustics—Description and measurement of environmental noise.*

Standards Australia and Standards New Zealand. (2019). *AS/NZS IEC 61672.1:2019 Electroacoustics—Sound level meters, Part 1: Specifications.*

Appendix 1
Sound Exposure Level and Noise Emission Level Calculations

Project No: 318001800
Client Name: Holcim Australia Pty Ltd
Project Name: NSW Environmental Monitoring
Project Site: Teven Quarry
23/12/2025

Sound Exposure Level Calculations

NM4 day monitoring period (11:44AM to 11:59AM)

	Holcim Conveyor
measurement duration (s)	536
measured LAeq (dB)	54
Calculated Sound Exposure Level (dB)	**81**
number of events in 15 minute period	1
Total LAeq (15min)	**52**

NM4 day monitoring period (12:16PM to 12:31PM)

	Holcim Water Truck
measurement duration (s)	420
measured LAeq (dB)	50
Calculated Sound Exposure Level (dB)	**76**
number of events in 15 minute period	1
Total LAeq (15min)	**47**

Project No: 318001800
Client Name: Holcim Australia Pty Ltd
Project Name: NSW Environmental Monitoring
Project Site: Teven Quarry
23/12/2025

Noise Emission Level Calculations

NM4 day monitoring period (11:44AM to 11:59AM)

Site contribution corrected for distance from monitoring location to receiver

	Holcim Conveyor
estimated site contribution (LAeq) at monitoring location (dBA)	52.0
approximate distance from monitoring location to site (m)	310
approximate distance from site to receiver (m)	500
Distance Corrected Site Contribution at Receiver (LAeq dBA)	**47.8**
estimated additional attenuation (vegetation & ground absorption)	8
Estimated Site Contribution at Receiver (dBA)	**39.8**

NM4 day monitoring period (12:16PM to 12:31PM)

Site contribution corrected for distance from monitoring location to receiver

	Holcim Water Truck
estimated site contribution (LAeq) at monitoring location (dBA)	47.0
approximate distance from monitoring location to site (m)	310
approximate distance from site to receiver (m)	500
Distance Corrected Site Contribution at Receiver (LAeq dBA)	**42.8**
estimated additional attenuation (vegetation & ground absorption)	8
Estimated Site Contribution at Receiver (dBA)	**34.8**

Appendix B – 2025 Rehabilitation and Revegetation Monitoring Report

Annual Report, 2025 Teven Rock Quarry Rehabilitation and Monitoring Program, Teven NSW

Prepared for: Holcim Australia

Date: 02 January 2026

Prepared By: Michael Hallinan

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1. Introduction

This annual report on the Teven Quarry 2025 Rehabilitation and Monitoring Program aims to address annual report requirements outlined in the following reports:

- EMM, 2016, *Biodiversity and Rehabilitation Management Plan, Teven Quarry* (Prepared by EMM for Holcim (Australia) Pty Limited, 18 May 2016);
- Holcim Australia, 2020, *Teven Quarry Biodiversity & Rehabilitation Management* (August 2020 Update);
- Holcim Australia, 2021, *Teven Quarry Biodiversity & Rehabilitation Management* (November 2021 Update); and
- Holcim Australia, 2022, *2022 Teven Quarry Weed Management Plan.*

In particular, rehabilitation and monitoring works have aimed to address requirements in relation to Holcim Australia's commitment to implement the following measures to minimise impacts of the quarry operations on ecological values of the site:

- *Avoidance of impact on remnant subtropical rainforest community within Lot 1.*
- *Conservation, where possible, of hollow bearing trees.*
- *Implementation of a tree felling procedure to minimise potential impacts on fauna, in particular, koalas.*
- *Implementation of a rehabilitation strategy targeting regeneration of Eucalypt, Brushbox and Rainforest communities across the non-disturbance areas of the site. This strategy involves weed management protocols for Camphor Laurel, Lantana and other weed species, and targeted planting of a range of recommended native species, including rare and threatened plant species and species which may be of benefit to threatened fauna species.*
- *Annual inspections of rehabilitated areas undertaken over the life of the project to assist in guiding rehabilitation practice.*
- *Annual survey of monitoring plots and assessment against targets, with data presented in a report and submitted to BCD annually.*

This annual report summarises 2025 flora and fauna rehabilitation and monitoring works and observations since the 2024 annual report (prepared by Arbor Ecological in December 2024).

1.1. NSW Plant Community Types (PCTs)

Plant Community Types (PCTs) are broadly consistent with the *Trees Near Me NSW* database (NSW Department of Planning and Environment) as follows:

1.1.1. PCT: 3004 Far North Bangalow Palm Swamp Forest

Formation: Rainforests
Vegetation Class: Subtropical Rainforests
Description: Tall to very tall dense palm forest or rainforest, or rarely, extremely tall sclerophyll open forest with a dense sub-canopy, restricted to poorly-drained sites along a narrow strip of coastal lowlands north from Woodburn, North Coast.

The palm Archontophoenix cunninghamiana is almost always present and has the highest foliage cover, very frequently accompanied by Ficus coronata and Melaleuca quinquenervia, with Ficus obliqua occasionally present. Other tree species such as Araucaria cunninghamii or Syzygium francisii may be locally common and the vine Flagellaria indica is very frequent.

The mid-stratum and ground layer are commonly highly diverse, although it may have low species richness where the palm canopy cover is very high. This PCT occurs only at very warm, very wet locations receiving 1710-1830 mm mean annual rainfall, in poorly-drained and seasonally swampy gullies and depressions, usually on alluvium, at low elevations of up to 40 metres asl, within 15 km of the coast.

It occurs as part of a complex, small-scale mosaic involving a range of other lowland PCTs. For example, it may be replaced by PCT 3993 on adjacent estuarine deposits or by PCTs 3016 or 3148 on adjacent slopes.

1.1.2. PCT: 3147 Far North Brush Box-Bloodwood Wet Forest

Formation: Wet Sclerophyll Forests (Shrubby sub-formation)
Vegetation Class: North Coast Wet Sclerophyll Forests
Description: Mid-high to extremely tall, mid-dense to dense sclerophyll forest, which occurs mainly on metasediments, rarely on sandstone, in valleys and low coastal hills north from Broken Head.

The canopy very frequently contains Lophostemon confertus, often with high foliage cover and Corymbia intermedia, sometimes with high cover, and occasionally with Eucalyptus siderophloia and Eucalyptus pilularis. The mid-stratum consists of a mix of small trees, shrubs and vines, almost always including Smilax australis, very frequently Guioa semiglauca, Geitonoplesium cymosum, commonly with Cupaniopsis anacardioides, Pittosporum undulatum and Synoum glandulosum.

The ground stratum very frequently includes Lomandra longifolia and Blechnum cartilagineum, the latter commonly with high cover. This PCT occurs mainly in very warm, very wet locations receiving 1710-1890 mm mean annual rainfall, at mostly low elevations of 10-170 metres asl.

It occurs at drier, upper slope or more frequently burnt locations, and forms a mosaic with rainforest communities. In the Broken Head area its distribution overlaps with that of the lowland rainforest PCT 3121, which occurs on more sheltered slopes and has a higher diversity and foliage cover of rainforest trees and shrubs.

In the same area, it grades into littoral rainforest PCT 3122 closer to the coast in areas exposed to maritime influence.

2. Monitoring

Vegetation community monitoring by Arbor Ecological commenced in March 2021 and continued in December 2021, 2022, 2023, 2024 and 2025. Additional monitoring was undertaken in August 2021 by EMM Consulting Pty Ltd (Holcim 2021).

2025 vegetation monitoring includes the following:

- **Appendix 1** – 2025 Visual monitoring at photo points established in March 2021 in the Rainforest community and April 2021 in the Brushbox community.
- **Appendix 2** – 2025 General flora and fauna observation plates.
- **Appendix 3** – 2025 NSW Biodiversity Assessment Method (BAM) Field Survey Forms.
- **Appendix 4** – 2025 Bush Regeneration Work Log.

The Subtropical Rainforest (STR1) monitoring plot established by EMM Consulting Pty Ltd (Holcim 2021) was adopted by Arbor Ecological as a long-term monitoring plot for the rainforest community as recommended by Holcim (2021), refer to **Appendix 3**.

In December 2025 Arbor Ecological established the new Brushbox forest BBF3 monitoring plot (refer to **Figure 1**) as most representative of the Brushbox forest community and most suitable as a long-term monitoring plot for the community. This follows quarry roadworks in 2024 near the southern extent of the BBF2 monitoring plot which caused soil erosion and reduced overstory vegetation compromising the integrity and value of the BBF2 monitoring plot.

The closed Camphor Laurel Small-leaved Privet Forest BBF1 monitoring plot randomly selected by EMM Consulting Pty Ltd was also discontinued. This was since it has no safe access and is not representative of the Brushbox community due to the lack of Brushbox trees and almost entirely non-native vegetation cover in all strata.

Monitoring photos and annual plot-based monitoring continues in association with rehabilitation works to detect changes in vegetation condition, particularly in relation to weed cover and natural regeneration of locally endemic native species. Rehabilitation monitoring includes priority weeds listed in the 2022 Teven Quarry Weed Management Plan (Holcim Australia 2022).

As recommended by Holcim (2021), annual survey of monitoring plots was conducted using the NSW BAM Calculator (https://bamcalc.lmbc.nsw.gov.au). **Table 1 (BAM Monitoring Plot Key Indicators of Vegetation Condition)** includes the key indicators of vegetation condition Vegetation Integrity (VI), Composition Condition Score, Structure Condition Score, Function Condition Score, and High Threat Weed Cover. Assessments against benchmark targets for Plant Community Types will continue over the coming years following sustained rehabilitation works.

Detection of changes and trends is currently limited since 2021 was the first year of rehabilitation works and monitoring by Arbor Ecological. Noteworthy early trends in changes to vegetation conditions in STR1 Subtropical Rainforest (EMM & Arbor Ecological) are as follows, refer to **Table 1**:

- An initial increase and now stable number of native species recorded (Composition Condition Score)
- An increase in native species cover (Structure Condition Score)
- An increase in the vegetation community Function Condition Score.
- An increase in High Threat Weed Cover following less weed control works in 2025.
- Continued increase in overall Vegetation Integrity (VI) Score.

A comparison of Brushbox Forest monitoring findings in the new BBF3 compared with BBF2 are as follows, refer to **Table 1**:

- Reduced number of native species (Composition Condition Score) compared to BBF2.
- Substantially higher Structure Condition Score which is indicative of the substantially higher Brushbox cover.
- Substantially higher Function Condition Score due to factors such as increased mature tree numbers, leaf litter, logs and presence of hollows.
- Reduced High Threat Weed Cover.
- Subsequently increased overall Vegetation Integrity (VI) Score from above listed factors.

Good growing conditions have prevailed since monitoring commenced in 2021 with generally regular rainfall in the subtropical climate. Regular high rainfall during 2025 has continued to provide good growing conditions.

Annual monitoring also aims to detect the following attributes:

- Signs of native and feral fauna occurrences including mammals (e.g. koalas and foxes), birds, reptiles and amphibians.
- Koala scat searches around primary Koala food tree species in line with Phillips and Callaghan (2011)[1].
- Presence of nests, burrows and substantially hollow-bearing trees.
- Survival and condition of past and future infill and fauna habitat plantings.

Key findings outlined in **Table 2 (2025 Observations of Fauna Habitat Values)** are largely unchanged as follows:

- Small (<6cm) and medium (6cm to 12cm) sized hollow openings observed in mature Brushbox and Camphor Laurel. Two hollow branch spouts without any signs of use or occupation on a Giant Water Gum/ Rose Satinash on the edge of the rainforest community, refer to **Appendix 2, Plates**.
- No signs of Koala use or occupation despite targeted searches of mature, naturally occurring Tallowwood and planted Koala food trees species to southwest and adjoining the haul road and Brushbox forest to the northeast.
- Observations of commonly occurring bird, reptile and frog species.
- No substantial nests observed.

[1] Phillips S and Callaghan J, 2011, *The Spot Assessment Technique: a tool for determining localised levels of habitat use by Koalas Phascolarctos cinereus*, Australian Zoologist 35, 774-780.

Table 1. 2025 BAM Monitoring Plot Key Indicators of Vegetation Condition

Monitoring Plot/ Vegetation Type	Composition Condition Score					Structure Condition Score					Function Condition Score					High Threat Weed Cover					Vegetation Integrity (VI) Score				
	2021	**2022**	**2023**	**2024**	**2025**	**2021**	**2022**	**2023**	**2024**	**2025**	**2021**	**2022**	**2023**	**2024**	**2025**	**2021**	**2022**	**2023**	**2024**	**2025**	**2021**	**2022**	**2023**	**2024**	**2025**
STR1 (EMM & Arbor Eco) Rainforest		13.2	22.5	24.6	23.9		19.1	20.3	20.3	21.3		61.9	63.6	67.4	71.2	35.2	27.7	9.4	6.4	8.7	19.6	25	31.7	32.3	33.1
BBF2 (Arbor Eco) Brushbox Forest	50.9	50.9	53.5	49.7		58.2	60.3	55.4	62.6		60.4	62.7	62.7	59.2		49	41.5	26.7	18.2		56.3	57.7	57.1	56.9	
BBF3 (Arbor Eco) Brushbox Forest					43.6					73.7					93.9					15.2					67.1

Table 2. 2025 Observations of Fauna Habitat Values

Fauna Habitat Features	Observations/
Hollow-bearing trees including basal cavities, pipes/ spouts and dead stags	Small (<6cm) and medium (6cm to 12cm) sized hollow openings observed in mature Brushbox and Camphor Laurel. Two hollow branch spouts on a Giant Water Gum/ Rose Satinash on the edge of the rainforest community
Natural burrows or dens	Nil
Hollow fallen logs	Generally small, i.e. <6cm opening size
Wetlands, streams, rivers, dams and other water bodies	The floodplain rainforest vegetation community is regularly inundated. Small ephemeral drainage lines cross the steep Brushbox vegetation community draining to the east. Constructed drainage lines exist for quarry operations draining to the east
Nests and roosts	Nil. No nests observed to date including large stick nests suitable for raptors/ birds of prey
Sap feed trees for Yellow-bellied Glider and Squirrel Glider	Nil
Distinctive scats (e.g. Spotted-tailed Quoll or Koala) and latrine sites	Nil. Wallaby scats typical of Swamp Wallaby regularly detected. No Koala scats detected despite targeted searches of naturally occurring and planted Koala food trees
Signs of feeding on surfaces below potential feed trees and shrubs	Nil other than bird scats
Scratch marks on trees	Scratch marks continue to be observed on planted smooth-barked eucalypts typical of Lace Monitor and possum
Casuarina and *Allocasuarina* species for Glossy Black Cockatoo	Nil
Flying-fox camps	Nil
Microchiropteran bat tree, decorticating bark or palm frond roosts	Nil. No roosts observed in somewhat dense canopy foliage within rainforest vegetation

Bush rock, caves, crevices, overhangs, culverts, tunnels or disused mine shafts	Bush rock of various sizes present, particularly within Brushbox and Camphor Laurel forest
Swift parrot and regent honeyeater feed or nest trees	Nil
Winter-flowering eucalypts and other tree/ shrub species	Nil
Mistletoe and epiphytes	Common epiphytes (e.g. Staghorn Fern) observed in rainforest and Brushbox forest
Koala food trees	Mature Tallowwood and planted Koala food trees species to southwest and adjoining the haul road and Brushbox forest to the northeast. No signs of Koala use or occupation
Fruit-bearing trees or shrubs	Common in both rainforest and Brushbox forest providing fauna food resources, particularly for frugivorous birdlife
Dense understory shrubs	Limited dense understory vegetation within the rainforest and Brushbox forest. More widespread in Camphor Laurel forest
Dense leaf litter	Dense leaf litter throughout, particularly within the rainforest and Camphor Laurel forest types
Dense grassland	Dense exotic grassland in relatively open areas adjoining forest vegetation offers good habitat for a range of birdlife, frogs and some mammals
Habitat connectivity	Corridors of connecting forest vegetation extend to the north, west and south through interspersed cleared farmland which is widespread to the east across the floodplain

Locations of priority work zones; vegetation monitoring plots; environmentally sensitive features detected; NSW mapped Biodiversity Values; and Koala scat search locations are shown on **Figure 1**.

Rehabilitation zones are separated from the approved extraction area and remain unaffected by direct and relatively unaffected by indirect environmental impacts associated with extraction activities.

Rainforest and Brushbox communities where rehabilitation works continue to be conducted are mostly in moderate condition and on-track to achieve rehabilitation objectives provided rehabilitation works continue.

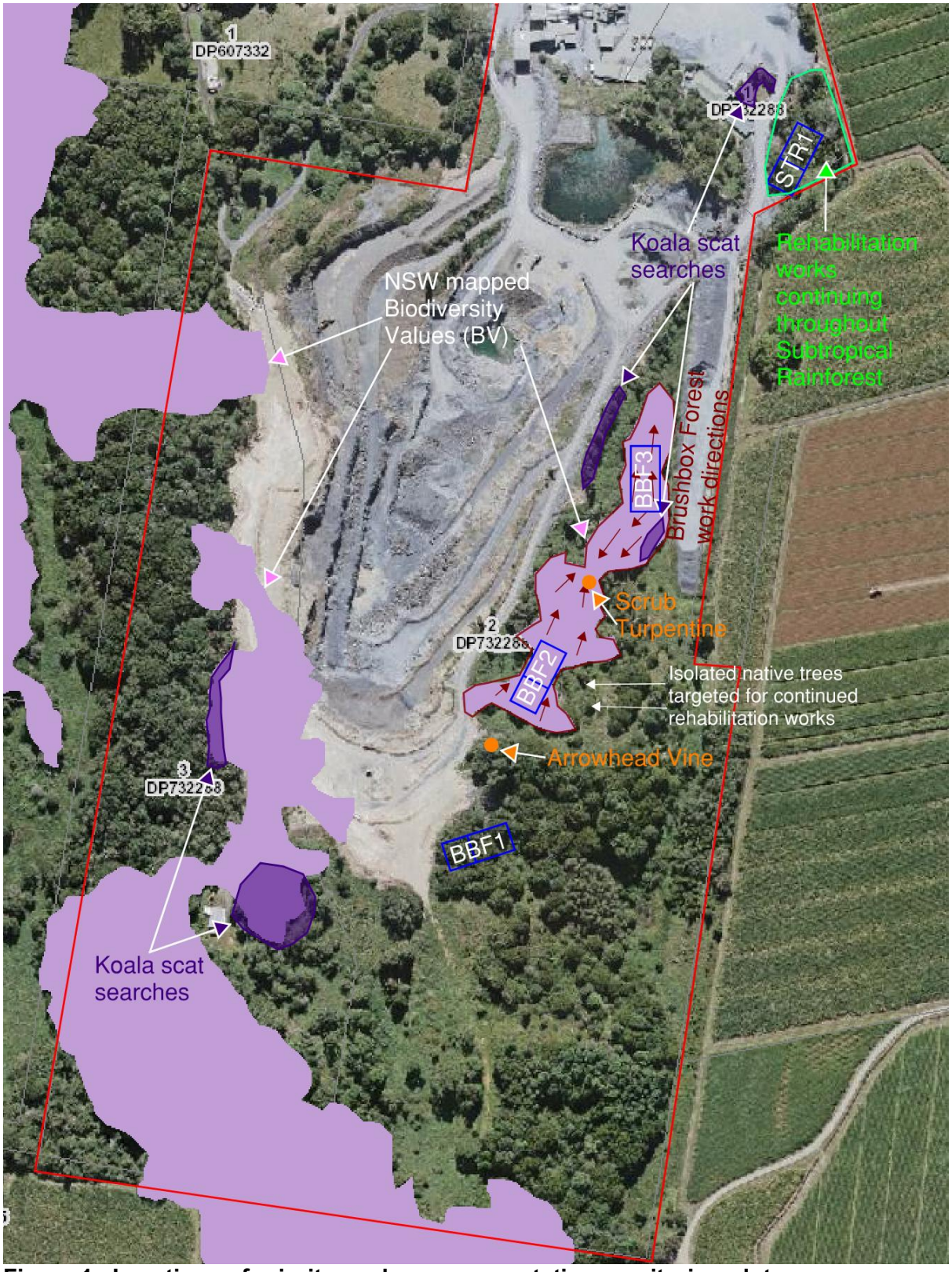

Figure 1. Locations of priority work zones; vegetation monitoring plots; environmentally sensitive features detected; NSW mapped Biodiversity Values; and Koala scat search locations.

3. Rehabilitation Works, 2025

Eucalypt, Rainforest and Brushbox vegetation communities in non-disturbance/ extraction areas of the site have been identified as priority areas for rehabilitation. In agreement with quarry management, works have initially focused on rehabilitation of the Rainforest and Brushbox vegetation communities.

Rehabilitation works have not commenced within the Eucalypt vegetation community near the southwest extent of the quarry since safe vehicle access remains unavailable to this portion of the property.

In line with sound principles of forest rehabilitation, rehabilitation works continue to be focused in priority vegetation communities in the best condition. As such, priority weed control and infill planting works are continuing in Rainforest and Brushbox plant communities since 2021. Also, in line with sound principles of forest rehabilitation, understory weeds are controlled prior to control of any overstory weeds such as mature Camphor Laurel. Overstory weed species (i.e. Camphor Laurel in the Brushbox community) are controlled in a staged manner.

2025 rehabilitation works were concentrated at the start and end of 2025. This was due to very wet conditions in much of the first half of 2025, including Cyclone Alfred, and an availability shortage of qualified and experienced bush regenerators. Works expanded on previous works in these plant communities through continued primary weed control and follow up works working towards and beyond edges.

Revegetation infill planting works were undertaken in April 2023 following substantial rainfall. The planting program used locally sourced (i.e. Friends of the Koala Nursery, Lismore) rainforest planting tubestock. All planting species were endemic to the plant communities as reflected in the Plant Community Type species lists. Further infill planting works in priority work areas are planned for February 2026. Species selections will be focused on those species that have established well, particularly in the regularly inundated conditions in the central open area of the rainforest community where multiple 2023 species plantings did not survive.

It is considered that weed control to promote natural regeneration remains the most effective rehabilitation strategy with supplementary infill plantings. It is recommended that the rehabilitation strategy be reviewed annually in light of identified priorities and available resources. The current rehabilitation approach of priority works in priority areas is recommended to continue to achieve objectives in a cost and resource effective manner.

3.1. Rainforest Community Works

The rainforest community occurs on a floodplain. Under the revised Plant Community Types in eastern NSW to the Biodiversity Offsets Scheme, the vegetation community most closely matches the Plant Community Type (PCT) 3004 – Far North Coast Bangalow Palm Swamp Forest. Vegetation varies on site in response to small variations in elevation and levels of regular inundation.

The site features large naturally occurring White Fig (*Ficus virens*), Port Jackson Fig (*Ficus rubiginosa*) and Giant Water Gum (*Syzygium francisii*). Numerous other locally occurring rainforest species occur along with Bangalow Palm (*Archontophoenix cunninghamiana*) in regularly inundated portions of the site. Obvious past plantings such as Coolamon/ Durobby (*Syzygium moorei*) and Cottonwood Hibiscus (*Hibiscus tiliaceus*) occur in the southern portion. **Appendix 3** lists all native and exotic species recorded within the 400m^2 monitoring plot.

The plant community is consistent with *Lowland Rainforest on Floodplain in the New South Wales North Coast bioregion*, an Endangered Ecological Community (EEC) listed as under the NSW *Biodiversity Conservation Act 2016* (BC Act). The plant community is also consistent with the Commonwealth listed Threatened Ecological Community (TEC) *Lowland Rainforest of Subtropical Australia* which is listed as Critically Endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

From **Appendix 3**, species richness and structural complexity is limited by the relatively small size, high edge ratio and past disturbances. In particular, a previously cleared and open area extends through the central portion which effectively fragments the rainforest community dividing it into two. This has noticeably increased weed pressure at the perimeter edges and was the focus of April 2023 infill plantings aiming to expand the extent of the canopy and achieve canopy closure over time. Planting fatalities were substantial in this central open area due to high rainfall and inundation. Swamp Hibiscus, Broad-leaved Cumbungi, sedges and Broad-leaved Paperbark currently thrive in the inundated conditions. Further infill planting works planned for February 2026 will consist of inundation tolerant species that prevail and thrive on site.

Plantings occurred following heavy rainfall, plantings were watered-in, and tree guards were installed to protect them from browsing wallabies. A selection of 50 plantings was undertaken from the following locally endemic rainforest species:

Acacia melanoxylon
Alphitonia excelsa
Argyrodendron trifoliatum
Beilschmiedia obtusifolia
Castanospermum australe
Commersonia bartramia
Cryptocarya microneura
Cryptocarya triplinervis
Diospyros fasciculosa
Dysoxylum mollissimum
Elaeocarpus grandis
Euroschinus falcata
Ficus virens
Ficus watkinsiana
Flindersia schottiana
Glochidion sumatranum
Macaranga tanarius
Melaleuca quinquenervia

Melicope elleryana
Planchonella australis
Polyscias elegans
Syzygium leuhmannii
Toechima dasyrrhache
Waterhousea floribunda

High rainfall in the weeks and months following planting works lead to the death of between 15% and 20% of rainforest plantings due to prolonged inundation. Subsequent infill plantings are planned to replace planting losses with the most inundation tolerant species such as Broad-leaved Paperbark (*Melaleuca quinquenervia*), Weeping Lilly Pilly (*Syzygium floribunda*), Pink Euodia (*Melicope elleryana*), Blue Fig/ Quandong (*Elaeocarpus grandis*), Umbrella Cheese Tree (*Glochidion sumatranum*), Cabbage Tree Palm (*Livistona australis*) and *Hibiscus spp*. No plantings are required for commonly recruiting species such as Giant Water Gum/ Rose Satinash (*Syzygium francisii*), Bangalow Palm (*Archontophoenix cunninghamiana*), White Fig (*Ficus virens*) and various understory native rainforest species.

Small-leaved Privet (*Ligustrum sinense*) and exotic grasses in open areas remain the most abundant exotic weed species in the rainforest community. Weed control works by Arbor Ecological commenced on the site on 10/03/21 and have largely focused on control of Small-leaved Privet to permit growth and development of native rainforest plants in the understory. Privet has been strategically retained around edges of rainforest community to exclude excessive drying sunlight and wind. The exotic weed is being progressively controlled around edges, particularly where native species are recruiting. A range of other exotic weeds thrive in areas with high soil moisture content, refer to **Appendix 3**.

Rehabilitation works continue to reduce understory weed cover and subsequently permit growth and development of native plants. Qualified and experienced bush regenerators continued to undertake weed control using industry best practice methods for weed control and chemical handling in line with DPI (2018)[2], BSRLG (2019)[3], the North Coast Regional Strategic Weed Management Plan 2023-2027 (North Coast Local Land Services, 2022).

Weed control works include priority weeds listed in the 2022 Teven Quarry Weed Management Plan (Holcim Australia 2022).

[2] NSW Department of Primary Industries (DPI) 2018, *Weed Control Handbook – A guide to weed control in non-crop, aquatic and bushland situations 7th Edition*.

[3] Big Scrub Rainforest Landcare Group (BSRLG) 2019, *Subtropical Rainforest Restoration – A practical manual and data source for Landcare groups, land managers and rainforest regenerators, 3rd Ed*. Big Scrub Rainforest Landcare Group, Mullumbimby NSW.

3.2. Brushbox Community Works

Brushbox (*Lophostemon confertus*) makes up the sole native canopy species of several steep portions of the property to the south and east with a scrubby rainforest understory and midstory as part of the wet sclerophyll vegetation community. Characteristic midstory native species include commonly occurring rainforest species such as Sweet Pittosporum (*Pittosporum undulatum*), Red Kamala (*Mallotus philippensis*), and Tuckeroo (*Cupaniopsis anacardioides*). **Appendix 3** lists all native and exotic species recorded within the 400m^2 monitoring plot.

Under the revised Plant Community Types in eastern NSW to the Biodiversity Offsets Scheme, the vegetation community most closely matches the Plant Community Type (PCT) 3147 Far North Brush Box-Bloodwood Wet Forest.

This PCT is partly associated with a threatened ecological community based on either distribution or floristic attributes. Despite occurrences of rainforest elements in the midstory and understory, the vegetation community is considered to not be associated with any NSW or Commonwealth listed Threatened Ecological Community (TEC). The PCT was identified as PCT 826 *Flooded Gum - Brush Box moist forest of the coastal ranges of the North Coast* by EMM (Holcim Australia 2021).

Weed control works by Arbor Ecological commenced within the Brushbox community on 10 March 2021 focusing on a vegetation corridor extending to the northeast. Works have focused on understory weed control, particularly the NSW Government listed High Threat Weeds Camphor Laurel, Lantana, Small-leaved Privet, Senna and vine weeds. This is similar to the rainforest community and as reflected in the monitoring results. Weed control works to reduce weed cover includes priority weeds listed in the 2022 Teven Quarry Weed Management Plan (Holcim Australia 2022).

2024 quarry roadworks near the southern extent of the BBF2 monitoring plot caused soil erosion and reduced overstory vegetation which compromised the integrity and value of the monitoring plot. In December 2025 Arbor Ecological established the new Brushbox forest (BBF3) monitoring plot to the north as most representative of the Brushbox forest community and most suitable as a long-term monitoring plot for the community.

2025 works have continued to extend to the northeast and towards the edges of the Brushbox community. Control of midstory Camphor Laurel is continuing and a splatter gun continues to be used to control Lantana infestations. Control of overstory Camphor Laurel, particularly near the community edges, is continuing in a strategic and staged manner following primary works in the understory and midstory.

Brushbox community edge and understory plantings were the focus of April 2023 infill plantings which followed heavy rainfall. Plantings were watered-in, and tree guards were installed to protect them from browsing wallabies. 70 plantings were undertaken from the following locally endemic rainforest species:

Acacia melanoxylon
Alphitonia excelsa
Commersonia bartramia

Cryptocarya microneura
Cryptocarya triplinervis
Diospyros fasciculosa
Dysoxylum mollissimum
Euroschinus falcata
Ficus watkinsiana
Flindersia schottiana
Glochidion sumatranum
Macaranga tanarius
Melaleuca quinquenervia
Melicope elleryana
Polyscias elegans
Syzygium leuhmannii
Cryptocarya glaucescens
Dysoxylum fraseranum
Toona ciliata

High rainfall occurred in the weeks and months following planting works. A planting survival rate of approximately 96% was recorded under good drainage conditions.

Previously cleared portions of the broader site, now dominated by Camphor Laurel, Small-leaved Privet and Lantana, are currently not high priority for weed control efforts. Weed control works in these areas occur in the areas of established and regenerating native plants, expanding out from areas in the best condition. This approach was adopted in the degraded Brushbox community to the southeast of the site, accessed via Wellers Road to the southeast. No works occurred in this low priority area in 2025.

A single over-mature NSW and Commonwealth listed Critically Endangered Scrub Turpentine (*Rhodamnia rubescens*) in the Brushbox community continues to show signs of decline due to Myrtle Rust (*Austropuccinia psidii*) infection, refer to general flora and fauna observation photos (**Appendix 2)**. A dead Scrub Turpentine (*Rhodamnia rubescens*) occurs nearby.

No further Arrow-head Vine has been detected since a single threatened (i.e. NSW Vulnerable listed) Arrow-head Vine (*Tinospora tinosporoides*) was detected in 2021 at the southern extent of the Brushbox overstory community.

Appendix C –2025 Surface Water Monitoring Results

HOLCIM

2025 - Surface Water Monitoring Results

Location	Frequency	Source	Lower Limit	Upper Limit	Description	Unit	Sample Date	13 01 2025	10 03 2025	28 03 2025	15 05 2025	16 05 2025	19 05 2025	2 06 2025	3 06 2025	1 08 2025	2 08 2025	11 08 2025	18 08 2025	22 08 2025
LDP (Licensed discharge point)	Wet Weather Discharge (Special Frequency 1)	EPL Section L2	6.5	8.5	pH	pH Units	Outcome	7.42	7.16	7.44	7.00	7.10	7.15	7.44	7.44	7.38	7.42	7.27	7.29	7.07
							Result	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria
			-	50	Suspended Solids	mg/L	Outcome	9.00	2.00	2.00	2.00	1.00	1.00	16.00	13.00	11.00	11.00	1.00	5.00	2.00
							Result	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria
			-	-	Visible Oil & Grease	Visable or Not Visable	Outcome	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible	Not Visible
							Result	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria	Within Criteria