


LYNWOOD QUARRY

2025 Annual Review

Site Details

Name of operation	Lynwood Quarry
Name of operator	Holcim (Australia) Pty Ltd
Development consent #	DA 128-5-2005
Document title	2025 Annual Review
Document version	A
Annual review start date	1 January 2025
Annual review end date	31 December 2025
<p>I, Wayne Beattie, certify that this audit report is a true and accurate record of the compliance status of Lynwood Quarry for the period 1 January 2025 to 31 December 2025 and that I am authorised to make this statement on behalf of Holcim.</p> <p><i>Note.</i></p> <p>a) <i>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).</i></p> <p>b) <i>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).</i></p>	
Name of authorised reporting officer	Wayne Beattie
Title of authorised reporting officer	Lynwood Quarry Manager
Signature of authorised reporting officer	
Date	31/03/2026

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Appendix A – 2025 Noise Monitoring Reports

Appendix B – 2025 Environmental Monitoring Results

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1 Statement of Compliance

This Annual Review has been prepared to provide a summary of the performance of the Lynwood Quarry operations over the period 1 January 2025 to 31 December 2025 (referred to hereafter as the reporting period). The compliance of the operation with relevant approvals is summarised in **Table 1**. The non-compliances have been ranked according to the risk matrix included in **Table 2**. A description of each non-compliance is provided in **Table 3**.

Table 1: Compliance Status 2025

Relevant Approval	All Conditions Complied With?
Development Consent (DA) 128-5-2005 (Mod 5)	No, refer to Table 3
Environment Protection Licence (EPL) 12939	No, refer to Table 3 .

Table 2: Compliance Status Key

Risk Level	Colour Code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of likelihood of occurrence
Medium	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • Potential for moderate environmental consequences, but is unlikely to occur; or • Potential for low environmental consequences, but is likely to occur
Administrative Non-compliance	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 condition)

Source: Annual Review Guideline (NSW Government, 2015)

Table 3: Non-Compliances

Relevant approval	Condition	Condition Description	Compliance status	Comment	Section addressed in Annual Review
DA128-5-2005 (Mod 5)	Schedule 3, Condition 20	<p>Water Management Plan</p> <p>The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Secretary. In addition to the standard requirements for management plans (see condition 2 of Schedule 5) this plan must:</p> <ul style="list-style-type: none"> (a) be prepared in consultation with the EPA, WaterNSW, DPI Water and DPI Fisheries; (b) be submitted to the Secretary for approval by 30 November 2016, unless otherwise agreed by the Secretary; (c) include a Water Balance; (d) include an Erosion and Sediment Control Plan; (e) include a Surface Water Monitoring Program; (f) include a Ground Water Monitoring Program; and (g) include a Surface and Ground Water Response Plan to address any potential adverse impacts associated with the development. <p>The Applicant must implement the management plan as approved from time to time by the Secretary.</p>	Non-Compliance	<p>Surface water monitoring recorded exceedances at:</p> <ul style="list-style-type: none"> • SW5: September (11mg/L) and October (14mg/L) for Total Oil and Grease • SW6: August (12mg/L), September (13mg/L) for Total Oil and Grease • SW11: pH in April (8.0) and May (8.0). <p>External consultants, Ramboll Australia Pty Ltd, were engaged to investigate the exceedances and found Lynwood Quarry unlikely to be the source of the exceedances on each occasion.</p>	Section 6.4
DA128-5-2005 (Mod 5)	Schedule 3, Condition 24	<p>Groundwater Monitoring Program</p> <p>The Ground Water Monitoring Program must include:</p> <ul style="list-style-type: none"> (a) detailed baseline data on ground water levels, flows, and quality, based on statistical analysis; (b) groundwater impact assessment criteria for monitoring bores; (c) a program to monitor regional ground water levels and quality; and (d) a protocol for the investigation of identified exceedances of the groundwater impact assessment criteria. 	Non-Compliance	<p>Holcim reported consecutive exceedances of trigger levels, including:</p> <ul style="list-style-type: none"> • pH exceedance at GPZ01 in Q2-Q3. DPHI was notified. • Depth to water level at groundwater bore MP1 remained below the minimum trigger level of 1.64 m throughout the 2025 reporting period. The exceedances were investigated and DPHI was notified. 	Section 6.5

Relevant approval	Condition	Condition Description	Compliance status	Comment	Section addressed in Annual Review
		<i>Note: The surface and ground water monitoring programs must be consistent with the current version of Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales (OEH).</i>			
DA128-5-2005 (Mod 5)	Schedule 3, Condition 15	<p>Air Quality Management Plan</p> <p><i>The Applicant must prepare an Air Quality Management Plan for the development to the satisfaction of the Secretary. In addition to the standard requirements for management plans (see condition 2 of Schedule 5) this plan must:</i></p> <p>(a) <i>be submitted to the Secretary for approval by 30 November 2016, unless otherwise agreed by the Secretary;</i></p> <p>(b) <i>be prepared in consultation with the EPA;</i></p> <p>(c) <i>describe the measures that would be implemented to ensure:</i></p> <ul style="list-style-type: none"> ● <i>compliance with the relevant conditions of this consent;</i> ● <i>best practice management is being employed; and</i> ● <i>the air quality impacts of the development are minimised during adverse meteorological conditions and extraordinary events;</i> <p>(d) <i>describe the proposed air quality management system; and</i></p> <p>(e) <i>include an air quality monitoring program that:</i></p> <ul style="list-style-type: none"> ● <i>is capable of evaluating the performance of the development;</i> ● <i>includes a protocol for determining any exceedances of the relevant conditions of consent;</i> ● <i>effectively supports the air quality management system; and</i> 	Non-Compliance	<p>One instance of missed monitoring at HVAS1 on November 22, 2025, due to filter damage. Holcim is reporting missed sampling to DPHI as part of this Annual Review. Monitoring was missed due to a damaged filter paper which could not be analysed at the laboratory. Contractor responsible for sampling including collection of sample filters has reviewed and updated their procedures following this event.</p> <p>An exceedance of the depositional dust criteria was recorded at DD13 in March and reported to DPHI. A subsequent investigation found the sample to contain a high level of organic material, and likely a result of adjacent farming practices.</p> <p>A further instance of depositional dust monitoring was missed in December, when the dust gauge was found with the funnel removed and no liquid inside the bottle.</p>	Section 6.3

Relevant approval	Condition	Condition Description	Compliance status	Comment	Section addressed in Annual Review																																																																																									
		<ul style="list-style-type: none"> evaluates and reports on the adequacy of the air quality management system. <p>The Applicant must implement the management plan as approved from time to time by the Secretary.</p>																																																																																												
EPL 12939	L4.1	<p>Noise Limits</p> <p>Noise generated at the premises must not exceed the noise limits presented in the table below:</p> <table border="1"> <thead> <tr> <th rowspan="2">Noise Assessment Location</th> <th>Day</th> <th>Evening</th> <th>Night</th> <th>Night</th> </tr> <tr> <th>LAeq (15 minute)</th> <th>LAeq (15 minute)</th> <th>LAeq (15 minute)</th> <th>LA1 (1 minute)</th> </tr> </thead> <tbody> <tr><td>Location 1</td><td>35</td><td>35</td><td>35</td><td>45</td></tr> <tr><td>Location 2</td><td>35</td><td>35</td><td>35</td><td>45</td></tr> <tr><td>Location 3</td><td>35</td><td>35</td><td>35</td><td>45</td></tr> <tr><td>Location 4</td><td>35</td><td>37</td><td>35</td><td>46</td></tr> <tr><td>Location 5</td><td>35</td><td>35</td><td>35</td><td>46</td></tr> <tr><td>Location 6</td><td>35</td><td>37</td><td>36</td><td>46</td></tr> <tr><td>Location 7</td><td>38</td><td>38</td><td>35</td><td>55</td></tr> <tr><td>Location 8</td><td>39</td><td>38</td><td>36</td><td>55</td></tr> <tr><td>Location 9</td><td>39</td><td>39</td><td>37</td><td>56</td></tr> <tr><td>Location 10</td><td>42</td><td>42</td><td>40</td><td>53</td></tr> <tr><td>Location 11</td><td>35</td><td>35</td><td>36</td><td>47</td></tr> <tr><td>Location 12</td><td>37</td><td>37</td><td>36</td><td>47</td></tr> <tr><td>Location 13</td><td>40</td><td>38</td><td>37</td><td>47</td></tr> <tr><td>Location 14</td><td>35</td><td>35</td><td>35</td><td>47</td></tr> <tr><td>Location 15</td><td>35</td><td>35</td><td>35</td><td>47</td></tr> <tr><td>Location 16</td><td>35</td><td>35</td><td>35</td><td>45</td></tr> </tbody> </table> <p>Note: The above locations refer to the respective noise assessment locations as depicted in Appendix 3 "Noise Receiver Locations" to the consolidated consent for Lynwood Quarry, as modified by the Department of Planning and Environment in May 2017.</p>	Noise Assessment Location	Day	Evening	Night	Night	LAeq (15 minute)	LAeq (15 minute)	LAeq (15 minute)	LA1 (1 minute)	Location 1	35	35	35	45	Location 2	35	35	35	45	Location 3	35	35	35	45	Location 4	35	37	35	46	Location 5	35	35	35	46	Location 6	35	37	36	46	Location 7	38	38	35	55	Location 8	39	38	36	55	Location 9	39	39	37	56	Location 10	42	42	40	53	Location 11	35	35	36	47	Location 12	37	37	36	47	Location 13	40	38	37	47	Location 14	35	35	35	47	Location 15	35	35	35	47	Location 16	35	35	35	45	Non-Compliance	Moderate Exceedance (5dB) of Noise Impact Assessment Criteria at monitoring Point N4 during the Q2 evening period. Investigations indicated the noise was influenced by external sources. DPPI was informed of the one-off exceedance.	Section 6.6.3
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DA128-5-2005 (Mod 5)	Schedule 3 Condition 3	<p>Noise Impact Assessment Criteria</p> <p>The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 1 at any residence on privately-owned land.</p>																																																																																												

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2 Introduction

Holcim (Australia) Pty Ltd (Holcim) owns and operates Lynwood Quarry, a hard rock quarry located west of Marulan, approximately 160 kilometres (km) southwest of Sydney and 27 km northeast of Goulburn in New South Wales (NSW), as seen in **Figure 1** and **Figure 2**.

Holcim is the trading name for Holcim (Australia) Pty Ltd which, as a member of the Large Holcim group, is one of the leading suppliers of heavy construction material products in Australia, operating over 80 quarries, over 200 fixed concrete plants and a fleet of over 900 concrete delivery trucks. Holcim began quarry operations at Lynwood Quarry in 2015 and since this time has provided high quality sand and aggregates for use in construction and landscaping across the local, regional and Sydney markets.

Holcim was granted Development Consent in December 2005 (DA 128-5-2005) (Development Consent) by the then NSW Minister for Planning for the construction and operation of Lynwood Quarry. There have been 5 modifications approved to the Development Consent under section 75W of the Environmental Planning and Assessment Act 1979 (EP&A Act) since 2005.

On 18 May 2016, Lynwood Quarry was granted modification to commence quarrying and associated activities in an alternative resource known as the Granite Pit located to the north-west of the Approved Pit area. The approval also allowed for the reduction in the extent of the approved pit to reflect limitations within the ignimbrite resource. Operations have continued in the Granite Pit since this time.

2.1 QUARRY CONTACTS

The Lynwood Quarry Manager is responsible to the regulatory authorities for all aspects of environmental compliance at the site. Key personnel for environmental management at Lynwood Quarry are listed in **Table 4**.

Table 4: Key personnel responsible for environmental management

Name	Role	Company	Contact Details
Wayne Beattie	Quarry Manager	Holcim	Office 4820 7007 M +61 419 476 900
Calin Rose Joshy	Support Services Supervisor	Holcim	M +61 482 133 223
Dozie Egeonu	Environment Manager – NSW & ACT	Holcim	M +61 429 557 493

2.2 ANNUAL REVIEW REQUIREMENTS

Condition 10 of Schedule 5 of the Lynwood Quarry Development Consent requires an Annual Review (AR) to be prepared and submitted to the Department of Planning, Housing, and Infrastructure (DPHI). This report has been prepared in accordance with the DPHI's Annual Review Guideline (DPE, 2015) and details the operational and environmental management activities of Lynwood Quarry during the reporting period 1 January 2025 to 31 December 2025. Development Consent requirements along with an explanation of where each requirement is addressed within this document are provided in **Table 5**.

Table 5: Development Consent 128-5-2005 (MOD 5) conditions for the Annual Review

Conditions		Addressed in Section
Schedule 2 – General Administrative Conditions		
Production Data		
13.	The Applicant must (a) Provide annual quarry production data to DRG using the standard form for that purpose; and (b) Include a copy of this data in the Annual Review.	Section 4.2
Schedule 3 – Specific Environmental Conditions		
Monitoring of Quarry Product Transport		
33A.	The Applicant must keep accurate records of all laden truck movements from the site (weekly, monthly, and annually) and publish a summary of records in its Annual Review.	Section 4.2.2
Schedule 3 – Specific Environmental Conditions		
Retirement of Biodiversity Credits		
48A.	The Applicant must retire the biodiversity credits specified in Table 11 to the satisfaction of the Secretary and OEH. The retirement of credits must be undertaken in accordance with the Framework for Biodiversity Assessment – NSW Biodiversity Offsets Policy for Major Projects by: (a) Acquiring or retiring credits under the Biobanking Scheme in the TSC Act. (b) Making payments into an offset fund that has been developed by the NSW Government; or (c) Providing supplementary measures.	Section 6.7
Schedule 3 – Specific Environmental Conditions		
Waste Management		
53	The Applicant must: (d) Report on waste management and minimisation on the Annual Review to the satisfaction of the Secretary.	Section 6.10

Conditions		Addressed in Section
Schedule 5 – Environmental Management, Reporting and Auditing		
Annual Review		
10	By the end of September each year, or other timing as may be agreed by the Secretary, the Applicant must 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 financial year, and the development that is proposed to be carried out over the current financial year;	Section 4, Section 6, and Section 8
	(b) Include a comprehensive review of the monitoring results and complaints records of the development over the previous financial year, which includes a comparison of these results against: <ul style="list-style-type: none"> ○ The relevant statutory requirements, limits, or performance measures/criteria. ○ The requirements of any plan or program required under this consent. ○ The monitoring results of previous years; and ○ The relevant predictions in the documents listed in condition 2(a) of Schedule 2; 	Section 6 and Section 9.2
	(c) Identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;	Section 1 and Section 11
	(d) Identify any trends in the monitoring data over the life of the development;	Section 6
	(e) Identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of significant discrepancies;	Section 6.1
	(f) Describe what measures will be implemented over the current financial year to improve the environmental performance of the development;	Section 6
	(g) Describe the area of vegetation cleared as part of the development and identify the area proposed to be cleared over the next 5 years;	Section 4.1 and Section 8
	(h) Calculate the number of additional Bio Banking (or equivalent) credits that will need to be purchased, before that clearing can be done; and	Section 6.7
	(i) Report on the number of Bio Banking (or equivalent) credits that have been purchased to allow ongoing clearing and completion of stages.	Section 6.7



FIGURE 2.1
Locality Plan

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Figure 1: Locality Plan (Umwelt, 2016)

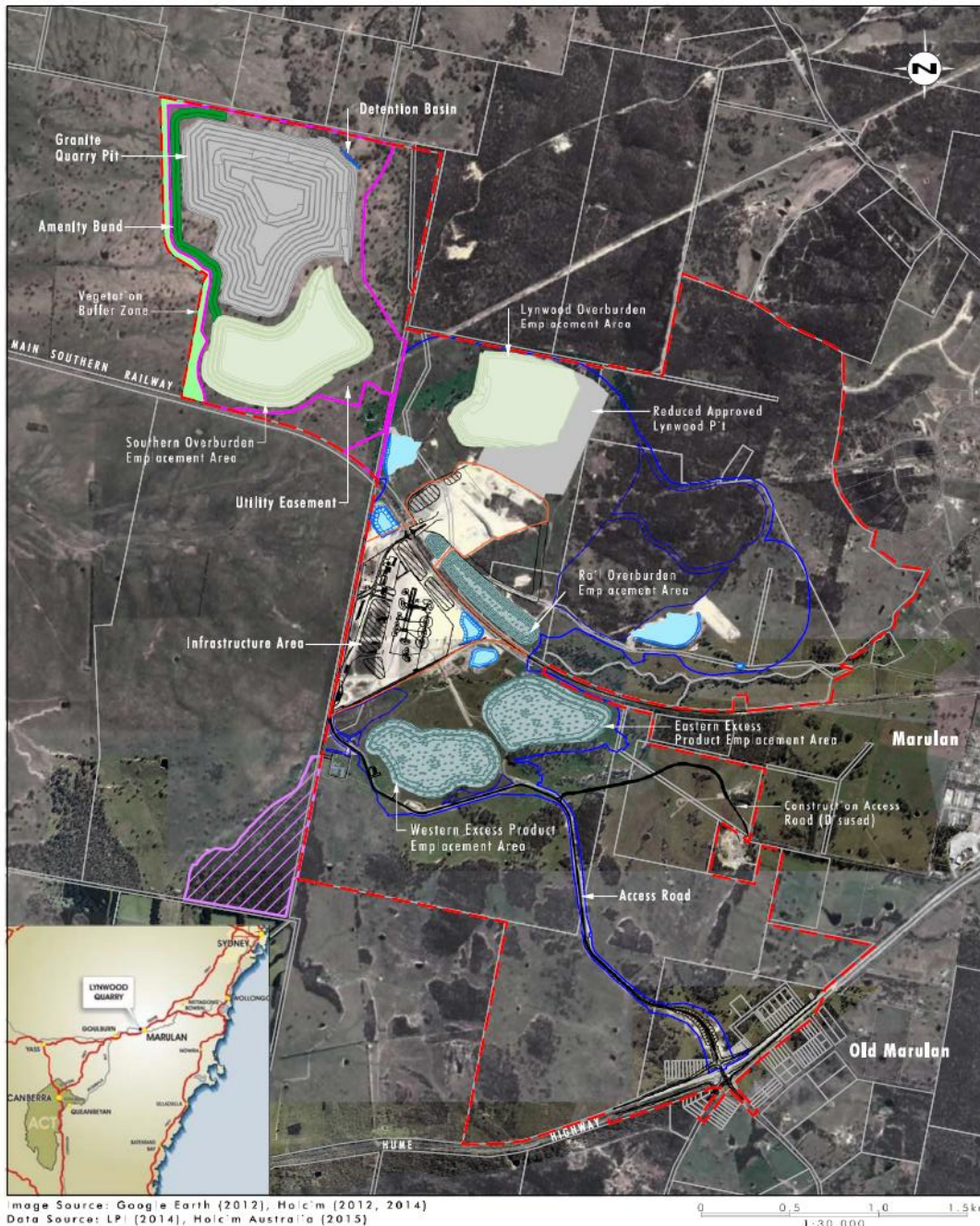


Figure supplied by Umwelt Pty Ltd

- Legend**
- Approved Project Area
 - Lynwood Infrastructure Area
 - Approved Disturbance Footprint
 - Granite Pit Disturbance Footprint
 - Lynwood Infrastructure Layout
 - Habitat Management Area
 - Query Pit
 - Emplacement Area
 - Dam
 - Overburden Emplacement Area
 - Vegetation Buffer Zone
 - Amenity Bund
 - Hume Road

FIGURE 1
Lynwood Quarry

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Figure 2: Overview of Operations (Environmental Management Strategy, 2020)

3 Approvals

Approvals currently held by Holcim (Australia) Pty Ltd. for Lynwood Quarry are listed in **Table 6**.

Table 6: Approvals and licences held by Holcim

Approval and Relevant Legislation	Details
Development Consent (DA) 128-5-2005 (Mod 5) <i>NSW Environmental Planning and Assessment Act 1979</i>	The MOD 5 Development Consent applied through the reporting period. Mining operations permitted to 1 January 2038 in accordance with the MOD 5 Development Consent.
Part 3A permit <i>Water Management Act 2000</i>	Obtained for works within 40 m of stream.
Part 2 Licence <i>Water Act 1912 Part 2</i>	Obtained for surface water capture and use.
Part 5 Licence <i>Water Act 1912 Part 5</i>	Obtained for groundwater monitoring.
Controlled Activity Approval (CAA) No. 10 ERM 2011/0446 <i>Rivers and Foreshores Improvement Act 1948</i>	Works within the riparian zones on site.
Environment Protection Licence (EPL) 12939 <i>Protection of the Environment Operations Act 1997</i>	Held by Holcim over the Lynwood Quarry premises. EPL 12939 was varied 20 September 2024.
Water Access Licence (WAL) No. 25575 <i>Water Act 1912</i>	Obtained under the water sharing plan for the Upper Nepean and Upstream Warragamba Water source (refer to Section 7.2)
Aboriginal Heritage Impact Permit (AHIP) No. 1100264 <i>National Parks and Wildlife Act 1974</i>	Discussed further in Section 6.1.1 .
EPBC 2012/6560 <i>Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)</i>	Obtained to manage matters of national environmental significance (MNES) including <i>Leucochrysum albicans var. tricolor</i> (Hoary Sunray) and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland. Compliance with this approval is assessed in the Annual Compliance Report.

3.1 DEVELOPMENT CONSENT HISTORY

The original Lynwood Quarry Development Consent 128-5-2005 was granted on 21 December 2005. Subsequent modifications to the Development Consent were approved in 2009, 2011, 2016, and 2017.

In May 2017, Lynwood Quarry was granted approval (MOD 5) to modify Condition 48A of Schedule 3 of the Development Consent. This condition related to the retirement of biodiversity credits for the site. All references to Development Consent conditions within this document refer to the MOD 5 unless stated otherwise.

3.2 MANAGEMENT PLAN APPROVALS

Environmental monitoring data and a copy of the current Lynwood Quarry Management Plans are published on the Holcim website (<https://www.holcim.com.au/lynwood>). During the preparation of this Annual Review, Holcim has assessed the need to review or update Management Plans.

All management plans were reviewed in 2025 and determined to not require updating. A letter was sent to DPHI to inform the department of the completed reviews on 30 June 2025.

4 Operations Summary

A summary of the operations performed at Lynwood Quarry during the reporting period is presented in the following sections.

4.1 QUARRYING OPERATIONS

Quarrying operations commenced in the Granite Pit in 2017 and have continued through the 2025 reporting period.

The quarrying process on site consists of the following four stages:

- Clearing and topsoil stripping – typically undertaken using a dozer and/or excavator in accordance with Lynwood Quarry’s clearing procedure, with selected material stockpiled for later use in rehabilitation.
- Overburden removal and emplacement – overlain material is typically removed via blasting and hauled to emplacement areas.
- Blasting, loading and haulage of primary raw feed (PRF) material – target resource removed via drill and blast then loaded by front-end loaders into haul trucks for transportation to the primary crusher; and
- Crushing and screening – resources are processed by the primary crusher and are then transported via conveyor to the infrastructure area for tertiary processing and screening. Products are stockpiled awaiting transport to local, regional and Sydney markets via road and rail transportation methods.

Lynwood Quarry did not complete any clearing or surface disturbance works in the reporting period.

4.2 PRODUCTION LIMITS

Production in 2025 met the limits on total saleable product and amount of product transported by road outlined in Schedule 2 Conditions 7 and 8 of the Development Consent. During the reporting period, a total of 2,134,400 tonnes of quarry products were transported from the quarry by road and rail.

Table 7 provides the annual production and transportation volumes from 2021 to 2025 reporting periods and provides a forecast for the 2026 reporting period.

Table 7: Long-term Production Summary (tonnes)

Material	Approved limit	2021	2022	2023	2024	2025	2026 (forecast)	Compliance
Product - total	5 million tonnes from the site in a year	2,018,000	2,085,790	2,185,343	2,087,683	2,134,400	2,200,000	Compliant
Product Transported - Rail	5 million tonnes from the site in a year	696,409	897,015	1,135,082	1,029,941	1,034,263	1,100,000	Compliant
Product Transported - Road	1.5 million tonnes from the site in a year by road	1,129,000	1,188,775	1,050,261	1,057,743	1,100,137	1,100,000	Compliant

4.2.1 Hours of Operation

Lynwood Quarry operates in accordance with the operating hours specified in **Table 8**.

Table 8: Operating hours at Lynwood Quarry

Activity	Day	Time	Compliance with Operating Hours during this reporting period
Construction works	Monday – Friday	7am to 6pm	Yes
	Saturday	8am to 1pm	Yes
	Sunday and Public Holidays	None	Yes
Topsoil/overburden removal/emplacement; drilling	Any day	7am to 6pm	Yes
Blasting	Monday – Saturday	9am to 5pm	Yes
	Sunday and Public Holidays	None	Yes
Extraction	Any day	7am to 10pm	Yes
Processing (crushing, screening, stockpiling); loading, delivery, and distribution; maintenance	Any day	Anytime	Yes

4.2.2 Vehicle Movements

In accordance with Condition 33A of Schedule 3 of the Development Consent, the number of laden truck movements from Lynwood Quarry are summarised in **Table 9**. Product transported by road from Lynwood Quarry is restricted to less than 1.5 million tonnes per annum. The 2025 reporting period road transport tonnages comply with the approved limits.

Table 9: Summary of Laden Trucks Movements

Month	Laden Truck Movements	Product by Road Transport (tonnes)
January	1,090	39,759.22
February	1,777	64,798.26
March	3,075	110,288.29
April	1,880	68,133.00

Month	Laden Truck Movements	Product by Road Transport (tonnes)
May	2,074	98,930.33
June	3,491	107,525.29
July	2,759	103,184.86
August	2,610	95,423.34
September	2,514	89,594.19
October	3,517	99,813.38
November	2,853	132,912.27
December	2,477	89,774.52
Total	30,117	1,100,136.95

4.3 CONSTRUCTION ACTIVITIES

No construction activities occurred during the reporting period.

4.4 NEXT REPORTING PERIOD

There are no development activities proposed for Lynwood Quarry in 2026.

5 Actions Required from Previous Annual Review

5.1 ACTIONS FROM THE 2024 ANNUAL REVIEW – DPHI ACTIONS

Lynwood Quarry’s 2024 Annual review was submitted on 31 March 2025. On 23 April 2025 DPHI confirmed that the Annual review generally satisfied reporting requirements of the consent and the NSW Planning *Annual Review Guideline* (October 2025). DPHI also advised that reported new non-compliances have been recorded in its system, with no further enforcement action proposed; however, these matters may be considered in the assessment of any future breaches.

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

Actions proposed to be undertaken at Lynwood Quarry during this reporting period based on the previous Annual Review are detailed in **Table 10**.

Table 10: Status of Actions in previous Annual Review (proposed by Holcim)

Action from Previous Annual Review	Works Undertaken in Reporting period
Complete implementation of the actions identified in the IEA (2024) Action Plan	A review into the status of actions from the 2024 IEA was completed as part of the scope of the most recent IEA.
Implementation of approved environmental Management Plans	Management measures and monitoring were completed in accordance with management plans. Some issues occurred with these summarised in Section 11
Continued extraction within the Granite Pit	Extraction of the granite pit continued throughout the 2025 reporting period.
Maintenance of visual amenity bund to the west of the Granite Pit	Maintenance continued into 2025
Continued weed and feral animal management	Holcim completed weed maintenance and feral animal operations
Continue to progress works for the Box Gum Woodland and update the BGWMP and RLMP to reflect this.	The BGWMP was updated and submitted to the Department of Climate Change, Energy, the Environment and Water of Australia (DCCEE). Final approval was granted 24 February 2026.

6 Environmental Performance

The following sections provide a summary of environmental monitoring and management undertaken during the reporting period. In accordance with the Development Consent, Lynwood Quarry has prepared several management plans in consultation with relevant stakeholders.

The environmental monitoring network is shown in **Figure 3**.

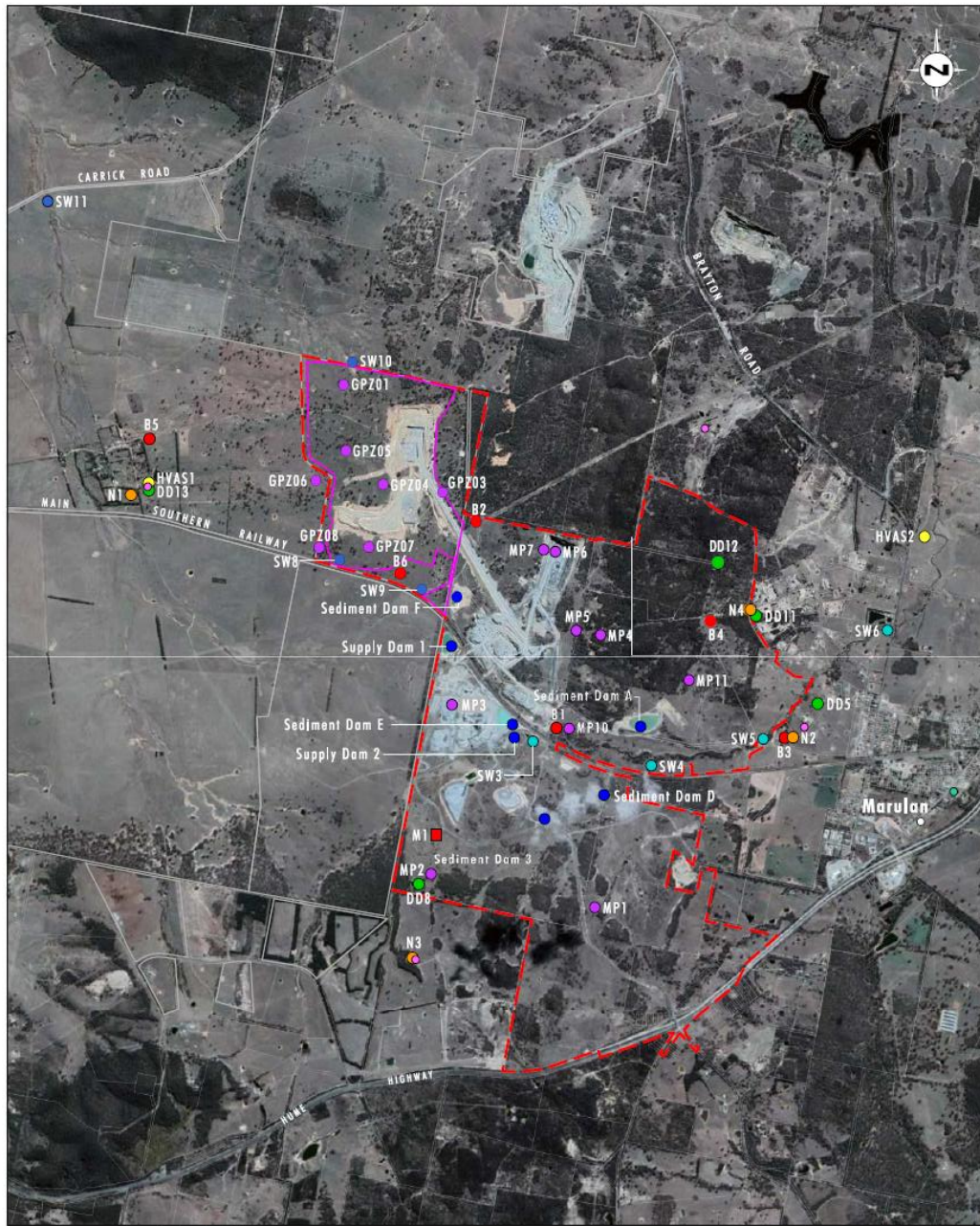


Image Source: Google Earth (2018)
 Data Source: LPI (2014), Holcim Australia (2015)

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- Legend**
- Approved Project Area
 - Granite Pit Disturbance Footprint
 - Meteorological Station
 - Depositional Dust Monitoring Location
 - HVAS Location
 - Blasting Monitoring Location
 - Noise Monitoring Location
 - Groundwater Piezometer
 - Surface Water Monitoring Location
 - Site Water Management Dams
 - Granite Pit Surface Water Monitoring Location SW8 to SW11
 - Residence Location
 - Marulan Public School
 - Marulan Childrens Centre

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Figure 6
 Environmental Monitoring Network

Figure 3: Environmental Monitoring Network (Water Management Plan, 2020)

6.1 SUMMARY OF PERFORMANCE AGAINST EA PREDICTIONS

The Lynwood Quarry has been subject to four environmental assessments (EA) and five modifications since the original environmental impact statement and development application was approved in 2005. MOD 4 involved expanding quarrying operations to the west of the existing operations. This was assessed by the most recent EA dated November 2015 (Umwelt, 2015). The results of environmental monitoring data obtained during the reporting period have been compared to the predictions in the EA dated November 2015 within this Annual Review. During the reporting period, monitoring was undertaken at Lynwood Quarry for meteorological, noise, air quality, surface water and groundwater.

A summary of environmental performance during the reporting period is given in **Table 11**.

Table 11: Summary of the environmental performance during the reporting period

Aspect	Approval Criteria/ EIS Prediction	Performance during the reporting period	Trend / key management implications	Implemented / proposed management actions
Air Quality	Refer to Section 6.1.1 and 6.3.2	One instance in 2025 when monitoring equipment failed to monitor for the full 24-hour period and collect a valid sample.	Average depositional dust and PM ₁₀ monitoring results continued to trend below impact assessment criteria limits during the reporting period and remained within historical range.	Actions that were undertaken to address these are detailed in Section 6.3 .
Surface Water	Refer to Section 6.1.2 and 6.4.2	<p>Surface Water monitoring generally compliant during the reporting period.</p> <p>Consecutive exceedances of oil and grease were detected at SW5 and SW6 during the reporting period. The exceedances were reported to DPHI and investigated. It was determined to be unlikely that the exceedance was a result of Lynwood Quarry.</p> <p>Site SW8 was dry throughout the entire reporting period.</p> <p>There were three exceedances of surface water pH through the reporting period. Two consecutive exceedances occurred and were reported.</p> <p>Oil and Grease compliance exceeded trigger levels 15 times through 2025.</p> <p>Monitoring of Total suspended solids and was compliant throughout 2025.</p> <p>Electrical conductivity recorded two exceedances in July.</p>	<p>Generally, surface water monitoring results were below impact assessment criteria during the reporting period and remained within historical range.</p> <p>Across the monitored locations, average pH in 2025 was lower than 2024 and 2023.</p> <p>Average oil and grease also decreased in 2025 compared with previous years. Most monitoring locations showed lower annual averages</p>	Actions to be undertaken are detailed in Section 6.4 .

Aspect	Approval Criteria/ EIS Prediction	Performance during the reporting period	Trend / key management implications	Implemented / proposed management actions
Groundwater	Refer to Section 6.1.3 and 6.5.2	<p>Groundwater monitoring was generally compliant throughout 2025.</p> <p>MP1 had groundwater trigger level exceedances. An external investigation found the changes to be due to regional factors and natural variability. DPHI was notified.</p> <p>Three pH exceedances occurred at during in 2025. DPHI was informed of three occurrences at GPZ01. The exceedances were not thought to be caused by quarry activities.</p>	<p>Generally, groundwater results were below impact assessment criteria during the reporting period and remained within historical ranges. There were some exceptions to this which are discussed further in Section 6.5 and Table 3.</p>	<p>Actions to be undertaken are detailed in Section 6.5.</p>
Noise	Refer to Section 6.1.4 and 6.6.2	<p>Noise monitoring during Q2 reported one exceedance at N4 during the evening period, the LAeq (15min) measurement exceeded the allowable limit by up to 5 dB. Investigations concluded that the exceedance was an isolated incident resulting from improper monitoring procedures and extraneous sources.</p>	<p>The exceedance at N4 during Q2 was the first exceedance of the criteria since the 2016 reporting period.</p> <p>All other noise monitoring results were below impact assessment criteria.</p>	<p>Any further actions to be undertaken are in Section 6.6.</p>
Biodiversity	Refer to Section 6.7.2	<p>Ecological monitoring was completed in 2025.</p>	<p>Holcim continues to consult with authorities on the status of conservation areas as well as appropriate Management Plans for these areas.</p> <p>The Box Gum Woodland Management Plan was approved 24 February 2026.</p>	<p>Any further actions to be undertaken are in Section 6.7.</p>
Blasting	Refer to Section 6.9.2	<p>All blasts were compliant in 2025.</p>	<p>Blasting monitoring was undertaken in 2025 and complied with the Consent and EPL Criteria.</p>	<p>Any further actions to be undertaken are in Section 6.9.</p>

6.1.1 Air Quality Predictions Against the EA

An Air Quality Impact Assessment (PEL, 2015) was completed as part of the Lynwood Quarry Extraction Area Modification EA (Umwelt, 2015). The assessment predicted that as operations move in a westerly direction, there would be no predicted exceedances of the assessment criteria for all PM10 and Depositional Dust at private residences during the operational phase of the quarry. In summary, the EA concluded that:

- EPA air quality impact assessment criteria were not predicted to be exceeded at nearby residences; and
- The modification is not anticipated to cause adverse impacts offsite.

A discussion of air quality monitoring results recorded during the reporting period is provided in **Section 6.3**. The annual depositional dust averages were below the impact assessment criteria and EA predictions for this reporting period. Depositional dust averages were calculated from 12 months of data.

PM10 results for 2025 were similarly below impact assessment criteria and EA predictions. There was one missed recording event in 2025. There were no exceedances. PM10 monitoring is presented in **Table 15**.

6.1.2 Surface Water Quality Predictions Against the EA

The outcomes of the surface water assessment (Umwelt 2005 & 2015) indicated that Lynwood Quarry would not significantly alter the flow regimes or annual flow volumes in the surrounding creek network in terms of peak discharges, flood levels, or peak in-stream velocities either upstream or downstream of Lynwood. Impacts to No adverse impacts are expected in terms of channel stability, in-stream habitat of either Joarimin Creek or Lockyersleigh Creek systems. Adverse impacts of water quality are not predicted in Joarimin Creek, Lockyersleigh Creek or the downstream drainage systems.

A discussion of the surface water quality results recorded during the reporting period is provided in **Section 6.4**. All surface water quality results were generally consistent with criteria. Little to low flow was observed at several sampling events. Oil and Grease, and pH exceeded trigger criteria more than twice over consecutive months during 2025. Subsequent investigations determined there was no evidence that the site impacted downstream water quality.

6.1.3 Groundwater Predictions Against the EA

Drawdown impacts are expected within the immediate vicinity of the quarry pit. As the expansion of the granite pit continues, a progressively deepening and slightly expanding cone of depression surrounding the pit is expected (Umwelt, 2015). Groundwater inflow rates are predicted to be negligible given the early stage of operations in the extension area.

Groundwater results for 2025 were generally consistent with the historical minimum and maximum bounds reaching back to 2010. Groundwater results indicated there has been no considerable impact on the local groundwater from operations. Consecutive exceedances of the maximum pH trigger level occurred at GPZ01. MP1 remained consistently below the minimum trigger level for depth to water

throughout 2025. All other parameters complied with the criteria outlined in the WMP. **Section 6.5** further discusses groundwater level and water quality results.

6.1.4 Noise Predictions Against the EA

The results of the noise impact assessment identified that noise impacts from the operations will meet the existing development consent criteria at all locations and time of day periods except receiver location 11 (Monitoring Location – N3) where a minor 1 dB exceedance is predicted at night (Umwelt, 2015).

Lynwood Quarry reported one noise monitoring exceedance during the reporting period. **Section 6.6** discusses noise monitoring results and **Appendix A** contains the 2025 quarterly noise monitoring reports.

6.2 METEOROLOGICAL MONITORING

The onsite meteorological station provided a summary of monthly rainfall and daily temperatures. The site uses this meteorological monitoring data to inform daily operations as per the Development Consent.

Table 12 presents the meteorological results for the 2025 reporting period.

Table 12: Meteorological monitoring results summary

Month	Total Rainfall (mm)	Minimum Temperature (°C)	Maximum Temperature (°C)
January	81.6	7.3	35.5
February	76.4	3.7	33.6
March	40.4	5.6	34
April	78.4	3.6	26.5
May	58.4	0.3	21.6
June	12.2	-5.6	17.3
July	93.6	-4.7	17.6
August	90	-2.6	21.2
September	60.8	-0.7	25.9
October	25	2	30.5
November	35.8	3.4	29.6
December	29.6	3.3	36.2
Annual TOTAL	682.2		

Lynwood Quarry received a total of 682.2 of rainfall over the 2025 reporting period, a decrease from 910 mm recorded in 2024. The highest monthly rainfall occurred in July (93.6 mm). The least amount of monthly rainfall occurred in June (12.2 mm). The minimum recorded temperature in the region occurred in June (-5.6°C). December recorded the maximum temperature (36.2°C).

6.3 AIR QUALITY

6.3.1 Environmental Management Measures

Lynwood’s Air Quality Management Plan (AQMP) was approved in September 2023.

The air quality monitoring network consists of five dust deposition gauges (DD5, DD8, DD11, D12, DD13) and two High Volume Air Samplers (HVAS1 and HVAS2), which are used to measure depositional dust and particulate matter <math><10\mu\text{m}</math> (PM₁₀), respectively. Dust monitoring locations are provided in **Figure 3**.

Following historical and ongoing issues with the power supply, Lynwood upgraded the two HVAS units in 2024. The HVAS were fitted with solar arrays and back-up generators to minimise the risk of missed sampling for PM10, PM2.5, and TSP.

6.3.2 Performance Criteria

Holcim is required to ensure that dust and particulate emissions do not cause exceedances of the criteria specified in the Development Consent. The air quality assessment criteria specified in the Development Consent are provided in **Table 13**.

Table 13: Air quality impact assessment criteria

Pollutant	Averaging Period	Criterion
Total suspended particulate (TSP) matter	Annual average	90 $\mu\text{g}/\text{m}^3$
Particulate matter <math><10\mu\text{m}</math> (PM ₁₀)	Annual average	30 $\mu\text{g}/\text{m}^3$
	24-hour average	50 $\mu\text{g}/\text{m}^3$
Deposited dust	Annual average (maximum total)	4 $\text{g}/\text{m}^2/\text{month}$
	Annual average (maximum increase)	2 $\text{g}/\text{m}^2/\text{month}$

6.3.3 Environmental Outcomes

Depositional Dust

As noted in **Table 14**, depositional dust monitoring during the reporting period took place monthly. All sampling sites generally complied with Development Consent criteria for annual average total deposited dust and ranged between 0.58 – 1.1 g/m²/month. One exceedance of the relevant criteria at DD13 in March (7.4g/m²/month) was reported to DPHI as required. The sample contained a high level of organic matter and was deemed likely to be a result of adjacent farming practices.

It should be noted that on approval of the AQMP (2023) that DD6 became an internal comparison monitor and is not used to measure offsite air quality nor is it intended for reporting as part of the monitoring network. As such, results recorded at DD6 are not included in **Table 14**.

There were two instances of monitoring non-conformance during the reporting period, where the depositional dust monitoring program did not occur as scheduled. In May, samples from all monitoring gauges were collected after an extended deployment period (33 days). In December, one monthly sample was invalidated due to tampering at DD12 when funnel was found out of the bottle, with no liquid inside the bottle. Both matters were recorded and reviewed.

Throughout the reporting period, the site was compliant with the annual average all recording below the annual criteria. The highest reading during the reporting period was 7.4 g/m²/month.

Table 14: Depositional Dust Monitoring Results

Month	Total Insoluble Solids (g/m ² /month)				
	DD5	DD8	DD11	DD12	DD13
January	1	0.5	1	0.4	0.6
February	0.6	0.7	0.6	0.6	1
March	0.4	0.9	0.4	0.3	7.4³
April	0.3	1	0.4	0.9	1
May	0.6 ¹	0.1 ¹	0.1 ¹	0.1 ¹	0.1 ¹
June	2.1	0.4	0.3	0.3	0.3
July	1	0.7	0.7	1.2	0.5
August	0.7	0.3	0.3	0.3	0.2
September	1.1	0.8	1.1	0.2	0.4
October	0.9	0.5	1.3	0.7	0.5
November	0.9	0.7	0.9	1.6	0.5
December	1	0.4	1.2	NS ²	0.7
Annual Average	0.88	0.58	0.69	0.60	1.10
Minimum	0.3	0.1	0.1	0.1	0.1
Maximum	2.1	1	1.3	1.6	7.4

Note:

Contaminated samples are marked with an asterisk (*) and have been removed from the annual average.

NS indicates where a sample was invalidated due to contamination. Values in bold are exceedances.

¹ Sample exposed for 33 days. Result has been averaged by the sampling period, in days, in accordance with AS3580.10.1

² Sample invalidated - funnel found out of bottle, with no liquid in bottle, indicating tampering (insoluble solids <0.1 g/m²/month)

³ Sample was predominantly organic material and deemed likely to be a result of activities on the adjacent farm.

PM₁₀ / TSP

PM₁₀ monitoring via HVAS units 1 (Lockyersleigh) and 2 (Brayton Road) was undertaken during the reporting period. There were 61 sampling events at HVAS1 and HVAS2 in the reporting period, as shown in **Table 15**.

Table 15: PM₁₀ Compliance Summary

Category	HVAS1	HVAS2
Total number of HVAS monitoring rounds required in 2025	61	61
Number of completed monitoring rounds	60	61
Number of incomplete monitoring rounds, contamination, or equipment failure	1	0
Number of valid samples	60	61

During the 2025 reporting period, one non-compliance was recorded at Lynwood Quarry.

On 22/11/2025, the HVAS1 filter was damaged preventing the PM₁₀ from being calculated. It is noted Holcim does not have a record of notification to DPHI regarding this missed event. An investigation by the monitoring contractor confirmed that the damage was a result of tears on the filter paper which resulted in a final filter weighing which was lower than the initial weighing. This then resulted in the lab calculating a negative particulate value. This was noted to occur on occasion as the filter papers required for this methodology are very delicate, and even a minor tear can result in a negative result. External influences such as wind gusts during sampling can also cause the filters to shift within the unit, even with correct placement.

Table 16 display the PM₁₀ monitoring results at HVAS1 and HVAS2, respectively. No results exceeded the 24-hour criteria in this reporting period.

Table 16: HVAS PM₁₀ Monitoring Results

Sampling Date	HVAS1 (Lockyersleigh)			Sampling Date	HVAS2 (Brayton Road)		
	PM ₁₀	TSP ¹	Compliance Status		PM ₁₀	TSP	Compliance Status
02/01/2025	22.2	55.6	Compliant	02/01/2025	32.3	80.7	Compliant
08/01/2025	22.1	55.2	Compliant	08/01/2025	33.9	84.7	Compliant
14/01/2025	18.6	46.6	Compliant	14/01/2025	17.5	43.6	Compliant
20/01/2025	18.7	46.9	Compliant	20/01/2025	17.8	44.4	Compliant
26/01/2025	12.5	31.2	Compliant	26/01/2025	13.4	33.5	Compliant
01/02/2025	13.3	33.3	Compliant	01/02/2025	13.9	34.7	Compliant
07/02/2025	14.6	36.6	Compliant	07/02/2025	17.1	42.7	Compliant
13/02/2025	14.8	37	Compliant	13/02/2025	14.6	36.6	Compliant
19/02/2025	19.9	49.8	Compliant	19/02/2025	23.4	58.4	Compliant
25/02/2025	11.4	28.6	Compliant	25/02/2025	12.9	32.3	Compliant
03/03/2025	11.6	29	Compliant	03/03/2025	11.4	28.6	Compliant
09/03/2025	7.1	17.8	Compliant	09/03/2025	9.2	23	Compliant
15/03/2025	15.5	38.9	Compliant	15/03/2025	18.1	45.2	Compliant
21/03/2025	9.6	24.1	Compliant	21/03/2025	10.3	25.8	Compliant
27/03/2025	9.9	24.7	Compliant	27/03/2025	13.9	34.7	Compliant
02/04/2025	5.6	14	Compliant	02/04/2025	8.5	21.2	Compliant
8/04/2025	11.3	28.3	Compliant	08/04/2025	12	30	Compliant
14/04/2025	16.4	41	Compliant	14/04/2025	18.3	45.6	Compliant
20/04/2025	14.1	35.3	Compliant	20/04/2025	15.7	39.2	Compliant
26/04/2025	12.5	31.2	Compliant	26/04/2025	13.5	33.8	Compliant
02/05/2025	7.7	19.4	Compliant	02/05/2025	8	20	Compliant
08/05/2025	15.5	38.9	Compliant	08/05/2025	14.9	37.3	Compliant
14/05/2025	10.9	27.2	Compliant	14/05/2025	12.2	30.4	Compliant
20/05/2025	9.8	24.6	Compliant	20/05/2025	14.6	36.6	Compliant

Sampling Date	HVAS1 (Lockyersleigh)			Sampling Date	HVAS2 (Brayton Road)		
	PM ₁₀	TSP ¹	Compliance Status		PM ₁₀	TSP	Compliance Status
26/05/2025	9.2	22.9	Compliant	26/05/2025	9.7	24.3	Compliant
01/06/2025	9.5	23.8	Compliant	01/06/2025	9	22.4	Compliant
07/06/2025	12.4	30.9	Compliant	07/06/2025	9.9	24.7	Compliant
13/06/2025	6.8	16.9	Compliant	13/06/2025	6	15.1	Compliant
19/06/2025	7.9	19.8	Compliant	19/06/2025	10	25	Compliant
25/06/2025	5.2	12.9	Compliant	25/06/2025	8.8	22	Compliant
01/07/2025	2.5	6.1	Compliant	01/07/2025	2.1	5.2	Compliant
07/07/2025	3.1	7.7	Compliant	07/07/2025	9.6	24	Compliant
13/07/2025	9.5	23.7	Compliant	13/07/2025	9	22.4	Compliant
19/07/2025	5.2	12.9	Compliant	19/07/2025	8.5	21.2	Compliant
25/07/2025	23	57.5	Compliant	25/07/2025	7.9	19.8	Compliant
31/07/2025	8.3	20.7	Compliant	31/07/2025	4.7	11.8	Compliant
06/08/2025	8.2	20.6	Compliant	06/08/2025	12.5	31.2	Compliant
12/08/2025	3.8	9.5	Compliant	12/08/2025	4.9	12.1	Compliant
18/08/2025	6	15.1	Compliant	18/08/2025	5.8	14.4	Compliant
24/08/2025	5.1	12.8	Compliant	24/08/2025	5.3	13.4	Compliant
30/08/2025	4.4	10.9	Compliant	30/08/2025	3.4	8.5	Compliant
05/09/2025	10.7	26.7	Compliant	05/09/2025	8	20	Compliant
11/09/2025	2.7	6.8	Compliant	11/09/2025	2.5	6.1	Compliant
17/09/2025	0.5	1.2	Compliant	17/09/2025	8.4	20.9	Compliant
23/09/2025	3.7	9.2	Compliant	23/09/2025	4.9	12.3	Compliant
29/09/2025	4.5	11.4	Compliant	29/09/2025	3.6	9.1	Compliant
05/10/2025	14.3	35.8	Compliant	05/10/2025	11.9	29.8	Compliant
11/10/2025	16.2	40.6	Compliant	11/10/2025	25.3	63.3	Compliant
17/10/2025	17.4	43.5	Compliant	17/10/2025	22.3	55.8	Compliant
23/10/2025	25.1	62.8	Compliant	23/10/2025	20	50.1	Compliant
29/10/2025	5.9	14.7	Compliant	29/10/2025	3.7	9.2	Compliant
04/11/2025	7.4	18.6	Compliant	04/11/2025	2.2	5.5	Compliant
10/11/2025	8.6	21.5	Compliant	10/11/2025	12.1	30.3	Compliant
16/11/2025	18.4	45.9	Compliant	16/11/2025	19	47.5	Compliant
22/11/2025	-	-	Non-Compliant ²	22/11/2025	4.1	10.1	Compliant
28/11/2025	14.4	36.1	Compliant	28/11/2025	16	40.1	Compliant
04/12/2025	20.5	51.2 5	Compliant	04/12/2025	20.5	51.2 5	Compliant
10/12/2025	18.8	47	Compliant	10/12/2025	16.4	41	Compliant
16/12/2025	14.3	35.7 5	Compliant	16/12/2025	13.4	33.5	Compliant

Sampling Date	HVAS1 (Lockyersleigh)			Sampling Date	HVAS2 (Brayton Road)		
	PM ₁₀	TSP ¹	Compliance Status		PM ₁₀	TSP	Compliance Status
22/12/2025	10.9	27.2 5	Compliant	22/12/2025	11.9	29.7 5	Compliant
28/12/2025	10.3	25.7 5	Compliant	28/12/2025	12.1	30.2 5	Compliant
Annual Average	11.3 4	28.3 6	Compliant	Annual Average	12.1 8	30.4 3	Compliant
Minimum	0.5	1.2	Compliant	Minimum	2.1	5.2	Compliant
Maximum	25.1	62.8	Compliant	Maximum	33.9	84.7	Compliant

Notes:

¹ TSP calculated based on PM₁₀ results (1.66 x PM₁₀). This was approved in 2010 by DPHI as part of the EMP (Umwelt, 2010).

² Filter damaged and PM10 values unable to be calculated.

6.3.4 Trends in data

Depositional Dust

Gauges DD11, DD12 and DD13 were installed in December 2016 following a revision to the depositional dust monitoring network and the approval of the Development Consent (Mod 4). As a result, limited data is available to compare against historical operations. Gauges DD5 and DD8 provide a longer-term comparison of monitoring results.

As shown in **Figure 4** a comparison of average depositional dust monitoring results indicates all sites were compliant with the development consent against maximum allowable annual increase criteria. Depositional dust results continue to be below the impact assessment criteria of 4(g/m²/month) at all sites. In 2025 most gauges showed a slight decrease in annual averages compared to the previous year.

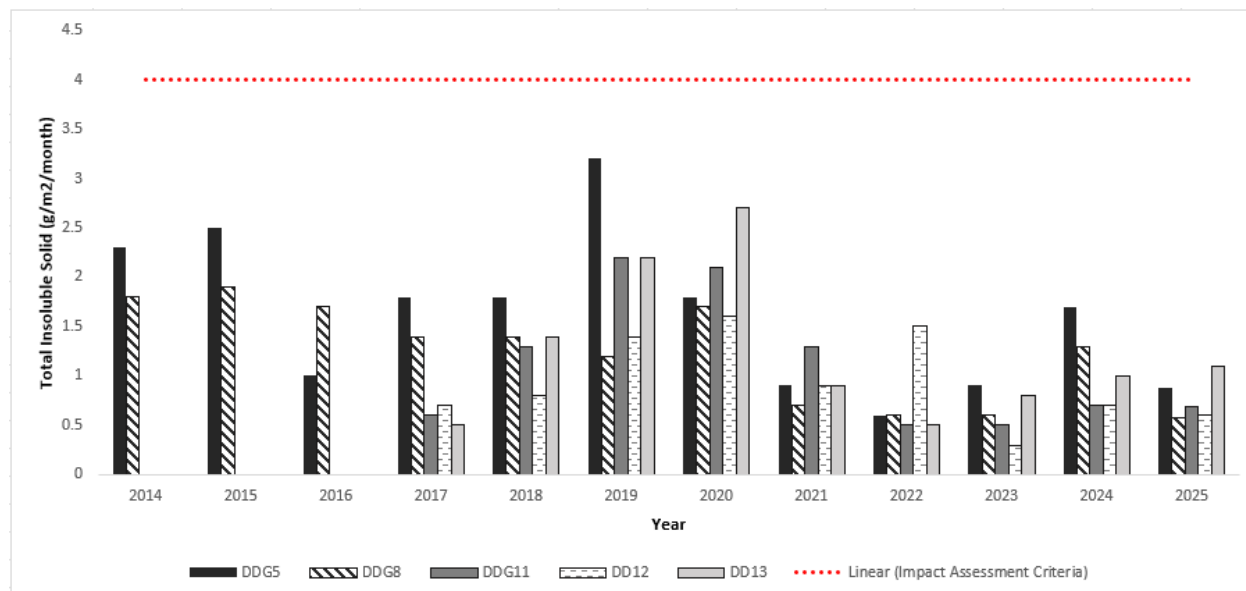


Figure 4: Average Historical Depositional Dust Monitoring

PM₁₀

Annual average PM₁₀ monitoring results from 2011 to this reporting period are provided in **Figure 5**. All results are below the annual average impact assessment criteria. As seen in **Figure 5**, a gap in data occurs in 2013 for HVAS2 because of the unit not recording the required number of samples due to power supply issues.

The 2025 annual averages at HVAS1 and HVAS2 were 11.34 µg/m³ and 12.18 µg/m³ respectively. Annual averages at HVAS1 and HVAS2 in 2019 are higher than all the other years represented. High 2019 results were attributed to excessive dust generated by drought conditions and particulate matter from heavy bushfire smoke. 2020, 2021 and 2022 results are more consistent with levels seen prior to 2019.

There were no exceedances throughout the reporting period, although there was one invalid sample as described in **Section 6.3.3**.

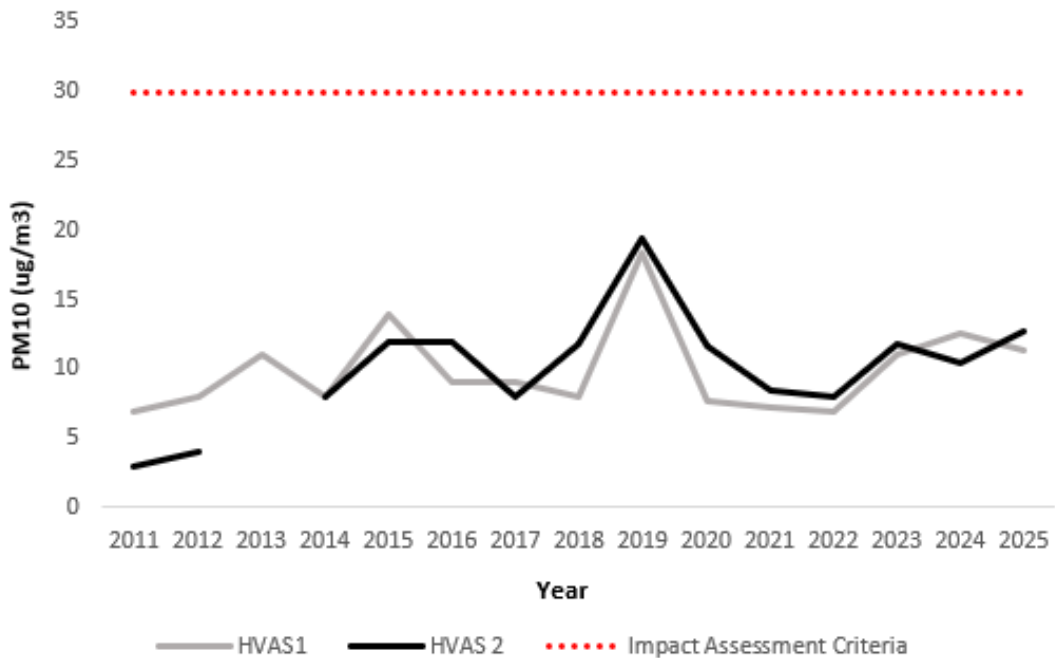


Figure 5: Historical PM₁₀ Monitoring Results

6.3.5 Proposed Improvements

Improvements were made to the air quality monitors in 2024 which will address historical issues with power supply.

Dust suppression cannons were added to the sales stockpile area in 2025.

Lynwood Quarry will continue to review the effectiveness of dust control measures in 2026.

6.4 SURFACE WATER

6.4.1 Environmental Management Measures

Lynwood has developed and implemented a Surface Water Monitoring Program in accordance with the requirements of the Development Consent. The overall Water Management Plan (WMP) (including component plans) was revised in 2020, with DPHI approving the WMP on 16 November 2020.

The SWMP provides details on:

- Baseline water quality data.
- Surface water impact criteria.
- Monitoring surface water flow and quality.
- Surface water impact trigger levels and management actions; and
- Erosion and sediment controls implemented onsite.

Surface water management infrastructure at the Quarry was established during the initial construction and operational phase of the Quarry. The water management system includes a series of clean water diversion drains, catch drains and sedimentation dams. These structures have been constructed to minimise the interaction between clean and dirty water and to provide controls to treat captured dirty water to a standard acceptable for discharge off-site.

As of September 2021, on the approval of the Riparian Management Plan for Joarimin Creek Catchment Area, quarterly inspections of Joarimin Creek undertaken by Holcim staff commenced. The riparian quality inspections assess sediment and erosion controls, creek stability, and riparian zone conditions.

6.4.2 Performance Criteria

Surface Water Monitoring Criteria/Trigger Levels

Trigger levels are provided in the 2020 Water Management Plan within the Surface Water Monitoring Program. These trigger levels are outlined in **Table 17** and have been based on an extended period of monitoring data from Lynwood surface water (SW) locations.

Table 17: Trigger Values for Key Water Parameters – from Surface Water Management Plan (2020)

Water Quality	Trigger Value			
Variable	³ Marulan Creek (SW 1 and 2), Joarimin Creek (SW 3 and 4), Lockyersleigh Creek (SW 7)	Joarimin Creek (SW4-SW6)	SW8 to SW11	⁴ Site Water Management System Dams (excluding SW5, SW6 and SW8 to SW11)
pH	No longer monitored. No trigger levels proposed.	5.3 to 9.7	6.4 to 7.8	6.5 to 8.5 ¹
Electrical Conductivity		Maximum of 3255 µS/cm	Maximum of 3922 µS/cm	No criteria listed in the Development Consent. No trigger levels proposed.
Oil and grease		10 mg/L or nonvisible	10 mg/L or nonvisible	10 mg/L or nonvisible ¹
Total Suspended Solids		Less than 320 mg/L	Less than 320 mg/L ²	50 mg/L ¹

Notes:

¹ Triggers marked with ¹ are from Schedule 3 Condition 17.

² For SW8 to 11 there has been very few samples obtained. The highest TSS level recorded across a total of four sampling events has been low (16 mg/L). Holcim have therefore used the Joarimin Creek TSS range for the TSS trigger value for SW8 to 11.

³ SW1 – 3 are no longer monitored, hence there are no proposed criteria. SW7 is also no longer monitored.

⁴ Criteria associated with site water dams are only applicable during discharge events offsite from these dams (controlled discharge dam).

6.4.3 Environmental Outcomes

There were no discharges from Lynwood Quarry during the reporting period. During discharge, surface water quality sampling is undertaken at Sediment Dam E, Sediment Dam F, and Supply Dam 1 in addition to the required monitoring points presented below.

Surface Water Monitoring Program

Lynwood is required to conduct monthly surface water monitoring at locations consistent with those shown in **Figure 3**. Monitoring records captured during the reporting period are summarised in **Table 18**. Surface water monitoring is undertaken when an appropriate volume of water is available to enable a representative sample to be obtained.

Table 18: Summary of Results – Surface Water

Site	EC (µs/cm)			pH			TSS (mg/L)			Oil & Grease (mg/L)			Flow	
	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max		
SW4	136	767	1890	5.3	7.27	8.8	5.0	20.9	52	5	7.58	15	No Flow (11) Flowing (1)	
SW5	311	945	1560	7.0	7.88	9.3	5	21.64	83	5	7.97	14	No Flow (10) Flowing (2)	
SW6	485	1072	3139	6.7	7.76	9.3	5	8.51	20	5	8.88	19	No Flow (10) Flowing (2)	
SW8 ¹	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	No Flow
SW9 ²	709	1848	4984	7.2	7.59	8.1	5	13.03	27	5	6.46	11	No Flow (8) Dry (4)	
SW10 ³	156	315	540	6.6	6.98	7.2	23	77	120	5	8.9	18	No Flow (4) Dry (8)	
SW11	201	1828	4439	6.5	7.66	9.3	5	43.2	350	5	7.18	13	No Flow (11) Flowing (1)	

Notes: Minimum and maximum values which are below or above the trigger values are in **bold**.

Sediment and Supply Dams did not discharge during 2025 reporting period.

¹ SW8 was dry for 2025 reporting period.

² SW9 was dry from January- April 2025

³ SW10 was dry from January-June, and November-December 2025

In accordance with the Trigger Response Action Plan (TARP) contained in the Surface Water Monitoring Program (SWMP), consecutive exceedances during monthly monitoring require reporting to DPHI. Surface water monitoring recorded multiple consecutive exceedances of oil and grease during the 2025 monitoring period.

- SW5: 02/09/25 11mg/L, and 01/10/25 14mg/L. Oil and grease was not visible on either occasion. DPHI was informed of the consecutive exceedances.
- SW6 06/03/25 19mg/L, 07/08/25 12mg/L, 02/09/25 13mg/L and 01/10/25 11mg/L. Oil and grease was not visible on all four occasions. DPHI was informed of the consecutive exceedances.

Surface water monitoring recorded a consecutive exceedance of pH (8.0) in April and May at SW11 during the 2025 monitoring period. The DPHI was notified of the consecutive exceedances.

SW4 - Joarimin Creek (Upstream)

Surface water monitoring results were generally compliant in 2025.

Oil and Grease at SW4 recorded three non-consecutive exceedances in March, June, and October, recording 15 mg/L, 14 mg/L, and 11 mg/L respectively. These represent an exceedance in the trigger levels outlined in the Surface Water Monitoring Program and **Table 18**. As these were not consecutive exceedances no reporting was required.

SW5 - Joarimin Creek (Downstream)

Surface water results were generally compliant in 2025.

During the 2025 reporting period, SW5 recorded three exceedances of Oil and Grease in March, September, and October recording 12mg/L, 11mg/L, and 14mg/L respectively; however, no Oil or Grease were noted as being visible during these times. The oil and grease visualisation in September followed by the exceedance in October qualified as condition red in the Trigger Action Response Plan (TARP) and required reporting to DPHI. A site investigation found the elevated oil and grease at SW5 was most likely due to natural and off-site factors, rather than quarry activities. Heavy rainfall flushed built-up organic material (such as decaying reeds and vegetation) through the creek, which can release natural oils. Train lubricants, fuel spills and maintenance activities from the nearby railway corridor may also have contributed. DPHI was informed of the exceedances and was satisfied with the outcomes of the investigation.

SW6 - Joarimin Creek (Downstream)

Monitoring was undertaken on 12 occasions during the reporting period.

The pH results were within the minimum and maximum trigger values and consistent with long-term results, as was the total suspended solids which were within trigger levels.

Oil and grease measurements exceeded trigger levels on four occasions at SW6, on all four occasions oil and grease was not visible. In March 19mg/L was recorded. Three consecutive exceedances were recorded in August (12mg/L), September (13mg/L) and October (11mg/L) triggering condition red in the TARP. SW6 is located about 1.5km downstream of where the creek leaves the quarry. A site inspection and review of operations found no evidence that quarry activities or spills contributed to the exceedances recorded at SW6. The most likely cause was off site inputs from heavy rainfall that washed organic material into the creek and stormwater runoff from the nearby Brayton Road bridge and surrounding

properties. DPHI was informed of the exceedances and was satisfied with the outcome of the investigation.

SW8 – Lockyersleigh Creek (Upstream)

During 2025 no sampling was recorded for SW8, as the sample location was too dry for all twelve occasions.

SW9 - Lockyersleigh Creek (Upstream)

Monitoring was conducted on eight occasions in 2025, with dry conditions prevailing from January to April.

pH exceeded the maximum trigger level on one occasion in June (8.1). As this was an isolated exceedance, no reporting was required. The annual average pH was 7.59.

Electrical conductivity exceeded the maximum trigger level once in July (4,984 $\mu\text{S}/\text{cm}$). All other results were below the maximum trigger, with an annual average of 1,848 $\mu\text{S}/\text{cm}$; therefore, a notification to DPHI was not required.

SW10 - Lockyersleigh Creek (Downstream)

Monitoring occurred on four occasions in 2025. A single exceedance of the total oil and grease trigger was recorded in September (18 mg/L).

SW11 - Lockyersleigh Creek (Downstream)

Monthly monitoring at SW11 indicated that electrical conductivity results were within trigger levels on all occasions except July, when a value of 4,439 $\mu\text{S}/\text{cm}$ was recorded.

During the reporting period, pH exceeded the trigger levels four times, in January (9.3), April (8.0), May (8.0) and June (8.3). The consecutive exceedances (April, May) constitute a reportable event under Section 4.1 of the Surface Water Monitoring Program. Lynwood quarry informed DPHI on 3 June 2025. Investigation to the exceedances indicated quarry activities were unlikely to cause the elevated pH recorded at SW11. SW11 is located approximately 3 km downstream of the site and the creek traverses disturbed agricultural land after leaving the quarry area. There were no quarry operations influencing that reach at the time. The adjacent landholder also advised of nearby superphosphate application. Runoff from these farm paddocks is considered the more plausible contributor to the elevated pH observed at SW11.

Oil and grease exceeded the trigger level once, in April (13 mg/L). Oil and grease were not visible on any of the twelve monitoring occasions, and the annual average concentration was 7.18 mg/L.

Summary

As there were no discharges during the reporting period, Lynwood believes that exceedances are likely to originate offsite. Lynwood notes that SW6 is located near a road and bridge where stormwater drains into Joarimin Creek.

A yearly comparison of average surface water results can be found in **Table 19**. Across the monitored locations, average pH in 2025 was lower than 2024 and 2023 and is closer to the levels seen in 2022. Average electrical conductivity increased in 2025 compared to 2024 but remained below the higher values recorded in 2023. Average TSS decreased markedly in 2025 compared with 2024 and 2023. This reduction was most noticeable at SW9 and SW10, where 2025 averages were lower than the elevated results recorded in 2023 and 2024. Average oil and grease also decreased in 2025 compared with previous years. Most monitoring locations showed lower annual averages. Monitoring at SW8 remained constrained by dry conditions, with no sample results available for 2025 and prior years.

Table 19: Yearly Comparison of Average Surface Water Results

Site	2025				2024				2023				2022			
	EC (µs/cm)	pH	TSS (mg/L)	Oil & Grease (mg/L)	EC (µs/cm)	pH	TSS (mg/L)	Oil & Grease (mg/L)	EC (µs/cm)	pH	TSS (mg/L)	Oil & Grease (mg/L)	EC (µs/cm)	pH	TSS (mg/L)	Oil & Grease (mg/L)
SW4	767	7.27	20.9	7.58	818	7.6	16	15	1483	6.9	17.2	7.9	251.3	7.3	19.9	8.2
SW5	945	7.88	21.64	7.97	1045	8	8	10	1626	8.0	9.5	11.4	397.6	7.8	8.4	7.5
SW6	1072	7.76	8.51	8.88	601	8	21	7	1148	8.1	41	8.7	373.5	7.4	11.5	11.4
SW8	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	NS	NS	NS	NS
SW9	1848	7.59	13.03	6.46	975	8	34	10	1887	8.25	265.7	10.2	632.1	8	135.3	13.1
SW10	315	6.98	77	8.9	896	8	394	9	1150	8.1	51.1	7.3	448.3	7.3	190.4	10.4
SW11	1828	7.66	43.2	7.18	1596	8	19	7	1604	7.8	11.8	6.8	1106.3	7.5	7.7	9.2

6.4.4 Trends in Data

Joarimin Creek

In 2025, Joarimin Creek monitoring at SW4–SW6 indicates generally stable to improved water quality compared to long-term trends, particularly for oil and grease, which returned to baseline levels at SW4–SW5 after higher results in 2024. Electrical conductivity remained below the 2023 peak overall, with continued improvement at SW4–SW5, although SW6 increased in 2025 relative to 2024, suggesting localised variability. TSS results were mixed, with a notable improvement at SW6 (lowest result across 2022–2025), while elevated TSS at SW5 and a smaller increase at SW4.

Lockyersleigh Creek

In 2025, Lockyersleigh Creek monitoring shows overall improvement in oil and grease and reduced suspended sediment at SW9, with TSS also improving at SW10 compared to 2024. Electrical conductivity was mixed, with a clear improvement at SW10 but higher EC at SW9 (relative to 2024) and an ongoing increase at SW11. TSS results were similarly mixed: SW9 recorded its lowest TSS across the four-year period, while SW11 recorded its highest.

6.4.5 Proposed Improvements

Holcim propose to continue to monitor the oil and grease levels at Joarimin Creek and pH at Lockyersleigh Creek to identify any emerging trends. Holcim will continue to monitor unusual monitoring results and investigate exceedances in 2026.

There were no additional surface water improvements identified in this reporting period. Holcim will continue to compare results against longer term trends and trigger levels from the WMP.

6.5 GROUNDWATER

6.5.1 Environmental Management Measures

DPHI approved a revised WMP in 2020. The revised plan included a revision of trigger levels which are used in this annual review. Lynwood has developed and implemented a Groundwater Monitoring Program (GMP) in accordance with the requirements of the Development Consent.

The GMP provides details on:

- Baseline water quality.
- Groundwater Impact Criteria.
- Monitoring regional groundwater level and quality; and
- Groundwater impact trigger levels and management actions.

The groundwater water management system includes a series of piezometers and groundwater monitoring bores.

6.5.2 Performance Criteria

Groundwater Inflow and Level Monitoring

As outlined in the WMP and Groundwater Monitoring Program, groundwater level monitoring is reviewed against long-term monitoring trends. Results are further compared against drawdowns predicted within the Lynwood Quarry EIS (Umwelt, 2005) and Modification EA (Umwelt, 2015). **Table 20** displays the triggers for groundwater depth.

Groundwater Quality Monitoring Criteria/Trigger Levels

Trigger levels were updated in the 2020 WMP and are included in **Table 20**. These trigger levels are based on an extended period of data obtained from Lynwood groundwater monitoring locations. Groundwater monitoring is required quarterly.

Table 20: Groundwater Monitoring Criteria (WMP, 2020)

Parameter	Minimum Trigger	Maximum Trigger	General comment
MP Bores			
Depth to groundwater (metres)	1.64	28.05	This was the minimum and maximum levels since regular monitoring commenced in 2010
EC (µS/cm)	No minimum trigger required	11,521	This was the highest EC reading since monitoring commenced for the MP bores.
pH	4.2	9.5	These were the highest and lowest pH readings since monitoring commenced for the MP bores.
Sulphate (mg/L)	No minimum trigger required	152	This was the maximum level recorded since monitoring commenced for sulphate.
Total Nitrogen (mg/L)	No minimum trigger required	2.20	This was the maximum level recorded since monitoring commenced for total nitrogen.
Total Phosphorus(mg/L)	No minimum trigger required	3.02	This was the maximum levels recorded since monitoring commenced for total phosphorus.
GPZ Bores			
Depth to groundwater (metres)	2.13	23.9	This was the minimum and maximum levels since regular monitoring commenced of GPZ bores in April 2017.
EC (µS/cm)	No minimum trigger	8,020	This was the highest EC reading since monitoring commenced for the GPZ bores.
pH	6.1	7.8	These were the highest and lowest pH readings since monitoring commenced for the GPZ bores.
Sulphate (mg/L)	No minimum trigger required	76	This was the maximum levels recorded since monitoring commenced for the GPZ bores.

Parameter	Minimum Trigger	Maximum Trigger	General comment
Total Nitrogen (mg/L)	No minimum trigger required	5.0	This was the maximum levels recorded since monitoring commenced for the GPZ bores.
Total Phosphorus (mg/L)	No minimum trigger required	1.20	This was the maximum levels recorded since monitoring commenced for the GPZ bores.

6.5.3 Environmental Trends and Outcomes

Lynwood Quarry conducts groundwater monitoring via a network of monitoring bores across site on a quarterly basis. A summary of groundwater monitoring results is provided in **Table 21**. Further monitoring results are presented in **Appendix B**.

Monitoring occurred at the required frequency for all monitoring bore sites except for GPZ02 at which monitoring ceased after Quarter 2 of 2020 due to the extension of the pit over this area.

Table 21: Summary of Quarterly Results – Groundwater

Site	Depth to Water Level			pH			EC			Sulphate			Total Nitrogen ¹	Total Phosphorous
	(m)						(µS/cm)			(mg/L)			(mg/L)	(mg/L)
	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Annual	Annual
MP Bores														
MP1	1.03²	1.16	1.32	6.5	6.9	7.4	1050	1225	1550	2	21.75	32	0.68	0.46
MP2	14.4	14.6	14.7	6.5	7.3	8.2	301	401	603	2.3	10.3	27	1.06	0.04
MP4	17.3	17.5	17.7	6.1	6.4	6.8	273	350	499	2	2	2	1.95	0.11
MP5	11.8	17.0	19.8	6.6	6.9	7.3	602	732	990	2	2	2	1.25	0.06
MP7	13.6	15.6	16.9	6.5	6.9	7.1	5070	5220	5480	24	30.5	37	0.26	0.01
MP10	3.7	4.3	4.8	6.6	6.9	7.0	5870	6618	7040	21	28.3	40	0.82	0.01
MP11	10.0	10.3	10.7	7.4	7.6	7.9	725	846	1150	2	2	2	0.7	0.01
GPZ Bores														
GPZ01	10.8	11.1	11.9	7.7	7.9	8.2	843	991	1260	9.6	13.4	24	0.65	0.32
GPZ02														
GPZ05	9.3	9.4	9.5	7.1	7.6	7.9	3330	3475	3610	2	7.2	20	1.75	0.46
GPZ06	5.3	5.7	6.0	7.2	7.5	7.8	485	613	826	17	19	20	2.6	0.29
GPZ08	6.0	6.0	6.1	7.1	7.3	7.6	2280	2445	2760	2	6.05	10	1.47	0.03

Note:

¹Total Nitrogen equals Total Kjeldahl Nitrogen+Nox.

² Exceedances of the monitoring criteria are in bold.

Depth to water level

Groundwater levels across the MP bore network were broadly comparable year-on-year, with most bores recording slightly lower depth to groundwater levels in 2025 compared to 2024 (i.e., reduced depth to water). The most notable shift was at MP7, which recorded lower average depth to ground water levels in 2025 (15.6 m) relative to 2024 (17.4 m) (see **Appendix B**). In contrast, MP11 recorded higher average depth to ground water levels in 2025 (10.3 m) compared to 2024 (9.5 m). MP5 also showed markedly greater variability in 2025 compared to 2024. Like 2024, MP1 was not within the Groundwater Monitoring Criteria. It remained consistently under the minimum trigger level of 1.64 m throughout the reporting with an average level of 1.16m. This constitutes a reportable exceedance under Section 3.2 of the Groundwater Monitoring Program within the WMP.

Ramboll investigated the repeated groundwater trigger level exceedances. The review assessed long-term monitoring results, site geology, climate, and operational history. It found no evidence that quarry operations contributed to the higher groundwater levels. The findings indicate the change is most likely due to regional factors and natural variability, such as rainfall. Lynwood Quarry notified DPHI of these consecutive exceedances.

Groundwater levels across the GPZ bore network were generally stable year-on-year, with a slight overall tendency toward deeper groundwater levels in 2025 relative to 2024. This reflects small deepening at GPZ01, GPZ05 and GPZ06, partially offset by slightly lower depth to groundwater levels at GPZ08. Overall, levels remained within the typical range for the network. All GPZ bores were well within the monitoring criteria.

pH

All pH results at MP series bores were well within the monitoring criteria. The MP bores were between 6.1 and 8.2 pH throughout quarterly monitoring in 2025. The most acidic (minimum) result was 6.1 pH at MP4.

GPZ05 recorded a pH level of 7.9 in Q3. GPZ01 recorded exceedances of the pH trigger value in Q2 (5 June 2025) of 8.2, and in Q3 (3 September 2025) of 7.9. According to Section 3.2 of the Groundwater Monitoring Program within the Lynwood Quarry WMP this constitutes a reportable event.

Investigations found no changes in quarry operations or the quarried-area geology. Recent high rainfall has likely contributed to sustained groundwater conditions. GPZ01 sits along the groundwater flow path from the granite pit near runoff point SW10. SW10 recorded a neutral pH (7.03), supporting that quarry activities are unlikely to be driving the elevated pH at GPZ01. The higher pH at GPZ01 may reflect offsite influences, including agricultural lime use on nearby paddocks (as previously advised by the Lockyersleigh Farm foreman). Agricultural lime can increase groundwater pH by adding alkalinity that may leach into soil and groundwater. Holcim will continue to monitor as results were only marginally above the limit and are now trending down. Lynwood quarry notified DPHI of the consecutive exceedances.

Electrical Conductivity

The electrical conductivity levels varied between each MP series bore. However, all 2025 samples were within the trigger levels and historical range of 15 µS/cm to 7,578 µS/cm. All results for electrical conductivity were compliant.

Sulphate

The sulphate levels in the MP and GPZ bores over 2025 were compliant with the maximum trigger value. Across the monitoring network, sulphate concentrations in 2025 were broadly comparable to 2024, with most bores showing only minor movement; however, there were a few clear exceptions. MP2 increased markedly, while MP11 decreased, and GPZ08 also showed a notable decrease relative to 2024.

Total Nitrogen

In 2025, total nitrogen concentrations in the MP series bores ranged from 0.26 mg/L to 1.95 mg/L, while the GPZ series bores ranged from 0.65 mg/L to 2.6 mg/L. Overall, results were generally consistent with, or slightly higher than, 2024, with the most notable year-on-year change being an increase at GPZ05, while MP5 recorded a decrease relative to 2024. Most other sites were comparable to previous years. Despite these changes, all MP and GPZ monitoring sites remained well within the applicable trigger levels.

Total phosphorous

For total phosphorous, concentrations were generally low and stable across most bores, though MP1 and GPZ05 recorded increases in 2025 compared to 2024. Several other bores showed minor decreases (notably MP7, MP10 and MP11).

All total phosphorous monitoring results for both MP and GPZ bores were below the maximum trigger levels. This is consistent with the results of previous years.

6.5.4 Proposed Improvements

Future Annual Reviews will continue to compare results against longer term trends and trigger levels from the WMP. Holcim will continue groundwater data collection at Lynwood Quarry.

6.6 NOISE

6.6.1 Environmental Management Measures

The Lynwood Noise Management Plan (NMP) has been prepared in accordance with the Development Consent and outlines measures for monitoring and managing noise emissions at Lynwood Quarry. The NMP outlines a range of design controls, ongoing operational controls, and a noise monitoring program which the site has implemented in 2025.

6.6.2 Performance Criteria

Noise impact assessment criteria for monitoring specified in Schedule 3, Condition 3 of the Development Consent are outlined in **Table 22** below.

Table 22: Noise Criteria

Location	Day (7am to 6pm)	Evening (6pm to 10pm)	Night (10pm to 7am)	
	dB(A), LA _{eq} (15min)	dB(A), LA _{eq} (15min)	dB(A), LA _{eq} (15min)	dB(A), LA ₁ (1min)
1	35	35	35	45
2	35	35	35	45
3	35	35	35	45
4	35	37	35	46
5	35	35	35	46
6	35	37	36	46
7	38	38	35	55
8	39	38	36	55
9	39	39	37	56
10	42	42	40	53
11	35	35	35	47
12	37	37	36	47
13	40	38	37	47
14	35	35	35	47
15	35	35	35	47
16	35	35	35	45

Noise monitoring occurred at the locations shown in **Figure 3**, and listed in **Table 23**. As noted in the NMP, monitoring at these locations is considered representative of all locations assessed as part of the Noise Impact Assessment (Umwelt, 2015).

Table 23: Noise Monitoring locations

Location	Address	Day ¹ LAeq(15min)	Evening ² LAeq(15min)	Night ³ LAeq(15min)	Night ³ LA1(1min)
N1	Residence west of the project area at 1114 Carrick rd., Marulan (L1)	35	35	35	45
N2	End of Maclura Drive, Marulan (L6)	35	37	36	46
N3	Residence to the south of the site at Northern Boundary (16038 Hume Highway, Marulan) near DD8 (L11)	35	35	36	47
N4	North-eastern boundary of the project area at rural residential subdivision, (Dorsett Road). Corner of Dorsett and Suffolk Road, Marulan (L12)	37	37	36	47

Note:

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

² 6 pm–10 pm Monday to Sunday

³ 10 pm–7 am Monday to Saturday and 10 pm–8 am Sunday and public holidays

6.6.3 Environmental Outcomes

Attended noise monitoring was conducted on a quarterly basis during the reporting period. Attended noise monitoring was conducted by Ramboll Australia Pty Ltd (Ramboll) at four representative monitoring locations surrounding the site during quarrying activities. These noise monitoring reports are provided in **Appendix A**. Noise monitoring locations are considered representative of the nearest private receivers in various directions of the operational area.

Noise monitoring occurred on the following dates:

- Q1: 4 and 5 of March 2025
- Q2: 4 and 6 of June 2025
- Q3: 1 of September 2025
- Q4: 3 of December 2025.

The noise monitoring results from 2025 are summarised in **Table 24**. One noise exceedance was recorded at Location N4 during the evening period in Q2. Holcim investigated the result and confirmed that no unusual activities or additional work occurred on the day. A site inspection near N4 did not identify any abnormal quarry noise from Lynwood Quarry. The investigation indicated the noise was likely influenced by external sources, with a strong possibility it originated from a nearby quarry and associated road traffic noise along Brayton Road. Ramboll also noted the monitoring may not have been performed in accordance with the relevant standard, which could have contributed to the result.

The exceedance was moderate (within 5 dB) and, given Lynwood Quarry’s strong compliance history, it is considered an isolated event. Holcim will ensure future monitoring is completed using the correct methods to avoid a recurrence. DPHI was informed of the exceedance.

Further discussion on the findings is found in the Ramboll Noise Monitoring Assessment reports in **Appendix A**.

Table 24: Noise Monitoring Summary

Location	Criteria	Q1	Q2	Q3	Q4	Compliance Status
Day dBA, LA_{eq}(15min)						
N1	35	<19	<31	<22	<33	Compliant
N2	35	<30	<32	<24	<29	Compliant
N3	35	<35-37*	<30	<23	<25	Compliant
N4	37	<27	<28	<22	<23	Compliant
Evening dBA, LA_{eq}(15min)						
N1	35	<35 – 37*	<25	<28	<18	Compliant
N2	37	<30	<33	<34	<22	Compliant
N3	35	<34-36*	<32	<31	<21	Compliant
N4	37	<28	<42 ¹	<30	<21	Non-complaint
Night dBA, LA_{eq}(15min)						
N1	35	<29*	<17	<30	<16	Compliant
N2	36	<32	<30	<34	<24	Compliant
N3	36	<34-36*	<33	<32	<35	Compliant
N4	36	<28	<43 ²	<28	<23	Compliant
Night dBA, LA1(1min)						
N1	45	n/a*	n/a	n/a*	<37	Compliant
N2	46	n/a*	n/a*	n/a*	n/a ³	Compliant
N3	47	<35	<35	n/a*	<31	Compliant
N4	47	n/a*	n/a*	n/a*	n/a ⁴	Compliant

Notes

For measurements with an Asterisk (*) – refer to corresponding noise monitoring report for external sources.

¹ Moderate exceedance (NPfl 2017 – Table 4.1). Measurement influenced by extraneous noise sources (wind/trees), so the quarry contribution estimated from LA90 measurement result.

² Criteria does not apply under the meteorological conditions encountered during this monitoring period (stability category G temperature inversion conditions)

³ Measured LA1 value of 51.8 dBA was dominated by traffic, fauna and a train, so unable to estimate contribution for quarry at the assessment location.

⁴ Measured LA1 value of 39.4 dBA was dominated by traffic and fauna, so unable to estimate contribution for quarry at the assessment location.

6.6.4 Trends in Data

Monitoring results recorded during the reporting period indicates noise levels continue to trend below noise impact assessment criteria as stipulated within Development Consent. The June exceedance at N4 was the first exceedance of these criteria since the 2016 reporting period. The complete noise monitoring results are included in **Appendix A**.

6.6.5 Proposed Improvements

Holcim will ensure all future monitoring is completed using the correct methods. No additional management or mitigation measures are proposed to be implemented which are outside of the existing approved NMP.

6.7 BIODIVERSITY

6.7.1 Environmental Management Measures

Lynwood Quarry takes a multifaceted approach to managing biodiversity values within the broader landscape with biodiversity and rehabilitation management controls detailed in the Lynwood Quarry Rehabilitation and Landscape Management Plan (RLMP) and Box Gum Woodland Management Plan (BGWMP). Areas managed in accordance with the RLMP include habitat management areas, riparian zones, and wildlife corridors. Pre-clearance inspections are carried out to identify the presence of habitat features such as tree hollows or stags and fauna within the disturbance area that can be relocated. Pre-clearance surveys also identify if nest boxes are required to be installed following the removal of habitat features within the disturbance boundary.

6.7.2 Performance Criteria

In accordance with Schedule 3 Condition 48A of the Development Consent, Lynwood Quarry must retire Biodiversity Credits to the satisfaction of the Secretary and OEH. A summary of Biodiversity Credits required to be retired by Lynwood Quarry is summarised in Table 25.

Table 25: Summary of Biodiversity Credits to be Retired.

Credit Type	Credits to be Retired
Ecosystem Credits	
HN614 <i>Yellow Box – Blakey’s Red Gum grassy woodland on the tablelands. South Eastern Highland Bioregion</i>	2,124
HN570 <i>Red Stringybark – Brittle Gum – Inland Scribbly Gum dry open forest of the tablelands. South Eastern Highlands Bioregion</i>	881
HN515 <i>Broad-leaved Peppermint – Ribbon Gum grassy open forest in the north-east of the South Eastern Highlands Bioregion</i>	33
Total	3,038
Species Credits	
Squirrel Glider (<i>Petaurus norfolcensis</i>)	1,725

Credit Type	Credits to be Retired
Ecosystem Credits	
Total	1,725

6.7.3 Environmental Outcomes

A summary of the credits retired in 2018, and the number of credits required to be retired into the future (credit balance) is detailed in **Table 26**.

Table 26: Summary of Retired Biodiversity Credits

Credit Type	Credits Retired (2018)	Stage of Retirement	Credit Balance
HN614 <i>Yellow Box – Blakey’s Red Gum grassy woodland on the tablelands. South Eastern Highland Bioregion</i>	1,063	Partially retired – credits retired for years 2016 – 2030 (inclusive)	1,061
HN570 <i>Red Stringybark – Brittle Gum – Inland Scribbly Gum dry open forest of the tablelands. South Eastern Highlands Bioregion</i>	881	Complete	0
HN515 <i>Broad-leaved Peppermint – Ribbon Gum grassy open forest in the north-east of the South Eastern Highlands Bioregion</i>	0	Not required – Area not be disturbed until 2036.	33
Squirrel Glider (<i>Petaurus norfolcensis</i>)	1,725	Complete	0

In accordance with the Development Consent and Lynwood Quarry Extraction Quarry Area Modification Biodiversity Assessment Report (2015), pre-clearing and post-clearing reports were prepared to identify significant habitat features when clearing occurred.

Ecological monitoring was undertaken by an external contractor during the reporting period. In 2025 Holcim engaged SLR Consulting Australia Pty Ltd (SLR) to perform ecological monitoring to satisfy requirements outlined in the RLMP and GWMP.

The following observations were made when completing the Box Gum Woodland monitoring:

- Box-Gum monitoring plots showed slight fluctuations in native species richness and cover across the monitoring period, but overall values across growth forms were close to the relevant PCT benchmark values.
- Natural regeneration is occurring, particularly at BG2, where recent increases in tree diversity and tree cover were observed and tree cover now meets benchmark levels. Overall vegetation health at the Box-Gum monitoring sites was assessed as moderate to good.
- Weed cover remained low overall. No threatened or significant species, feral animals or erosion were recorded at the Box-Gum monitoring sites. No recent fire was evident, fuel loads were low,

and fencing remained in good condition. Overall, vegetation integrity at the Box-Gum sites has remained stable or improved due to regeneration.

- Follow up actions for the Box-Gum monitoring sites include minor weed control.

The annual nest box monitoring recorded a high rate of use by native fauna and a moderate to good condition of most nest boxes. A total of 100 nest boxes were inspected in 2025, with nine boxes occupied by native fauna, 64 containing nesting material, and no pest species recorded. Thirteen boxes require maintenance and a further 15 boxes are showing early signs of wear. Continued maintenance and ongoing monitoring are recommended to mitigate impacts on native fauna.

Monitoring of Hoary Sunray in 2025 indicated that the population at Lynwood Quarry remains strong, with a 2024-2025 population estimate of 7,972 plants across eleven locations. While numbers appear lower than in recent previous survey periods, detailed survey work indicates that strong numbers remain, and the true extent of the population is likely larger due to natural variation in flowering, unsurveyed areas and a likely soil seed bank. Sifton Bush may be contributing to local competition with native species, including Hoary Sunray. Ongoing monitoring using parallel traverse and plot-based methods is recommended.

6.7.4 Trends in Data

Holcim continues to consult with authorities on the status of conservation areas as well as appropriate Management Plans for these areas.

6.7.5 Proposed Improvements or Actions Next Reporting period

No additional management, mitigation measures or monitoring is proposed to be implemented outside of the scope of the approved RLMP.

6.8 WEEDS AND FERAL ANIMALS

6.8.1 Weeds

Historically, the dominant weed species on site have included Fireweed (*Chamerion angustifolium*), *Optunia* sp., Serrated tussock (*Nassella trichotoma*), Blackberry (*Rubus fruticosus*) and St John's Wort (*Hypericum perforate*). In the 2025 ecological and rehabilitation monitoring, Sifton Bush (*Cassinia Sifton*) was also observed. Weed management is conducted in accordance with the RLMP.

In 2025, Holcim engaged a contractor to complete a targeted program on Serrated Tussock. The contractor used a drone to apply granular herbicide, a method which avoids spray drift.

Weed control will continue in 2026 including spraying, targeted removal of fireweeds, and biocontrol St. Johns Wort with the use of beetles.

6.8.2 Feral Animals

Lynwood Quarry engaged a contractor to complete feral animal inspections within the Lynwood Quarry consent boundary on seven occasions in 2025. **Table 27** summarises pest animals identified and taken in 2025.

Table 27: Pest Report

Date, time and permit info (where relevant)	Species	Sighted	Taken
05/04/2025 6:28pm NPWS Permit (H1205006)	Kangaroos	Not specified	162
12/04/2025 5:28pm	Kangaroos Rabbits Foxes	Not specified 60+ 19	0 53 16
19/07/2025 5:30pm NPWS Permit (H12025053)	Kangaroos Foxes Hares	Not specified 1 1	63 0 0
09/08/2025 6:00pm NPWS Permit (H12025053)	Kangaroos Foxes Goats	Not specified Not specified Not specified	87 3 0

Date, time and permit info (where relevant)	Species	Sighted	Taken
11/10/2025 7:00pm NPWS Permit (H12025123)	Kangaroos	Not specified	67
	Rabbits	Not specified	0
	Foxes	2	0
	Hares	1	0
13/09/2025 6:56pm	Rabbits	40+	25
	Foxes	15	14
25/10/2025 7:00pm NPWS Permit (H12025053)	Kangaroos	Not specified	83
	Rabbits	Not specified	0
	Foxes	2	0
	Hares	1	0
	Deer	4	0

6.9 BLASTING AND VIBRATION

6.9.1 Environmental Management Measures

The Blast Management Plan (BMP) was revised in 2020, with this sent to DPHI for comment and approval. The 2020 BMP sets out the criteria, monitoring frequencies, and management measures for blasting during quarrying operations.

Blast monitoring is conducted at four monitoring locations. All blasts in 2025 met air blast overpressure and ground vibration criteria.

6.9.2 Performance Criteria

Blasting performance criteria are set out in the EPL and Development Consent as outlined in **Table 28**.

Table 28: Blast Criteria Summary

Air blast Overpressure Criteria		
Location	Level (dB)	Allowable Exceedance
Residence on Privately owned land	115	5% of the total number of blasts over a period of 12 months
	120	0%
Ground Vibration Impact Assessment Criteria		
Location	Peak Particle Velocity (mm/s)	Allowable Exceedance
Residence on Privately owned land	5	5% of the total number of blasts over a period of 12 months

Air blast Overpressure Criteria		
Location	Level (dB)	Allowable Exceedance
	10	0%
Main Southern Railway Line	25	0%
Reservoir*		Not applicable
Gas Pipeline	100	0%

* Reservoir is not constructed. Blast monitoring not performed at this location.

6.9.3 Environmental Outcomes

A summary of blast monitoring performance during the reporting period is provided in **Table 29**. Blast monitoring data is provided in **Appendix B**. All blasts during the reporting period occurred between 9 am – 5 pm, Monday – Saturday. No blasts occurred on Sundays or Public Holidays.

There was a total of 68 blasts in 2025. This is higher than 2024 which recorded total number of 59 blasts.

Table 29: Blast Monitoring Summary

Parameter Summary		Number of Blasts	Percentage of Blasts
Total Number of Blasts		68	NA
Blasts in Ignimbrite Pit		0	NA
Blasts in Granite Pit		68	100%
Blasts exceeding allowable Overpressure criteria		0	0%
Blasts exceeding allowable Ground Vibration criteria		0	0%
Blasts triggering Overpressure measurement	B4 Resident	1	1.47%
	B5 Resident	25	36.8%
Blasts triggering Ground Vibration measurement	B4 Resident	1	1.47%
	B5 Resident	24	35.3%
	B6 Rail / Gas Pipeline	37	54.4%
Blasts Triggering Measurement		42	61.8%

6.9.4 Trends in Data

Blasting results continued to trend below compliance limits during the reporting period with this also being the case in previous Annual Review periods. During the 2025 reporting period, monitoring location B5 Resident recorded the highest overpressure, recording 111.9 dBL on 11 July 2025. On 5 September 2025, location B6 Rail / Gas Pipeline recorded the highest ground vibration, at 1.78mm/s.

6.9.5 Proposed Improvements

No additional blast management improvements are proposed outside the current approved BMP during the next reporting period.

6.10 WASTE MANAGEMENT

There were no changes to waste management practices during the reporting period. Waste streams at Lynwood Quarry are collected and disposed of by licensed waste contractors on an as-required basis. Holcim record when waste is collected from site and as well as volumes collected. A summary of the types and quantities of waste generated during the reporting period is provided in **Table 30**.

Table 30: Long-term Summary of Waste Generation

Waste Category	2025	2024	2023	2022	2021	2020	2019
Cardboard (t)	1.28	0.270	0.3	0.4	0.04	0.37	1.8
General Waste (t)	69.58	98.82	78.29	53.91	56.92	48.8	54.7
Steel (t)	92.99	130.28	78.02	162.05	88.68	84	90.28
Rubber (t)	<i>Included in General Waste</i>						
Wood (t)	0	0	0	0	0	4.1	4.5
Oily Water (L)	3,000	109	9000	-	0	-	<i>Included in Used Oil</i>
Used Oil (L)	3800	4800	17, 520	20,250	0	-	46,100
Oil Filter (number of bins)	0	0	0	-	0	18	20
Rags (number of bins)	<i>Included in General Waste</i>						
Grease (L)	0	0	0	0	0	40,000	0
Tyres (t)	0	0	0	15	-	-	-

General waste and steel show fluctuating trends over the long term. General waste rose from 2022 to a peak in 2024, then declined in 2025. Steel varies year to year with a high in 2022, a reduction in 2023, an increase in 2024 and a return toward typical levels in 2025. Cardboard remains a minor waste stream overall but increased in 2025. In addition to the above-mentioned waste, 1.7 tonnes of contaminated soil was generated.

6.11 INDIGENOUS HERITAGE

An Aboriginal Heritage Management Plan (AHMP) (Revision 3) has been prepared in accordance with the Development Consent. Lynwood Quarry also holds an Aboriginal Heritage Impact Permit (AHIP #1100264) for Quarry operation. The AHMP and AHIP set out relevant monitoring frequencies and management measures required during quarrying operations.

6.11.1 Results of Aboriginal Heritage Site Monitoring

In compliance with the requirements of the Development Consent, the Lynwood Quarry had an existing Aboriginal Heritage Impact Permit (AHIP #1100264) for the life of the quarry for the Ignimbrite Pit development. Lynwood Quarry is required to carry out monitoring of Aboriginal sites located in proximity

to the impact footprint boundary within the Ignimbrite Pit and Granite Pit areas. On a triennial basis, Holcim is required to monitor all the Aboriginal sites within the broader Lynwood Quarry project area. Triennial Aboriginal Heritage site monitoring was completed in November 2025. The next Aboriginal Heritage site monitoring will occur in 2026.

6.11.2 Meetings of the Aboriginal Heritage Management Committee

The Aboriginal Heritage Management Committee's (AHMC's) ongoing role is to provide guidance and contribute to indigenous related activities and initiatives at Lynwood Quarry, as well as review the implementation of the AHMP.

The Aboriginal Heritage Management Plan requires the AHMC to meet on at least a six-monthly basis. During the reporting period, Lynwood Quarry undertook four AHMC meetings, on 27 March, 18 June, 4 September and 25 November.

Discussions at the AHMC meetings centred around the Aboriginal Heritage Management Plan, discovery of artifacts, annual monitoring outcomes, cultural heritage awareness training, cultural burns, and general business.

6.11.3 Keeping Place Contract Development

A meeting was held with the AHMC on 26 November 2018 to discuss the process for the construction and operation of the Keeping Place. At this time, a draft process was agreed and discussions with the AHMC are still ongoing. Progress towards finalisation of the agreed process for the Keeping Place construction and management was ongoing in this reporting period including some minor design modifications. It is proposed that the Keeping Place will have display facilities for a selection of the Aboriginal objects and teaching materials to educate Aboriginal and non-Aboriginal visitors.

The care of all 'Aboriginal objects' (stone artefacts) recovered from the Lynwood Quarry development footprint is detailed within 'Care' Permits #2761 and #2762 approved by DPC on 27 August 2007. Holcim, GAHAI, GTCAC, PLALC and PFC were all signatories to the Care Permit.

6.11.4 Revisions to the Aboriginal Heritage Management Plan

AHMP Revision 3 provides a framework for the ongoing management of Aboriginal sites and potential archaeological deposits (PADs) conserved in-situ for the life of Lynwood Quarry. The AHMP also sets out the requirements for long-term management of Aboriginal sites and PADs located within a Cultural Heritage Management Zone (CHMZ) set up within the broader Lynwood Quarry project area.

There have been no triggers to update the AHMP in the reporting period.

6.12 NON-INDIGENOUS HERITAGE

No additional European Heritage management actions were conducted during the reporting period. Actions from the Old Marulan European heritage report were reviewed and completed in 2017.

There are no proposed actions concerning European Heritage for the next reporting period.

6.13 BUSHFIRE MANAGEMENT

Bushfire hazards are managed in accordance with the RLMP. Measures and safeguards included in the RLMP to minimise bushfire risk at Lynwood Quarry include:

- Fire breaks in the form of access and haul roads, rail lines, electricity easements, quarry pits and out-of-pit emplacement areas.
- Fuel reduction activities, as required, in consultation with the local Rural Fire Service.
- Selective grazing to assist with management of fuel loads.
- Asset protection zones in the form of hardstand areas, lawn, and bare earth around the quarry's permanent infrastructure.
- A range of onsite firefighting equipment including two water carts, fire hydrants and hose reels, to be used as required, and extinguishers located on infrastructure, mobile equipment, and light vehicles.
- Availability of water through the site water management system; and
- Emergency preparedness training for all quarry personnel.

No bushfires occurred in proximity to the site in 2025. Lynwood Quarry consulted with the RFS in the reporting period to plan hazard reduction burns and maintenance of containment lines. Fuel reduction activities to reduce the risk of severe bushfires will continue to be considered in future reporting periods.

6.14 PUBLIC SAFETY

Access to the site by members of the public is via contact at the quarry office where visitors or contractors can only be escorted by site personnel around the site. Warning signs have been placed on extremities of operations to make members of the public aware of quarrying operations. There were no incidents related to public safety during the reporting period.

7 Water Management

7.1 WATER MANAGEMENT SYSTEM

Lynwood Quarry manages site inflows such as runoff, groundwater inflow, and external water sourced from Johnniefields Quarry Dam as well as discharge events as per the WMP. Lynwood Quarry is committed to the minimisation of water consumption through strategies outlined in the WMP including:

- Continued construction of water management devices to achieve the aims of the WMP.
- Vegetating non-operational areas.
- Calibration of water use for product quality; and
- The use of misting in fixed plant to reduce water used by dust suppression sprays.

Control structures have been constructed to minimise the interaction between clean and dirty water and to provide controls to treat captured dirty water to a standard acceptable for discharge off site. In addition to the storage of external water, storage dams are used to opportunistically capture run-off from the disturbed catchment area along with any groundwater seepage into the quarry pits. In 2019, a stormwater sediment dam, G1, with capacity of 26 ML, was constructed at the Granite Pit. There were no changes to the water management system in 2025.

7.2 WATER TAKE AND DISCHARGE

7.2.1 External Water Use

Water imported onto the project site on an “as needs” basis is continually tracked against its licensed allocation. In 2025 there was no water pumped from the Johnniefields Dam for use onsite and as such, no water take. This is compliant with the water sourcing limit under the landholder’s agreement. Details of the 2025 water take is provided in **Table 31**.

Table 31: Water Take Summary

Water Licence	Water sharing plan, source, and management zone (as applicable)	Entitlement	Passive take/ inflows (ML)	Active pumping (ML)	Total (units)
WAL: 25575 (continuing, unregulated river) 10UA119159 Reference: 10AL102708 Other reference numbers: 10WA102709 (lower Wollondilly management zone), 10BL164515.	Upper Nepean and Upstream Warragamba Water source.	130 units (ML) of which Holcim have access to 80 ML due to a landholder agreement.	0	0	0

7.2.2 Licensed Discharges

The Licensed Discharge Point (LDP) under EPL 12939 for Lynwood Quarry is at Dam F (EPA Identification number 20).

Lynwood Quarry did not have any controlled or uncontrolled discharges from site during the reporting period.

7.3 EROSION AND SEDIMENTATION

7.3.1 Environmental Management Measures

The WMP Erosion and Sediment Control (ESC) Plan provides a framework for the management of erosion and sedimentation at Lynwood Quarry. ESC measures are implemented to minimise impact on the surrounding environment. All ESC measures at Lynwood Quarry are designed and constructed to the standard consistent with:

- Managing Urban Stormwater – Soils and Construction, Volume 1 (Landcom 2004); and
- Managing Urban Stormwater – Soils and Construction, Volume 2E Mines and Quarries (DECC 2008d).

No sediment dams or other major ESC structures were constructed, mined through, or decommissioned during this reporting period.

7.3.2 Proposed Improvements

There are currently no additional management or mitigation measures proposed for erosion and sediment control.

8 Rehabilitation

As with all quarry operations, the progression of the quarry pit will be based on market demand and will therefore be subject to change. The progression of the rehabilitation of the site is therefore also subject to market demand. Whilst every opportunity will be taken to rehabilitate areas not required for future operational use, rehabilitation opportunities were limited during the reporting period as the works focused on continued quarrying activities.

Rehabilitation of the Granite Pit benches will commence once the resource is exhausted and sufficient areas are available for rehabilitation. Due to the extent of the resource within the Granite Pit, rehabilitation of final benches will commence in approximately 30 years. Backfilling is proposed for the Lynwood Quarry Pit resulting in no final void located in this area. Once rehabilitated, these areas will be monitored and managed until self-sustaining. Final rehabilitation areas will achieve the rehabilitation completion criteria specified in the RLMP.

Ongoing opportunities for rehabilitation will be limited to rehabilitation of areas impacted by haul road construction, the western amenity bund, and the southern edge of the overburden emplacement area. Where appropriate, temporary land shaping, seeding and other revegetation works may occur in disturbed areas to minimise the potential for offsite impacts associated with the migration of windblown dust, particularly from stockpiles and stripped soil surfaces not required for operational use. Topsoil stockpiles are temporarily stabilised via seeding to minimise the potential for loss of soil through wind or rainfall erosion.

8.1 STATUS OF QUARRYING AND REHABILITATION

Construction of the visual amenity bund to the west of the Granite Pit also commenced in late 2018, continued throughout 2020, and was delayed due to adverse weather in 2021. Sections of the bund were temporarily stabilised in 2021. The construction of the visual amenity bund to the west of Granite pit was completed in October 2022 and the planting of tube stock was completed in 2023. In 2025, monitoring of the visual amenity bund (RM1) found rehabilitation to be on track. Vegetation establishment and tree development are progressing well. Further groundcover improvement is recommended across the western side of the bund, including grass and herb planting using Box Gum Woodland species. Minor sheet erosion was noted, but recently constructed erosion controls are expected to improve stability.

Topsoil stockpiles have been seeded with the aim of establishing ground cover and reducing soil substrate loss via erosion. This material is planned for use in the rehabilitation of the site following the completion of quarrying operations.

The rehabilitation status for Lynwood Quarry is presented in **Table 32**.

Table 32: Rehabilitation Status

Quarry Area Type	2018 (ha)	2019 (ha)	2020 (ha)	2021 (ha)	2022 (ha)	2023 (ha)	2024 (ha)	2025 (ha)	Next Reporting period (forecast)
A. Total quarry footprint (all areas including active disturbance areas and rehabilitation areas)	36	42	42	62.4	62.4	62.4	62.4	62.4	62.4
B. Total active disturbance (areas within the footprint still requiring rehabilitation)	208	216	216	236	236	242.2	242.2	242.2	242.2
C. Land being prepared for rehabilitation	0	0	0	3.85	2	2	2	2	5
D. Land under active rehabilitation*	0	0	11	15	17	17	11	11	11
E. Completed rehabilitation. (areas that have achieved completion criteria and been signed off by DRG)	0	0	0	0	0	0	0	0	0

8.2 POST REHABILITATION LAND USES

The proposed final land use aims to emulate the pre-mining environment. The final land use will enhance local and regional ecological linkages throughout the pit and surface infrastructure areas and with the adjacent surrounding landscape. The primary objective of site revegetation and regeneration is to create a stable final landform with acceptable post-quarrying land use.

8.3 REHABILITATION ACTIVITIES

Ecological monitoring of revegetated areas, fauna, and nest boxes was completed in 2025 as per the approved RLMP and the BGWMP. The rehabilitation monitoring was undertaken by SLR to determine the current condition of rehabilitation and retained vegetation areas through comparison with benchmarks.

The following observations were made:

- Natural regeneration was observed at most plots; however, some areas exhibited only very low levels of regeneration. In the open paddock monitoring areas, particularly RM2, RM3 and RM5, regeneration was dominated by *Cassinia sifton* (Sifton Bush), a disturbance-colonising species occurring at very high abundance and cover. This species appears to be suppressing other native species, including Hoary Sunray, while also increasing bushfire risk and restricting access to

monitoring plots. At RM1, natural regeneration was not occurring due to earthworks, although tree and shrub planting was evident

- Native species cover and diversity varied across the plots but were generally lower at the rehabilitation monitoring plots, particularly within the canopy layer. Overall vegetation health ranged from moderate to good, though typically lower at the rehabilitation plots. Weeds occurred at most plots and showed a slight decrease in 2025, with evidence of weed control noted across the site (Photo 1, Photo 2). Plots with higher weed presence continue to include RM1, RM5 and CR1. The main problematic weeds across the site continue to be *Nassella trichotoma* (Serrated Tussock), *Hypericum perforatum* (St John's Wort), *Rubus anglocandicans* (Blackberry), and *Anthoxanthum odoratum* (Sweet Vernal Grass).
- No threatened or significant species were recorded within the vegetation monitoring plots. Although past estimates indicated that Hoary Sunray abundance on the Holcim land was lower compared with previous years, more detailed survey work confirmed that the species remains present in good numbers.
- No signs of feral animals were observed, and no rabbit burrows or warrens were identified during the 2025 monitoring survey.
- Minor erosion was recorded across several monitored areas, with sheet erosion at RM1 and bank erosion at CR1 and CR2. Erosion control works have been implemented. No recent fire evidence was observed, and fuel loads were low at the time of survey. While *Cassinia sifton* (Sifton Bush) cover has decreased over the past two years, it may still present a fire risk, particularly at RM2, RM3 and RM5.
- There were no notable signs of human or animal disturbance, and no other site management observations were made in 2025.

9 Community

9.1 COMMUNITY ENGAGEMENT

9.1.1 Community Consultative Committee Meetings

The Lynwood Quarry Community Consultative Group (CCG) meetings were held in the reporting period on 30 May 2025, and 07 November 2025. The meetings provided updates on the general operations at site, community engagement, complaints received by the site, environmental updates, and an outline on actions for the next 6 months. The outcomes of both CCC meetings are detailed in the meeting notes available on the Lynwood Quarry website (<https://www.holcim.com.au/lynwood>).

9.1.2 Community Activities

Lynwood Quarry supported several community-based activities during the reporting period. These activities are presented in **Table 33**. The site also supports the Chamber of Commerce, Goulburn, and District Show Jumping Club, and Gibraltar Road residents. Quarry activities are communicated to the public through articles in a local newsletter (the Marulan Messenger), and CCG meetings.

Table 33: Community Engagement Activities and Sponsorship

Community Activity	Amount Funded in 2025
Tallong Apple Day Festival	\$3500
Goulburn and District Showjumping Competition	\$1000
Tallong Public School P&C	\$400
Cystic Fibrosis Goulburn	\$2500
Goulburn Rotary Charity Golf Day	\$5000
Pejar Local Aboriginal Land Council NAIDOC Family Day	\$3000
Total	\$15,400

9.1.3 Community Investment Fund

The Community Investment Fund (CIF), dedicated to the communities of Marulan and surrounds, is designed to improve the quality of life of the members of the Holcim workforce, their families, and the community. The CIF has been designed to improve economic, cultural, and social development throughout the region. Lynwood Quarry no longer has a set budget but rather assesses the level of financial support for each application as it is received.

CIF details are available to the public on Lynwood website. **Appendix C** lists the approved CIF funded projects since the inception of the CIF.

9.2 COMPLAINTS

In accordance with Condition M5 of the EPL, a community complaints line is operated by Lynwood Quarry during the hours of operation. The complaints line is also displayed on the Lynwood Quarry website. This contact point provides the community with a mechanism by which to raise any concerns that they have with operations at Lynwood Quarry.

The Lynwood Quarry Environment Management Strategy (EMS) details the complaints management and dispute resolution procedures for the site. The Quarry Manager is responsible for the implementation of the complaints management process so that complaints are responded to in a timely manner. Investigation findings and corrective actions implemented are communicated to the complainant as appropriate.

Lynwood Quarry maintains a Complaints Register to record complaints received from the community, with the register contained on the Lynwood Quarry website (<https://www.holcim.com.au/lynwood>).

A summary of complaints received by Lynwood Quarry between 2015 and 2025 is presented in Table 34. Lynwood Quarry received one complaint during the 2025 reporting period. On 26 November at about 3:15pm, strong winds (around 65 km/h) caused dust from the southern excess sand emplacement to drift east toward the Marulan Waste Management Centre. Work was stopped immediately and watercarts were deployed to suppress dust, with continued control measures (including reapplication of crusting agent) to maintain suppression through the afternoon and night shift.

Table 34: Comparison of complaints 2015 - 2025

Complaint Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Noise	0	0	1	2	4	0	0	0	0	0	0
Air quality (dust)	1	0	1	6	41	2	0	0	0	0	1
Blasting	2	1	1	0	0	3	0	0	0	0	0
Traffic	0	0	0	0	0	1	0	0	0	0	0
Water	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	2	1	2	0	0	0	0
Total	2	1	3	8	47	7	2	0	0	0	1

10 Independent Audit

Schedule 5 Condition 11 of DA 128-5-2005 states:

“By 30 September 2017, and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant must commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:

(a) be conducted by suitably qualified, experienced, and independent team of experts whose appointment has been endorsed by the Secretary.

(b) include consultation with the relevant agencies and the CCC.

(c) assess the environmental performance of the development and whether it is complying with the relevant requirements in this consent and any relevant EPL and/or Water Licence (Including any assessment, plan or program required under these approvals).

(d) review the adequacy of any approved strategy, plan or program required under these approvals.

(e) recommend measures or actions to improve the environmental performance of the development, and/or any assessment, plan or program required under these approvals; and

(f) be conducted and reported to the satisfaction of the Secretary.”

EMM Consulting PTY Limited (EMM) conducted an Independent Environmental Audit (IEA) on 01 February 2024. This was the fifth IEA for the quarry. Holcim’s response to recommendations from the IEA is presented in **Appendix D**.

The next IEA is due in February 2027.

11 Incidents and Non-Compliances during the Reporting period

A summary of Lynwood Quarry incidents and any internal or external actions conducted by Holcim to correct non-compliances or prevent future incidents is presented in Table 35.

Table 35: Summary of Incidents and Non-compliances

Incident / Non-Compliance	Related condition(s)	Date	Explanation and comments
<p><u>Noise Monitoring</u></p> <p>One noise exceedance at monitoring location N4 during Q2</p>	<p>Schedule 3, Condition 3</p> <p>EPL 12939 Condition L4.1</p>	4 June 2025	<p>Holcim investigated the result and confirmed that no unusual activities or additional work occurred on the day. A site inspection near N4 did not identify any abnormal quarry noise. The investigation indicated the noise was likely influenced by external sources, with a strong possibility it originated from a nearby quarry. Lynwood Quarry informed DPHI on 21 August 2025.</p>
<p><u>Surface Water Monitoring</u></p> <p>Non-compliance for surface water exceedances during the 2025 reporting period (Oil and Grease).</p>	Schedule 3, Condition 20	<p>Oil and Grease exceedances: August, September, and October.</p> <p>pH exceedances: April and May (SW11)</p>	<p>DPHI was notified during the reporting period of consecutive oil and grease exceedances above criteria levels at SW5 and SW6.</p> <p>DPHI was notified of pH exceedances at SW11 in April and May</p> <p>DPHI was not notified of consecutive oil and grease exceedances at SW09 and SW10 in September and October.</p>
<p><u>Groundwater Monitoring</u></p> <p>Non-compliance for multiple trigger level exceedances</p>	Schedule 3, Condition 24	<p>pH exceedance at GPZ01 in Q1-Q3.</p> <p>Water level at groundwater bore MP1 remained below the minimum trigger level of 1.64 m throughout the 2025 reporting period.</p>	<p>Holcim reported consecutive exceedances of trigger levels. Ramboll investigated the exceedances.</p>

Incident / Non-Compliance	Related condition(s)	Date	Explanation and comments
<p><u>Dust Monitoring</u></p> <p>Non-compliance due to damage to a HVAS sample paper resulting in an invalid sample.</p>	<p>Schedule 3, Condition 15</p>	<p>Invalid HVAS sample on 22 November 2025. DD13 depositional dust exceedance in March 2025.</p>	<p>An investigation from the monitoring contractor confirmed an invalid sample due to damage to the filter paper. The contractor has reviewed their procedures to prevent future invalid samples.</p> <p>An exceedance of the depositional dust criteria was recorded at DD13 in March, and reported as required. A subsequent investigation found a high level of organic material in the sample, and likely a result of adjacent agricultural practices.</p>

12 Activities to be Completed in the Next Reporting Period

Lynwood Quarry proposes to perform a range of activities during the 2026 reporting period, including:

- Implementation of approved environmental Management Plans;
- Continued extraction within the Granite Pit;
- Continued weed and feral animal management;
- Engage contractors to implement the updated BGWMP once approved by DCCEEW; and
- Renewal of Rehabilitation and Landscape Management Plan.

APPENDIX A – Noise Monitoring Reports

Intended for
Holcim (Australia) Pty Ltd

Document type
Report

Date
May 2025

Lynwood Quarry Quarterly Noise Monitoring Assessment

Quarter 1 2025

Lynwood Quarry Quarterly Noise Monitoring Assessment

Quarter 1 2025

Project name **NSW Environmental Monitoring 2024-2025**
Project no. **318001800**
Recipient **Wayne Beattie**
Document type **Report**
Version **1**
Date **02/05/2025**
Prepared by **Jake Bourke, Brodie Wood**
Checked by **Arnold Cho**
Approved by **Gavan Butterfield**
Description **Data collected on 4 and 5 March 2025 for the quarterly period ending March 2025 at Marulan, 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).
LAm _{ax}	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 Lynwood Quarry ("the quarry") at Marulan, NSW.

This NMA was done in accordance with the following documents:

- Noise Policy for Industry (NPfI) (NSW EPA, 2017)
- Lynwood Quarry Noise Management Plan (NMP) (Holcim Australia, 2019)
- Environment Protection Licence (EPL) number 12939 (NSW EPA, 2021)
- Development Consent DA 128-5-2005 (Minister for Planning, 2017)
- Australian Standard AS 1055:2018 Acoustics – Description and measurement of environmental noise (Standards Australia, 2018)
- 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 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 Receptors

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

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



Legend

- Noise monitoring location
- Residence/noise assessment location



Figure 1: Noise monitoring locations at Lynwood Quarry

2. Noise Criteria

Table 2-1 includes the applicable noise criteria outlined in the Development Consent and the EPL for the 16 residential receivers surrounding the quarry (L1–L16), and the four monitoring locations adopted from the NMP that are deemed representative and applicable for this NMA (N1–N4). It should be noted that the original location of N3 (on the northern boundary of 16038 Hume Highway, Marulan) continues to be inaccessible and as such N3 has been relocated to a nearby residential receiver approximately 900 m to the west on Munro Road, Marulan (**Figure 1**) where all future monitoring will take place. This revised location is deemed representative and applicable for this NMA.

Table 2-1: Monitoring locations and noise criteria

EPL ID	Receiver Description	Monitoring Locations		Day ¹	Evening ²	Night ³	Night ³
		NMP ID	Address	LAeq (15min)	LAeq (15min)	LAeq (15min)	LA1 (1min)
dBA							
L1	West of the Granite Pit.	N1	1114 Carrick Road, Marulan	35	35	35	45
L2	Northeast of the site	-	-	35	35	35	45
L3	Northeast of the site	-	-	35	35	35	45
L4	East of the site in Marulan	-	-	35	37	35	46
L5	East of the site in Marulan	-	-	35	35	35	46
L6	East of the site in Marulan	N2	End of Maclura Drive, Marulan	35	37	36	46
L7	East of the site in Marulan	-	-	38	38	35	55
L8	East of the site in Marulan	-	-	39	38	36	55
L9	East of the site in Marulan	-	-	39	39	37	56
L10	Southeast of the site in Old Marulan	-	-	42	42	40	53
L11	South of the site	N3	Off Marulan South Road, near DD8	35	35	36	47
L12	East of the site in Marulan	N4	Corner of Dorsett and Suffolk Road, Marulan	37	37	36	47
L13	East of the site in Marulan	-	-	40	38	37	47
L14	South of the site	-	-	35	35	35	47
L15	South of the site	-	-	35	35	35	47
L16	Northeast of the site	-	-	35	35	35	45

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

² 6 pm–10 pm Monday to Sunday

³ 10 pm–7 am Monday to Saturday and 10 pm–8 am Sunday and public holidays

3. Methodology

The monitoring program was developed in accordance with the procedures described in Australian Standard AS 1055:2018 and the Approval Documents referenced in Section 0. The measurements were carried out using a RION Sound Level Meter NL-52 on Tuesday 4 March 2025 and Wednesday 5 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 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-minutes in duration during the day, evening, and night periods over two days at each monitoring location. Where possible, throughout each measurement the operator quantified the contribution of each significant noise source. Where the quarry was not distinctly audible during the attended monitoring, the quarry contribution is estimated to be at least 10 dBA below the ambient noise level, as determined by the LA90.

3.1 Meteorological Conditions

Meteorology has an important influence on noise monitoring assessment. An onsite meteorological 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:

- Monitoring locations for the collection of representative noise data
- Wind speeds greater than 3 m/s at 10 metres above ground level
- Stability category F temperature inversion conditions and wind speeds greater than 2 m/s at 10 metres above ground level
- Stability category G temperature inversion conditions.

Appendix 10 of the Development Consent also specifies that except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline.

4. Results and Discussion

4.1 Location N1

Noise monitoring at location N1 was conducted on Tuesday 4 March 2025 and Wednesday 5 March 2025 with results presented in **Table 4-1**. Noise from the quarry was inaudible at N1 during the day monitoring period. The site was audible at N1 during the evening and night monitoring period, with an industrial hum. The ambient noise environment was dominated by trees/wind, birds, cicadas and a passing train. The results are deemed to satisfy the established noise criteria and indicate that noise emissions from Lynwood Quarry did not contribute to noise nuisance at the time of the monitoring.

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

Date	Time	Descriptor (dBA)			Meteorology (Handheld at microphone height)	Onsite Met Station (10m height)	Apparent Noise Source, Description and SPL (dBA)	Lynwood Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1(1min) Criteria (dBA)
		LA1	LAeq	LA90							
5-03-25	7:00am to 7:15am (Day)	70.5	56.6	28.8	WD: n/a WS: 0 m/s Rain: Nil	WD: 122° WS: 0.8 m/s Rain: Nil Stability Category: D ¹	Background birds, insects 28-36 Birds 36-58 Train 40-74 Quarry inaudible	<19	35	n/a	n/a
4-03-25	7:41pm to 7:56pm (Evening)	44.1	40.8	39.2	WD: 71° WS: 2.3 m/s Rain: Nil	WD: 113° WS: 0.6 m/s Rain: Nil Stability Category: D ¹	Background wind, trees, cicadas, Holcim industrial hum 37-49 Magpies 50-56 Quarry audible	<35 - 37 ²	35	n/a	n/a
5-03-25	6:34am to 6:49am (Night)	51.5	38.3	29.4	WD: n/a WS: 0 m/s Rain: Nil	WD: 116° WS: 0.8 m/s Rain: Nil Stability Category: D ¹	Background Holcim industrial hum, insects 28-36 Birds 36-58 Quarry audible	<29 ³	35	n/a ⁴	45

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

² Measured LAeq value of 40.8 was dominated by flora and fauna, so unable to separate extraneous noise from Holcim noise but estimated to be 35 – 37 dBA at the assessment location.

³ Measured LAeq value of 38.3 was dominated by fauna, so unable to separate extraneous noise from Holcim noise but estimated to be less than 29 dBA at the assessment location.

⁴ Measured LA1 value of 51.5 was dominated by fauna, so unable to estimate contribution for quarry at the assessment location.

4.2 Location N2

Noise monitoring at location N2 was conducted on Tuesday 4 March 2025 and Wednesday 5 March 2025 with results presented in **Table 4-2**. Noise from the quarry was inaudible at N2 during the day, evening, and night monitoring periods. The ambient noise environment was dominated by motorway traffic, wind, birds, trees, and insects. The results satisfy the established noise criteria and indicate that noise emissions from Lynwood Quarry did not contribute to noise nuisance at the time of the monitoring.

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

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (10m height)	Apparent Noise Source, Description and SPL (dBA)	Lynwood Quarry LAeq (15min) Contribution (dBA)	LAeq (15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1 (1min) Criteria (dBA)
		LA1	LAeq	LA90							
5-03-25	10:41am to 10:56am (Day)	50.4	43.1	40.1	WD: 267° WS: 2.4 m/s Rain: Nil	WD: 95° WS: 0.5 m/s Rain: Nil Stability Category: D ¹	Background traffic, birds, wind, trees 40-60 Quarry inaudible	<30	35	n/a	n/a
4-03-25	6:42pm to 6:57pm (Evening)	37	43.8	39.5	WD: 92° WS: 1.2 m/s Rain: Nil	WD: 93° WS: 0.5 m/s Rain: Nil Stability Category: D ¹	Background traffic, trees, birds, insects, wind 37-44 Magpies 42-50 Train 45-60 Quarry inaudible	<30	37	n/a	n/a
5-03-25	5:37am to 5:52am (Night)	60.3	46.8	41.6	WD: n/a WS: 0 m/s Rain: Nil	WD: 108° WS: 0.8 m/s Rain: Nil Stability Category: D ¹	Background traffic, insects 40-60 Train 45-66 Quarry inaudible	<32	36	n/a ²	46

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

² Measured LA1 value of 60.3 was dominated by traffic, fauna and a train, so unable to estimate contribution for quarry at the assessment location.

4.3 Location N3

Noise monitoring at location N3 was conducted on Tuesday 4 March 2025 and Wednesday 5 March 2025 with results presented in **Table 4-3**. Noise from the quarry was audible at N3 during the day, evening and night monitoring period. The ambient noise environment was dominated by birds, wind, trees, cicadas, insects and background traffic. The results are deemed to satisfy the established noise criteria and indicate that noise emissions from Lynwood Quarry did not contribute to noise nuisance at the time of the monitoring (see Footnotes 2 to 4 below).

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

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (10m height)	Apparent Noise Source, Description and SPL (dBA)	Lynwood Quarry LAeq (15min) Contribution (dBA)	LAeq (15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1 (1min) Criteria (dBA)
		LA1	LAeq	LA90							
5-03-25	12:10pm to 12:25pm (Day)	47.1	41.2	38.2	WD: 160° WS: 2.3 m/s Rain: Nil	WD: 103° WS: 0.6 m/s Rain: Nil Stability Category: D ¹	Holcim industrial hum, wind, birds, trees, cicadas 37-50 Quarry audible	<35 - 37 ²	35	n/a	n/a
4-03-25	6:06pm to 6:21pm (Evening)	33.8	38.1	35.8	WD: 92° WS: 1.6 m/s Rain: Nil	WD: 88° WS: 0.4 m/s Rain: Nil Stability Category: D ¹	Background traffic, trees, wind, cicadas, Holcim industrial hum 34-43 Quarry audible	<34 - 36 ³	35	n/a	n/a
5-03-25	5:09am to 5:24am (Night)	34.6	39.9	36.7	WD: n/a WS: 0 m/s Rain: Nil	WD: 137° WS: 0.8 m/s Rain: Nil Stability Category: D ¹	Background traffic, Holcim industrial hum, insects 34-47 Quarry audible	<34 - 36 ⁴	36	<35	47

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

² Measured LAeq value of 41.2 was dominated by fauna so unable to separate extraneous noise from Holcim noise but estimated to be 35 - 37 dBA at the assessment location.

³ Measured LAeq value of 38.1 was dominated by background traffic, flora and fauna, so unable to separate extraneous noise from Holcim noise but estimated to be 34 - 36 dBA at the assessment location.

⁴ Measured LAeq value of 39.9 was dominated by background traffic and fauna, so unable to separate extraneous noise from Holcim noise but estimated to be 34 - 36 dBA at the assessment location.

4.4 Location N4

Noise monitoring at location N3 was conducted on Tuesday 4 March 2025 and Wednesday 5 March 2025 with results presented in **Table 4-4**. Noise from the quarry was inaudible during the day, evening night monitoring periods. The ambient noise environment was dominated by insects, birds, wind, trees, sheep, motorway traffic and a passing car. The results satisfy the established noise criteria and indicate that noise emissions from Lynwood Quarry did not contribute to noise nuisance at the time of the monitoring.

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

Date	Time	Descriptor (dBA)			Meteorology (Handheld at microphone height)	Onsite Met Station (10m height)	Apparent Noise Source, Description and SPL (dBA)	Lynwood Quarry LAeq (15min) Contribution (dBA)	LAeq (15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1 (1min) Criteria (dBA)
		LA1	LAeq	LA90							
5-03-25	9:44am to 9:59am (Day)	50.7	41.4	37.4	WD: n/a WS: 0 m/s Rain: Nil	WD: 98° WS: 0.9 m/s Rain: Nil Stability Category: D ¹	Background traffic, birds 36-45 Flock of birds 45-63 Sheep 40-45 Quarry inaudible	<27	37	n/a	n/a
4-03-25	7:07pm to 7:22pm (Evening)	48.1	42.5	37.5	WD: n/a WS: 0 m/s Rain: Nil	WD: 107° WS: 0.5 m/s Rain: Nil Stability Category: D ¹	Background traffic, wind, trees 35-42 Birds 40-42 Train 50-57 Quarry inaudible	<28	37	n/a	n/a
5-03-25	5:59am to 6:14am (Night)	48.2	40.9	38.4	WD: n/a WS: 0 m/s Rain: Nil	WD: 109° WS: 0.8 m/s Rain: Nil Stability Category: D ¹	Background traffic 38-41 Passing car 50-55 Magpies 40-46 Quarry inaudible	<28	36	n/a ²	47

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

² Measured LA1 value of 48.2 was dominated by fauna and a car, so unable to estimate contribution for quarry at the assessment location.

5. Conclusion

This NMA was completed by Ramboll at the Holcim Lynwood Quarry, Marulan, NSW as a quarterly requirement of the NMP. Monitoring was carried out on Tuesday, 4 March 2025 and Wednesday, 5 March 2025 at four locations selected as representative to the sensitive receptors at the surroundings to Lynwood Quarry.

No audible noise from quarry operations was observed at locations N2 and N4 during the day, evening and night periods. Quarry noise was audible at locations N1 and N3 during all periods, where the quarry was audible as an industrial hum, except for N1 during the day, when it was inaudible.

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

It is noted that at two assessment locations, some exceedances of the noise criteria have been recorded as follows:

- Up to 2 dB at N1 during the evening period and at N3 during the day period
- Up to 1 dB at N3 during the evening period

The above exceedances are deemed negligible (<2 dB) when considered against Table 4.1 of the NPfI. It should also be noted that the noise environment during these periods, noise monitoring was heavily affected by extraneous noise sources. Therefore, it can be concluded that the exceedance was not caused by the site operation.

6. References

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

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

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

NSW EPA (2021) Environment Protection Licence number 12939

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

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

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

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

Standards Australia and Standards New Zealand (2019) *AS/NZS IEC 61672.1:2019 Electroacoustics—Sound level meters, Part 1: Specifications*. Australian/New Zealand Standard. Available at: https://infostore.saiglobal.com/preview/825343328243.pdf?sku=1142059_SAIG_AS_AS_2705644 (Accessed: 28 September 2022).

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Quarter 2 2025

Lynwood Quarry Quarterly Noise Monitoring Assessment

Quarter 2 2025

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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).
LAm _{ax}	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 Lynwood Quarry ("the quarry") at Marulan, NSW.

This NMA was done in accordance with the following documents:

- Noise Policy for Industry (NPfI) (NSW EPA, 2017)
- Lynwood Quarry Noise Management Plan (NMP) (Holcim Australia, 2019)
- Environment Protection Licence (EPL) number 12939 (NSW EPA, 2021)
- Development Consent DA 128-5-2005 (Minister for Planning, 2017)
- Australian Standard AS 1055:2018 Acoustics – Description and measurement of environmental noise (Standards Australia, 2018)
- 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 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 Receptors

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

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



Legend

- Noise monitoring location
- Residence/noise assessment location



Figure 1: Noise monitoring locations at Lynwood Quarry

2. Noise Criteria

Table 2-1 includes the applicable noise criteria outlined in the Development Consent and the EPL for the 16 residential receivers surrounding the quarry (L1–L16), and the four monitoring locations adopted from the NMP that are deemed representative and applicable for this NMA (N1–N4). It should be noted that the original location of N3 (on the northern boundary of 16038 Hume Highway, Marulan) continues to be inaccessible and as such N3 has been relocated to a nearby residential receiver approximately 900 m to the west on Munro Road, Marulan (**Figure 1**) where all future monitoring will take place. This revised location is deemed representative and applicable for this NMA.

Table 2-1: Monitoring locations and noise criteria

EPL ID	Receiver Description	Monitoring Locations		Day ¹	Evening ²	Night ³	Night ³
		NMP ID	Address	LAeq (15min)	LAeq (15min)	LAeq (15min)	LA1 (1min)
dBA							
L1	West of the Granite Pit.	N1	1114 Carrick Road, Marulan	35	35	35	45
L2	Northeast of the site	-	-	35	35	35	45
L3	Northeast of the site	-	-	35	35	35	45
L4	East of the site in Marulan	-	-	35	37	35	46
L5	East of the site in Marulan	-	-	35	35	35	46
L6	East of the site in Marulan	N2	End of Maclura Drive, Marulan	35	37	36	46
L7	East of the site in Marulan	-	-	38	38	35	55
L8	East of the site in Marulan	-	-	39	38	36	55
L9	East of the site in Marulan	-	-	39	39	37	56
L10	Southeast of the site in Old Marulan	-	-	42	42	40	53
L11	South of the site	N3	Off Marulan South Road, near DD8	35	35	36	47
L12	East of the site in Marulan	N4	Corner of Dorsett and Suffolk Road, Marulan	37	37	36	47
L13	East of the site in Marulan	-	-	40	38	37	47
L14	South of the site	-	-	35	35	35	47
L15	South of the site	-	-	35	35	35	47
L16	Northeast of the site	-	-	35	35	35	45

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

² 6 pm–10 pm Monday to Sunday

³ 10 pm–7 am Monday to Saturday and 10 pm–8 am Sunday and public holidays

3. Methodology

The monitoring program was developed in accordance with the procedures described in Australian Standard AS 1055:2018 and the Approval Documents referenced in Section 0. The measurements were carried out using a RION Sound Level Meter NL-52 on Wednesday 4 June 2025 and Friday 6 June 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 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-minutes in duration during the day, evening, and night periods over two days at each monitoring location. Where possible, throughout each measurement the operator quantified the contribution of each significant noise source. Where the quarry was not distinctly audible during the attended monitoring, the quarry contribution is estimated to be at least 10 dBA below the ambient noise level, as determined by the LA90.

3.1 Meteorological Conditions

Meteorology has an important influence on noise monitoring assessment. An onsite meteorological 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:

- Monitoring locations for the collection of representative noise data
- Wind speeds greater than 3 m/s at 10 metres above ground level
- Stability category F temperature inversion conditions and wind speeds greater than 2 m/s at 10 metres above ground level
- Stability category G temperature inversion conditions.

Appendix 10 of the Development Consent also specifies that except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline.

4. Results and Discussion

4.1 Location N1

Noise monitoring at location N1 was conducted on Wednesday 4 June 2025 and Friday 6 June 2025 with results presented in **Table 4-1**. Noise from the quarry was inaudible at N1 during the day, evening and night monitoring period. The ambient noise environment was dominated by wind, trees, insects, frogs and birds. The results are deemed to satisfy the established noise criteria and indicate that noise emissions from Lynwood Quarry did not contribute to noise nuisance at the time of the monitoring.

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

Date	Time	Descriptor (dBA)			Meteorology (Handheld at microphone height)	Onsite Met Station (10m height)	Apparent Noise Source, Description and SPL (dBA)	Lynwood Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1(1min) Criteria (dBA)
		LA1	LAeq	LA90							
04-06-25	11:53am to 12:08pm (Day)	56.5	49.3	40.9	WD: 189° WS: 2.8 m/s Rain: Nil	WD: 175° WS: 4.1 m/s Rain: Nil Stability Category: E ¹	Wind/trees/insects 48-53 Gust of wind 55-57 Quarry inaudible	<31	35	n/a	n/a
04-06-25	8:58pm to 9:13pm (Evening)	39.3	36.2	34.8	WD: n/a WS: 0 m/s Rain: Nil	WD: 61° WS: 0.1 m/s Rain: Nil Stability Category: E ¹	Background traffic/insects/frogs/birds 36-40 Quarry inaudible	<25	35	n/a	n/a
06-06-25	6:12am to 6:27am (Night)	23.9	31.1	26.5	WD: n/a WS: 0 m/s Rain: Nil	WD: 116° WS: 0.8 m/s Rain: Nil Stability Category: G ¹	Insects/birds 29-32 Dog barking 34-40 Quarry inaudible	<17	35 ²	n/a	45

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

² Criteria does not apply under the meteorological conditions encountered during this monitoring period (stability category G temperature inversion conditions) as outlined in Section 3.1.

4.2 Location N2

Noise monitoring at location N2 was conducted on Wednesday 4 June 2025 and Friday 6 June 2025 with results presented in **Table 4-2**. Noise from the quarry was inaudible at N2 during the day, evening, and night monitoring periods. The ambient noise environment was dominated by wind, trees, birds, construction noise, background traffic and trains. The results satisfy the established noise criteria and indicate that noise emissions from Lynwood Quarry did not contribute to noise nuisance at the time of the monitoring.

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

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (10m height)	Apparent Noise Source, Description and SPL (dBA)	Lynwood Quarry LAeq (15min) Contribution (dBA)	LAeq (15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1 (1min) Criteria (dBA)
		LA1	LAeq	LA90							
04-06-25	1:37pm to 1:52pm (Day)	54.4	47.9	41.5	WD: 184° WS: 2.7 m/s Rain: Nil	WD: 176° WS: 3.8 m/s Rain: Nil Stability Category: E ¹	Wind/trees/birds/backyard construction noise 47-53 Loud bangs 54-59 Quarry inaudible	<32	35	n/a	n/a
04-06-25	7:57pm to 8:12pm (Evening)	56.2	46.6	43.3	WD: n/a WS: 0 m/s Rain: Nil	WD: 186° WS: 1.3 m/s Rain: Nil Stability Category: E ¹	Background traffic/trees 44-46 Birds 48-51 Train 51-60 Quarry inaudible	<33	37	n/a	n/a
06-06-25	5:16am to 5:31am (Night)	63.3	48.3	40.2	WD: n/a WS: 0 m/s Rain: Nil	WD: 10° WS: 0.2 m/s Rain: Nil Stability Category: G ¹	Background traffic, insects 40-48 Train 50-65 Quarry inaudible	<30	36 ³	n/a ²	46

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

² Measured LA1 value of 63.3 was dominated by traffic, fauna and a train, so unable to estimate contribution for quarry at the assessment location.

³ Criteria does not apply under the meteorological conditions encountered during this monitoring period (stability category G temperature inversion conditions) as outlined in Section 3.1.

4.3 Location N3

Noise monitoring at location N3 was conducted on Wednesday 4 June 2025 with results presented in **Table 4-3**. Noise from the quarry was inaudible at N3 during the day, evening and night monitoring period. The ambient noise environment was dominated by wind, trees, frogs, birds and background traffic. The results satisfy the established noise criteria and indicate that noise emissions from Lynwood Quarry did not contribute to noise nuisance at the time of the monitoring.

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

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (10m height)	Apparent Noise Source, Description and SPL (dBA)	Lynwood Quarry LAeq (15min) Contribution (dBA)	LAeq (15min) Criteria (dBA)	Lynwood Quarry LA1 (1min) Contribution (dBA)	LA1 (1min) Criteria (dBA)
		LA1	LAeq	LA90							
04-06-25	2:14pm to 2:29pm (Day)	47.6	43	40	WD: 185° WS: 2.7 m/s Rain: Nil	WD: 188° WS: 3.3 m/s Rain: Nil Stability Category: E ¹	Wind/trees/insects/birds/background traffic 39-44 Quarry inaudible	<30	35	n/a	n/a
04-06-25	7:18pm to 7:33pm (Evening)	48.3	44.1	41.5	WD: n/a WS: 0 m/s Rain: Nil	WD: 193° WS: 2.3 m/s Rain: Nil Stability Category: E ¹	Background traffic/trees/insects/frogs 41-47 Quarry inaudible	<32	35	n/a	n/a
04-06-25	10:00pm to 10:15pm (Night)	50.1	45.7	42.9	WD: 229° WS: 1.3 m/s Rain: Nil	WD: 300° WS: 0.4 m/s Rain: Nil Stability Category: G ¹	Background traffic/insects/frogs/wind/trees 47-49 Quarry inaudible	<33	36 ²	<35	47

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

² Criteria does not apply under the meteorological conditions encountered during this monitoring period (stability category G temperature inversion conditions) as outlined in Section 3.1.

4.4 Location N4

Noise monitoring at location N4 was conducted on Wednesday 4 June 2025 and Friday 6 June with results presented in **Table 4-4**. Noise from the quarry was inaudible during the day monitoring periods. Noise from the quarry was audible at N4 during the evening and night monitoring period. The ambient noise environment was dominated by wind, trees, birds, passing cars and aircrafts. The results satisfy the established noise criteria and indicate that noise emissions from Lynwood Quarry did not contribute to noise nuisance at the time of the monitoring, except for the evening period.

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

Date	Time	Descriptor (dBA)			Meteorology (Handheld at microphone height)	Onsite Met Station (10m height)	Apparent Noise Source, Description and SPL (dBA)	Lynwood Quarry LAeq (15min) Contribution (dBA)	LAeq (15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1 (1min) Criteria (dBA)
		LA1	LAeq	LA90							
04-06-25	12:49pm to 1:04pm (Day)	46.9	41.3	38.2	WD: 185° WS: 2.4 m/s Rain: Nil	WD: 176° WS: 4.1 m/s Rain: Nil Stability Category: E ¹	Wind/trees/birds 38-44 Passing cars 49 Quarry inaudible	<28	37	n/a	n/a
04-06-25	8:21pm to 8:36pm (Evening)	47.3	43.5	41.6	WD: 230° WS: 1.5 m/s Rain: Nil	WD: 186° WS: 1.3 m/s Rain: Nil Stability Category: E ¹	Wind/trees/operation hum 42-44 Quarry audible	<42 ²	37	n/a	n/a
06-06-25	5:38am to 5:53am (Night)	52.9	43	36.6	WD: n/a WS: 0 m/s Rain: Nil	WD: 43° WS: 0.3 m/s Rain: Nil Stability Category: G ¹	Wind/trees/truck movements 34-36 Aircraft 45-50 Quarry audible	<43	36 ³	n/a ⁴	47

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

² Moderate exceedance (NPF1 2017 – Table 4.1). Measurement influenced by extraneous noise sources (wind/trees), so the quarry contribution estimated from LA90 measurement result.

³ Criteria does not apply under the meteorological conditions encountered during this monitoring period (stability category G temperature inversion conditions) as outlined in **Section 3.1**.

5. Conclusion

This NMA was completed by Ramboll at the Holcim Lynwood Quarry, Marulan, NSW as a quarterly requirement of the NMP. Monitoring was carried out on Wednesday 4 June 2025 and Friday 6 June 2025 at four locations selected as representative to the sensitive receptors at the surroundings to Lynwood Quarry.

No audible noise from quarry operations was observed at locations N1, N2 and N3 during the day, evening and night periods. Quarry noise was audible at location N4 during the evening and night monitoring periods where the quarry was audible with truck movements and operational hum. No audible noise from quarry operations was observed at N4 during the day.

The results presented in this NMA show compliance with the relevant noise criteria at the Holcim Lynwood Quarry, Marulan, NSW, except at one assessment location, where the following exceedance of the noise criteria has been recorded:

- Up to 5 dB at N4 during the evening period.

The above exceedance is deemed moderate (≤ 5 dB) when considered against Table 4.1 of the NPfI. It should also be noted that the noise environment during these periods, noise monitoring was influenced by extraneous noise sources.

6. References

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

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

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

NSW EPA (2021) Environment Protection Licence number 12939

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

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

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

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

Standards Australia and Standards New Zealand (2019) *AS/NZS IEC 61672.1:2019 Electroacoustics—Sound level meters, Part 1: Specifications*. Australian/New Zealand Standard. Available at: https://infostore.saiglobal.com/preview/825343328243.pdf?sku=1142059_SAIG_AS_AS_2705644 (Accessed: 28 September 2022).

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Lynwood Quarry Quarterly Noise Monitoring Assessment

Quarter 3 2025

Lynwood Quarry Quarterly Noise Monitoring Assessment

Quarter 3 2025

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Recipient **Wayne Beattie, Celin Joshy**
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Prepared by **Brodie Wood**
Checked by **Arnold Cho, Jake Bourke**
Approved by **Gavan Butterfield**
Description **Data collected on 1 September 2025 for the quarterly period ending
September 2025 at Marulan, 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	Celsius
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).
LAm _{ax}	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
NPI	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 Lynwood Quarry ("the quarry") at Marulan, NSW.

This NMA was done in accordance with the following documents:

- Noise Policy for Industry (NPfI) (NSW EPA, 2017)
- Lynwood Quarry Noise Management Plan (NMP) (Holcim, 2019)
- Environment Protection Licence (EPL) number 12939 (NSW EPA, 2021)
- Development Consent DA 128-5-2005 (Minister for Planning, 2017)
- Australian Standard AS 1055:2018 Acoustics – Description and measurement of environmental noise (Standards Australia, 2018)
- 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 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 Receptors

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

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



Legend

- Noise monitoring location
- Residence/noise assessment location



Figure 1: Noise monitoring locations at Lynwood Quarry

2. Noise Criteria

Table 2-1 includes the applicable noise criteria outlined in the Development Consent and the EPL for the 16 residential receivers surrounding the quarry (L1–L16), and the four monitoring locations adopted from the NMP that are deemed representative and applicable for this NMA (N1–N4). It should be noted that the original location of N3 (on the northern boundary of 16038 Hume Highway, Marulan) continues to be inaccessible and as such N3 has been relocated to a nearby residential receiver approximately 900 m to the west on Munro Road, Marulan (**Figure 1**) where all future monitoring will take place. This revised location is deemed representative and applicable for this NMA.

Table 2-1: Monitoring locations and noise criteria

EPL ID	Receiver Description	Monitoring Locations		Day ¹	Evening ²	Night ³	Night ³
		NMP ID	Address	LAeq (15min)	LAeq (15min)	LAeq (15min)	LA1 (1min)
dBA							
L1	West of the Granite Pit.	N1	1114 Carrick Road, Marulan	35	35	35	45
L2	Northeast of the site	-	-	35	35	35	45
L3	Northeast of the site	-	-	35	35	35	45
L4	East of the site in Marulan	-	-	35	37	35	46
L5	East of the site in Marulan	-	-	35	35	35	46
L6	East of the site in Marulan	N2	End of Maclura Drive, Marulan	35	37	36	46
L7	East of the site in Marulan	-	-	38	38	35	55
L8	East of the site in Marulan	-	-	39	38	36	55
L9	East of the site in Marulan	-	-	39	39	37	56
L10	Southeast of the site in Old Marulan	-	-	42	42	40	53
L11	South of the site	N3	Off Marulan South Road, near DD8	35	35	36	47
L12	East of the site in Marulan	N4	Corner of Dorsett and Suffolk Road, Marulan	37	37	36	47
L13	East of the site in Marulan	-	-	40	38	37	47
L14	South of the site	-	-	35	35	35	47
L15	South of the site	-	-	35	35	35	47
L16	Northeast of the site	-	-	35	35	35	45

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

² 6 pm–10 pm Monday to Sunday

³ 10 pm–7 am Monday to Saturday and 10 pm–8 am Sunday and public holidays

3. Methodology

The monitoring program was developed in accordance with the procedures described in AS 1055:2018 (Standards Australia, 2018) and the Approval Documents referenced in Section 1. The measurements were carried out using a RION Sound Level Meter NL-52 on Monday 1 September 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 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-minutes in duration during the day, evening, and night periods over two days at each monitoring location. Where possible, throughout each measurement the operator quantified the contribution of each significant noise source. Where the quarry was not distinctly audible during the attended monitoring, the quarry contribution is estimated to be at least 10 dBA below the ambient noise level, as determined by the LA90.

3.1 Meteorological Conditions

Meteorology has an important influence on noise monitoring assessment. An onsite meteorological 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:

- Monitoring locations for the collection of representative noise data
- Wind speeds greater than 3 m/s at 10 metres above ground level
- Stability category F temperature inversion conditions and wind speeds greater than 2 m/s at 10 metres above ground level
- Stability category G temperature inversion conditions.

Appendix 10 of the Development Consent also specifies that except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline.

4. Results and Discussion

4.1 Location N1

Noise monitoring at location N1 was conducted on Monday 1 September 2025 with results presented in **Table 4-1**. Noise from the quarry was inaudible at N1 during the day, evening and night monitoring period. The ambient noise environment was dominated by wind, fauna, traffic, trains, and aircraft. The results are deemed to satisfy the established noise criteria and indicate that noise emissions from Lynwood Quarry did not contribute to noise nuisance at the time of the monitoring.

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

Date	Time	Descriptor (dBA)			Meteorology (Handheld at microphone height)	Onsite Met Station (10m height)	Apparent Noise Source, Description and SPL (dBA)	Lynwood Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1(1min) Criteria (dBA)
		LA1	LAeq	LA90							
01-09-25	2:33pm to 2:48pm (Day)	60.1	48	32	WD: 270° WS: 1.2 m/s Rain: Nil	WD: 258° WS: 1.6 m/s Rain: Nil Stability Category: F ¹	Wind, insects, frogs, birds 30-50 Train 54-60 Aircraft 50-55 Bird 65-70 Quarry inaudible	<22	35	n/a	n/a
01-09-25	9:27pm to 9:42pm (Evening)	35.5	40.3	38	WD: n/a WS: 0 m/s Rain: Nil	WD: 42.6° WS: 0.6 m/s Rain: Nil Stability Category: F ¹	Background traffic, insects, cicadas 37-43 Train 40-44 Cow 40-42 Quarry inaudible	<28	35	n/a	n/a
01-09-25	10:00pm to 10:15pm (Night)	44.6	42.1	40.4	WD: n/a WS: 0 m/s Rain: Nil	WD: 282° WS: 0.2 m/s Rain: Nil Stability Category: F ¹	Background traffic, insects, cicadas 38-46 Cow 44-45 Quarry inaudible	<30	35	n/a ²	45

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

² Measured LA1 value of 44.6 dBA was dominated by traffic and fauna, so unable to estimate contribution for quarry at the assessment location.

4.2 Location N2

Noise monitoring at location N2 was conducted on Monday 1 September 2025 with results presented in **Table 4-2**. Noise from the quarry was inaudible at N2 during the day, evening, and night monitoring periods. The ambient noise environment was dominated by background traffic, wind, trees, fauna and trains. The results satisfy the established noise criteria and indicate that noise emissions from Lynwood Quarry did not contribute to noise nuisance at the time of the monitoring.

Table 4-2: Noise survey results and observations for location N2

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (10m height)	Apparent Noise Source, Description and SPL (dBA)	Lynwood Quarry LAeq (15min) Contribution (dBA)	LAeq (15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1 (1min) Criteria (dBA)
		LA1	LAeq	LA90							
01-09-25	1:29pm to 1:44pm (Day)	63.1	49.2	33.7	WD: 290° WS: 0.9 m/s Rain: Nil	WD: 253° WS: 1.0 m/s Rain: Nil Stability Category: F ¹	Background traffic, wind, trees, insects, birds 34-38 Dog 45 Train 60-67 Quarry inaudible	<24	35	n/a	n/a
01-09-25	8:14pm to 8:29pm (Evening)	52.5	47.5	44.3	WD: n/a WS: 0 m/s Rain: Nil	WD: 68° WS: 0.6 m/s Rain: Nil Stability Category: F ¹	Background traffic, insects, frogs, birds 44-57 Dog 45-47 Quarry inaudible	<34	37	n/a	n/a
01-09-25	11:06pm to 11:21pm (Night)	53.6	47.2	43.9	WD: n/a WS: 0 m/s Rain: Nil	WD: 249° WS: 0.2 m/s Rain: Nil Stability Category: F ¹	Background traffic, insects, frogs, birds 45-50 Train 50-56 Plover 50-56 Quarry inaudible	<34	36	n/a ²	46

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

² Measured LA1 value of 53.6 dBA was dominated by traffic, fauna and a train, so unable to estimate contribution for quarry at the assessment location.

4.3 Location N3

Noise monitoring at location N3 was conducted on Monday 1 September 2025 with results presented in **Table 4-3**. Noise from the quarry was inaudible at N3 during the day, evening and night monitoring period. The ambient noise environment was dominated by background traffic and fauna. The results satisfy the established noise criteria and indicate that noise emissions from Lynwood Quarry did not contribute to noise nuisance at the time of the monitoring.

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

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (10m height)	Apparent Noise Source, Description and SPL (dBA)	Lynwood Quarry LAeq (15min) Contribution (dBA)	LAeq (15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1 (1min) Criteria (dBA)
		LA1	LAeq	LA90							
01-09-25	12:44pm to 12:59pm (Day)	40.3	35.2	33.1	WD: 258° WS: 0.8 m/s Rain: Nil	WD: 252° WS: 1.2 m/s Rain: Nil Stability Category: F ¹	Background traffic, insects, birds 32-46 Quarry inaudible	<23	35	n/a	n/a
01-09-25	7:30pm to 7:45pm (Evening)	44.1	44.1	41.3	WD: n/a WS: 0 m/s Rain: Nil	WD: 315° WS: 0.4 m/s Rain: Nil Stability Category: F ¹	Background traffic, insects, frogs 43-49 Quarry inaudible	<31	35	n/a	n/a
01-09-25	11:45pm to 12:00am (Night)	43	45.7	41.8	WD: 229° WS: 1.3 m/s Rain: Nil	WD: 249° WS: 0.2 m/s Rain: Nil Stability Category: F ¹	Background traffic, cicadas, insects, frogs, birds 40-47 Quarry inaudible	<32	36	n/a ²	47

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

² Measured LA1 value of 43 dBA was dominated by traffic and fauna, so unable to estimate contribution for quarry at the assessment location.

4.4 Location N4

Noise monitoring at location N4 was conducted on Monday 1 September 2025 with results presented in **Table 4-4**. Noise from the quarry was inaudible at N4 during the day, evening and night monitoring period. The ambient noise environment was dominated by residential rumblings, fauna, wind, trees, background traffic, cars, trucks, a train and aircraft. The results satisfy the established noise criteria and indicate that noise emissions from Lynwood Quarry did not contribute to noise nuisance at the time of the monitoring.

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

Date	Time	Descriptor (dBA)			Meteorology (Handheld at microphone height)	Onsite Met Station (10m height)	Apparent Noise Source, Description and SPL (dBA)	Lynwood Quarry LAeq (15min) Contribution (dBA)	LAeq (15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1 (1min) Criteria (dBA)
		LA1	LAeq	LA90							
01-09-25	1:57pm to 2:22pm (Day)	55.8	44.6	32	WD: 257° WS: 1.2 m/s Rain: Nil	WD: 258° WS: 1.6 m/s Rain: Nil Stability Category: E ¹	Residential rumblings, birds, insects, wind, trees 34-50 Train 45-50 Car passing 50-56 Aircraft 52-65 Quarry inaudible	<22	37	n/a	n/a
01-09-25	8:42pm to 8:57pm (Evening)	46.5	42.6	40.3	WD: n/a WS: 0 m/s Rain: Nil	WD: 68° WS: 0.6 m/s Rain: Nil Stability Category: F ¹	Background traffic, insects 40-47 Dog barking 43 Quarry inaudible	<30	37	n/a	n/a
01-09-25	10:40pm to 10:55pm (Night)	44.1	40.1	38.4	WD: n/a WS: 0 m/s Rain: Nil	WD: 43° WS: 0.6 m/s Rain: Nil Stability Category: F ¹	Background traffic, insects, cicadas, frogs 38-41 Dog barking 43 Truck 44-47 Quarry inaudible	<28	36	n/a ²	47

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

² Measured LA1 value of 44.1 dBA was dominated by traffic and fauna, so unable to estimate contribution for quarry at the assessment location.

5. Conclusion

This NMA was completed by Ramboll at the Holcim Lynwood Quarry, Marulan, NSW as a quarterly requirement of the NMP. Monitoring was carried out on Monday 1 September 2025 at four locations selected as representative to the sensitive receptors at the surroundings to Lynwood Quarry.

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

6. References

- Holcim. (2019). *Lynwood Noise Management Plan*.
- IEC. (2017). *International Electrotechnical Commission. IEC 60942:2017 Electroacoustics – Sound calibrators*.
- Minister for Planning. (2017). *Development Consent DA 128-5-2005*.
- NSW EPA. (2014). *Discussion Paper. Validation of Inversion Strength Estimation Method*.
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- NSW EPA. (2021). *Environment Protection Licence number 12939*.
- Standards Australia. (2018). *AS 1055:2018 Acoustics—Description and measurement of environmental noise*.
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Holcim (Australia) Pty Ltd

Document type
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Date
January 2026

Lynwood Quarry Quarterly Noise Monitoring Assessment

Quarter 4 2025

Lynwood Quarry Quarterly Noise Monitoring Assessment

Quarter 4 2025

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Recipient **Wayne Beattie, Celin Joshy**
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Approved by **Gavan Butterfield**
Description **Data collected on 3 December 2025 for the quarterly period ending
December 2025 at Marulan, NSW, as part of the noise monitoring program**

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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
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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).
LAm _{ax}	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
NPI	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 Lynwood Quarry ("the quarry") at Marulan, NSW.

This NMA was done in accordance with the following documents:

- Noise Policy for Industry (NPI) (NSW EPA, 2017)
- Lynwood Quarry Noise Management Plan (NMP) (Holcim, 2019)
- Environment Protection Licence (EPL) number 12939 (NSW EPA, 2021)
- Development Consent DA 128-5-2005 (Minister for Planning, 2017)
- Australian Standard AS 1055:2018 Acoustics – Description and measurement of environmental noise (Standards Australia, 2018)
- 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 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 Receptors

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

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



Legend

- Noise monitoring location
- Residence/noise assessment location



Figure 1: Noise monitoring locations at Lynwood Quarry

2. Noise Criteria

Table 2-1 includes the applicable noise criteria outlined in the Development Consent and the EPL for the 16 residential receivers surrounding the quarry (L1–L16), and the four monitoring locations adopted from the NMP that are deemed representative and applicable for this NMA (N1–N4). It should be noted that the original location of N3 (on the northern boundary of 16038 Hume Highway, Marulan) continues to be inaccessible and as such N3 has been relocated to a nearby residential receiver approximately 900 m to the west on Munro Road, Marulan (**Figure 1**) where all future monitoring will take place. This revised location is deemed representative and applicable for this NMA.

Table 2-1: Monitoring locations and noise criteria

EPL ID	Receiver Description	Monitoring Locations		Day ¹	Evening ²	Night ³	Night ³
		NMP ID	Address	LAeq (15min)	LAeq (15min)	LAeq (15min)	LA1 (1min)
dBA							
L1	West of the Granite Pit.	N1	1114 Carrick Road, Marulan	35	35	35	45
L2	Northeast of the site	-	-	35	35	35	45
L3	Northeast of the site	-	-	35	35	35	45
L4	East of the site in Marulan	-	-	35	37	35	46
L5	East of the site in Marulan	-	-	35	35	35	46
L6	East of the site in Marulan	N2	End of Maclura Drive, Marulan	35	37	36	46
L7	East of the site in Marulan	-	-	38	38	35	55
L8	East of the site in Marulan	-	-	39	38	36	55
L9	East of the site in Marulan	-	-	39	39	37	56
L10	Southeast of the site in Old Marulan	-	-	42	42	40	53
L11	South of the site	N3	Off Marulan South Road, near DD8	35	35	36	47
L12	East of the site in Marulan	N4	Corner of Dorsett and Suffolk Road, Marulan	37	37	36	47
L13	East of the site in Marulan	-	-	40	38	37	47
L14	South of the site	-	-	35	35	35	47
L15	South of the site	-	-	35	35	35	47
L16	Northeast of the site	-	-	35	35	35	45

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

² 6 pm–10 pm Monday to Sunday

³ 10 pm–7 am Monday to Saturday and 10 pm–8 am Sunday and public holidays

3. Methodology

The monitoring program was developed in accordance with the procedures described in AS 1055:2018 (Standards Australia, 2018) and the Approval Documents referenced in Section 1. The measurements were carried out using a RION Sound Level Meter NL-52 on Wednesday 3 December 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 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-minutes in duration during the day, evening, and night periods over one day at each monitoring location. Where possible, throughout each measurement the operator quantified the contribution of each significant noise source. Where the quarry was not distinctly audible during the attended monitoring, the quarry contribution is estimated to be at least 10 dBA below the ambient noise level, as determined by the LA90.

3.1 Meteorological Conditions

Meteorology has an important influence on noise monitoring assessment. An onsite meteorological 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:

- Monitoring locations for the collection of representative noise data
- Wind speeds greater than 3 m/s at 10 metres above ground level
- Stability category F temperature inversion conditions and wind speeds greater than 2 m/s at 10 metres above ground level
- Stability category G temperature inversion conditions.

Appendix 10 of the Development Consent also specifies that except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline.

4. Results and Discussion

4.1 Location N1

Noise monitoring at location N1 was conducted on Wednesday 3 December 2025 with results presented in **Table 4-1**. Noise from the quarry was inaudible at N1 during the day, evening and night monitoring period. The ambient noise environment was dominated by wind, fauna and trains. The results are deemed to satisfy the established noise criteria and indicate that noise emissions from Lynwood Quarry did not contribute to noise nuisance at the time of the monitoring.

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

Date	Time	Descriptor (dBA)			Meteorology (Handheld at microphone height)	Onsite Met Station (10m height)	Apparent Noise Source, Description and SPL (dBA)	Lynwood Quarry LAeq(15min) Contribution (dBA)	LAeq(15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1(1min) Criteria (dBA)
		LA1	LAeq	LA90							
03-12-25	11:03am to 11:18am (Day)	57.4	49.3	42.9	WD: 260° WS: 2.3 m/s Rain: Nil	WD: 270° WS: 1.6 m/s Rain: Nil Stability Category: E ¹	Wind, trees, birds 45-60 Quarry inaudible	<33	35	n/a	n/a
03-12-25	9:25pm to 9:40pm (Evening)	54.5	45.3	27.2	WD: 329° WS: 0.5 m/s Rain: Nil	WD: 288° WS: 1.5 m/s Rain: Nil Stability Category: E ¹	Trees, insects, birds 29-37 Train 45-69 Quarry inaudible	<18	35	n/a	n/a
03-12-25	10:01pm to 10:16pm (Night)	37.4	31.0	26.0	WD: 329° WS: 0.5 m/s Rain: Nil	WD: 286° WS: 1.7 m/s Rain: Nil Stability Category: E ¹	Trees, insects, birds 29-37 Train 45-69 Quarry inaudible	<16	35	<37	45

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

4.2 Location N2

Noise monitoring at location N2 was conducted on Wednesday 3 December 2025 with results presented in **Table 4-2**. Noise from the quarry was inaudible at N2 during the day, evening, and night monitoring periods. The ambient noise environment was dominated by background traffic, wind, trees, fauna, barking dogs and trains. The results satisfy the established noise criteria and indicate that noise emissions from Lynwood Quarry did not contribute to noise nuisance at the time of the monitoring.

Table 4-2: Noise survey results and observations for location N2

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (10m height)	Apparent Noise Source, Description and SPL (dBA)	Lynwood Quarry LAeq (15min) Contribution (dBA)	LAeq (15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1 (1min) Criteria (dBA)
		LA1	LAeq	LA90							
03-12-25	1:03pm to 1:18pm (Day)	52.6	43.7	38.8	WD: 265° WS: 2.9 m/s Rain: Nil	WD: 338° WS: 0.6 m/s Rain: Nil Stability Category: E ¹	Background traffic, wind, barking dog 35-44 Train passing 49-67 Quarry inaudible	<29	35	n/a	n/a
03-12-25	8:20pm to 8:35pm (Evening)	49.0	38.3	31.8	WD: n/a WS: 0 m/s Rain: Nil	WD: 303° WS: 0.8 m/s Rain: Nil Stability Category: E ¹	Background traffic, insects, birds 32-36 Dog 39-52 Quarry inaudible	<22	37	n/a	n/a
03-12-25	11:03pm to 11:18pm (Night)	51.8	40.4	33.9	WD: n/a WS: 0 m/s Rain: Nil	WD: 271° WS: 1.4 m/s Rain: Nil Stability Category: E ¹	Background traffic, insects, birds 34-38 Plover 43-47 Train 47-61 Quarry inaudible	<24	36	n/a ²	46

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

² Measured LA1 value of 51.8 dBA was dominated by traffic, fauna and a train, so unable to estimate contribution for quarry at the assessment location.

4.3 Location N3

Noise monitoring at location N3 was conducted on Wednesday 3 December 2025 with results presented in **Table 4-3**. Noise from the quarry was inaudible at N3 during the day and evening monitoring period. The quarry was audible during the night monitoring period with Holcim truck and machine movements. The ambient noise environment was dominated by background traffic, wind, trees and fauna. The results satisfy the established noise criteria and indicate that noise emissions from Lynwood Quarry did not contribute to noise nuisance at the time of the monitoring.

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

Date	Time	Descriptor (dBA)			Meteorology (handheld at microphone height)	Onsite Met Station (10m height)	Apparent Noise Source, Description and SPL (dBA)	Lynwood Quarry LAeq (15min) Contribution (dBA)	LAeq (15min) Criteria (dBA)	Lynwood Quarry LA1 (1min) Contribution (dBA)	LA1 (1min) Criteria (dBA)
		LA1	LAeq	LA90							
03-12-25	12:19pm to 12:34pm (Day)	47.7	40.7	35.4	WD: 270° WS: 1.4 m/s Rain: Nil	WD: 284° WS: 0.9 m/s Rain: Nil Stability Category: E ¹	Background traffic, wind, trees, insects 41-48 Quarry inaudible	<25	35	n/a	n/a
03-12-25	7:45pm to 8:00pm (Evening)	51.6	39.4	31.0	WD: n/a WS: 0 m/s Rain: Nil	WD: 303° WS: 1.3 m/s Rain: Nil Stability Category: E ¹	Birds, wind 40-69 Quarry inaudible	<21	35	n/a	n/a
03-12-25	11:40pm to 11:55pm (Night)	39.5	34.3	30.9	WD: 229° WS: 1.3 m/s Rain: Nil	WD: 239° WS: 0.9 m/s Rain: Nil Stability Category: E ¹	Holcim truck/machine movements, trees, insects 33-35 Bird 40-69 Quarry audible	<35	36	<31	47

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

4.4 Location N4

Noise monitoring at location N4 was conducted on Wednesday 3 December 2025 with results presented in **Table 4-4**. Noise from the quarry was inaudible at N4 during the day, evening and night monitoring period. The ambient noise environment was dominated by highway traffic, wind, fauna and a barking dog. The results satisfy the established noise criteria and indicate that noise emissions from Lynwood Quarry did not contribute to noise nuisance at the time of the monitoring.

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

Date	Time	Descriptor (dBA)			Meteorology (Handheld at microphone height)	Onsite Met Station (10m height)	Apparent Noise Source, Description and SPL (dBA)	Lynwood Quarry LAeq (15min) Contribution (dBA)	LAeq (15min) Criteria (dBA)	Lynwood Quarry LA1(1min) Contribution (dBA)	LA1 (1min) Criteria (dBA)
		LA1	LAeq	LA90							
03-12-25	1:32pm to 1:47pm (Day)	49.9	39.5	32.8	WD: 265° WS: 2.3 m/s Rain: Nil	WD: 275° WS: 0.7 m/s Rain: Nil Stability Category: E ¹	Bird, wind, highway traffic, 34-58 Quarry inaudible	<23	37	n/a	n/a
03-12-25	8:44pm to 8:59pm (Evening)	37.5	33.7	31.1	WD: n/a WS: 0 m/s Rain: Nil	WD: 305° WS: 1.0 m/s Rain: Nil Stability Category: E ¹	Truck movements insects, birds 32-33 Quarry inaudible	<21	37	n/a	n/a
03-12-25	10:39pm to 10:54pm (Night)	39.4	35.3	33.0	WD: n/a WS: 0 m/s Rain: Nil	WD: 291° WS: 2.0 m/s Rain: Nil Stability Category: E ¹	Truck movement, insects 33-36 Dog barking 37-39 Quarry inaudible	<23	36	n/a ²	47

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

² Measured LA1 value of 39.4 dBA was dominated by traffic and fauna, so unable to estimate contribution for quarry at the assessment location.

5. Conclusion

This NMA was completed by Ramboll at the Holcim Lynwood Quarry, Marulan, NSW as a quarterly requirement of the NMP. Monitoring was carried out on Wednesday 3 December 2025 at four locations selected as representative to the sensitive receptors at the surroundings to Lynwood Quarry.

Audible noise identified as emitted from the quarry was recorded during the night period at location N3. The results presented in this NMA show compliance with the relevant noise criteria at the Holcim Lynwood Quarry.

6. References

- Holcim. (2019). *Lynwood Noise Management Plan*.
- IEC. (2017). *International Electrotechnical Commission. IEC 60942:2017 Electroacoustics – Sound calibrators*.
- Minister for Planning. (2017). *Development Consent DA 128-5-2005*.
- 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*.
- NSW EPA. (2021). *Environment Protection Licence number 12939*.
- 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. Australian/New Zealand Standard*.

APPENDIX B – Environmental Monitoring Results

Date	EC	pH	Suspended Solids	Total Oil and Grease	Total Phosphorous	Total Nitrogen	Flow Observations
	µs/cm		mg/L	mg/L	mg/L	mg/L	
ANZECC Criteria	N/A	6.5 to 7.5	50	10	N/A	N/A	N/A
SW5							
1/07/2004	740	6.9	NS	NS	0.01	3	NS
3/08/2004	793	6.8	NS	NS	0.01	3.4	NS
3/09/2004	NS	NS	NS	NS			NS
8/10/2004	281	6.2	NS	NS	0.02	1.4	NS
2/11/2004	270	6.9	NS	NS	0.02	1.4	NS
30/11/2004	NS	NS	NS	NS	0.01	1.3	NS
6/01/2005	272	7	NS	NS	0.02	2	NS
2/02/2005	266	6.3	NS	NS	0.08	2	NS
2/03/2005	235	6.7	NS	NS	0.02	1.2	NS
8/04/2005	363	6.5	NS	NS	0.01	0.87	NS
5/05/2005	395	6.7	NS	NS	0.02	0.88	NS
2/06/2005	405	6.8	NS	NS	0.02	1.1	NS
6/07/2005	333	6.7	NS	NS	0.01	1	NS
3/08/2005	498	6.6	NS	NS	0.01	0.81	NS
8/09/2005	547	6.8	NS	NS	0.01	0.81	NS
13/10/2005	301	6.7	NS	NS	0.01	1	NS
2/11/2005	379	6.6	NS	NS	0.01	0.99	NS
1/12/2005	279	6.4	NS	NS	0.01	1.1	NS
5/01/2006	919	6.4	NS	NS	0.02	1.6	NS
2/02/2006	574	6.7	NS	NS	0.04	1.6	NS
2/03/2006	708	7	NS	NS	0.07	2	NS
7/04/2006	828	7.3	NS	NS	0.01	1.6	NS
3/05/2006	910	7.1	NS	NS	0.01	2.1	NS
8/06/2006	287	6	NS	NS	0.03	1.8	NS
6/07/2006	399	6.4	NS	NS	0.01	0.75	NS
3/08/2006	566	6.6	NS	NS	0.01	0.95	NS
7/09/2006	635	6.8	NS	NS	0.01	1.3	NS
5/10/2006	732	6.5	NS	NS	0.01	1.3	NS
2/11/2006	946	6.8	NS	NS	0.03	2	NS
4/12/2006	1362	6.8	NS	NS	0.05	2.6	NS
11/01/2007	310	6.4	NS	NS	0.02	2.2	NS
9/02/2007	416	6.8	NS	NS	0.02	2.8	NS
2/03/2007	468	6.3	NS	NS	0.01	1.6	NS
13/04/2007	469	6.3	NS	NS	0.02	1.4	NS
2/05/2007	491	6.6	NS	NS	0.01	1.4	NS
6/06/2007	506	6.6	NS	NS	0.02	1.9	NS
9/07/2007	326	7.3	NS	NS	0.01	1.4	NS
15/08/2007	748	6.5	NS	NS	0.02	0.88	NS
6/09/2007	845	6.9	NS	NS	0.01	0.88	NS
12/10/2007	1049	6.6	NS	NS	0.02	1.1	NS
8/11/2007	272	6.2	NS	NS	0.03	1.3	NS
6/12/2007	530	6.2	NS	NS	0.03	1.1	NS
10/01/2008	398	6.4	NS	NS	0.02	1.4	NS
7/02/2008	386	6.3	NS	NS	0.01	1.2	NS
6/03/2008	445	6.6	NS	NS	0.03	1.3	NS
11/04/2008	414	6.5	NS	NS	0.01	1.3	NS
8/05/2008	441	6.7	NS	NS	0.12	1.1	NS
4/06/2008	442	6.7	NS	NS	0.01	1.2	NS
3/07/2008	454	7.3	NS	NS	0.03	1.2	NS
20/02/2009	404	6.5	NS	NS	0.01	1.8	NS
30/07/2009	319	6.5	NS	NS	0.02	0.99	NS
8/01/2010	378	5.8	NS	NS	0.02	2.3	NS
1/07/2010	333	6.2	NA	NA	0.05	0.96	
19/07/2010	333	6.2	NS	NS	0.01	0.96	NS
1/12/2010	464	6.3	9	1	0.07	1.6	Moderate
15/12/2010	464	6.3	NS	NS	0	1.6	Moderate
1/01/2011	778	6.2	4	1	0.05	1.2	Moderate
12/01/2011	778	6.2	NS	NS	0	1.2	Moderate
1/02/2011	618	6.1	14	1	0.13	1.4	Low
10/02/2011	618	6.1	NS	NS	0	1.4	Low
1/03/2011	569	6.2	7	1	0.05	1.2	Low
10/03/2011	569	6.2	NS	NS	0	1.2	Low
1/04/2011	944	6	5	1	0.03	0.8	Low
6/04/2011	944	6	NS	NS	0	0.8	NS
1/05/2011	1000	6.7	10	1	0.03	0.74	Low
1/06/2011	932	6.8	13	1	0.03	0.73	Low
13/07/2011	865	6.6	7	1	0.03	0.75	Low
12/08/2011	820	6.6	17	1	0.04	0.79	Moderate

Date	EC	pH	Suspended Solids	Total Oil and Grease	Total Phosphorous	Total Nitrogen	Flow Observations
	µs/cm		mg/L	mg/L	mg/L	mg/L	
ANZECC Criteria	N/A	6.5 to 7.5	50	10	N/A	N/A	N/A
8/09/2011	603	6.6	40	1	0.07	1.1	Moderate
6/10/2011	674	6.2	33	1	0.07	1.1	Low
7/11/2011	725	6.7	9	1	0.05	0.98	Low
9/12/2011	736	7.2	29	1	0.06	1	Moderate
10/01/2012	766	6.6	25	1	0.07	1.1	Moderate
13/02/2012	448	6.8	810	1	0.24	2.7	Moderate
16/03/2012	208	7.5	140	1	0.1	1.3	Flood
16/04/2012	146	6	530	1	0.13	1.5	Moderate
14/05/2012	335	7.1	97	1	0.08	1.2	Moderate
13/06/2012	380	6.2	34	1	0.06	1.3	Moderate
12/07/2012	1137	6.5	52	1	0.04	1.1	Moderate
24/08/2012	760	6.8	22	1	0.04	1	Low
18/09/2012	795	6.3	18	1	0.04	1.1	Low
30/10/2012	141.5	6.6	36	5	0.05	0.9	Very Low
27/11/2012	1461	6.1	10	5	0.05	5.6	Very Low
17/12/2012	968	5.3	15	5	0.05	2.6	No Flow
29/01/2013	202.8	5.6	140	5	0.07	2.5	Fast Flow
28/02/2013	202.3	6.4	76	5	0.09	2	Med to Fast
21/03/2013	480	6.1	17	5	0.09	2.1	No Flow
18/04/2013	402.1	6.7	17	5	0.09	2.5	No Flow
22/05/2013	518	7.3	7	5	0.07	2.5	No Flow
19/06/2013	1137	6.5	52	1	0.04	1.1	Moderate
19/07/2013	447	7.34	100	5	0.05	1.4	NS
19/08/2013	504	7.43	15	5	0.05	0.4	NS
24/09/2013	442	6.62	25	5	0.05	1.2	NS
26/11/2013	283	6.59	71	5	0.08	2.7	NS
21/01/2014	235	6	28	1	0.12	2.2	NS
18/02/2014	265	6	48	1	0.11	1.7	NS
20/03/2014	361	6	56	1	0.11	1.4	NS
29/04/2014	600	6	20	1	0.08	1.8	NS
21/05/2014	622	6	23	1	0.1	1.6	NS
16/06/2014	875	6	43	1	0.04	0.86	NS
18/07/2014	75	7	11	1	0.04	0.83	NS
22/08/2014	355	6	39	1	0.07	1.4	NS
19/09/2014	356	6.7	25	1	0.06	1.4	NS
24/10/2014	199	6	21	1	0.08	1.4	NS
20/11/2014	330	6.4	39	1	0.11	1.9	NS
17/12/2014	273	6.2	62	1	0.09	1.7	NS
20/01/2015	340	6.4	14	1	0.08	1.8	NS
20/02/2015	308	6.7	29	1	0.1	1.4	NS
20/03/2015	383	6.9	7	1	0.09	1.3	NS
20/04/2015	319	6.3	130	1	0.1	2.1	NS
18/05/2015	533	6.9	13	1	0.05	1.1	NS
21/07/2015	326	6	11	1	0.04	1.29	NS
27/08/2015	172	6.2	44	1	0.08	2.02	NS
16/09/2015	224	5.9	34	1	0.1	1.15	NS
19/10/2015	261	6.5	15	1	0.08	1.46	NS
20/11/2015	986	6.4	4	1	0.02	0.75	NS
17/12/2015	NS	NS	NS	NS	NS	NS	NS
20/01/2016	1360	6.2	7	1	0.06	1.17	NS
23/02/2016	556	7.1	12	1	0.08	1.65	NS
20/04/2016	NS	NS	NS	NS	NS	NS	NS
24/05/2016	NS	NS	NS	NS	NS	NS	NS
23/06/2016	354	6.4	18	1	0.04	1.98	NS
21/07/2016	501	6.8	23	1	0.07	2.78	Flood
22/08/2016	603	7.1	6	1	0.03	1.14	Low
27/09/2016	477	7.4	8	1	0.09	2.27	Moderate
24/10/2016	905	7	7	1	0.02	1	Low
21/11/2016	NS	NS	NS	NS	NS	NS	ponding no flow no sample
15/12/2016	NS	NS	NS	NS	NS	NS	pooling no flow
20/03/2017	908	7.5	23	1	0.05	2.59	Moderate
20/04/2017	1200	7.7	4	1	0.02	1.22	Low
25/05/2017	1040	7.62	20	1	0.03	1.34	Low
19/06/2017	1080	7.6	13	1	0.03	2.66	Low
25/07/2017	1280	7.89	4	1	0.02	0.74	Low
24/08/2017	1240	7.69	5	1	0.02	1.18	Low
22/09/2017	1340	7.66	6	1	0.02	0.92	No flow. Pooling
19/01/2018	ND	ND	ND	ND	ND	ND	No flow
14/02/2018	ND	ND	ND	ND	ND	ND	No flow
15/03/2018	707	7.54	5	1	0.05	1.33	Low

Date	EC	pH	Suspended Solids	Total Oil and Grease	Total Phosphorous	Total Nitrogen	Flow Observations
	µs/cm		mg/L	mg/L	mg/L	mg/L	
ANZECC Criteria	N/A	6.5 to 7.5	50	10	N/A	N/A	N/A
20/04/2018	818	6.98	95	1	0.51	4.34	Low
18/05/2018	871	7.63	3	1	0.03	1.4	Low
14/06/2018	846	7.66	3	1	0.03	1.36	Low
16/07/2018	NS	NS	NS	NS	NS	NS	Low
13/08/2018	1110	7.73	13	1	0.07	1.74	Low
17/09/2018	ND	ND	ND	ND	ND	ND	Dry
23/10/2018	ND	ND	ND	ND	ND	ND	Dry
15/11/2018	ND	ND	ND	ND	ND	ND	Dry
17/12/2018	892	7.05	13	NS	0.03	3.18	Low
21/01/2019	NS	NS	NS	NS	NS	NS	NF
20/02/2019	NS	NS	NS	NS	NS	NS	NF
18/03/2019	NS	NS	NS	NS	NS	NS	NF
29/04/2019	NS	NS	NS	NS	NS	NS	NF
30/05/2019	NS	NS	NS	NS	NS	NS	NF
14/06/2019	536	7	9	1	0.04	0.86	F
11/07/2019	1000	7.44	5	1	0.02	0.71	F
20/08/2019	NS	NS	NS	NS	NS	NS	NF
18/09/2019	684	6.81	17	1	0.63	1.32	F
15/10/2019	902	7.48	5	1	0.04	NF	
13/11/2019	ND	ND	ND	ND	ND	ND	NF
12/12/2019	ND	ND	ND	ND	ND	ND	NF
3/04/2020	*597	*7.12	*5	*10	*0.05	*1.6	NT
20/05/2020	512	7.12	4	5	0.13	3.4	F
11/06/2020	748	7.64	34	7	0.15	3.6	F
30/07/2020	554	7.01	11	5	0.02	0.86	F
25/08/2020	489.3	7.58	5.8	5	0.02	1.11	F
3/09/2020	557	7.49	45	5	0.02	1.1	F
30/10/2020	561	7.26	13	5	0.06	1.1	F
19/11/2020	542	6.82	17	5	0.05	1	F
14/12/2020	645	7.41	12	5	0.03	0.2	F
20/01/2021	901	7.06	8.8	5	0.07	1.5	F
23/02/2021	1020	7.5	6.6	5	0.03	0.5	F
10/03/2021	1050	7.6	9.2	5	0.03	0.96	F
9/04/2021	771	7.4	7.9	5	0.5	0.2	F
7/05/2021	111	7.4	27	5	0.03	0.5	F
2/06/2021	912	7.3	3.4	5	0.01	0.8	NF
1/07/2021	896	7.6	4.4	5	0.02	0.84	NF
2/08/2021	1410	7.3	12	5	0.02	0.2	F
1/09/2021	379	7.5	11	5	0.03	2.37	NF
6/10/2021	475	8	2.7	13	0.01	0.2	F
3/11/2021	609	7.9	13	5	0.03	0.9	F
9/12/2021	506	7	10	5	0.02	2.2	NF
6/01/2022	758	7.2	14	12	0.03	2.9	NF
1/02/2022	326	7.1	7	5	0.11	0.3	NF
9/03/2022	NA	7	10	5	0.04	1	F
5/04/2022	441	7.3	6	6.4	0.03	3.7	NF
3/05/2022	418	7.7	11	5	0.03	0.88	NF
2/06/2022	384	8	8	5	0.02	0.85	F
6/07/2022	181	8.2	8	5	0.17	1	F
3/08/2022	311	8.6	7	6	0.03	1.18	F
7/09/2022	421	8.4	5	5	0.04	0.2	NF
5/10/2022	390	7.4	5	5	0.02	0.2	NF
9/11/2022	310	8.2	12	25	0.05	49	NF
6/12/2022	434	8.1	8	5	0.05	1.3	F
4/01/2023	707	8.2	8	5.6	0.01	1.9	NF
8/02/2023	326	8.3	18	17	0.02	0.4	NF
1/03/2023	NA	8.3	5	25	0.01	4.2	NF
4/04/2023	441	8.5	5	9.4	0.02	0.2	NF
2/05/2023	418	8	10	17	0.02	0.2	NF
1/06/2023	384	7	5	15	0.01	0.2	NF
4/07/2023	181	9	8	5	0.01	2.1	NF
1/08/2023	311	8.2	6	5	0.01	1.1	NF
9/06/2023	421	7	5	9.4	0.01	0.4	NF
10/05/2023	390	8.2	26	15	0.03	0.9	NF
8/11/2023	310	8.2	9	7.9	0.01	0.2	NF
8/12/2023	434	7.3	10	5	0.02	0.7	NF
3/01/2024	1010	7.5	5.1	23	0.01	0.4	NF
19/02/2024	299	8	8.6	5	0.04	1.9	NF
6/03/2024	589	9	5	5	0.01	1.3	NF
3/04/2024	872	7.6	5	28	0.02	1.4	NF

Date	EC	pH	Suspended Solids	Total Oil and Grease	Total Phosphorous	Total Nitrogen	Flow Observations
	µs/cm		mg/L	mg/L	mg/L	mg/L	
ANZECC Criteria	N/A	6.5 to 7.5	50	10	N/A	N/A	N/A
2/05/2024	691	8.1	5	5		0.5	NF
4/06/2024	639	8.3	5	5.8	0.01	0.9	NF
6/07/2024	4870	8.18	14	5	0.04	0.4	NF
6/08/2024	387	7.5	8	13	0.07	1.1	NF
9/04/2024	682	7.4	5	8.1	0.03	1	NF
1/10/2024	723	6.7	11	5	0.03	0.5	NF
5/11/2024	839	6.9	7.6	11	0.01	0.9	NF
3/12/2024	940	8.5	11	5	0.05	0.4	NF
7/01/2025	876	9	31	5.5	0.01	0.9	NF
5/02/2025	1360	9.3	25	8.5	0.02	0.4	NF
5/03/2025	1560	7.1	61	12	0.1	0.3	NF
2/04/2025	1510	8.4	83	5	0.03	0.2	NF
7/05/2025	1080	8	5	5.6	1.5	1.2	NF
5/06/2025	1240	8.2	8	8.8	0.02	0.6	NF
3/07/2025	311	7	6.4	5.3	0.08	1	NF
7/08/2025	534	7.6	17	9	0.04	1.9	NF
2/09/2025	471	7.1	5.7	11	0.04	1.8	F
1/10/2025	620	7.8	5	14	0.02	1.8	F
5/11/2025	837	7.8	7.6	5.9	0.03	1.3	NF
2/12/2025	938	7.2	5	5	0.01	1.6	NF
Average	624.98	7.00	29.32	4.58	0.06	1.60	-
Minimum	75.00	5.30	2.70	1.00	0.00	0.20	-
Maximum	4870.00	9.30	810.00	28.00	1.50	49.00	-
SW6							
1/07/2004	2316	7.1	NS	NS	0.01	0.95	NS
3/08/2004	2268	7.1	NS	NS	0.01	0.41	NS
3/09/2004	3255	9.7	NS	NS	0.01	0.47	NS
8/10/2004	488	6.9	NS	NS	0.01	1.1	More water than previous samples
2/11/2004	277	7	NS	NS	0.01	1.2	NS
30/11/2004	NS	NS	NS	NS	0.01	0.89	NS
6/01/2005	575	7	NS	NS	0.01	1	NS
2/02/2005	248	6.4	NS	NS	0.05	1.9	NS
2/03/2005	588	6.5	NS	NS	0.01	0.88	NS
8/04/2005	682	7.2	NS	NS	0.01	0.79	NS
5/05/2005	887	6.9	NS	NS	0.02	0.59	NS
2/06/2005	1290	7.1	NS	NS	0.01	0.95	NS
6/07/2005	352	6.8	NS	NS	0.01	1	NS
3/08/2005	632	6.9	NS	NS	0.01	0.68	NS
8/09/2005	860	7.5	NS	NS	0.01	0.54	NS
13/10/2005	529	7	NS	NS	0.01	0.73	NS
2/11/2005	821	7.2	NS	NS	0.01	0.66	NS
1/12/2005	323	6.7	NS	NS	0.01	1.1	NS
5/01/2006	1052	6.6	NS	NS	0.02	0.84	NS
2/02/2006	667	7	NS	NS	0.02	1.2	NS
2/03/2006	1176	6.9	NS	NS	0.04	0.97	Brown oil film on surface
7/04/2006	1730	7.3	NS	NS	0.01	0.67	NS
3/05/2006	1910	7	NS	NS	0.01	0.61	NS
8/06/2006	2091	6.9	NS	NS	0.01	0.44	NS
6/07/2006	425	6.2	NS	NS	0.02	0.43	NS
3/08/2006	576	6.7	NS	NS	0.01	0.86	NS
7/09/2006	818	6.9	NS	NS	0.01	0.86	NS
5/10/2006	934	6.9	NS	NS	0.01	0.88	NS
2/11/2006	1055	7.2	NS	NS	0.02	1	NS
4/12/2006	1303	7.2	NS	NS	0.03	1	NS
11/01/2007	412	6.6	NS	NS	0.01	1.4	NS
9/02/2007	890	6.9	NS	NS	0.02	1	NS
2/03/2007	309	6.7	NS	NS	0.01	1.3	NS
13/04/2007	612	6.7	NS	NS	0.02	1	NS
2/05/2007	697	6.9	NS	NS	0.01	0.99	NS
6/06/2007	984	6.7	NS	NS	0.02	0.75	NS
9/07/2007	485	7.3	NS	NS	0.01	1.2	NS
15/08/2007	644	7	NS	NS	0.02	0.77	NS
6/09/2007	1260	6.9	NS	NS	0.01	0.66	NS
12/10/2007	1557	7	NS	NS	0.03	0.75	NS
8/11/2007	414	6.4	NS	NS	0.02	1	NS
6/12/2007	351	6.7	NS	NS	0.02	0.97	NS
10/01/2008	307	6.6	NS	NS	0.02	0.91	NS
7/02/2008	378	6.9	NS	NS	0.01	1	NS
6/03/2008	644	6.5	NS	NS	0.02	0.73	NS
11/04/2008	886	7	NS	NS	0.01	0.72	NS

Date	EC	pH	Suspended Solids	Total Oil and Grease	Total Phosphorous	Total Nitrogen	Flow Observations
	µs/cm		mg/L	mg/L	mg/L	mg/L	
ANZECC Criteria	N/A	6.5 to 7.5	50	10	N/A	N/A	N/A
8/05/2008	1017	6.9	NS	NS	0.03	0.63	NS
4/06/2008	970	7.2	NS	NS	0.01	0.66	NS
3/07/2008	971	7.4	NS	NS	0.02	0.71	NS
20/02/2009	1197	6.9	NS	NS	0.01	0.85	NS
30/07/2009	1174	7.1	NS	NS	0.02	0.57	NS
8/01/2010	1149	6.5	NS	NS	0.01	1	NS
1/07/2010	1000	7	NA	NA	0.01	0.62	NS
19/07/2010	1000	7	NS	NS	0.01	0.62	NS
1/12/2010	459	6.5	11	1	0.06	1.6	NS
15/12/2010	459	6.5	NS	NS	0	1.6	Moderate
1/01/2011	943	6.9	3	1	0.02	0.98	Moderate
1/02/2011	1182	6.7	4	1	0.07	0.97	Low
1/03/2011	1143	6.7	3	1	0.02	0.89	Low
1/04/2011	973	6.7	3	1	0.02	0.82	Low
1/05/2011	929	7.1	3	1	0.02	0.69	Low
1/06/2011	999	7	2	1	0.01	0.6	Low
13/07/2011	952	7	2	1	0.01	0.55	Low
12/08/2011	1053	7	4	1	0.02	0.58	Moderate
8/09/2011	634	7.3	21	1	0.05	0.91	Moderate
6/10/2011	1003	6.4	4	1	0.01	0.58	Low
7/11/2011	1001	7.3	3	1	0.02	0.76	Low
9/12/2011	1102	7.7	6	1	0.02	0.7	Moderate
10/01/2012	1146	7.1	3	1	0.02	0.72	Low
13/02/2012	916	7.1	9	1	0.06	1	Moderate
16/03/2012	435	7.2	27	1	0.07	1.4	Flood
16/04/2012	2110	6.6	320	1	0.11	1.3	Moderate
14/05/2012	574	7	28	1	0.05	1.1	Moderate
13/06/2012	349	6.5	34	1	0.07	1.2	Moderate
12/07/2012	647	6.5	20	1	0.04	0.91	Moderate
24/08/2012	940	6.6	6	1	0.02	0.78	Low
18/09/2012	1215	6.9	6	1	0.02	0.8	Low
30/10/2012	943	6.3	5	5	0.05	0.8	Med - Low
27/11/2012	1631	6.4	5	5	0.05	1.1	Med-Low
17/12/2012	1096	6.9	7	5	0.05	0.6	Low Flow
29/01/2013	259	5.8	51	5	0.07	1.9	Low Flow
28/02/2013	180	6.4	69	5	0.09	1.4	Low to No Flow
21/03/2013	752	6.5	6	5	0.05	1.5	No to Low Flow
18/04/2013	832	5.5	5	5	0.05	1.9	No to Low Flow
22/05/2013	1048	7.1	5	5	0.05	1.2	No to Low Flow
19/06/2013	1129	7.3	5	5	0.05	0.9	Low to Medium
19/07/2013	634	7.13	46	5	0.05	1.2	NS
19/08/2013	849	7.37	5	5	0.05	0.4	NS
24/09/2013	573	6.89	16	5	0.05	1	NS
15/10/2013	766	7.19	5	5	0.05	0.8	NS
26/11/2013	551	6.74	26	5	0.05	1.8	NS
21/01/2014	666	6	4	1	0.04	1.2	NS
18/02/2014	1007	7	4	1	0.02	0.99	NS
20/03/2014	655	6.7	18	1	0.05	1	NS
29/04/2014	702	6.9	9	1	0.04	1.2	NS
21/05/2014	905	6.5	3	1	0.06	0.82	NS
16/06/2014	1029	6.4	4	1	0.01	0.68	NS
18/07/2014	951	6.8	2	1	0.02	0.69	NS
22/08/2014	372	7.3	40	1	0.07	1.4	NS
19/09/2014	244	6.9	10	1	0.03	1	NS
20/11/2014	981	6.6	3	1	0.02	0.92	NS
17/12/2014	404	6.4	80	1	0.08	1.5	NS
20/01/2015	383	6.5	20	1	0.08	1.6	NS
20/02/2015	419	6.8	14	1	0.06	1.1	NS
20/03/2015	816	6.7	3	1	0.03	0.79	NS
20/04/2015	523	6.3	71	1	0.08	1.1	NS
18/05/2015	687	7.2	8	1	0.03	0.92	NS
21/07/2015	332	6.3	16	1	0.06	1.37	Low
27/08/2015	180	6.2	31	1	0.1	1.89	Moderate
16/09/2015	660	6.5	12	1	0.04	1.13	Moderate
19/10/2015	907	6.3	8	1	0.04	0.97	Moderate
20/11/2015	1050	6.7	3	1	0.02	0.78	Low
17/12/2015	1740	6.7	4	1	0.02	0.8	Moderate
20/01/2016	2300	6.6	4	1	0.01	0.61	Low
23/02/2016	678	6.8	6	1	0.04	1.09	Low
20/04/2016	1140	6.9	3	1	0.01	0.82	Low

Date	EC	pH	Suspended Solids	Total Oil and Grease	Total Phosphorous	Total Nitrogen	Flow Observations
	µs/cm		mg/L	mg/L	mg/L	mg/L	
ANZECC Criteria	N/A	6.5 to 7.5	50	10	N/A	N/A	N/A
24/05/2016	935	6.9	2	1	0.01	0.76	Moderate
23/06/2016	361	6.6	16	1	0.05	1.68	Low
21/07/2016	427	6.2	59	1	0.06	2.12	Moderate
22/08/2016	686	6.8	9	1	0.03	0.93	Low
27/09/2016	541	7.2	7	1	0.05	1.95	Moderate
24/10/2016	710	6.8	5	1	0.02	0.83	Low
21/11/2016	710	7	2	1	0.02	0.87	Low
15/12/2016	768	7.1	3	1	0.02	0.9	Low
19/01/2017	859	7.31	3	1	0.02	1.01	Low
17/02/2017	723	7.47	4	1	0.03	1.11	Low
20/03/2017	838	7.27	7	1	0.04	0.98	Low
20/04/2017	1240	7.59	3	1	0.02	0.92	No flow detectable
25/05/2017	1240	7.28	5	1	0.02	0.75	Pooling with no flow
19/06/2017	1120	7.41	2	1	0.02	0.67	Low
25/07/2017	1190	7.67	154	1	0.05	0.9	Low
24/08/2017	1150	7.69	2	1	0.02	0.72	Low
22/09/2017	1270	7.79	3	1	0.02	0.71	Low
25/10/2017	1390	7.8	3	1	0.02	0.76	Low
24/11/2017	821	7.59	4	1	0.03	0.92	No Flow Detectable
19/01/2018	1060	7.38	4	1	0.02	0.94	Low
14/02/2018	1200	7.6	5	1	0.02	0.88	Low
15/03/2018	637	7.35	5	1	0.04	0.94	Low
20/04/2018	1030	7.34	4	1	0.02	0.71	Low
18/05/2018	1060	7.78	2	1	0.01	0.72	Low
14/06/2018	1020	7.86	4	1	0.01	0.7	Low
16/07/2018	1020	8	2	1	0.01	0.68	Low
13/08/2018	987	7.9	2	1	0.02	0.55	Low
17/09/2018	1040	7.83	2	1	0.01	0.7	Low
23/10/2018	1100	6.82	6	1	0.03	0.79	Low
15/11/2018	1230	7.66	7	1	0.03	0.8	Low
17/12/2018	NS	NS	NS	NS	NS	NS	Low
21/01/2019	897	7.6	6	1	0.12	1.47	F
20/02/2019	1450	7.5	36	0.9	0.03	0.96	F
18/03/2019	1810	7.6	7	1	0.03	0.88	F
29/04/2019	1510	6.7	5	<1	0.02	0.82	F
30/05/2019	1120	7.4	5	<1	0.89	0.04	F
14/06/2019	533	7	43	<1	0.1	1.21	F
11/07/2019	688	7.18	9	<1	0.04	0.84	F
20/08/2019	746	7.67	5	<1	0.02	0.66	F
18/09/2019	532	7.01	21	<1	0.16	1.52	F
15/10/2019	707	7.26	2	1	0.03	0.74	F
13/11/2019	954	7.79	4	1	0.02	0.67	F
12/12/2019	163	7.58	11	1	0.02	0.69	F
3/04/2020	*906	*6.88	*7.3	*10	*0.13	*2	NT
20/05/2020	498.5	7.19	5.8	5	0.07	1.2	F
11/06/2020	666.9	7.55	25	5	0.04	1.7	F
30/07/2020	325.9	7.4	17	6.8	0.06	12.14	F
25/08/2020	465.9	7.6	2.3	5.6	0.03	0.9	F
3/09/2020	713	7.54	7.7	5	0.03	0.9	F
30/10/2020	657	7.45	5.3	5	0.03	1.2	F
19/11/2020	561	6.97	19	5	0.05	0.4	F
14/12/2020	698	7.93	9.9	5	0.03	0.7	F
20/01/2021	594	7.1	6.5	5	0.08	0.4	F
23/02/2021	652	7.3	11	5	0.05	0.6	F
10/03/2021	753	7.4	6.6	5	0.03	0.8	F
9/04/2021	746	7.1	14	5	0.5	0.2	F
7/05/2021	169	6.9	18	7.9	0.18	1.02	F
2/06/2021	681	7.6	5.7	5	0.03	6.9	NF
1/07/2021	980	7.1	6.8	7.6	0.03	1.22	NF
2/08/2021	1050	6.8	5.5	8.7	0.02	0.2	F
1/09/2021	368	8.06	5.9	12	0.04	1.4	F
6/10/2021	503	7.2	2.2	6.7	0.01	0.2	NF
3/11/2021	599	8.7	21	5	0.03	1.7	NF
9/12/2021	596	7.1	5.6	5	0.08	2.7	NF
1/09/2021	379	7.5	11	5	0.03	2.37	NF
6/10/2021	475	8	2.7	13	0.01	0.2	F
3/11/2021	609	7.9	13	5	0.03	0.9	F
9/12/2021	506	7	10	5	0.02	2.2	NF
6/01/2022	758	7.2	14	12	0.03	2.9	NF
1/02/2022	326	7.1	7	5	0.11	0.3	NF

Date	EC	pH	Suspended Solids	Total Oil and Grease	Total Phosphorous	Total Nitrogen	Flow Observations
	µs/cm		mg/L	mg/L	mg/L	mg/L	
ANZECC Criteria	N/A	6.5 to 7.5	50	10	N/A	N/A	N/A
9/03/2022	NS	7	10	5	0.04	1.0	F
5/04/2022	441	7.3	6	6.4	0.03	3.7	NF
3/05/2022	418	7.7	11	5	0.03	0.9	NF
2/06/2022	384	8	8	5	0.02	0.9	F
6/07/2022	181	8.2	8	5	0.17	1.0	F
3/08/2022	311	8.6	7	6	0.03	1.2	F
7/09/2022	421	8.4	5	5	0.04	0.2	NF
5/10/2022	390	7.4	5	5	0.02	0.2	NF
9/11/2022	310	8.2	12	25	0.05	49.0	NF
6/12/2022	434	8.1	8	5	0.05	1.3	F
4/01/2023	789	8.15	5	6.5	0.01	1.1	NF
8/02/2023	286	7.6	24	6.8	0.03	2.3	NF
1/03/2023	553	8.1	250	8.8	0.01	0.9	NF
4/04/2023	5131	8.4	6.8	9	0.06	0.2	NF
2/05/2023	555	7.7	20	5.5	0.06	1.1	NF
1/06/2023	512	8.9	14	15	0.02	0.7	NF
4/07/2023	625	8.1	5	5	0.01	0.5	NF
1/08/2023	939	9.1	7.5	5	0.02	1.74	NF
9/06/2023	1598	6.9	5	5	0.01	5	NF
10/05/2023	1040	8.2	18	18	0.02	0.8	NF
8/11/2023	751	7.4	130	5	0.01	0.2	NF
8/12/2023	1000	8.2	6.8	15	0.03	0.6	NF
3/01/2024	676	8	5	5	0.04	2	NF
19/02/2024	269	8.5	51	5	0.1	1.1	NF
6/03/2024	722	8.7	35	5	0.05	1.1	NF
3/04/2024	696	8.5	7.5	17	0.03	0.9	NF
2/05/2024	659	8.4	5	5		0.6	NF
4/06/2024	577	8.2	18	8.6	0.05	0.7	NF
6/07/2024	507	8.5	14	5	0.04	1.2	NF
6/08/2024	387	8.1	31	6.7	0.12	0.9	NF
9/04/2024	795	8.4	6.1	5	0.06	0.7	NF
1/10/2024	711	7.8	6.7	5	0.03	1	NF
5/11/2024	705	8.1	61	10	0.05	0.5	NF
3/12/2024	502	8.8	7	5	0.05	0.2	NF
7/01/2025	1180	9.3	20	7	0.01	0.8	NF
5/02/2025	1170	8.7	7.1	7.3	0.02	0.2	NF
5/03/2025	1008	6.9	16	19	0.03	0.4	NF
2/04/2025	897	7.9	5.4	5	0.03	0.6	NF
7/05/2025	878	8.1	5	6.2	0.04	2.3	NF
4/06/2025	1260	7.9	5.7	8.9	0.03	0.6	NF
3/07/2025	3139	7.4	16	5	0.08	1.7	NF
7/08/2025	521	8.1	5.2	12	0.02	1.7	NF
2/09/2025	485	7.6	5	13	0.04	1.6	NF
1/10/2025	660	7.5	6.7	11	0.1	1.4	F
5/11/2025	945	6.7	5	7.2	0.05	1	NF
2/12/2025	716	7	5	5	0.01	0.9	F
Average	848.73	7.24	16.16	4.05	0.04	1.27	-
Minimum	163.00	5.50	2.00	0.90	0.00	0.04	-
Maximum	5131.00	9.70	320.00	25.00	0.89	49.00	-
SW8							
19/01/2018	NS	NS	NS	NS	NS	NS	Dry
14/02/2018	NS	NS	NS	NS	NS	NS	NF
15/03/2018	NS	NS	NS	NS	NS	NS	Dry
20/04/2018	NS	NS	NS	NS	NS	NS	Dry
18/05/2018	NS	NS	NS	NS	NS	NS	Dry
14/06/2018	NS	NS	NS	NS	NS	NS	Dry
16/07/2018	NS	NS	NS	NS	NS	NS	Dry
13/08/2018	NS	NS	NS	NS	NS	NS	Dry
17/09/2018	NS	NS	NS	NS	NS	NS	Dry
23/10/2018	NS	NS	NS	NS	NS	NS	Dry
15/11/2018	NS	NS	NS	NS	NS	NS	Dry
17/12/2018	NS	NS	NS	NS	NS	NS	Dry
21/01/2019	NS	NS	NS	NS	NS	NS	NF
20/02/2019	NS	NS	NS	NS	NS	NS	NF
18/03/2019	NS	NS	NS	NS	NS	NS	NF
29/04/2019	NS	NS	NS	NS	NS	NS	NF
30/05/2019	NS	NS	NS	NS	NS	NS	NF
14/06/2019	NS	NS	NS	NS	NS	NS	NF
11/07/2019	380	7.84	16	1	0.08	1.89	F
20/08/2019	NS	NS	NS	NS	NS	NS	NF

Date	EC	pH	Suspended Solids	Total Oil and Grease	Total Phosphorous	Total Nitrogen	Flow Observations
	µs/cm		mg/L	mg/L	mg/L	mg/L	
ANZECC Criteria	N/A	6.5 to 7.5	50	10	N/A	N/A	N/A
18/09/2019	NS	NS	NS	NS	NS	NS	NF
15/10/2019	NS	NS	NS	NS	NS	NS	NF
13/11/2019	NS	NS	NS	NS	NS	NS	NF
12/12/2019	NS	NS	NS	NS	NS	NS	NF
3/04/2020	293	7.86	630	14	0.05	2.9	NF
20/05/2020	208.9	7.47	540	5	0.51	3.3	NF
11/06/2020	296.6	8.7	270	5.4	0.55	4.6	NF
30/07/2020	202.5	7.84	330	5	0.38	2.7	NF
25/08/2020	215.4	8.34	830	7.3	0.39	4.6	NF
3/09/2020	308.2	8.11	170	5	0.08	5.6	NF
30/10/2020	384.1	7.7	79	5	0.08	5	NF
19/11/2020	477.1	8.3	22	5	0.05	5.2	NF
14/12/2020	477.6	7.85	32	5	0.03	5.6	NF
2/08/2021	NS	NS	NS	NS	NS	NS	Dry
1/09/2021	NS	NS	NS	NS	NS	NS	Dry
6/10/2021	NS	NS	NS	NS	NS	NS	Dry
3/11/2021	NS	NS	NS	NS	NS	NS	Dry
9/12/2021	NS	NS	NS	NS	NS	NS	Dry
6/01/2022	NS	NS	NS	NS	NS	NS	Dry
1/02/2022	NS	NS	NS	NS	NS	NS	Dry
9/03/2022	NS	NS	NS	NS	NS	NS	Dry
5/04/2022	NS	NS	NS	NS	NS	NS	Dry
3/05/2022	NS	NS	NS	NS	NS	NS	Dry
2/06/2022	NS	NS	NS	NS	NS	NS	Dry
6/07/2022	NS	NS	NS	NS	NS	NS	Dry
3/08/2022	NS	NS	NS	NS	NS	NS	Dry
7/09/2022	NS	NS	NS	NS	NS	NS	Dry
5/10/2022	NS	NS	NS	NS	NS	NS	Dry
9/11/2022	NS	NS	NS	NS	NS	NS	Dry
6/12/2022	NS	NS	NS	NS	NS	NS	Dry
4/01/2023	DRY	DRY	DRY	DRY	DRY	DRY	DRY
8/02/2023	DRY	DRY	DRY	DRY	DRY	DRY	DRY
1/03/2023	DRY	DRY	DRY	DRY	DRY	DRY	DRY
4/04/2023	DRY	DRY	DRY	DRY	DRY	DRY	DRY
2/05/2023	DRY	DRY	DRY	DRY	DRY	DRY	DRY
1/06/2023	DRY	DRY	DRY	DRY	DRY	DRY	DRY
4/07/2023	DRY	DRY	DRY	DRY	DRY	DRY	DRY
1/08/2023	DRY	DRY	DRY	DRY	DRY	DRY	DRY
9/06/2023	DRY	DRY	DRY	DRY	DRY	DRY	DRY
10/05/2023	DRY	DRY	DRY	DRY	DRY	DRY	DRY
8/11/2023	DRY	DRY	DRY	DRY	DRY	DRY	DRY
8/12/2023	DRY	DRY	DRY	DRY	DRY	DRY	DRY
3/01/2024	DRY	DRY	DRY	DRY	DRY	DRY	DRY
19/02/2024	DRY	DRY	DRY	DRY	DRY	DRY	DRY
6/03/2024	DRY	DRY	DRY	DRY	DRY	DRY	DRY
3/04/2024	DRY	DRY	DRY	DRY	DRY	DRY	DRY
2/05/2024	DRY	DRY	DRY	DRY	DRY	DRY	DRY
4/06/2024	DRY	DRY	DRY	DRY	DRY	DRY	DRY
6/07/2024	DRY	DRY	DRY	DRY	DRY	DRY	DRY
6/08/2024	DRY	DRY	DRY	DRY	DRY	DRY	DRY
9/04/2024	DRY	DRY	DRY	DRY	DRY	DRY	DRY
1/10/2024	DRY	DRY	DRY	DRY	DRY	DRY	DRY
5/11/2024	DRY	DRY	DRY	DRY	DRY	DRY	DRY
3/12/2024	DRY	DRY	DRY	DRY	DRY	DRY	DRY
7/01/2025	DRY	DRY	DRY	DRY	DRY	DRY	DRY
5/02/2025	DRY	DRY	DRY	DRY	DRY	DRY	DRY
6/03/2025	DRY	DRY	DRY	DRY	DRY	DRY	DRY
April	-	-	-	-	-	-	-
7/05/2025	DRY	DRY	DRY	DRY	DRY	DRY	DRY
5/06/2025	DRY	DRY	DRY	DRY	DRY	DRY	DRY
18/07/2025	DRY	DRY	DRY	DRY	DRY	DRY	DRY
7/08/2025	DRY	DRY	DRY	DRY	DRY	DRY	DRY
2/09/2025	DRY	DRY	DRY	DRY	DRY	DRY	DRY
1/10/2025	DRY	DRY	DRY	DRY	DRY	DRY	DRY
21/11/2025	DRY	DRY	DRY	DRY	DRY	DRY	DRY
December	-	-	-	-	-	-	-
Average	324.34	8.00	291.90	5.77	0.22	4.14	-
Minimum	202.50	7.47	16.00	1.00	0.03	1.89	-
Maximum	477.60	8.70	830.00	14.00	0.55	5.60	-

Date	EC	pH	Suspended Solids	Total Oil and Grease	Total Phosphorous	Total Nitrogen	Flow Observations
	µs/cm		mg/L	mg/L	mg/L	mg/L	
ANZECC Criteria	N/A	6.5 to 7.5	50	10	N/A	N/A	N/A
19/01/2018	NS	NS	NS	NS	NS	NS	Dry
14/02/2018	NS	NS	NS	NS	NS	NS	NF
15/03/2018	NS	NS	NS	NS	NS	NS	Dry
20/04/2018	NS	NS	NS	NS	NS	NS	Dry
18/05/2018	NS	NS	NS	NS	NS	NS	Dry
14/06/2018	NS	NS	NS	NS	NS	NS	Dry
16/07/2018	NS	NS	NS	NS	NS	NS	Dry
13/08/2018	NS	NS	NS	NS	NS	NS	Dry
17/09/2018	NS	NS	NS	NS	NS	NS	Dry
23/10/2018	NS	NS	NS	NS	NS	NS	Dry
15/11/2018	NS	NS	NS	NS	NS	NS	Dry
17/12/2018	NS	NS	NS	NS	NS	NS	Dry
21/01/2019	NS	NS	NS	NS	NS	NS	NF
20/02/2019	NS	NS	NS	NS	NS	NS	NF
18/03/2019	NS	NS	NS	NS	NS	NS	NF
29/04/2019	NS	NS	NS	NS	NS	NS	NF
30/05/2019	NS	NS	NS	NS	NS	NS	NF
14/06/2019	NS	NS	NS	NS	NS	NS	NF
11/07/2019	NS	NS	NS	NS	NS	NS	NF
20/08/2019	NS	NS	NS	NS	NS	NS	NF
18/09/2019	NS	NS	NS	NS	NS	NS	NF
15/10/2019	NS	NS	NS	NS	NS	NS	NF
13/11/2019	NS	NS	NS	NS	NS	NS	NF
12/12/2019	NS	NS	NS	NS	NS	NS	NF
3/04/2020	2840	6.77	5.3	10	0.05	1.6	NF
20/05/2020	2670	6.87	140	5	0.76	0.7	NF
11/06/2020	4087	7.8	100	5	0.8	0.6	NF
30/07/2020	2367	6.72	87	8.3	0.38	0.9	NF
25/08/2020	2749	7.24	17	5	0.11	0.7	F
3/09/2020	2871	6.63	42	5.2	0.07	0.7	NF
30/10/2020	2678	6.87	62	5	0.12	0.3	NF
19/11/2020	2936	6.82	750	5.6	0.07	4.56	NF
14/12/2020	3526	7.48	8.1	5	0.13	0.4	NF
20/01/2021	3924	6.83	97	5	0.24	0.6	NF
23/02/2021	4580	7.2	180	5	0.78	0.3	NF
10/03/2021	4830	7.2	93	5	0.54	0.2	NF
9/04/2021	3720	7	33	5	0.5	0.2	NF
7/05/2021	119	7	150	7.3	0.2	1.8	F
2/06/2021	2770	6.8	130	5	0.35	2.79	NF
1/07/2021	3260	7.01	75	6.1	0.33	2.7	F
2/08/2021	3130	6.8	39	5	0.16	0.4	NF
1/09/2021	1940	6.7	44	12	0.1	0.2	NF
6/10/2021	1940	7.1	19	8.4	0.07	0.2	NF
3/11/2021	2310	7	21	5	0.07	6.7	NF
9/12/2021	481	7.1	540	13	0.28	3.7	NF
6/01/2022	759	7	96	13	0.55	5.2	NF
1/02/2022	300	7	1800	5	0.01	1.4	NF
9/03/2022		7	120	13	0.01	1.9	F
5/04/2022	685	7	15	12	0.01	0.9	F
3/05/2022	459	7	50	11	0.17	0.4	NF
2/06/2022	398	8	14	26	0.08	1.0	F
6/07/2022	142	8	35	5	0.52	2.0	F
3/08/2022	308	7	14	6.8	0.08	1.6	F
7/09/2022	434	8	9	5	0.12	0.2	NF
5/10/2022	476	7	76	5	0.21	1.7	NF
9/11/2022	378	7	38	18	0.19	0.8	NF
6/12/2022	592	7	18	5	0.05	0.4	NF
4/01/2023	344	7.3	98	13	0.07	2.49	NF
8/02/2023	512	7.34	19	5	0.01	1.6	NF
1/03/2023	957	7.9	24	5	0.01	1.4	NF
4/04/2023	6040	8.8	19	16	0.01	0.2	NF
2/05/2023	288	7.5	60	7.9	0.1	0.9	NV
1/06/2023	565	8.9	11	5	0.17	1	NF
4/07/2023	522	8.9	18	5	0.01	0.9	NF
1/08/2023	982	8.1	31	5	0.04	1.2	NF
9/06/2023	922	7.4	21	5.9	0.01	1.1	NF
10/05/2023	372	8.6	210	5	0.38	0.7	NF
8/11/2023	DRY	DRY	DRY	DRY	0.1	0.5	DRY
8/12/2023	DRY	DRY	DRY	DRY	0.09	0.1	DRY
3/01/2024	353	6.6	5	20	0.01	15	NF

Date	EC	pH	Suspended Solids	Total Oil and Grease	Total Phosphorous	Total Nitrogen	Flow Observations
	µs/cm		mg/L	mg/L	mg/L	mg/L	
ANZECC Criteria	N/A	6.5 to 7.5	50	10	N/A	N/A	N/A
19/02/2024	256	7.8	300	5	0.2	0.2	NF
6/03/2024	1140	8.5	1100	5	0.02	3	NF
3/04/2024	1660	7.8	320	11	0.05	0.8	NF
2/05/2024	690	8.2	150	6.3		1.3	NF
4/06/2024	506	7.4	400	6.4	1.1	1.9	NF
6/07/2024	2720	8.55	35	5	0.01	1	NF
6/08/2024	1260	8.2	190	15	0.65	1.5	NF
9/04/2024	580	7.5	120	10	0.56	1.7	NF
1/10/2024	583	6.5	110	5	0.16	1.4	NF
5/11/2024	620	7.8	1900	11	0.67	8.5	NF
3/12/2024	386	7.69	100	5	0.31	1.3	NF
7/01/2025	DRY	DRY	DRY	DRY	DRY	DRY	NF
5/02/2025	DRY	DRY	DRY	DRY	DRY	DRY	NF
6/03/2025	DRY	DRY	DRY	DRY	DRY	DRY	NF
2/04/2025	DRY	DRY	DRY	DRY	DRY	DRY	NF
7/05/2025	156	6.6	120	5	0.28	6.9	NF
5/06/2025	260	7	100	5	0.11	1.9	NF
3/07/2025	302	7.1	23	18	0.12	0.2	NF
7/08/2025	540	7.2	65	7.6	0.08	2	NF
2/09/2025	DRY	DRY	DRY	DRY	DRY	DRY	NF
1/10/2025	DRY	DRY	DRY	DRY	DRY	DRY	NF
5/11/2025	DRY	DRY	DRY	DRY	DRY	DRY	NF
2/12/2025	DRY	DRY	DRY	DRY	DRY	DRY	NF
Average	1520.3	7.4	177.4	8.0	0.2	1.8	-
Minimum	119.0	6.5	5.0	5.0	0.0	0.1	-
Maximum	6040.0	8.9	1900.0	26.0	1.1	15.0	-
SW11							
20/04/2017	3130	7.72	8	1	0.04	0.68	No Flow Pooling
25/05/2017	2750	7.64	3	1	0.02	0.5	Low
24/08/2017	3260	7.78	6	1	0.04	0.45	Minimal inflow, no outflow
19/01/2018	NS	NS	NS	NS	NS	NS	Dry
14/02/2018	NS	NS	NS	NS	NS	NS	NF
15/03/2018	NS	NS	NS	NS	NS	NS	Dry
20/04/2018	NS	NS	NS	NS	NS	NS	Dry
18/05/2018	NS	NS	NS	NS	NS	NS	Dry
14/06/2018	NS	NS	NS	NS	NS	NS	Dry
16/07/2018	NS	NS	NS	NS	NS	NS	Dry
13/08/2018	NS	NS	NS	NS	NS	NS	Dry
17/09/2018	NS	NS	NS	NS	NS	NS	Dry
23/10/2018	NS	NS	NS	NS	NS	NS	Dry
15/11/2018	NS	NS	NS	NS	NS	NS	Dry
17/12/2018	NS	NS	NS	NS	NS	NS	Dry
21/01/2019	NS	NS	NS	NS	NS	NS	NF
20/02/2019	NS	NS	NS	NS	NS	NS	NF
18/03/2019	NS	NS	NS	NS	NS	NS	NF
29/04/2019	NS	NS	NS	NS	NS	NS	NF
30/05/2019	NS	NS	NS	NS	NS	NS	NF
14/06/2019	NS	NS	NS	NS	NS	NS	NF
11/07/2019	NS	NS	NS	NS	NS	NS	NF
20/08/2019	NS	NS	NS	NS	NS	NS	NF
18/09/2019	NS	NS	NS	NS	NS	NS	NF
15/10/2019	NS	NS	NS	NS	NS	NS	NF
13/11/2019	NS	NS	NS	NS	NS	NS	NF
12/12/2019	NS	NS	NS	NS	NS	NS	NF
28/02/2020	1720	7.21	82	1	0.21	2.7	F
3/04/2020	2530	7.04	160	10	0.24	0.7	NF
20/05/2020	2206	6.62	900	5	2.5	2.4	NF
11/06/2020	3553	7.12	170	5	0.15	0.7	F
30/07/2020	1873	7.58	4.5	6.8	0.03	1.2	F
25/08/2020	1090	7.53	1.2	5	0.02	0.7	F
3/09/2020	2101	7.4	39	5	0.04	0.7	F
30/10/2020	2292	7.48	6.9	5	0.02	1.3	F
19/11/2020	1673	6.94	160	5	0.05	0.5	NF
14/12/2020	1914	7.32	1900	8.4	14	70	NF
20/01/2021	NS	NS	NS	NS	NS	NS	NF
23/02/2021	3390	7.4	37	5	0.06	1.8	F
10/03/2021	6510	7	190	5	0.37	0.2	NF
9/04/2021	1880	7.5	41	5	0.5	0.2	F
7/05/2021	369	7.5	15	8.7	0.32	0.49	F
2/06/2021	2270	7.6	4.6	5	0.02	0.5	NF

Date	EC	pH	Suspended Solids	Total Oil and Grease	Total Phosphorous	Total Nitrogen	Flow Observations
	µs/cm		mg/L	mg/L	mg/L	mg/L	
ANZECC Criteria	N/A	6.5 to 7.5	50	10	N/A	N/A	N/A
1/07/2021	3930	7.7	2.8	5	0.02	0.6	NF
2/08/2021	4110	7.1	6.2	5	0.01	0.2	F
1/09/2021	1180	7.5	74	10	0.04	1.5	F
6/10/2021	2160	7.8	1.2	7.3	0.01	0.2	NF
3/11/2021	2530	7.5	21	5	0.16	0.9	NF
9/12/2021	1560	7.5	7.8	6.7	0.14	4.8	NF
6/01/2022	2150	7.3	30.0	5.0	0.07	3.2	NF
1/02/2022	806	7.1	5.0	5.0	0.34	2.2	NF
9/03/2022	NA	7.2	7.8	10.0	0.29	2.1	F
5/04/2022	1260	7.5	5.0	23.0	0.02	1.6	NF
3/05/2022	1240	7.6	5.0	5.0	0.02	0.9	NF
2/06/2022	1270	7.6	5.0	5.0	0.02	0.6	NF
6/07/2022	325	7.6	9.4	5.0	0.07	1.2	F
3/08/2022	951	7.9	5.0	15.0	0.03	1.1	NF
7/09/2022	991	8.3	5.0	5.0	0.03	0.2	NF
5/10/2022	1290	7.1	5.0	12.0	0.22	2.9	NF
9/11/2022	726	7.5	5.3	11.0	0.04	0.2	NF
6/12/2022	1160	7.5	5.0	9.2	0.02	0.6	NF
4/01/2023	344	7.3	98	13	0.02	1.2	NV
8/02/2023	512	7.34	19	5	0.01	2.3	V
1/03/2023	957	7.9	24	5	0.01	1	NV
4/04/2023	6040	8.8	19	16	0.01	0.2	NV
2/05/2023	288	7.5	60	7.9	0.02	0.9	NF
1/06/2023	565	8.9	11	5	0.35	0.7	NV
4/07/2023	522	8.9	18	5	0.11	0.8	NV
1/08/2023	982	8.1	31	5	0.01	2.1	NV
9/06/2023	922	7.4	21	5.9	0.01	1.4	NV
10/05/2023	372	8.6	210	5	0.03	0.2	NV
8/11/2023	DRY	DRY	DRY	DRY	0.01	0.6	DRY
8/12/2023	DRY	DRY	DRY	DRY	0.04	0.5	DRY
3/01/2024	1660	7.9	5	5	0.03	1.8	NF
19/02/2024	1340	7.8	34	6.1	0.11	1.4	NF
6/03/2024	1870	7.8	23	0.02	0.06	1.5	NF
3/04/2024	2110	7.9	15	15	0.12	2	NF
2/05/2024	1440	8.1	5.3	5		0.3	NF
4/06/2024	1290	7.8	5	8.8	0.05	0.8	NF
6/07/2024	1020	8.2	5	5	0.05	0.8	NF
6/08/2024	1520	8	32	11	0.18	0.9	NF
9/04/2024	1850	7.3	14	7.4	0.05	0.3	NF
1/10/2024	1930	7.7	16	5	0.01	0.5	NF
5/11/2024	1960	7.7	64	8.4	0.1	0.6	NF
3/12/2024	2360	8.2	5	5	0.02	1	NF
7/01/2025	1140	9.3	350	5	0.04	3	NF
5/02/2025	2730	7.6	97	8	0.07	0.3	NF
5/03/2025	2370	6.9	6.8	7.4	0.03	0.8	NF
2/04/2025	2250	8	5	13	0.02	0.9	NF
7/05/2025	1530	8	5	6.1	0.02	0.9	F
4/06/2025	2250	8.3	12	5.2	0.02	1	NF
3/07/2025	4439	7.3	15	5	0.24	1.7	NF
7/08/2025	899	7.6	5	9.8	0.07	1.8	NF
2/09/2025	976	7.6	7.6	5	0.04	1.2	NF
1/10/2025	1400	7.6	5	8.2	0.04	1.2	NF
5/11/2025	201	7.2	5	5	0.01	0.7	NF
2/12/2025	1750	6.5	5	8.5	0.01	0.8	NF
Average	1825.20	7.64	74.09	6.83	0.31	2.07	-
Minimum	201.00	6.50	1.20	0.02	0.01	0.20	-
Maximum	6510.00	9.30	1900.00	23.00	14.00	70.00	-

Location	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Depth to Water Level					
MP1	m	1.16	1.32	1.13	1.03
MP2		14.59	14.72	14.56	14.13
MP4		17.30	17.62	17.68	17.51
MP5		18.99	19.81	11.80	17.56
MP7		13.64	16.85	15.48	16.47
MP10		4.22	4.76	3.69	4.63
MP11		10.52	10.72	10.09	9.98
GPZ1		10.79	10.88	10.96	11.86
GPZ5		9.28	9.28	9.42	9.46
GPZ6		5.98	5.99	5.34	5.56
GPZ8		6.11	6.00	6.00	5.97
pH					
MP1	pH Units	7.1	7.4	6.5	6.5
MP2		8.2	7.7	6.9	6.5
MP4		6.6	6.8	6.1	6.1
MP5		7.0	7.3	6.7	6.6
MP7		7.1	7.0	6.9	6.5
MP10		6.6	7.0	7.0	7.0
MP11		7.5	7.9	7.4	7.5
GPZ1		7.8	8.2	7.9	7.7
GPZ5		7.7	7.1	7.9	7.8
GPZ6		7.6	7.8	7.2	7.2
GPZ8		7.1	7.6	7.2	7.2
EC					
MP1	$\mu\text{S/cm}$	1050	1550	1140	1160
MP2		301	603	362	339
MP4		303	499	273	324
MP5		635	990	602	699
MP7		5070	5480	5260	5070
MP10		6750	5870	7040	6810
MP11		725	1150	744	763
GPZ1		843	1260	948	913
GPZ5		3460	3330	3610	3500
GPZ6		485	826	537	604
GPZ8		2280	2760	2420	2320
Sulphate					

Location	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4
MP1	mg/L	2.0	32.0	24	29
MP2		27.0	5.1	2	7
MP4		2.0	2.0	2.0	2.0
MP5		2.0	2.0	2.0	2.0
MP7		24.0	34.0	27	37
MP10		21.0	24.0	28	40
MP11		2.0	2.0	2.0	2.0
GPZ1		10.0	24.0	9.6	10
GPZ5		2.0	4.1	3	20
GPZ6		20.0	20.0	19	17
GPZ8		2.0	4.2	8	10
Kjeldahl Nitrogen					
MP1	mg/L	-	-	-	0.60
MP2		-	-	-	0.90
MP4		-	-	-	1.90
MP5		-	-	-	1.20
MP7		-	-	-	0.20
MP10		-	-	-	0.70
MP11		-	-	-	0.60
GPZ1		-	-	-	0.60
GPZ5		-	-	-	1.70
GPZ6		-	-	-	1.30
GPZ8		-	-	-	1.40
Total Phosphate					
MP1	mg/L	-	-	-	0.46
MP2		-	-	-	0.04
MP4		-	-	-	0.11
MP5		-	-	-	0.06
MP7		-	-	-	0.01
MP10		-	-	-	0.01
MP11		-	-	-	0.01
GPZ1		-	-	-	0.32
GPZ5		-	-	-	0.46
GPZ6		-	-	-	0.29
GPZ8		-	-	-	0.03
Nitrate as N					
MP1		-	-	-	0.08
MP2		-	-	-	0.16

Location	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4
MP4	mg/L	-	-	-	0.05
MP5		-	-	-	0.05
MP7		-	-	-	0.06
MP10		-	-	-	0.12
MP11		-	-	-	0.10
GPZ1		-	-	-	0.05
GPZ5		-	-	-	0.05
GPZ6		-	-	-	1.30
GPZ8		-	-	-	0.07

Date	Granite Pit				
	B4		B5		B6
	Over Pressure	Ground Vibration	Over Pressure	Ground Vibration	Ground Vibration
14-Jan-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	DNT <0.5mm/s
21-Jan-25	DNT <100dB	DNT <0.5mm/s	86.7 dB	0.66mm/s	DNT <0.5mm/s
31-Jan-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	DNT <0.5mm/s
07-Feb-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	DNT <0.5mm/s
14-Feb-25	DNT <100dB	DNT <0.5mm/s	83.2 dB	0.66mm/s	1.52mm/s
19-Feb-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	DNT <0.5mm/s
21-Feb-25	DNT <100dB	DNT <0.5mm/s	97.2 dB	0.84mm/s	1.15mm/s
28-Feb-25	DNT <100dB	DNT <0.5mm/s	83.2 dB	0.68mm/s	0.75mm/s
07-Mar-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	DNT <0.5mm/s
14-Mar-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	0.10mm/s
21-Mar-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	DNT <0.5mm/s
28-Mar-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	0.10mm/s
04-Apr-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	0.08 mm/s
08-Apr-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	DNT <0.5mm/s
11-Apr-25	DNT <100dB	DNT <0.5mm/s	92.7db	0.60mm/s	0.63 mm/s
16-Apr-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	DNT <0.5mm/s
22-Apr-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	DNT <0.5mm/s
02-May-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	0.97 mm/s
06-May-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	0.58 mm/s
09-May-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	0.68 mm/s
14-May-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	DNT <0.5mm/s
16-May-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	DNT <0.5mm/s
23-May-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	0.70 mm/s
03-Jun-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	DNT <0.5mm/s
06-Jun-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	DNT <0.5mm/s
10-Jun-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	DNT <0.5mm/s
13-Jun-25	DNT <100dB	DNT <0.5mm/s	92.2 dB	0.72 mm/s	0.94 mm/s
17-Jun-25	DNT <100dB	DNT <0.5mm/s	96.9 dB	0.55 mm/s	DNT <0.5mm/s
20-Jun-25	DNT <100dB	DNT <0.5mm/s	84.9 dB	0.69 mm/s	1.27 mm/s
24-Jun-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	0.65 mm/s
27-Jun-25	DNT <100dB	DNT <0.5mm/s	81.4 dB	0.69 mm/s	1.02 mm/s
04-Jul-25	DNT <100dB	DNT <0.5mm/s	84.9 dB	0.55 mm/s	1.03 mm/s
08-Jul-25	DNT <100dB	DNT <0.5mm/s	101.8 dB	DNT <0.5mm/s	DNT <0.5mm/s

Date	Granite Pit				
	B4		B5		B6
	Over Pressure	Ground Vibration	Over Pressure	Ground Vibration	Ground Vibration
11-Jul-25	DNT <100dB	DNT <0.5mm/s	111.9 db	0.14 mm/s	DNT <0.5mm/s
18-Jul-25	DNT <100dB	DNT <0.5mm/s	81.4 db	0.72 mm/s	0.68 mm/s
22-Jul-25	DNT <100dB	DNT <0.5mm/s	95.3 db	0.53 mm/s	1.23 mm/s
25-Jul-25	DNT <100dB	DNT <0.5mm/s	89.3 db	0.56 mm/S	1.34 mm/s
01-Aug-25	DNT <100dB	DNT <0.5mm/s	81.4 db	0.50 mm/s	0.79 mm/s
05-Aug-25	DNT <100dB	DNT <0.5mm/s	DNT <100db	DNT <0.5mm/s	DNT <0.5mm/s
08-Aug-25	DNT <100dB	DNT <0.5mm/s	DNT <100db	DNT <0.5mm/s	0.97 mm/s
15-Aug-25	111.0 dB	0.08mm/s	DNT <100db	DNT <0.5mm/s	DNT <0.5mm/s
19-Aug-25	DNT <100dB	DNT <0.5mm/s	DNT <100db	DNT <0.5mm/s	1.28 mm/s
27-Aug-25	DNT <100dB	DNT <0.5mm/s	110.8db	0.52 mm/s	1.22 mm/s
05-Sep-25	DNT <100dB	DNT <0.5mm/s	87.4 db	0.68 mm/s	1.78 mm/s
12-Sep-25	DNT <100dB	DNT <0.5mm/s	DNT <100db	DNT <0.5mm/s	1.33 mm/s
19-Sep-25	DNT <100dB	DNT <0.5mm/s	DNT <100db	DNT <0.5mm/s	0.60 mm/s
26-Sep-25	DNT <100dB	DNT <0.5mm/s	111.1 db	0.78 mm/s	1.14 mm/s
03-Oct-25	DNT <100dB	DNT <0.5mm/s	DNT <100db	DNT <0.5mm/s	DNT <0.5mm/s
07-Oct-25	DNT <100dB	DNT <0.5mm/s	DNT <100db	DNT <0.5mm/s	DNT <0.5mm/s
10-Oct-25	DNT <100dB	DNT <0.5mm/s	DNT <100db	DNT <0.5mm/s	DNT <0.5mm/s
17-Oct-25	DNT <100dB	DNT <0.5mm/s	DNT <100db	DNT <0.5mm/s	DNT <0.5mm/s
21-Oct-25	DNT <100dB	DNT <0.5mm/s	DNT <100db	DNT <0.5mm/s	DNT <0.5mm/s
24-Oct-25	DNT <100dB	DNT <0.5mm/s	DNT <100db	DNT <0.5mm/s	DNT <0.5mm/s
28-Oct-25	DNT <100dB	DNT <0.5mm/s	DNT <100db	DNT <0.5mm/s	0.79 mm/s
31-Oct-25	DNT <100dB	DNT <0.5mm/s	81.4 db	0.89 mm/s	1.45 mm/s
04-Nov-25	DNT <100dB	DNT <0.5mm/s	DNT <100db	DNT <0.5mm/s	DNT <0.5mm/s
07-Nov-25	DNT <100dB	DNT <0.5mm/s	94.4 db	0.84 mm/s	1.12 mm/s
11-Nov-25	DNT <100dB	DNT <0.5mm/s	DNT <100db	DNT <0.5mm/s	DNT <0.5mm/s
14-Nov-25	DNT <100dB	DNT <0.5mm/s	DNT <100db	DNT <0.5mm/s	0.72mm/s
18-Nov-25	DNT <100dB	DNT <0.5mm/s	DNT <100db	DNT <0.5mm/s	DNT <0.5mm/s
21-Nov-25	DNT <100dB	DNT <0.5mm/s	98.3 db	0.78 mm/s	1.30 mm/s
25-Nov-25	DNT <100dB	DNT <0.5mm/s	106.0 db	0.93 mm/s	0.96 mm/s
02-Dec-25	DNT <100dB	DNT <0.5mm/s	DNT <100db	DNT <0.5mm/s	DNT <0.5mm/s
05-Dec-25	DNT <100dB	DNT <0.5mm/s	DNT <100db	DNT <0.5mm/s	0.99 mm/s
09-Dec-25	DNT <100dB	DNT <0.5mm/s	84.9 db	0.52mm/s	0.83 mm/s
12-Dec-25	DNT <100dB	DNT <0.5mm/s	84.9 db	0.53 mm/s	0.79 mm/s

Date	Granite Pit				
	B4		B5		B6
	Over Pressure	Ground Vibration	Over Pressure	Ground Vibration	Ground Vibration
15-Dec-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	DNT <0.5mm/s
18-Dec-25	DNT <100dB	DNT <0.5mm/s	DNT <100dB	DNT <0.5mm/s	0.69 mm/s

APPENDIX C – Approved CIF-Funded Projects since CIF Inception

Project Name	Total Approved
Bungonia: Sustaining the present through the past	\$8,000
Marulan Community Hall Upgrade	\$2,500
Marulan School Projects Room	\$15,000
Restoration of historical culvert	\$12,010
Computer hardware for archiving and cataloguing	\$2,500
Meridian mosaic installation	\$2,000
Tallong Memorial Hall Refurbishment	\$13,318
Marulan Road Safety	\$1,770
Towrang Hall Floor Refurbishment	\$14,230
Extension to GMC Road Safety Day	\$2,000
Insectivorous Bat Flight Centre	\$15,912
Increase in funds for GMC project - Road Safety	\$2,000
Thermal Imaging Camera	\$1,890
Tallong Community Memorial Walk	\$8,323
Tallong Hall project	\$5,133
Toilet Block for RFS	\$15,790
Community Sign at Towrang	\$11,923
Local Schools Co creating a sustainable future	\$4,000
Bungonia Community Engagement Program	\$4,500
Marulan Highway Signage	\$8,190
Promotions for Australia Day Committee	\$2,613
Muulii Murra (beautiful place)	\$2,800
MHS Archive & Research Facility	\$15,862
Marulan Public School Playground Upgrade	\$ 15,000 (funded in 2019, in progress as of October 2020)
Tallong Public School Playground Upgrade	\$ 15,000 (funded in 2019)
Marulan RFS - Training Room Extension	\$ 10,000 (funded in 2019)
Big Hill RFS - Thermal Imaging Camera	\$ 2,403 (funded in 2019)

Project Name	Total Approved
Tallong Community Focus Group – Defibrillator	\$ 2,572 (funded in 2019)
Marulan Kite Festival	\$3,000 (funded in 2020, however the event was cancelled)
Marulan Pony Club	\$1,500 (funded in 2020)
Goulburn & District Show Jumping Club	\$500 (funded in 2020)
Tallong Apple Festival	\$2,000 (funded in 2020)
Marulan Christmas Carols	\$3,500 (funded in 2020)
Goulburn Hockey Club	\$3,000 (funded in 2020)
Goulburn Cricket	\$3,000 (funded in 2020)
Marulan Soccer Club	\$5,000 (funded in 2020)
Goulburn Rugby	\$3,000 (funded in 2020)
Mayoral Charity Golf Day	\$5,000 (funded in 2020)
Goulburn Australia Day BBQ	\$1,000 (funded in 2020)
Tallong Public School Father's Day	\$600 (funded in 2020)
Lion's Club BBQ	\$500 (funded in 2020)
Marulan Australia Day BBQ	\$1,500 (funded in 2020)
Goulburn Mulwaree Council Australia Day BBQ	\$500 (funded in 2021)
Gunning Campdraft	\$500 (funded in 2021)
Towrang Valley Progress Assoc Australia Day BBQ	\$500 (funded in 2021)
Goulburn Agriculture, Pastoral and Horticultural Society	\$2,000 (funded in 2021)
Marulan Football Club	\$3,500 (funded in 2021)
Goulburn & District Showjumping Competition	\$1,000 (funded in 2021)
Tallong Apple Day Festival	\$900 (funded in 2022)
Marulan Football Club	\$500 (funded in 2022)
Tallong Public School P&C	\$900 (funded in 2022)
Cystic Fibrosis Goulburn	\$2000 (funded in 2022)
Goulburn and District Show jumping Competition	\$1000 (funded in 2022)
Convoy for Kids	\$500 (funded in 2022)
Goulburn Mayoral Charity Golf Day	\$5000 (funded in 2022)

Project Name	Total Approved
Tallong Apple Day Festival	\$900 (funded in 2023)
Marulan Football Club	\$500 (funded in 2023)
Tallong Public School P&C	\$1,800 (funded in 2023)
Cystic Fibrosis Goulburn	\$2000 (funded in 2023)
Goulburn Rotary Charity Golf Day	\$5000 (funded in 2023)
TREK4KIDS Starlight foundation	\$3000 (funded in 2023)
Tallong Apple Day Festival	\$5040 (funded in 2024)
Tallong Public School P & C	\$900 (funded in 2024)
Cystic Fibrosis Goulburn	\$2000 (funded in 2024)
Goulburn and District Showjumping Competition	\$1000 (funded in 2024)
Aboriginal Rugby League Knockout Competition	\$1000 (funded in 2024)
Goulburn Rotary Charity Golf Day	\$5000 (funded in 2024)
Tallong Apple Day Festival	\$3500 (funded in 2025)
Goulburn and District Showjumping Competition	\$1000 (funded in 2025)
Tallong Public School P&C	\$400 (funded in 2025)
Cystic Fibrosis Goulburn	\$2500 (funded in 2025)
Goulburn Rotary Charity Golf Day	\$5000 (funded in 2025)
Pejar Local Aboriginal Land Council NAIDOC Family Day	\$3000 (funded in 2025)

APPENDIX D – Proponent Response to IEA Recommendations

Table A.1 - Development Consent DA 128-5-2005				
Section	Requirement	Findings	Recommendations	Action Update
SCHEDULE 2 - ADMINISTRATIVE CONDITIONS				
13	The Applicant must: (a) provide annual quarry production data to DRG using the standard form for that purpose; and (b) include a copy of this data in the Annual Review.	It is noted that uploading of 2021-22 extractive industry return has not been possible as the portal is currently not active as advised by correspondence from Department of Regional NSW to Holcim dated 17 October 2022. This is non-compliance as the report has not been submitted however the issue rests with Department of Regional NSW.	Ensure annual quarry data is provided to DRG once portal is active.	Not yet.
SCHEDULE 3 - SPECIFIC ENVIRONMENTAL CONDITIONS				
3	The Applicant must ensure that the noise generated by the operation of the development does not exceed the criteria in Table 1 at any residence on privately-owned land.	Noise is monitored quarterly at four locations which are representative of the receivers listed in Table 1. 2020, 21 and 22 AERs states that four quarterly monitoring events took place within each reporting period and found that review of all documents confirmed that operation noise complied with legislative noise emission requirements. In Sept 2023, a negligible exceedance (1dB) was observed at N1 during the evening monitored period with an estimated quarry contribution of 36 LAeq (15min) dBA against a criteria of 35 LAeq (15min) dBA. The LA1 quarry contribution also exceeded the LA1(1min) (dBA) criteria for all locations but it was noted that LA1 was dominated by birds, road traffic and/or a passing train at each location.	Review noise monitoring locations - should road and traffic noise be considered an issue an alternative location may be appropriate.	Review by engaged contractor completed. Holcim is currently implementing the recommendations.
12	The Applicant must ensure that dust generated by the development does not cause additional exceedances of the criteria listed in Tables 6-8 at any residence that exists on the date of this consent, or on more than 25 percent of any privately owned land.	It is noted during the site visit minimal dust was noted and active controls in place. It is also noted that DDG6 has been removed as per correspondence to DPE from Holcim dated June 30 2023. A number of dust exceedances were recorded during the audit period, having being report in the 2020, 2021, 2022 Annual Reviews and evident in the 2023 monitoring database. Majority of incidents involved missed one off sampling events or likely contamination of samples. Notable exceedances are identified below: - DDG6 during 2022 exceed the annual average, recording 4.74(g/m2/month). Reported to DPE, likely contamination of samples. - HVAS1 missed sampling events a total of 8 times during 2022. Reported to DPE, due to inclement weather and solar power issues	Determine root cause of the HVAS failures and appropriately action corrective measures. It is understood that a number of failed sampling events relate to power supply which Lynwood Quarry is currently in the process of improving. However, it is noted that a number of failed sampling attempts related to the run time of the HVAS or the days set. This may be improved by detailed operating procedures to reduce the risk of operator error. • Review DDG data, should a result be contaminated remove the result from the annual average data set as this appears to be artificially increasing the average values.	Completed Additional wind turbine and a permanent diesel generator installed. These are integrated with the HVAS solar panel and battery system to ensure optimal charging even during adverse weather conditions.
12, 15(e)	The Applicant must implement the management plan as approved from time to time by the Secretary.	Monitoring methods described in current and revised AQMPs (both sighted). Site observations identified air quality management measures are being implemented. It is however noted that during the audit period monitoring a number of failed monitoring events and incidents occurred as noted under Schedule 3, Condition 12.	Determine root cause of the HVAS failures and appropriately action corrective measures. It is understood that a number of failed sampling events relate to power supply which Lynwood Quarry is currently in the process of improving. However, it is noted that a number of failed sampling attempts related to the run time of the HVAS or the days set. This may be improved by detailed operating procedures to reduce the risk of operator error. • Review DDG data, should a result be contaminated remove the result from the annual average data set as this appears to be artificially increasing the average values.	Completed
19 (a)	(a) ensure that the water collected in the Sediment Dams is pumped to the supply dams as soon as practicable;	Water Management Plan (November 2020), Section 6.1.2 notes sediment dams will be emptied using a pump and pipe or gravity systems after rainfall events. During site inspection Sediment Dam F and Sediment Dam E were inspected and whilst not empty given recent rainfall were actively being managed. Sediment Dam G1 was inspect and at the time of inspection was at capacity and level with the spillway. Holcim Representatives D Egoneo and M Vafaei Fard, at the time advised that water discharging from Sediment Dam G1 reported internally to Sediment Dam F and did not discharge from site.	It is recommended event based inspections of SDs be implemented to ensure that adequate capacity is maintained to reduce the risk of discharge events.	Completed The LYQ dam checklist has been reviewed and updated. All silt dams are now included in the checklist and will be inspected following any heavy rain event, as well as at the onset of each month. Furthermore, a permanent poly pipeline and pump have been established between the dams to ensure that a minimum of 90% empty capacity is maintained for the silt dams.
44 (c)	describe in detail the measures that would be implemented over the next 5 years to rehabilitate and manage the landscape on the site;	Section 3.1 of the Rehabilitation and Landscape Management Plan (2018) describes in detail rehabilitation during years 2016 - 2021.	Section 3.1 of the Rehabilitation and Landscape Management Plan (2018) to be updated to account for next 5 years, i.e. 2024 to 2029.	Update in progress. Holcim will submit to updated plan to DPHI for approval by 27 May 2026
46	Within 3 months of the Independent Environmental Audit (see Condition 11 in Schedule 5), the Applicant shall update the Rehabilitation and Landscape Management Plan to the satisfaction of the Secretary.	No evidence sighted of updates to the Rehabilitation and Landscape Management Plan following the 2020 IEA.	Ensure management plans, following updates if required, are issued to DPHI following IEAs.	Same as above
48	Within 3 months of each Independent Environmental Audit (see Condition 11 in Schedule 5) after the lodgement of the rehabilitation bond, the Applicant must review, and if necessary revise the sum of the bond to the satisfaction of the Secretary. This review must consider:	The auditor has not been provided any evidence of a bond review occurring following the previous audit.	Review and if necessary revise the bond to the satisfaction of the secretary	Completed Bond review completed in 2024 following the IEA. DPHI approved the updated bond on 19/11/2024. Amount now lodged.
48 (a)	(a) the effects of inflation;		Review and if necessary revise the bond to the satisfaction of the secretary	Completed Bond review completed in 2024 following the IEA. DPHI approved the updated bond on 19/11/2024. Amount now lodged.
48 (b)	(b) any changes to the total area of disturbance; and		Review and if necessary revise the bond to the satisfaction of the secretary	Completed Bond review completed in 2024 following the IEA. DPHI approved the updated bond on 19/11/2024. Amount now lodged.
48 (c)	(c) the performance of the rehabilitation against the completion criteria of the Rehabilitation and Landscape Management Plan.		Review and if necessary revise the bond to the satisfaction of the secretary	Completed Bond review completed in 2024 following the IEA. DPHI approved the updated bond on 19/11/2024. Amount now lodged.
SCHEDULE 5 ENVIRONMENTAL MANAGEMENT, MONITORING, AUDITING AND REPORTING				
5	Within 3 months of the submission of an: (a) incident report under condition 8 below; (b) Annual Review under condition 10 below; (c) audit report under condition 11 below; and (d) any modifications to this consent, the Applicant must review, and if necessary revise, the strategies, plans, and programs required under this consent, to the satisfaction of the Secretary.	Sighted correspondence between Holcim and DPE confirm reviews of Management Plans following annual reviews. No evidence sighted of review of plans following incidents or previous audit. 2020 Annual Review notes an IEA Action plan is available as Appendix 3 of the document however is notes local funding initiatives not IEA actions	Ensure revisions of management plans, if required, are documented and communicated to DPHI.	All Lynwood management plans were reviewed in 2025. DPHI notified in June 2025.
10 (i)	The Applicant must ensure that copies of the Annual Review are submitted to Council and are available to the Community Consultative Committee (see condition 7 of Schedule 5) and any interested person upon request.	While the AERs are publicly available on the Holcim website, there is no evidence that that the AERs in the reporting period were submitted directly to Council.	Ensure AERs are issued to Council.	Completed Last AEMR submitted to Goulburn council on 31/03/2025
11	By 30 September 2017, and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant must commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:	Audit commissioned 4 December 2023, and was originally scheduled for the week the 11th of December 2023. However due to personal circumstances the auditor could not undertake the audit till 11 January 2024.	Ensure IEA lead auditor engaged prior to the end of the audit period in future.	Holcim has updated the Audit register and entered a reminder in the Holcim iCare system for prompt alert to site. Next Audit is in 2027.

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Section	Requirement	Findings	Recommendations	Action Update
13	<ul style="list-style-type: none"> the Annual Reviews (over the last 5 years); 	Only 2020, 2021 and 2022 AERs available online. 2012, 2015, 2019, and 2020 IEAs available online. No response to audits available.	<ul style="list-style-type: none"> Previous AERs made available on the Holcim website post audit. No further action necessary. 	Completed. The AEMRs are now accessible on the website.
	<ul style="list-style-type: none"> any independent environmental audit, and the Applicant's response to the recommendations in any audit; 	No response to audits available.	<ul style="list-style-type: none"> Upload response to IEAs to Holcim website if available. 	Holcim will upload the RAR by 27/05/2026.
APPENDIX 7: DETAILED HERITAGE CONDITIONS				
9(e)	The progress on the archaeological works on site is systematically video recorded,	Previous audit identified that Videos are not able to be located and it is understood that photographs were taken instead. Previous audit included action to discuss this matter with DPE. No evidence of action being addressed.	As per previous audit Holcim to action previous recommendation outlined below: Recommendation 20: Close this issue out with DPHI to avoid ongoing on compliance issues at each audit. Ensure videos are taken during any future archaeological works on site.	Need to liaise with DPHI. If possible
APPENDIX 10. NOISE COMPLIANCE ASSESSMENT				
2	Except for wind speed at microphone height, the data to be used for determining meteorological conditions must be that recorded by the meteorological station required under condition 15A of Schedule 3.	No reference in reports to reliance of meteorological station required under condition 15A of Schedule 2	Ensure noise consultant engaged for quarterly assessments relies on meteorological station required under condition 15A of Schedule 3.	Completed.
Statement of commitments				
Social Impact	Undertake social monitoring as outlined in Table 6.14 of the EA (MOD 4).	Table 6.14 states the following will be completed in regard to social monitoring: <ul style="list-style-type: none"> Completion of periodic community surveys to review community perception over time. Continued implementation of community engagement program including seeking feedback on engagement effectiveness and on the community's preferred engagement mechanisms. Continued effective operation of the CCC. Newsletter content to focus on key community issues identified as of most interest to the community. Community survey outcomes and feedback from the CCC to be used to inform and update engagement and broader business planning. No evidence sighted of periodic community surveys or newsletters during audit period. It is noted CCC operated effectively.	Implement periodic community engagement surveys and community newsletters.	Holcim has commenced publishing in Marulan messenger.
Rehabilitation	The key elements of the rehabilitation strategy for the Modification Project will include: <ul style="list-style-type: none"> the timely and progressive rehabilitation of disturbed areas 	Section 3.1 of the Rehabilitation and Landscape Management Plan (2018) describes in detail rehabilitation during years 2016 – 2021 only. Plan does not identify planned future rehabilitation works.	Section 3.1 of the Rehabilitation and Landscape Management Plan (2018) to be updated to account for next 5 years, i.e. 2024 to 2029.	Addressed above
EPL 12939				
P1.2	The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.	2021 All dust deposition (DD) gauges and high volume (HVAS) units were in operation. HVAS 1 failed to operate on 4 occasions during the year and HVAS 2 failed to operate on 1 occasion during the year. (Lynwood Quarry 2021 Annual Review). 2022 All dust deposition (DD) gauges and high volume (HVAS) units were in operation. HVAS 1 failed to operate on 8 occasions during the year. (Lynwood Quarry 2022 Annual Review). 2023 - All dust deposition (DD) gauges and high volume (HVAS) units were in operation. HVAS 1 failed to operate on 8 occasions during the year and HVAS 2 failed to operate on 2 occasions during the year (Lynwood (EPL 12939) - Live Monitoring Worksheet 2023.XLS). In general, all points were monitored during the three year period. Occasional failures occurred at the high volume samplers (reported as LOW NON-COMPLIANCE in 2021 and 2022 Annual Reviews). Dust deposition gauges were not collected in June 2021 due to CV19	<ul style="list-style-type: none"> Determine root cause of the HVAS failures and appropriately action corrective measures. It is understood that a number of failed sampling events relate to power supply which Lynwood Quarry is currently in the process of improving. However, it is noted that a number of failed sampling attempts related to the run time of the HVAS or the days set. This may be improved by detailed operating procedures to reduce the risk of operator error. Review DDG data, should a result be contaminated remove the result from the annual average data set as this appears to be artificially increasing the average values. 	Addressed above
L3.1	Noise generated at the premises must not exceed the noise limits presented in the table b	4 receivers - representative as they are the closest 4 in each direction were monitored each year. No exceedances of the noise limits set were recorded due to the quarry; however, attended monitoring found occasional exceedance caused by bird noise, road traffic noise and rail (train) noise. These noise events were excluded from the results. In Sept 2023, a negligible exceedance (1dB) was observed at N1 during the evening monitored period with an estimated quarry contribution of 36 LAeq (15min) dBA against a criteria of 35 LAeq (15min) dBA. The LA1 quarry contribution also exceeded the LA1(1min) (dBA) criteria for all locations but it was noted that LA1 was dominated by birds, road traffic and/or a passing train at each location.	Review noise monitoring locations - should road and traffic noise be considered an issue an alternative location may be appropriate.	Addressed above
M2.2	Air Monitoring Requirements (Note see EPL 12939 for criteria).	2021 All dust deposition (DD) gauges were in operation to collect PM g/sqm/month and high volume (HVAS) units were in operation to collect a HV Sample of PM10 for 24 hours every 6 days . HVAS 1 failed to operate on 4 occasions during the year and HVAS 2 failed to operate on 1 occasion during the year. (Lynwood Quarry 2021 Annual Review). 2022 All dust deposition (DD) gauges were in operation to collect PM g/sqm/month and high volume (HVAS) units were in operation to collect a HV Sample of PM10 for 24 hours every 6 days. HVAS 1 failed to operate on 8 occasions during the year. (Lynwood Quarry 2022 Annual Review). 2023 - All dust deposition (DD) gauges were in operation to collect a HV Sample of PM10 for 24 hours every 6 days. HVAS 1 failed to operate on 8 occasions during the year and HVAS 2 failed to operate on 2 occasions during the year (Lynwood (EPL 12939) - Live Monitoring Worksheet 2023.XLS).	<ul style="list-style-type: none"> Determine root cause of the HVAS failures and appropriately action corrective measures. It is understood that a number of failed sampling events relate to power supply which Lynwood Quarry is currently in the process of improving. However, it is noted that a number of failed sampling attempts related to the run time of the HVAS or the days set. This may be improved by detailed operating procedures to reduce the risk of operator error. Review DDG data, should a result be contaminated remove the result from the annual average data set as this appears to be artificially increasing the average values. 	Addressed above
R2.1	Notifications must be made by telephoning the Environment Line service on 131 555.	No evidence of incidents or exceedances reported to EPA of EPL criteria during the audit period. Notable this includes ongoing failures of air quality and noise monitoring events. It is noted that incidents recorded within the information provided are unlikely to have caused environmental harm.	Implement process to ensure EPA is notified of incidents in future.	Holcim has in place process to notify EPA fo any incident that is considered material harm.

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Section	Requirement	Findings	Recommendations	Action Update
R2.2	The licensee must provide written details of the notification to the EPA within 7 days of the date on which they became aware of the incident. Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.	No evidence of incidents or exceedances reported to EPA of EPL criteria during the audit period. Notable this includes ongoing failures of air quality and noise monitoring events. It is noted that incidents recorded within the information provided are unlikely to have caused environmental harm.	Implement process to ensure EPA is notified of incidents in future.	Holcim has in place process to notify EPA for any incident that is considered material harm.
U1.2	Monitoring must be undertaken at HVAS1 and HVAS 2 as described in Condition P1.2.	<p>2021 All dust deposition (DD) gauges and high volume (HVAS) units were in operation. HVAS 1 failed to operate on 4 occasions during the year and HVAS 2 failed to operate on 1 occasion during the year. (Lynwood Quarry 2021 Annual Review);</p> <p>2022 All dust deposition (DD) gauges and high volume (HVAS) units were in operation. HVAS 1 failed to operate on 8 occasions during the year. (Lynwood Quarry 2022 Annual Review); 2023 - All dust deposition (DD) gauges and high volume (HVAS) units were in operation. HVAS 1 failed to operate on 8 occasions during the year and HVAS 2 failed to operate on 2 occasions during the year (Lynwood (EPL 12939) - Live Monitoring Worksheet 2023.XLS). In general, all points were monitored during the three year period. Occasional failures occurred at the high volume samplers (reported as LOW NON-COMPLIANCE in 2021 and 2022 Annual Reviews). Dust deposition gauges were not collected in June 2021 due to CV19 restrictions.</p>	<ul style="list-style-type: none"> Determine root cause of the HVAS failures and appropriately action corrective measures. It is understood that a number of failed sampling events relate to power supply which Lynwood Quarry is currently in the process of improving. However, it is noted that a number of failed sampling attempts related to the run time of the HVAS or the days set. This may be improved by detailed operating procedures to reduce the risk of operator error. Review DDG data, should a result be contaminated remove the result from the annual average data set as this appears to be artificially increasing the average values. 	Addressed above
U1.3	Monitoring must be undertaken using the same methodology as described in Condition M2.2.	<p>2022 All dust deposition (DD) gauges were in operation to collect PM g/sqm/month and high volume (HVAS) units were in operation to collect a HV Sample of PM10 for 24 hours every 6 days. HVAS 1 failed to operate on 4 occasions during the year and HVAS 2 failed to operate on 1 occasion during the year. (Lynwood Quarry 2021 Annual Review).</p> <p>2022 All dust deposition (DD) gauges were in operation to collect PM g/sqm/month and high volume (HVAS) units were in operation to collect a HV Sample of PM10 for 24 hours every 6 days. HVAS 1 failed to operate on 8 occasions during the year. (Lynwood Quarry 2022 Annual Review).</p> <p>2023 - All dust deposition (DD) gauges were in operation to collect PM g/sqm/month and high volume (HVAS) units were in operation to collect a HV Sample of PM10 for 24 hours every 6 days. HVAS 1 failed to operate on 8 occasions during the year and HVAS 2 failed to operate on 2 occasions during the year (Lynwood (EPL 12939) - Live Monitoring Worksheet 2023.XLS).</p>	<ul style="list-style-type: none"> Determine root cause of the HVAS failures and appropriately action corrective measures. It is understood that a number of failed sampling events relate to power supply which Lynwood Quarry is currently in the process of improving. However, it is noted that a number of failed sampling attempts related to the run time of the HVAS or the days set. This may be improved by detailed operating procedures to reduce the risk of operator error. Review DDG data, should a result be contaminated remove the result from the annual average data set as this appears to be artificially increasing the average values. 	Addressed above