

# Jandra Quarry Annual Review 2017

Holcim (Australia) Pty Ltd



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## **APPENDICES**


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**Appendix 1** – Transport Summary

**Appendix 2** – Quarterly Noise Monitoring

**Appendix 3** – Close Out of Audit Recommendations

## SITE DETAILS

<b><u>Name of operation</u></b>	Jandra Quarry
<b><u>Name of operator</u></b>	Holcim (Australia) Pty Ltd
<b><u>Development consent / project approval #</u></b>	DA 213-10-99 (Modification 5)
<b><u>Name of holder of development consent / project approval</u></b>	Holcim (Australia) Pty Ltd
<b><u>Annual Review start date</u></b>	January 1, 2017
<b><u>Annual Review end date</u></b>	December 31, 2017
<p><b><u>I, Matt Neil certify that this audit report is a true and accurate record of the compliance status of Jandra Quarry for the period of January 1, 2017- December 31, 2017 and that I am authorised to make this statement on behalf of Holcim (Australia) Pty Ltd.</u></b></p> <p><i>Note.</i></p> <p>a) <u>The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000.</u></p> <p>b) <u>The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or \$22,000, or both).</u></p>	
<b><u>Name of authorised reporting officer</u></b>	Matt Neil
<b><u>Title of authorised reporting officer</u></b>	Quarry Manager
<b><u>Signature of authorised reporting officer</u></b>	
<b><u>Date</u></b>	29 March 2018

# 1 STATEMENT OF COMPLIANCE

See **Table 1** for statement of commitments for the 2017 reporting period for Jandra Quarry. **Table 3** details the non-compliances identified within the reporting period.

**Table 1: Statement of Commitments**

Were all conditions of the relevant approval(s) complied with?	
DA 213-10-99 (Mod 5)	NO - see table below for further details.
EPL No. 2796	YES

**Table 2: DPE Compliance Status Key**

Risk level	Colour code	Description
<b>High</b>	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
<b>Medium</b>	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> <li>• potential for serious environmental consequences, but is unlikely to occur; or</li> <li>• potential for moderate environmental consequences, but is likely to occur</li> </ul>
<b>Low</b>	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> <li>• potential for moderate environmental consequences, but is unlikely to occur; or</li> <li>• potential for low environmental consequences, but is likely to occur</li> </ul>
<b>Admin NC</b>	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

**Table 3: Non – Compliances – Jandra Quarry**

Relevant approval	Condition #	Condition description (summary)	Compliance status	Section addressed in Annual Review/Comment															
DA 213-10-99 (Mod 5)	Condition 10 Schedule 3.	<p>The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria listed in Tables 5, 6 and 7 at any residence on privately-owned land</p> <table border="1"> <caption>Table 5: Long-term impact assessment criteria for particulate matter</caption> <thead> <tr> <th>Pollutant</th> <th>Averaging Period</th> <th><sup>a</sup> Criterion</th> </tr> </thead> <tbody> <tr> <td>Total suspended particulate (TSP) matter</td> <td>Annual</td> <td><sup>a</sup> 90 µg/m<sup>3</sup></td> </tr> <tr> <td>Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td>Annual</td> <td><sup>a</sup> 30 µg/m<sup>3</sup></td> </tr> </tbody> </table> <table border="1"> <caption>Table 6: Short-term impact assessment criteria for particulate matter</caption> <thead> <tr> <th>Pollutant</th> <th>Averaging Period</th> <th><sup>a</sup> Criterion</th> </tr> </thead> <tbody> <tr> <td>Particulate matter &lt; 10 µm (PM<sub>10</sub>)</td> <td>24 hour</td> <td><sup>a</sup> 50 µg/m<sup>3</sup></td> </tr> </tbody> </table>	Pollutant	Averaging Period	<sup>a</sup> Criterion	Total suspended particulate (TSP) matter	Annual	<sup>a</sup> 90 µg/m <sup>3</sup>	Particulate matter < 10 µm (PM <sub>10</sub> )	Annual	<sup>a</sup> 30 µg/m <sup>3</sup>	Pollutant	Averaging Period	<sup>a</sup> Criterion	Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	<sup>a</sup> 50 µg/m <sup>3</sup>	<p><b>Low Risk</b> <b>Non - Compliant</b></p>	<p>Non - compliance as PM<sub>10</sub> monitoring only commenced in May 2017. There also appears to have been problems with data collection at times since May 2017.</p>
Pollutant	Averaging Period	<sup>a</sup> Criterion																	
Total suspended particulate (TSP) matter	Annual	<sup>a</sup> 90 µg/m <sup>3</sup>																	
Particulate matter < 10 µm (PM <sub>10</sub> )	Annual	<sup>a</sup> 30 µg/m <sup>3</sup>																	
Pollutant	Averaging Period	<sup>a</sup> Criterion																	
Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	<sup>a</sup> 50 µg/m <sup>3</sup>																	
DA 213-10-99 (Mod 5)	Condition 12 Schedule 3.	<p>The Applicant shall:</p> <p>c) regularly assess air quality monitoring data and relocate, modify and/or stop operations on site to ensure compliance with the air quality criteria in this consent;</p>	<p><b>Low Risk</b> <b>Non - Compliant</b></p>	<p>PM<sub>10</sub> monitoring only commenced in May 2017. There also appears to have been problems with data collection at times since May 2017.</p> <p>Section 6.2</p>															
DA 213-10-99 (Mod 5)	Condition 14 Schedule 3	<p>The Applicant shall prepare and implement an <i>Air Quality Management Plan</i> for the development to the satisfaction of the Secretary. This plan must:</p> <p>(d) include an air quality monitoring program that:</p> <ul style="list-style-type: none"> <li>• Is capable of evaluating the performance of the</li> </ul>	<p><b>Low Risk</b> <b>Non - Compliant</b></p>	<p>PM<sub>10</sub> monitoring only commenced in May 2017. There also appears to have been problems with data collection at times since May 2017.</p>															

Relevant approval	Condition #	Condition description (summary)	Compliance status	Section addressed in Annual Review/Comment
		<p>development;</p> <ul style="list-style-type: none"> <li>• Includes a protocol for determining any exceedances of the relevant conditions of consent;</li> <li>• Effectively supports the air quality management system; and</li> <li>• Evaluates and reports on the adequacy of the air quality management system.</li> </ul>		Section 6.2
DA 213-10-99 (Mod 5)	Condition 6 Schedule 5	<p>The Applicant shall notify, at the earliest opportunity, the Secretary and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the development, the Applicant shall notify the Secretary and any other relevant agencies as soon as practicable after the Applicant becomes aware of the incident. Within 7 days of the date of the incident, the Applicant shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.</p>	<b>Admin Non - Compliant</b>	Holcim has reviewed its procedure regarding incident notification.
DA 213-10-99 (Mod 5)	Condition 9(d), Schedule 3	<p>Include a blast fume management protocol to demonstrate how emissions will be minimized including risk management strategies if blast fumes are generated.</p>	<b>Admin Non - Compliant</b>	Section 6.3 (Blasting)



## 2 INTRODUCTION

Holcim (Australia) Pty Ltd (Holcim) operates Jandra Quarry, a hard rock quarry located on the Pacific Highway, Possum Brush in the Greater Taree Local Government Area. The site operates under Development Consent (DA -213-10-99 Modification 5) approved by the New South Wales (NSW) Department of Planning and Environment (DPE) on 13 March 2015.

The site also operates in accordance with Environment Protection Licence (EPL) No. 2796 issued by the Environmental Protection Authority (EPA). A regional locality figure and aerial view of the site are outlined in **Figure 1** and **Figure 2** below. **Figure 3** outlines the approved quarry operations and **Figure 4** outlines the offset areas.

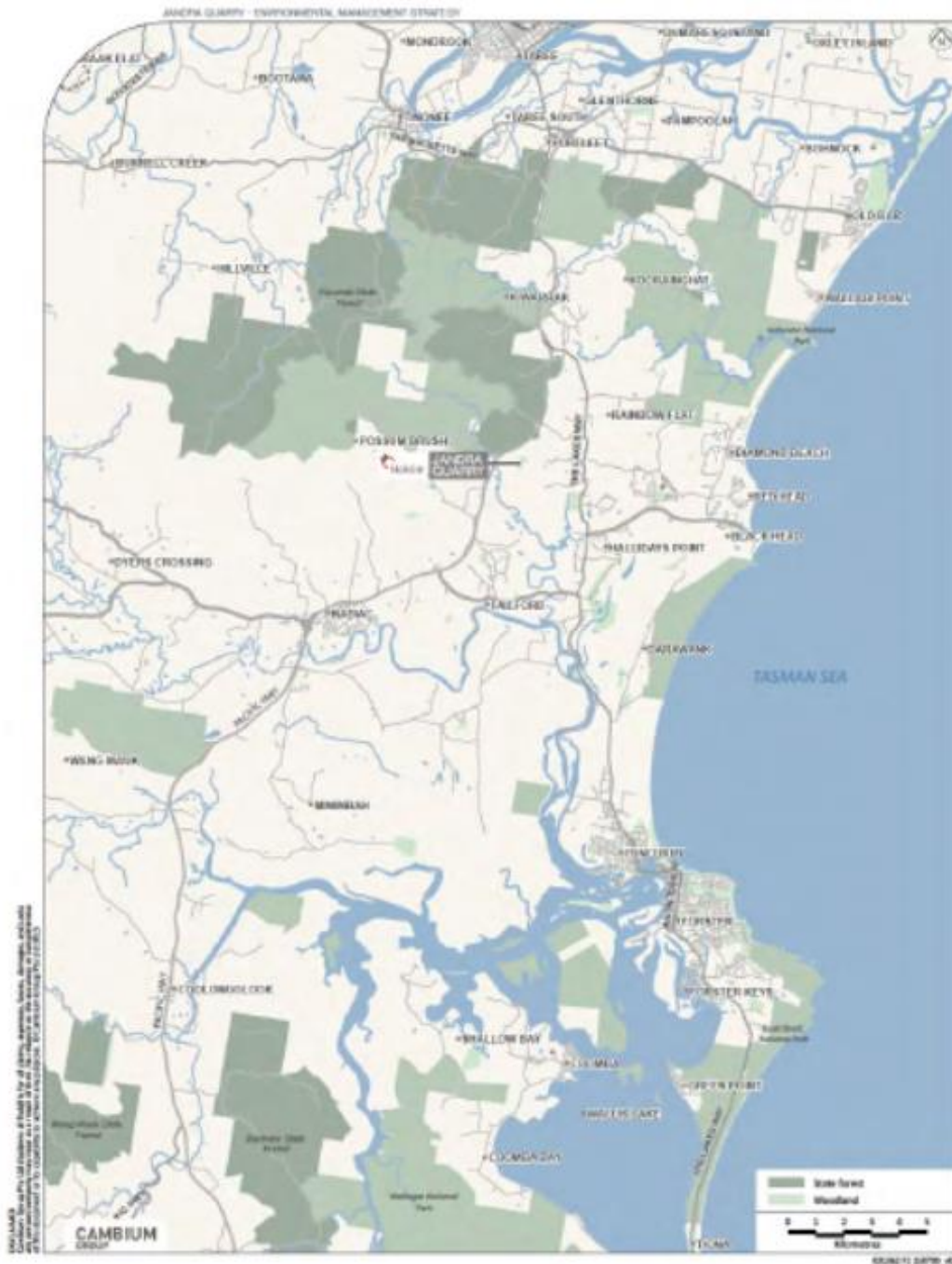


Figure 1: Regional Locality



**Figure 2: Aerial view of the Jandra Quarry, located on the Pacific Highway, Possum Brush.**





Image Source: Google, DigitalGlobe (2019)  
 Data Source: Holcim (2015)

0 100 200 300m  
 1:10 000

- Legend**
- Development Consent Boundary
  - Potential Biodiversity Offset Investigation Area
  - Access Road and Road Routes
  - Approved Extraction Area
  - Approved Overburden Emplacement Area
  - Approved Secondary Stockpile Area
  - Approved Stockpile and Site Facilities
  - Finished Stockpile Area
  - Heavy Vehicle Access Road

File Name: (A4): R01/3404\_002.dgn  
 DATE/TIME: 11.02

FIGURE 1.2  
 Jandra Quarry  
 Modification Operations

Figure 4: Biodiversity Offset Area and Disturbance (Source Umwelt)

In accordance with Schedule 5, Condition 4 of the modified Development Consent the site is required to undertake an Annual Review of the site. This Annual Review has been prepared in accordance with Condition 6.3 (Annual Performance Monitoring) of the Development Consent and in accordance with the *Annual Review Guideline: post approvals requirements for state significance mining developments* (October 2015). The Annual Review requirements and the section where they have been addressed in this document have been provided in **Table 4**.

**Table 4: Annual Review Requirement**

Condition	Section in Annual Review
<p>4. Annual Review</p> <p>Annual Review By the end of March each year, the Applicant shall review the environmental performance of the development to the satisfaction of the Secretary. This review must:</p> <p>(a) describe the development (including rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year;</p>	Section 4 and 6
<p>(b) include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, which includes a comparison of these results against:</p> <ul style="list-style-type: none"> <li>- the relevant statutory requirements, limits or performance measures/criteria;</li> <li>- the monitoring results of previous years, and</li> <li>- the relevant predictions in the documents listed in condition 2 of Schedule 2;</li> </ul>	Section 6 and 7
<p>(c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;</p>	Section 1 and 11
<p>(d) identify any trends in the monitoring data over the life of the development;</p>	Section 6 and 7
<p>(e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and</p>	Section 6
<p>(f) describe what measures will be implemented over the current calendar year to improve the environmental performance of the development</p>	Section 12

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### 3 APPROVALS

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

**Table 5: Approvals for Jandra Operations**

Approval	Regulatory Authority
DA 213-10-99 (Modification No. 5)	NSW Department of Planning & Environment
EPL No. 2796	NSW Environmental Protection Authority

Holcim holds EPL 2796 which covers its activities at Jandra Quarry. **Table 6** outlines the EPL licensing limits.

**Table 6: EPL Fee-Based Activity at Jandra Quarry**

Scheduled Activity	Fee Based Activity	Scale
Crushing, grinding or separating	Crushing, grinding or separating	> 100,000 – 500,000 T processed
Extractive activities	Land-based extractive activity	>100,000 – 500,000 T extracted, processed or stored
Resource recovery	Recovery of general waste	Any waste recovered
Waste storage	Waste storage – other types of waste	Any other types of waste stored

## 4 OPERATIONS SUMMARY

### 4.1 Exploration

No exploration activities were completed during the Annual Review period.

### 4.2 Land Preparation

There was no land preparation (clearing) undertaken during the Annual Review period. Activities were completed within the existing quarry footprint.

### 4.3 Construction Activities

The only construction completed during the Annual Review period was the installation of new office amenities at the site, with this being a portable building.

### 4.4 Quarry Operations

Development activities undertaken at Jandra Quarry in 2017 included:

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

Extraction and processing operations in 2017 were undertaken between 6am and 10pm, Monday to Friday and between 6am and 6pm on Saturdays. Transportation operations in 2017 were undertaken between 6am and 10pm, Monday to Saturday. These timeframes are in accordance with the permissible hours outlined in Schedule 2, Condition 10 of the Project Approval DA 213-10-99 (Modification No. 5) dated 13 March 2015. .

**Table 7** include a summary of the operations undertaken during the reporting period against the development consent conditions regarding product transported from Jandra Quarry. Production and sales volumes for the reporting period have been submitted to the Division of Resources and Geosciences (DRG).

**Table 7: Total Product Distributed (Jandra Quarry)**

Material	Approved limit (Sch 2, Condition 8 & 9)	Previous reporting period	This reporting period
Product Extracted Total	490 000 T	315 205 T	335,705 T
Product Sales Total	475 000 T	308 080T	299,945 T

### 4.5 Next Reporting Period

Operational activities proposed to be carried out at Jandra Quarry in 2018, include:

- Stripping of topsoil and overburden within the existing extraction limit boundary;
- Drill, blast, load and haul activities;
- Crushing, screening and stockpiling of product; and
- Progressive maintenance of rehabilitation in the completed bench at RL 50 on the northern face.



## 5 ACTIONS REQUIRED FROM 2016 ANNUAL REVIEW

The actions listed in **Table 8** were required as part of the findings of the 2016 Annual Review. These items have been closed out in accordance with the conditions of the Development Consent. Note, some of the section references have now changed based on the restructured 2017 Annual Review.

**Table 8: Actions required from Annual Review - DPE**

Section	Requirement	Compliance Status
Section 2.0 Introduction	Please revise Figure 1 to show the regional context , approved extraction footprint , current operational disturbance footprint and offset areas	Completed for 2016 Annual Review Resubmission – November 2017. Also see <b>Figure 1 – 4.</b>
Section 4.0 Operations Summary	Please report the cumulative total extraction for the site, to show compliance with Schedule 2 Condition 7 of the approval.	Completed for 2016 Annual Review Resubmission – November 2017. Outlined in Section 4.4 of this document.
Section 4.0 Operations Summary	Please report annual quarry production data as provided to the Division of Resources and Geosciences (DRG) using the standard form for that purpose, as required by Schedule 2 Condition 18 of the approval.	Volumes of quarry material transported from site are provided in <b>Appendix 1.</b> Total product distributed from Jandra Quarry is provided in <b>Table 7.</b>
Section 6.1 Noise	Please present all quarterly noise monitoring results (including full copies of monitoring reports as an appendix) , as required by Schedule 3 Condition 4 of the approval and Section 8.1.1 of the <i>Noise and Blast Management Plan</i>	Completed for 2016 Annual Review Resubmission – November 2017. Also see <b>Appendix 2.</b>
Section 6.0 Environmental Performance	Please include a section to report on the effectiveness of waste minimisation and management measures, as required by Schedule 3 Condition 35 of the approval.	Completed for 2016 Annual Review Resubmission – November 2017. Outlined in Section 6.7 of this document.
Section 6.6 Summary of Environmental Performance	Please include the approval criteria and EIS predictions values in the table for all aspects, as required by Schedule 5 Condition 4 of the approval.	Outlined within Section 6.
Section 8.0 Community	Please provide a discussion on trends in complaint data (graph preferred), as required by Schedule 5 Condition 4 of the approval.	See Section 9.3.
Section 9.0 Independent Audit	Please include a status update for all recommendations and agreed actions as per letter from Holcim to the Department dated 9 August 2016. The status update for Schedule 3 Condition 13(a) has not been provided.	Close out of audit recommendations letter provided in <b>Appendix 3.</b>

Section	Requirement	Compliance Status
Schedule 10.0 Incidents and non-compliance	<p>Please provide further information on the non-compliances identified in Table 3 in this section. Details should include: the particulars of any non-compliance;</p> <ul style="list-style-type: none"> <li>• identify the date when the non-compliance occurred, if applicable;</li> <li>• if relevant, identify the precise location where the non-compliance occurred (using maps or diagrams as appropriate);</li> <li>• the cause of the non-compliance;</li> <li>• what action has been, or will be, taken to mitigate any adverse effects of the non-compliance; and</li> <li>• what action has been, or will be, taken to prevent a recurrence of the non-compliance.</li> </ul>	Section 11 of this document

**Table 9: Actions required from Annual Review – Holcim Proposed Actions**

Commitment	Compliance Status
Progressive Rehabilitation - The site will continue to progressively rehabilitate available areas.	Rehabilitation of approximately 0.2 ha of terminal benches was completed in 2017. Rehabilitation to continue in 2018.
Installation of Solar Lighting - If required, the site will install solar lighting (with approval from RMS) at the intersection to the Pacific Highway and Quarry Access Road to allow dispatch prior to 7am and after 6pm.	Anticipated installation at end of April 2018. This process has taken longer than expected due to the requirement to obtain third party approval with the RMS.

## 6 ENVIRONMENTAL PERFORMANCE

### 6.1 Noise

#### 6.1.1 EIS Predictions

The noise and blasting impact assessment in the Environmental Assessment (2014) considered the potential impacts of the proposed modification on nearby sensitive residential receivers.

Noise levels (without asphalt production) below the early morning shoulder project criteria, are predicted at all private residential receiver locations and for all stages of the quarry life, provided that operations are restricted during this time including:

- No works in the approved overburden emplacement area;
- No works above RL50; and
- No operation of the mobile processing plant.

Noise levels (without asphalt production) above the day / evening criteria are predicted at three private residential receivers and range from a marginal 2 dBA to 5 dBA above the criteria. Holcim is confident that these noise levels will not be perceived as a nuisance and has negotiated agreements with the potentially affected property owners.

Predicted noise levels from the Environmental Assessment (2014) from asphalt production were up to 7 dBA above the criteria at one private residential receiver R1 during all periods and all stages of the quarry development, as this receiver has a line of sight to the asphalt plant. Holcim has a negotiated agreement with the property holder of R1

Jandra Quarry is currently only in Stage 1 of its development plan as described in the Noise and Blasting Impact Assessment detailed within the Environmental Assessment (2014). Table 10 details the noise modelling for this stage. When compared with the data in **Table 12** all results have been below that modelled within the Environmental Assessment (2014).

**Table 10: Stage 1 Assessment without asphalt plant operating (exceedances in bold)**

Receptor	Day / Evening (dBA Leq) 7 am to 10 pm		Early morning shoulder (dBA Leq) 6 am to 7 am		
	Project Criteria	Predicted level	Project criteria	Predicted level	
		Neutral		Neutral	Worst case
R1	41	41	40	<b>41</b>	<b>46</b>
R2	38	30	38	30	35
R3	51	<30	50	<30	30
R4	41	34	40	33	38
R5	41	40	40	38	<b>43</b>
R6	38	32	38	32	37
R7	38	<30	38	<30	<30
R8 (Holcim)	41	33	40	32	36
R9 (Holcim)	41	38	40	36	40
R10 (Holcim)	38	<b>44</b>	38	<b>43</b>	<b>47</b>

### 6.1.2 Approved Criteria

Criteria for each of the receivers R1 – R10, as outlined in the Conditions of Consent, for both quarry operation and combined quarry and asphalt production operations are provided in **Table 11**.

**Table 11: Noise Criteria**

Location	Quarry Operations		Quarry Operations and Asphalt Plant Production	
	6am – 10pm	6am – 10pm	10pm – 6am	10pm – 6am
	LAeq(15min)	LAeq(15min)	LAeq(15min)	LA1(1min)
<i>R1<sup>1,2</sup></i>	46	48	46	51
R2	36	40	35	48
<i>R3<sup>1,2</sup></i>	N/A	N/A	N/A	N/A
R4	36	40	39	51
R5	40	41	39	51
R6	36	40	35	48
R7	35	36	35	48
<i>R8<sup>1,2</sup></i>	N/A	N/A	N/A	N/A
<i>R9<sup>1,2</sup></i>	N/A	N/A	N/A	N/A
<i>R10<sup>1,2</sup></i>	N/A	N/A	N/A	N/A

Note 1: Noise criteria are not applicable to these receivers as per Section 4 of the NBMP.

Note 2: Either quarry owned or excluded from the assessment as per Section 4 of the NBMP.

### 6.1.3 Key Environmental Performance

Noise monitoring was undertaken by Muller Acoustic Consulting quarterly in 2017. The assessments identified that noise emissions generated by Jandra Quarry were in compliance with relevant statutory noise criteria specified in the Conditions of Consent on all occasions at all assessed locations. The compliance assessments for each residential receiver (R2, R4, R5, R6 and R7) are presented in **Table 12**.

**Table 12: Noise Compliance Assessment (Muller Acoustic Consultants, 2017)**

Assessment Period	Receiver No.	Quarry Noise Contribution	Quarrying Noise Criteria	Compliant				Quarry Noise Contribution	Quarrying and Asphalt Production Criteria	Compliant			
		L <sub>Aeq</sub> (15min)		Q1	Q2	Q3	Q4	Day/evening L <sub>Aeq</sub> (15min) Night LA <sub>1</sub> (1min)		Q1	Q2	Q3	Q4
Day	R2	Nil	36	✓	✓	✓	✓	N/A	40	✓	✓	✓	✓
	R4	Nil	36	✓	✓	✓	✓	N/A	40	✓	✓	✓	✓
	R5	Nil	40	✓	✓	✓	✓	N/A	41	✓	✓	✓	✓
	R6	Nil	36	✓	✓	✓	✓	N/A	40	✓	✓	✓	✓
	R7	Nil	35	✓	✓	✓	✓	N/A	36	✓	✓	✓	✓
Evening	R2	Nil	36	✓	✓	✓	✓	N/A	40	✓	✓	✓	✓
	R4	Nil	36	✓	✓	✓	✓	N/A	40	✓	✓	✓	✓
	R5	Nil	40	✓	✓	✓	✓	N/A	41	✓	✓	✓	✓
	R6	Nil	36	✓	✓	✓	✓	N/A	40	✓	✓	✓	✓
	R7	Nil	35	✓	✓	✓	✓	N/A	36	✓	✓	✓	✓
Night	R2	Nil	35	✓	✓	✓	✓	Nil	48	✓	✓	✓	✓
	R4	Nil	39	✓	✓	✓	✓	Nil	51	✓	✓	✓	✓
	R5	Nil	39	✓	✓	✓	✓	Nil	51	✓	✓	✓	✓
	R6	Nil	35	✓	✓	✓	✓	Nil	48	✓	✓	✓	✓
	R7	Nil	35	✓	✓	✓	✓	Nil	48	✓	✓	✓	✓

### **Longterm Trends:**

2017 was the first full year of quarterly noise monitoring undertaken at Jandra Quarry. During 2016 noise monitoring at Jandra Quarry was undertaken only in Quarter 4. This noise monitoring was undertaken post approval of the *Noise and Blast Management Plan* by DPE and the independent environmental audit. There were no noise complaints received during 2016 and the results of the Q4 monitoring were within the required noise criteria. This is consistent with 2017 results, with no noise related complaints and compliance with criteria at all monitoring locations on all monitoring occasions.

Trends are not yet available as 2017 is the first full year noise monitoring data is available.

### **Comparison to EIS Predictions:**

2017 noise results at Jandra Quarry remained consistent with EIS predictions. The well-established vegetative buffer and distance between the operations and the sensitive receivers assists the Quarry in meeting these predictions.

### **6.1.4 Management Measures**

Management measures relating to noise are outlined within the *Jandra Quarry Noise and Blast Management Plan*. These include:

- Defined operating hours;
- Work restrictions during the early morning shoulder period;
- Monitoring for noise and meteorological conditions;
- Broadband reversing beepers;
- Staff and contractors have been inducted; and
- Controlled blasting activities.

### **6.1.5 Proposed Improvements**

None proposed relating to noise management.

## **6.2 Air Quality**

### **6.2.1 Environmental Assessment Predictions**

Jandra Quarry is currently in Stage 1 of its development plan as described in the Air Quality Impact Assessment detailed within the Environmental Assessment (2014). **Table 13 to 15** are the modelled dust contributions expected from Jandra Quarry. The air quality impact assessment concluded that with the implementation of existing and additional feasible management measures, all relevant air quality criteria could be met at all identified sensitive residential receivers for all stages of the quarry development.

Table 13: Summary of Contemporaneous Impact and Background – R1

Date	Highest Background ( $\mu\text{g}/\text{m}^3$ )	Predicted Increment ( $\mu\text{g}/\text{m}^3$ )	Total ( $\mu\text{g}/\text{m}^3$ )	Date	Background ( $\mu\text{g}/\text{m}^3$ )	Highest Increment ( $\mu\text{g}/\text{m}^3$ )	Total ( $\mu\text{g}/\text{m}^3$ )
Stage 1							
22-11-2012	45.8	0.6	46.4	03-06-2013	10.8	34.3	45.1
09-01-2013	42.7	0.0	42.7	22-06-2013	11.8	30.2	41.8
29-06-2013	41.3	0.3	41.6	30-07-2013	13.7	25.0	38.7
07-11-2012	40.7	0.0	40.7	08-07-2013	14.2	24.9	39.1
06-10-2012	40.6	0.3	40.9	07-06-2013	9.2	22.9	32.1
Stage 2							
22-11-2012	45.8	0.3	46.1	03-06-2013	10.8	28.3	39.1
09-01-2013	42.7	0.0	42.7	22-06-2013	11.8	20.7	32.3
29-06-2013	41.3	0.3	41.6	17-05-2013	10.2	19.0	29.2
07-11-2012	40.7	0.0	40.7	30-07-2013	13.7	18.9	32.6
06-10-2012	40.6	0.1	40.7	08-07-2013	14.2	16.3	30.5
Stage 2							
06-10-2012	40.6	0.2	40.8	03-06-2013	10.8	33.0	43.8
07-11-2012	40.7	0.0	40.7	22-06-2013	11.8	25.3	36.9
22-11-2012	45.8	0.9	46.7	25-06-2013	8.7	21.1	29.8
09-01-2013	42.7	0.0	42.7	08-07-2013	14.2	22.8	37.0
29-06-2013	41.3	0.3	41.6	30-07-2013	13.7	22.9	36.6
Criteria			50				50

Note: Top 5 shown for each Stage of operation

Table 14: Predicted Incremental & Cumulative Annual Average TSP Concentrations ( $\mu\text{g}/\text{m}^3$ )

Receptor ID	Increment			Cumulative		
	Stage 1	Stage 2	Stage 3	Stage 1	Stage 2	Stage 3
Privately Owned Receptors						
R1	2.5	2.6	2.8	48.5	48.6	48.8
R2	0.3	0.3	0.4	46.3	46.3	46.4
R3	0.8	0.7	0.6	46.8	46.7	46.6
R4	0.9	0.8	0.7	46.9	46.8	46.7
R5	0.6	0.5	0.5	46.6	46.5	46.5
R6	0.4	0.4	0.5	46.4	46.4	46.5
R7	0.1	0.1	0.2	46.1	46.1	46.2
R11	0.4	0.4	0.3	46.4	46.4	46.3
R12	0.3	0.3	0.3	46.3	46.3	46.3
R13	0.3	0.3	0.3	46.3	46.3	46.3
R14	0.3	0.3	0.3	46.3	46.3	46.3
R15	0.2	0.2	0.2	46.2	46.2	46.2
R16	0.3	0.2	0.2	46.3	46.2	46.2
R17	<0.1	<0.1	0.1	<46.1	<46.1	46.1
R18	<0.1	<0.1	<0.1	<46.1	<46.1	<46.1
R19	0.4	0.4	0.5	46.4	46.4	46.5
Quarry Owned Receptors						
R8	1.3	1.1	1.0	47.3	47.1	47.0
R9	1.7	1.7	1.7	47.7	47.7	47.7
R10	1.5	1.5	4.6	47.5	47.5	50.6
Criteria					90	

**Table 15: Predicted Incremental Annual Average Dust Deposition Rate (g/m<sup>2</sup>/month)**

Receptor ID	Stage 1	Stage 2	Stage 3
Privately Owned Receptors			
R1	<0.1	<0.1	<0.1
R2	<0.1	<0.1	<0.1
R3	<0.1	<0.1	<0.1
R4	<0.1	<0.1	<0.1
R5	<0.1	<0.1	<0.1
R6	<0.1	<0.1	<0.1
R7	<0.1	<0.1	<0.1
R11	<0.1	<0.1	<0.1
R12	<0.1	<0.1	<0.1
R13	<0.1	<0.1	<0.1
R14	<0.1	<0.1	<0.1
R15	<0.1	<0.1	<0.1
R16	<0.1	<0.1	<0.1
R17	<0.1	<0.1	<0.1
R18	<0.1	<0.1	<0.1
R19	<0.1	<0.1	<0.1
Quarry Owned Receptors			
R8	<0.1	<0.1	<0.1

## 6.2.2 Approved Criteria

Air Quality monitoring is required to be undertaken in accordance with the following development consent conditions:

**Table 16: Long – term impact assessment criteria for particulate matter**

Pollutant	Averaging Period	<sup>d</sup> Criterion
Total suspended particulate (TSP) matter	Annual	<sup>a</sup> 90 µg/m <sup>3</sup>
Particulate matter < 10 µm (PM <sub>10</sub> )	Annual	<sup>a</sup> 30 µg/m <sup>3</sup>

**Table 17: Short – term impact assessment criteria for particulate matter**

Pollutant	Averaging Period	<sup>d</sup> Criterion
Particulate matter < 10 µm (PM <sub>10</sub> )	24 hour	<sup>a</sup> 50 µg/m <sup>3</sup>

**Table 18: Long – term impact assessment criteria for deposited dust**

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
<sup>c</sup> Deposited dust	Annual	<sup>b</sup> 2 g/m <sup>2</sup> /month	<sup>a</sup> 4 g/m <sup>2</sup> /month

## 6.2.3 Key Environmental Performance

### 6.2.3.1 Depositional Dust

Dust deposition monitoring has been undertaken at the Jandra Quarry throughout the 2017 reporting period with all results within the expected levels of criteria at each monitoring point. Results are shown in **Table 19**.



**Table 19: Dust Monitoring (Dust Deposition) - 2017**

Start Date	End Date	DDG 1	DDG 2	DDG 3	DDG 4	DDG 5
		(g/m <sup>2</sup> /month)				
6-Dec-16	11-Jan-17	0.5	0.5	1	0.7	1.2
11-Jan-17	08-Feb-17	0.9	1.4	1	1.3	1.2
08-Feb-17	10-Mar-17	1.2	1.5	1.1	0.9	<b>9.8*</b>
10-Mar-17	11-Apr-17	0.8	1.5	0.4	0.4	7.4
11-Apr-17	09-May-17	0.6	0.6	0.2	0.3	0.9
09-May-17	06-Jun-17	0.3	0.4	0.6	0.5	0.9
06-Jun-17	03-Jul-17	0.2	0.3	0.2	0.2	3.1
03-Jul-17	01-Aug-17	0.3	0.3	0.2	0.6	5.1
01-Aug-17	29-Aug-17	0.2	0.4	0.6	0.6	2.3
29-Aug-17	26-Sep-17	0.6	0.9	0.5	0.6	1.1
26-Sep-17	24-Oct-17	0.5	0.8	0.7	0.4	1.5
24-Oct-17	21-Nov-17	1	1.5	1.3	0.9	1.9
21-Nov-17	19-Dec-17	0.6	0.5	1	0.5	1.1
<b>Annual Average (4g/m<sup>2</sup>/year)</b>		<b>0.6</b>	<b>0.8</b>	<b>0.7</b>	<b>0.6</b>	<b>2.9</b>
<b>Annual Average – contaminated samples removed</b> *contaminated samples (bird dropping, insects, vegetation)		<b>0.6</b>	<b>0.8</b>	<b>0.7</b>	<b>0.6</b>	<b>2.3</b>
<b>Result</b>		<b>Compliant</b>	<b>Compliant</b>	<b>Compliant</b>	<b>Compliant</b>	<b>Compliant</b>

The February/March sample from DDG5 was contaminated with plant material. As such this result has been removed from the annual average for DGG5.

The annual average of all gauges was below the development consent criteria for depositional dust gauges. This was also the case in the previous Annual Review period indicating effective dust management.

**Table 20: Depositional Dust Monitoring Summary (2016-2017)**

Dust Depositional Gauge	Monitoring Summary for Annual Review Period	Monitoring Results 2017 Period	Monitoring Results 2016 Period
		(g/m <sup>2</sup> /month)	
DDG1	Insoluble Solids Reporting Period Average	0.6	0.4
	Max. Insoluble Solids	1.2	0.8
	Min. Insoluble Solids	0.2	<0.1
DDG2	Insoluble Solids Reporting Period Average	0.8	0.9
	Max. Insoluble Solids	1.5	2.9
	Min. Insoluble Solids	0.3	<0.1
DDG3	Insoluble Solids Reporting Period Average	0.7	0.5
	Max. Insoluble Solids	1.3	0.7
	Min. Insoluble Solids	0.2	<0.2
DDG4	Insoluble Solids Reporting Period Average	0.6	0.7
	Max. Insoluble Solids	1.3	1.8
	Min. Insoluble Solids	0.2	0.4
DDG5	Insoluble Solids Reporting Period Average	2.9	1.2
	Max. Insoluble Solids	9.8	1.9
	Min. Insoluble Solids	0.9	0.2

**6.2.3.2 PM<sub>10</sub> Monitoring**

PM<sub>10</sub> monitoring is required to be undertaken in accordance with the criteria provided in **Table 16** and **Table 17**.

The site had commenced works to install a PM<sub>10</sub> monitor in 2016 however; it was identified during an electrical hazards audit that the approved location would not meet Holcim's minimum Safety Health & Environment (SHE) electrical standards. Several actions were required to meet these minimum safety standards. Monitoring for PM<sub>10</sub> first commenced in May 2017. Results are provided in **Table 21**.

**Table 21: PM<sub>10</sub> Monitoring – 2017**

Date	PM <sub>10</sub> (µg/m <sup>3</sup> )	Comment
13-May-17	16	-
19-May-17	27	-
25-May-17	<2	Paper did not run
31-May-17	<2	Paper did not run
06-Jun-17	12	-
12-Jun-17	22	-
06-Jul-17	5	-
12-Jul-17	5	-
05-Aug-17	11	One paper run throughout the month
04-Sep-17	3	Paper damaged
10-Sep-17	14	-
16-Sep-17	12	-
22-Sep-17	22	-
28-Sep-17	40	-
04-Oct-17	34	-
16-Oct-17	27	-
28-Oct-17	7	-
03-Nov-17	12	Paper ran twice
15-Nov-17	2	-
21-Nov-17	9	-
27-Nov-17	4	-
03-Dec-17	10	-
09-Dec-17	10	-
15-Dec-17	18	-
21-Dec-17	12	-
27-Dec-17	12	-
<b>Annual Average (30µg/m<sup>3</sup>/year)</b>	<b>14.4</b>	It is noted that there were errors in the monitoring methodology throughout 2017.
<b>Result</b>	<b>Within Criteria for the Year so Far</b>	

Dust levels have been low, however it is noted that there have been errors in the monitoring methodology, including papers running longer than required and damaged papers.

**Longterm Trends:**

From 2015 – 2017 the annual depositional dust levels have been within the criteria. As 2017 was the first year of PM<sub>10</sub> monitoring there are no trends available.

**Comparison to EIS Predictions:**

The results for depositional dust and PM<sub>10</sub> were within the predicted limits of the EIS predictions.

## 6.2.4 Management Measures

Dust minimisation and control measures implemented on site include:

- The use of a watercart that follows specified procedures to achieve the most optimal dust control measures;
- Sprays throughout the plant;
- Speed limits across the site;
- Dust covers in place across the screening building;
- Inspections;
- Defined operating hours;
- Monitoring for air quality and meteorological conditions; and
- Training of staff and contractors.

## 6.2.5 Proposed Improvements

There is a commitment to improving data capture from the PM<sub>10</sub> monitor in 2018.

## 6.3 Blasting

### 6.3.1 Environmental Assessment Predictions

The Noise and Blasting Impact Assessment (SLR, 2014) identified the MIC that allows the ANZEC Guidelines for human comfort to be met, at the closest private (non-Holcim owned) residences, during all stages of the quarry development.

The design of blasts will then be optimised to limit the possibility of EPA criteria exceedances, when blast locations are closer to residences and preferred blast designs can be used for blast locations with adequate distances to residences.

### 6.3.2 Approved Criteria

The site undertook blasts in 2017 in accordance with the criteria listed in **Table 22**.

**Table 22: Blasting Criteria for Jandra Quarry**

Location	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance
Any residence on privately owned land, or any public infrastructure	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months

### 6.3.3 Key Environmental Performance

Results of blasting undertaken in 2017 are shown in **Table 23**.

**Table 23: 2017 Blast Monitoring Results for Jandra Quarry**

Date	Monitoring Location	Overpressure (dBL)	Vibration (mm/s)	Compliance with Approved Criteria
		(Criteria Limit 115 dBL)	(Criteria Limit 5 mm/s)	
16/1/2017 1:52pm	Residence 1	108.9	3.10	Compliant
20/2/2017	Residence	106.8	2.44	Compliant

Date	Monitoring Location	Overpressure (dBL)	Vibration (mm/s)	Compliance with Approved Criteria
		(Criteria Limit 115 dBL)	(Criteria Limit 5 mm/s)	
11:50am				
20/3/2017 9:47am	Residence	106.8	0.66	Compliant
20/3/2017 11:11am	Residence	106.0	1.71	Compliant
13/4/2017 9:57am	Residence	113.1	0.62	Compliant
14/4/2017 12:50pm	Residence	Nil trigger	Nil trigger	Compliant
9/5/2017 2:01pm	Residence <sub>2</sub>	108.9	1.31	Compliant
6/6/2017	Residence	107.3	0.54	Compliant
27/6/2017 12:18pm	Residence	103.1	0.35	Compliant
21/6/2017 12:52pm	Residence	109.2	1.33	Compliant
10/7/2017 11:34am	Residence <sub>3</sub>	109.1	0.52	Compliant
24/7/2017 1:26pm	Residence	103.1	0.59	Compliant
31/7/2017 12:50pm	Residence	103.5	0.60	Compliant
10/10/2017 11:22am	Residence	84.1	0.55	Compliant
25/10/2017 1:23pm	Residence	113.2	0.52	Compliant
15/11/2017 12:50pm	Residence	103.2	0.48	Compliant

*Blasting Notes:*

1. 2 slightly staggered blasts captured by the blasting monitor. Designed by blasting contractors.
2. 3 slightly staggered blasts captured by the blasting monitor. Designed by blasting contractors.
3. 2 slightly staggered blasts captured by the blasting monitor. Designed by blasting contractors.

All blasts in 2017 were within the Development Consent criteria.

Sensitive receivers near the quarry are notified prior to blasting as per the *Jandra Quarry Noise and Blast Management Plan*. This process is managed by the weighbridge staff who send a text message to the tenants the day before a planned blast is undertaken.

**Longterm Trends:**

From 2015 – 2017 the blasting levels have been within the Development Consent criteria.

**Comparison to EIS Predictions:**

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

### 6.3.4 Management Measures

Management measures relating to blasting are outlined within the *Jandra Quarry Noise and Blast Management Plan*, which includes a Drill and Blast Procedure. This procedure outlines the key steps of the blasting process including design, drilling, loading and firing.

### 6.3.5 Proposed Improvement

No improvements to blasting practices are required.

## 6.4 Traffic Management

### 6.4.1 Environmental Assessment Predictions

Section 3.5.6 of the Environmental Assessment (2014) stated that at peak demand, the maximum number of heavy vehicles leaving the site to deliver product to customers would reach approximately 12 (24 truck movements) per hour. This has been calculated based on a minimum loading time of approximately 5 minutes per truck. It is unlikely that, on a typical day, these peaks in demand will occur for more than a few hours at a time. A detailed assessment of traffic and transport is outlined within Section 6.2 of the Environmental Assessment (2014).

### 6.4.2 Approved Criteria

The site is required to operate traffic and manage transport through compliance with the requirements of the conditions listed below:

<p><b>Pacific Highway Intersection</b></p> <p>31. The Applicant shall maintain the intersection of the Pacific Highway and the Jandra Quarry Access Road, for the duration of product transport from the site, to the satisfaction of the RMS.</p> <p>32. The Applicant shall install and subsequently maintain street lighting at the intersection of the Pacific Highway and the Jandra Quarry Access Road, to the satisfaction of the RMS, prior to transporting quarry products from the site outside of the hours 7 am to 6 pm. Any works affecting the Pacific Highway must not take place without the prior approval of the RMS.</p> <p><b>Monitoring of Product Transport</b></p> <p>33. The Applicant shall keep accurate records of:</p> <ul style="list-style-type: none"><li>(a) the amount of quarry products, including asphalt, transported from the site (calendar month and year);</li><li>(b) the number of laden vehicle movements to and from the site (day, calendar month and year); and</li><li>(c) publish these records on its website at the end of each calendar quarter.</li></ul>
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### 6.4.3 Key Environmental Performance

The site has maintained the intersection at the Pacific Highway and Quarry Access Road in accordance with the conditions in **Section 6.4.2**. No impacts to the intersection have been identified during the reporting period.

The site has not operated outside the hours of 7am and 6pm. Holcim are investigating a solar lighting option to install at the intersection in accordance with Schedule 3, Condition 32 of the consent. No operations outside the approved hours will occur until the solar lights are signed off by RMS and installed at the intersection.

All truck movements and quarry product volumes are published on the Holcim (Jandra Quarry) webpage in accordance with Schedule 3, Condition 33 of the consent. A summary of transport data for 2017 is appended to this Annual Review as Appendix 1.

### Management Measures

Management measures relating to traffic include:

- Defined haulage times;
- Covered loads leaving site;
- Defined haulage limits; and
- Trained transport operators.

#### **6.4.4 Proposed Improvements**

There are no proposed improvements relating to transport.

### **6.5 Biodiversity**

#### **6.5.1 Environmental Assessment Predictions**

The Environmental Assessment (2014) assessed the biodiversity impacts associated with clearing an additional 1.284 hectares of native vegetation. The Flora and Fauna Assessment accompanying the EIS stated: *“With the implementation of flora and fauna management measures included in the Flora and Fauna Management Plan and this Environmental Assessment (2014), (depending on the outcome of the targeted surveys for the Eastern Underground Orchid) the proposed modification would not result in any significant impacts on biodiversity on site and in surrounding bushland”.*

#### **6.5.2 Approved Criteria**

There are no specific criteria relating to biodiversity within the Development Consent. Schedule 3 Condition 25 outlines the requirement to complete a *Biodiversity and Rehabilitation Plan* with this document dated December 2015.

#### **6.5.3 Key Environmental Performance**

There were limited impacts to biodiversity in the reporting period as vegetation clearance was not required.

Four campaigns of weed spraying targeting Lantana (*Lantana* sp.) and Tobacco weed (*Solanum mauritianum*) were completed along the internal haul in the reporting period.

The installed nest boxes were monitored throughout the year however have not shown signs of occupancy to date.

#### **Comparison to EIS Predictions:**

There were limited impacts to biodiversity within the Annual Review period. This is consistent with the EIS predictions.

#### **6.5.4 Management Measures**

Management measures relating to biodiversity are outlined within the *Jandra Quarry Biodiversity Management Plan*. These include:

- Weed and feral animal management;
- Pre clearance surveys and tree felling procedures;
- Salvaging of habitat resources;
- Nest box installation;
- Bushfire management; and
- Rehabilitation and biodiversity offset area monitoring.

#### **6.5.5 Proposed Improvements**

Weed spraying will continue at the site during the next reporting period.

Quarterly inspections of the nest boxes by Holcim staff will continue to occur during next reporting period.

Ecological pre-clearance surveys will be required in the next reporting period for vegetation clearing required to extend the eastern end of the approved extraction boundary.

A feral animal assessment will be undertaken in the next reporting period to determine if there is a need for managing feral animals in the rehabilitation area and Biodiversity Offset Area. A feral animal control program will be completed if required. To date, Holcim employees have not reported any sightings of feral animals within these areas.

## **6.6 Heritage**

### **6.6.1 Environmental Assessment Predictions**

An extensive AHIMS search was conducted on 5 February 2014 for the purposes of an Aboriginal Heritage Due Diligence Assessment for the Environmental Assessment (2014). The search covered an area of approximately 10 square kilometres, which encompassed the disturbance area of the new heavy vehicle access road and expansion of the existing finished product stockpile area. Seven recorded sites are within the Jandra Quarry development consent boundary. All seven of these sites were determined to be of low or medium significance. No Aboriginal archaeological sites registered on AHIMS are located within the disturbance area of the new heavy vehicle access road and expansion of the existing finished product stockpile area. There are no predicted detrimental impacts to Aboriginal and cultural heritage.

### **6.6.2 Approved Criteria**

There are no specific criteria relating to Aboriginal and Cultural Heritage within the Development Consent. Schedule 3 Condition 29 outlines the requirement to prepare an *Aboriginal Cultural Heritage Management Plan*.

### **6.6.3 Key Environmental Performance**

There were no issues relating to Aboriginal and Cultural Heritage in 2017. There was no additional clearing during the Annual Review period.

### **6.6.4 Management Measures**

Management measures relating to heritage are outlined within the *Jandra Quarry Aboriginal Cultural Heritage Management Plan*. These include:

- Consultation with Aboriginal stakeholders during the preparation of the *Jandra Quarry Aboriginal Cultural Heritage Management Plan*;
- Records of known sites of Aboriginal heritage significance;
- The Quarry Manager or delegate will undertake monthly inspections of the known Aboriginal and cultural heritage sites;
- Training of staff and contractors; and
- Procedure for impacts of unexpected finds.

### **6.6.5 Proposed Improvements**

There are no proposed improvements relating to Aboriginal and cultural heritage.

## **6.7 Waste Minimisation**

### **6.7.1 Management Measures**

Wherever possible, Jandra Quarry implements initiatives to minimise the waste generated from our operations. General waste is minimised and all oil, cardboard, paper and steel is sorted on site and sent to recycling facilities in the region. This is significantly reducing the amount of waste going to landfill.

Tyres from machines are used for traffic management, garden edging and signage stabilisers. This reduces the use of raw materials as well as diverting rubber from landfill.

### **6.7.2 Proposed Improvements**

There are no proposed improvements to waste management during the Annual Review period.



## 6.8 Summary of Environmental Performance

A summary of the performance of environmental management measures and sampling results are detailed in **Table 24**.

**Table 24: Summary of Performance**

Aspect	Approval criteria / EIS prediction	Performance during the reporting period	Trend / key management implications	Implemented/ proposed management actions
<b>Noise</b>	EIS predictions are all below development consent criteria.	Quarter 4 monitoring has met the Development Consent Criteria.	Meets criteria.	None required.
<b>Air quality</b>	EIS predictions are all below development consent criteria.	Dust deposition results are within criteria of EPL, EIS and Development Consent. PM <sub>10</sub> monitoring has not been undertaken.	Dust deposition has been consistent with EIS and previous Annual Review reporting. PM <sub>10</sub> monitoring has not been undertaken.	None required. 2018 will be the first full year of monitoring.
<b>Blasting</b>	EIS predictions are all below development consent criteria.	All blasts in 2017 were within the Development Consent criteria.	Blast results continue to remain within approved criteria and EIS predictions.	None required.
<b>Water Management</b>	EIS predictions are all below development consent criteria.	No discharge during 2017	Surface water generally meets criteria. No discharge during 2017.	Groundwater assessment will be undertaken during the 2018 reporting period, subject to intersection of the water table.
<b>Biodiversity</b>	2014 EA Mod – The proposed modification would not result in any significant impacts on biodiversity on site and in surrounding bushland.	No additional impacts - no clearing.	Operating as per <i>Biodiversity and Rehabilitation Management Plan</i> .	None required.
<b>Heritage</b>	No predictions	No impacts	Continued to be no impacts	None required.

## 7 WATER MANAGEMENT

### 7.1 EIS Predictions

The predictive modelling within the Environmental Assessment (July 2014) pertains to the water balance for Jandra Quarry (**Table 25**). During the reporting period, the water available on site was all that was required for operations providing Holcim with the confidence in the water balance figures. There are no other predictive figures for surface water management.

**Table 25: Water Balance Modelling from Surface Water Management Plan**

Summary Results	Current			Stage 1		
	Dry Year	Mean Year	Wet Year	Dry Year	Mean Year	Wet Year
Total Runoff (ML/yr)	35	98	165	34	97	164
Total Demands (ML/yr) <sup>1</sup>	25.60	24.88	24.11	36.60	35.64	34.63
Stormwater Supplied (ML/yr) <sup>2</sup>	25.46	24.88	24.11	32.13	35.45	34.63
Total Storage Top Up (ML/yr)	0.13	0.00	0.00	4.46	0.19	0.00
% Demand Met	99%	100%	100%	88%	99%	100%
Spill Volume (ML/yr)	4	68	131	3	57	112

Summary Results	Stage 2			Stage 3		
	Dry Year	Mean Year	Wet Year	Dry Year	Mean Year	Wet Year
Total Runoff (ML/yr)	39	110	186	45	129	219
Total Demands (ML/yr)	36.42	35.47	34.46	34.60	33.74	32.82
Stormwater Supplied (ML/yr)	32.32	35.34	34.46	31.85	33.74	32.82
Total Storage Top Up (ML/yr)	4.09	0.13	0.00	2.75	0.00	0.00
% Demand Met	89%	100%	100%	92%	100%	100%
Spill Volume (ML/yr)	4	70	139	9	90	174

The Environmental Assessment (2014) stated with the implementation of surface water management measures included in the *Soil and Water Management Plan*, the EPL and this EA, the proposed modification would not result in any significant impacts on the downstream environments.

### 7.2 Approved Criteria

The site is required to monitor and record discharge events from the Main Dam offsite in accordance with the requirements listed in **Table 26** taken from the EPL.

**Table 26: EPL Discharge Monitoring Requirements**

**POINT 1**

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
pH	pH				6.5-8.5
Total suspended solids	milligrams per litre				50

**POINT 1**

Pollutant	Units of measure	Frequency	Sampling Method
pH	pH	Each overflow event	Grab sample
Total suspended solids	milligrams per litre	2 times daily during discharge	Grab sample
Turbidity	nephelometric turbidity units	2 times daily during discharge	Grab sample

### 7.3 Water Use and Storage

Effective control of erosion and sediment movement at the site is currently achieved via the following measures:

- Sedimentation basins;
- Wash off water collection and primary treatment systems;
- Minimisation of disturbed areas;
- Diversion of clean water from undisturbed areas around working areas;
- Temporary erosion and sediment controls prior to commencement of topsoil and overburden removal;
- Sequential clearing and rehabilitation of the quarry as extraction of material proceeds; and
- Twice yearly maintenance of erosion and sediment control structures to ensure their efficiency.

### 7.4 Surface Water Results

There was no discharge at site during 2017. A summary of the monthly water results are outlined in **Table 27**.

**Table 27: Monthly surface water results**

Date	pH	TSS (mg/L)	Result
11-Jan-17	8.0	9	Within Criteria
08-Feb-17	8.0	52	Outside criteria, but not a discharge result
10-Mar-17	7.4	284	Outside criteria, but not a discharge result
11-Apr-17	8.1	23	Within Criteria
09-May-17	8.2	48	Within Criteria
06-Jun-17	8.2	58	Outside criteria, but not a discharge result
03-Jul-17	8.3	67	Outside criteria, but not a discharge result
01-Aug-17	7.9	50	Within Criteria
29-Aug-17	8.4	20	Within Criteria
26-Sep-17	8.3	33	Within Criteria
24-Oct-17	7.8	111	Outside criteria, but not a discharge result
21-Nov-17	7.9	11	Within Criteria
19-Dec-17	7.5	21	Within Criteria

The pH results from the monthly sampling was slightly alkaline ranging from 7.4 to 8.3. There was a large variability in TSS results ranging from 9mg/L to 284mg/L. Results are heavily linked to rainfall events, with higher TSS levels often occurring following significant rainfall events.

#### **Longterm Trends:**

The results from 2015 to 2017 were reviewed for surface water. Results were similar over a long period with slightly alkaline pH and a large variability in TSS results. Although there was no discharge in 2017, there is a system in place at the site where samples are obtained prior to a discharge event, with the goal of containing water onsite if the water quality parameters are not within the EPL requirements.

#### **Comparison to EIS Predictions:**

The Environmental Assessment (2014) stated the increase in scale of the operations not result in any significant impacts on the downstream environments. With there being no discharge events during the Annual Review period and the site operating as per the *Soil and Water Management Plan*, Holcim consider this prediction has been met.

## **7.5 Groundwater Results**

No groundwater monitoring was completed at Jandra during the Annual Review period.

### **7.5.1 Water Take**

There is no groundwater extraction licences at Jandra Quarry, therefore there has been no water take.

## 8 REHABILITATION AND LANDSCAPE MANAGEMENT

### 8.1 Rehabilitation Performance during the Reporting Period

A summary of rehabilitation at Jandra Quarry is outlined in **Table 28**.

**Table 28: Rehabilitation Performance**

Guideline Requirement	Site Comment
Extent of the operations and rehabilitation at completion of the reporting period	<p>Rehabilitation of benches continued during the Annual Review period as per the <i>Biodiversity and Rehabilitation Management Plan</i>. There was approximately 0.2 ha of rehabilitation completed during the Annual Review period.</p> <p>Quarry benches are landscaped and vegetated using native tree and understorey species, to minimise the visual impact of the quarry.</p> <p>The rehabilitation process includes placing approximately 1 metre of overburden on benches, followed by 300mm of topsoil. Tubestocking is the preferred rehabilitation method on benches.</p>
Agreed post- rehabilitation land use	<p>The <i>Biodiversity and Rehabilitation Management Plan</i> outlines the proposed rehabilitation at the site.</p> <p>The proposed final land use is native woodland.</p>
Key rehabilitation performance indicators	Key performance indicators are outlined within the <i>Biodiversity and Rehabilitation Management Plan</i> . Rehabilitation inspections are completed by Holcim.
Renovation or removal of buildings	None during reporting period.
Any other Rehabilitation Taken including: Exploration activities; Infrastructure; Dams; and The installation or maintenance of fences, bunds and any other works.	No rehabilitation of exploration, infrastructure or dams undertaken during the Annual Review period.
Any rehabilitation areas which have received formal sign off from DRG	None.
Variations to activities undertaken to those proposed (including why there were variations and whether DRG was notified)	Rehabilitation completed as per the <i>Biodiversity and Rehabilitation Management Plan</i> .
Outcomes of trials, research projects and other initiatives	No trials.
Key issues that may affect successful rehabilitation	There are several potential issues including availability of material, seed stock, climatic events and rehabilitation methodology.

## 8.2 Summary of Current Rehabilitation and Disturbance

A summary of the rehabilitation and disturbance status is outlined in **Table 29**.

**Table 29: Rehabilitation and Disturbance Status**

Quarry Area Type	This Reporting Period (Actual)	Next Reporting Period (Forecast)
	Current Annual Review Period (ha)	Next Annual Review Period (ha)
A. Total Quarry Footprint <sub>1</sub>	21.0	23.2
B. Total Active Disturbance <sub>2</sub>	19.6	21.1
C. Land Being Prepared for Rehabilitation <sub>3</sub>	0	0
D. Land Under Active Rehabilitation <sub>4</sub>	1.4	2.1
E. Completed Rehabilitation <sub>5</sub>	0	0

1 Total disturbance and rehabilitation.

2 Total disturbance within the Project Approval boundary

3 Rehabilitation that is being shaped in a phase of decommissioning, landform establishment and growth medium development.

4 rehabilitation under a phase of ecosystem and land use establishment or ecosystem and land use sustainability

5 This refers to rehabilitation that has been signed off from the DRG.

At the end of 2017 there was approximately 19.6 Ha of active disturbance and 1.4 Ha of active rehabilitation. There is proposed to be 2.2 Ha of additional disturbance in 2018 and 0.7 Ha of additional rehabilitation in 2018 at Jandra Quarry.

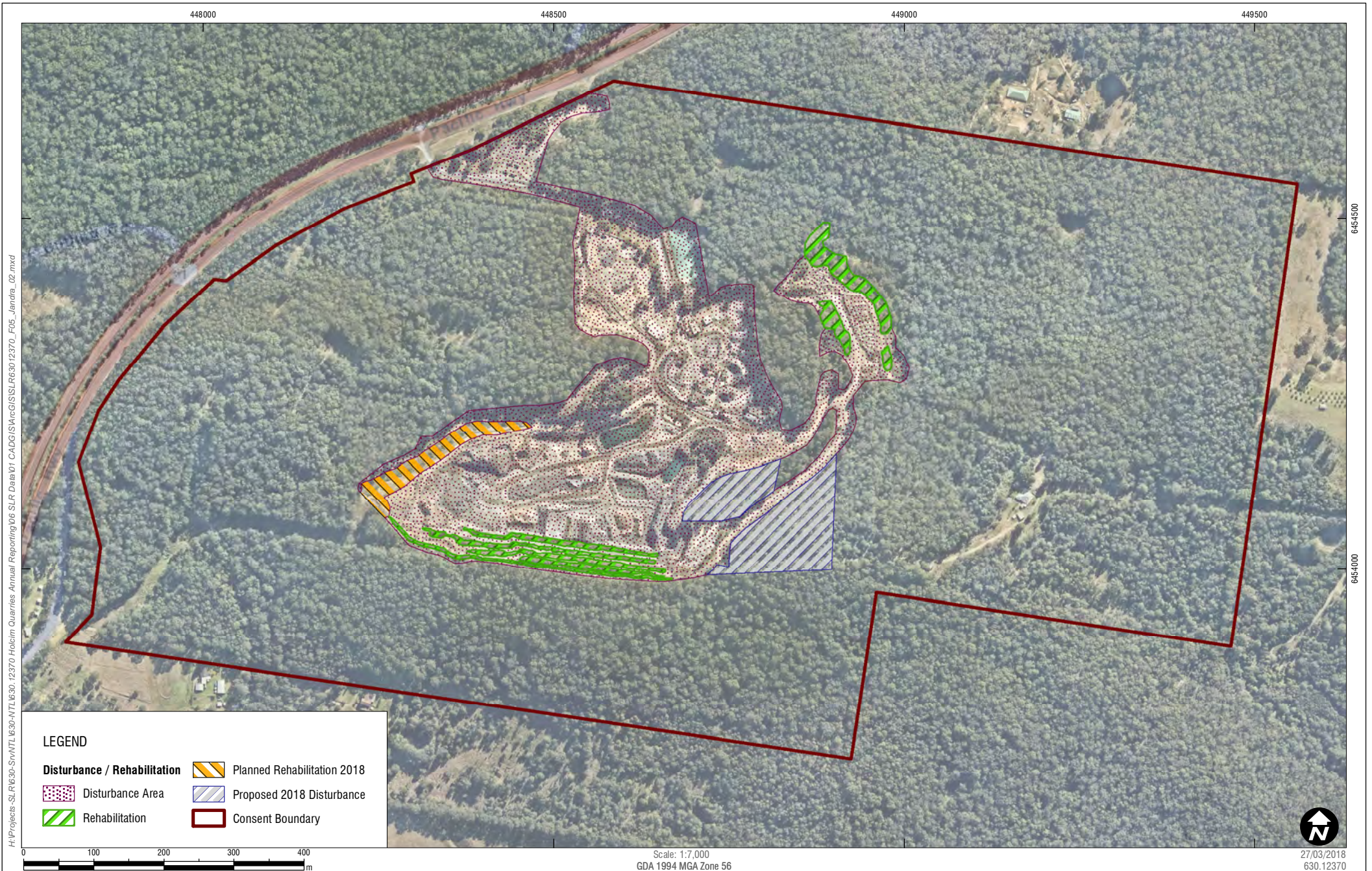
## 8.3 Actions for the next Reporting Period

The DPE 2015 Annual Review Guidelines require the Annual Review to outline the rehabilitation actions proposed during the next reporting period. These actions are detailed in **Table 30**.

**Table 30: Rehabilitation and Closure Actions for the Next Reporting Period**

Requirement	Site Comment
Describe the steps to be undertaken to progress agreement during next reporting period, where final rehabilitation outcomes have not yet been agreed between stakeholders	Rehabilitation to continue as per the <i>Biodiversity and Rehabilitation Management Plan</i> .
Outline proposed rehabilitation trials, research projects and other initiatives to be undertaken during next reporting period	No proposed rehabilitation trials.
Summary of rehabilitation activities proposed for next report period	There is planned to be the rehabilitation of the RL50 Northern Bench (0.3 ha).

The rehabilitation and disturbance areas at Jandra Quarry are outlined in **Figure 5**



## **9 COMMUNITY**

### **9.1 Community Engagement Activities**

Holcim has maintained community engagement measures during the reporting period by undertaking the following activities in accordance with Schedule 5, Condition 7 and 10 of the Development Consent:

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

### **9.2 Community Contributions**

Holcim has provided discounted material to nearby neighbours during the Annual Review period. Sponsorships have also been provided to Riding for the Disabled and the local Archery Club.

### **9.3 Complaints**

A review of the Holcim Safety, Health & Environment (SHE) reporting database (INX) did not identify any complaints from external stakeholders during the 2017 reporting period.

A link to all publicly listed information including complaints registers and contacts for locals in the community is attached below showing compliance with this condition.

<http://www.holcim.com.au/about-us/community-link/jandra-quarry-possum-brush-taree-nsw.html>



## **10 INDEPENDENT AUDIT**

The site undertook an Independent Environmental Audit (IEA) in 2016 in accordance with the timeframes of the Development Consent. All actions raised in IEA have been undertaken in accordance with the recommendations made by GHD Consultants. All actions were closed out in 2016.

## 11 INCIDENTS AND NON-COMPLIANCE

**Table 31** summarises the incidents and non - compliances at Jandra in 2017. It should be noted that the first three incidents/non – compliances have already been outlined within the letter from Holcim to the DPE dated 23 January 2018 responding to a Show Cause Notice.

**Table 31: Summary of Incidents and Non Compliances**

Date	Incident/Non Compliance	Action/Comment
Until 13 May 2017 when PM <sub>10</sub> monitoring commenced. Errors since monitoring commencement.	DA 213-10-99 (Mod 5) Condition 10 Schedule 3. PM <sub>10</sub> monitoring only commenced in May 2017. Errors in data collection.	As outlined in the 2016 Annual Review, the site commenced works to install a PM <sub>10</sub> monitor in 2016 however, it was identified during an electrical hazards audit that the approved location would not meet Holcim's minimum Safety Health and Environment (SHE) electrical standards.  Several actions were required to meet these minimum safety standards. These actions have now been completed and the site commenced PM <sub>10</sub> monitoring on 13 May 2017. Holcim is committed to providing a zero harm environment for its employees and worked effectively to eliminate the identified risk and enable monitoring to commence in a safe manner, as soon as practicable.  Dust levels have been low, however it is noted that there have been errors in the monitoring methodology, including papers running longer than required and damaged papers. There is a commitment to improving data capture from the PM <sub>10</sub> monitor in 2018.
Until 13 May 2017 when PM <sub>10</sub> monitoring commenced. Errors since monitoring commencement.	DA 213-10-99 (Mod 5) Condition 12 Schedule 3. PM <sub>10</sub> monitoring only commenced in May 2017. Errors in data collection.	Same action as above.
Until 13 May 2017 when PM <sub>10</sub> monitoring commenced. Errors since monitoring commencement.	DA 213-10-99 (Mod 5) Condition 14 Schedule 3 PM <sub>10</sub> monitoring only commenced in May 2017	Same action as above.

Date	Incident/Non Compliance	Action/Comment
Until 13 May 2017 when PM <sub>10</sub> monitoring commenced. Errors since monitoring commencement.	DA 213-10-99 (Mod 5) Condition 6 Schedule 5 Holcim did not notify the DPE within 7 days of the date of an incident/exceedance (relating to commencement of PM <sub>10</sub> monitoring).	Holcim is not of the opinion that the failure to monitor outlined above resulted in an incident that has caused, or threatens to cause, material harm to the environment. Irrespective of this, Holcim worked to resolve the relevant procurement and safety issues as soon as practicable at the site to enable the necessary monitoring to be undertaken moving forward. Regardless, Holcim will review its procedure for reporting of incidents to ensure that, if any doubt exists regarding material harm, incidents are reported at the earliest opportunity to the Secretary.
Throughout period	DA 213-10-99 (Mod 5)	There is no blast fume protocol within the Jandra Quarry Blast Management Plan. The site currently uses the contractor's protocol. The Blast Management Plan will be updated to include a protocol.

## 12 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

Holcim staff will undertake the following works and improvement measures and projects in 2018 to ensure compliance with the consent and to ensure that effective environmental management controls are in place and operating in accordance with the requirements of the Consent.

**Table 32: Proposed Improvement Measures**

Improvement Measure	Activities
Progressive Rehabilitation	The site will continue to progressively rehabilitate available areas.
Desilting of the sites main process pond/sediment Basin	The site initiated an intensive campaign to dewater and desilt the main process pond/sediment basin. The benefits of this include greater free board management and increased water quality holdings.
Biodiversity	<p>Weed spraying will continue at the site during the next reporting period.</p> <p>Quarterly inspections of the nest boxes by Holcim staff will continue to occur during next reporting period.</p> <p>Ecological pre-clearance surveys will be required in the next reporting period for vegetation clearing required to extend the eastern end of the approved extraction boundary.</p> <p>A feral animal assessment will be undertaken in the next reporting period to determine if there is a need for managing feral animals in the rehabilitation area and Biodiversity Offset Area. A feral animal control program will be completed if required. To date, Holcim employees have not reported any sightings of feral animals within these areas.</p>

## 13 REFERENCES

Department of Planning and Environment (2015) Jandra Quarry Project Approval (DA 213-10-99) – Notice of Modification

Holcim (2017) Jandra Quarry Annual Review 2016;

Holcim (2015) Environmental Management Plans

Holcim (2014) Jandra Quarry Environmental Assessment – Intensification in Production

Office of Environment and Heritage – Environment Protection Licence 2796

## 14 APPENDICES

# **APPENDIX 1**

## **TRANSPORT SUMMARY**



# Jandra Quarry Transport 2017

2016	January		February		March		April		May		June		July		August		September		October		November		December		
	Truck Movements	Volume (T)	Truck Movements	Volume (T)	Truck Movements	Volume (T)	Truck Movements	Volume (T)	Truck Movements	Volume (T)	Truck Movements	Volume (T)	Truck Movements	Volume (T)	Truck Movements	Volume (T)	Truck Movements	Volume (T)	Truck Movements	Volume (T)	Truck Movements	Volume (T)	Truck Movements	Volume (T)	
Day 1	0	0	36	1057.88	27	819.51	0	0	65	2043.1	58	1652.41	1	103.72	32	854.22	32	914.82	0	0	50	1284.32	35	1020.92	
Day 2	0	0	34	1050.6	20	569.41	0	0	55	1688.1	54	1570.08	0	0	48	1365.01	0	0	0	0	47	1096.62	0	0	
Day 3	0	0	30	1128.94	45	1172.58	33	1022.5	52	1556.5	2	65.08	50	1590.24	44	1361.3	0	0	58	1817.64	31	921.21	0	0	
Day 4	0	0	0	0	0	0	31	940.3	48	1336.74	0	0	42	1284.39	35	1032.74	28	863.76	0	0	0	0	15	467.56	
Day 5	0	0	0	0	0	0	28	772.1	52	1622.76	52	1722.28	56	1612.05	12	390.9	30	873.34	17	1138.34	0	0	0	0	
Day 6	0	0	51	1592.16	46	1415.87	31	892.49	0	0	0	0	0	0	0	0	17	520.2	28	892.35	30	742.48	130	3295.96	
Day 7	0	0	36	1104.21	58	1595.63	19	627.22	0	0	0	0	0	0	0	0	22	602.28	0	0	41	872.46	32	873.18	
Day 8	0	0	21	634.82	74	1901.7	0	0	58	1710.95	38	1198.34	0	0	38	1198.96	25	706.9	0	0	12	204.88	49	1462.76	
Day 9	19	622.22	34	1100.09	45	1145.14	0	0	65	1989.58	8	222.18	0	0	22	667.56	0	0	34	982.74	34	739.4	0	0	
Day 10	24	816.14	41	1315.88	33	1017.2	37	1189.62	55	1688.88	0	0	48	1348.02	32	1151.82	0	0	38	1084.22	37	888.04	0	0	
Day 11	31	751.29	12	387.56	1	12.06	72	2048.14	50	1567.74	0	0	54	1651.47	34	1005.38	25	722.58	38	1000.52	0	0	46	1158.08	
Day 12	27	867.6	0	0	0	0	63	1645.81	63	1870.2	0	0	43	1277.46	0	0	55	1431.9	29	820.04	0	0	34	910.74	
Day 13	15	435.55	0	0	0	0	82	2166.8	68	1911.4	11	362.62	51	1556.18	0	0	40	1244.64	53	1353.32	25	717.7	27	803.24	
Day 14	0	0	44	1383.43	25	735.28	0	0	0	0	0	0	31	921.14	54	1685.65	30	871.96	31	901.34	3	103.3	28	806.08	
Day 15	0	0	53	1550.26	11	307.66	0	0	49	1376.76	49	1590.26	0	0	0	0	30	773.18	43	925.96	0	0	70	2024.78	
Day 16	19	621.36	30	1537.05	7	230.2	0	0	53	1550.54	53	1597.59	0	0	38	1128.81	0	0	39	1055.8	78	1893.16	2	15.18	
Day 17	26	723.29	52	1520.28	38	507.48	0	0	66	1913.26	28	852.24	45	1462.14	37	1150.42	0	0	0	0	0	0	0	0	
Day 18	31	889.35	0	0	0	0	15	428.12	86	2649.04	0	0	51	1653.20	24	664.4	60	1155.06	74	1952.32	0	0	26	636.26	
Day 19	27	777.76	0	0	0	0	32	970.8	44	1388.17	33	1045.24	34	1070.78	0	0	54	1178.68	64	1519.6	0	0	27	786.86	
Day 20	32	1027.17	47	1482.43	31	1014.98	41	1220.48	0	0	57	1350.88	31	887.34	0	0	53	1215	27	859.98	60	1433.7	25	789.8	
Day 21	0	0	0	0	0	0	0	0	0	0	0	0	47	1383.99	33	925.88	37	1058.68	74	2029.52	0	0	57	1623.24	
Day 22	0	0	0	0	0	0	0	0	0	0	0	0	65	1812.62	47	1200.6	6	75.4	30	885.54	75	2267.42	0	0	
Day 23	34	1092.86	37	2126.97	45	1494.97	0	0	53	1691.3	0	0	50	1394.73	43	1195.36	0	0	49	1094.32	54	1441.46	0	0	
Day 24	38	1174.04	38	2124.78	27	889.88	0	0	49	1382.88	31	1773.71	0	0	38	1038.8	0	0	30	868.69	64	1535.34	0	0	
Day 25	23	634.38	52	1937.41	14	388.84	0	0	53	1691.3	0	0	50	1394.73	43	1195.36	0	0	49	1094.32	54	1441.46	0	0	
Day 26	0	0	0	0	0	0	0	0	47	1314.88	0	0	43	1337.34	37	952.34	115	3446.04	63	1880.08	0	0	0	0	
Day 27	0	0	0	0	0	0	0	0	53	1634.96	51	1589.18	19	592.82	0	0	107	2724.12	61	1692.54	0	0	0	0	
Day 28	0	0	29	929.6	32	975.66	49	1349.23	3	89.88	67	2080.11	34	1118.06	0	0	79	2024.51	62	1731.4	46	1315.34	0	0	
Day 29	0	0	22	677.54	63	1659.8	32	1003.62	0	0	26	825.78	43	1313.62	20	518.7	95	2545.26	0	0	67	1837.22	0	0	
Day 30	29	927.68	0	0	50	1394.07	0	0	38	1222.68	17	554.8	0	0	23	628.38	71	2320.54	0	0	59	1792.62	0	0	
Day 31	33	960.39	0	0	0	0	0	0	59	2130.3	31	843.38	0	0	41	1092	0	0	0	0	1038.3	49	1528.78	0	0
TOTAL	409	12215.1	905	27857.95	781	24422.49	596	17234.35	1300	39206.48	1026	29913.55	937	28227.18	825	23553.3	1131	30512.85	978	26680.48	1072	28446.83	537	14874.73	
TOTAL VOLUME	301147.29 (Q1 = 62495.54 Q2 = 86354.38 Q3 = 82293.33 Q4 = 70004.04)																								
TOTAL TRUCK MOVEMENTS	10497																								



**APPENDIX 2**  
**QUARTERLY NOISE MONITORING**

# Quarterly Noise Monitoring Assessment

Jandra Quarry, March 2017.



# Document Information

## Quarterly Noise Monitoring Assessment

Jandra Quarry, Possum Brush, NSW

March 2017

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# 1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by VGT Pty Limited (VGT) on behalf of Holcim Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for the March 2017 quarter for Jandra Quarry ('the quarry'), Possum Brush, NSW.

The monitoring has been conducted in accordance with the Jandra Noise Management Plan and in general accordance with Conditions L4.2 to L4.8 of the EPL #2796 (EPL); at three representative monitoring locations. This assessment has been undertaken during Quarter 1, 2017 and forms part of the annual noise monitoring program to address conditions of the EPL.

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

- NSW Environment Protection Authority (EPA), Industrial Noise Policy (INP), 2000;
- Environment Protection Licence EPL #2796; and
- Standards Australia AS 1055.1:1997 - Acoustics - Description and measurement of environmental noise - General Procedures.

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

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## 2 Noise Criteria

Schedule 3, Section 1 of the Jandra Quarry Conditions of Consent, first approved on 30 March 2000 and modified on 13 March 2015, outlines the applicable noise criteria for residential receivers R1 – R7 surrounding the quarry site. Schedule 3 presents noise criteria which are applicable for two different operational activities undertaken onsite.

The first set of criteria (presented in Table 2 of the consent) are applicable when the site undertakes quarrying operations during the hours of 6am to 10pm.

The second set of criteria (presented in Table 3 of the consent) are applicable to 24 hour operations when quarrying operations and asphalt production occur simultaneously.

Furthermore, Section 5 of the Jandra Noise and Blasting Management Plan (NBMP) outlines that noise criteria do not apply at R1, R3, R8 - R10. Section 5 of the NBMP states:

- *'Holcim has executed a negotiated agreement with the property owner of R1 which excludes this receptor from the approved noise criteria';*
- *'R3 is not included in the approved noise criteria as this receiver represented road noise and the EA concluded that road noise impacts as a consequence of the development were below guideline thresholds and didn't warrant further assessment'; and*
- *'Receivers R8, R9 & R10 are Holcim owned residences and the approved criteria only apply to privately owned land'.*

**Table 1** presents the criteria for each of the receivers R1 – R10 as outlined in the Conditions of Consent for both quarry operation and combined quarry and asphalt production operations taking into account notes outlined in the NBMP.



**Table 1 Noise Criteria**

Location	Quarry Operations		Quarry Operations and Asphalt Plant Production	
	6am – 10pm	6am – 10pm	10pm – 6am	10pm – 6am
	LAeq(15min)	LAeq(15min)	LAeq(15min)	LA1(1min)
<i>R1<sup>1,2</sup></i>	46	48	46	51
R2	36	40	35	48
<i>R3<sup>1,2</sup></i>	N/A	N/A	N/A	N/A
R4	36	40	39	51
R5	40	41	39	51
R6	36	40	35	48
R7	35	36	35	48
<i>R8<sup>1,2</sup></i>	N/A	N/A	N/A	N/A
<i>R9<sup>1,2</sup></i>	N/A	N/A	N/A	N/A
<i>R10<sup>1,2</sup></i>	N/A	N/A	N/A	N/A

Note 1: Noise criteria are not applicable to these receivers as per Section 4 of the NBMP.

Note 2: Either quarry owned or excluded from the assessment as per Section 4 of the NBMP.

### 3 Methodology

#### 3.1 Locality

The quarry is located in Possum Brush, NSW approximately 16km south of Taree, NSW. Receivers in the locality surrounding the quarry are primarily rural/residential. The Pacific Highway is situated to the west of the site, with highway traffic a dominant noise source at all assessed receivers. To the east, the quarry is bounded by rural properties with noise from Tuncurry Road dominating the acoustic environment. The monitoring locations with respect to the quarry and assessed receivers are presented in the locality plan shown in **Figure 1**.

#### 3.2 Noise Monitoring Locations

Three monitoring locations have been selected as part of the NMA and in accordance with the NBMP. M1 is located adjacent to R1 to the north of the quarry and is used as a reference location for the northern catchment. It is noted that this assessment location has a negotiated agreement with Holcim, hence noise criteria are not mandatory. M2 is representative of receivers R2, R6 and R7, to the east of the quarry and M3 is situated to the west of the quarry and is representative of receivers R4 and R5.

#### 3.3 Assessment Methodology

The attended noise surveys were conducted in general accordance with the procedures described in Australian Standard AS 1055-1997, "Acoustics - Description and Measurement of Environmental Noise" and the EPL. The measurements were carried out using Svantek Type 1, 977 noise analyser on Thursday 30 March 2017 and Friday 31 March 2017. The acoustic instrumentation used carries current NATA calibration and complies with AS IEC 61672.1-2004-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed  $\pm 0.5$  dBA.

Noise measurements were of 15 minutes in duration and where possible, throughout each survey the operator quantified the contribution of each significant noise source. One measurement was conducted at each of the monitoring locations during the day monitoring period. Although the site was not undertaking Asphalt batching, evening and night measurements were undertaken for completeness. However due to the unprecedented April 2017 rainfall during the evening and night, measurements could not be completed at M1 and M3 during the evening period and all locations (M1 – M3) during the night period. An additional round of noise measurements was undertaken during the night/morning shoulder period (5.45am to 7.00am).

Extraneous noise sources were excluded from the analysis to calculate the  $L_{Aeq}(15min)$  quarry noise contribution for comparison against the relevant EPL criteria (criteria). In the event of quarry attributed noise being above criteria, prevailing meteorological conditions for the monitoring period were sourced from Taree airport's meteorological station and analysed in accordance with Appendix E4 of the INP to determine the stability category present at the time of each attended measurement.

The meteorological analysis has been completed to determine applicability of results in accordance with Condition L4.5 of the EPL. Results obtained during non-prevailing meteorological conditions (ie F Class Stability in conjunction with a 2m/s drainage wind or a G Class Stability) are considered not applicable against the EPL criteria.

FIGURE 1

LOCALITY PLAN

REF: MAC160381



KEY	
	RECEIVER / MONITORING LOCATION
	PROJECT SITE



\*Imagery Source : nearmap

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## 4 Results

### 4.1 Assessment Results - Location M1

The monitored noise level contributions and observed meteorological conditions for each assessment period at location M1 for Friday 31 March 2017 are presented in **Table 2**.

Table 2 Operator-Attended Noise Survey Results – Location M1						
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>		
31/03/2017	8:56 (Day)	54	46	43	Dir: Westerly Wind Speed: 0.5m/s Rain: Nil	Leaves Rustling 46 – 48
						Insects 43 – 45
						Highway traffic 45 – 48
						Quarry Bang 47
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						37
31/03/2017	6:40 (Night / Morning Shoulder)	56	44	42	Dir: Westerly Wind Speed: 0.4m/s Rain: Nil	Highway Traffic 44 - 46
						Insects and Frogs 42 - 45
						Quarry Hum 36 - 41
						Leaves Rustling and Dripping 40 - 48
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						36

## 4.2 Assessment Results - Location M2

The monitored noise level contributions and observed meteorological conditions for each assessment period at location M2 for Thursday 30 March and Friday 31 March 2017 are presented in **Table 3**.

**Table 3 Operator-Attended Noise Survey Results – Location M2**

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>		
31/03/2017	8:06 (Day)	72	47	39	Dir: Westerly Wind Speed: 0.5m/s Rain: Nil	Aircraft Noise 46 - 49
						Insects 42 - 47
						Traffic Hum 42 - 47
						Passing Car 56 - 70
Jandra Quarry LAeq(15min) Contribution						Quarry Inaudible
30/03/2017	18:33 (Evening)	58	40	33	Dir: Northerly Wind Speed: 0.1m/s Rain: Nil	Insects 36 - 43
						Traffic Hum 37 - 40
						Birds 41 - 52
						Leaves Rustling 42 - 44
Jandra Quarry LAeq(15min) Contribution						Quarry Inaudible
31/03/2017	5:37 (Morning shoulder)	59	49	44	Dir: Westerly Wind Speed: 1.0m/s Rain: Nil	Insects 47 - 53
						Traffic Hum 44 - 51
						Leaves Dripping 45 - 50
						Leaves Rustling 44 - 48
Jandra Quarry LAeq(15min) Contribution						Quarry Inaudible

#### 4.3 Assessment Results - Location M3

The monitored noise level contributions and observed meteorological conditions for each assessment period at location M3 for Friday 31 March 2017 are presented in **Table 4**.

Table 4 Operator-Attended Noise Survey Results – Location M3						
Date	Time (hrs)	Descriptor (dBA re 20 $\mu$ Pa)			Meteorology	Description and SPL, dBA
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>		
31/03/2017	8:34 (Day)	74	50	46	Dir: Westerly	Leaves Rustling 46 - 50
					Wind Speed: 0.3m/s	Leaves Dripping 45 - 48
					Rain: Nil	Highway traffic 48 - 60
	Jandra Quarry L <sub>Aeq</sub> (15min) Contribution					Quarry Inaudible
31/03/2017	6:06 (Night / Morning Shoulder)	60	50	45	Dir: Westerly	Insects 45 - 48
					Wind Speed: m/s	Highway Traffic 46 - 60
					Rain: Nil	Birds 46 - 50
	Jandra Quarry L <sub>Aeq</sub> (15min) Contribution					Quarry Inaudible



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## 5 Noise Compliance Assessment

The compliance assessment for each residential receiver R2, R4, R5, R6 and R7 are presented in **Table 5** to **Table 7** for day, evening and night assessment periods.

**Table 5 Daytime Noise Compliance Assessment**

Receiver No.	Quarry Noise	Quarrying Noise	Compliant	Quarrying & Asphalt	Compliant
	Contribution	Criteria		Production Criteria	
	LAeq(15min)	LAeq(15min)		LAeq(15min)	
R2	Nil	36	✓	40	✓
R4	Nil	36	✓	40	✓
R5	Nil	40	✓	41	✓
R6	Nil	36	✓	40	✓
R7	Nil	35	✓	36	✓

**Table 6 Evening Noise Compliance Assessment**

Receiver No.	Quarry Noise	Quarrying Noise	Compliant	Quarrying & Asphalt	Compliant
	Contribution	Criteria		Production Criteria	
	LAeq(15min)	LAeq(15min)		LAeq(15min)	
R2	Nil	36	✓	40	✓
R4	Nil	36	✓	40	✓
R5	Nil	40	✓	41	✓
R6	Nil	36	✓	40	✓
R7	Nil	35	✓	36	✓

**Table 7 Night-time Noise Compliance Assessment**

Receiver No.	Quarry Noise	Quarrying & Asphalt	Compliant	Quarry Noise	Quarrying & Asphalt	Compliant
	Contribution	Production Criteria		Contribution	Production Criteria	
	LAeq(15min)	LAeq(15min)		LA1(1min)	LA1(1min)	
R2	Nil	35	✓	Nil	48	✓
R4	Nil	39	✓	Nil	51	✓
R5	Nil	39	✓	Nil	51	✓
R6	Nil	35	✓	Nil	48	✓
R7	Nil	35	✓	Nil	48	✓

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## 6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a noise monitoring assessment for VGT Pty Ltd on behalf of Holcim Pty Ltd at the Jandra Quarry, Possum Brush, NSW. The assessment was completed to assess the quarry's compliance with the relevant criteria outlined in their EPL (EPL#2796) for several residential receivers surrounding the quarry.

Attended noise monitoring was undertaken on Thursday 30 March 2017 and Friday 31 March 2017 at representative monitoring locations with quarry noise contributions compared against the relevant criteria. The assessment has identified that noise emissions generated by Jandra Quarry comply with relevant statutory noise criteria specified in the conditions of consent at all assessed residential receivers.

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# Appendix A - Glossary of Terms

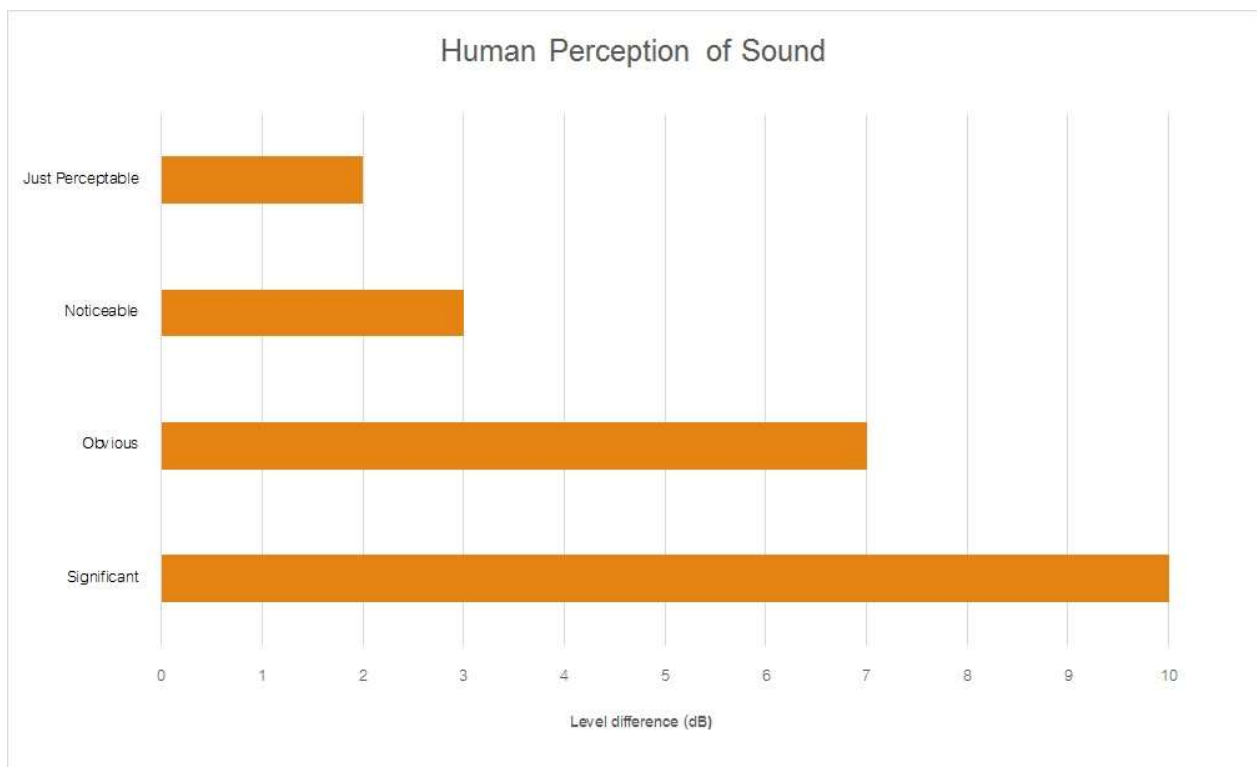
Table A1 provides a number of technical terms have been used in this report.

Table 1A Glossary of Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the INP as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured LA90 statistical noise levels.
Adverse Weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient Noise	The noise associated with a given environment. Typically a composite of sounds from many sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Linear or decibels Z-weighted.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
LA90	Commonly referred to as the background noise, this is the level exceeded 90 % of the time.
LAeq	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.
LAm <sub>ax</sub>	The maximum root mean squared (rms) sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
Sound power level (LW)	This is a measure of the total power radiated by a source. The sound power of a source is a fundamental location of the source and is independent of the surrounding environment. Or a measure of the energy emitted from a source as sound and is given by : $= 10 \cdot \log_{10} (W/W_0)$ Where : W is the sound power in watts and W <sub>0</sub> is the sound reference power at 10-12 watts.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA	
Source	Typical Sound Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound





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# Quarterly Noise Monitoring Assessment

Jandra Quarry, June 2017



# Document Information

## Quarterly Noise Monitoring Assessment

Jandra Quarry, Possum Brush, NSW

June 2017

Prepared for: VGT Pty Limited (on behalf of Holcim Pty Ltd)

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MAC160381RP3	Final	13 July 2017	Robin Heaton	<i>Robin Heaton</i>	Oliver Muller	<i>Oliver Muller</i>

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# 1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by VGT Pty Limited (VGT) on behalf of Holcim Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for the June 2017 quarter for Jandra Quarry ('the quarry'), Possum Brush, NSW.

The monitoring has been conducted in accordance with the Jandra Noise Management Plan and in general accordance with Conditions L4.2 to L4.8 of the EPL #2796 (EPL); at three representative monitoring locations. This assessment has been undertaken during Quarter 2, 2017 and forms part of the annual noise monitoring program to address conditions of the EPL.

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

- NSW Environment Protection Authority (EPA), Industrial Noise Policy (INP), 2000;
- Environment Protection Licence EPL #2796; and
- Standards Australia AS 1055.1:1997 - Acoustics - Description and measurement of environmental noise - General Procedures.

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

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## 2 Noise Criteria

Schedule 3, Section 1 of the Jandra Quarry Conditions of Consent, first approved on 30 March 2000 and modified on 13 March 2015, outlines the applicable noise criteria for residential receivers R1 – R7 surrounding the quarry site. Schedule 3 presents noise criteria which are applicable for two different operational activities undertaken onsite.

The first set of criteria (presented in Table 2 of the consent) are applicable when the site undertakes quarrying operations during the hours of 6am to 10pm.

The second set of criteria (presented in Table 3 of the consent) are applicable to 24 hour operations when quarrying operations and asphalt production occur simultaneously.

Furthermore, Section 5 of the Jandra Noise and Blasting Management Plan (NBMP) outlines that noise criteria do not apply at R1, R3, R8 - R10. Section 5 of the NBMP states:

- *'Holcim has executed a negotiated agreement with the property owner of R1 which excludes this receptor from the approved noise criteria';*
- *'R3 is not included in the approved noise criteria as this receiver represented road noise and the EA concluded that road noise impacts as a consequence of the development were below guideline thresholds and didn't warrant further assessment'; and*
- *'Receivers R8, R9 & R10 are Holcim owned residences and the approved criteria only apply to privately owned land'.*



**Table 1** presents the criteria for each of the receivers R1 – R10 as outlined in the Conditions of Consent for both quarry operation and combined quarry and asphalt production operations.

<b>Table 1 Noise Criteria</b>				
Location	Quarry Operations		Quarry Operations and Asphalt Plant Production	
	6am – 10pm	6am – 10pm	10pm – 6am	10pm – 6am
	LAeq(15min)	LAeq(15min)	LAeq(15min)	LA1(1min)
<i>R1<sup>1,2</sup></i>	46	48	46	51
R2	36	40	35	48
<i>R3<sup>1,2</sup></i>	N/A	N/A	N/A	N/A
R4	36	40	39	51
R5	40	41	39	51
R6	36	40	35	48
R7	35	36	35	48
<i>R8<sup>1,2</sup></i>	N/A	N/A	N/A	N/A
<i>R9<sup>1,2</sup></i>	N/A	N/A	N/A	N/A
<i>R10<sup>1,2</sup></i>	N/A	N/A	N/A	N/A

Note 1: Noise criteria are not applicable to these receivers as per Section 5 of the NBMP.

Note 2: Either quarry owned or excluded from the assessment as per Section 5 of the NBMP.

### 3 Methodology

#### 3.1 Locality

The quarry is located in Possum Brush, NSW approximately 16km south of Taree, NSW. Receivers in the locality surrounding the quarry are primarily rural/residential. The Pacific Highway is situated to the west of the site, with highway traffic a dominant noise source at all assessed receivers. To the east, the quarry is bounded by rural properties with noise from Tuncurry Road dominating the acoustic environment. The monitoring locations with respect to the quarry and assessed receivers are presented in the locality plan shown in **Figure 1**.

#### 3.2 Noise Monitoring Locations

Three monitoring locations have been selected as part of the NMA and in accordance with the NBMP. M1 is located adjacent to R1 to the north of the quarry and is used as a reference location for the northern catchment. It is noted that this assessment location has a negotiated agreement with Holcim, hence noise criteria are not mandatory. M2 is representative of receivers R2, R6 and R7, to the east of the quarry and M3 is situated to the west of the quarry and is representative of receivers R4 and R5.

#### 3.3 Assessment Methodology

The attended noise surveys were conducted in general accordance with the procedures described in Australian Standard AS 1055-1997, "Acoustics - Description and Measurement of Environmental Noise" and the EPL. The measurements were carried out using Svantek Type 1, 971 noise analyser on Tuesday 27 June 2017 and Wednesday 28 June 2017. The acoustic instrumentation used carries current NATA calibration and complies with AS IEC 61672.1-2004-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed  $\pm 0.5$  dBA.

Noise measurements were of 15 minutes in duration and where possible, throughout each survey the operator quantified the contribution of each significant noise source. One measurement was conducted at each of the monitoring locations during the day monitoring period. Although the site was not undertaking Asphaltting, evening measurements were undertaken for completeness. An additional round of noise measurements were completed during the night/morning shoulder period.

FIGURE 1

LOCALITY PLAN

REF: MAC160381



KEY	
	RECEIVER / MONITORING LOCATION
	PROJECT SITE



\*Imagery Source : nearmap

## 4 Results

### 4.1 Assessment Results - Location M1

The monitored noise level contributions and observed meteorological conditions for each assessment period at location M1 for Tuesday 27 June 2017 and Wednesday 28 June 2017 are presented in **Table 2**.

**Table 2 Operator-Attended Noise Survey Results – Location M1**

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>		
28/6/17	09:23 (Day)	60	44	41	Dir: W Wind Speed: 0.1 m/s Rain: Nil	Highway traffic 42-47
						Birds 34-45
						Insects <32
						Aircraft 39-58
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						33
27/6/17	19:00 (Evening)	57	49	45	Dir: S Wind Speed: 0.1 m/s Rain: Nil	Highway traffic 44-53
						Insects <40
						Jandra Quarry L <sub>Aeq</sub> (15min) Contribution
28/6/17	05:34 (Morning shoulder)	56	46	42	Dir: W Wind Speed: 0.1 m/s Rain: Nil	Wind in trees 31-36
						Highway traffic 31-41
						Jandra Quarry L <sub>Aeq</sub> (15min) Contribution

## 4.2 Assessment Results - Location M2

The monitored noise level contributions and observed meteorological conditions for each assessment period at location M2 for Tuesday 27 June 2017 and Wednesday 28 June 2017 are presented in **Table 3**.

Table 3 Operator-Attended Noise Survey Results – Location M2						
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>		
28/6/17	08:50	71	44	39	Dir: W Wind Speed: 0.1 m/s Rain: Nil	Highway traffic 35-42
	(Day)					Birds 33-44 Dog 21-34 Rooster 32-39
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Quarry Inaudible
27/6/17	19:31	47	36	31	Dir: S Wind Speed: 0.1 m/s Rain: Nil	Highway traffic 31-39
	(Evening)					Insects <30
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Quarry Inaudible
28/6/17	05:02	57	35	31	Dir: S Wind Speed: 0.1 m/s Rain: Nil	Livestock <34
	(Morning shoulder)					Highway traffic 28-33 Insects <30
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Quarry Inaudible

### 4.3 Assessment Results - Location M3

The monitored noise level contributions and observed meteorological conditions for each assessment period at location M3 for Tuesday 27 June 2017 and Wednesday 28 June 2017 are presented in **Table 4**.

Table 4 Operator-Attended Noise Survey Results – Location M3						
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>		
28/6/17	09:49	75	62	52	Dir: W	Highway traffic 52-71
	(Day)				Wind Speed: 0.1 m/s	Birds 39-61
					Rain: Nil	
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Quarry Inaudible
27/6/17	18:30	78	61	49	Dir: S	Highway traffic 47-65
	(Evening)				Wind Speed: 0.2 m/s	Insects <30
					Rain: Nil	
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Quarry Inaudible
28/6/17	06:11	73	60	47	Dir: W	Highway traffic 37-68
	(Morning				Wind Speed: 0.1 m/s	Wind in trees 36-38
	shoulder)				Rain: Nil	
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Quarry Inaudible

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## 5 Noise Compliance Assessment

The compliance assessment for each residential receiver R2, R4, R5, R6 and R7 are presented in **Table 5** to **Table 7** for day, evening and night assessment periods.

**Table 5 Daytime Noise Compliance Assessment**

Receiver No.	Quarry Noise	Quarrying Noise	Compliant	Quarrying & Asphalt	Compliant
	Contribution	Criteria		Production Criteria	
	LAeq(15min)	LAeq(15min)		LAeq(15min)	
R2	Nil	36	✓	40	✓
R4	Nil	36	✓	40	✓
R5	Nil	40	✓	41	✓
R6	Nil	36	✓	40	✓
R7	Nil	35	✓	36	✓

**Table 6 Evening Noise Compliance Assessment**

Receiver No.	Quarry Noise	Quarrying Noise	Compliant	Quarrying & Asphalt	Compliant
	Contribution	Criteria		Production Criteria	
	LAeq(15min)	LAeq(15min)		LAeq(15min)	
R2	Nil	36	✓	40	✓
R4	Nil	36	✓	40	✓
R5	Nil	40	✓	41	✓
R6	Nil	36	✓	40	✓
R7	Nil	35	✓	36	✓

**Table 7 Night-time Noise Compliance Assessment**

Receiver No.	Quarry Noise	Quarrying & Asphalt	Compliant	Quarry Noise	Quarrying & Asphalt	Compliant
	Contribution	Production Criteria		Contribution	Production Criteria	
	LAeq(15min)	LAeq(15min)		LA1(1min)	LA1(1min)	
R2	Nil	35	✓	Nil	48	✓
R4	Nil	39	✓	Nil	51	✓
R5	Nil	39	✓	Nil	51	✓
R6	Nil	35	✓	Nil	48	✓
R7	Nil	35	✓	Nil	48	✓



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## 6 Discussion

### 6.1 Discussion of Results - Location M1

It is noted that this location is a reference location only and criteria are not applicable under the EPL for this receiver. Monitoring on 27 June 2017 and 28 June 2017 identified that quarry noise was audible on one of three occasions during the June 2017 monitoring assessment. Quarry noise emissions were audible during the day period on 28 June 2017. Quarry emissions ranged from 31dBA to 36dBA, it is noted that the quarry was not operational during the evening period although background measurements were undertaken for completeness. Extraneous sources audible during the three attended surveys included birds, wind in trees, insects, aircraft and highway traffic.

### 6.2 Discussion of Results - Location M2

Monitoring results at M2 during the June 2017 quarter were dominated by highway traffic that was mostly constant during all three attended measurements. Quarry emissions were inaudible on all three occasions, therefore satisfying the relevant daytime noise limits. The quarry was not operational during the evening period, although ambient measurements were undertaken to satisfy the EPL. Extraneous sources include birds, highway traffic, dog, rooster, insects and livestock.

### 6.3 Discussion of Results - Location M3

Quarry noise was inaudible on all three occasions during the June 2017 survey period satisfying the morning, daytime and evening criteria. The quarry was not operational during the evening period although monitoring was completed as per the requirements of the EPL. Non-quarry noise sources included birds, highway traffic, insects, and wind in trees.

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## 7 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment for VGT Pty Ltd on behalf of Holcim Pty Ltd at the Jandra Quarry, Possum Brush, NSW. The assessment was completed to assess the quarry's compliance with the relevant criteria outlined in their EPL (EPL#2796) for several residential receivers surrounding the quarry.

Attended noise monitoring was undertaken on Tuesday 27 June 2017 and Wednesday 28 June 2017 at representative monitoring locations with quarry noise contributions compared against the relevant criteria. The assessment has identified that noise emissions generated by Jandra Quarry comply with relevant statutory noise criteria specified in the Conditions of Consent at all assessed locations.

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# Appendix A - Glossary of Terms

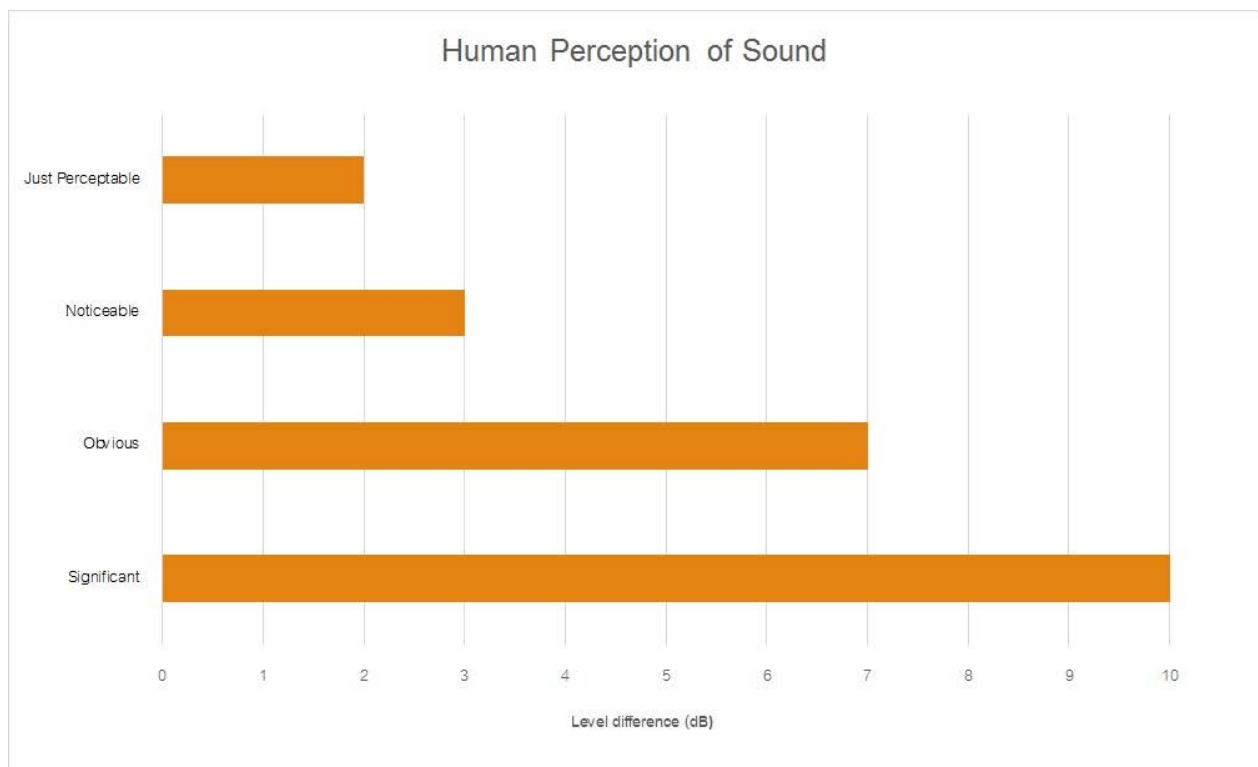
Table A1 provides a number of technical terms have been used in this report.

Table 1A Glossary of Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the INP as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured LA90 statistical noise levels.
Adverse Weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient Noise	The noise associated with a given environment. Typically a composite of sounds from many sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Linear or decibels Z-weighted.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
LA90	Commonly referred to as the background noise, this is the level exceeded 90 % of the time.
LAeq	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.
LAm <sub>ax</sub>	The maximum root mean squared (rms) sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
Sound power level (LW)	This is a measure of the total power radiated by a source. The sound power of a source is a fundamental location of the source and is independent of the surrounding environment. Or a measure of the energy emitted from a source as sound and is given by : $= 10 \cdot \log_{10} (W/W_0)$ Where : W is the sound power in watts and W <sub>0</sub> is the sound reference power at 10-12 watts.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA	
Source	Typical Sound Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound





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# Quarterly Noise Monitoring Assessment

Jandra Quarry, September 2017



# Document Information

## Quarterly Noise Monitoring Assessment

### Jandra Quarry, Possum Brush, NSW

### September 2017

Prepared for: VGT Pty Limited (on behalf of Holcim Pty Ltd)

**Prepared by:** Muller Acoustic Consulting Pty Ltd

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Document ID	Status	Date	Prepared By	Signed
MAC160381RP4	Final	16 October 2017	Oliver Muller	

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# 1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by VGT Pty Limited (VGT) on behalf of Holcim Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for the September 2017 quarter for Jandra Quarry ('the quarry'), Possum Brush, NSW.

The monitoring has been conducted in accordance with the Jandra Noise Management Plan and in general accordance with Conditions L4.2 to L4.8 of the EPL #2796 (EPL); at three representative monitoring locations. This assessment has been undertaken during Quarter 3, 2017 and forms part of the annual noise monitoring program to address conditions of the EPL.

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

- NSW Environment Protection Authority (EPA), Industrial Noise Policy (INP), 2000;
- Environment Protection Licence EPL #2796; and
- Standards Australia AS 1055.1:1997 - Acoustics - Description and measurement of environmental noise - General Procedures.

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

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## 2 Noise Criteria

Schedule 3, Section 1 of the Jandra Quarry Conditions of Consent, first approved on 30 March 2000 and modified on 13 March 2015, outlines the applicable noise criteria for residential receivers R1 – R7 surrounding the quarry site. Schedule 3 presents noise criteria which are applicable for two different operational activities undertaken onsite.

The first set of criteria (presented in Table 2 of the consent) are applicable when the site undertakes quarrying operations during the hours of 6am to 10pm.

The second set of criteria (presented in Table 3 of the consent) are applicable to 24 hour operations when quarrying operations and asphalt production occur simultaneously.

Furthermore, Section 5 of the Jandra Noise and Blasting Management Plan (NBMP) outlines that noise criteria do not apply at R1, R3, R8 - R10. Section 5 of the NBMP states:

- *'Holcim has executed a negotiated agreement with the property owner of R1 which excludes this receptor from the approved noise criteria';*
- *'R3 is not included in the approved noise criteria as this receiver represented road noise and the EA concluded that road noise impacts as a consequence of the development were below guideline thresholds and didn't warrant further assessment'; and*
- *'Receivers R8, R9 & R10 are Holcim owned residences and the approved criteria only apply to privately owned land'.*



**Table 1** presents the criteria for each of the receivers R1 – R10 as outlined in the Conditions of Consent for both quarry operation and combined quarry and asphalt production operations.

<b>Table 1 Noise Criteria</b>				
Location	Quarry Operations		Quarry Operations and Asphalt Plant Production	
	6am – 10pm	6am – 10pm	10pm – 6am	10pm – 6am
	LAeq(15min)	LAeq(15min)	LAeq(15min)	LA1(1min)
<i>R1<sup>1,2</sup></i>	46	48	46	51
R2	36	40	35	48
<i>R3<sup>1,2</sup></i>	N/A	N/A	N/A	N/A
R4	36	40	39	51
R5	40	41	39	51
R6	36	40	35	48
R7	35	36	35	48
<i>R8<sup>1,2</sup></i>	N/A	N/A	N/A	N/A
<i>R9<sup>1,2</sup></i>	N/A	N/A	N/A	N/A
<i>R10<sup>1,2</sup></i>	N/A	N/A	N/A	N/A

Note 1: Noise criteria are not applicable to these receivers as per Section 5 of the NBMP.

Note 2: Either quarry owned or excluded from the assessment as per Section 5 of the NBMP.

### 3 Methodology

#### 3.1 Locality

The quarry is located in Possum Brush, NSW approximately 16km south of Taree, NSW. Receivers in the locality surrounding the quarry are primarily rural/residential. The Pacific Highway is situated to the west of the site, with highway traffic a dominant noise source at all assessed receivers. To the east, the quarry is bounded by rural properties with noise from Tuncurry Road dominating the acoustic environment. The monitoring locations with respect to the quarry and assessed receivers are presented in the locality plan shown in **Figure 1**.

#### 3.2 Noise Monitoring Locations

Three monitoring locations have been selected as part of the NMA and in accordance with the NBMP. M1 is located adjacent to R1 to the north of the quarry and is used as a reference location for the northern catchment. It is noted that this assessment location has a negotiated agreement with Holcim, hence noise criteria are not mandatory. M2 is representative of receivers R2, R6 and R7, to the east of the quarry and M3 is situated to the west of the quarry and is representative of receivers R4 and R5.

#### 3.3 Assessment Methodology

The attended noise surveys were conducted in general accordance with the procedures described in Australian Standard AS 1055-1997, "Acoustics - Description and Measurement of Environmental Noise" and the EPL. The measurements were carried out using Svantek Type 1, 971 noise analyser on Tuesday 19 September 2017 and Wednesday 20 September 2017. The acoustic instrumentation used carries current NATA calibration and complies with AS IEC 61672.1-2004-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed  $\pm 0.5\text{dBA}$ .



Noise measurements were of 15 minutes in duration and where possible, throughout each survey the operator quantified the contribution of each significant noise source. One measurement was conducted at each of the monitoring locations during the day monitoring period. Although the site was not undertaking Asphaltting, evening measurements were undertaken for completeness. An additional round of noise measurements were completed during the night/morning shoulder period.

FIGURE 1

LOCALITY PLAN

REF: MAC160381



KEY	
	RECEIVER / MONITORING LOCATION
	PROJECT SITE



\*Imagery Source : nearmap

## 4 Results

### 4.1 Assessment Results - Location M1

The monitored noise level contributions and observed meteorological conditions for each assessment period at location M1 for Tuesday 19 September 2017 and Wednesday 20 September 2017 are presented in **Table 2**.

Table 2 Operator-Attended Noise Survey Results – Location M1						
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>		
19/9/17	13:36 (Day)	63	43	39	Dir: SE	Birds 43-51
					Wind Speed: 1.0 m/s	Distant traffic 39-46
					Rain: Nil	Wind in trees <43
Jandra Quarry LAeq(15min) Contribution						Quarry Inaudible
19/9/17	18:35 (Evening)	58	43	40	Dir: SE	Insects <38
					Wind Speed: 0.1 m/s	Highway traffic 38-42
					Rain: Nil	
Jandra Quarry LAeq(15min) Contribution						Quarry Inaudible
20/9/17	06:31 (Morning shoulder)	73	52	46	Dir: SE	Birds 48-72
					Wind Speed: 0.2 m/s	Highway traffic 48-53
					Rain: Nil	
Jandra Quarry LAeq(15min) Contribution						Quarry Inaudible

## 4.2 Assessment Results - Location M2

The monitored noise level contributions and observed meteorological conditions for each assessment period at location M2 for Tuesday 19 September 2017 and Wednesday 20 September 2017 are presented in **Table 3**.

Table 3 Operator-Attended Noise Survey Results – Location M2						
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>		
19/9/17	14:30 (Day)	63	46	41	Dir: SE Wind Speed: 0.8 m/s Rain: Nil	Local traffic 46-48
						Aircraft 46-58
						Wind in trees 39-41
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Quarry Inaudible
19/9/17	18:00 (Evening)	64	43	34	Dir: S Wind Speed: 0.5 m/s Rain: Nil	Local traffic 38-42
						Birds <39-57
						Livestock 37-41
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Quarry Inaudible
20/9/17	06:00 (Morning shoulder)	57	44	35	Dir: S Wind Speed: 0.2 m/s Rain: Nil	Birds & roosters 34-49
						Dog bark 43-54
						Distant traffic 36-40
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Quarry Inaudible
Livestock <44						

### 4.3 Assessment Results - Location M3

The monitored noise level contributions and observed meteorological conditions for each assessment period at location M3 for Tuesday 19 September 2017 and Wednesday 20 September 2017 are presented in **Table 4**.

Table 4 Operator-Attended Noise Survey Results – Location M3						
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>		
19/9/17	13:59 (Day)	64	54	49	Dir: SE	Highway traffic 48-52
					Wind Speed: 1.2 m/s	Wind in trees <48
					Rain: Nil	Birds <48
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Quarry Inaudible
19/9/17	19:00 (Evening)	65	56	48	Dir: SE	Highway traffic 48-53
					Wind Speed: 0.1 m/s	
					Rain: Nil	
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Quarry Inaudible
20/9/17	06:54 (Morning shoulder)	68	58	49	Dir: SE	Highway traffic 55-64
					Wind Speed: 0.1 m/s	Birds <57
					Rain: Nil	
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Quarry Inaudible

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## 5 Noise Compliance Assessment

The compliance assessment for each residential receiver R2, R4, R5, R6 and R7 are presented in **Table 5** to **Table 7** for day, evening and morning shoulder/night assessment periods.

**Table 5 Daytime Noise Compliance Assessment**

Receiver No.	Quarry Noise	Quarrying Noise	Compliant	Quarrying & Asphalt	Compliant
	Contribution	Criteria		Production Criteria	
	LAeq(15min)	LAeq(15min)		LAeq(15min)	
R2	Nil	36	✓	40	✓
R4	Nil	36	✓	40	✓
R5	Nil	40	✓	41	✓
R6	Nil	36	✓	40	✓
R7	Nil	35	✓	36	✓

**Table 6 Evening Noise Compliance Assessment**

Receiver No.	Quarry Noise	Quarrying Noise	Compliant	Quarrying & Asphalt	Compliant
	Contribution	Criteria		Production Criteria	
	LAeq(15min)	LAeq(15min)		LAeq(15min)	
R2	Nil	36	✓	40	✓
R4	Nil	36	✓	40	✓
R5	Nil	40	✓	41	✓
R6	Nil	36	✓	40	✓
R7	Nil	35	✓	36	✓

**Table 7 Morning Shoulder/Night Noise Compliance Assessment**

Receiver No.	Quarry Noise	Quarrying & Asphalt	Compliant	Quarry Noise	Quarrying & Asphalt	Compliant
	Contribution	Production Criteria		Contribution	Production Criteria	
	LAeq(15min)	LAeq(15min)		LA1(1min)	LA1(1min)	
R2	Nil	35	✓	Nil	48	✓
R4	Nil	39	✓	Nil	51	✓
R5	Nil	39	✓	Nil	51	✓
R6	Nil	35	✓	Nil	48	✓
R7	Nil	35	✓	Nil	48	✓



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## 6 Discussion

### 6.1 Discussion of Results - Location M1

It is noted that M1 is a reference location only, and criteria is not applicable under the EPL for this receiver. Monitoring on 19 September 2017 and 20 September 2017 identified that quarry noise was inaudible on all three occasions during the September 2017 monitoring assessment. It is noted that the quarry was not operational during the evening period although background measurements were undertaken for completeness. Extraneous sources audible during the three attended surveys included birds, wind in trees, insects and highway traffic.

### 6.2 Discussion of Results - Location M2

Monitoring results at M2 during the September 2017 quarter were dominated by highway traffic that was mostly constant during all three attended measurements. Quarry emissions were inaudible on all three occasions, therefore satisfying the relevant daytime noise limits. The quarry was not operational during the evening period, although ambient measurements were undertaken to satisfy the EPL. Extraneous sources include birds, highway traffic, dog bark, rooster, aircraft, insects and livestock.

### 6.3 Discussion of Results - Location M3

Quarry noise was inaudible on all three occasions during the September 2017 survey period satisfying the morning, daytime and evening criteria. The quarry was not operational during the evening period although monitoring was completed as per the requirements of the EPL. Non-quarry noise sources included birds, highway traffic and wind in trees.

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## 7 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment for VGT Pty Ltd on behalf of Holcim Pty Ltd at the Jandra Quarry, Possum Brush, NSW. The assessment was completed to assess the quarry's compliance with the relevant criteria outlined in their EPL (EPL#2796) for several residential receivers surrounding the quarry.

Attended noise monitoring was undertaken on Tuesday 19 September 2017 and Wednesday 20 September 2017 at representative monitoring locations with quarry noise contributions compared against the relevant criteria. The assessment has identified that noise emissions generated by Jandra Quarry comply with relevant statutory noise criteria specified in the Conditions of Consent at all assessed locations.

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# Appendix A - Glossary of Terms

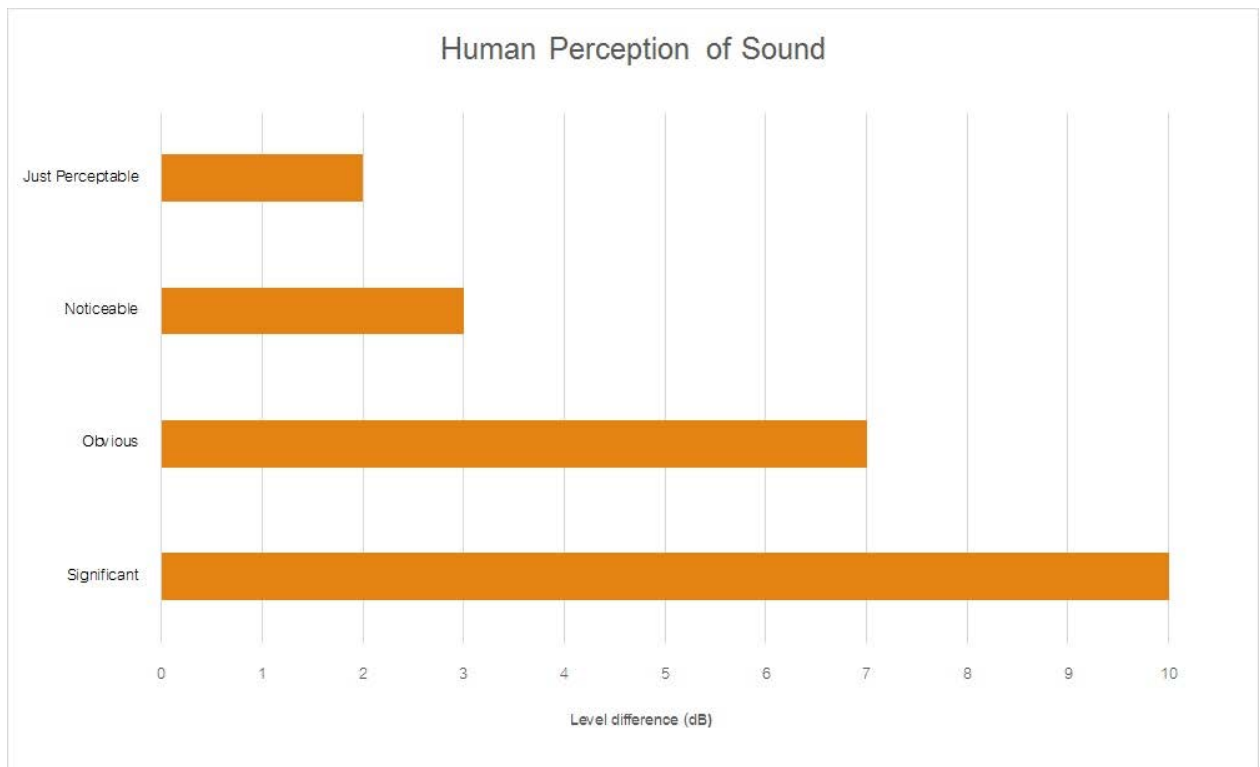
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Ambient Noise	The noise associated with a given environment. Typically a composite of sounds from many sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Linear or decibels Z-weighted.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
LA90	Commonly referred to as the background noise, this is the level exceeded 90 % of the time.
LAeq	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.
LAm <sub>ax</sub>	The maximum root mean squared (rms) sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
Sound power level (LW)	This is a measure of the total power radiated by a source. The sound power of a source is a fundamental location of the source and is independent of the surrounding environment. Or a measure of the energy emitted from a source as sound and is given by : $= 10 \cdot \log_{10} (W/W_0)$ Where : W is the sound power in watts and W <sub>0</sub> is the sound reference power at 10-12 watts.

Table A2 provides a list of common noise sources and their typical sound level.

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Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
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Figure A1 – Human Perception of Sound





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# Quarterly Noise Monitoring Assessment

Jandra Quarry, December 2017



# Document Information

## Quarterly Noise Monitoring Assessment

### Jandra Quarry, Possum Brush, NSW

### December 2017

Prepared for: VGT Pty Limited (on behalf of Holcim Pty Ltd)

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# 1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by VGT Pty Limited (VGT) on behalf of Holcim Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for the December 2017 quarter for Jandra Quarry ('the quarry'), Possum Brush, NSW.

The monitoring has been conducted in accordance with the Jandra Noise Management Plan and in general accordance with Conditions L4.2 to L4.8 of the EPL #2796 (EPL); at three representative monitoring locations. This assessment has been undertaken during Quarter 4, December 2017 and forms part of the annual noise monitoring program to address conditions of the EPL.

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

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- Environment Protection Licence EPL #2796; and
- Standards Australia AS 1055.1:1997 - Acoustics - Description and measurement of environmental noise - General Procedures.

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

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## 2 Noise Criteria

Schedule 3, Section 1 of the Jandra Quarry Conditions of Consent, first approved on 30 March 2000 and modified on 13 March 2015, outlines the applicable noise criteria for residential receivers surrounding the quarry site. Schedule 3 presents noise criteria which are applicable for two different operational activities undertaken onsite.

The first set of criteria (presented in Table 2 of the consent) are applicable when the site undertakes quarrying operations during the hours of 6am to 10pm.

The second set of criteria (presented in Table 3 of the consent) are applicable to 24 hour operations when quarrying operations and asphalt production occur simultaneously.

Furthermore, Section 5 of the Jandra Noise and Blasting Management Plan (NBMP) outlines that noise criteria do not apply at R1, R3, R8 - R10. Section 5 of the NBMP states:

- *'Holcim has executed a negotiated agreement with the property owner of R1 which excludes this receptor from the approved noise criteria';*
- *'R3 is not included in the approved noise criteria as this receiver represented road noise and the EA concluded that road noise impacts as a consequence of the development were below guideline thresholds and didn't warrant further assessment'; and*
- *'Receivers R8, R9 & R10 are Holcim owned residences and the approved criteria only apply to privately owned land'.*



**Table 1** presents the criteria for each of the receivers R1 – R10 as outlined in the Conditions of Consent for both quarry operation and combined quarry and asphalt production operations.

<b>Table 1 Noise Criteria</b>				
Location	Quarry Operations		Quarry Operations and Asphalt Plant Production	
	6am – 10pm	6am – 10pm	10pm – 6am	10pm – 6am
	dBA, LAeq(15min)	dBA, LAeq(15min)	dBA, LAeq(15min)	LA1(1min)
<i>R1<sup>1,2</sup></i>	46	48	46	51
R2	36	40	35	48
<i>R3<sup>1,2</sup></i>	N/A	N/A	N/A	N/A
R4	36	40	39	51
R5	40	41	39	51
R6	36	40	35	48
R7	35	36	35	48
<i>R8<sup>1,2</sup></i>	N/A	N/A	N/A	N/A
<i>R9<sup>1,2</sup></i>	N/A	N/A	N/A	N/A
<i>R10<sup>1,2</sup></i>	N/A	N/A	N/A	N/A

Note 1: Noise criteria are not applicable to these receivers as per Section 5 of the NBMP.

Note 2: Either quarry owned or excluded from the assessment as per Section 5 of the NBMP.

### 3 Methodology

#### 3.1 Locality

The quarry is located in Possum Brush, NSW approximately 16km south of Taree, NSW. Receivers in the locality surrounding the quarry are primarily rural/residential. The Pacific Highway is situated to the west of the site, with highway traffic a dominant noise source at all assessed receivers. To the east, the quarry is bounded by rural properties with noise from Tuncurry Road dominating the acoustic environment. The monitoring locations with respect to the quarry and assessed receivers are presented in the locality plan shown in **Figure 1**.

#### 3.2 Noise Monitoring Locations

Three monitoring locations have been selected as part of the NMA and in accordance with the NBMP. M1 is located adjacent to R1 to the north of the quarry and is used as a reference location for the northern catchment. It is noted that this assessment location has a negotiated agreement with Holcim, hence noise criteria are not mandatory. M2 is representative of receivers R2, R6 and R7, to the east of the quarry and M3 is situated to the west of the quarry and is representative of receivers R4 and R5.

#### 3.3 Assessment Methodology

The attended noise surveys were conducted in general accordance with the procedures described in Australian Standard AS 1055-1997, "Acoustics - Description and Measurement of Environmental Noise" and the EPL. The measurements were carried out using Svantek Type 1, 971 noise analyser on Tuesday 12 December 2017 and Wednesday 13 December 2017. The acoustic instrumentation used carries current NATA calibration and complies with AS IEC 61672.1-2004-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed  $\pm 0.5$  dBA.

Noise measurements were of 15 minutes in duration and where possible, throughout each survey the operator quantified the contribution of each significant noise source. One measurement was conducted at each of the monitoring locations during the day monitoring period. Although the site was not undertaking asphaltting, evening measurements were undertaken for completeness. An additional round of noise measurements was completed during the night/morning shoulder period (ie 6am to 7am).

FIGURE 1

LOCALITY PLAN

REF: MAC160381



KEY

- R7 RECEIVER / MONITORING LOCATION
- PROJECT SITE



\*Imagery Source : nearmap

## 4 Results

### 4.1 Assessment Results - Location M1

The monitored noise level contributions and observed meteorological conditions for each assessment period at location M1 for Tuesday 12 December 2017 and Wednesday 13 December 2017 are presented in **Table 2**.

Table 2 Operator-Attended Noise Survey Results – Location M1						
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>		
12/12/17	15:25	73	65	61	Dir: NE Wind Speed: 0.5m/s Rain: Nil	Insects 61-63
	(Day)					Birds 61-69 Highway traffic 63-66 Aircrafts 64-66
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Quarry Inaudible
12/12/17	18:00	60	47	43	Dir: NE Wind Speed: 1m/s Rain: Nil	Insects <44
	(Evening)					Highway traffic 44-50 Birds 46-51 Wind in trees <44
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Quarry Inaudible
13/12/17	06:08	69	52	44	Dir: N Wind Speed: 0.1m/s Rain: Nil	Highway traffic 41-54
	(Morning shoulder)					Birds 46-53
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Quarry Inaudible

## 4.2 Assessment Results - Location M2

The monitored noise level contributions and observed meteorological conditions for each assessment period at location M2 for Tuesday 12 December 2017 and Wednesday 13 December 2017 are presented in **Table 3**.

Table 3 Operator-Attended Noise Survey Results – Location M2						
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>		
12/12/17	16:14 (Day)	67	51	45	Dir: N Wind Speed: 1m/s Rain: Nil	Insects 50-51
						Wind in trees 50-51
						Birds 49-53
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Distant traffic 48-49
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Quarry Inaudible
12/12/17	18:48 (Evening)	75	51	41	Dir: NE Wind Speed: 0.1m/s Rain: Nil	Insects <38
						Roosters 38-45
						Distant traffic 42-48
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Wind in trees <38
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Birds 42-65
13/12/17	06:55 (Morning shoulder)	73	56	42	Dir: N Wind Speed: 0.1m/s Rain: Nil	Insects <41
						Distant traffic 42-47
						Birds 41-43
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Rooster 44-49
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Quarry Inaudible

### 4.3 Assessment Results - Location M3

The monitored noise level contributions and observed meteorological conditions for each assessment period at location M3 for Tuesday 12 December 2017 and Wednesday 13 December 2017 are presented in **Table 4**.

Table 4 Operator-Attended Noise Survey Results – Location M3						
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>		
12/12/17	15:47 (Day)	86	79	75	Dir: NE	Highway traffic 82-86
					Wind Speed: 1m/s	Insects 80-82
					Rain: Nil	Birds 78-79
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Quarry Inaudible
12/12/17	18:21 (Evening)	85	76	69	Dir: NE	Insects 69-80
					Wind Speed: 0.5m/s	Highway traffic 71-81
					Rain: Nil	
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Quarry Inaudible
13/12/17	06:28 (Morning shoulder)	73	69	66	Dir: N	Highway traffic 64-70
					Wind Speed: 0.1m/s	Insects <64
					Rain: Nil	Birds <66
Jandra Quarry L <sub>Aeq</sub> (15min) Contribution						Quarry Inaudible

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## 5 Noise Compliance Assessment

The compliance assessment for each residential receiver R2, R4, R5, R6 and R7 are presented in **Table 5** to **Table 7** for day, evening and morning shoulder/night assessment periods.

**Table 5 Daytime Noise Compliance Assessment**

Receiver No.	Quarry Noise	Quarrying Noise	Compliant	Quarrying & Asphalt	Compliant
	Contribution	Criteria		Production Criteria	
	dBA, LAeq(15min)	dBA, LAeq(15min)		dBA, LAeq(15min)	
R2	Nil	36	✓	40	✓
R4	Nil	36	✓	40	✓
R5	Nil	40	✓	41	✓
R6	Nil	36	✓	40	✓
R7	Nil	35	✓	36	✓

**Table 6 Evening Noise Compliance Assessment**

Receiver No.	Quarry Noise	Quarrying Noise	Compliant	Quarrying & Asphalt	Compliant
	Contribution	Criteria		Production Criteria	
	dBA, LAeq(15min)	dBA, LAeq(15min)		dBA, LAeq(15min)	
R2	Nil	36	✓	40	✓
R4	Nil	36	✓	40	✓
R5	Nil	40	✓	41	✓
R6	Nil	36	✓	40	✓
R7	Nil	35	✓	36	✓

**Table 7 Morning Shoulder/Night Noise Compliance Assessment**

Receiver No.	Quarry Noise	Quarrying & Asphalt	Compliant	Quarry Noise	Quarrying & Asphalt	Compliant
	Contribution	Production Criteria		Contribution	Production Criteria	
	dBA, LAeq(15min)	dBA, LAeq(15min)		dBA, LA1(1min)	dBA, LA1(1min)	
R2	Nil	35	✓	Nil	48	✓
R4	Nil	39	✓	Nil	51	✓
R5	Nil	39	✓	Nil	51	✓
R6	Nil	35	✓	Nil	48	✓
R7	Nil	35	✓	Nil	48	✓



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## 6 Discussion

### 6.1 Discussion of Results - Location M1

It is noted that M1 is a reference location only, and criteria is not applicable under the EPL for this receiver. Monitoring on 12 December 2017 and 13 December 2017 identified that quarry noise was inaudible on all three occasions during the December 2017 monitoring assessment demonstrating compliance with the EPL at R1 and receivers situated to the north of this location. It is noted that the quarry was not operational during the evening period although background measurements were undertaken for completeness. Extraneous sources audible during the three attended surveys included insects, birds, highway traffic, aircrafts and wind in trees.

### 6.2 Discussion of Results - Location M2

Monitoring results at M2 during the December 2017 quarter were inaudible during all three attended measurements, therefore satisfying the relevant daytime noise limits. The quarry was not operational during the evening period, although ambient measurements were undertaken to satisfy the EPL. Extraneous sources include insects, wind in trees, birds and distant traffic.

### 6.3 Discussion of Results - Location M3

Quarry noise was inaudible on all three occasions during the December 2017 survey period satisfying the morning, daytime and evening criteria. The quarry was not operational during the evening period although monitoring was completed as per the requirements of the EPL. Non-quarry noise sources included highway traffic, insects and birds.

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## 7 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) for VGT Pty Ltd on behalf of Holcim Pty Ltd at the Jandra Quarry, Possum Brush, NSW. The assessment was completed to assess the quarry's compliance with the relevant criteria outlined in their EPL (EPL#2796) for several residential receivers surrounding the quarry.

Attended noise monitoring was undertaken on Tuesday 12 December 2017 and Wednesday 13 December 2017 at representative monitoring locations with quarry noise contributions compared against the relevant criteria. The assessment has identified that noise emissions generated by Jandra Quarry comply with relevant statutory noise criteria specified in the Conditions of Consent at all assessed locations.

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# Appendix A - Glossary of Terms

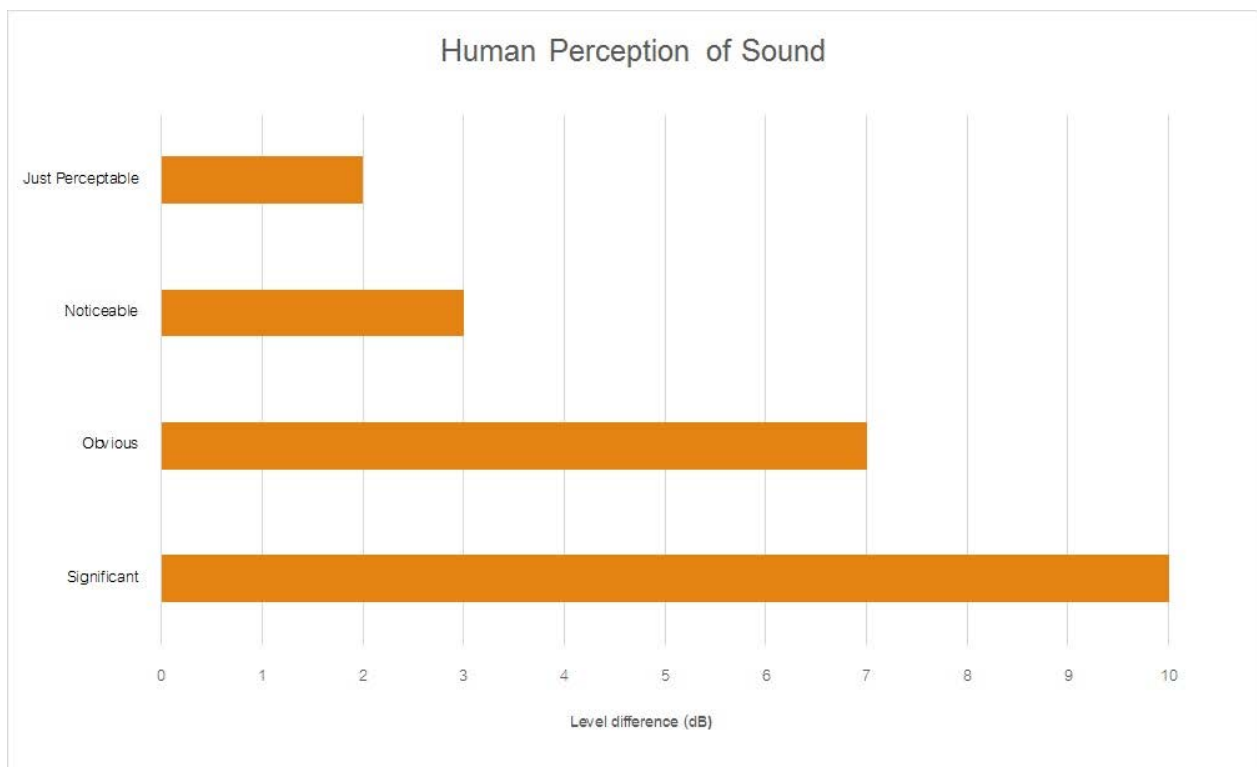
Table A1 provides a number of technical terms have been used in this report.

Table 1A Glossary of Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the INP as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured LA90 statistical noise levels.
Adverse Weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient Noise	The noise associated with a given environment. Typically a composite of sounds from many sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Linear or decibels Z-weighted.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
LA90	Commonly referred to as the background noise, this is the level exceeded 90 % of the time.
LAeq	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.
LAm <sub>ax</sub>	The maximum root mean squared (rms) sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
Sound power level (LW)	This is a measure of the total power radiated by a source. The sound power of a source is a fundamental location of the source and is independent of the surrounding environment. Or a measure of the energy emitted from a source as sound and is given by : $= 10 \cdot \log_{10} (W/W_0)$ Where : W is the sound power in watts and W <sub>0</sub> is the sound reference power at 10-12 watts.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA	
Source	Typical Sound Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound





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**APPENDIX 3**  
**CLOSE OUT OF AUDIT**  
**RECOMMENDATIONS**

Heidi Waters  
Senior Compliance Planner  
Department of Planning & Environment  
Level 1, Suite 14, 1 Civic Ave  
Singleton NSW 2333

August 9, 2016

[daniel.lidbetter@holcim.com](mailto:daniel.lidbetter@holcim.com)

Dear Heidi,

Holcim (Australia) Pty Ltd (Holcim) is the owner and operator of the Jandra Quarry, located on Lots 10-15 DP790056 and Lot 2 DP255621 on the Pacific Highway, Possum Brush.

A modification to the existing Development Consent was granted on March 13, 2015 and allows for an increase in the production and transport of quarry materials from 250,000 Tonnes per Annum (TpA) to 490,000 TpA (production) and 475,000 TpA (transport).

Schedule 5, Conditions 8 (a-e) & 9 of the Development Consent required the site to commission an independent consultant to undertake an Environmental Audit to ensure compliance with the requirements of the Development Consent.

Consultants GHD undertook the Independent Environmental Audit on May 20, 2016 with a copy of the Audit report submitted to the Department of Planning & Environment (DP&E) on June 30, 2016.

### **Close out of Audit Recommendations**

In accordance with the DP&E's request please find the attached table that includes close out dates and actions for all 14 recommendations listed in the Jandra audit report.

In addition to the close out dates provided for each recommendation, Holcim has undertaken the following actions to ensure compliance with Condition 10, Schedule 5 of the Development Consent:

1. A copy of Holcim's incident & complaints reporting database (INX) has been uploaded to the Jandra webpage. Please note, this INX document is empty due to the site having received no complaints since operations commenced under Development Consent Mod 5.
2. All of the Jandra Environmental Management Plans (including the Environmental Management Strategy) have been posted onto the Jandra webpage.
3. A copy of the 2016 Independent Environmental Audit report (prepared by GHD) has been uploaded to the Jandra webpage.

NSW Aggregates



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Should you wish to contact me with regards to any of the information above, please do not hesitate to contact me on (02) 9412 6592.

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'D. Lidbetter'.

Daniel Lidbetter

**NSW/ACT Planning & Environment Coordinator**

NSW Aggregates



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**Attachment 1: Jandra Independent Environmental Audit Recommendations and Time-frames for action close out.**

Condition No.	Requirement	Recommendation	Due Date
<p><b>Condition 10, Schedule 5</b></p>	<p>By 31 August 2015, the Applicant shall:</p> <p>(a) make the following information publicly available on its website:</p> <ul style="list-style-type: none"> <li>- the documents listed in condition 2 of Schedule 2;</li> <li>- current statutory approvals for the development;</li> <li>- approved strategies, plans or programs;</li> <li>- a summary of the monitoring results of the development, which have been reported in accordance with the various plans and programs approved under the conditions of this consent;</li> <li>- a complaints register, which is to be updated on a quarterly basis;</li> <li>- the annual reviews (over the last 5 years);</li> <li>- any independent environmental audit, and the Applicant's response to the recommendations in any audit; and</li> <li>- any other matter required by the Secretary; and</li> </ul>	<p>Upload dust depositional monitoring results and the DP&amp;E approved management plans (when approved) to the Holcim website.</p> <p><b><u>NOTE: This action has been completed.</u></b></p>	<p>August 31, 2016</p>
<p><b>Condition 10, Schedule 3</b></p>	<p>The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria listed in Tables 5, 6 and 7 at any residence on privately-owned land.</p>	<p>Send email correspondence to members of the DP&amp;E to confirm that the proposed location of the PM10 monitor is practicable.</p>	<p>August 17, 2016</p>
<p><b>Condition 25 (b), Schedule 3</b></p>	<p>The Applicant shall prepare and implement a Biodiversity and Rehabilitation Management Plan for the site to the satisfaction of the Secretary. This plan must:</p> <p>(b) be prepared in consultation with OEH and Council, and submitted to the Secretary for approval by 31 August 2015;</p>	<p>Provide Council with an updated copy of the DP&amp;E approved BRMP.</p>	<p>August 17, 2016</p>

Condition No.	Requirement	Recommendation	Due Date
<b>Condition 1, Schedule 3</b>	The Applicant shall ensure that the noise generated by the development does not exceed the criteria in Table 2 or Table 3 at any residence on privately owned land.	Holcim will begin monitoring as soon as each individual management plan is approved by the DP&E.	August 19, 2016
<b>Condition 8 (b), Schedule 3</b>	(b) operate a suitable system to enable the public to get up-to-date information on the proposed blasting schedule on site;	Holcim staff will develop a generic email that includes the surrounding neighbour's email address' and will send out advising the next time and date of the proposed blast.	August 31, 2016
<b>Condition 9 (d), Schedule 3</b>	(d) include a blast fume management protocol to demonstrate how emissions will be minimized including risk management strategies if blast fumes are generated;	Update the NBMP to include a reference to the Blast Fume Code of Practice (available on site via USAFE), or this be included as an appendix to the NBMP.	August 31, 2016
<b>Condition 29, Schedule 3</b>	The Applicant shall prepare and implement an Aboriginal Cultural Heritage Management Plan for the Project to the satisfaction of the Secretary. This plan must:	Update the ACHMP to include monitoring of all new surface disturbances on site and include an unexpected finds procedure for unidentified Aboriginal objects and submit to DP&E for approval.	August 31, 2016
<b>Condition 13 (a), Schedule 3</b>	The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria in Tables 5, 6, and 7 at any occupied residence on quarry-owned land unless:	The site Quarry Manager will notify the tenant at the location specified in this condition on the risks associated with exceedances of particulate matter criteria.	August 31, 2016
<b>Condition 15, Schedule 3</b>	For the life of the development, the Applicant shall ensure that there is 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.	Advise DP&E in writing of the installation and location of the meteorological weather station following installation.	August 31, 2016

Condition No.	Requirement	Recommendation	Due Date
<b>Condition 19, Schedule 3</b>	The Applicant shall prepare and implement a Soil and Water Management Plan for the development to the satisfaction of the Secretary.	Update the SWMP to include details of documentation referred to in Table 8 of the SWMP, or include Attachment 4.1H as an Appendix to the SWMP.	August 31, 2016
<b>Condition 19, Schedule 3</b>	The Applicant shall prepare and implement a Soil and Water Management Plan for the development to the satisfaction of the Secretary.	Update the SWMP to include requirements for the investigation and reporting of exceedances of water quality performance criteria in accordance with Condition 6 of Schedule 5 of DA 213-10-99.	August 31, 2016
<b>Condition P1.2, EPL</b>	The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.	Install a sign at the licensed discharge point from the Main Dam to notify that this location is the discharge point.	August 31, 2016
<b>Condition M1.3, EPL</b>	The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.	Prepare a field record sheet for environmental monitoring rather than use the chain of custody and include the field sheet as an Appendix to the SWMP.	August 31, 2016
<b>Condition 10, Schedule 3</b>	The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria listed in Tables 5, 6 and 7 at any residence on privately-owned land.	Advise DP&E in writing of the installation and location of the PM10 monitor following installation.	August 31, 2016