



**DECEMBER 2016**

**NOISE COMPLIANCE REVIEW**

**CORAKI QUARRY**

**CORAKI**

**Commissioned by:**

Quarry Solutions Pty Ltd

**Prepared by:**

MWA Environmental

**16 December 2016**

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**DOCUMENT CONTROL SHEET**
**MWA Environmental**

Level 15 241 Adelaide Street  
GPO Box 3137 Brisbane 4001

Job Name: Coraki

Job No: 15-041

Telephone: 07 3002 5500

Original Date of Issue: 16 December 2016

Facsimile 07 3002 5588

Email: mail@mwaenviro.com.au

**DOCUMENT DETAILS**

Title: December 2016 Noise Compliance Review – Coraki Quarry – Coraki



Principal Author: Mr Ben Hyde

Client: Quarry Solutions Pty Ltd  
c/- Groundwork Plus

Client Address: 6 Mayneview Street, MILTON QLD 4064

Client Contact: Mr Jim Lawler

**REVISION/CHECKING HISTORY**

Version Number	Date	Issued By		Checked By	
1 Report	16/12/16	BH		PAK	
2					
3					
4					
5					
6					
7					
8					

**DISTRIBUTION RECORD**

Destination	Version Number								
	1	2	3	4	5	6	7	8	9
Groundwork Plus (electronic)	1								
Client (electronic)	1								
File Copy	1								
MWA Enviro Library									

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## 1.0 INTRODUCTION

### 1.1 PURPOSE OF REPORT

MWA Environmental was commissioned by Quarry Solutions Pty Ltd to conduct a Noise Compliance Review for the Coraki Quarry.

The Noise Compliance Review was undertaken in accordance with Condition 7 of the Development Consent Schedule 3, as follows:

#### **Noise Compliance Review**

7. The Applicant must commission a Noise Compliance Review for the development within 3 months of commencement of operations or as otherwise agreed with the Secretary. The review must be undertaken to the satisfaction of the Secretary and:
  - (a) be undertaken by a suitably qualified and experienced acoustic engineer during a period when the quarry is operating;
  - (b) assess whether the development is complying with the noise limits in this consent;
  - (c) include the details of the plant and equipment operating at the time of the review;
  - (d) identify any additional measures to be implemented to ensure compliance; and
  - (e) provide details of any complaints received in relation to noise generated by the development and the action taken in response to those complaints.

Within one month of receiving the Noise Compliance Review report, or as otherwise agreed by the Secretary, the Applicant must submit a copy of the report to the Secretary, with a response to any recommendations contained in the report.

The compliance noise monitoring presented in this report was undertaken on 2 December 2016.

### 1.2 SITE DESCRIPTION

Quarry Solutions Pty Ltd operates the Coraki Quarry located at Petersons Quarry Road, Coraki. The site incorporates the Petersons Quarry site and comprises the following properties:

#### **Primary Resource Area**

- Lot 401 on DP633427

#### **Access Road via Easement**

- Lot 403 on DP802985

#### **Existing Petersons Quarry**

- Lot 402 DP802985
- Lot 408 DP1166287
- Lot A DP397946
- Lot A DP389418
- Lot 3 DP701197
- Lot 2 DP954593
- Lot 1 DP954592
- Lot 1 DP310756

Access to the quarry is via Petersons Quarry Road.

An aerial photograph of the subject site and surrounding area, including nominated surrounding residences, is included as **Figure 1**.

### **1.3 SURROUNDING LAND USES**

Surrounding land uses are shown on the aerial photograph included as **Figure 1**.

Surrounding land uses comprise rural allotments with scattered detached dwellings. A precast concrete product manufacturing facility is located to the south.

Nine (9) residential dwellings surrounding the subject site have been nominated R1 to R9 on **Figure 1** for the purposes of this assessment.

## **2.0 NOISE COMPLAINT RECORDS**

Quarry Solutions Pty Ltd has advised that no noise complaints have been received in relation to the Coraki Quarry.

### 3.0 RELEVANT COMPLIANCE NOISE LIMITS

Condition 4 of the Development Consent Schedule 3 prescribes noise limits for the Coraki Quarry, as follows:

#### Noise Impact Assessment Criteria

4. The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land.

Table 3: Noise criteria dB(A)

Receiver	Day dB(A) (L <sub>Aeq</sub> (15 min))	Evening dB(A) (L <sub>Aeq</sub> (15 min))	Night dB(A) (L <sub>Aeq</sub> (15 min))
All privately-owned residences	35	35	35

Note: Receiver locations are shown on the figure in Appendix 3.

Noise generated by the development is to be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the *NSW Industrial Noise Policy*. Appendix 4 sets out the meteorological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria.

However, the noise criteria in Table 3 do not apply if the Applicant has an agreement with the relevant landowner to exceed the noise criteria, and the Applicant has advised the EPA and the Secretary in writing of the terms of this agreement.

Condition L4 of Environment Protection Licence No. 3397 (“the EPL”) sets the compliance noise limits for the quarry as being consistent with Condition 4 of the Development Consent Schedule 3, as follows:

#### L4 Noise limits

- L4.1 Noise from the premises must not exceed an LAeq (15 minute) noise emission criterion of 35 dB(A) for receivers R1 to R9, except as expressly provided by this licence.
- L4.2 Noise from the premises is to be measured at residential receivers R1 through to R9 as identified in the *Noise and Dust Assessment Proposed Coraki Quarry* (MWA Environmental dated 4 November 2015) to determine compliance with this condition. This condition does not apply if written permission from the property owners of receivers R1 through to R9 for an exceedance of condition L4.1 has been provided to the EPA.

Note: The noise limits set out in condition L4.1 apply under all meteorological conditions except for the following:

1. Wind speeds greater than 3 metre/second at 10 metres above ground level; or
2. Temperature inversion conditions up to 30C/100m and wind speeds greater than 2 metres/second at 10 metres above ground level; or
3. Temperature inversion conditions greater than 30C/100m

As allowed for by Development Consent Schedule 3 Condition 4 and EPL Condition L4.2, formal written agreements are in place with the following landowners to the effect that the land owners do not hold objections to the operation of the Coraki Quarry exceeding the noise emission criterion by up to 5 dB(A):

- R1: 200 Lagoon Road, Coraki
- R2: 95 Spring Hill Road, Coraki
- R3: 75 Spring Hill Road, Coraki
- R6: 1905 Casino-Coraki Road, Coraki
- R7: 140 Newmans Road, Coraki

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## 4.0 DECEMBER 2016 COMPLIANCE NOISE MONITORING

### 4.1 QUARRY OPERATIONS

On 2 December 2016 the quarry operations were as follows:

- Crushing and screening plant including jaw crusher, cone crusher, barmac crusher, two screens - approximately at the northeastern corner of the existing Petersons Quarry pit
- Primary hopper/feed bin off roadway above the northeastern corner of the existing Petersons Quarry pit
- Two (2) dump trucks (Terex TA40 & Komatsu HD325) hauling from pit to primary hopper/feed bin
- Komatsu EX350 excavator preparing drilling pad at approx. RL35m bench
- Excavator at quarry face loading dump trucks
- CAT 980K loader at stockpiles within the existing Petersons Quarry pit
- Pug Mill at 'southern stockpile area' at approx. RL40m bench
- Normal product sales
- Two (2) excavators constructing more direct route from weighbridge to stockpile area and associated bunds – at the southeastern corner of the Petersons Quarry extraction area – temporary preparatory works

No rock drill or rock pick were operating on 2 December 2016.

### 4.2 NOISE MONITORING LOCATIONS

The approved *Coraki Quarry Noise Management Plan* (13 September 2016) includes the following requirements for noise monitoring locations:

*Subject to permission from the landowners, noise monitoring shall be conducted at residences R1, R2, R6 and R7, as a minimum. To the extent practicable, monitoring locations shall be:*

- *Within 30 metres of the dwelling and considered to be the most affected by noise from the quarry;*
- *Free-field i.e. not within 3.5 metres of a vertical reflective surface; and*
- *Not unreasonably affected by extraneous noise sources.*



With the permission of landowners, compliance noise monitoring was undertaken on 2 December 2016 at free-field locations within 30 metres of the dwellings nominated as R1, R2, R3, R6 & R7 on **Figure 1**. Observations within 30 metres of dwellings R4 and R5 and at the street boundary of R8 and R9 did not identify audible noise from the Coraki Quarry during the 2 December 2016 monitoring period.

Extraneous noise was excluded to the extent feasible by selection of monitoring locations, with the following exceptions:

- Loud television at R7 remained audible at 30 metres from the dwelling;
- Insect noise during the summer monitoring period was unavoidable and significant at some locations; and
- Bird noise which was filtered from the data to the extent possible by post-processing using audio recordings.

### **4.3 METEOROLOGICAL CONDITIONS**

Meteorological conditions during each of the noise measurements was based upon the 5 minute update data available from the Coraki Quarry on-site weather station. Wind speed and direction is measured at a height of 10 metres above ground level.

Meteorological conditions were fine on 2 December 2016 with no rainfall during the noise monitoring period. Temperatures ranged 26 to 33 degrees Celsius.

Winds were generally from northwesterly directions with speeds measured at 10 metres above ground level ranging 1.3 to 4.0 metres per second during the monitoring periods.

### **4.4 EXTRANEOUS INFLUENCES**

Extraneous noise influences were excluded from the compliance noise measurements to the extent feasible (i.e. traffic, aircraft, significant bird noise periods etc.) through on-site filtering and post-processing using the audio recordings and analysis software.

During some monitoring periods overriding extraneous noise influences did not allow for direct assessment of quarry noise, including:

- Significant insect noise during some measurements; and
- Bird noise during some measurements.

Extraneous noise associated with birds and more significant insect noise periods were further removed through desktop analysis of audio recording files. For two measurements insect noise was in the order of 45 dB(A) at times and frequency analysis measurements were taken to allow for post-processing to filter excess noise in the affected one-third octave frequency bands.

In order to derive quarry component levels for certain measurements affected by significant extraneous and/or elevated background noise), the 'quarry component' was assessed by two methods:

#### **BASED UPON INTERMITTENT QUARRY NOISE ANALYSIS**

Average of:

- The overall measured level (with extraneous noise filtered to extent feasible); and
- 'Addition' of component levels for the marked periods of audible quarry noise sources based upon the source audible period, source  $L_{Aeq}$  level and the averaging across the full measurement period.

#### **BASED UPON FREQUENCY ANALYSIS TO FILTER INSECT NOISE**

Lower of:

- The overall measured level (with non-insect related extraneous noise included) from the frequency analysis measurement but with insect noise affected one-third octave band levels moderated; and
- The overall measured level (with extraneous noise filtered to extent feasible) from the broadband logging measurement but with broadband level adjusted to downwards based upon the influence of insect noise determined from the frequency analysis measurement.

Given that it is not possible to entirely filter the extraneous noise influence from measurements affected by significant insect and/or bird noise, the overall assessed quarry noise levels are likely to be a slight overestimate.

## **4.5 MONITORING EQUIPMENT**

Attended noise monitoring was undertaken using a Bruel & Kjaer Type 2250 frequency analysing sound level meter with current NATA calibration. The sound level meter was calibrated to a reference signal of 94 dB at 1kHz prior to the monitoring and displayed no variance post-monitoring.

## **4.6 COMPLIANCE ASSESSMENT**

Based upon the monitoring conducted no tonality, impulse or low frequency noise modifying factors were warranted.

The compliance noise monitoring results are summarised in **Table 1** below.

**Table 1: Compliance Noise Assessment -  $L_{Aeq,15min}$  - dB(A)  
2 December 2016**

MEASUREMENT #	MONITORING LOCATION	TIME	ASSESSED QUARRY NOISE $L_{eq}$ - dB(A)	BASIS	WIND	NOTES
T003	R1	1005	34.4	Insect noise filtered level	1.8m/s NNW => 2.7m/s NW	Processing plant and excavators at SE corner of Petersons Quarry area audible in addition to occasional tip to primary hopper/feed bin. Quarry less than 35dB(A) prior to significant insect noise. Insect noise affected measurement to extent that broadband data invalid and frequency analysis was undertaken for post-processing.
T004 (Frequency Analysis)						
T010		1240	37.8*	Average of overall measured level and calculated quarry 'component' contributions - but wind speed over 3m/s for much of measurement period	2.7m/s NNW => 4m/s NNW	Processing plant audible and occasional tip to primary hopper/feed bin and vehicle/excavator engines. Louder with 4m/s NNW wind. Reversing beeper audible at times. Some birds.
T005	R2	1030	39.65*	Average of overall measured level and calculated quarry 'component' contributions - but wind speed over 3m/s for part of measurement period	1.8m/s NNW => 1.3m/s NW => 1.8m/s NNW => 3.6m/s WSW	Processing plant and primary hopper/feed bin audible, some wind/tree and insect noise
T011		1305	35.6	Average of overall measured level and calculated quarry 'component' contributions	1.8m/s NNE => 2.7m/s NNW	Processing plant audible and rock dumping/loading noise at times. Some birds and wind/tree noise.
T006	R3	1100	36.8	Insect noise filtered level	2.2m/s NW => 2.7m/s NW	Trucks and tip to primary hopper/feed bin audible occasionally but significant insect noise at times. Insect noise constant 45 dB(A) when quarry inaudible. Frequency analysis was undertaken for post-processing.
T007 (Frequency Analysis)						
T001	R6	900	Generally inaudible, measureable - Compliant	Generally inaudible	1.3m/s NNE => 2.2m/s WNW	Quarry inaudible aside from occasional tip to primary hopper/feed bin during westerly wind. Casino-Coraki Rd noise, some birds at times.
T008		1125	Inaudible - Compliant	Inaudible	2.7m/s NW => 2.2m/s NW	Quarry inaudible. Casino-Coraki Rd noise, some birds at times, wind/tree at times.
T002	R7	935	<32 dB(A)	Quarry barely audible thus quarry noise is less than the overall measured level including ambient noise	2.2m/s NNW => 1.3m/s NW	Quarry inaudible aside from occasional tip to primary hopper/feed bin. Distant Casino-Coraki Rd noise, occasional wind/tree during gusts, resident's TV audible, some birds and insects at times.
T009		1220	<33 dB(A)	Quarry barely audible thus quarry noise is less than the overall measured level including ambient noise	2.2m/s NNW => 2.2m/s NE	Processing plant barely audible. Cows, birds, resident's TV.

\* level presented but compliance not assessable given wind speed over 3 metres per second during the measurement

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Key outcomes from the December 2016 compliance monitoring program are as follows:

1. Quarry operations during the compliance monitoring period included crushing and screening, pit to plant haulage, preparatory works by excavators, pug mill and product sales. No rock drill or rock pick were operating on 2 December 2016.
2. Insect and/or bird noise was significant at some locations and necessitated post-processing of data to provide an estimate of the quarry noise level.
3. Quarry noise was assessed to be compliant with the noise limit specified in Condition 4 of the Development Consent Schedule 3 and Condition L4 of the EPL at residences R1, R2, R3, R6 and R7 considering the 5 dB(A) exceedance allowed for in agreements with the relevant landowners.
4. The highest assessed quarry noise levels (measurements T010 & T005) were affected by periods when wind speeds exceeded the 3 metre per second threshold for valid assessment against the noise limit.
5. Observations within 30 metres of dwellings R4 and R5 and at the street boundary of R8 and R9 did not identify audible noise from the Coraki Quarry during the 2 December 2016 monitoring period.
6. At locations to the east, on Spring Hill Road (R2 & R3) the main quarry noise influence was the crushing and screening plant and associated primary hopper/feed bin. Advice from Quarry Solutions is that the crushing and screening plant and primary hopper/feed bin are to be relocated to a more shielded location within the existing Petersons Quarry pit in the near future.
7. At location R1 to the south the main quarry noise influences were the excavators undertaking preparatory works in constructing a more direct route from weighbridge to stockpile area and the associated bunds. The crushing and screening plant and occasional truck engines were also audible at this location.

## 5.0 CONCLUSION

MWA Environmental was commissioned by Quarry Solutions Pty Ltd to conduct a Noise Compliance Review for the Coraki Quarry in accordance with Condition 7 of the Development Consent Schedule 3.

Quarry Solutions Pty Ltd has advised that no noise complaints have been received in relation to the Coraki Quarry.

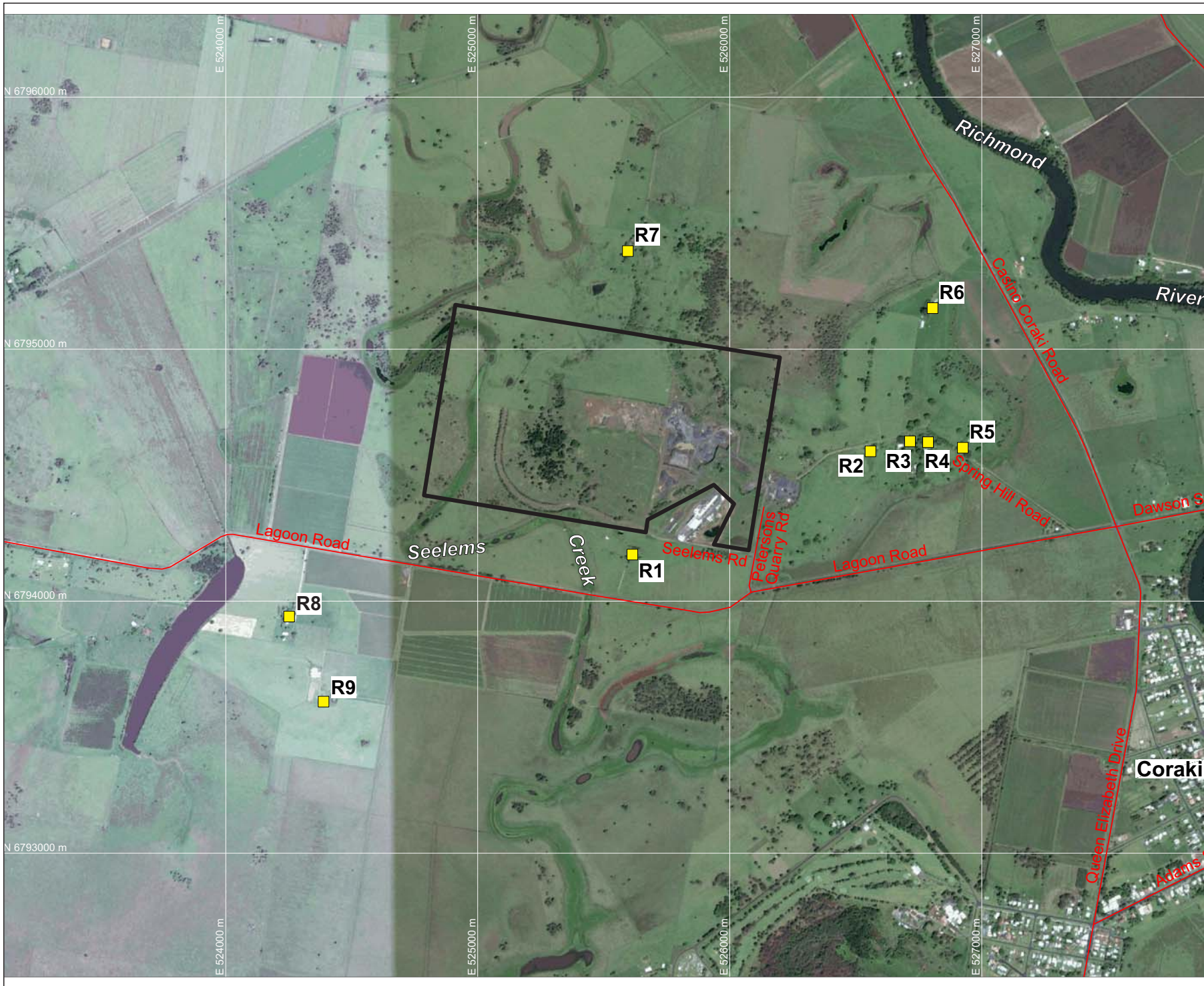
Attended compliance noise monitoring was conducted on 2 December 2016 at free-field locations within 30 metres of the dwellings nominated as R1, R2, R3, R6 & R7 on **Figure 1**. Observations within 30 metres of dwellings R4 and R5 and at the street boundary of R8 and R9 did not identify audible noise from the Coraki Quarry during the 2 December 2016 monitoring period.

Compliance noise monitoring was affected at certain times and locations by wind speeds above 3 metres per second in addition to significant insect and/or bird noise.

Quarry noise was assessed to be compliant with the noise limit specified in Condition 4 of the Development Consent Schedule 3 and Condition L4 of the EPL at residences R1, R2, R3, R6 and R7 considering the 5 dB(A) exceedance allowed for in agreements with the relevant landowners.

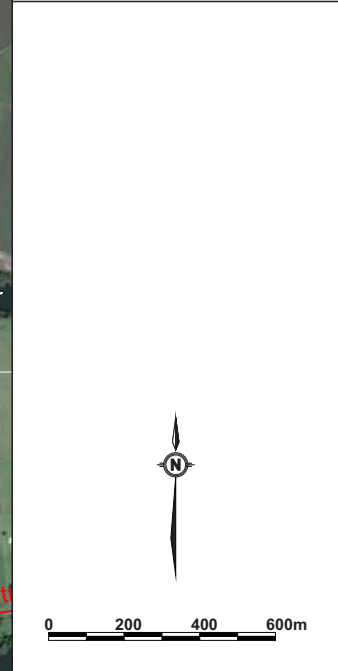
**MWA Environmental**  
**16 December 2016**

## **FIGURES**



**LEGEND**  
 — SITE BOUNDARY  
 ■ R9 SURROUNDING RESIDENCES (R1-R9)

**DRAWING REFERENCE**  
 GROUNDWATER PLUS SITE LOCATION PLAN  
 1837.DRG.002, 13/04/15.



CLIENT  
**QUARRY SOLUTIONS PTY LTD**

PROJECT  
**CORAKI  
 NOISE COMPLIANCE  
 ASSESSMENT  
 CORAKI QUARRY**  
 Petersons Quarry Rd Coraki NSW

TITLE  
**AERIAL PHOTOGRAPH  
 SHOWING SURROUNDING  
 RESIDENCES**

JOB	CORAKI	<b>FIGURE 1</b>
JOB NO.	15-041	
DATE	16/12/16	DRAWING NUMBER
SCALE	1:20,000 (A4)	<b>15-041-1</b>
REV.		

Max Winders & Associates Pty Ltd tas MWA Environmental  
 Level 15, 241 Adelaide St, Brisbane, GPO BOX 3137, Brisbane Qld 4001  
 P 07 3002 5500 F 07 3002 5588 E mail@mwaenviro.com.au  
 W www.mwaenviro.com.au  
 ABN 94 010 833 084