Noise Monitoring Assessment

Austen Quarry, Hartley, NSW.

Prepared for : R.W. Corkery & Co. Pty Limited
December 2017

MAC
Muller Acoustic Consulting

Document Information

Noise Monitoring Assessment

Austen Quarry, Hartley, NSW

December 2017

Prepared for: RW Corkery & Co Pty Limited (on behalf of Hy-Tec Pty Ltd)

Prepared by: Muller Acoustic Consulting Pty Ltd
PO Box 262, Newcastle NSW 2300
ABN: 36 602 225 132
P: +61 2 4920 1833
www.mulleracoustic.com

Document ID	Status	Date	Prepared By	Signed	Reviewed By	Signed
MAC170523RP2V01	Final	14 December 2017	Robin Heaton	Robin Heaton	Oliver Muller	

CONTENTS

This page has been intentionally left blank

1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by RW Corkery & Co Pty Limited (RWC) on behalf of Hy-Tec Industries Pty Ltd (HT) to complete a Noise Monitoring Assessment (NMA) for Austen Quarry Operations, Hartley, NSW.

The monitoring has been conducted in accordance with the approved Austen Quarry Noise Management Plan and in general accordance with Conditions L4.1 to L4.3 of EPL#12323 (EPL); at three representative monitoring locations.

The assessment was conducted in accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- Environment Protection Licence EPL #12323;
- RW Corkery & Co Pty Limited, Austen Quarry Noise Management Plan (NMP); and
- Standards Australia AS 1055.1:1997 - Acoustics - Description and measurement of environmental noise - General Procedures.

This assessment was undertaken during December 2017 and forms part of the noise monitoring program to address conditions of EPL 12323, Austen Quarry Development Consent SSD 6084 (SSD-6084) and the Noise Management Plan.

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

This page has been intentionally left blank

2 Noise Criteria

2.1 Attended Noise Compliance

Schedule 3, Condition 3 of the Austen Quarry Development Consent (SSD-6084), approved on 15 July 2015, outlines the applicable noise criteria for all privately owned residential receivers surrounding the quarry site. The operating criteria specified in SSD-6084 also aligns with criteria in EPL#12323 for the quarry at all receivers ie 35dBA $LA_{eq(15min)}$. **Table 1** presents the criteria for privately owned residential receivers surrounding the quarry, as outlined in SSD-6084 and EPL#12323.

Table 1 Noise Criteria

Receiver	Day dB(A) LAeq(15min)	Evening dB(A) LAeq(15min)	Morning Shoulder dB(A) LAeq(15min)
All privately owned residences	35	35	35

This page has been intentionally left blank

3 Methodology

3.1 Locality

The quarry is located on Jenolan Caves Road, Hartley, NSW approximately 10km south of Lithgow, NSW. Receivers in the locality surrounding the quarry are primarily rural/residential. The Great Western Highway is situated to the north east of the site and Jenolan Caves Road to the west of the site.

3.2 Noise Monitoring Locations

Three monitoring locations have been selected as part of the NMA and in accordance with the Noise Management Plan (NMP) and are summarised below:

- Location A (residence identifier R24A as per NMP), is located at 200 Jenolan Caves Road approximately 2.5km north of the project;
- Location B (residence identifier R31 as per NMP), is located at 781 Jenolan Caves Road and approximately 1km south west of the project site; and
- Location C (residential identifier R48 as per NMP) located at 64 Carrol Drive, Hartley which is approximately 2.5km north east of the quarry.

The monitoring locations with respect to quarry location are presented in the locality plan shown in Figure 1.

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 EPL 12323. The measurements were carried out using Svantek Type 1, 971 noise analyser on Wednesday 6 December 2017 and Thursday 7 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 ±0.5dBA.

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

3.4 Operational Logs

Operational logs for the primary and secondary crushers have been provided by Austen Quarry management. It is noted that transportation activities commence at 5:00am and work shifts for processing equipment commence at 6.00am. Daily pre-shift meetings and safety checks often delay commencement of onsite operations until closer to 7.00am. Morning shoulder measurements were conducted from 6.00am to 7.00am on the 7 December 2017 to capture the commencement of onsite operations at the nominated monitoring locations. Notwithstanding, noise monitoring during the morning shoulder period was conducted at reduced operational levels as the secondary crusher and therefore other processing equipment (screens, conveyors and the air separator) had not yet commenced operation. **Table 2** presents a summary of the hours of operation of the primary and secondary crushers with the quarry operational logs presented in **Appendix B**.

Table 2 Primary and Secondary Crushers Hours of Operation

Date	Primary Crusher		Secondary Crusher	
	Commenced Crushing	Ceased Crushing	Commenced Crushing	Ceased Crushing
6 Dec 17	7.10 am	4.40pm	6.38am	4.45pm
7 Dec 17	6.50am	4.40pm	7.18am	9.55pm

FIGURE 1

LOCALITY PLAN

REF: MAC170523

0 500m

KEY

A MONITORING LOCATION

SITE LOCATION

MAC
Muller Acoustic Consulting

*Imagery Source : nearmaps

This page has been intentionally left blank

4 Results

4.1 Assessment Results - Location A, 200 Jenolan Caves Road

Operational attended noise monitoring was completed in each assessment period at Location A on Wednesday 6 December 2017 and Thursday 7 December 2017. **Table 3** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

Table 3 Operator-Attended Noise Survey Results – Location A

Date	Time (hrs)	Period	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
			LAmax	L_{Aeq}	L_{A90}		
7/12/17	7:55	Day	89	68	39	Dir: W Wind Speed: 0.2m/s Rain: Nil	Birds 39 - 65 Water Flowing 36 - 38 Traffic 34 - 89
			Austen Quarry $L_{Aeq(15min)}$ Contribution				Not audible
6/12/17	18:43	Evening	82	59	37	Dir: W Wind Speed: 0.1m/s Rain: Nil	Traffic 45 - 82 Water Flowing 37 - 38 Birds 36 - 42
			Austen Quarry $L_{Aeq(15min)}$ Contribution				Not audible
7/12/17	6:21	Shoulder	88	67	39	Dir: W Wind Speed: 0.1m/s Rain: Nil	Traffic 43 - 88 Birds 36 - 40 Water Flowing 36 - 38
			Austen Quarry $L_{Aeq(15min)}$ Contribution				Not audible

4.2 Assessment Results - Location B, 781 Jenolan Caves Road

Operational attended noise monitoring was completed in each assessment period at Location B on Wednesday 6 December 2017 and Thursday 7 December 2017. **Table 4** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

Table 4 Operator-Attended Noise Survey Results – Location B

Date	Time (hrs)	Period	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
			LAmax	L_{Aeq}	L_{A90}		
7/12/17	8:22	Day	73	47	34	Dir: W Wind Speed: 1.8m/s Rain: Nil	Dog Noise 48 - 72 Birds 36 - 40 Site Noise 27 - 30 Traffic 34 - 39
			Austen Quarry $L_{Aeq(15min)}$ Contribution				28
6/12/17	18:16	Evening	63	39	32	Dir: W Wind Speed: 1.2m/s Rain: Nil	Traffic 34 - 35 Aircraft 37 - 63 Birds 34 – 55 Cow Bellows 35 - 40
			Austen Quarry $L_{Aeq(15min)}$ Contribution				Not Audible
7/12/17	6:45	Shoulder	59	41	34	Dir: North W Wind Speed: 1.2m/s Rain: Nil	Birds 37 - 59 Traffic 34 - 39 Site Noise 32 - 34
			Austen Quarry $L_{Aeq(15min)}$ Contribution				27

4.3 Assessment Results - Location C, 64 Carrol Drive

Operational attended noise monitoring was completed in each assessment period at Location C on Wednesday 6 December 2017 and Thursday 7 December 2017. **Table 5** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

Table 5 Operator-Attended Noise Survey Results – Location C

Date	Time (hrs)	Period	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
			LAmax	L_{Aeq}	L_{A90}		
7/12/17	7:33	Day	74	48	35	Dir: W Wind Speed: 0.5m/s Rain: Nil	Birds 34 - 46 Traffic 34 - 74
		Austen Quarry $L_{Aeq(15min)}$ Contribution					Not Audible
6/12/17	19:05	Evening	60	40	32	Dir: W Wind Speed: 0.7m/s Rain: Nil	Birds 32 - 60 Domestic Noise 31 - 35 Traffic 32 - 36
		Austen Quarry $L_{Aeq(15min)}$ Contribution					Not audible
7/12/17	6:00	Shoulder	53	40	35	Dir: W Wind Speed: 0.1m/s Rain: Nil	Birds 36 - 53 Traffic 32 - 39
		Austen Quarry $L_{Aeq(15min)}$ Contribution					Not audible

This page has been intentionally left blank

5 Noise Compliance Assessment

The compliance assessment for the nominated monitoring locations are presented in **Table 6** to **Table 8** for day, evening and morning shoulder assessment periods.

Table 6 Daytime Noise Compliance Assessment

Receiver No.	Quarry Noise Contribution	Quarrying Noise Criteria	Compliant
	$L_{Aeq(15min)}$	LAeq(15min)	
A	Not Audible	35	✓
B	28	35	✓
C	Not Audible	35	✓

Table 7 Evening Noise Compliance Assessment

Receiver No.	Quarry Noise Contribution	Quarrying Noise Criteria	Compliant
	$L_{Aeq(15min)}$	LAeq(15min)	
A	Not Audible	35	✓
B	Not Audible	35	✓
C	Not Audible	35	✓

Table 8 Morning Shoulder Noise Compliance Assessment

Receiver No.	Quarry Noise Contribution	Quarrying Noise Criteria	Compliant
	$L_{Aeq(15min)}$	LAeq(15min)	
A	Not Audible	35	✓
B	27	35	✓
C	Not Audible	35	✓

This page has been intentionally left blank

6 Discussion

6.1 Discussion of Results - Location A

Monitoring conducted at Location A, 200 Jenolan Caves Road, Hartley, NSW, was dominated by passing traffic. Where possible, vehicles markings and identification was observed. Traffic included trucks from the Austen Quarry, adjacent (non-project) quarries and several transport firms. Local light vehicle traffic also contributed to the overall ambient environment. Quarry noise emissions were inaudible during all three monitoring periods during the December 2017 survey. Other extraneous noise sources audible during the three attended surveys included birds, and water flowing from nearby Coxs River.

6.2 Discussion of Results - Location B

Monitoring results at Location B, 781 Jenolan Caves Road, Good Forest, NSW, identified that the quarry was audible at this monitoring location during the morning shoulder and daytime monitoring periods, although remained within the applicable noise criteria. This is consistent with the predictions made in the EIS for Stage 2 of the Project (RWC, 2014). Mobile plant noise was intermittently audible during the morning shoulder and daytime survey periods at this location. Notwithstanding, extraneous noise sources dominated the noise environment which included birds, distant traffic hum, dog barking, insects and aircraft noise.

6.3 Discussion of Results - Location C

Quarry noise was inaudible during all three survey periods at Location C, 64 Carroll Drive, Hartley, NSW. Highway and passing local traffic, local wildlife and domestic activities dominated the ambient noise environment.

This page has been intentionally left blank

7 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment for RW Corkery & Co Pty Limited on behalf of Hy-Tec Industries Pty Ltd for Austen Quarry, Hartley, NSW. The assessment was completed to assess the quarry's compliance with the relevant criteria outlined in EPL#12323 and SSD-6084 for three nominated residential receivers surrounding the quarry.

Operator attended noise monitoring was undertaken on Wednesday 6 December 2017 and Thursday 7 December 2017 at the nominated monitoring locations with quarry noise contributions compared against the relevant criteria.

The assessment has identified that noise emissions generated by Austen Quarry comply with relevant noise criteria specified in EPL#12323 and SSD-6084 at all assessed locations for the three relevant assessment periods.

This page has been intentionally left blank

Appendix A – Glossary of Terms

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

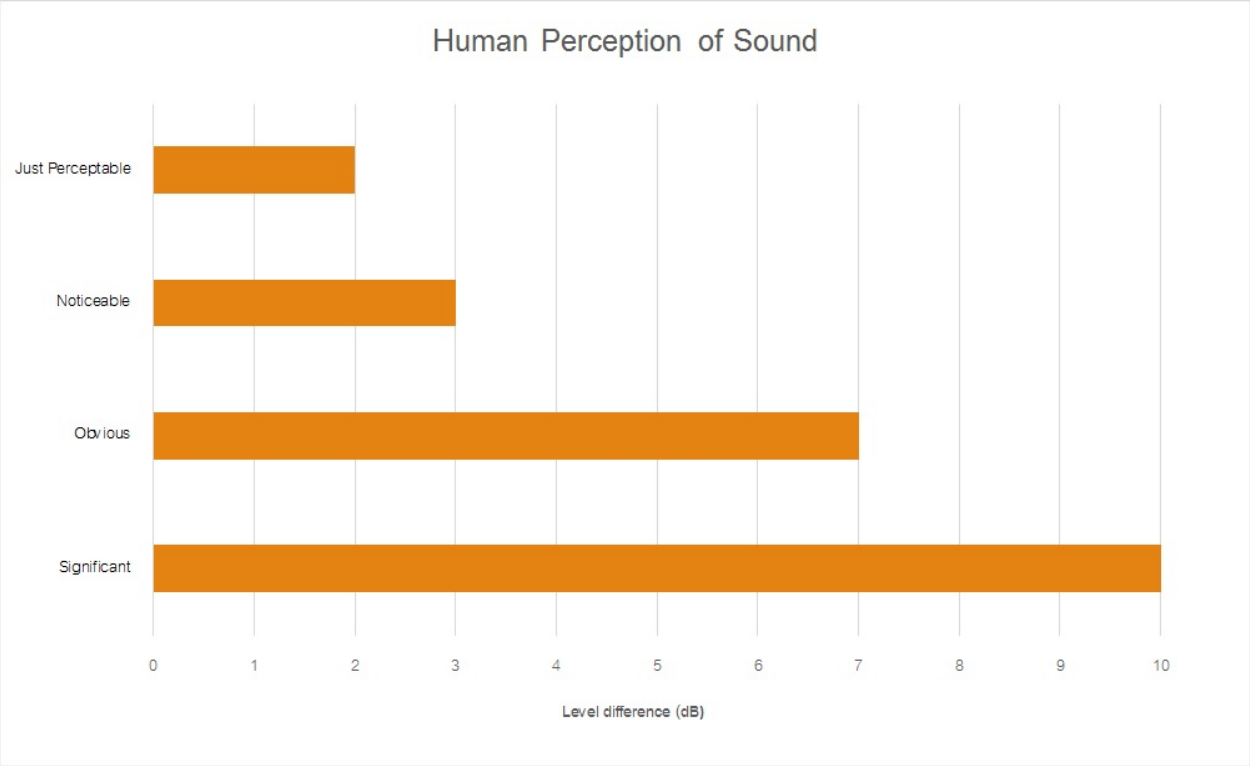
Table 1A Glossary of Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured LA90 statistical noise levels.
Adverse Weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient Noise	The noise associated with a given environment. Typically a composite of sounds from many sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Linear or decibels Z-weighted.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
LA90	Commonly referred to as the background noise, this is the level exceeded 90 % of the time.
LAeq	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.
LAmax	The maximum root mean squared (rms) sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
Sound power level (LW)	This is a measure of the total power radiated by a source. The sound power of a source is a fundamental location of the source and is independent of the surrounding environment. Or a measure of the energy emitted from a source as sound and is given by : = 10.log10 (W/Wo) Where : W is the sound power in watts and Wo is the sound reference power at 10-12 watts.

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

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA

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

Figure A1 – Human Perception of Sound



Appendix B – Operational Logs

DAILY PRODUCTION LOG & CHECKLIST - SECONDARY

Date: 6:12:17 Operator: Jezza

Weather Conditions; overcast

Shift Start Time	6.00	Shift Finish Time	5.00 PM
Crusher Start Time	6.38	End of day Crusher stopped	4.45 PM.

Weightometer Reading; Start: 1726873 **Finish:**

Plant Stopped	Plant Started	Downtime (Hrs/Min)	Reason
6.00	6.38	38m	TOOLBOX / PRE-START
7.36	7.45	9m	Clean S3 + Adj 450
10.52	11.07	15m	Blocked air sep + Adj. 450 + 550
11.51	12.00	9m	Clean S3
2.00	2.02	2m	Adj 450 + 550

PRODUCTION SUMMARY

FINES - 202

Belts	Size	Description	Total	Gate open	Comments
CV 8	20 mm	Concrete Aggregate	1198		
CV 20	Course Sand 4-0mm	Manufactured Sand	504		
CV19*	10-7mm Blend*	Concrete Blend	873		
CV19	7mm	Concrete Aggregate			
CV17	10mm	Concrete Aggregate			
CV15	14mm	Concrete Aggregate	414		
CV5	Ballast/40mm	Non Spec Aggregate			

TOTAL - 3191

COMMENTS

DAILY PRODUCTION LOG & CHECKLIST - SECONDARY

Date: 7.12.17 Operator: Jezza

Weather Conditions; fine

Shift Start Time	6.00	Shift Finish Time	10 PM
Crusher Start Time	7.18	End of day Crusher stopped	955

Weightometer Reading; Start: 173018 **Finish:**

Plant Stopped	Plant Started	Downtime (Hrs/Min)	Reason
6.00	~~Started~~ 7.18	1hr 18m	TOOLBOX / PRE-START / Blocked air sep
8.24	8.32	8m	Clean S3
8.43	9.25	43m	Shut plant down to re-fit gaurds
9.30	9.32	2m	Adj 450
12.46	12.48	2m	Adj 400 + 550
124	133	9 min	Clean S3
519	522	8 min	Adj 450 + 550
702	704	2 min	Adj 450
854	908	14 min	Clean S3. PRC Wouldnt Restart ~~Kept motor~~ going out on motor overload.
—	—	—	

PRODUCTION SUMMARY

FINES - 302

Belts	Size	Description	Total	Gate open	Comments
CV 8	20 mm	Concrete Aggregate	1352		
CV 20	Course Sand 4-0mm	Manufactured Sand	806		
CV19*	10-7mm Blend*	Concrete Blend	1405		
CV19	7mm	Concrete Aggregate			
CV17	10mm	Concrete Aggregate			
CV15	14mm	Concrete Aggregate	605		
CV5	Ballast/40mm	Non Spec Aggregate			

TOTAL - 4470

COMMENTS

Hole in waterline on PRC

NEW 450 + 550 liners

ASK PTE To check PRC Belt Motor fail To Run ON RESTART AFTER A450 ADJUSTMENT.

6315

DAILY PRODUCTION LOG & CHECKLIST - PRIMARY

Date: 6.12.17 Operator: Kingsley

Weather Conditions; overcast - fine Quarry Bench ID. 615

Shift Start Time	6.00	Shift Finish Time	5.00
Crusher Start Time	7.10	End of day Crusher stopped	4.40

Belt Weightometer Reading - Daily

Conveyor 1 Start	Conveyor 1 Finish	Total Tonnes Crushed
549806	554 856	5068
Conveyor 6 Scalps Start	**Conveyor 6 Scalps Finish**	**Total Tonnes Stockpiled**

Cartage of Raw Feed from Face to Boot – Number of loads

KK1 Loads to Boot	39	KK3 Loads to Boot	
KK2 Loads to Boot		Contractor Loads to Boot	

Stoppages due to Trucks	Stoppages due to Jaw
𝍸 𝍸 |	𝍸 𝍸 𝍸 |||

Plant Stopped	Plant Started	Downtime (Hrs/Min)	Reason
6.00	7.10	1h 10m	tool box, move bench
9.25	9.55	30m	smoko
12.55	2.15	1h 20m	emiR, blast, PTE. greasa
4.40			end crushing

Pre start checks;

Generator hours. 21711 - 21721 Generator oil level.. ✓

Plant Visual ... ✓

COMMENTS

HY-TEC

1H383

DAILY PRODUCTION LOG & CHECKLIST - PRIMARY

Date: 7.12.17 Operator: Kingsley

Weather Conditions; Fine Quarry Bench ID. 6.15

Shift Start Time	6.00	Shift Finish Time	5.00
Crusher Start Time	6.50	End of day Crusher stopped	4.40

Belt Weightometer Reading - Daily

Conveyor 1 Start	Conveyor 1 Finish	Total Tonnes Crushed
554 856	560 334	5485
Conveyor 6 Scalps Start	**Conveyor 6 Scalps Finish**	**Total Tonnes Stockpiled**
	31	

Cartage of Raw Feed from Face to Boot – Number of loads

KK1 Loads to Boot	44	KK3 Loads to Boot	
KK2 Loads to Boot	43	Contractor Loads to Boot	

Stoppages due to Trucks	Stoppages due to Jaw
IIII 1	IIII IIII IIII IIII IIII II

Plant Stopped	Plant Started	Downtime (Hrs/Min)	Reason
6.00	6.50	50m	tool box
9.25	9.55	30	smoko.
12.55	1.35	40	smoko
4.40			end crushing

Pre start checks;

Generator hours 21722 - 21732 Generator oil level.. ✓

Plant Visual ✓

COMMENTS

Muller Acoustic Consulting Pty Ltd
PO Box 262, Newcastle NSW 2300
ABN: 36 602 225 132
P: +61 2 4920 1833
www.mulleracoustic.com

MAC
Muller Acoustic Consulting