



MARSHALL DAY
Acoustics 

THREE KINGS QUARRY
BIANNUAL NOISE COMPLIANCE
Rp 011 2011528A | 6 July 2017

Project: **THREE KINGS QUARRY
Biannual Noise Compliance**

Prepared for: **Winstone Aggregates
PO Box 17195
Greenlane
Auckland 1546**

Attention: **Angela Klein**

Report No.: **Rp 011 2011528A**

Disclaimer

Reports produced by Marshall Day Acoustics Limited are prepared based on the Client's objective and are based on a specific scope, conditions and limitations, as agreed between Marshall Day Acoustics and the Client. Information and/or report(s) prepared by Marshall Day Acoustics may not be suitable for uses other than the original intended objective. No parties other than the Client should use any information and/or report(s) without first conferring with Marshall Day Acoustics.

We stress that the advice given herein is for acoustic purposes only, and that the relevant authorities and experts should be consulted with regard to compliance with regulations or requirements governing areas other than acoustics.

Copyright

The concepts and information contained in this document are the property of Marshall Day Acoustics Limited. Use or copying of this document in whole or in part without the written permission of Marshall Day Acoustics constitutes an infringement of copyright. Information shall not be assigned to a third party without prior consent.

Document Control

Status:	Rev:	Comments	Date:	Author:	Reviewer:
Draft	-	Draft issued to Client	5 July 2017	M. Cottle	K. Prosée
Final	00	Final issued to Client	6 July 2017	M. Cottle	K. Prosée

TABLE OF CONTENTS

1.0	INTRODUCTION	4
2.0	NOISE PERFORMANCE STANDARDS	4
3.0	MEASUREMENTS	5
3.1	General	5
3.2	Operations and Equipment.....	5
3.3	Results	5
3.4	Discussion.....	6
3.4.1	Fyvie Avenue.....	6
3.4.2	Grahame Breed Drive	6
3.4.3	Residentially zoned land between 904 and 944 Mt Eden Rd (including 14-16 Kingsway)	6
4.0	CONCLUSIONS AND RECOMMENDATIONS.....	8
APPENDIX A GLOSSARY OF TERMINOLOGY		9
APPENDIX B NOISE MEASUREMENT POSITIONS		10

1.0 INTRODUCTION

Marshall Day Acoustics (MDA) has carried out an environmental noise survey at monitoring positions adjacent to Three Kings Quarry, Mt Eden, on 20 June 2017.

Historically, Winstone Aggregates (Winstone) was required to undertake two noise surveys per year, at two identified monitoring positions, as part of the Environmental Management Plan for the quarry, to determine compliance with the noise rules for the site. However, as quarrying activity at the site has temporarily ceased, controlled fill operations is now considered to be the primary activity being undertaken and consequently, sound generated by this activity must comply with the noise limits contained in conditions in Environment Court Decision No. [2011] NZEnvC 214.

MDA understands that Winstone has chosen to continue biannual monitoring to ensure compliance is maintained as far as practicable.

A glossary of acoustic terminology used in this report is contained in Appendix A.

2.0 NOISE PERFORMANCE STANDARDS

Condition 54.51 of the consent sets out the following with respect to noise limits:

“Any activity on the site associated with fill operations at the Three Kings Quarry shall not exceed the following noise limits at residentially zoned land fronting Mount Eden Road between street numbers 904 and 944 (including 14-16 Kingsway):

<i>Monday to Saturday</i>	<i>7:00 am to 10:00 pm</i>	<i>L₁₀ 60 dBA</i>
<i>Sunday & Public Holidays</i>	<i>9.00 am to 6.00 pm</i>	
<i>At all other times</i>	<i>L₁₀ 45 dBA</i> <i>L_{MAX} 75 dBA</i>	

At all other residentially zoned land noise limits as per the table below shall not be exceeded.

<i>Monday to Saturday</i>	<i>7:00 am to 10:00 pm</i>	<i>L₁₀ 55 dBA</i>
<i>Sunday & Public Holidays</i>	<i>9.00 am to 6.00 pm</i>	
<i>At all other times</i>	<i>L₁₀ 45 dBA</i> <i>L_{MAX} 75 dBA</i>	

N.B - Noise shall be measured and assessed in accordance with NZS6801: 1991 and NZS6802.2008.”¹

¹ It is noted that there is a discrepancy in the versions (year) of the acoustic standards quoted in the condition. It is also noted that NZS6802:2008 does not use the L₁₀ noise descriptor which has been used to specify the noise limits in condition 54.51. MDA understands that it is the intention of the Condition to reference NZS6801: 1991 and NZS6802:1991.

3.0 MEASUREMENTS

3.1 General

Measurements were completed at each of the two measurement positions on 20 June 2017. The first was at the Grahame Breed Drive position between 8:35 am and 8:50 am and the second was at the Fyvie Avenue position between 9:05 am and 9:30 am. The measurement positions are the same as in all previous compliance measurements of this type and are shown on the figure in Appendix B.

Sound level measurements were carried out using a Brüel & Kjaer 2250 sound level meter, which satisfies the requirements for a Type 1 sound level meter per IEC 651. Measurements were carried out and assessed in accordance with the relevant New Zealand Standards.

The weather was fine with little cloud cover and calm 0 - 0.2 m/s breeze from the NE. These conditions are considered acceptable for environmental noise surveys.

3.2 Operations and Equipment

The following equipment was operating in the quarry during the survey. These operations were confirmed by the quarry supervisor following completion of the survey.

Quarry Activity:

- No quarry extraction or supply activity

Fill Operations Activity:

- 1 x Caterpillar excavator loading a Volvo articulated truck at the trench
- 1 x Caterpillar Komatsu D65 bulldozer pushing fill
- 2 x Volvo dump truck carting fill within the site
- 1 x Hyundai excavator working near centre of site
- Arrival and departure of trucks delivering clean fill

3.3 Results

The measured sound levels are presented in Table 1 below.

Table 1 – Measured Sound Levels

Measurement Position	Duration	dB L _{A10} ⁽¹⁾	Noise Sources ⁽²⁾
14 November 2016 Survey:			
Fyvie Avenue	17 minutes	53	<u>One bulldozer spreading fill, 1 excavator loading a dump truck, Hyundai excavator, 2 Volvo articulated dump trucks carting fill, trucks arriving / dumping soft fill / departing</u> <i>Non-quarry sound: Bird sounds, dogs barking, distant traffic on Mt Eden Road</i>
Grahame Breed Drive	17 minutes	54	<u>One bulldozer spreading fill, 1 excavator loading a dump truck, Hyundai excavator, 2 Volvo articulated dump trucks carting fill, trucks arriving / dumping soft fill / departing</u> <i>Non-quarry sound: Bird sounds, distant traffic on Mt Albert Road</i>

Notes to Table 1:

- (1) An explanation of technical terms is provided in Appendix A
- (2) The controlling noise source(s) is underlined
- (3) The measurement positions are shown in Appendix B

3.4 Discussion

It is understood that quarrying of Thee Kings Quarry has temporarily ceased. Therefore, associated activities including extraction of rock from the quarry face, crushing and scoria load-out by dump truck no longer occur. The following discusses each measurement, associated noise contributors and compliance assessment.

3.4.1 Fyvie Avenue

During the measurement, the overall noise level was controlled by fill operations occurring near the centre of the quarry (refer Photos 1 and 2 in Section 3.4.2).

The primary noise generating plant was the bulldozer pushing fill, two excavators, and two articulated dump trucks. Trucks (both quarry and fill operations related) moving along the haul road were also audible.

Ambient sound sources i.e. not associated with fill operations, included birds, dogs barking, and distant traffic.

A level of 53 dB L_{A10} was measured at this location from fill operations, which complies with the consented noise limit.

3.4.2 Grahame Breed Drive

During the measurement, the overall noise level was controlled by fill operations occurring near the centre of the quarry.

The primary noise generating plant was the bulldozer pushing fill, two excavators, and two articulated dump trucks. Trucks (both quarry and fill operations related) moving along the haul road were also audible.

Ambient sound sources i.e. not associated with fill operations, included birds and distant traffic.

A level of 54 dB L_{A10} was measured at this location from fill operations, which complies with the consented noise limit.

Photos 1 & 2 (overleaf) show the plant which was in the quarry during the period of the noise survey.

3.4.3 Residentially zoned land between 904 and 944 Mt Eden Rd (including 14-16 Kingsway)

Noise measurements were not possible at this location due to extraneous noise from traffic movements on Mt Eden Road making the measurement of controlled fill operations noise impracticable. However, based on the measured levels at the other positions and comparable source-to-receiver distances, MDA anticipates compliance with the 60 dB L_{A10} noise limit at residential properties along Mt Eden Road.

Photo 1: Southern End of Quarry (as viewed near Grahame Breed Drive position)



Photo 2: Centre of Quarry (as viewed from west boundary fence)



4.0 CONCLUSIONS AND RECOMMENDATIONS

Marshall Day Acoustics has completed noise monitoring at two of the three nominated monitoring positions as required by the Environmental Management Plan for the Three Kings Quarry.

Fill operations is now widespread within the quarry and it is understood that quarrying activities have temporarily ceased. Therefore, sound generating activity from the quarry during the survey period originated solely from fill operations and as such, has been assessed against the fill operations noise limits contained in [2011] NZEnvC 214.

Fill operations was occurring near the centre of the quarry and involved one bulldozer spreading a fill material, two excavators, two dump trucks hauling fill and trucks delivering material to the fill areas from off-site.

The cumulative acoustic emission from fill operation resulted in sound levels which complied with the relevant noise rules for consented operations on the site for the two monitoring positions where measurements were carried out.

Quarry noise could not be measured at residential boundaries along Mt Eden Road due to extraneous traffic noise. However, based on the compliant levels measured at the other positions and comparable source-to-receiver distances, MDA anticipates compliance with the 60 dB L_{A10} noise limit at residential boundaries along Mt Eden Road.

APPENDIX A GLOSSARY OF TERMINOLOGY

A-weighting	The process by which sound levels are corrected to account for the non-linear frequency response of the human ear.
dB	<u>Decibel</u> The unit of sound level. Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of $P_r=20 \mu\text{Pa}$ i.e. $\text{dB} = 20 \times \log(P/P_r)$
dB(A)	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) to more closely approximate the frequency bias of the human ear.
$L_{A10}(t)$	The A-weighted noise level equalled or exceeded for 10% of the measurement period. This is commonly referred to as the background noise level. The suffix "t" represents the time to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
$L_{A95}(t)$	The A-weighted noise level equalled or exceeded for 95% of the measurement period. This is commonly referred to as the background noise level.
L_{AFmax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
NZS 6801: 1991	New Zealand Standard NZS 6801:1991 " <i>Measurement of Sound</i> ".
NZS 6802: 1991	New Zealand Standard NZS 6802:1991 " <i>Assessment of Environmental Sound</i> ".

APPENDIX B NOISE MEASUREMENT POSITIONS



Source: Google Earth Pro