



MARSHALL DAY
Acoustics 

**FULTON HOGAN ROYDON QUARRY
NOISE LEVEL COMMISSIONING**

Rp 001 R01 20251416 | 27 July 2026

Project: **ROYDON QUARRY COMMISSIONING**

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Document Control

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SUMMARY

Fulton Hogan Limited have engaged Marshall Day Acoustics to assess the compliance of Roydon Quarry against the following consent conditions when the processing plant is operating.

- a) Daytime 7.00 am to 6.00 pm 55 dB L_{Aeq} ;
- b) Evening 6.00 pm to 8.00 pm 50 dB L_{Aeq} ;
- c) Night 8.00 pm to 7.00 am 45 dB L_{Aeq} and 70 dB L_{Amax} .

Our assessment confirms that daytime noise emissions are currently in the range 38 to 43 dB L_{Aeq} at the compliance assessment locations and therefore comfortably comply with the applicable 55 dB L_{Aeq} noise limit. Given the margin of compliance, noise management practices are operating effectively on site and a review of the Fulton Hogan Noise Management Plan is not required.

Compliance could not be measured directly at the assessment locations because quarry noise was not audible and was masked by traffic and other ambient sources. Therefore, this report describes how sound power levels have been derived through measurements close to the processing area and extrapolated using best practice techniques in accordance with ISO 9613-2:2024.

We have also determined site operations comply during the early morning, evening and night-time periods as permitted by the resource consent.

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1.0 INTRODUCTION

Marshall Day Acoustics was engaged by Fulton Hogan to assess operational noise levels from the Roydon Quarry processing plant against resource consent conditions 63(a) and 57 (RC245107). This report includes the following:

- Description of the site
- Summary of the relevant consent conditions
- Assessment of the operational noise levels of the processing plant and quarry

2.0 SITE AND ACTIVITY DESCRIPTION

2.1 Site Location and Zoning

The site is located in the Selwyn District and is exposed to traffic noise from Curraghs, Jones and Dawsons Roads, which directly border the property. Additional traffic noise from Main South Road (SH1) and the Christchurch Southern Motorway is also present at the southern end of the site. The site is close to the rail line and lies beneath the Christchurch Airport flight path. As a result, traffic and aircraft noise were common features in both noise surveys.

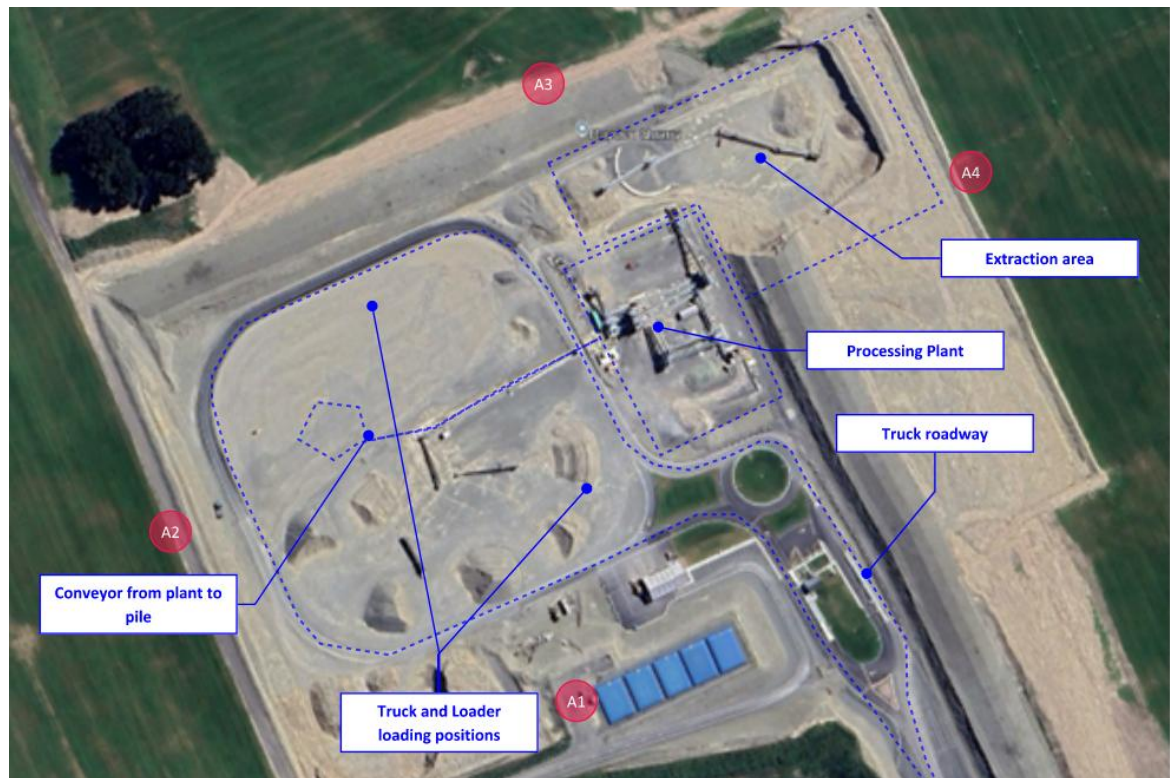
Figure 1: Indicative compliance and measurement locations



2.2 Site activities

At the time of the noise surveys, the site operations were located at the centre of the overall Roydon Quarry site and are broadly represented by the layout in Figure 2. The dominant noise sources during the surveys were the processing plant, gravel extraction, truck movements and loading. The processing plant did not operate for the full duration of the surveys and during those periods the main activities were trucks collecting or delivering gravel and loader operation.

Figure 2: Site activities and arrangement at the time of the surveys



3.0 RELEVANT CONSENT CONDITIONS

The applicable resource consent conditions relating to noise monitoring are Nos. 57, 58 and 63 as set out below:

Condition 57 All quarrying operations on the site, measured in accordance with the provisions of NZS 6801:2008 “Acoustics – Measurement of environmental sound” and assessed in accordance with NZS 6802:2008 “Acoustics – Environmental Noise”, must not exceed the following noise limits at any point within any other property, during the following times:

- | | | | |
|----|---------|--------------------|--|
| a) | Daytime | 7.00 am to 6.00 pm | 55 dB L_{Aeq} ; |
| b) | Evening | 6.00 pm to 8.00 pm | 50 dB L_{Aeq} ; |
| c) | Night | 8.00 pm to 7.00 am | 45 dB L_{Aeq} and 70 dB L_{Amax} . |

Condition 58 The noise limits in condition 57 do not apply to vehicle movements on the internal site accessways within 250m of the site boundary.

Condition 63 Noise emissions from quarry activities must be measured and assessed in accordance with condition 57 by a suitably qualified and experienced acoustic consultant at all the following times:

- a) Once within the first 12 months following the commencement of quarrying operations;

- b) When excavation initially advances to within 400m of either of the dwellings at 319 Maddisons Road or 151 Curraghs Road and thereafter when excavation initially advances to within 250m of either of those dwellings;
- c) Once when rehabilitation activities are initially undertaken within 400m of the dwellings at 319 Maddisons Road or 151 Curraghs Road and thereafter when excavation(rehabilitation) initially advances to within 250m of either of those dwellings.

We note that this report addresses Condition 63a. Monitoring to determine compliance with Condition 63b and 63c will occur at the appropriate time in the future.

4.0 SURVEY METHODOLOGY

Site activities were assessed over two noise surveys conducted between 1200 and 1630 hrs on Wednesday 4 and Tuesday 10 February 2026.

Measurement positions MP1 to MP5 in Figure 1 were chosen to be representative of the “...at any point within any other property ...” assessment locations described in Condition 57. While noise measurements were conducted at the nominated compliance locations MP1 to MP5, the noise environment was dominated by traffic and Roydon Quarry was not audible. Therefore, we adopted a different methodology of measuring close to the current activity area and extrapolating the measured noise levels to the compliance locations.

Measurement locations A1 to A4 in Figure 2 were chosen for this purpose. The noise environment was dominated by noise from the processing plant. Trucks being loaded and activity in the extraction area was intermittently audible. Truck and loader activity was the dominant noise source when the processing plant is not operating.

Additional measurements of only truck and loader activity were conducted to understand noise levels during periods when the plant is not operating. Aircraft, trains and traffic noise were all excluded from all measurements.

5.0 COMPLIANCE ASSESSMENT

Using the data collected at positions A1 to A4 in Figure 2, we have extrapolated the site’s noise emissions to the site boundaries taking into account ground attenuation, atmospheric absorption and meteorological conditions with reference to ISO 9613-2:2024 *Acoustics — Attenuation of sound during propagation outdoors, Part 2: Engineering method for the prediction of sound pressure levels outdoors*.

In ISO 9613, the effect of meteorological conditions is significantly simplified by calculating the average downwind sound pressure level. The Standard adopts a conservative approach of assuming that wind is always blowing from the noise sources to the receiver locations. The equations and calculations also hold for average propagation under a well-developed moderate ground-based temperature inversion, such as commonly occurs on clear, calm nights.

Using the data collected at positions A1 to A4, we have derived a maximum sound power level for all quarrying and processing activities of 113 dB L_{WA} . This value was used to calculate the daytime noise levels included in Table 1. It shows that current site operations comfortably comply with the applicable 55 dB L_{Aeq} noise limit, at the compliance locations MP1 to MP5.

Table 1: DAYTIME noise levels from observed site activities at compliance locations

Assessment position	Measurement position	Predicted noise level	Complies with 55 dB L _{Aeq} limit?
dB L _{Aeq} (15 min)			
5 Dawsons Road parallel to Jones Road	MP1	41	Complies
175 Dawsons Road	MP2	43	Complies
319 Maddisons Road	MP3	40	Complies
389 Maddisons Road	MP4	38	Complies
151 Curraghs Road	MP5	39	Complies

The site's resource consent permits different activities over the course of the day as set out in Appendix C. Table 2 provides a noise level analysis for each period of operation, based on our observations of current noise sources on site and the applicable noise limit for each timeframe. This analysis shows that site operations currently comply at all times; however, noise emissions will change over the life of the quarry and should be verified during future compliance surveys.

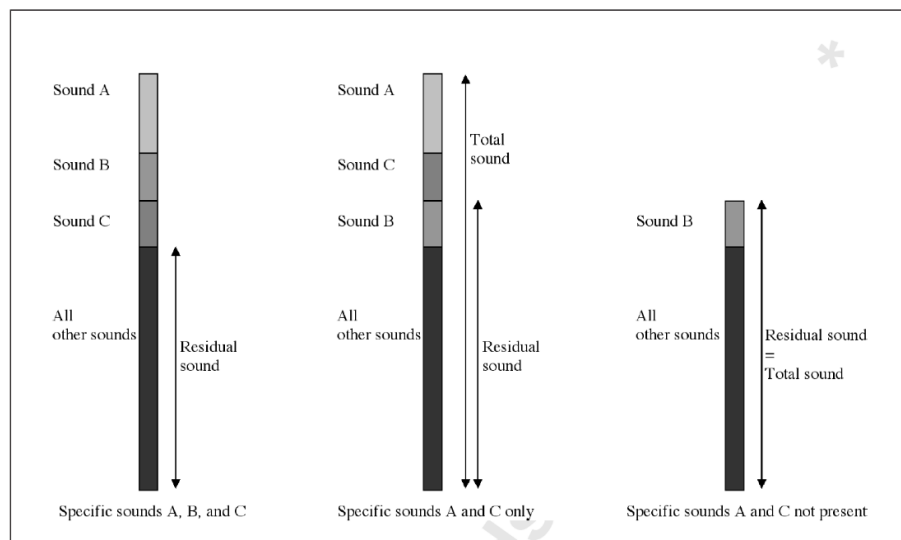
Table 2: Refer to Appendix C –quarry noise levels over different timeframes

Days	Hours	Noise generating activities	Noise level L _{Aeq} (15 min)					Noise limit
			MP1	MP2	MP3	MP4	MP5	L _{Aeq} (15 min)
Early morning	0600 – 0700	Truck and loader movements Conveyor and plant start up	41	43	40	38	39	45
Daytime	0700 – 1800	Daytime as per Table 1						
Evening	1800 – 2000	Main processing plant Extraction ¹ Truck and loader movements	41	43	40	38	39	50
Nighttime	2000 – 0600	Truck and loader movements and loading	35	32	30	29	31	45
1	No mobile plant was operational on site at the time of the measurement							

The noise levels from the quarry operation at the compliance locations are below all the noise limits. Based on the above, we consider the activity has minimal effect on rural amenity of surrounding noise-sensitive sites, and the existing level of amenity is maintained.

APPENDIX A GLOSSARY OF TERMINOLOGY

Background sound	The sound that is continuously present in a room or outdoor location. Often expressed as the A-weighted sound level exceeded for 90 % of a given time period i.e. L_{A90} .
Emission	Sound that is generated by and propagates away from a source.
Noise	A subjective term used to describe sound that is unwanted by, or distracting to, the receiver.
Notional boundary	A line 20 metres from any side of a dwelling, or the legal boundary where this is closer to the dwelling. This definition is from NZS 6802:2008.
Prescribed time frame	‘Daytime’, ‘night-time’, ‘evening’, or any other relevant period specified in any rule or national environmental standard. This definition is from NZS 6802:2008.
Total sound Or Ambient sound	The totally encompassing sound in a given situation at a given time, from all sources near and far, including the Specific Sound. See also Residual Sound.



This definition is from NZS 6802:2008.

A-weighting	A set of frequency-dependent sound level adjustments that are used to better represent how humans hear sounds. Humans are less sensitive to low and very high frequency sounds. Sound levels using an “A” frequency weighting are expressed as dB L_A . Alternative ways of expressing A-weighted decibels are dBA or dB(A).
dB	Decibel. The unit of sound level.
L_{AE}	Exposure Level. An A-weighted measure of the total sound energy over a certain time period, compressed into 1 second. Used to describe the sound energy of a single event, such as a train pass-by or an aircraft flyover.
L_{Aeq}	The equivalent continuous A-weighted sound level. Commonly referred to as the average sound level and is measured in dB.
L_w	Sound Power Level. The calculated level of total sound power radiated by a sound source. Usually A-weighted i.e. L_{WA} .
NZS 6801:2008	New Zealand Standard NZS 6801:2008 <i>Acoustics – Measurement of environmental sound</i>
NZS 6802:2008	New Zealand Standard NZS 6802:2008 <i>Acoustics - Environmental Noise</i>

APPENDIX B NOISE SURVEY DETAILS

The key details of the first noise survey are as follows:

Date:	4/02/2026, 1030 -1615 hours
Personnel:	Elena Salmond, Marshall Day Acoustics
Weather:	Average temperature 20°C, 0% cloud coverage, north easterly wind less than 4 m/s
Instrumentation:	Sound Level Meter: NTI XL2, SN A2A-2046-E0, calibration due 04/04/2026 Calibrator: Brüel & Kjær Type 4231, SN 1882775, calibration due 22/02/2026
Calibration:	Field calibration of the equipment was carried out before measurements, and the calibration checked after measurements. Observed change less than 0.1 dB.

The key details of the second noise survey are as follows:

Date:	10/02/2026, 1130 -1430 hours
Personnel:	Elena Salmond, Marshall Day Acoustics
Weather:	Average temperature 20°C, 80% cloud coverage, north easterly wind less than 4 m/s
Instrumentation:	Sound Level Meter: NTI XL2, SN A2A-2046-E0, calibration due 04/04/2026 Calibrator: Brüel & Kjær Type 4231, SN 1882775, calibration due 22/02/2026
Calibration:	Field calibration of the equipment was carried out before measurements, and the calibration checked after measurements. Observed change less than 0.1 dB.

APPENDIX C RESOURCE CONSENT – HOURS OF ACTIVITY

Table 1: Hours of quarry activities and other associated activities.

When			Allowable activities
At all times			Dust suppression, operation of weighbridge office activities, site security and light maintenance.
Daytime	Monday to Saturday, excluding Public Holidays.	7.00 am to 6.00 pm	Full range of <i>quarry activities</i> except processing of aggregates with mobile plant is limited to a maximum of 120 days per annum.
Early Morning		6.00 am to 7.00 am	Deposition of cleanfill, loading and transportation of material, and movement of vehicles associated with these activities. Site pre-start up including operational warm up of conveyors and machinery.
Evening	Monday to Saturday on up to 150 days per annum, excluding Public Holidays.	6.00 pm to 8.00 pm	Full range of <i>quarry activities</i> excluding processing of aggregates with mobile plant and deposition of cleanfill.
Night-time	Monday to Saturday on up to 30 nights per annum, excluding Public Holidays.	8.00 pm to 6.00 am.	Loading and transportation of material, and movement of vehicles associated with these activities.
Sunday	On up to 15 Sundays per annum, excluding Public Holidays.	7.00 am to 6.00 pm	