

**Before Independent Hearings Commissioners Appointed by Canterbury Regional  
Council and Selwyn District Council**

**In the matter of**                      The Resource Management Act 1991

**And**

**In the matter of**                      Applications by **Fulton Hogan Limited** for all resource  
consents necessary to establish, operate, maintain and  
close an aggregate quarry (**Roydon Quarry**) between  
Curraghs, Dawsons, Maddisons and Jones Roads,  
Templeton

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**EVIDENCE OF JON FARREN ON BEHALF OF FULTON HOGAN LIMITED**

**NOISE**

**DATED: 23 SEPTEMBER 2019**

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## Introduction

- 1 My name is Jon Farren. I am the manager and principal of the Christchurch office of Marshall Day Acoustics (**MDA**).
- 2 I have been asked by Fulton Hogan Limited (**Fulton Hogan**) to provide evidence in respect of its application for resource consents to establish, operate, maintain and close the proposed Roydon Quarry (**Proposal**).
- 3 My area of expertise is noise.

## Qualifications and Experience

- 4 I hold a Bachelor of Engineering with Honours in Electroacoustics from the University of Salford in the United Kingdom. I hold full Membership of the Institute of Acoustics (UK), a requirement of membership being that I am active in the field of professional acoustics and satisfy the Institute's requirements with regard to level of qualifications and experience.
- 5 I have been actively employed as an Acoustic Consultant for 25 years, approximately 16 of which have been with Marshall Day Acoustics. I have considerable experience in the areas of planning with regard to noise, the assessment of noise and vibration, and noise control in relation to both environmental noise and building acoustics.
- 6 Of specific relevance to this project, I have assessed noise effects and performed compliance monitoring at over 25 quarries and mineral extraction sites across the South Island, where product extraction, processing and its transportation are the dominant noise sources. My experience includes several gravel quarries in Canterbury for various operators including Fulton Hogan.
- 7 I confirm that I have read the 'Code of Conduct' for expert witnesses contained in the Environment Court Practice Note 2014. My evidence has been prepared in compliance with that Code. In particular, unless I state otherwise, this evidence is within my sphere of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

## Scope of Evidence

- 8 I note the Commissioners' Minute 1 paragraph 16, which advises that I do not need to repeat the material in my technical report. My evidence provides a brief summary of the noise generating aspects of the Roydon Quarry Proposal (**Proposal**) and addresses the key concerns in more detail.

- 9 My statement of evidence will address:
- 9.1 My involvement in the Proposal to date;
  - 9.2 Key noise-related features of the Proposal and any changes that have occurred since the original Application;
  - 9.3 The existing noise environment around and potentially affected by the Proposal;
  - 9.4 Relevant noise standards applying to the Proposal;
  - 9.5 Potential noise and vibration effects arising from the Proposal and how they might be mitigated;
  - 9.6 Acoustic-related issues raised in the s42A Reports; and
  - 9.7 The key concerns raised in submissions on the Proposal;

**My involvement in the Proposal**

- 10 I have been engaged by Fulton Hogan to prepare evidence for the resource consent application for the Proposal.
- 11 My role in the project to date has been as technical reviewer and supervisor for all noise monitoring, modelling and analysis. Working with my colleague Gary Walton of MDA, I have undertaken the assessment noise effects for the Proposal. I was responsible for reviewing and providing input to the *Environmental Noise Assessment* that accompanied the application, and for the subsequent Requests for Information (**RFI**).
- 12 Both my colleague Gary Walton and I have been to site on several occasions. I have been to site at varying times of day and days of the week, in order to observe the existing noise environment. I have performed noise measurements at the site and observed traffic movements including during the early morning period between 0600 to 0700hrs on Curraghs Road.
- 13 I presented at the Proposal's community information evenings in November 2018 which provided an opportunity for me to explain quarry noise generation to members of the public and to listen to their concerns.
- 14 On 7 August 2019, I attended a meeting to discuss the Proposal with the noise experts engaged by Selwyn District Council, Canterbury District Health Board, Templeton Residents Association and the New Zealand Motor Caravan Association. The intention is for the noise experts to produce a Joint Witness Statement prior to the Hearing.

- 15 I have discussed heavy vehicle use and distribution around the site with Mr Andrew Metherell of Stantec and Mr Don Chittock of Fulton Hogan. I have also discussed proposed conditions of consent with Mr Kevin Bligh of Golder Associates.
- 16 In preparing my evidence I have reviewed the following documents:
- 16.1 the Proposal's consent application;
  - 16.2 the s42A report prepared by Mr Andrew Henderson; and
  - 16.3 the noise evidence of Dr Jeremy Trevathan.

### **Key noise-related features of the Proposal**

- 17 The key noise generating features of the Proposal are outlined in detail in the *Environmental Noise Assessment*. Below I have described each of the key noise sources and how they might be perceived by a person standing at the perimeter of the site, taking into account the noise mitigation proposed by Fulton Hogan such as the proposed noise control bund and prohibition of tonal reversing alarms on quarry vehicles:
- 17.1 Topsoil removal and formation of the perimeter bunds – this activity is dominated by engine and track noise from slow moving earthmoving equipment;
  - 17.2 Gravel extraction – whilst front-end loader engine noise is a key feature of this activity, it is unlikely to be particularly noticeable at the boundary of the site;
  - 17.3 Crushing and screening (fixed and mobile) – the mechanical action of the crushing and screening plant and the sound of stones being processed on a continuous basis are the dominant noise sources. Whilst this noise will be noticeable at the site boundary, it will be at a relatively low-level and will generally be inaudible above passing cars, planes or trains;
  - 17.4 Hardfill – hardfill being deposited from trucks onto the floor of the central processing area will be heard as a short duration rumble at a relatively low level. When being backfilled into the excavated pit, mechanical engine noise from trucks and loaders will dominate;
  - 17.5 Transportation – engine noise from the front-end loader and quarry trucks are a key feature of this activity along with the noise from the placement of the first scoop of gravel into an empty truck. However, neither of these noise sources are likely to be particularly noticeable at the site boundary.

- 18 Predicted noise levels from the site are based on MDA noise surveys of similar equipment operating under similar conditions. The predicted noise levels are based on several operational scenarios where all equipment is operating continuously and simultaneously in order to represent a worst-case situation. In reality, not all equipment will be operating at all times and noise levels will therefore often be lower than the predicted levels.
- 19 The entire site perimeter will have a three-metre-high noise control bund which, in conjunction with an approximately nine metre deep pit, will mean that many of the noise sources used during gravel extraction will be mitigated to a significant degree.
- 20 Although traffic noise generation outside the site is not considered against the District Plan noise standards, a considerable number of off-site truck movements are proposed. I will discuss the potential for any resulting adverse noise effects in more detail later in my evidence.
- 21 Vibration generated by normal operation of the proposed quarry will be imperceptible beyond the boundary of the site. No blasting is required at this site. During construction of the perimeter bunds, there may be perceptible vibration at the closest dwelling at 319 Maddisons Road, but if this occurs, it will be of short duration. If it was to occur, the vibration would more likely to be noticeable by someone sitting down reading a book, for example. It is unlikely to be particularly noticeable by someone actively doing housework or gardening.

**What noise generating aspects have changed?**

- 22 Several operational aspects of the proposed quarry have been amended since the *Environmental Noise Assessment* was prepared. In respect of noise generation, these can be summarised as:
- 22.1 An amendment to operational hours and the activities that can occur within certain time frames;
- 22.2 A reduction in the maximum number of truck movements; and
- 22.3 A variation to the staging of extraction.
- 23 Overall, I consider these amendments will further reduce noise emissions and potential adverse effects from the proposed activity. I will briefly discuss each of these below.

***Operating Hours***

- 24 Revised operating hours, and the activities that can occur within them, were outlined in the August 2019 RFI response. In my view the most substantive positive change

is the proposal not to commence full quarry operations until 0700 hrs, compared with 0600 hrs previously. A noise limit of 45 dB L<sub>Aeq</sub> will now apply prior to 0700 hours, compared with 55 dB L<sub>Aeq</sub> previously.

### ***Truck Movements***

- 25 Maximum truck movements have reduced from a maximum of 1,500 heavy vehicle movements a day to 1,200 movements a day, not exceeding 800 movements per day as a 60 day average. As truck noise generation and potential adverse noise effects are directly related to the number of trucks, these reduced numbers will serve to reduce noise from heavy vehicle movements at dwellings both adjacent to, and in close proximity to the main on-road routes around the site.
- 26 Access roads within the site will be sealed<sup>1</sup>, significantly lessening the risk of holes or bumps that can potentially give rise to truck body rattle. The site is configured to minimise the need for any quarry truck to reverse and therefore engage a reversing alarm. I understand that site-based vehicles (e.g. front-end loaders) will have a blue flashing light as opposed to reversing alarms. However, where audible alarms are necessary for safety reasons, all site-based vehicles will be fitted with a broadband reversing alarm which is unlikely to be discernible beyond the boundaries of the site. A resource consent condition has been drafted to that effect.
- 27 The applicant has proposed to restrict heavy vehicle movements to not more than 30 movements an hour between 2000 and 0600 hrs, and only on 60 nights a year. In assessing potential noise effects, I have assumed that trucks will not use “local roads” during this time. The absence of the definition of “local roads” has given rise to some uncertainty which I will clarify.
- 28 My understanding is that between 2000 and 0600 hours, trucks will turn left onto Jones Rd when they leave site and then turn right onto Dawsons Rd before travelling on SH1 and I understand this will be captured as a condition of consent using the following text:
- 28.1 Heavy vehicle movements leaving or accessing the Roydon Quarry between the hours of 2000 and 0600 hrs shall not travel on the following roads:
- (a) Jones Road west of access (between the access and Curraghs Road);
  - (b) Dawsons Road north of Jones Road (between Jones Road and Maddisons Road);

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<sup>1</sup> Revised proposed draft condition “29) Any roads within the central processing area shall be sealed as shall the access road(s) into the site”

- (c) Jones Road east of Dawsons Road (between Dawsons Road and Railway Terrace);
- (d) Advice note: The above conditions will also avoid travel down Curraghs Rd.

29 In my evidence, where appropriate, I have referred to the time of day rather than “night-time” or “daytime”, in order to address potential confusion that has arisen from the change of operational hours outlined in the August 2019 RFI response. I will discuss this further in my comments on the s42 report.

### ***Staging***

30 Sections 5.0 and 6.0 of the *Environmental Noise Assessment* describe noise emissions from a number of operational scenarios that were related to the staged extraction of the project. Their purpose was to describe the maximum noise envelope that could occur and represent a reasonable worst case. As such, I consider that the revised staging plan will not materially change the range of noise levels that can occur at each of the residential locations.

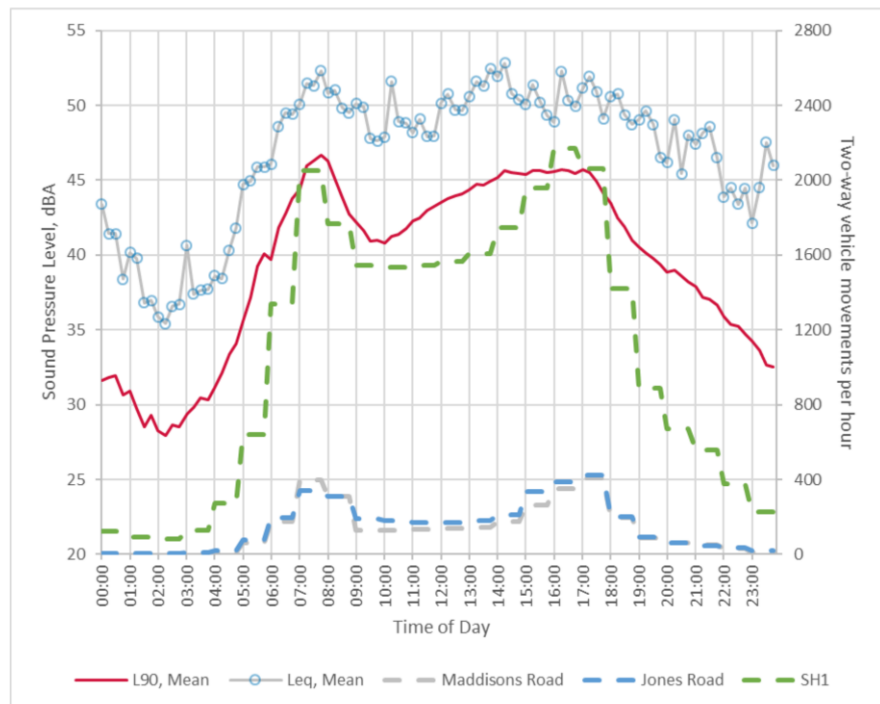
31 I note that Dr. Trevathan agrees with this position in Paragraphs 57 and 58 of his evidence.

### **The existing noise environment and receiving environment**

32 The *Environmental Noise Assessment* outlines the existing noise environment in some detail, including comprehensive noise monitoring at noise sensitive locations around the site. This included both unattended noise monitoring on the site over a period of three weeks and attended noise monitoring adjacent to the nearest dwellings over several days.

33 In my view, the most notable feature of the existing noise environment is the relatively rapid increase in noise levels from around 0400 hours that is directly correlated to the increase in traffic volumes on both SH1 and local roads. I have reproduced Figure 11 from the *Environmental Noise Assessment* to illustrate this. The significant number of early morning aircraft movements that either pass directly over, or are audible from, the site is also of note.

Figure 11: Comparison of hourly ambient noise levels and vehicle movements



34 In summary, the site and surrounds have a rural character which is subject to elevated ambient noise levels from road, air and rail traffic on a relatively continuous basis. The noise environment is typical of rural areas on the urban fringe that are close to transport infrastructure. The noise environment at the site is in contrast to other rural areas in Selwyn District away from busy roads, which will have lower ambient noise levels. In my opinion, the existing elevated ambient noise environment, proximity to transport infrastructure and large setback distances to dwellings, make this site suitable for a quarry to operate with minimal adverse noise effects.

#### Relevant noise standards applying to the Proposal

35 The applicable Selwyn District Plan noise standards for this project are outlined in detail in Section 4.0 of the *Environmental Noise Assessment*. In summary, the rural zone permitted activity noise standards at the notional boundary of a dwelling are:

35.1 0730 – 2000 hrs 60 dB  $L_{A10}$

35.2 2001 – 0729 hrs 45 dB  $L_{A10}$  and 70 dB  $L_{Amax}$

36 The *Environmental Noise Assessment* discusses other published guidance in the context of the receiving environment in order to develop appropriate noise level assessment criteria for a project, at the proposed site boundary. These criteria are summarised below and have been adopted as proposed conditions of consent:

36.1 0700 – 1800 hrs 55 dB  $L_{Aeq}$



36.2 1800 – 2000 hrs 50 dB L<sub>Aeq</sub>

36.3 2000 – 0700 hrs 45 dB L<sub>Aeq</sub> and 70 dB L<sub>Amax</sub>

- 37 I consider the proposed limits to be generally more stringent than the District Plan's permitted activity standards, once the different application point (i.e. notional boundary versus site boundary) and noise metrics (i.e. L<sub>A10</sub> versus L<sub>Aeq</sub>), are considered. Therefore, compliance with the noise limits will result in a noise environment consistent with that anticipated by the District Plan.
- 38 The only area where the proposed noise limits are less stringent than the Plan thresholds is the period between 0700 and 0730 hours where the proposed project limit of 55 dB L<sub>Aeq</sub> is higher than the District Plan permitted activity threshold of 45 dB L<sub>A10</sub>. In my view, the already elevated ambient noise environment within the area during this time frame will mean that any potential adverse noise effects as a result of this change are minimal. I note that 0700 hours is suggested as the start of daytime in NZS6802<sup>2</sup> and is commonly cited as such in many District Plans around New Zealand. Whilst the proposed replacement Selwyn District Plan has not been publicly notified, reporting to date has signalled that "daytime" may be proposed to change to 0700 hours<sup>3</sup>.
- 39 In order to permit trucks to leave the site and not breach the proposed limits, I consider it appropriate to provide an exemption for noise from trucks for a distance of 250 metres from the site entrance. This recommendation has been formulated into a condition of consent and I will discuss it further shortly.
- 40 In my opinion the proposed project criteria that I have outlined in Paragraph 36 will result in an acceptable level of noise effects and maintain appropriate levels of residential amenity. In Paragraphs 38 to 40 of his evidence, Dr. Trevathan also agrees the criteria are appropriate.
- 41 In relation to the topsoil stripping and the construction of noise control bunds, I consider New Zealand Standard NZS 6803: 1999 "*Acoustics - Construction Noise*" to be the appropriate mechanism for management of construction noise effects and I have proposed its adoption as a condition of consent. This standard is referred to in the Selwyn District Plan and is widely used across New Zealand. In practice the nearest residents to the site will experience elevated construction noise levels when machinery is working at the closest point to their dwelling. This is likely to have only

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<sup>2</sup> New Zealand Standard NZS 6802:2008 "Acoustics - Environmental Noise"

<sup>3</sup> "Noise and Vibration" Preferred Options Report to District Plan Committee Date: DPC Meeting - 25 July 2018.  
[https://www.selwyn.govt.nz/\\_data/assets/pdf\\_file/0007/282166/Noise-and-Vibration-Endorsed-Preferred-Option-Report.pdf](https://www.selwyn.govt.nz/_data/assets/pdf_file/0007/282166/Noise-and-Vibration-Endorsed-Preferred-Option-Report.pdf)

a few days duration compared to the construction of a dwelling, for example, which may generate elevated noise levels for several weeks.

### **Potential acoustic effects**

- 42 The potential noise and vibration effects of the proposed activity are discussed in some detail in the *Environmental Noise Assessment*, so I have provided only a summary below. The anticipated effects take into account the proposed controls and mitigation measures I have recommended, which are included in the draft conditions of consent attached to the August 2019 RFI response, and the further minor amendments which I will discuss in the following sections.
- 43 In my opinion, gravel extraction, processing, backfilling and transportation activities can occur within the site and comply with project noise limits that I have discussed at Paragraph 36. With the implementation of the proposed August 2019 Draft conditions of consent, subject to some further refinement which I discuss below, I am satisfied that the Proposal will result in acceptable noise levels and therefore effects.
- 44 Based on the anticipated traffic distribution around the site, my assessment indicates that truck movements will not result in any notable adverse noise or vibration effects at the nearest residences. As I have stated in Paragraph 27, trucks should not use local roads between 2000 and 0600 hrs.
- 45 During the construction phase of the project, the dwelling at 319 Maddisons Road has the potential to receive relatively high noise levels over a short period of time when noise control bunds are being established in the vicinity. I have recommended that compliance with NZS 6803 is required as a condition of consent, which will ensure these construction-type noise effects are acceptable. As I have noted in Paragraph 41, construction noise effects will be of shorter duration compared to those experienced during the construction of a dwelling over several weeks.
- 46 Overall, the Proposal will generate noise at a reasonable level at adjacent residences. For the most part, the noise generated will be below the Selwyn District Plan permitted activity noise standards. At all times I am satisfied proposal will result in an acceptable level of noise effects and will provide an appropriate level of both daytime and night-time residential amenity. Noise emissions will not be noticeable for the majority of residences in the vicinity of the site.

### **Acoustic issues raised by the s42A Report and Conditions**

- 47 I have reviewed the s42A report prepared by Mr Andrew Henderson and supporting evidence of Dr Jeremy Trevathan, acoustic advisor for Selwyn District Council.
- 48 Firstly, I would like to comment on several proposed amendments to the draft consent conditions and secondly, I would like to provide further commentary and

clarification on several issues raised by Dr Trevathan. For ease of reference I have attached the proposed consent conditions I am referring to, as **Appendix A** to my evidence.

### **Site Access**

49 The proposed amendment to condition 14 includes the sentence:

*“...The heavy vehicle access shall be located at least 250 metres from the dwelling at 1090 Main South Road...”*

50 This amendment is based on Dr. Trevathan’s paragraph 50 and is intended to ensure that the dwelling at 1090 Main South Road does not receive greater noise effects than anticipated by the *Environmental Noise Assessment*. I agree this proposed addition to the condition is appropriate.

### **Operation – General**

51 In the s42A Report’s amended conditions, the fourth row of Table 1 of proposed Condition 19 has been deleted to preclude any activities between 2000 and 0600 hrs. Furthermore, proposed Condition 21, which limits truck movements to 30 per hour between 2000 and 0700 hrs, has been deleted.

52 These conditions relate to activity at a similar time period and it appears that the basis for the deletion of both is set out in Mr Henderson paragraphs 109, 110 and 111, which in turn reference Dr. Trevathan’s evidence.

53 What I consider to be the relevant part of Mr Henderson paragraph 109 states:

*“...He [Dr Trevathan] has noted that while the wider environment will be unlikely to be affected by noise from night time activity, some of the closest dwellings (including those on Jones Road and Dawsons Road) could experience increases in their ambient noise of up 4 to 5DB LAeq [sic] at night...”(emphasis added)*

54 And in Paragraph 110:

*“Overall, I note that Dr Trevathan’s view is that the noise effects of the proposal will be minimal, assuming compliance with the proposed conditions. However, I have reservations about the appropriateness of the night time activities on the amenity of the closest residential dwellings. Although the increases in night time noise at the locations identified by Dr. Trevathan fall within the noise limits, the night time ambient noise level will increase...” (emphasis added)*

55 And in Paragraph 111:

*“I consider that the increase in the night time noise levels, even though they fit within the night time limits proposed by the Applicant, will contribute to a decrease in the overall amenity experienced by the closest residential properties at night ...” (emphasis added).*

56 From my reading of these paragraphs, it is the stated increase in noise levels at dwellings on Jones Road and Dawsons Road, and his view that amenity values will decrease, that leads Mr Henderson to the recommendation that no activities should occur on site between 2000 and 0600hrs.

57 Regarding 4 Dawsons Road, while Dr Trevathan considers there will be a noise level increase here of 4 to 5 dB  $L_{Aeq}$  (Paragraph 70), this is predicted to occur during the quietest part of the night. In his later analysis (Paragraph 101), Dr. Trevathan notes that the assessment is on a conservative basis as ambient noise levels at night are:

*“...already elevated significantly above those which would be conducive to uninterrupted sleep with windows open. The occupants of this dwelling will therefore already need to take steps to manage the external noise situation in this location, such as keeping windows closed during the night-time period, or sleeping in rooms which are less exposed to noise from traffic. In this context, I consider the presence of additional noise from night time quarry trucks from time to time will only have a minor cumulative effect...”*

58 I generally agree with this statement. The proposed operation of the quarry between 2000 and 0600 hrs will not substantially change night-time amenity being experienced by the residents of the dwelling at 4 Dawsons Road. The noise level increase being referred to by Mr. Henderson in his paragraph 109 needs to be considered in the broader context of the overall night-time noise levels. In my opinion, neither the operation of the proposed quarry nor the passing quarry trucks, will substantially change the existing ambient noise environment and the residents sleep amenity will be unchanged.

59 With regard to Jones Road, as I noted in my Paragraph 28, traffic will not travel on “local roads”, including Jones Road west of the site, between 2000 and 0600 hours. Therefore, the analysis presented by Dr. Trevethan in his paragraph 71 is not relevant as there will be no increase in noise at the Jones Road dwellings as a result of the proposed quarry.

60 As a result, my opinion is that the proposed activities can occur on site between 2000 and 0600 hours without any discernible change to noise amenity of these properties (Jones Road and 4 Dawson Road). Therefore, the preclusion of activity on site between 2000 and 0600 hrs is not warranted.

### **Traffic**

- 61 Proposed Condition 37 has been amended to exclude quarry traffic movements on Curraghs Road at all times, (except for deliveries in the immediate vicinity).
- 62 I note that Dr. Trevathan refers to 153 Curraghs Road in his evidence, presumably in direct response to it being referenced in the *Environmental Noise Assessment* which evaluated noise effects at two adjacent dwellings at 151 and 153 Curraghs Road. I understand the correct address for both dwellings is 151 Curraghs Road and I will use this address reference from this point on. For the purposes of my discussion, potential noise effects can be considered the same at both dwellings.
- 63 I understand the rationale for excluding traffic on Curraghs Road comes from Dr. Trevathan's Paragraph 89 which I have repeated below:
- "I accept that a low number of quarry trucks travelling on Curraghs Road during the daytime and evening would not have a significant effect, in the context of a road which already carries approximate 50 heavy vehicles per day. However, I also understand that there is currently no certainty that this will always be the case. A scenario with a high number of quarry trucks on Curraghs Road has not been assessed by MDA, and would be of concern. I therefore recommended that quarry heavy vehicles are also prohibited from using this portion of Curraghs Road during the daytime and evening."*
- 64 From my reading of this paragraph, I understand it is the uncertainty regarding the number of heavy vehicles that may use Curraghs Road, and therefore the potential uncertainty in truck noise, that leads Dr. Trevathan to recommend a complete prohibition of heavy vehicles on Curraghs Road. For the reasons I outline below, I do not agree with Dr. Trevathan's analysis or recommendation.
- 65 In my opinion, a low number of heavy vehicles on Curraghs Road will be acceptable and I note Dr Trevathan agrees with this (his Paragraph 89). For my analysis, I have relied on the heavy vehicle distributions that were included in the *Integrated Transport Assessment* (ITA) prepared by Stantec and were provided as Appendix B to the *Environmental Noise Assessment*.
- 66 This distribution assessment indicates that the maximum daily quarry traffic passing 153 Curraghs Road will be between 0 and 5 vehicles per day. I note this data was based on the maximum volume of 1,500 heavy vehicle movements in the original application and not the reduced maximum volume of 1,200 heavy vehicles per day.
- 67 Truck noise on Curraghs Road is discussed in Section 10.3.3 of the *Environmental Noise Assessment* on the conservative basis of 4 trucks per hour. Four trucks per hour was selected as a worst-case analysis to test the sensitivity of this road to traffic noise. This number of movements is equivalent to 56 vehicles between 0600 to

2000hrs, which is over 11 times more vehicles than anticipated by the ITA distribution maximum of 5 vehicles per day. I consider this to be a conservative assessment as it would equate to more than a doubling of existing heavy vehicle numbers of approximately 50 as indicated by Dr. Trevathan (his Paragraph 89).

68 However, even on this conservative basis of four vehicles per hour, I calculate that quarry trucks will result in a small increase in noise level of typically no greater than 1 dB at 153 Curraghs Road compared with the existing situation, once all vehicular, air and rail noise sources are considered. In my opinion a change in 1 dB is a negligible difference and no noticeable noise effect.

69 To address the concerns raised by Dr. Trevathan, my conservative analysis shows that “56 heavy vehicles per day” passing 153 Curraghs Road will result in a negligible change in noise level. Therefore, it follows that the ITA’s anticipated “5 heavy vehicles per day” will also be insignificant. Whilst my analysis does not provide the certainty in traffic numbers that Dr. Trevathan is seeking, my analysis shows negligible heavy traffic noise impact at 153 Curraghs Road even if the ITA analysis was incorrect by a factor of 11 and this would be unprecedented in my experience.

70 On this basis I do not agree that there should be a restriction in heavy vehicle movements over and above the restriction between 2000 and 0600 hrs discussed in Paragraphs 27 and 28.

### **Noise**

71 I support the addition of the phrase “...*deconstruction and topsoil spreading, and formation of final batter slopes...*” in proposed condition 46 as it lessens potential ambiguities about what can be considered as construction noise.

72 Proposed condition 47 relates vehicle reversing alarms. Whilst I support the intention of adding the words “...*including trucks...*” to this condition, I understand that it may not be practical to enforce for all possible trucks visiting the site. The site has been configured so that trucks can manoeuvre into position while driving forwards and, as such, will generally not be required to reverse. Therefore, the likelihood of a truck reversing alarm being engaged is relatively small in my opinion and if it were to occur, there would be minimal adverse noise effect.

73 Proposed condition 48 requires the preparation of a Noise Management Plan (**NMP**). As the potential offsite noise effects are considered to be so minimal, I do not see any particular additional merits or benefits that an NMP will provide. That said, the preparation of an NMP is relatively straightforward and will not be particularly onerous for the Applicant.

74 Proposed condition 48 also requires noise monitoring at various stages of the Proposal including for excavation work and rehabilitation work within 400 metres of

319 Maddisons Road and 153 Curraghs Road, and when mobile crushing plant is used within 400 metres of these dwellings. As the conservatively predicted noise levels from the Proposal comfortably comply with the noise criteria, I do not consider monitoring to this extent to be necessary.

- 75 If consent is granted and this proposed condition is adopted, my opinion is that further clarification should be provided in order that noise monitoring only takes once place during the initial stages of the specified activities occurring within 400 metres of the dwellings. This is to avoid the repeated requests for noise monitoring every time machinery may operate within 400 metres which would be excessive and unnecessary in my opinion.

#### **Specific response to Dr Trevathan's evidence**

- 76 I note that Dr Trevathan considers that the potential noise effects of the proposal are "minimal" and I agree with this statement. However, I do not agree with several of the restrictions proposed by Dr. Trevathan and I discuss this below.
- 77 In Paragraph 88 of his evidence, Dr. Trevathan seeks Marshall Day Acoustics' clarification on "night-time" truck movements. I note there has been some confusion regarding the definition of night-time and operational hours between the original application and RFI response.
- 78 As I noted previously in Paragraph 27, I do not agree with Dr Trevathan's proposed prohibition of trucks on Curraghs Road and all times. Trucks will be prohibited from using local roads between 2000 and 0600 hrs. Between 0600 and 2000 hrs trucks will use local roads in relatively low numbers, as outlined in the Stantec ITA. As I have discussed in Paragraphs 63 to 70 **Error! Reference source not found.**, I consider the effects of trucks using Curraghs Road between 0600 and 2000 hrs will be negligible.
- 79 Again, to clarify the points raised in Dr Trevathan's paragraph 96, I consider Jones Road west of the site entrance to be one of the "local roads" where trucks will be prohibited between 2000 and 0600 hrs. As such, the analysis and discussion provided by Dr Trevathan is not applicable.
- 80 Accordingly, as I have discussed in Paragraphs 51 to 60, the position taken by Mr Henderson in recommending no activity "at night" is not warranted and should be removed in my view.

#### **Submitter concerns regarding noise**

- 81 I have read a summary of submissions that was provided to me and reviewed those that relate to noise and vibration. Several of the submissions on the Proposal mention noise as being of concern. Issues include:

- 81.1 Construction and operational noise including specific mention of crushing, heavy equipment and reversing alarms;
  - 81.2 Truck noise;
  - 81.3 Vibration;
  - 81.4 Hours of operation; and
  - 81.5 Particular noise sensitivity of submitters.
- 82 I have considered all of those issues in reaching my conclusions in this evidence, the *Environmental Noise Assessment* accompanying the application and the subsequent modifications to the proposal that were outlined in the RFI responses.
- 83 I am satisfied that all submitter concerns have been appropriately considered and addressed as regards to noise and vibration. Adverse effects will be appropriately managed and mitigated by the conditions of consent I recommend.
- 84 As I have noted in Paragraph 14, several of the submitters are represented by noise experts and we intend to engage in caucusing and produce a Joint Witness Statement prior to the Hearing. It is my view that many of the issues of concern that were discussed during the initial meeting of the noise experts on 7 August 2019 have now been addressed through the modifications to the proposal that I have discussed in Paragraphs 22 to 31.

## **Conclusion**

- 85 I have assessed the noise and vibration effects from the proposed operation of the proposed Roydon Quarry. This involved noise level measurements, noise level predictions and a discussion of potential adverse noise and effects from both quarry operations and quarry trucks on public roads.
- 86 I have proposed noise limits based on published guidance which are generally more stringent than the applicable District Plan permitted activity noise standards.
- 87 I have recommended noise mitigation measures and conditions of consent to ensure that quarry operations can comply with the proposed noise limits – these have been adopted by Fulton Hogan.



88 I consider that with the controls provided for, the proposed activity will result in acceptable noise and vibration effects that will maintain an appropriate level of daytime and night-time residential amenity at adjacent dwellings.

Dated 23 September 2019

Jon Farren  
Manager & Principal - Marshall Day Acoustics

## Appendix A – Relevant draft reporting officer consent conditions

### Site Access

- 4)14) Vehicle access shall be provided on Jones Road, between Curraghs and Dawsons Road, for light and heavy vehicles. This may involve a separate access point exclusively for light vehicles. These access points shall be designed and constructed/ upgraded in accordance with the recommendations of the Stantec ITA (Appendix C of the AEE). [The heavy vehicle access shall be located at least 250 metres from the dwelling at 1090 Main South Road.](#)

### Operational

#### General

- 6)19) The hours of operation are 7.00 am to 8:00 pm, Monday to Saturday. Outside of these hours restricted processing operations and load out of trucks may occur as detailed in Table 1 below.

Table 1: Hours of operations/activities.

Hours	Duration	Range of activities
6.00 am to 7.00 am	Monday to Saturday	Load out of trucks, site pre-start up including operational warm up of conveyors and machinery. Clean fill deposition.
7.00 am to 6.00 pm	Monday to Saturday	Full range of quarry activities.
6.00 pm to 8.00 pm	Monday to Saturday on 150 days per annum.	Full range of quarry activities with the exception of processing using mobile plant and backfilling.
<del>8.00 pm to 6.00 am.</del>	<del>Monday to Saturday on 150 nights per annum</del>	<del>Load out of trucks and truck movements, and ancillary activities such as operation of weighbridge and site offices and clean fill deposition.</del>
Sunday and public holidays	For up to 15 days per year	Truck movements – load out of aggregate and clean fill deposition.
At all times, dust suppression, operation of weighbridge office activities, site security and light maintenance as required.		

- 7)20) No aggregate processing or transportation from the site shall take place prior to the opening of the Christchurch Southern Motorway Stage 2 (CSM2).

- 8)21) ~~Truck movements outside the hours of 7.00 am to 8.00 pm Monday to Saturday shall be restricted to no more than 30 vehicle movements per hour.~~

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23)37) A Transportation Management and Routing Plan shall be prepared by the consent-holder. This will include, as a minimum, that

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- a. Fulton Hogan controlled trucks will only travel into or through Templeton or on Curraghs Road if a delivery is in the immediate vicinity.
- b. Fulton Hogan will require any non FH-controlled truck drivers accessing the site to sign on to a code of practice committing to the same.
- c. A prominent sign will be established inside the quarry gate reminding drivers not to travel through Templeton or on Curraghs Road unless a delivery is in the immediate vicinity.
- d. Arrangements for site induction shall include a section on truck route options to and from the site and specifically address point (b) above.

30)46) Construction activities including the establishment of the site, roadworks, topsoil stripping, bund construction deconstruction and topsoil spreading, and formation of final batter slopes, shall be conducted in accordance with NZS 6803: 1999 “Acoustics - Construction Noise”, and shall comply with the “typical duration” noise limits contained within Table 2 of that Standard.

47) Should audible vehicle reversing alarms be required, only broadband noise alarms are to be used on quarry- equipment, including trucks. Tonal reversing alarms are not permitted.

Fulton Hogan Ltd shall require any non-FH controlled drivers accessing the site to sign on to a code of practice committing to the same.

31)48) Prior to the commencement of the activity, the consent holder shall submit to the Team Leader – Compliance Environmental Services, Selwyn District Council ([compliance@selwyn.govt.nz](mailto:compliance@selwyn.govt.nz)), a Noise Management Plan relating to the proposed operation. The Plan shall describe in detail the proposed managerial measures to be used to control noise generated by the operator. The Plan shall describe the role of staff in the management of noise, and nominate the specific staff member(s) responsible for overseeing the implementation and upkeep of the Plan. The Plan shall also specify procedures should any complaint in relation to noise be received.

Noise emissions from the site shall be measured and assessed in accordance with Condition 44) above, by a suitably qualified and experienced acoustic consultant at the following stages:

- Within the first 12 months following the commencement of gravel extraction activities.
- When excavation advances to within 400 metres of the dwellings at 319 Maddisons and 153 Curraghs Road
- If mobile crushing is undertaken within 400 metres of the dwellings at 319 Maddisons and 153 Curraghs Road
- When rehabilitation activities are undertaken within 400 metres of the dwellings at 319 Maddisons and 153 Curraghs Road

On each occasion, a report describing the measurement results shall be submitted to the Team Leader – Compliance, Environmental Services, Selwyn District Council ([compliance@selwyn.govt.nz](mailto:compliance@selwyn.govt.nz)) within 20 working days of completion of the survey.