

# APPENDIX H

## NOISE AND VIBRATION REVIEW PREPARED BY MARSHALL DAY ACOUSTICS

14 October 2020

Waikato District Council  
Private Bag 544  
Ngaruawahia 3742

**Attention: Victoria Majoor**

Dear Victoria

**MCPHERSON QUARRY – ACOUSTIC PEER REVIEW**

The Waikato District Council has engaged Marshall Day Acoustics (MDA) to undertake a peer review of the acoustic aspects related to McPherson Quarry’s proposal to obtain consent for their current operations, and to expand operations in several stages.

The noise assessment was undertaken by Hegley Acoustic Consultants (HAC). We reviewed the following documentation relating to acoustic effects, with the application and in response to requests for further information:

- Resource Consent Application & Assessment of Environmental Effects by Kinetic Environmental, dated 31 Jan 2019.
- Assessment of Noise Effects report No. 18185, by HAC, dated 9 October 2018.
- Letter in response to Section 92 request, by HAC, dated 2 July 2019 (first S92 response).
- Letter with further information in response to a further Section 92 request, by HAC, dated 24 July 2019 (second S92 response).
- Letter with further information in response to a further Section 92 request, by HAC, dated 5 August 2019 (third S92 response).
- Letter with further information relating to an assessment of effects and predicted noise levels at the upper floor levels of neighbouring dwellings, by HAC, dated 5 October 2020 (fourth S92 response).
- Various emails between the project planner and WDC planner containing information clarification, new information, and progressive changes to the original application.

We have also reviewed a number of submissions received and provide responses to those. We have reviewed 15 submissions that were provided to us, all of which raise noise and/or vibration concerns.

**1. Hours of operation**

Following some uncertainty about the proposed hours of operation (e.g. 7am to 6pm, 7am to 7pm, or 7am to 7pm allowing for “emergency works” from 5am to 7am and 6pm to 10pm), we now understand that the proposal is for hours of operation to be 7am to 7pm, Monday to Saturday.

A number of submissions made reference to the long hours, including Saturday, with some suggesting that Saturday hours should be restricted to 1pm only.

While the character of the area appears to change from rural to lifestyle, the area is zoned Rural. The predicted noise levels are not unreasonable for a rural environment, and therefore we do not recommend a reduction in Saturday operating hours for acoustic reasons.

## 2. Noise performance standards

The quarry is located in the Waikato District – Franklin Section, in the Rural zone. HAC recommends applying the relevant noise limits of the Proposed Waikato District Plan. We agree with this recommendation.

In addition, we recommend that blasting noise be controlled through conditions.

## 3. Vibration performance standards

The HAC report does not discuss vibration. The AEE contains a section on vibration (Section 6.5) which deals with blast noise, not vibration.

The submissions have included reference to adverse vibration effects, and while we cannot comment on the validity of some submissions' assertion that blasting vibration has caused damage to buildings, we consider that a vibration control should be included in the conditions.

The Proposed Waikato District Plan does not to contain any vibration limits. The Operative Waikato District Plan – Franklin Section references AS2187.2. This standard sets a vibration limit for blasting, of 10 mm/s PPV at dwellings, but also recognises that this level may be not appropriate. It states that *"In the absence of a particular site-specific study which may determine the appropriate damage criterion, then peak particle velocity is suggested as a damage criterion and a maximum level of 5 mm/s is recommended for blast design purposes..."*.

We consider that a vibration limit of 5 mm/s PPV is appropriate to avoid building damage and deal with amenity effects, provided prior notification is given.

Recommended condition wording is included in this letter.

## 4. Existing environment

Some ambient sound level measurements for daytime have been provided by HAC. The ambient sound environment is described as being affected by noise from SH2 and potentially SH1, and natural sounds. A summary of measured noise levels provided by HAC in various documentation are summarised below:

Survey area	dB L <sub>Aeq</sub>	dB L <sub>A90</sub>
231 Pinnacle Hill Road	44	40
211 – 221 Pinnacle Hill Road	39	35
57B and 77 Irish Road	49	46

These levels are as expected for a rural environment during daytime and support the District Plan daytime noise limit of 50 dB L<sub>Aeq</sub>.

We note that submissions call into question the measurement timing, duration and results. While it is unfortunate that no long duration survey was undertaken to gain a fuller understanding of the ambient environment, we are satisfied that the measured levels show a snapshot of the receiving environment that is within an expected range. The wind direction during the measurement at 231 Pinnacle Hill Road was described as being from south west, so from the quarry and SH1 to the receiver position. The ambient noise levels provided by HAC are within the range expected in the area, also supported by MDA surveys undertaken on unrelated projects in the area.

## 5. Noise level predictions

HAC predicted noise levels for various operating scenarios, both existing and future. Allowance was made for all equipment operating concurrently and in "worst case" locations for each stage. Noise level predictions are generally undertaken for a universal downwind situation, i.e. the modelling algorithm assumes downwind propagation to all receivers. Therefore, noise levels would reflect a reasonable worst case in terms of meteorological conditions.

The predicted noise levels indicate that compliance with the daytime noise limit can be achieved at all dwellings for all stages of works, including the fill activities in the south of the site.

Predictions have been provided for the notional boundary and the upper floor level of multi storey houses. Generally, the upper floors will receive higher noise levels due to less terrain and incidental shielding. The highest predicted noise level is 49 dB  $L_{Aeq}$  at the upper floor of 40 McPherson Road. This level is just compliant with the 50 dB  $L_{Aeq}$  daytime noise limit, which suggests that the quarry needs to carefully manage its noise generation in order to ensure compliance at all times.

## 6. Blast notification

Blasting at the quarry has been briefly discussed in the HAC report, namely that the rock extracted is not hard, and therefore blasting will not generate high noise or vibration levels at closest dwellings.

A number of submissions comment on adverse effects from blasting, including potential building damage, annoyance and startle. We have discussed blast vibration limits in section 3 above.

Regarding startle, some submitters request notification of blasts. That is a common management measure, where blasts are notified to people in the vicinity prior to the blast occurring (e.g. 30 min prior and then again 1 min prior). Such notification can be undertaken via siren over a wider area, or more targeted via text message. Either has been used successfully at other quarries, and we recommend that a similar regime is implemented at this quarry. Both options are pros and cons. Sirens may result in additional noise pollution as they need to be at a level that notifies a wider area, however, sirens are easy to use and means that everyone in the vicinity is aware of the impending blast. Text messages are targeted at those neighbours that are concerned about blasting, but may be missed if reception is insufficient or people do not have their phone on them.

We recommend gauging submitters' preference on notification and condition one blast notification option.

## 7. Trucks on the road

Trucks on the public road are not controlled by the relevant zone noise limits. Nevertheless, the effect should still be assessed, particularly if the road would not otherwise carry a large number of heavy vehicles.

Some submitters are concerned that trucks to or from the quarry will use Pinnacle Hill Road, a windy road that carries very low traffic volumes in general, and even less heavy vehicles. The latest traffic count on Pinnacle Hill Road that is available, was done in 2010, and showed a daily traffic flow of 540 vehicles, with 1% heavy vehicles (i.e. 5 per day). Upscaling to 2020 at 3% non-compounding per year, would result in a daily traffic flow of around 700 vehicles per day and 7 trucks.

Further questions for clarification to the applicant show that it is not intended that quarry trucks would use Pinnacle Hill Road, unless they are delivering material to a project on that road. Therefore, in our opinion, no further assessment is required.

## 8. "Emergency Works"

The AEE seemed to seek the formalisation of some limited night-time works during the shoulder periods from 5am to 7am and from 7pm to 10pm. The third S92 response dated 5 August 2019 from HAC, states that *"other than possible emergencies no night work is proposed"*.

We are unsure about what the applicant defines as an "emergency". The second S92 response from HAC states that: *"it is understood the activity that would occur when the lower night-time noise limits are applicable is when it is necessary to move overburden after hours for safety reasons"*. We have based our assessment on this statement.

In our opinion, emergency works would be required infrequently, be unplanned and occur only in situations where health and safety are at risk. It appears unusual to set timeframes for these works as health and safety considerations do not normally fall within predetermined times. We consider that actual emergency works would not fall under the general operational noise limits but would be governed by other legislation.

We are also reluctant to “normalise” emergency works with a condition that effectively permits night-time works – site planning should be sufficiently organised to ensure that no after hour work are required.

Our experience with a large number of quarries across New Zealand is that such condition is unusual. We have not come across it in the past and query why McPherson Quarry would run differently to all other quarries we have been involved with.

In our opinion, the only two valid options forward are;

- The application is for quarry operations to extend from 5am to 10pm, in which case a full and proper assessment of effects (including noise effects) over the entire period of proposed operation would be required. We note that the third S92 response does not provide ambient night-time noise levels as requested, which does not allow for an assessment of effects; or
- The application is for quarry operations between 7am and 7pm Monday to Saturday (as set out in point 1 of this letter), without “special provisions” for works that should not be occurring in the first instance.

Overall, we concur with the noise level predictions, but disagree with the potential to extend the works through “emergency works” provisions, which should only occur unexpectedly and unplanned, and would be covered by health and safety requirements rather than standard noise limits. Section 16 of the RMA remains in force in any event.

## 9. Assessment of effects

An assessment of effects has been provided in the fourth S92 response. Generally, predicted noise levels and measured ambient noise levels are similar.

The quarry activities will be audible at receivers not only when activities are in close proximity but also at other times, due to the character of the noise. At times of low ambient sound (e.g. still days with little traffic flow on the surrounding roads) quarry noise levels will be more prominent, particularly for dwellings near, or elevated above, the site with line of sight to the quarry operation. However, audibility is not an assessment requirement, but rather if the noise level is reasonable in the context of the environment.

Based on the measured levels provided, noise level surveys undertaken by MDA on an unrelated project in the area and the HAC assessment of effects, the predicted quarry noise levels would not be unreasonable compared with existing noise levels. The quarry will be audible and noticeable but should not interfere with normal day to day residential activities.

Should the applicant apply for an extension of hours of 5am to 10pm to allow for “emergency works”, authorised through conditions, then further work would be required including;

- An assessment of effects based on ambient noise levels during the early morning/late at night, and
- An assessment of the potential for annoyance/sleep disturbance at nearest houses.

## 10. Submissions

We have reviewed 15 submissions that addressed noise and/or vibration concerns. All these submissions were in opposition to the proposal. A summary of reviewed submissions is set out below.

No	Submitter	Address	Concerns	Responses
18	Mt William Ltd	12ha nth of the quarry	- amenity and ambience of the rural areas	Discussed under 9. Assessment of Effects
15	Aaron Baker and Emma West	247 Pinnacle Hill Rd	- health concerns because of noise - general noise and vibration concerns - noise impact from additional blasting and general quarry works - impact on homes in the 500m buffer zone - queries about the noise survey: not during prevailing winds and not taken on their site	Discussed under 2. Noise Performance Standards, 3. Vibration Performance Standards and 4. Existing Environment
21	Charlotte and Royce McCourt	217 Pinnacle Hill Rd	- no consideration of dwellings on north ridge - noise effects from operations	We requested additional information for the Stage 2 proposal and its effects on dwellings to the north of the quarry. This was provided in due course and has been reviewed and taken into consideration.  Based on the noise level contours, noise levels up to 40 dB L <sub>Aeq</sub> could be expected at the upper floor of 217 Pinnacle Hill Road.
19	Katrina and Sander Post	7D Macks Road/soon 231 Pinnacle Hills Road	- vibration from blasting - queries about the noise survey: not taken on their site	Discussed under 3. Vibration Performance Standards and 4. Existing Environment
22	Brittany Aker and Jason Johns	215 Pinnacle Hill Rd	- noise can be heard over long distances (e.g. single digger too loud and could be heard inside trough double glazing)	Discussed under 9. Assessment of Effects – audibility is not an assessment criterion
23	Megan Clotworthy	262G Pinnacle Hill Rd	- general noise from operations	Discussed under 9. Assessment of Effects

No	Submitter	Address	Concerns	Responses
30	Marilyn Thompson and Nigel Cowan	40 McPherson Rd	<ul style="list-style-type: none"> <li>- blasting vibration resulting in house damage</li> <li>- change in blast noise when it moves out of pit and shielding</li> <li>- Concrete tiles have developed cracks, concrete tile roof caps got lose and needed to be fixed</li> <li>- general quarry noise (crusher noise, drilling, noise from tipping into trucks)</li> <li>- wind has strong effect on noise (prevailing wind from west, truck noise from empties rattling)</li> </ul>	<p>Potential for vibration damage discussed under 3. Vibration Performance Standards. We consider that if appropriate limits are set for noise and vibration from blasting, effects can be appropriately managed. We have recommended lower vibration limits in accordance with the relevant standard, given the assertions made by submitters.</p> <p>Comments on general quarry noise are discussed under 9. Assessment of Effects</p> <p>Comments on the effects on wind are discussed in 5. Noise Level Predictions</p>
29	David Williams for Heartland Farms and Various	219 SH2	<ul style="list-style-type: none"> <li>- noise from trucks on local roads</li> <li>- restrict quarry operations to Mon-Fri 8am – 5pm and Sat 8am – 1pm</li> <li>- noise limit should be applied at quarry boundary, not notional boundary</li> <li>- blasting noise</li> <li>- notification of blasting in writing to reduce startle effect on horses and people</li> <li>- reduction in blast size to reduce vibration</li> <li>- vibration impacts on historic buildings on site</li> <li>- no blasting on Saturday and Sunday</li> </ul>	<p>Truck noise discussed in 7. Trucks on the Road</p> <p>Operating hours discussed under 1. Hours of Operation</p> <p>In rural areas, the appropriate assessment location is at the notional boundary as the sites are large and only the area surrounding a dwelling is protected. This is confirmed in the relevant New Zealand standards and the District Plan.</p> <p>Blasting noise and vibration discussed under 2. Noise Performance Standards and 3. Vibration Performance Standards. Notification of blasts is discussed in 6. Blast Notification, and recommended to be included in the conditions.</p>

No	Submitter	Address	Concerns	Responses
24	Jason and Shalby Kemble	213B Pinnacle Hill Rd	- vibration predictions for dwellings further away	Discussed under 3. Vibration Performance Standards. We note that vibration dissipates at distance. Therefore, vibration will be lower further away.
31	Pinnacle Hill Rd residents	149b, 209, 211, 213,215,217,251, 223, 233, 231B, 233D, 247, 231, 233B, 231A, 258, 235, 233C PHR	- noise from truck haulage on Pinnacle Hill Rd	Truck noise discussed in 6. Trucks on the Road
33	Marja Spencer and Jamie McKinstry	209 Pinnacle Hill Rd	- insufficient noise monitoring - possible expansion after consent, e.g. not taken account of potential additional equipment - long operating hours	Monitoring discussed under 4. Existing Environment. We have to rely on the accuracy of the information provided including the type and size of equipment. However, the noise and vibration limits in the conditions will control the level of effects permitted. Operating hours discussed under 1. Hours of Operation
35	Belinda Duggan and Andrew James	233B Pinnacle Hill Rd	- Considers that there is now more noise. Further information will be provided at the hearing	We will await further information to respond to.
36	Jocelyn Scott	433 Pinnacle Hill Rd	- general quarry operation noise	Discussed under 9. Assessment of Effects
17	Gordon and Helen Bray (have Bal Matheson as lawyer)	211 Pinnacle Hill Rd	- assessment of effects missing, currently only assessment of compliance	Discussed under 9. Assessment of Effects
16	Mark and Karin Joubert	251 Pinnacle Hill Rd	- general noise and vibration effects	Discussed under 9. Assessment of Effects

## 11. Recommended conditions

We recommend that the following conditions be attached to any consent granted:

1. McPherson Quarry shall only operate between the hours of 7am and 7pm, Monday to Saturday. No quarry activity, including, but not limited to, extraction, overburden removal, transport and distribution of material, shall occur outside those hours.
2. Noise from all activities within the quarry, measured at or within the notional boundary of any other site in the Rural Zone, shall not exceed the following noise limits:
  - a. 50 dB  $L_{Aeq}$  7am to 7pm all days
  - b. 45 dB  $L_{Aeq}$  7pm to 10pm all days
  - c. 40 dB  $L_{Aeq}$  and 65 dB  $L_{AFmax}$  10pm to 7am all days
3. Noise from all activities within the quarry, measured within any site in any zone other than the Rural Zone, shall not exceed the noise limits for that zone.
4. Noise shall be measured in accordance with the requirements of NZS6801:2008 Acoustics – Measurement of Environmental Sound and shall be assessed in accordance with the requirements of NZS6802:2008 Acoustics – Environmental Noise.
5. The noise created by the use of explosives for any blasting activity within the quarry measured at or within the notional boundary of any other site shall not exceed a peak sound pressure level of 128 dB $_{Zpeak}$ .
6. The vibration created by the use of explosives for any blasting activity within the quarry shall not exceed 5 mm/s PPV at any building not on the same site.
7. Blasting shall be limited to two occasions per day between 10am and 4pm, Monday to Saturday, except where required for safety reasons. Each blast shall be notified *[to relevant parties via siren/text message]* 30 minutes and again 1 minute prior to the blast occurring.
8. A blast register shall be maintained at the quarry office and shall be made available to Council on request.

We trust this information is satisfactory. If you have any further questions, please do not hesitate to contact us.

Yours faithfully

**MARSHALL DAY ACOUSTICS LTD**

**Siiri Wilkening**

**Acoustician**