

**In the Environment Court  
I Mua I Te Kōti Taiao O Aotearoa**

Under the Resource Management Act 1991

and in the matter of the direct referral of an application for resource consents by Meridian Energy Limited in respect of the proposed Mt Munro wind farm under section 87G of the Resource Management Act 1991 (**RMA**).

**Meridian Energy Limited**  
Applicant

and

**Tararua District Council, Masterton District Council, Manawatū-Whanganui Regional Council and Greater Wellington Regional Council (Councils)**  
Consent Authorities

and

**s 274 Parties**

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**Statement of Rebuttal Evidence of Michael Miklin Halstead on behalf of Meridian Energy Limited**

**6 September 2024**

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## INTRODUCTION

1. My full name is Michael Miklin Halstead. My statement of evidence in chief dated 24 May 2024 addresses acoustics matters in relation to the proposed Mt Munro Wind Farm. My qualifications and experience are set out in that statement of evidence, and I reaffirm my commitment to comply with the code of conduct for expert witnesses.
2. The purpose of this rebuttal evidence is to respond to the remaining outstanding issues raised in the Mr Nigel Lloyd's evidence, and noise-related matters raised by the section 274 parties.
3. Mr Lloyd and I participated in expert conferencing in relation to acoustics. We reached agreement on nearly all matters, as is reflected in the Joint Statement of Acoustics Experts (the **JWS**). The condition set attached to the evidence of Mr Anderson incorporates the changes we agreed should be made. I note that the changes we made are explained in the evidence of Mr Lloyd, and that the agreed changes are reflected in the set attached to the evidence of Mr Damien McGahan (the **August Proposed Conditions**). I confirm that these conditions allow noise to be appropriately managed throughout the construction and operation of the Project. I comment on conditions which relate to the narrow points of disagreement below, and note that my recommended edits to the August Proposed Conditions are incorporated in the set attached to the evidence of Mr Thomas Anderson (the **6 September Proposed Conditions**).
4. Following conferencing I have further investigated the need for, and management of out-of-hours blasting and propose a compromise solution that I consider should enable the activity with acceptable noise effects.

## RESPONSE TO S 274 EVIDENCE

5. Some points raised in s 274 party evidence were considered during expert conferencing and have been addressed in the JWS. However, for completeness, I address these matters below as well. The evidence

produced by the lay witnesses has a number of common themes and I have addressed these under general subject headings below.

### ***Location of assessments***

6. The evidence of the Hastwell Mount Munro Protection Society Inc (The Society) expresses concern that my noise assessment was focussed only on dwellings and not on the working farm environment where much of the resident's time is spent.
7. My assessment focusses on the area within the notional boundaries of dwellings, because I am specifically directed to do so by the District Plans, which assign amenity protections to those areas and not to the rural working environment. This is not an oversight – it is a conscious decision by the territorial authorities to ensure that the rural working environment is protected as a place that production can occur, without restriction by noise limits.
8. It is true that much of the rural environment can be, for much of the time, a quiet place. However, the district plans do not offer protections of that quiet, beyond the notional boundary of dwellings. I note that this is a common approach taken both throughout New Zealand and internationally.

### ***Assessment methodology***

9. The Society comments on the modelling methodology, and claims it does not take into account the wind direction, echoes, sightlines through hills, and that multiple turbines will produce noise.
10. The statement of Mr John Maxwell also cites the predominant wind direction as being one which directs sound from the turbines towards the Hastwell properties much of the time.
11. These are all factors that are taken into account by the ISO9613-2 modelling methodology, and they are modelled with a significant degree of conservatism that predicts the worst case scenario.

12. In particular, the predicted noise level from this noise model always uses downwind noise propagation at receivers, so all dwellings are considered under their most affected wind condition.

***Suitability of applying NZS:6808 to a rural environment***

13. The evidence of Mr John Maxwell states that the noise limits in NZS6808:2010 are not appropriate for rural dwellers. These noise limits are based on World Health Organization recommendations for an indoor sleeping environment of 30 dBA, and which note that a house with partially open windows typically provides 15 dB of attenuation from outside to inside. This conservatively achieves this indoor environment.
14. Although many rural environments are quiet, it is a misrepresentation of the rural environment in general to consider or describe it as 'peaceful'. The rural environment is protected as a production zone, which allows for uncontrolled primary production noise, farming noise, as well as noise from permitted activities (residential and industrial and farming and other noises) which are controlled by the least stringent noise limits suggested by the New Zealand standards which assist local authorities in setting limits.
15. By contrast, there are rural residential zones in other parts of the country where the quiet outdoor amenity is protected by significantly lower noise limits. It is the District Plan which sets out the anticipated noise levels from activities at different locations, and the protection offered by the 40 dBA wind farm noise limit is consistent with the amenity protections provided in relation to other noise sources by the applicable District Plan noise limits.
16. The evidence of Ms Janet McIlraith notes that the character of the noise from the wind turbines will be different to that presently enjoyed – the sound of birdsong.
17. It is true that a different type of noise will be introduced into the community, although wind farm noise is of neutral character and at a modest level. Birdsong will still be audible and likely dominant, although it will have in the background the steady noise of the wind turbines when the wind is blowing. The same would be true of a pine plantation

as it matures – a significant increase in wind-related steady noise would occur over a period of several decades.

### ***Infrasound and ‘hum’***

18. The evidence of Mr John Maxwell cites hum and infrasound as an effect of wind turbines. “Hum” is a tonal component of overall audible noise from a noise source. The methodology for assessing noise from wind turbines identifies tonality as an undesirable feature, and imposes a penalty for turbine noise which exhibits significant tonality.
19. As a result, significant efforts are made by the turbine manufacturers to eliminate tonal components, and in the event that such tones are sufficiently audible, the wind farm is required to adhere to a more stringent noise limit. The level of audible sound which could contain tones is controlled by similar (or lower) limits as would apply to other noise sources which could include hums, such as spa pool motors or heat pump outdoor units.
20. Infrasound is sound energy which occurs at frequencies not directly audible, and at extremely high levels can cause health effects. However, the levels of infrasound generated by wind turbines are orders of magnitude lower than this, and in fact are also lower than the levels of infrasound commonly experienced by activities such as driving a car at a modest speed with the windows rolled down. Infrasound at levels of concern is not a feature of modern wind turbines.

### ***Intensity and Duration of Construction Noise***

21. Concern around the impacts of construction noise is well expressed in the evidence of Mr Robin Olliver. The evidence correctly notes that there will be a large number of trucks entering the site, and that heavy machinery, a rock crusher, and a concrete batching plant will be employed. The evidence also expresses concern about the use of blasting.
22. I acknowledge that noise from construction will have an impact on the noise environment, and in particular the movement of trucks past dwellings will increase the noise level for a time. I note however that

most of the construction activities will occur at large enough distances from houses that the noise levels will be well below the noise levels expected of normal daytime activities, and that night-time construction activities will be minimised and carefully controlled. In particular, proposed conditions limit the amount of noise that can be produced in the evenings and night-time, and during weekends when family functions and gatherings commonly occur.

23. I note also that Mr Olliver's home on Smiths Line will not experience truck traffic directly, as site access will occur on Old Coach Road. The noise from trucks and other machinery operating on the east side of the project will be at distances of more than 1 kilometre from his dwelling.
24. I address the specifics of blasting later in this evidence.

## **RESPONSE TO COUNCIL EVIDENCE**

### ***Appropriate Standard for Concrete Batching and Crushing***

25. I agree with the practical outcome of the joint witness statement concerning the limits placed on concrete batching and aggregate crushing – i.e. that both should occur at least 250 metres from dwellings, and that neither should operate at night, except for the necessary operation of the Batching Plant which should occur only as detailed in the Construction Noise Management Plan (CNMP).
26. As noted in Mr Lloyd's evidence, this setback would allow both activities to comply with the daytime noise limits of the District Plan permitted activity noise limit, and because the night-time permitted activity noise limit and construction noise limits are the same, the same matters would need to be addressed in the CNMP regardless of which standard were applied.
27. However, for the sake of avoiding setting a precedent which could unduly restrict such activity in another project, I wish to state that I disagree with the application of the permitted activity standard and instead consider that the construction noise standard is both appropriate and applicable for the following reasons:

- a) Both the concrete batching and the aggregate crushing activities are carried out solely for the purpose of construction of the wind farm, not for any ongoing production purpose.
- b) The noise effects of both activities are not in any way fundamentally different from other construction activities, such as operating machinery, engaging rock with tractor-mounted implements, or moving vehicles through the site.
- c) While I understand Mr Lloyd characterises these activities as “production activities” instead of “construction activities” because they are producing a product, the same could be said for sawing and nailing wood in the construction of a building, or welding and grinding bracket assemblies in turbine foundations. These activities, when occurring on an ongoing basis in a factory, should be controlled by the district plan; when occurring for a limited time during construction of a particular project on site, they are construction.
- d) Likewise, when concrete batching or aggregate crushing occurs at a fixed production site or quarry, I agree these activities should be controlled by the relevant permitted activity limits, and there is an exclusion in the construction noise standard to ensure it cannot be mis-applied in these cases. That is not what is proposed here.

### ***Production Blasting***

- 28. I agree with the concerns raised by Mr Lloyd around uncontrolled blasting. While my experience with “production blasting”<sup>1</sup> is that its noise emissions can be well controlled, I agree that it would not be appropriate to allow this to occur at night-time.
- 29. I have discussed the need for after hours blasting with the blasting contractor and the site manager. I understand that the issue is the need to clear the site of construction workers when the blast occurs. If blasting is limited to normal working hours, this can have a significant

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<sup>1</sup> I understand that “production blasting” is being used to describe blasting inside a series of packed and covered holes for the purpose of loosening rock for excavation



impact on the ability to complete the project in a timely manner due to the interruptions to the work schedule.

30. To address this, I recommend that the condition be modified to allow a limited period of time when such blasting could occur, subject to the same noise limits as would normally apply, but restricted to evening hours and Saturday daytime hours. This avoids times when sleep would be interrupted, and means that any audible blasting noise would occur in the context of normal daytime or evening activities.
31. I note that the noise limit proposed is one designed to avoid “startle response”, e.g. the noise of the blast may be audible, but is not sufficiently louder than impact noises from normal daytime activities to attract attention as a dangerous or worrisome event.
32. The hours which have precedent for this activity are those included in NZS6803:1999 where some elevation from normal permitted activity noise limits occur before 8.00pm on weekdays, and between 07.30am and 6.00pm on Saturdays. In the context of the construction noise standard, these times are considered valid for increased activity noise. I would suggest however limiting Saturday blasting to 9.00am to 6.00pm, for consistency with the starting time proposed for weekday blasting.

## **CONCLUSIONS**

33. The 6 September Proposed Conditions include two changes to the conditions which reflect the positions I have presented above – that:
  - a) Aggregate crushing and concrete batching are appropriately managed using the construction noise standard; and
  - b) The noise effects of production blasting can be reasonably managed using the proposed noise limits in a slightly extended set of working hours, which would avoid prolonging the construction programme for safety reasons.
34. The methodology I have employed in assessing the noise effects of the wind farm are appropriate and correctly applied for the environment around the Wind Farm project. Matters discussed include the location

of my assessment, the method used to calculate wind turbine noise level, the noise limits applied, and consideration of whether there are special circumstances at this location which would invalidate the use of this methodology.

35. The risk of exposure to tonal sounds is adequately anticipated and controlled by the assessment and compliance testing methodology. The risk of exposure to infrasound is not high enough to be relevant in this assessment.

**Miklin Halstead**

6 September 2024