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Glen Starr
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via email: glenn@ventusenergy.co.nz

Dear Glenn

Taumatotara Wind Farm – Noise effects of change in turbine

1 Introduction

Ventus Energy holds a resource consent to install and operate 22 wind turbines at Taumatotara, in the Waitomo District. The consent is subject to meeting the noise limits prescribed in NZS 6808:1998, which are 40 dB L_{A90} , plus an allowance for increased generation where background sound is already higher.

In addition to noise limits being set as above (condition 8), there is a restriction on the turbine sound emissions and size in Condition 11:

The wind turbines shall not exceed a rotor top height of 110 metres above ground and a sound power of 107.2dBA unless it can be demonstrated by a person specialising in acoustics and accepted by the Manager, Policy and Planning, Waitomo District Council that turbine heights or sound power will still comply with the requirements of NZS 6808:1998.

2 Proposed alteration

While the consented design included 22 turbines, Ventus is proposing to surrender turbines 12-22 as part of this consent variation. The revised turbine layout is provided in Appendix A.

Since the grant of consent, wind turbine technology has progressed with higher generation turbines available with similar noise characteristics to those in the consented design. Ventus proposes to install a modern turbine such as the Enercon E-138 detailed in Table 1 or similar.

Table 1 Turbine parameters

Parameter	Value
Manufacturer / Model	Enercon E-138 EP3 E2
Turbine type	Downwind, with trailing edge serrations
Nominal power	4.2 MW
Hub height	92
Rotor diameter	155m
Tip height	172.5 m
Maximum sound power level across wind speed range	106.0 dB (mode 0 s)
Maximum tonal audibility	$\Delta L_{a,k} < 2$ dB

3 Assessment

The proposed modern wind turbines have a sound power level of 105-106 dB, and therefore the only factor requiring assessment is the increased height from 110 m to 172.5 m.

The original modelling was completed using a 2-dimensional approach and did not include reduction in the predicted noise level due to topography or obstructions. In that context, the predicted sound levels are insensitive to the wind turbine height. The profile of a typical turbine / receiver pair is shown in Appendix B.

We have reviewed the original predictions and consider that increasing turbine heights to up to 172.5m (tip) will not meaningfully alter the extent of the 30 and 40 dB L_{A90} sound contours.

4 Conclusion

Increasing the turbine height will not materially change the sound level received at the affected properties, and therefore the acoustic effects of this alteration are minimal.

Yours sincerely
Altissimo Consulting Ltd



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