

Project:	Taumatotara Wind Farm	Document No.:	Ca 004
To:	Bloxam Burnett & Olliver	Date:	25 September 2023
Attention:	Chris Dawson	Cross Reference:	
Delivery:	email	Project No.:	20191042
From:	Siiri Wilkening	No. Pages:	5
		Attachments:	No
Subject:	S42A Report Input – Noise and Vibration		

Chris,

You engaged us to undertake a review of the acoustic assessment undertaken, and the noise conditions proposed, for the proposed Taumatotara Wind Farm. The Wind Farm has gone through several iterations since the lodgement of the amendment application in 2019 and while we have reviewed the documentation throughout, this advice only discusses the latest proposal from September 2023.

We have reviewed the following documentation relevant to the final proposal of the Taumatotara Wind Farm:

- (a) Letter “Update on Progress – Taumatotara Windfarm Ltd (T4) Consent Variation Application, from Gilliam Chappell, dated 15 September 2023
- (b) Appendices to Ms Chappell’s letter, including a brief noise memo by Altissimo, dates 15 September 2023
- (c) Proposed updated conditions of consent.

In addition to these documents, the following documents are also relevant in relation to the proposal:

- (d) Letter “Taumatotara Wind Farm – Noise questions from Waitomo District Council”, by Altissimo Consulting, dated 7 April 2021

We are now satisfied that the proposed wind farm can comply with the relevant noise limits, and that the effects would be insignificant, and generally inaudible, at most of the closest dwellings from which written approval has not been obtained.

Layout and receiver locations

The wind farm is proposed to consist of 8 turbines (reduced from the previous 11 turbines), with a maximum tip height of 180.5 m above ground level and a hub height of 99 m above ground level. The location of the proposed turbines is identified the figure “Taumatotara Separation Distance 1.1C (A3)”, which formed part of the bundle discussed above. The figure still contains Turbines 2, 4 and 9, which have now been removed. The only turbines proposed are now Turbines 1, 3, 5, 6, 7, 8, 10 and 11.

The closest receivers surrounding the turbines have been identified on the figure, both on the aerial photo and via coordinates in a table on the same figure. The receivers include dwellings from which written approval has been obtained, dwellings on the wind farm site as well as dwellings where noise effects must be assessed.

The closest dwellings at which effects must be assessed are more than 2 km from the closest wind turbine. Those are dwellings 22 to 25 on Taharoa Road and Taumatotara West Road. We understand that written approval has been obtained from the Stokes family (835 Taharoa Road) and the Smith family (189 and 313 Te Waitere Road) and therefore the effects on these dwelling must not be taken into consideration.

We are satisfied that all turbines and receivers are clearly identified to enable a review of the Altissimo assessment.

Predicted noise levels

The assessment by Altissimo (item (d) in the list above) includes noise level predictions of turbine layout scenarios:

- 11 turbines with a hub height of 95m and a sound power level of 103.9 dB L_{AW} (a previous iteration not relevant now)
- 11 turbines with a hub height of 95m and a sound power level of 107.2 dB L_{AW} (the consented sound power level and previous layout)
- 22 turbines with a hub height of 65m and a sound power level of 107.2 dB L_{AW} (the consented sound power level and originally consented layout/height) (the original proposal from 2006)

Of the above scenarios, the closest to the proposed 8-turbine, 99m hub height layout, is the 11-turbine scenario with the 95m hub height, with the proposed sound power level of 107.2 dB L_{WA} . For this scenario, the noise levels at all receivers are below 35 dB $L_{A90(10\text{ min})}$. Such noise levels are within the most stringent noise limit of NZS6808, which is 40 dB $L_{A90(10\text{ min})}$ or the background noise level $L_{A90} + 5$ dB, whichever is the higher.

With the proposed 8 turbines, with slightly higher hub height and the same sound power level, the noise levels would be the same or lower than predicted at all dwellings.

The highest predicted noise levels are at house 22 (the Martin dwelling) at 32 dB $L_{A90(10\text{ min})}$, with all other dwellings predicted to receive noise levels below 30 dB $L_{A90(10\text{ min})}$.

This means that the wind farm will likely be largely inaudible, and only intermittently audible when there are still conditions at the dwelling location and windy conditions at the wind farm site.

Ambient sound level surveys

In accordance with NZS6808, where a predicted noise level is 35 dB $L_{A90(10\text{ min})}$ or above, background sound level measurements should be undertaken to determine the applicable noise limit. The conditions require noise level surveys at all dwellings where the predicted wind farm sound level is higher than 30 dB $L_{A90(10\text{ min})}$.

Currently, only one location (Martin) shows a predicted wind farm noise level above 30 dB L_{A90} , of 32 dB L_{A90} . Therefore, ambient measurements are required to be undertaken at this location prior to the construction of the wind farm.

The proposed conditions require two ambient sound level surveys, therefore, another position in addition to the Martin house will need to be undertaken. This should be at one of the houses labelled 23 to 25 in the figure referenced above.

Submissions

I have reviewed the submissions received as they relate to noise and/or vibration. Of the 15 submissions received on the application, only four raise noise issues. I address each of these submissions below.

Te Waitere View Ltd

The submitter is concerned with noise from construction and operation of the wind farm. The concern is that wind farm noise will be at a level so that the submitter loses *“the ability to hear the sea in the morning and evening”*.

The submitter is approximately 3 km from the closest wind turbine and just under 8 km from the coast. At the distance from the closest turbine, I consider that the wind farm noise level would be around 25 dB $L_{A90(10\text{ min})}$ and, while potentially at times audible, will generally be inaudible and should not interfere with the ambient noise environment. I do not consider that the wind farm will result in the effects the submitter is concerned about.

During construction, I do not consider that noise levels will have adverse effects as at the distance and the shielding afforded by the intervening terrain (e.g. where materials are transported along the road), noise

levels will be well less than 35 dB L_{Aeq} and therefore, while potentially audible at times outside, will be generally inaudible.

Knight Family Trust

The submitter seeks to understand the noise levels from the wind farm at their property and comments that no noise level survey has been undertaken. Noise level surveys only need to be undertaken where the predicted noise level from the wind farm is 35 dB L_{A90} or higher.

The submitter property appears to be about 4 km from the closest wind turbine. I estimate that the noise levels at this property would be less than 25 dB L_{A90} which will be largely inaudible. Based on this noise level, I consider that the wind farm will have negligible noise effects on this property.

Leslie Gaston

The submitter is concerned with the noise pollution from trucks on the public roads when delivering the wind farm components. I understand that delivery will occur via Te Anga Road rather than through Marokopa.

Trucks on the public road are not governed by noise limits in the District Plan. Nevertheless, it is important to apply the best practicable option to reduce noise effects as far as practicable. This means that deliveries should only occur during daytime to avoid night-time noise impacts, ensuring that roads and trucks are well maintained and drivers are careful and mindful of neighbouring dwellings, to reduce noise generation.

I do note, however, that traffic on the public road is intended to and permitted to use the roads and that audibility is not an appropriate design criterion for traffic on the road.

Marokopa Paa Environmental Team

The submitter queries the noise levels from the turbines. It is unclear if this information is sought for the environment as a whole or at a specific location in relation to the Marokopa Paa.

As discussed, any receiver more than 2km from the closest wind turbine is likely to receive noise levels below 35 dB L_{A90} which is a relatively low level that is unlikely to cause adverse effects on the environment. Any locations further away will receive lower noise levels, and therefore negligible effects where the wind turbines will be largely inaudible.

Conditions

The latest bundle of documentation received after 15 September 2023 included suggested conditions for the wind farm. Altissimo, in their letter included in document (d) above, recommends updates to the noise conditions. We have accepted the proposed changes and provide some slight amendments (in ~~strikethrough~~ and underline, with our comments in [...]). With these changes in place, we agree with the proposed conditions as set out below.

Note that we have replaced the word “sound” with “noise” as it is the noise of the wind turbines that is being assessed. Noise has a specific meaning and that is also reflected in the title of the relevant New Zealand Standard ‘NZS 6806 Acoustics – Wind Farm Noise’.

“Noise

Operational Noise

7. The consent holder shall ensure that ~~sound~~ noise from sources on the site other than those within the scope of conditions 8 and 12 does not exceed the following noise limits:

7.00am to 7.00pm 45 dB $L_{Aeq(15min)}$

7.00pm to 7.00am 35 dB $L_{Aeq(15min)}$

60 dB L_{AFmax}

Noise ~~Sound~~ shall be measured in accordance with NZS 6801:2008 and assessed in accordance with NZS 6802:2008.

8. The consent holder shall ensure that, at the specified assessment positions, at any wind speed, wind farm ~~noise sound~~ levels do not exceed 40 dB $L_{A90(10 \text{ min})}$. Wind farm ~~noise sound~~ shall be measured and assessed in accordance with NZS 6808:2010. The Assessment Positions shall be outside at the locations marked 22, 23, 24 and 25 on Site Plan [x].

[We note that at present Site Plan [x] is not currently shown in the conditions offered and will need to be provided.]

9. Prior to ~~installation of the turbines~~ commencing any development of the wind farm, background sound level measurements shall be undertaken at any Assessment Position within the 30 dB L_{A90} contour. Measurements shall be ~~measured~~ undertaken in accordance with Section 7.4 of NZS 6808:2010 Acoustics – Wind Farm Noise. If no Assessment Positions have predicted ~~noise sound~~ levels above 30 dB L_{A90} , measurements shall be performed at two of the Assessment Positions to the satisfaction of Council’s Manager, Policy and Planning. A report of measured ~~noise sound~~ levels shall be prepared in accordance with Section 8.2 of NZS 6808:2010 and submitted to the Council’s Manager, Policy and Planning.

[We consider that the background sound level survey must be undertaken prior to activity on site. Construction noise can affect ambient noise level measurement, particularly in a currently relatively low noise environment. Therefore, we do not agree that the surveys should be undertaken prior to installation of turbines but should be done prior to activities on site. There is no intensive forestry or similar in the area that could lead to a significant change in background sound should the survey be done 12 months or longer before wind farm development. While for some wind farm sites that may be an issue, it is unlikely to be a risk factor here.]

10. Prior to installation of the turbines, a prediction report shall be submitted to the Council’s Manager Policy and Planning, in accordance with Section 8.4.2 of NZS 6808:2010. That prediction ~~should~~ shall be based on the highest sound power level of the turbine to be installed, and include results for both NZS 6808:2010 and IoA GPG methods.
11. The wind turbines shall not have a sound power level of greater than 107.2 dB L_{WA} . A certificate confirming the sound power level shall be included in the prediction report required by Condition 10.

Construction Noise

12. Noise from all construction and decommissioning work including (but not limited to):
- a. Public road upgrades between SH37 and the site;
 - b. Site works;
 - c. Wind turbine generator assembly and placement;
 - d. Concrete placement;
 - e. Wind turbine removal; and
 - f. Land reinstatement

~~shall~~ be measured and assessed in accordance with the requirements of NZS6803:1999 Acoustics – Construction Noise, and shall comply with the noise limits ~~shall be those set out in the Table 2 of NZS6803 for works of “long term” duration (the levels for long term construction work are reproduced in the table below).~~

Time	Weekdays		Saturdays		Sundays	
	L _{Aeq}	L _{AFmax}	L _{Aeq}	L _{AFmax}	L _{Aeq}	L _{AFmax}
0630-0730	55 dBA	75 dBA	45 dBA	75 dBA	45 dBA	75 dBA
0730-1800	70 dBA	85 dBA	70 dBA	85 dBA	55 dBA	85 dBA
1800-2000	65 dBA	80 dBA	45 dBA	75 dBA	45 dBA	75 dBA
2000-0630	45 dBA	75 dBA	45 dBA	75 dBA	45 dBA	75 dBA

[Following the site visit and gaining a better understanding of the works required to be undertaken on the local roads to enable the wind farm to be constructed, we consider that construction works directly related to the construction of the wind farm should also be made to comply with the relevant standards above. This specifically relates to potential night-time works to upgrade bridges. The remainder of the condition has been simplified.]

13. – 15. *[No changes]*

Noise Monitoring

16. Within six months of the wind farm becoming fully operational commencement of operation, wind farm noise sound levels shall be measured at all Assessment Positions where, in the report of Condition 10, predicted noise sound levels were are greater than 30 dB L_{A90}. If no Assessment Positions have predicted noise sound levels above 30 dB L_{A90}, measurements shall be performed at two locations agreed with Council. A compliance assessment report shall be submitted to the Manager Policy and Planning, Waitomo District Council in accordance with Section 8.4.1 of NZS 6808:2010. If no Assessment Positions have predicted noise sound levels above 30 dB L_{A90}, measurements shall be performed at same locations measured in Condition 9. If access is denied, alternate at locations are to be proposed to the satisfaction of agreed with Council's Manager, Policy and Planning Waitomo District Council in accordance with section 8.4.1 of NZS 6808:2010."

[We consider that the final survey should be undertaken when all turbines are operational as operations may commence with only part of the turbines in place which does not reflect the worst case noise levels.]