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Memorandum

To	**Damien McGahan**	From	**Fowzi Dahhan**
Copy	**NA**	Reference	**P524167**
Date	**2024-03-12**	Pages (including this page)	**3**
Subject	**Mt Munro Wind Farm – Review of Radio Compatibility Assessment Report**		

Introduction

Meridian Energy Limited (**Meridian**) is seeking resource consent for the construction, operation and maintenance of a new wind farm on Mt Munro (the **Project**).

Wind farms can cause potential electromagnetic interference to broadcast or other radio communications signals.

As part of the resource consent process for the Project, Kordia Limited (**Kordia**) have prepared a Radio Compatibility Assessment Report (the **RCA**), dated 27 October 2022, that considers potential radio interference to communication services that could be caused by the Project.

This memo provides a peer review of the RCA's determination that the Project is not likely to cause any such effects.

Background

The Project comprises 20 wind turbines and ancillary works including earthworks, an underground internal cable network, access roads between the turbines and from the site entrance, a new overhead transmission line to connect the wind farm to the national grid, and an associated new terminal substation on a site located approximately 5 km south of Eketahuna.

The location of the 20 proposed wind turbines is not fixed. Rather, two Turbine Envelope Zones have been included on the ridgelines of Mt Munro. The wind turbines may be built anywhere within this envelope.

Report Summary

The RCA is based on the Project's proposed design of a maximum of 20 wind turbines, with a maximum upper blade tip height of 160 m.

The scope of the radio compatibility assessment presented in the report considers the following services:

- Fixed radio linking services;
- Wide area coverage services, including broadcast television and radio, wireless broadband, and cellular services; and
- Aeronautical navigation.

The report concludes that the proposed Project layout and configuration is not expected to cause any harmful interference effects to licensed radio communications services operating in the vicinity of the Project.

Aurecon Review

I have reviewed the RCA and agree with the overall methodology and conclusions of the report.

The methodology used involved:

- Identifying all licensed fixed radio linking services within 150 km of the Project, and mapping the link paths passing in the vicinity of the Project to check that no paths are obstructed by the turbine envelope.
- Identifying licensed wide area coverage services, including broadcast television and radio and wireless broadband, within 20 km of the Project, and reviewing relevant signal coverage near the Project.
- Identifying all licensed aeronautical radio and radar services within a 200 km radius of the Project, and reviewing potential effects based on the distance of nearest services.
- Applying coordination zones for each licence service type, which radio communications services need to be clear of to avoid interference.
- Consultation with relevant identified stakeholders to inform them of the Project development and seek their feedback on whether impacts are expected to their services.

This methodology is broadly aligned with industry practice and covers the key radio communications services that would typically be considered in a wind farm radio compatibility assessment. It is noted that the RCA used the first Fresnel zone as the coordination zone for fixed radio linking services. The second Fresnel zone, which is wider and therefore more conservative, is typically used as a coordination zone for fixed radio linking services. However, since the nearest link paths pass at a significant distance from the Project envelope, the approach used in the RCA is sufficient.

Telecommunications services

The RCA considers the Project's interaction with fixed radio linking services and wide area coverage services such as broadcast television, radio, wireless broadband, and cellular services, and aeronautical navigation.

Based on the information presented in the RCA, I consider that the proposed Project wind turbine configuration and envelope are sufficiently distant from these services so as not to interfere with their operation.

I note that Section 3.2.3 of the report describes the reception area of a wide area coverage service (operated by Wiz Wireless) overlapping with the wind farm envelope, and consultation correspondence with Wiz Wireless has been appended to the report. Wiz Wireless have indicated that they do not expect adverse effects to their services due to the Project.

The Project (based on the current location of the turbines) is therefore considered to avoid interference to these services.

Meteorological radar

Wind turbines have the potential to cause interference to the operation of meteorological or weather radar through reflection or scattering of radar signals. For example, at certain distances the presence of turbines may generate echoes that a weather radar system may misinterpret as rain. The World

Meteorological Organisation (WMO) recommends assessment and consultation with radar operators within 5-20 km of wind turbines. Significant interference is generally not expected at distances of greater than 45 km, although this is dependent on surrounding terrain[1]. However, I note that Australian guidance for wind farm development[2] recommends operators of weather radars within 250 nautical miles (463km) should be consulted.

The RCA did not explicitly consider potential interference effects to meteorological radar. However, a review of the New Zealand Government Register of Radio Frequencies (RRF) database[3] indicates that the nearest meteorological radar licence is located near Wellington (Outlook Hill, Licence number 72284), operated by the Meteorological Service of New Zealand. This radar is located over 100 km from the Project. The distance means that I consider interference with this radar to be unlikely.

Location of turbines

I note the turbine locations are not fixed and may be shifted within the Turbine Envelope Zone.

In terms of potential impact to fixed radio linking services (Section 3.1 in the RCA) as well as aeronautical radio (Section 3.3 in the RCA), there will be no change to the result if turbines are moved anywhere within the envelope.

The distance to the nearest meteorological radar licence means there is unlikely to be any interference to this radar. The placement of turbines within the Turbine Envelope Zone does not change this analysis.

For the potential impact to wide area coverage services (Section 3.2 in the RCA), it is unlikely that moving turbines would change the outcome. However, this could be said with more certainty if maps showing the relative position of turbines, houses and service coverage areas were provided. As such, I recommend a pre-construction condition is imposed that confirms the finalised design will not cause interference to wide area coverage services, by demonstrating that the Project envelope is sufficiently distant from relevant signal coverage areas. This confirmation should include mapped figures that show:

- the Project envelope relative to the transmission tower location, the broadcast coverage area, and the locations of inhabited dwellings in the vicinity of the Project envelope.
- Cellular service coverage in the vicinity of the Project envelope, as well as the locations of nearby inhabited dwellings

These maps should be prepared at similar scale to Figure 3 in the RCA and be checked by a relevant professional.

Conclusion

Based on my review of the Project and the RCA, and if the pre-construction condition recommended is imposed, I consider electromagnetic interference with broadcast or other signals will be avoided by the Project.

[1] World Meteorological Organisation (WMO), "Commission for Instruments and Methods of Observation, Fifteenth Session: Abridged final report with resolutions and recommendations," 2-3 September 2010
[2] Environment Protection and Heritage Council (2010) "National Wind Farm Development Guidelines – Draft"
[3] https://rrf.rsm.govt.nz/ui/search/licence