

FACT SHEET

Wind power acoustic amenity



According to the Clean Energy Council, wind turbines are one of the quietest forms of energy generation currently available. In Queensland, some of the toughest guidelines in the world are applied to wind farm developments to ensure noise levels are minimised.

Source of noise originating from a wind turbine

- There are two main noise sources originating from a wind turbine; mechanical and aerodynamic. Sources of mechanical noise include the following: gearbox, generator, yaw drives, cooling fans, auxiliary equipment and application of brakes.
- Sources of mechanical noise tend to be both tonal and broadband in nature since the emitted sound is associated with the rotation of mechanical and electrical equipment. However, in modern wind turbines, mechanical noise is not usually audible above aerodynamic noise. Mechanical noise can be effectively reduced through standard noise control practices such as vibration isolation, damping and noise enclosures.
- Aerodynamic noise is associated with the passage of air over the wind turbine blades and is considered the most dominant source of wind turbine noise emissions. Aerodynamic noise levels typically increase with rotor speed.

What the State Code for wind farm development says:

- Wind farm developments must be sensitively developed to ensure local communities understand what is proposed and to minimise impacts at sensitive receptors.
- The Queensland Government has regulated wind farm development under State Code 23, which specifies acceptable noise impacts generated by a wind turbine on nearby residents and sensitive receptors.
- The acceptable noise level specified in State Code 23 is 45dBA during the night for host lots with sensitive land users, and 37dBA during the day and 35dBA during the night for non-host lots.

The Forest Wind experience

- Forest Wind has been planned in line with international best practice, the requirements set out in the State Code for wind farm development, and the Australian Wind Energy Best Practice Guideline. Forest Wind will comply with the Queensland Government wind farm noise regulations.
- An independent acoustic amenity assessment has been undertaken for Forest Wind.
- The operation noise impact assessment report identifies acoustic criteria that are to be complied with at sensitive land uses located on non-host lots. In the Queensland Government regulations, non-host lots are classified as a parcel of land that does not accommodate any part of a wind farm development. Sensitive land uses (herein referred to as sensitive receptors) are defined as areas including childcare centre, residential dwellings, educational establishments, healthcare services, short-term accommodation and tourist parks.
- The acoustic modelling assessment was based on a wind farm layout that includes 226 Siemens SG 6.0-170, Rev. 0 Wind turbines with a hub height of 160 m and 180 m. The technical specifications for this model have a maximum sound power level (LwA) of 106 dBA, however, to be conservative, Forest Wind requested this model be assessed assuming a worst case of LwA 109 dBA, or 3 dBA above standard technical specifications.
- The assessment used the most stringent criterion, that is the baseline criterion (37dBA during the day and 35dBA during the night for non-host lots) rather than the background LA90 noise level add 5 dBA criterion. As the assessment applied the most stringent criterion, the requirement for adjustment based on measured background noise levels was not required, and as such background noise monitoring was not necessary for this assessment.
- The assessment identified that, using the worst case noise for a wind turbine operating at 12 m/sec (43km/ hour or 23 knots), the wind farm is predicted to comply with the required criteria at all host and non-host lots during both day and night periods: noise levels will not exceed 37dBA during the day and 35dBA during the night for private residents.
- The expected noise levels modelled at the sensitive receptors (labelled as SR0X on Figure A) around the project area are described over page.



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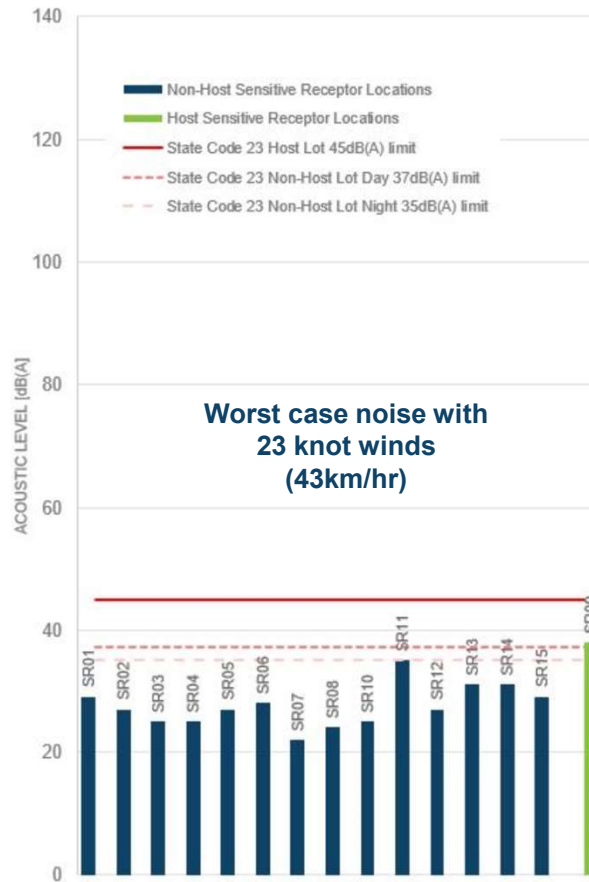
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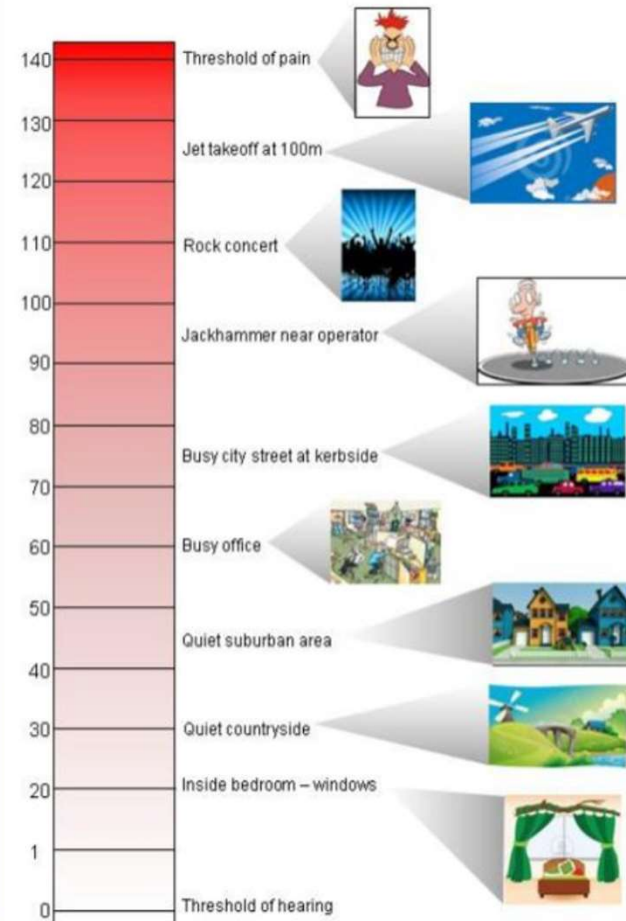


Figure A. Modelled sensitive receptor locations



Source: GHD Forest Wind Noise Assessment, September 2019

Figure B. Results of noise modelling at sensitive receptor locations at worst case



Source: Noise Measurement Manual, ESR/2016/2195 (formerly EM1107), Department of Environment and Science, © The State of Queensland 2013
<https://environment.des.qld.gov.au/licences-permits/pdf/noise-measurement-manual-em1107.pdf>

Figure C. Common sound pressure levels dB(A)

A full copy of the noise impact assessment is available at:

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