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Acciona Energy Australia Global Pty Ltd

Tall Tree Wind Farm

Preliminary Noise Impact Assessment

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Tall Tree Wind Farm

Preliminary Noise Impact Assessment

0629242

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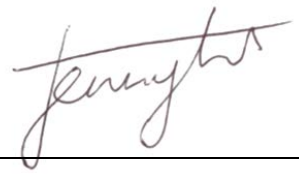

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ACRONYMS AND ABBREVIATIONS

Acronyms	Description
Associated Dwelling	Also referred to as 'hosts' in *Technical Guideline* (EPA Victoria, 2024), associated dwellings are defined as dwellings whose owners are hosting Project infrastructure or have entered into a wind turbine noise agreement (as defined in Part 5.3 Division 5 Clause 131A of the EP Regulations) in relation to the Project. The word 'Associated' may also be defined as 'Host', 'Stakeholder' or 'Involved'.
BESS	Battery Energy Storage System
dB	Decibel, a derived unit used to express values on a logarithmic scale. In acoustics, the dB scale is used to measure sound pressure and sound power levels, each of which are related to a standard reference point to allow comparison between measurements.
dB(A)	dB(A) denotes a single number sound pressure level that includes a frequency weighting ("A-weighting") to reflect the subjective loudness of the sound level. The frequency of a sound affects its perceived loudness. Human hearing is less sensitive at low and very high frequencies, and so the A-weighting is used to account for this effect. An A-weighted decibel level is written as dB(A).
DEECA	Department of Energy, Environment and Climate Action (formerly DELWP)
DELWP	Department of Environment, Land, Water and Planning (now DEECA and DTP)
DTP	Department of Transport and Planning (formerly DELWP)
EP Act	*Environment Protection Act 2017*
EP Regulations	*Environment Protection Regulations 2021*
Hz	Hertz - the measure of frequency of sound wave oscillations per second. 1 oscillation per second equals 1 hertz
L_{Aeq}	Time averaged A-weighted equivalent continuous sound pressure level.
L_{A90}	A-weighted sound pressure level which is exceeded for 90% of the measurement period. Often referred to as the Background noise level.
Non-associated Dwelling	All other dwellings which are not Associated Dwellings.
NML	Noise Monitoring Location
SWL	Sound Power Level - this is a measure of the total power radiated by a source. The Sound Power of a source is a fundamental property of the source and is independent of the surrounding environment
SPL	Sound Pressure Level - the level of sound pressure; as measured at a distance by a standard sound level meter with a microphone. This differs from LW in that this is the received sound as opposed to the sound 'intensity' at the source
The Guidelines	Planning Guidelines for Development of Wind Energy Facilities (DTP, 2023)
The Standard	NZS 6808:2010 Acoustics – Wind Farm Noise (Standards New Zealand, 2010)
WTG	Wind Turbine Generator

EXECUTIVE SUMMARY

Acciona Energy Australia Global Pty Ltd (Acciona Energia) is seeking approval to construct, operate and decommission the Tall Tree Wind Farm (the Project), located in the Golden Plains Shire, West of Lethbridge, North of Teesdale & South of Meredith, Victoria.

The Project involves the construction, operation and maintenance of a wind farm, described as follows:

- up to 53 wind turbine generators ('WTGs'), with three blades mounted to a rotor hub;
- at a hub height of up to 169 m on a nacelle above a tubular steel tower and a blade tip height (blade length plus hub height) of up to 250.5 m;
- rotor diameter of up to 183 m; and
- associated and ancillary infrastructure.

This preliminary Noise Impact Assessment has been conducted in accordance with the following documents:

- Environment Protection Act 2017 (Victorian Government, 2017);
- Environment Protection Regulations 2021 (Victorian Government, 2021);
- Planning Guidelines for Development of Wind Energy Facilities (DTP, 2023);
- Wind Energy Facility Turbine Noise, Technical Guideline, Publication 3011 [December 2024] (EPA Victoria, 2024) ('Publication 3011'); and
- NZS 6808:2010 Acoustics – Wind Farm Noise (Standards New Zealand, 2010).

This assessment focuses on wind turbine operational noise only, and excludes an assessment of noise from the electrical and ancillary infrastructure of the Project and the proposed Battery Energy Storage System (BESS).

Noise from the assessed layout of 53 WTGs was modelled assuming a maximum sound power level of 106.0 dB(A) as per the candidate WTG – Nordex N175-6.X (Mode 2 with rated power of 6.22 MW) wind turbine with Serrated Trailing Edge (STE) technology. The modelled candidate turbine features include rotor diameter of 175 m and WTG hub height at 162 m.

Noise modelling was undertaken with ISO 9613-2:2024 algorithms implemented into the environmental noise propagation software, SoundPLAN 9.1.

The worst-case predicted noise levels at 4.0 m above ground level at the nearest sites (associated and non-associated dwellings) were assessed against base (minimum) limits obtained from Publication 3011. The assessment results indicate, with the use of STE technology adopted for all the WTGs, compliance at all associated dwellings and two minor exceedances at non-associated dwellings 192 and 203 by 1 dB, in accordance with the methodology outlined in the *Technical Guideline* (EPA Victoria, 2024).

In addition to the sound level predictions at a receptor height of 4.0 m as per the *Technical Guideline* (EPA Victoria, 2024), ERM has also modelled sound level predictions at a receptor height of 1.5 m above ground level, the expected height at which operational compliance will be determined. The predicted results at a receptor height of 1.5 m indicate, with STE technology adopted for all WTGs, compliance at all associated and non-associated dwellings.

Recommendations for the Project include background noise monitoring at non-associated dwellings 192 and 203, or at representative locations, to allow for derivation of project-specific criteria. Additional recommendations include consideration of micro-siting, sector management and the implementation of noise-reduced operational modes for the turbines and engagement with EPA and DTP.

Should the WTG layout and the final WTG model selection deviate from this assessment materially (with any potential for increase of predicted noise levels at both Associated or Non-associated dwellings), an updated noise assessment of the final layout design and turbine model selection will be required to assess compliance with noise criteria.

1. INTRODUCTION

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by Acciona Energy Australia Global Pty Ltd (Acciona Energia) (the Applicant) to undertake a preliminary wind farm Noise Impact Assessment (NIA) of the proposed Tall Tree Wind Farm (the Project). This assessment focuses on wind turbine operational noise only, and excludes an assessment of noise from the electrical and ancillary infrastructure, and the proposed Battery Energy Storage System, of the Project.

The assessment has been prepared to inform a referral under *the Environment Effects Act 1978* (EE Act).

Wind turbine operational noise has been assessed in accordance with:

- Wind Energy Facility Turbine Noise, Technical Guideline, Publication 3011 [December 2024] (EPA Victoria, 2024) ('Publication 3011');
- New Zealand Standard *NZS6808:2010, Acoustics - Wind Farm Noise* (Standards New Zealand, 2010) (the Standard), as required by *Part 5.3, Division 5* of the Environment Protection Regulations 2021 ('the Regulations'); and
- Environment Protection Authority (EPA) Victoria *Publication 2061: Wind Energy Facility Turbine Noise Regulation Guidelines* (EPA Victoria, 2021).

2. SITE CONTEXT

The Project is a proposed renewable energy development located within the Golden Plains Shire, south of Meredith, west of Lethbridge, north of Teesdale in Central West Victoria. The Project area is situated within the proposed Central Highlands Renewable Energy Zone (REZ), located approximately 85 km west of Melbourne, and approximately 23 km north-west of Geelong. The project area also abuts Bamganie State Forest to the north-west.

The Project extends over an area of approximately 5011.48 hectares (Ha) (wind farm area only). This excludes the transmission line route which follows a corridor approximately 12km in length from Lower Plains Road to the connection point to the existing 220kV transmission network to the south-east of Meredith.

3. PROJECT DESCRIPTION

The Project consists of the following key components:

Up to 53 WTGs, each comprising:

- Three blades mounted to a rotor hub (up to a hub height of up to 169 m) on a nacelle above a tubular steel tower, with a blade tip height (half rotor diameter plus hub height) of up to 250.5 m AGL;
- A gearbox and generator assembly housed in the nacelle; and
- Adjacent hardstands for use as crane pads, assembly and laydown areas.

Electrical infrastructure comprising:

- One (1) 220kV electrical substation, including control room, transformers, circuit breakers, switches and other ancillary equipment;
- A BESS of up to 800 MWh (up to four hours of storage);
- Underground internal 33 kV electrical reticulation connecting the WTGs to the onsite substations (where practicable, these generally follow site access tracks); and
- A 220kV overhead transmission line of up to 11.3 km from Lower Plains Road and a new electrical switchyard to the east of Taylor Road to provide connection to the existing Moorabool to Elaine 220 kV transmission line. The final transmission line easement will be up 60 m within the 100 m corridor.

Ancillary infrastructure:

- Operations and maintenance (O&M) facilities including office, carpark and warehouse;
- Internal access tracks (combined total length of approximately 134.2 km) connecting the WTGs and associated Project infrastructure with the public road network; and
- Decommissioning of one temporary meteorological monitoring masts and installation of up to four permanent (short term) meteorological monitoring masts for power testing. The permanent monitoring masts will each be located close to a WTG location and will have a maximum height of up to 170 m AGL.

Temporary elements:

- Two temporary construction site compounds, comprising site buildings and facilities for construction contractors / equipment, site offices, car parking and amenities for the construction workforce;
- Two concrete batching plants to supply concrete for WTG footings and substation construction works;
- Earthworks for access tracks, WTG platforms and foundations;
- Two hardstand laydown areas for the storage of construction materials, plant, and equipment;
- Up to four temporary meteorological monitoring masts. The temporary monitoring masts will be located close to a WTG location with a maximum height of up to 170 m AGL;
- A borrow pit to source raw material required for construction;

- The transport, storage and handling of fuels, oils and other hazardous materials for construction and operation of wind farm infrastructure; and
- Beneficial reuse of materials from within the development footprint during cut and fill and WTG foundation excavation works for use in access track, hardstands and foundation material.

The Project Area will be rehabilitated after decommissioning of the site.

4. LEGISLATION AND GUIDELINES

This Preliminary Noise Impact Assessment (NIA) has been conducted in accordance with the following documents:

1. The *Environment Protection Act 2017* (the EP Act) (Victorian Government, 2017);
2. The *Environment Protection Regulations 2021* (the EP Regulations) (incorporating amendments as at 8 November 2023) (Victorian Government, 2021);
3. The Planning Guidelines for the Development of Wind Energy Facilities (the Guidelines) (DTP, 2023);
4. Wind Energy Facility Turbine Noise, Technical Guideline, Publication 3011 [December 2024] (EPA Victoria, 2024); and
5. New Zealand Standard *NZS6808:2010 Acoustics – Wind Farm Noise* (the Standard) (Standards New Zealand, 2010).

The legislation and guidelines above are discussed in the following sub-sections.

4.1 ENVIRONMENT PROTECTION ACT 2017

The EP Act (Victorian Government, 2017) provides the overarching legislative framework for the protection of the environment in Victoria.

The EP Act establishes a general environmental duty to minimise the risks of harm to human health or the environment from pollution or waste, including noise related amenity impacts, so far as reasonably practicable.

4.2 ENVIRONMENT PROTECTION REGULATIONS 2021

The EP Regulations (Victorian Government, 2021) give effect to the EP Act by establishing prescriptive requirements for a range of environmental considerations including noise. The EP Regulations were amended on 18 October 2022 to specify matters in relation to wind turbine noise from wind energy facilities (Victorian Government, 2022).

Part 5.3 Division 5 Clause 131A of the EP Regulations states that an owner or operator of a wind energy facility and a relevant landowner may enter into a written agreement regarding noise limits with which the wind turbine noise from that facility must comply (wind turbine noise agreement).

Part 5.3 Division 5 Clause 131B of the EP Regulations sets *NZS6808:2010 Acoustics – Wind farm noise* (the Standard) (Standards New Zealand, 2010) as the relevant standard for assessing wind energy facilities in Victoria on or after 1 January 2011.

Part 5.3 Division 5 Clause 131BA of the EP Regulations states that if a wind energy facility is the subject of a wind turbine noise agreement, the noise limit for that facility in relation to noise emissions to the premises of the relevant landowner is:

- if the agreement is made before 1 November 2021, the noise limit specified in the agreement, or
- if the agreement is made on or after 1 November 2021, the noise limit that is the greater of:
    - 45 dB(A); or

- the background sound level plus 5 dB

Dwellings with a wind turbine noise agreement are identified as Associated Dwellings in this Preliminary NIA.

4.3 PLANNING GUIDELINES FOR THE DEVELOPMENT OF WIND ENERGY FACILITIES

The Guidelines (DTP, 2023) provide advice to responsible authorities, proponents and the community about suitable sites to locate wind energy facilities and to inform planning decisions about a wind energy facility proposal.

Section 5.1.2 of the Guidelines details information relating to the amenity of areas surrounding a wind energy facility and addresses noise. Consistent with the EP Regulations, it states that a wind energy facility should comply with the Standard, which is discussed in the following sub-section.

Consistent with the EP Regulations, a 45-decibel limit (45 dB $L_{A90(10min)}$) is recommended in the Guidelines for stakeholder dwellings. A stakeholder dwelling is a dwelling located on the same land as the wind energy facility, or one that has an agreement with the wind energy facility to allow for a higher noise limit. Stakeholder dwellings are referred to as Associated Dwellings in this Preliminary NIA.

4.4 WIND ENERGY FACILITY TURBINE NOISE, TECHNICAL GUIDELINE – EPA VICTORIA PUBLICATION 3011

Wind Energy Facility Turbine Noise, *Technical Guideline – EPA Victoria Publication 3011* (EPA Victoria, 2024) supports the technical measurement and assessment of wind turbine noise emissions under the Regulations made under the EP Act. It is intended to assist wind energy facility (WEF) operators to meet their obligations. This guideline may also be used when preparing a pre-construction (predictive) noise assessment report (this report) for a planning permit application to establish or expand a WEF. Noise modelling assumptions for the wind turbine noise modelling conducted for this report have been taken from this guideline.

This guideline provides clarity on EPA's approach to interpreting and applying *NZS6808:2010 Acoustics – Wind farm noise* (the Standard) (Standards New Zealand, 2010). In particular, this assessment refers to the *Section 7.3* of this guideline to implement the required prediction model and environmental parameters.

4.5 NEW ZEALAND STANDARD 6808:2010 ACOUSTICS – WIND FARM NOISE (THE STANDARD)

The Standard (Standards New Zealand, 2010) provides methods for the prediction, measurement, and assessment of sound from wind turbines.

The Standard specifies a general 40 decibel limit (40 dB $L_{A90(10min)}$) for wind energy facility sound levels outdoors at noise sensitive locations, or that the sound level should not exceed the background sound level by more than 5 decibels (referred to as 'background sound level +5 dB'), whichever is the greater.

Under *Section 5.3* of the Standard, a 'high amenity noise limit' of 35 decibels may be justified in special circumstances.

All wind energy facility applications must be assessed using *Section 5.3* of the Standard to determine whether a high amenity noise limit is justified for specific locations, following procedures outlined in *Section 5.3.1* of the Standard.

Guidance can be found on this issue in the Victorian Civil and Administrative Tribunal (VCAT) determination for the Cherry Tree Wind Farm. ERM has reviewed the VCAT determination for Cherry Tree Wind Farm (VCAT, 2013) and the zoning in the Golden Plains Shire Planning Scheme which is applicable to the Project. The scheme does not specify the Farming Zone or any other zone in the vicinity of the Project as promoting a higher degree of protection of amenity related to the sound environment. Therefore, no high amenity noise limit is triggered by the underlying zones affecting the subject site in response to the requirements of *Section 5.3* of the Standard.

Noise sensitive locations are defined by the Standard as the location of a noise sensitive activity, associated with a habitable space or education space in a building not on a wind farm site. These locations are classified as 'Non-associated Dwellings' in this Preliminary NIA.

Section 5.4.2 of the Standard also requires that wind turbine sound levels with special audible characteristics (such as tonality, impulsiveness and amplitude modulation) shall be adjusted by arithmetically adding up to +6dB to the measured level at the noise sensitive location. Therefore, the Standard accounts for special audible characteristics at nearby residential properties.

5. APPLICABLE NOISE LIMITS

The applicable noise limits for dwellings in the Preliminary NIA are based on legislation and guidelines discussed in Section 4 and are summarised in **Table 5-1**.

TABLE 5-1 APPLICABLE NOISE LIMITS

Dwelling	Description	Noise Limit
Associated	Dwellings whose owners are hosting Project infrastructure or have entered into a wind turbine noise agreement (as defined in Part 5.3 Division 5 Clause 131A of the EP Regulations) in relation to the Project. The word 'Associated' may also be defined as 'Host' or 'Involved'.	45 dB or background L_{A90} + 5 dB, whichever is the greater
Non-associated	All other dwellings	40 dB or background L_{A90} + 5 dB, whichever is the greater

6. SENSITIVE RECEPTORS

Appendix A lists the Associated and Non-associated Dwellings for the assessment and provides their respective distances to the nearest WTG. No other sensitive receptors (defined as 'noise sensitive locations' in the Standard) other than dwellings are in proximity to the Project. Only dwellings located within 2 km from any WTG (dwellings sourced from dataset "20250522_Dwellings_within_2500m_WTGs") are assessed. Dwellings located further away are anticipated to experience lower noise impact than at the assessed dwellings, as indicated in this report.

7. METHODOLOGY

The modelled wind farm layout consists of 53 WTGs with layout reference IPAUSVICXXTTR20241022. The coordinates of the WTGs for this layout are provided in **Appendix B**. Details of the candidate WTG are provided in **Table 7-1**.

TABLE 7-1 CANDIDATE WIND TURBINE DETAILS

Feature	Parameter used
Wind Turbine Generator (WTG) Model	Nordex N175/6.X
WTG Mode	Mode 2 (Rated power of 6.22 MW)
Investigated Hub Height	162 m
Rotor Diameter	175 m
Cut-in wind speed	3 m/s
Cut-out wind speed	26 m/s
Modelled Maximum Sound Power Level, with Serrated Trailed Edge (STE) technology correction*	106.0 dB(A)

Note: *At >6m/s standardized wind speed at 10m in accordance with IEC 61400-11 (International Electrotechnical Commission, 2012) and equivalent to >9.2 m/s hub height wind speed as per the conversion method in Section 6.2.2 of the Standard.

The 1/3 octave band centre frequency sound power levels at various hub-height wind speeds for the candidate WTG with STE (Nordex, 2023) are provided in **Appendix C.** Details of the noise model and the modelling parameters are provided in **Table 7-2**.

TABLE 7-2 MODELLING PARAMETERS

Modelling aspect	Parameter
Noise Modelling Software	SoundPLAN 9.1
Algorithm	International Standard ISO 9613-2:2024 Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation (ISO 9613-2) (Standards Australia, 2024)
Ground Absorption Factor	0.5 (50% acoustically hard ground and 50% acoustically soft ground)
Humidity	70%, as per *Technical Guideline* (EPA Victoria, 2024)
Temperature	10°C, as per *Technical Guideline* (EPA Victoria, 2024)
Receptor height	4.0 m, as per *Technical Guideline* (EPA Victoria, 2024) 1.5 m (corresponding to the expected measurement height for operational compliance testing)
Topographical contours	10 m intervals, sourced from Vicmap Elevation - 1-5 Contours & Relief (DECCA, 2023)
Wind direction	Downwind – noise level at each receptor is predicted based on being simultaneously downwind of every wind turbine at the site.

Note: Corrections for barrier attenuation being no greater than 2 dB have been incorporated into the noise model.

8. ASSESSMENT

8.1 PREDICTED NOISE LEVELS

In this preliminary NIA, the WTG modelling scenario considered for modelling, is at 162 m WTG Hub Height with Serrated Trailing Edge (STE) technology on blades.

The predicted worst-case noise levels (based on the candidate WTG specifications as noted in **Section 7**) at Associated and Non-associated Dwellings are presented in **Table 8-1** and **Table 8-2** respectively, located within 2 km from any WTG (dwellings sourced from dataset "20250522_Dwellings_within_2500m_WTGs")**.** Potential exceedances are indicated by an asterisk (*) next to the predicted noise levels. Noise contour maps for the modelled scenario has been provided in **Figure 8-1** and **Figure 8-2** for predictions at a 4.0 m and 1.5 m receptor height respectively.

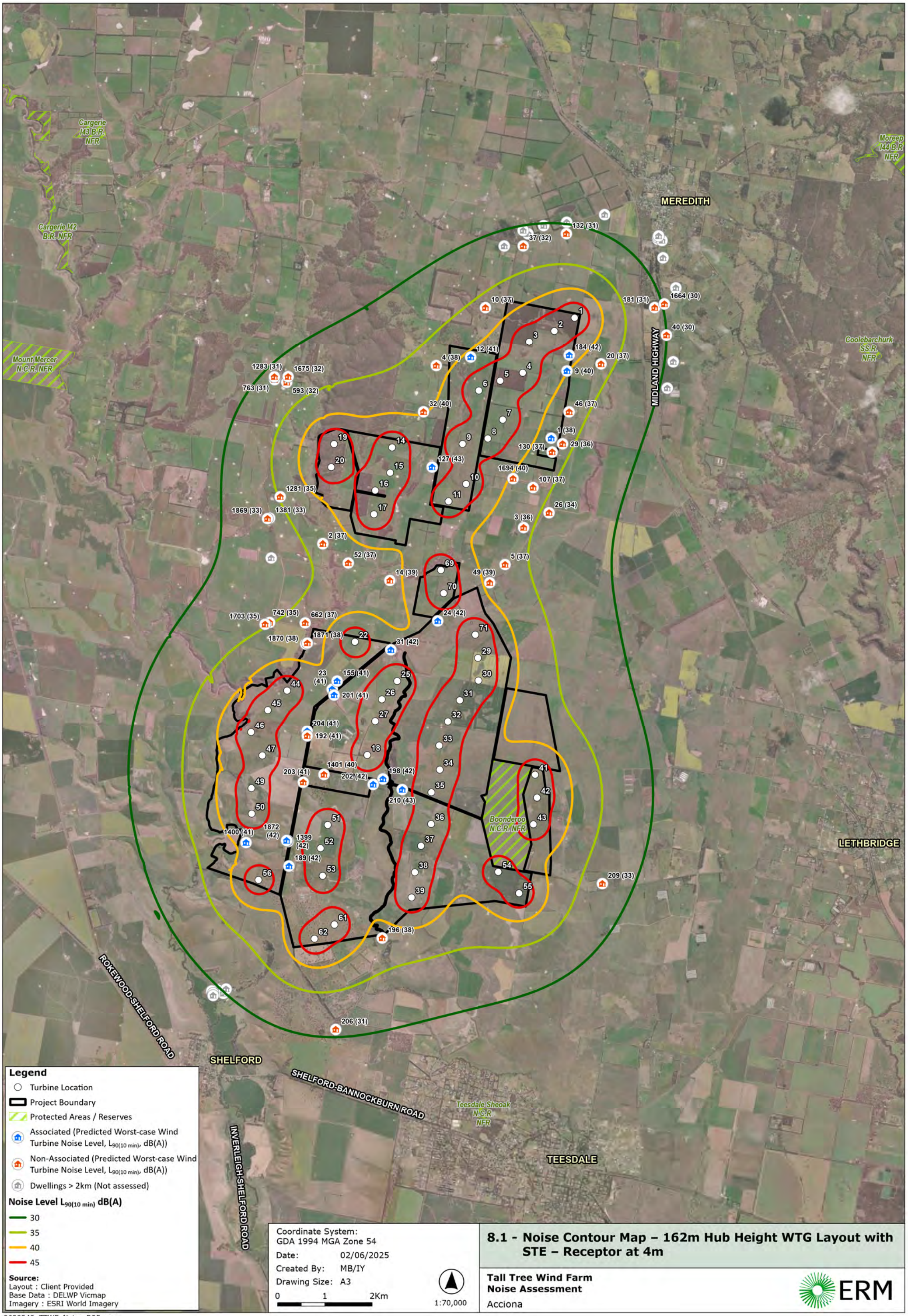
TABLE 8-1 PREDICTED NOISE LEVELS AT SENSITIVE RECEPTORS – ASSOCIATED

Dwelling ID	Dwelling Type	Nearest Wind Turbine	Distance to Nearest Wind Turbine, in metres	Base Limit, $L_{90(10\ min)}$, dB(A)	Predicted Worst-case Wind Turbine Noise Level, $L_{90(10\ min)}$, dB(A)	
					1.5 m above ground level	4.0 m above ground level
1	Associated	7	1098	45	36	38
9	Associated	2	894	45	39	40
12	Associated	6	730	45	40	41
23	Associated	44	953	45	39	41
24	Associated	70	599	45	41	42
31	Associated	25	675	45	41	42
127	Associated	10	803	45	42	43
155	Associated	22	911	45	39	41
184	Associated	2	606	45	41	42
189	Associated	56	708	45	41	42
198	Associated	18	605	45	41	42
201	Associated	44	999	45	39	41
202	Associated	18	634	45	41	42
204	Associated	45	946	45	40	41
210	Associated	35	619	45	42	43
1399	Associated	20	701	45	41	42
1400	Associated	50	621	45	40	41
1402	Associated	52	719	45	41	42
1872	Associated	52	735	45	41	42

TABLE 8-2 PREDICTED NOISE LEVELS AT SENSITIVE RECEPTORS – NON-ASSOCIATED

Dwelling ID	Dwelling Type	Nearest Wind Turbine	Distance to Nearest Wind Turbine, in metres	Base Limit, $L_{90(10\ min)}$, dB(A)	Predicted Worst-case Wind Turbine Noise Level, $L_{90(10\ min)}$, dB(A)	
					1.5 m above ground level	4.0 m above ground level
2	Non-associated	17	1247	40	35	37
3	Non-associated	10	1527	40	34	36
4	Non-associated	6	1045	40	36	38
5	Non-associated	69	1363	40	36	37
10	Non-associated	3	1177	40	35	37
14	Non-associated	69	1101	40	37	39
20	Non-associated	1	1134	40	35	37
26	Non-associated	10	1858	40	33	34
29	Non-associated	7	1366	40	35	36
32	Non-associated	14	1006	40	39	40
37	Non-associated	1	1869	40	31	32
40	Non-associated	1	1978	40	29	30
46	Non-associated	4	1284	40	36	37
49	Non-associated	70	999	40	38	39
52	Non-associated	17	1161	40	36	37
107	Non-associated	8	1411	40	35	37
130	Non-associated	7	1250	40	36	37
132	Non-associated	1	1788	40	30	31
181	Non-associated	1	1707	40	29	31

Dwelling ID	Dwelling Type	Nearest Wind Turbine	Distance to Nearest Wind Turbine, in metres	Base Limit, $L_{90(10\ min)}$, dB(A)	Predicted Worst-case Wind Turbine Noise Level, $L_{90(10\ min)}$, dB(A)	
					1.5 m above ground level	4.0 m above ground level
192	Non-associated	45	1000	40	39	41*
196	Non-associated	61	1049	40	37	38
203	Non-associated	47	1034	40	39	41*
206	Non-associated	62	1969	40	29	31
209	Non-associated	55	1774	40	31	33
593	Non-associated	19	1646	40	31	32
662	Non-associated	22	1126	40	35	37
742	Non-associated	44	1488	40	33	35
763	Non-associated	19	1854	40	30	31
1281	Non-associated	20	1247	40	34	35
1283	Non-associated	19	1901	40	30	31
1381	Non-associated	20	1691	40	32	33
1401	Non-associated	18	1004	40	39	40
1664	Non-associated	1	1922	40	28	30
1675	Non-associated	19	1725	40	30	32
1694	Non-associated	10	1000	40	38	40
1703	Non-associated	44	1479	40	33	35
1869	Non-associated	20	1732	40	32	33
1870	Non-associated	22	1043	40	37	38
1871	Non-associated	22	1007	40	37	38



Legend

- Turbine Location
- Project Boundary
- Protected Areas / Reserves
- Associated (Predicted Worst-case Wind Turbine Noise Level, $L_{90(10\ min)}$, dB(A))
- Non-Associated (Predicted Worst-case Wind Turbine Noise Level, $L_{90(10\ min)}$, dB(A))
- Dwellings > 2km (Not assessed)

Noise Level $L_{90(10\ min)}$ dB(A)

- 30
- 35
- 40
- 45

Source:
Layout : Client Provided
Base Data : DELWP Vicmap
Imagery : ESRI World Imagery

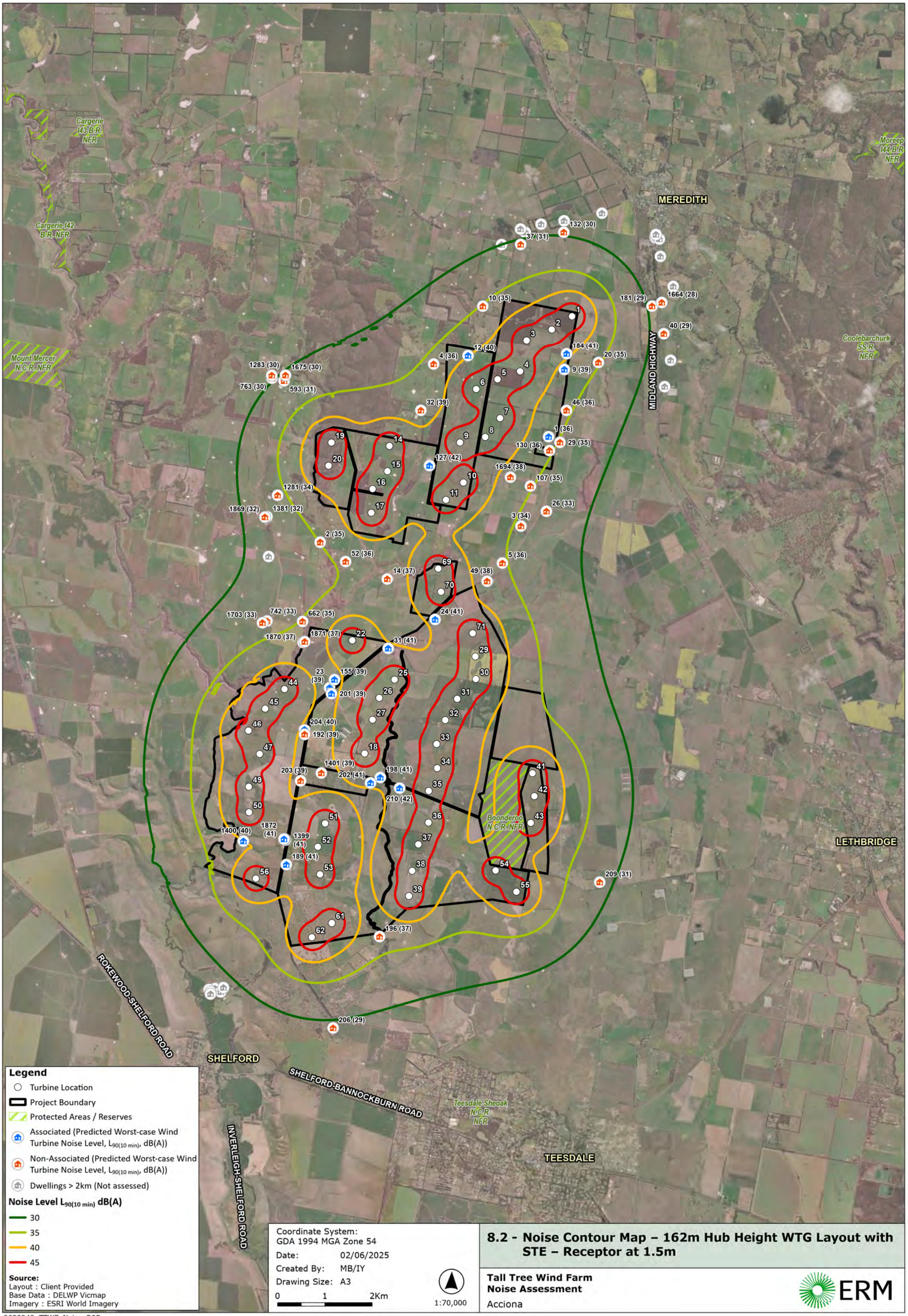
Coordinate System:
GDA 1994 MGA Zone 54
Date: 02/06/2025
Created By: MB/IY
Drawing Size: A3
0 1 2Km
1:70,000

8.1 - Noise Contour Map – 162m Hub Height WTG Layout with STE – Receptor at 4m

Tall Tree Wind Farm
Noise Assessment
Acciona

ERM

0629242_TTWF_Noise_R05.aprx



0629242_TTWF_Noise_R05.aprx

In accordance with *Section 6.2.1* of the Standard, the resultant predicted time-average (L_{eq}) wind farm sound levels occurring at all receptors are taken as the predicted L_{90} wind farm sound levels.

With STE technology, predicted wind farm sound levels indicate:

- at associated dwelling: compliance at all receptors when predicted at 4.0 m above ground level;
- at non-associated dwellings: compliance at all receptors except at dwellings 192 and 203 where minor exceedances of 1 dB are predicted at 4.0 m above ground level; and
- When predicted at a receptor height of 1.5 m, corresponding to the expected measurement height for operational compliance, compliance is indicated to be achieved at all associated and non-associated dwellings.

8.2 SPECIAL NOISE CHARACTERISTICS

Amplitude modulation is an expected characteristic of WTG noise (regular variation in sound level due to the rotation of the blades) and is considered to be taken into account in the sound power levels of the WTGs and the noise limits used for this Preliminary NIA. Impulsivity is not expected to occur normally and is typically a result of mechanical or aerodynamic issues with the WTGs.

Tonality from wind turbines is generally related to rotational equipment in the turbine nacelle. It should be noted that tonal characteristics typically do not occur in well designed and well-maintained wind turbines and if present, they are usually caused by a turbine maintenance issue. Notwithstanding this, tonality was assessed using the methodology described in *Appendix B2.1* of the Standard.

Tonality is defined as when the sound pressure level of 1/3 octave band centre frequency exceeds the level of the adjacent bands on both sides by:

- 5 dB or more if the centre frequency of the band containing the tone is in the range 500 Hz to 10,000 Hz;
- 8 dB or more if the centre frequency of the band containing the tone is in the range 160 Hz to 400 Hz; and/or
- 15 dB or more if the centre frequency of the band containing the tone is in the range 25 Hz to 125 Hz.

8.2.1 ASSESSMENT OF TONAL CHARACTERISTICS

For the assessment of tonal characteristics, the 1/3 octave band centre frequency noise predictions at the worst-affected dwelling, non-associated dwelling 203, was investigated.

The predicted 1/3 octave band centre frequency noise levels at dwelling 203 are provided in **Table 8-3**.

TABLE 8-3 PREDICTED 1/3 OCTAVE BAND CENTRE FREQUENCY NOISE LEVELS

1/3 Octave Band Centre Frequency	Predicted Noise Level (Unweighted), $L_{90(10\ min)}$, dB – Receptor height of 4.0 m above ground level	Tonality Criteria – Difference between both adjacent bands, in dB	Difference between adjacent bands (Lower band / Higher band), in dB
20 Hz	60.4	-	-
25 Hz	58.2	15	2.2 / -1.2
31.5 Hz	54.8	15	3.4 / -0.5
40 Hz	50.9	15	3.9 / 1.7
50 Hz	48.7	15	2.2 / 2.3
63 Hz	48.8	15	-0.1 / -1.4
80 Hz	47.5	15	1.3 / -4.1
100 Hz	42.1	15	5.4 / 4.9
125 Hz	41.6	15	0.5 / -0.8
160 Hz	40.3	10	1.3 / 0.7
200 Hz	39.7	10	0.6 / -0.9
250 Hz	38.2	10	1.5 / 0.1
315 Hz	36.8	10	1.4 / 0.2
400 Hz	35.6	10	1.2 / -0.8
500 Hz	33.6	5	2.0 / 1.1
630 Hz	32.7	5	0.9 / -0.2
800 Hz	31.6	5	1.1 / -0.6
1000 Hz	29.9	5	1.7 / 3.6
1250 Hz	28.2	5	1.7 / -1.4
1600 Hz	25.1	5	3.1 / -2.8
2000 Hz	19.2	5	5.9 / -3.1
2500 Hz	10.2	5	9.0 / -3.3
3150 Hz	-2.1	5	12.3 / -4.8
4000 Hz	-19.2	5	17.1 / -6.2
5000 Hz	-42.5	5	23.3 / -11.4
6300 Hz	-77.2	5	34.7 / -
8000 Hz	-	5	-
10000 Hz	-	5	-

Based on the analysis of the data using the methodology detailed above, no tonal characteristics are present at dwelling 203 and therefore, tonality is unlikely to be a feature of the Project.

8.3 TURBINE CONTRIBUTION AT WORST-AFFECTED RECEPTOR

As presented in **Section 8.1**, two minor exceedances of 1 dB are predicted at dwellings 192 and 203 when predicted at 4.0 m above ground level, which are the worst-affected non-associated sensitive receptors. The review of noise contribution from individual turbine is therefore focused on dwellings 192 and 203, for the consideration of sector management and micro-siting.

Table 8-4 summarises the predicted noise levels for the top 10 noise contributing wind turbines at dwellings 192 and 203.

TABLE 8-4 NOISE CONTRIBUTION FROM INDIVIDUAL TURBINES

Dwelling ID	Dwelling Type	Predicted Worst-case Wind Turbine Noise Level, $L_{90(10\ min)}$, dB(A)	Noise Contribution from Individual Turbine	
			Turbine ID	Noise Level, $L_{90(10\ min)}$, dB(A)
192	Non-associated	41	45	33
			47	33
			44	32
			46	31
			18	30
			27	29
			49	27
			26	26
			51	25
			50	25
203	Non-associated	41	47	33
			51	33
			49	32
			50	30
			52	29
			18	29
			46	28
			45	27
			44	25
			27	25

9. RECOMMENDATIONS

With the use of STE technology, implemented as best practice and to address general environmental duty as per the EP Act in the design, the predicted results indicate compliance at all associated dwellings, and two minor exceedances at non-associated dwelling 192 and 203 by 1 dB, in accordance with the methodology outlined in the *Technical Guideline* (EPA Victoria, 2024).

The predicted results at a receptor height of 1.5 m (the height at which operational compliance is expected to be measured) indicate, with the use of STE technology adopted for all the WTGs, compliance at all associated and non-associated dwellings.

The following recommendations are provided based on the assessment:

- Conduct background noise monitoring at non-associated dwellings 192 and 203, or at representative locations, as per *Section 7.4* of the Standard. Background noise monitoring will allow project-specific criteria (based on a regression analysis of background noise data and hub-height wind speeds) which accounts for potentially elevated background noise to be developed. There is potential for the noise limit to be more relaxed when compared to the base (minimum) limit which were used for this assessment.
- Consider adjusting WTG positioning (micro-siting) by considering the contribution of individual WTGs, by referring to the noise contribution given in **Section 8.3**, to enable criteria compliance.
- Consider sector management and the implementation of noise reduced operational modes for the turbines.
- Engage with EPA Victoria and DTP, as relevant, to clarify the height above ground level at which post-construction noise monitoring will take place, given that noise modelling results were assessed at 4.0 m as per the *Technical Guideline* (EPA Victoria, 2024), as well as 1.5m, in this assessment. It should be noted that the Standard does not prescribe a noise measurement height.

10. CONCLUSION

Noise from the assessed layout of 53 WTGs was modelled assuming hub height of 162 m with a maximum sound power level of 106.0 dB(A) as per the candidate WTG – Nordex N175-6.X (Mode 2 with rated power of 6.22 MW) wind turbine with Serrated Trailing Edge (STE) technology.

The predicted noise levels at the nearest noise sensitive receptors (associated and non-associated dwellings) were assessed against base (minimum) noise limits. The assessment results indicate, with the use of STE technology adopted for all the WTGs, compliance at all associated dwellings and two minor exceedances at non-associated dwellings 192 and 203 by 1 dB, in accordance with the methodology outlined in the *Technical Guideline* (EPA Victoria, 2024).

In addition to the sound level predictions at a receptor height of 4.0 m as per the *Technical Guideline* (EPA Victoria, 2024), ERM also presented sound level predictions at a receptor height of 1.5 m, the expected height of operational compliance monitoring. The predicted results at a receptor height of 1.5 m indicate, with the use of STE technology adopted for all the WTGs, compliance at all associated and non-associated dwellings.

Recommendations for the Project include background noise monitoring at non-associated dwellings 192 and 203, or at representative locations, to allow for derivation of project-specific criteria. Additional recommendations include consideration of micro-siting, sector management and the implementation of noise-reduced operational modes for the turbines and engagement with EPA and DTP.

Should the WTG layout and the final WTG model selection deviate from this assessment materially (with any potential for increase of predicted noise levels at both Associated or Non-associated dwellings), an updated noise assessment of the final layout design and turbine model selection will be required to assess compliance with noise criteria.

11. STATEMENT OF LIMITATIONS

1. This report is based solely on the scope of work described in the submitted proposal performed by Environmental Resources Management Australia Pacific Pty Ltd (ERM) for Acciona Energy Australia Global Pty Ltd (the Client). The Scope of Work was governed by a contract between ERM and the Client (Contract).
2. No limitation, qualification or caveat set out below is intended to derogate from the rights and obligations of ERM and the Client under the Contract.
3. The findings of this report are solely based on, and the information provided in this report is strictly limited to that required by, the Scope of Work. Except to the extent stated otherwise, in preparing this report ERM has not considered any question, nor provides any information, beyond that required by the Scope of Work.
4. This report was prepared between June 2022 and May 2025 and is based on conditions encountered and information reviewed at the time of preparation. The report does not, and cannot, take into account changes in law, factual circumstances, applicable regulatory instruments or any other future matter. ERM does not, and will not, provide any on-going advice on the impact of any future matters unless it has agreed with the Client to amend the Scope of Work or has entered into a new engagement to provide a further report.
5. Unless this report expressly states to the contrary, ERM's Scope of Work was limited strictly to identifying typical environmental conditions associated with the subject site(s) and does not evaluate the condition of any structure on the subject site nor any other issues. Although normal standards of professional practice have been applied, the absence of any identified hazardous or toxic materials or any identified impacted soil or groundwater on the site(s) should not be interpreted as a guarantee that such materials or impacts do not exist.
6. Although the data that has been used in compiling this report is generally based on actual circumstances, if the report refers to hypothetical examples those examples may, or may not, represent actual existing circumstances.
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12. REFERENCES

DECCA. (2023). *Vicmap Elevation - 1-5 Contours & Relief.* Retrieved from https://discover.data.vic.gov.au/dataset/vicmap-elevation-1-5-contours-relief

DTP. (2023). *Department of Transport and Planning (DTP), Planning Guidelines for Development of Wind Energy Facilities, September 2023.*

EPA Victoria. (2021). *Wind Energy Facility Turbine Noise Regulation Guidelines, Publication 2061*. Retrieved from https://www.epa.vic.gov.au/for-business/find-a-topic/noise-guidance-for-businesses/wind-energy-facility-turbine-noise-regulation-guidelines

EPA Victoria. (2024). *Wind Energy Facility Turbine Noise - Technical Guideline, Publication 3011.*

International Electrotechnical Commission. (2012). *IEC Technical Specification 61400-14 IEC TS 61400-11:2012 Wind turbines - Part 11: Acoustic noise measurement techniques.*

Nordex. (2023). *Sales Document, Third Octave Sound Power Levels for Nordex N175/6.X, Reference: F008_278_A17_EN, Doc.: 9003492, Revision 01, dated 23/05/2023.*

Standards Australia. (2024). *ISO 9613-2:2024 - Acoustics - Attenuation of Sound during Propagation Outdoors, Part 2: General method of calculation.*

Standards New Zealand. (2010). *New Zealand Standard 6808:2010 Acoustics – Wind farm noise.*

VCAT. (2013). *Cherry Tree Wind Farm Pty Ltd v Mitchell SC & Ors (Includes Summary) (Red Dot) [2013] VCAT 521 .*

Victorian Government. (2017). *Environment Protection Act 2017.* Retrieved from https://www.legislation.vic.gov.au/in-force/acts/environment-protection-act-2017/004

Victorian Government. (2021). *Environment Protection Regulations (incorporating amendments as at 8 November 2023).*

Victorian Government. (2022). *Environment Protection Amendment (Wind Turbine Noise) Regulations .*

APPENDIX A SENSITIVE RECEPTORS

ACCIONA Dwelling ID	Dwelling Type	Nearest WTG	Distance to Nearest WTG, m	Dwelling Coordinates (GDA94 MGA Zone 54)	
				X, m	Y, m
1	Associated	7	1098	768367	768367
9	Associated	2	894	768701	768701
12	Associated	6	730	766664	766664
23	Associated	44	953	763733	763733
24	Associated	70	599	765967	765967
31	Associated	25	675	764975	764975
127	Associated	10	803	765848	765848
155	Associated	22	911	763838	763838
184	Associated	2	606	768749	768749
189	Associated	56	708	762820	762820
198	Associated	18	605	764807	764807
201	Associated	44	999	763775	763775
202	Associated	18	634	764601	764601
204	Associated	45	946	763204	763204
210	Associated	35	619	765216	765216
1399	Associated	20	701	762801	762801
1400	Associated	50	621	761912	761912
1402	Associated	52	719	762786	762786
1872	Associated	52	735	762770	762770
2	Non-associated	17	1247	763536	763536
3	Non-associated	10	1527	767783	767783
4	Non-associated	6	1045	765936	765936
5	Non-associated	69	1363	767391	767391
10	Non-associated	3	1177	766976	766976
14	Non-associated	69	1101	764954	764954
20	Non-associated	1	1134	769422	769422
26	Non-associated	10	1858	768322	768322
29	Non-associated	7	1366	768608	768608
32	Non-associated	14	1006	765666	765666

ACCIONA Dwelling ID	Dwelling Type	Nearest WTG	Distance to Nearest WTG, m	Dwelling Coordinates (GDA94 MGA Zone 54)	
				X, m	Y, m
37	Non-associated	1	1869	767776	767776
40	Non-associated	1	1978	770806	770806
46	Non-associated	4	1284	768747	768747
49	Non-associated	70	999	767066	767066
52	Non-associated	17	1161	764074	764074
107	Non-associated	8	1411	767984	767984
130	Non-associated	7	1250	768387	768387
132	Non-associated	1	1788	768688	768688
181	Non-associated	1	1707	770556	770556
192	Non-associated	45	1000	763206	763206
196	Non-associated	61	1049	764792	764792
203	Non-associated	47	1034	763121	763121
206	Non-associated	62	1969	763809	763809
209	Non-associated	55	1774	769449	769449
593	Non-associated	19	1646	762772	762772
662	Non-associated	22	1126	763163	763163
742	Non-associated	44	1488	762411	762411
763	Non-associated	19	1854	762516	762516
1281	Non-associated	20	1247	762635	762635
1283	Non-associated	19	1901	762511	762511
1381	Non-associated	20	1691	762411	762411
1401	Non-associated	18	1004	763560	763560
1664	Non-associated	1	1922	770762	770762
1675	Non-associated	19	1725	762802	762802
1694	Non-associated	10	1000	767560	767560
1703	Non-associated	44	1479	762314	762314
1869	Non-associated	20	1732	762366	762366
1870	Non-associated	22	1043	763173	763173
1871	Non-associated	22	1007	763208	763208

APPENDIX B WIND TURBINE GENERATOR COORDINATES (LAYOUT REFERENCE IPAUSVICXXTTR20241022)

WTG ID	GDA94 / MGA Zone 54, X in m	GDA94 / MGA Zone 54, Y in m
1	768863	5804491
2	768435	5804210
3	767902	5803979
4	767765	5803317
5	767288	5803149
6	766836	5802942
7	767341	5802326
8	767026	5801927
9	766492	5801812
10	766566	5800964
11	766196	5800598
14	765001	5801737
15	764959	5801203
16	764644	5800827
17	764617	5800323
18	764476	5795226
19	763774	5801810
20	763714	5801320
22	764215	5797629
25	765109	5796798
26	764785	5796411
27	764644	5795950
29	766817	5797288
30	766829	5796810
31	766434	5796391
32	766182	5795942
33	765998	5795426
34	766010	5794915
35	765832	5794436
36	765826	5793765
37	765612	5793304
38	765481	5792745
39	765413	5792213
41	768027	5794809
42	768067	5794324

WTG ID	GDA94 / MGA Zone 54, X in m	GDA94 / MGA Zone 54, Y in m
43	767989	5793760
44	762780	5796597
45	762372	5796183
46	762019	5795710
47	762256	5795215
49	762025	5794523
50	762031	5793984
51	763640	5793747
52	763487	5793254
53	763532	5792671
54	767248	5792753
55	767687	5792303
56	762175	5792584
61	763781	5791643
62	763360	5791346
69	766033	5799148
70	766092	5798657
71	766762	5797780

APPENDIX C WIND TURBINE 1/3 OCTAVE BAND CENTRE FREQUENCY SOUND POWER LEVELS AT HUB-HEIGHT WIND SPEEDS

Sound power level at 1/3 octave band centre frequency, at standardised and hub-height wind speed, in dB(A)										
Standardised Wind Speed	3m/s	4m/s	5m/s	6m/s	7m/s	8m/s	9m/s	10m/s	11m/s	12m/s
Hub Height Wind Speed	4.6m/s	6.1m/s	7.7m/s	9.2m/s	10.7m/s	12.3m/s	13.8m/s	15.3m/s	16.9m/s	18.4m/s
10 Hz	46.4	50.0	54.8	56.2	56.2	56.2	56.2	56.2	56.2	56.2
12.5 Hz	51.2	54.8	59.6	61.0	61.0	61.0	61.0	61.0	61.0	61.0
16 Hz	55.8	59.4	64.2	65.6	65.6	65.6	65.6	65.6	65.6	65.6
20 Hz	59.1	62.7	67.5	68.9	68.9	68.9	68.9	68.9	68.9	68.9
25 Hz	62.5	66.1	70.9	72.3	72.3	72.3	72.3	72.3	72.3	72.3
31.5 Hz	64.4	68.0	72.8	74.2	74.2	74.2	74.2	74.2	74.2	74.2
40 Hz	65.6	69.2	74.0	75.4	75.4	75.4	75.4	75.4	75.4	75.4
50 Hz	67.6	71.2	76.0	77.4	77.4	77.4	77.4	77.4	77.4	77.4
63 Hz	71.9	75.5	80.3	81.7	81.7	81.7	81.7	81.7	81.7	81.7
80 Hz	74.6	78.2	83.0	84.4	84.4	84.4	84.4	84.4	84.4	84.4
100 Hz	76.2	79.8	84.6	86.0	86.0	86.0	86.0	86.0	86.0	86.0
125 Hz	78.8	82.4	87.2	88.6	88.6	88.6	88.6	88.6	88.6	88.6
160 Hz	80.8	84.4	89.2	90.6	90.6	90.6	90.6	90.6	90.6	90.6
200 Hz	82.1	85.7	90.5	91.9	91.9	91.9	91.9	91.9	91.9	91.9
250 Hz	83.1	86.7	91.5	92.9	92.9	92.9	92.9	92.9	92.9	92.9
315 Hz	84.2	87.8	92.6	94.0	94.0	94.0	94.0	94.0	94.0	94.0
400 Hz	84.3	87.9	92.7	94.1	94.1	94.1	94.1	94.1	94.1	94.1

Sound power level at 1/3 octave band centre frequency, at standardised and hub-height wind speed, in dB(A)										
500 Hz	84.4	88.0	92.8	94.2	94.2	94.2	94.2	94.2	94.2	94.2
630 Hz	85.5	89.1	93.9	95.3	95.3	95.3	95.3	95.3	95.3	95.3
800 Hz	86.3	89.9	94.7	96.1	96.1	96.1	96.1	96.1	96.1	96.1
1000 Hz	86.5	90.1	94.9	96.3	96.3	96.3	96.3	96.3	96.3	96.3
1250 Hz	87.0	90.6	95.4	96.8	96.8	96.8	96.8	96.8	96.8	96.8
1600 Hz	86.8	90.4	95.2	96.6	96.6	96.6	96.6	96.6	96.6	96.6
2000 Hz	84.7	88.3	93.1	94.5	94.5	94.5	94.5	94.5	94.5	94.5
2500 Hz	81.2	84.8	89.6	91.0	91.0	91.0	91.0	91.0	91.0	91.0
3150 Hz	76.9	80.5	85.3	86.7	86.7	86.7	86.7	86.7	86.7	86.7
4000 Hz	71.9	75.5	80.3	81.7	81.7	81.7	81.7	81.7	81.7	81.7
5000 Hz	67.0	70.6	75.4	76.8	76.8	76.8	76.8	76.8	76.8	76.8
6300 Hz	59.9	63.5	68.3	69.7	69.7	69.7	69.7	69.7	69.7	69.7
8000 Hz	52.2	55.8	60.6	62.0	62.0	62.0	62.0	62.0	62.0	62.0
10000 Hz	42.8	46.4	51.2	52.6	52.6	52.6	52.6	52.6	52.6	52.6
Overall A-weighted value	**96.2**	**99.8**	**104.6**	**106.0**	**106.0**	**106.0**	**106.0**	**106.0**	**106.0**	**106.0**

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