Appendix H

Noise Impact Assessment

Chalumbin Wind Farm

Noise Impact Assessment

S6886C3

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Sonus is a member of the Association of Australian Acoustical Consultants (AAAC).

EXECUTIVE SUMMARY

An assessment has been made of the noise from the proposed Chalumbin Wind Farm (the **wind farm**) in accordance with the Queensland Government Department of Infrastructure, Government and Planning *State code 23: Wind farm development*, Planning Guideline (July 2017) (**State Code 23**).

The wind farm consists of 94 wind turbine generators with a hub height of up to 150m above ground level and is well located with respect to providing significant separation distance to the sparsely located sensitive land uses.

The noise from the wind farm to the sensitive land uses in the vicinity has been predicted. The predictions have been conducted based on the *Vestas V162 6.0MW* wind turbine generator (**WTG**) without serrated edge blades and a hub height of 150m. It is understood that this is one of the WTGs under consideration for the wind farm and represents the WTG with the highest expected noise output, thus providing an indication of the worst-case performance of the wind farm.

The predicted noise levels have been compared with noise assessment criteria established through background noise monitoring in the vicinity. Due to the separation distances to sensitive land uses, the predicted noise levels readily satisfy the assessment criteria.

The final WTG selection may change subject to detailed design and technological advances as the project progresses; however, the representative *Vestas* WTG selection has been used to demonstrate that the appropriate noise criteria can be readily achieved.

The noise from the potential substations has also been predicted with respect to the criteria contained in the Environment Protection (Noise) Policy 2019 (the **EPP**). The predicted noise levels are less than the relevant criteria and therefore this ancillary wind farm infrastructure will not adversely impact on the existing acoustic amenity at the sensitive land uses.

GLOSSARY AND ABBREVIATIONS

Term	Definition
A weighting	Frequency adjustment representing the response of the human ear.
Ambient noise level	Noise level in the absence of the noise from the wind farm.
Background noise level	The ambient noise level represented by the L_{A90} in the absence of intermittent noise such as vehicles and short term wind gusts.
dB	Linear (unweighted) sound pressure or power level in decibels.
dB(A)	A weighted noise or sound pressure or power level in decibels.
EPP	Queensland *Environment Protection (Noise) Policy 2019*
Host Lot	A parcel of land (lot(s)) that accommodates any part of a wind farm development.
L_{A90}	The A weighted sound pressure level exceeded for 90% of the measurement period.
$L_{A90,10min}$	The L_{A90} sound pressure level measured over a 10 minute period.
L_{Aeq}	The A weighted equivalent continuous noise level – the energy-average of noise levels occurring over a measurement period.
May 2013 UK IOA Good Practice Guide	*UK Institute of Acoustics IOA - A Good Practice Guide To The Application Of Etsu-R-97 For The Assessment And Rating Of Wind Turbine Noise*
Non - Host Lot	Premises in proximity to the wind farm that are not Host Lots.
Sensitive land uses	A range of different uses as defined by the Planning Regulations 2017, typically dwellings. Both Non-Host Lots and Host Lots are considered sensitive land uses, albeit subject to different assessment criteria under State Code 23.
State Code 23	Queensland Government Department of Infrastructure, Government and Planning *State code 23: Wind farm development*, Planning Guideline (July 2017).
The Wind Farm	The Chalumbin Wind Farm project, including wind turbine generators and ancillary infrastructure
WTG	Wind Turbine Generator

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1 INTRODUCTION

An assessment has been made of the noise from the proposed Chalumbin Wind Farm (the **wind farm**), in accordance with the Queensland Government Department of Infrastructure, Government and Planning *State code 23: Wind farm development*, Planning Guideline (July 2017) (**State Code 23**).

Noise levels at sensitive land uses in the vicinity of the proposed wind farm have been predicted using the noise propagation model and the inputs recommended by the *May 2013 UK IOA Good Practice Guide* and State Code 23.

The noise predictions have been made based on an indicative wind turbine generator (**WTG**) selection being the *Vestas V162 6.0MW*. This WTG selection is provided for indicative purposes to show that a contemporary selection can comply with the relevant noise assessment criteria. An assessment will be made during the detailed design phase to confirm that the final WTG will comply with the criteria established in this report. It is expected that this additional assessment will be a condition of any forthcoming development permit for the Project.

The proposed wind farm layout and sensitive land uses are provided in Figure 1 below.

The co-ordinates of the WTGs and the relevant sensitive land uses are provided in Appendices A and B, respectively.

The noise from the wind farm substations has been predicted as part of this assessment and compared against the requirements of the Environment Protection (Noise) Policy 2019 (the **EPP**). Construction noise is also considered.

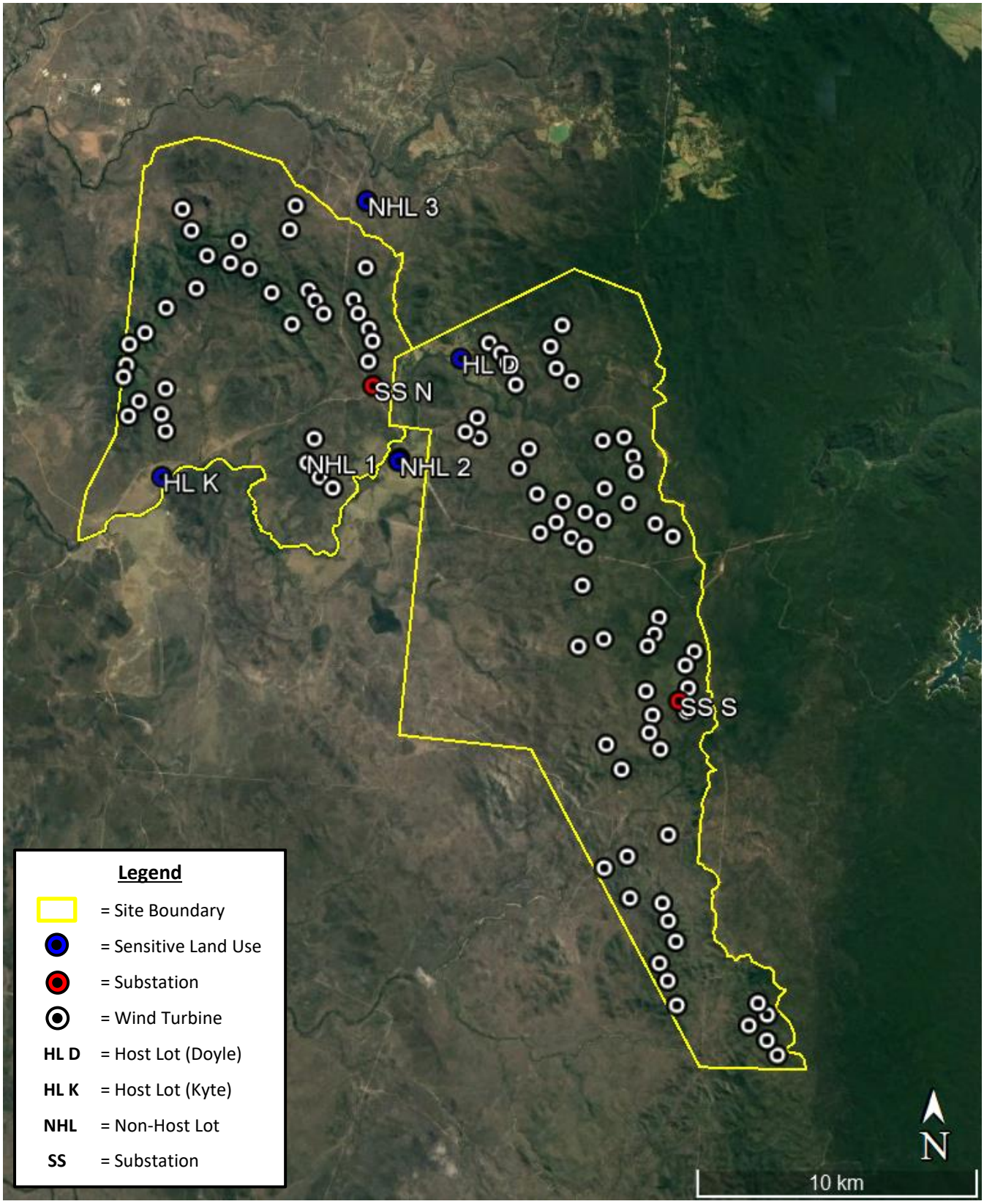


Figure 1: *Wind Farm layout and sensitive land uses*

2 ENVIRONMENTAL NOISE CRITERIA

The State Code 23 provides noise criteria to be achieved by the wind farm at existing or approved sensitive land uses on host lots and non-host lots, to ensure the health and safety of individuals and the community. These criteria are listed within Performance Outcomes (POs) 11 and 12 for host lots and non-host lots, respectively.

Sensitive land uses are defined by the Planning Regulations 2017 and include (amongst other things) dwellings, hotels, community centres, health and aged care facilities, and education establishments.

For host lots, noise from the wind farm must not exceed 45 dB(A) or the background noise level plus 5 dB(A), whichever is greater, during the night period (10pm to 6am).

For non-host lots, noise from the wind farm must not exceed:

- 35 dB(A) or the background noise level plus 5 dB(A), whichever is greater, during the night period; and
- 37 dB(A) or the background noise level plus 5 dB(A), whichever is greater, during the day period (6am to 10pm).

Where a deed of release is in place, the noise from the wind farm may be increased above these limits, however, the noise must not exceed the agreed maximum noise level limit, or if not available, the limit that would apply if the lot were a host lot.

2.1 Background Noise Monitoring

Background noise monitoring has been conducted in the vicinity of the wind farm to:

- determine the ambient noise levels in the environment surrounding the wind farm during the day and night period; and,
- determine the background noise levels ($L_{A90,\ 10min}$) for correlation against a range of hub height wind speeds for the day and night periods, which in turn establish the assessment criteria at sensitive land uses.

The data acquisition procedure and subsequent analysis have been conducted in accordance with the State Code 23.

Given the sparsely located sensitive land uses and the distance to these land uses, it is considered that a single monitoring location is sufficient to characterise the existing noise environment.

2.1.1 Noise Monitoring Location and Period

Background noise monitoring was conducted at the Host Lot on the Doyle property (as shown in Figure 2) between 30 March and 19 May 2021 as a representative location to measure the ambient noise environment in the vicinity of the wind farm.

2.1.2 Hub Height Wind Data

Wind data was measured during the monitoring period and sheared up to a height of 150m above ground level by Epuron. The wind speed data have been correlated with the background noise monitoring data.

2.1.3 Monitoring Equipment

Background noise levels (L_{A90}) were measured in 10-minute intervals with a *Rion NL-21* sound level meter with Class 2 certification in accordance with *AS IEC−61672.1-2004 Electroacoustics – Sound level meters.*

The sound level meter had a noise floor of less than 20 dB(A) and was calibrated at the beginning and end of the measurement period using a Class 1 *Rion NC74* Calibrator, with no significant drift observed.

The noise logging equipment was positioned on the wind farm side of the Doyle property and well removed from any significant structures which could introduce reflections or domestic noise sources (such as air conditioning units). The microphone was positioned approximately 1.5 m above ground level and fitted with wind shield with a diameter of at least 150mm. A photograph of the noise monitoring equipment is provided in Appendix C.

Local wind speed conditions (accurate to ±1m/s) were also monitored at the Doyle property at microphone height (approximately 1.5m above ground level). Rainfall data were obtained from the nearest Bureau of Meteorology (BOM) weather station, at Mareeba. The data have been used to exclude periods when local weather may have adversely affected the background noise measurement data.

2.2 Data Analysis

The acquired background noise and wind speed data have been analysed in accordance with the methodology provided in the State Code 23.

2.2.1 Data Removal

Prior to the correlation analysis, the following data were removed:

- data points corresponding to any periods of measured rainfall and/or measured wind speed exceeding 5 m/s at the microphone for more than 90% of the measurement period;
- data points corresponding to wind speeds below the cut-in (3 m/s) and above the approximate wind speed of rated power (13 m/s); and,
- data points which were clearly affected by extraneous noise (ie, outliers in the data set).

There were 7216 data pairs (10-minute noise and wind) before the filtering and 6216 after filtering.

2.2.2 Noise and Wind Data Correlations and Criteria

The background noise data were correlated with the wind speeds referenced to 150m above ground level for both the daytime period (between 6am and 10pm) and night-time period (between 10pm and 6am). A best fit third order regression analysis was undertaken for the periods. The data sets and resultant regression curves are provided in Appendix D. Using the regression curves, the background noise level ($L_{A90,10min}$) at each integer hub height wind speed were determined and in turn, the assessment criteria established.

2.3 Operational Wind Turbine Criteria

Table 1 summarises the background noise levels during the daytime and night-time periods for each integer hub height wind speed between 3m/s and 13m/s and the assessment criteria that subsequently apply to both a non-host lot and a host lot:

Table 1: *Background Noise Levels ($L_{A90,10min}$).*

Based on measurements at the Doyle property		**Background Noise Level (dB(A)) at 170m Hub Height Wind Speed (m/s)**										
		3	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
Day (6am to 10pm)	Background	34	35	36	37	38	38	38	39	39	40	40
	Non-Host Lot Criteria	39	40	41	42	43	43	43	44	44	45	45
	Host Lot Criteria	45	45	45	45	45	45	45	45	45	45	45
Night (10pm to 6am)	Background	37	36	36	35	35	35	36	36	37	38	39
	Non-Host Lot Criteria	42	41	41	40	40	40	41	41	42	43	44
	Host Lot Criteria	45	45	45	45	45	45	45	45	45	45	45

2.4 Environment Protection (Noise) Policy 2019

The noise from ancillary infrastructure such as substations is not considered within State Code 23. These noise sources have therefore been assessed against the requirements of the *Environment Protection (Noise) Policy 2019* (the **EPP**). The EPP provides acoustic quality objectives to be achieved so as to protect the environmental values of an area, specifically in regard to noise, as shown in Table 2 below. The substation has the potential to operate at any time of the day, making the night-time levels the most relevant.

Table 2: *Acoustic Quality Objectives.*

Sensitive receptor	Time of day	Acoustic quality objectives (measured at the receptor) dB(A)		
		$L_{Aeq,adj,1hr}$	$L_{A10,adj,1hr}$	$L_{A1,adj,1hr}$
Residence (outdoors)	Daytime or evening	50	55	65
Residences (indoors)	Daytime or evening	35	40	45
	Night-time	30	35	40

3 NOISE ASSESSMENT

3.1 Noise Propagation Model

The noise levels from the wind farm have been predicted using the noise propagation model, *ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors* (**ISO 9613-2**). ISO 9613-2 provides a methodology for predicting noise levels at sensitive land uses under meteorological conditions favourable to noise propagation. It is known as a downwind model, based on the conservative assumption of being downwind (resulting in the highest noise level) of all WTGs operating simultaneously. The noise prediction model inputs are in accordance with the *May 2013 UK IOA Good Practice Guide* and State Code 23, including:

- sound power level data;
- 10°C temperature;
- 70% relative humidity;
- 50% acoustically hard ground and 50% acoustically soft ground;
- barrier attenuation of no greater than 2 dB(A);
- 4m receiver height; and,
- application of a 3 dB(A) correction where a "concave" ground profile exists as defined by the *May 2013 UK IOA Good Practice Guide*.

The noise model uses topographical ground contours but limits the barrier attenuation as noted above.

3.2 Noise Sources

3.2.1 WTGs

As this project is in the planning phase, the final WTG has not yet been selected or procured. Therefore, predictions have been made based on a contemporary turbine, being the *Vestas V162 6.0MW* with a hub height of 150m, understood to be one of the WTGs under consideration. As a conservative approach, the variant of the turbine without serrated blade edges has been considered.

Table 3 summarises the sound power level data which has been used for the noise predictions.

Table 3: *One Third Octave Band Sound Power Levels for Vestas V162 6.0MW without serrated blade edge, dB(A)*

Hub height wind speed	1/3 Octave Band Centre Frequency																							Overall
	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz	
3 m/s	65.5	69.2	72.8	75.7	78.3	80.8	82.8	84.3	85.6	86.5	87.1	87.3	87.1	86.6	85.8	84.4	82.9	81	78.7	75.9	73	69.6	65.8	61.8	**96.7**
4 m/s	65.1	68.9	72.5	75.5	78.1	80.7	82.6	84.3	85.6	86.6	87.2	87.5	87.4	86.9	86.1	84.9	83.4	81.6	79.4	76.7	73.8	70.5	66.7	62.9	**96.9**
5 m/s	65.1	68.9	72.5	75.5	78.2	80.8	82.8	84.4	85.8	86.8	87.4	87.7	87.6	87.1	86.4	85.1	83.7	81.9	79.7	77	74.2	70.9	67.1	63.3	**97.1**
6 m/s	67.2	71.1	74.6	77.6	80.3	82.9	84.8	86.4	87.8	88.8	89.3	89.6	89.5	89	88.2	86.9	85.4	83.6	81.3	78.6	75.7	72.4	68.6	64.6	**99**
7 m/s	70.4	74.2	77.8	80.8	83.4	86	87.9	89.5	90.9	91.8	92.4	92.6	92.4	92	91.1	89.8	88.3	86.4	84.1	81.3	78.4	75	71.1	67.1	**102**
8 m/s	73.3	77.1	80.7	83.7	86.4	88.9	90.8	92.4	93.7	94.7	95.2	95.4	95.2	94.7	93.9	92.5	90.9	89	86.7	83.9	80.9	77.5	73.5	69.5	**104.8**
9 m/s	75.5	79.3	82.9	85.9	88.5	91.1	93	94.6	95.9	96.8	97.3	97.5	97.3	96.8	95.9	94.5	93	91	88.6	85.8	82.8	79.3	75.4	71.3	**106.9**
10 m/s	75.7	79.5	83.1	86.1	88.7	91.3	93.2	94.8	96.1	97	97.5	97.7	97.5	97	96.1	94.8	93.2	91.2	88.8	86	83	79.5	75.6	71.5	**107.1**
11 m/s	75.7	79.5	83.1	86.1	88.7	91.3	93.2	94.8	96.1	97	97.5	97.7	97.5	97	96.1	94.7	93.2	91.2	88.8	86	83	79.5	75.6	71.5	**107.1**
12 m/s	75.9	79.7	83.3	86.2	88.9	91.4	93.3	94.9	96.1	97.1	97.6	97.7	97.5	97	96.1	94.7	93	91.1	88.7	85.8	82.8	79.3	75.3	71.2	**107.1**
13 m/s	76.2	80	83.5	86.5	89.1	91.6	93.5	95	96.2	97.1	97.6	97.7	97.5	96.9	96	94.5	92.9	90.8	88.4	85.5	82.4	78.9	74.8	70.7	**107.1**

3.2.2 Ancillary Infrastructure

The wind farm includes two potential substation locations, with approximate coordinates detailed in Table 4:

Table 4: *Substation Coordinates*

Substations	Approximate Coordinates (GDA 94 MGA Zone 55)	
	Easting	Easting
North Substation	331343	8037637
South Substation	342342	8026517

The final layout and selections of the infrastructure will be subject to detailed design and may be constructed at any, or all, of the above potential locations. The main noise generating equipment associated with the substations are the transformers.

This assessment has been made based on the understanding that the north substation will contain two 190 MVA rated transformers, and the south substation will contain two 160 MVA rated transformers. A sound power level of 98 dB(A) for the 190 MVA rated transformers and 97 dB(A) for the 160 MVA transformers has been derived from the Australian/New Zealand Standard *AS/NZS 60076.10:2009 Power transformers – Part 10: Determination of sound levels.*

3.3 Predicted Noise Levels

The noise from the wind farm has been predicted to the sensitive land uses. For the purposes of this assessment, it is understood that the dwellings on the non-host lots and host lots are the only sensitive land uses in the vicinity of the wind farm.

3.3.1 WTGs

A WTG will increase in noise level with an increase in wind speed up until a certain speed at which point it plateaus (or even reduces) at higher wind speeds. The highest noise levels from the representative WTG occurs at operational wind speeds of 10m/s and above. The highest noise levels are shown in Figure 2 along with the sensitive land uses in the vicinity of the wind farm.

The predicted wind farm noise levels at each sensitive land use for each WTG hub height integer wind speed are tabulated in Table 5.

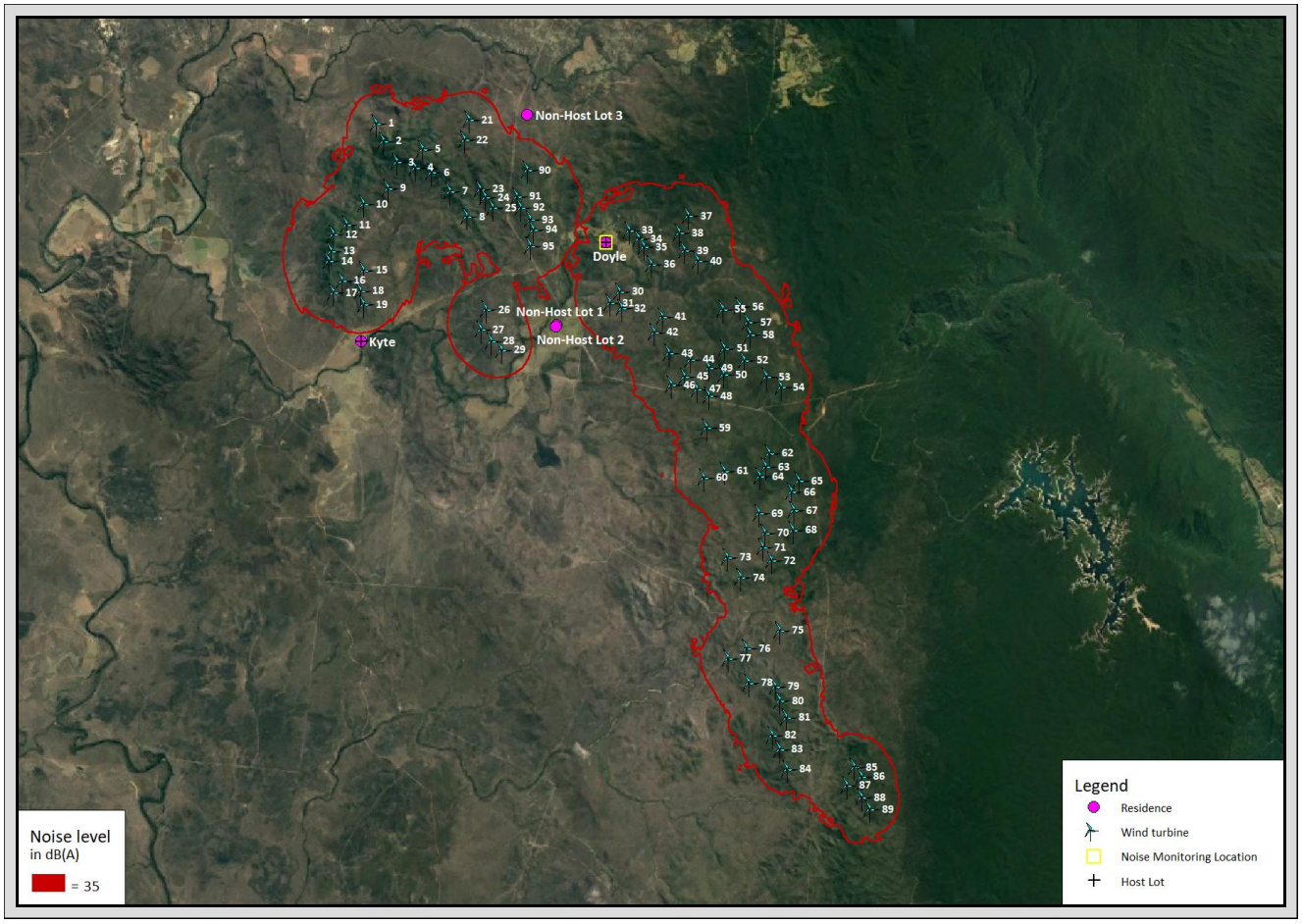


Figure 2: *Highest predicted noise levels (L_{Aeq}) from Vestas V162 6.0MW turbines*

Table 5: *Predicted wind farm noise levels (L_{Aeq}) from Vestas V162 6.0MW turbines at integer wind speeds*

Location ID	150m Hub Height Wind Speed (m/s)										
	3	4	5	6	7	8	9	10	11	12	13
Host Lots											
Doyle	28	28	28	30	33	36	38	38	38	38	38
Kyte	22	22	23	25	28	30	33	33	33	33	33
Non-Host Lots											
Non-Host Lot 1	22	22	22	24	27	30	32	33	33	33	33
Non-Host Lot 2	22	22	22	24	27	30	32	32	32	33	33
Non-Host Lot 3	22	22	22	24	27	30	32	32	32	32	33

The above results indicate that the predicted noise levels at the lots are as follows:

- 33 dB(A), or less, at non-host lots (baseline criterion 35 dB(A)); and,
- 38 dB(A), or less, at host lots (baseline criterion 45 dB(A)).

These predicted noise levels not only comply with the criteria established in accordance with State Code 23 based on background noise levels but also with the most onerous baseline criteria of 45 dB(A) at host lots and 35 dB(A) at night for non-host lots.

Therefore, the wind farm is predicted to readily satisfy the noise assessment criteria established in accordance with the State Code 23, contained within PO11 and PO12.

3.3.2 Ancillary Infrastructure

The noise from the substations associated with the wind farm is not required to be assessed in accordance with the State Code 23. As such, a prediction has been made of noise levels from the substations to the surrounding sensitive land uses in accordance with the EPP.

The assessment has considered the noise at each sensitive land use based on the understanding that two 190 MVA and two 160 MVA rated transformer units will be located at the northern and southern substation locations, respectively. The noise from the substations has been predicted using the same noise model used to predict noise from the wind turbines, albeit with a receiver height of 1.5m, in line with commonly accepted practice for predicting noise from sources other than wind turbines.

Given the significant separation distance between the proposed infrastructure and the closest sensitive land uses, the highest noise level is predicted to be less than 15 dB(A) at all locations. As such, the noise will easily achieve the acoustic quality objective of 30 dB(A) indoors for a receptor during the night period, while conservatively not considering a reduction across the facade.

As the final substation arrangement is not currently known, the presence of annoying characteristics cannot be determined. Due to the low levels of noise predicted, it is unlikely that these characteristics, if present, would be audible above the background noise. Nonetheless, if the maximum penalty of 5 dB(A) is applied for tonality were applicable, the predicted level would still achieve the relevant criteria.

3.4 Construction Noise

The State Code 23 requires that construction activities avoid, minimise, and mitigate adverse impacts.

A Construction Noise and Vibration Management Plan prepared prior to construction can satisfy the State Code 23 by including the following:

- description of the proposed construction work associated with the development
- description of the proposed hours of work and what work will be undertaken during those hours
- description and location of sensitive uses that may be affected by noise and vibration from the construction work

- description of the activities and equipment likely to generate noise and vibration emissions
- description of the noise and vibration impact control measures to be implemented to minimise noise and vibration impacts at sensitive uses
- description of the methods to be used to monitor performance and receive, record, and respond to complaints.

Examples of the control measures to minimise noise and vibration at sensitive uses could include the following, subject to detailed information on the actual construction processes that are proposed to be used:

- limit the hours of construction to typical daytime construction hours where practicable;
- incorporate proprietary enclosures around machines if necessary;
- substitute construction methods with alternative processes that produce less noise and vibration where cost effective to do so;
- incorporate broadband reversing signals to vehicles which remain on the site, in lieu of tonal reversing beepers,
- incorporate administrative measures such as inspections, scheduling and providing training to establish a noise minimisation culture for the works.
- incorporate specific noise and vibration reduction measures for high noise and vibration generating activities (such as blasting, concrete batching, percussion drilling rigs, crushing etc.)
- incorporate specific recommendations for activity that is required to occur outside of the typical daytime construction hours (such as concrete pouring before 7am on days of extreme heat or turbine erection at night).

4 CONCLUSION

An assessment has been made of the noise from the proposed Chalumbin Wind Farm (the **wind farm**), in accordance with the Queensland Government Department of Infrastructure, Government and Planning *State code 23: Wind farm development*, Planning Guideline (July 2017).

Noise levels at sensitive land uses from the proposed wind farm have been predicted using the noise propagation model and the inputs recommended by the *May 2013 UK IOA Good Practice Guide* and the State Code 23.

The noise predictions have been made based on an indicative wind turbine generator (**WTG**) selection being the *Vestas V162 6.0MW*. The outcomes of this assessment indicate that a contemporary and representative WTG selection can readily comply with the relevant assessment criteria, as determined by background noise monitoring conducted in the vicinity of the proposed site. The wind farm therefore demonstrates compliance with the acoustic amenity-related Performance Outcomes (POs) of State Code 23, namely PO11 and PO12.

An assessment will be made during the detailed design phase to confirm that the final wind turbine generator selection and hub height will comply with the assessment criteria.

The noise from ancillary infrastructure including substations is predicted to easily achieve the Environment Protection (Noise) Policy assessment criteria and will not result in adverse impacts on the acoustic amenity at the sensitive land uses.

Construction activities can satisfy the State Code 23 and avoid, minimise, and mitigate adverse impacts through the development of a Construction Noise and Vibration Management Plan within the framework of this assessment, once the final construction delivery method is known.

APPENDIX A: COORDINATES OF TURBINES

Turbine ID	Coordinates (GDA 94 MGA Zone 55)	
	Easting	Northing
1	324466	8043862
2	324784	8043086
3	325341	8042174
4	326170	8041924
5	326473	8042727
6	326862	8041723
7	327666	8040896
8	328410	8039792
9	324980	8041034
10	323908	8040335
11	323164	8039445
12	322600	8039026
13	322494	8038290
14	322399	8037863
15	323913	8037466
16	322967	8037004
17	322584	8036480
18	323766	8036561
19	323925	8035963
21	328512	8044009
22	328301	8043144
23	328982	8040994
24	329223	8040630
25	329539	8040170
26	329258	8035738
27	329011	8034878
28	329461	8034369
29	329933	8033989
30	335081	8036531
31	334659	8036025
32	335178	8035809
33	335479	8039190
34	335891	8038827
35	336118	8038478
36	336448	8037716
37	338059	8039831
38	337666	8039078
39	337902	8038311
40	338470	8037869
41	336944	8035439

Turbine ID	Coordinates (GDA 94 MGA Zone 55)	
	Easting	Northing
42	336586	8034751
43	337228	8033835
44	338157	8033563
45	337908	8032833
46	337331	8032454
47	338449	8032288
48	338947	8031980
49	338959	8033204
50	339589	8032912
51	339626	8034049
52	340504	8033538
53	341482	8032815
54	342100	8032366
55	339555	8035752
56	340321	8035873
57	340657	8035196
58	340770	8034653
59	338864	8030599
60	338740	8028429
61	339627	8028705
62	341610	8029481
63	341446	8028888
64	341190	8028466
65	342881	8028285
66	342560	8027790
67	342670	8026984
68	342624	8026140
69	341158	8026865
70	341402	8026012
71	341290	8025387
72	341692	8024802
73	339770	8024952
74	340337	8024069
75	342037	8021757
76	340598	8020970
77	339786	8020545
78	340705	8019485
79	341852	8019322
80	342057	8018701
81	342330	8017970

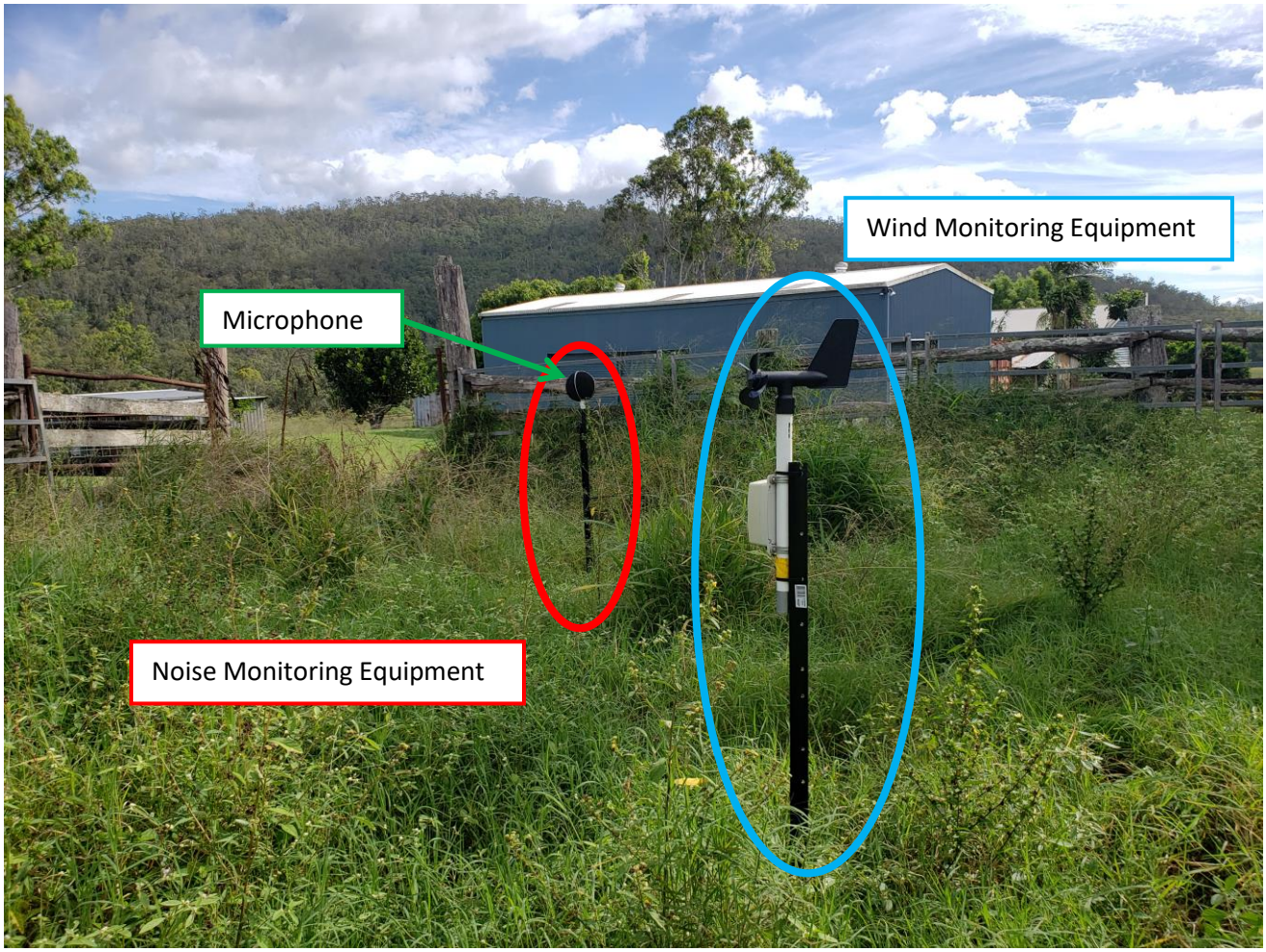
Turbine ID	Coordinates (GDA 94 MGA Zone 55)	
	Easting	Northing
82	341734	8017199
83	342031	8016580
84	342364	8015715
85	345277	8015806
86	345599	8015397
87	344969	8015004
88	345614	8014482

Turbine ID	Coordinates (GDA 94 MGA Zone 55)	
	Easting	Northing
89	345974	8013973
90	331032	8041825
91	330594	8040678
92	330771	8040190
93	331162	8039658
94	331303	8039222
95	331169	8038504

APPENDIX B: COORDINATES OF SENSITIVE LAND USES

Location ID	Coordinates (GDA 94 MGA Zone 55)	
	Easting	Northing
Host Lots		
Doyle	334498	8038630
Kyte	323819	8034331
Non-host Lots		
Non-Host Lot 1	332327	8035054
Non-Host Lot 2	332293	8034969
Non-Host Lot 3	331058	8044197

APPENDIX C: PHOTOGRAPH OF THE MONITORING EQUIPMENT AT DOYLE PROPERTY



APPENDIX D: NOISE MONITORING RESULTS AND REGRESSION CURVES