Rye Park Wind Farm

Permit Noise Compliance Testing

S3200.4C9

July 2025

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EXECUTIVE SUMMARY

Sonus has been engaged to conduct noise compliance testing for the Rye Park Wind Farm (the **Wind Farm**). The testing has been conducted to demonstrate compliance with the conditions of Development Consent.

The testing has been conducted in accordance with the approved *Noise Management Plan* (**NMP**) for the Wind Farm prepared by Sonus and Tilt Renewables (Revision C, dated April 2023) in accordance with Condition 13 of Schedule 3 of the Development Consent for the Wind Farm (State Significant Development (**SSD**) 6693, the **Development Consent**).

The testing comprised far field testing at five *Critical Non-Associated Residences* over a six-week period between 4 December 2024 and 15 January 2025. Where relevant, additional noise monitors were also placed at intermediate positions between the Wind Farm and residential noise monitoring locations to assist with filtering data which may have been impacted by extraneous sources of noise in the vicinity of the residential noise monitoring locations. Near field testing was also conducted at two WTGs for the purpose of determining the frequencies of potential tones and the wind speeds at which they occur, as per the NMP.

To assist with filtering extraneous noise from the collected acoustic data, local rainfall and wind speed monitoring was conducted at two locations (R38 and R63). To facilitate a consistent comparison of the post-construction far field noise monitoring results with the relevant criteria at each monitoring location, data from the on-site meteorological masts were used to generate wake free wind speed and direction datasets for now decommissioned 'development' meteorological masts used to generate the noise criteria for each monitoring location.

Based on analysis of the near-field testing data, tonality was not detected at any hub-height wind speed during the near field measurements at either of the tested WTGs, indicating that tonality is not a repeated characteristic of the noise emission from the WTGs. Accordingly, under the NMP, assessment of tonality at residential noise monitoring locations was not required and no adjustment for tonality was made to the noise levels measured at *Critical Non-Associated Residences*.

Similarly, when assessed in accordance with the primary test as per the NMP, low frequency noise from the Wind Farm was found to achieve the 60 dB(C) criterion specified by the NMP. As such, no adjustment was made to the noise levels measured at *Critical Non-Associated Residences* for low frequency noise.

Based on the results of the far-field noise monitoring, noise at each *Critical Non-Associated Residence* was found to not exceed the relevant criteria at any integer wind speed. Noise from the WTGs therefore compliant with Condition 11 of the Development Consent. Further analysis conducted for one *Critical Non-Associated Residence* (R11) where fewer than 500 valid downwind data points were collected demonstrates that compliance is also achieved even when significantly more data than the minimum required by the Technical Supplement is considered.

Noise from auxiliary infrastructure, when assessed at the nearest *Non-Associated Residences* and incorporating a conservative penalty for tonality in accordance with the *Noise Policy for Industry* is no higher than 28 dB(A), and therefore complies with Condition 12 of the Development Consent.

GLOSSARY

A-weighting	Frequency adjustment representing the response of the human ear
AS/NZS IEC 61672.1	AS/NZS IEC 61672.1-2019 *Electroacoustics – Sound Level Meters*
Associated Residences	Residences included in a commercial agreement with the Wind Farm (as per the definition in the NMP)
Background noise	Noise in the absence of the Wind Farm determined by monitoring conducted prior to the operation of the Wind Farm
Bulletin	*Wind Energy: Noise Assessment Bulletin – For State significant wind energy Development*, NSW Planning and Environment (2016). Replaced by the Technical Supplement for the purposes of this assessment.
C-weighting	Frequency adjustment which places emphasis on the low frequency range
Critical Non-Associated Residences	As per the NMP, the residences used to demonstrate compliance with the NSW Bulletin. The residences are selected based on having the highest predicted noise level in a range of directions around the Wind Farm. Compliance at these residences demonstrates compliance at all Non-associated Residences.
Curtailment Strategy	Means the acoustic curtailment strategy described in Section 2 of the approved NMP,.
dB(A)	A weighted noise level measured in decibels.
dB(C)	C weighted noise level measured in decibels.
The Development Consent	Development Consent SSD 6693 (incorporating Mod 1) granted on 15 April 2021 for the Wind Farm under the *Environmental Planning and Assessment Act* 1979 for up to 77 wind turbines with a 200 m tip height
IEC	International Electrotechnical Commission
IEC 61400-11	IEC 61400 Ed. 3.1 *Wind turbines – Part 11: Acoustic noise measurement techniques* (consolidating AMD1:2018 and COR1:2019)
Intermediate Monitoring Locations	A sound level meter location between the WTGs and a residential noise monitoring location. The Intermediate Monitoring Locations were selected to minimise noise from sources other than the WTGs (such as wind in trees and road traffic). The Intermediate Monitoring Locations will be located within 30 degrees of the line between the residential noise monitoring location and the closest WTG.
NATA	National Association of Testing Authorities, Australia.
Noise Management Plan (or NMP)	Means the approved NMP prepared in accordance with Condition 13 of Schedule 3 of the Development Consent for the Wind Farm, entitled *Rye Park Wind Farm: Noise Management Plan for Development Consent State Significant Development: 6693* (Rev C dated April 2023), prepared by Sonus and Tilt Renewables. The NMP provides the procedure for determination of compliance with the Development Consent.
Non-Associated Residences	Residences not included in a commercial agreement with the Wind Farm (as per the definition in the NMP)

Proxy Location	A location where noise logging was conducted because access to a Critical Non-Associated Residence was not granted. The Proxy Location was selected a comparable distance and similar direction from the nearest WTG, such that compliance with the relevant noise criteria at the Proxy Location will demonstrate compliance at the Critical Non-Associated Residence.
Residential Noise Monitoring Locations	The Critical Non-Associated Residences (as per the NMP) where noise monitoring was conducted
SA Guidelines	*Wind farms – environmental noise guidelines*, South Australian Environmental Protection Authority (issued July 2009, updated November 2021)
SLM	Sound Level Meter
Technical Supplement	*Wind Energy Guideline: Technical Supplement for Noise Assessment*, NSW Department of Housing, Planning and Infrastructure (2024). Replaces the Bulletin for the purposes of this assessment.
The Wind Farm	Rye Park Wind Farm
WTG	Wind Turbine Generator

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1 INTRODUCTION

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The testing has been conducted in accordance with the approved *Noise Management Plan* (**NMP**) for the Wind Farm prepared by Sonus and Tilt Renewables (Revision C, dated April 2023) in accordance with Condition 13 of Schedule 3 of the Development Consent for the Wind Farm (State Significant Development (**SSD**) 6693, the **Development Consent**).

This report summarises the following assessments:

- An assessment of far-field operational noise levels at the five *Critical Non-Associated Residences* nominated by the NMP. As per the NMP, compliance at these residences will demonstrate overall compliance of the Wind Farm with the relevant Development Consent noise criteria.
- An assessment of tonality based on measurements conducted in the near field of two *Wind Turbine Generators* (**WTGs**), and of low frequency noise, measured at the residence nominated by the approved NMP, in accordance with the methodology described in the NMP.
- An assessment of noise from auxiliary infrastructure at the Wind Farm site, including the collector sub-station, and the connection sub-station/switchyard.

2 DEVELOPMENT CONSENT REQUIREMENTS

The Development Consent conditions relating to noise emissions from the Wind Farm are specified in *Schedule 3, Environmental Conditions – General*. The relevant conditions are reproduced in Table 1 below.

Table 1: Relevant Development Consent Conditions

Condition	Requirements
Condition 11 Operational Noise Criteria – Wind Turbines	The Applicant must ensure that the noise generated by the operation of wind turbines does not exceed the higher of 35 dB(A) or the existing background noise level (LA90 (10-minute)) plus 5 dB(A) for each integer wind speed, measured at hub height, from cut-in to rated turbine generator power, at any non-associated residence. Noise generated by the operation of the wind turbines is to be measured in accordance with the relevant requirements of the Department's Wind Energy: Noise Assessment Bulletin (2016) (or its latest version). The noise generated by the operation of the wind turbines must also be adjusted for tonality and low frequency noise in accordance with the Department's Wind Energy: Noise Assessment Bulletin (2016) (or its latest version). However, these criteria do not apply if the Applicant has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Applicant has advised the Department in writing of the terms of this agreement.
Condition 12 Operational Noise Criteria – Ancillary Infrastructure	The Applicant must ensure that the noise generated by the operation of ancillary infrastructure does not exceed 35 dB(A) $L_{Aeq\ (15\text{-}minute)}$ at any non-associated residence. Noise generated by the development is to be measured in accordance with the relevant requirements of the Noise Policy for Industry (2017) (or its equivalent).
Condition 13 Noise Management Plan	Prior to commissioning of the turbines, the Proponent must prepare a Noise Management Plan to manage noise emissions from the operation of the development, to the satisfaction of the Planning Secretary. The Plan must include: (a) compliance monitoring within 3 months of operations, or the commencement of operation of a cluster of turbines if the development is to be staged, unless the Planning Secretary agrees otherwise, in accordance with the Department's Wind Energy: Noise Assessment Bulletin (2016) (or its latest version) to determine whether the development is complying with the relevant conditions of this consent; (b) description of the parameters and meteorological conditions which trigger the use of noise management mode and sector management; (c) an auditable process that compliance can be independently confirmed for the use of noise management mode and sector management; (d) procedures and corrective actions to be undertaken if non-compliance is detected; (e) provision of a copy of the compliance monitoring results to the Secretary and the EPA.
Condition 14 Noise Management Plan	Following the Planning Secretary's approval, the Applicant must implement the measures described in the Noise Management Plan.

Conditions 11 and 13 of Schedule 3 of the Development Consent conditions refer to the *Wind Energy: Noise Assessment Bulletin – For State significant wind energy Development*, NSW Planning and Environment (2016) (the **Bulletin**) or its latest version.

The Bulletin was superseded by the *Wind Energy Guideline: Technical Supplement for Noise Assessment*, NSW Department of Housing, Planning and Infrastructure (2024) (the **Technical Supplement**) in November 2024. The Technical Supplement takes a similar approach to the Bulletin in that it adopts the South Australian *Wind Farms Environmental Noise Guidelines* (the **SA Guidelines**) (adapted to a New South Wales context) as the basis for noise assessments (with the exception that the Technical Supplement references the 2021 update of the SA Guidelines in lieu of the 2009 version referenced by the Bulletin). In this context, it is considered that the Technical Supplement represents an update of the Bulletin to the most contemporary assessment methodology.

As such, for the purposes of this assessment any reference to the Bulletin (or its latest version) has been taken to refer to the Technical Supplement, and by extension the 2021 SA Guidelines as the most contemporary assessment approach.

2.1 Noise Management Plan (NMP)

Condition 13 of the Development Consent requires that a *Noise Management Plan* (**NMP**) be prepared prior to commissioning of the WTGs. The NMP is to include (amongst other things) compliance monitoring within 3 months of operations to determine whether the Wind Farm is complying with the relevant conditions of the Development Consent.

Condition 14 of the Development Consent requires that, following the Planning Secretary's approval, the Applicant must implement the measures described in the NMP.

An NMP for the Wind Farm has been prepared by Tilt Renewables and Sonus (*Rye Park Wind Farm – Noise Management Plan (Rev C)*, dated 24 April 2023). The NMP was approved on 26 April 2023.

2.1.1 Residential Monitoring Locations

The NMP identifies five "critical" *Non-Associated Residences*, compliance at which will demonstrate overall compliance of the WTGs with the relevant noise criteria. The critical *Non-Associated Residences* are the following:

Table 2: Critical Non-Associated Residences

Residence	Coordinates [WGS 84 UTM Zone 55S]	
	Easting	Northing
R11	679650	6183618
R19	676412	6181665
R38	679623	6173620
R63	683875	6148991
R24	683597	6178847

As noted in the NMP, access to R24 was not available to conduct the compliance testing. In such circumstance, testing was conducted at a *Proxy Location* a comparable distance and similar direction from the nearest WTG. The coordinates of the *Proxy Location* are provided below. An overview of the Wind Farm showing the location of the critical *Non-Associated Residences* and the *Proxy Location* is provided in Figure 1 (north) and Figure 2 (south) below.

Table 3: Proxy Location for R24

Proxy Location	Coordinates (WGS 84 UTM Zone 55S)	
	Easting	Northing
R113 (R24 Proxy)	683680	6179243

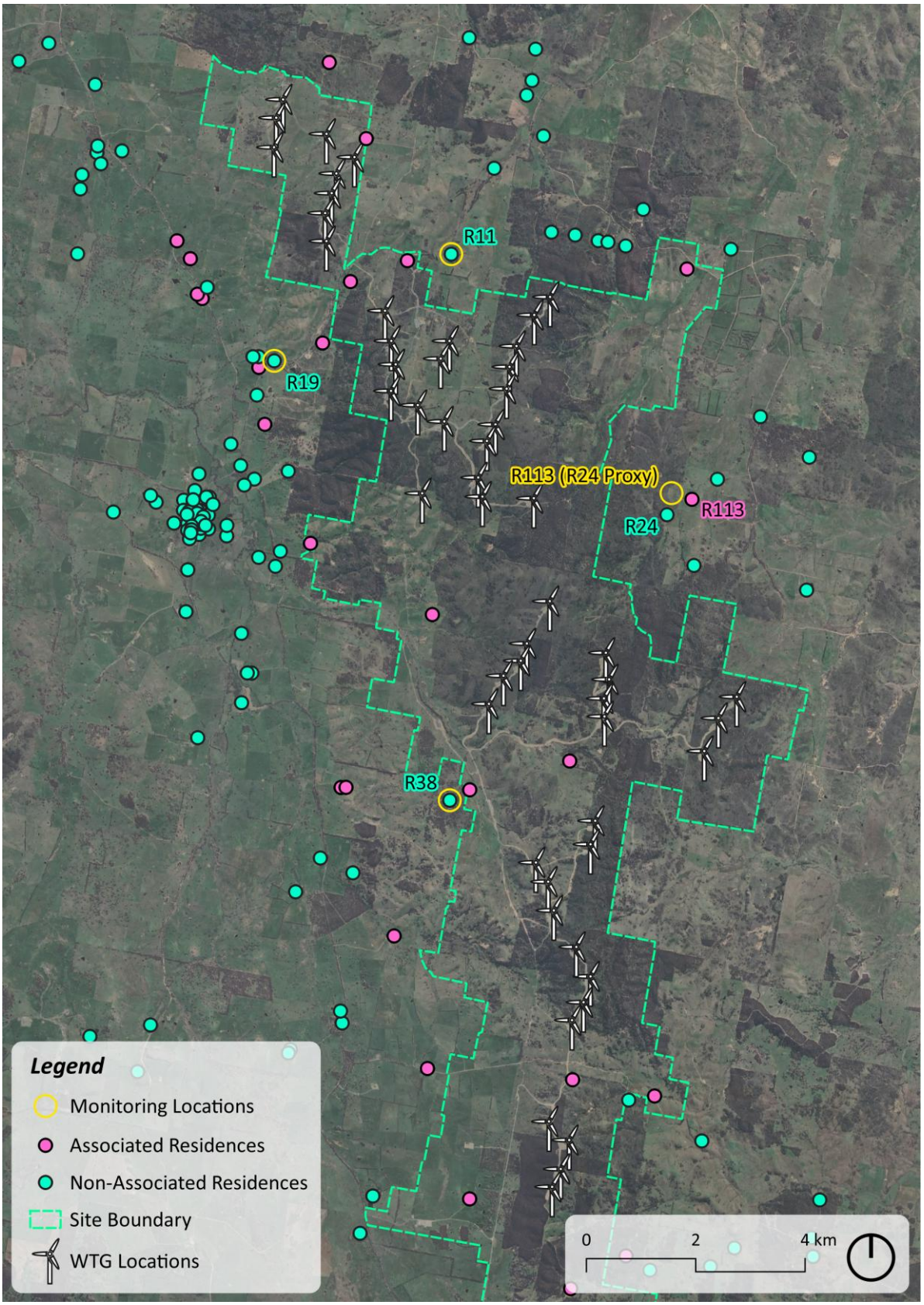

Figure 1: Rye Park Wind Farm - North

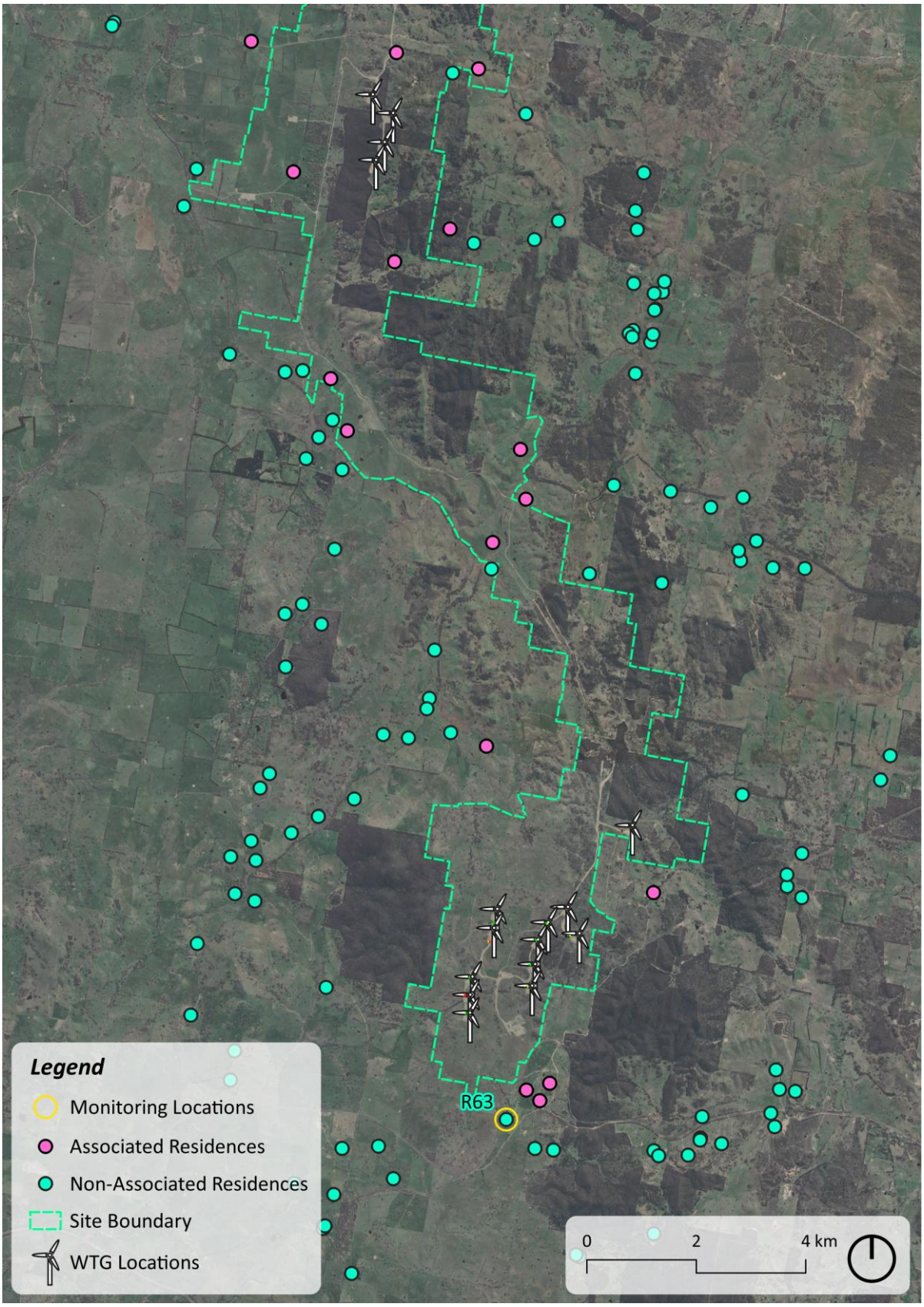

Figure 2: Rye Park Wind Farm - South

2.1.2 Residential Noise Criteria

Table 5 of the NMP specifies the noise criteria not to be exceeded at relevant receivers in the vicinity of the Wind Farm. The background noise monitoring used to derive the criteria is summarised in Sonus Report S3200.2C4 (April 2021).

The noise criteria to be achieved at each "Critical" *Non-Associated Residence*, and the background noise monitoring campaign used to derive the criteria are summarised in Table 4 below.

Table 4: Critical Non-Associated Residence Criteria

Critical Residence	Year of Monitoring	Noise Criteria [L_{A90} dB(A)] at Hub Height (119m) Integer Wind Speeds [m/s]									
		3	4	5	6	7	8	9	10	11	12
R11	2021	35	35	35	35	35	35	35	36	40	44
R19	2012	36	36	36	36	36	37	37	38	39	40
R38	2021	35	35	35	35	35	35	38	41	45	49
R63	2021	35	35	35	35	35	35	36	39	41	45
R24	2020	35	35	35	35	35	35	35	35	35	35

3 NOISE MONITORING – NEAR FIELD

Near-field testing was conducted at two representative WTGs (B01 and G05), in accordance with IEC 61400-11 as referenced by the NMP. The testing was conducted for the purpose of determining the frequencies of potential tones and the wind speeds at which they occur, as per the NMP.

3.1 Data Collection

Noise measurements were made using Class 1[1] Rion NL-52A, NATA calibrated, Sound Level Meters (**SLMs**) equipped with one-third octave band analysers. The SLMs were calibrated before and after the measurements using a Class 1[1] Rion NC-74 calibrator (serial number 35094478), with negligible drift observed.

The measurements were conducted at a single location in the expected prevailing (westerly) wind direction, so as to be downwind (within 15 degrees) for a sufficient proportion of the monitoring period. The measurement locations are provided in Table 5, along with the monitoring dates (when consistent downwind conditions occurred), and the serial number of the SLM installed at each location. The calibration certificates are provided in Appendix B.

Table 5: Near-field measurement locations

WTG	Sound Level Meter Serial Number	Coordinates (GDA 94 MGA 55)		Monitoring Dates	Slant Distance (m)	Downwind Direction (˚)
		Easting	Northing			
B01	00331171	679655	6180379	22/01/2025 and 28/01/2025	250	280
G05	00331169	686306	6154185	14/12/2024, 17/12/2024 and 06/01/2025	240	284

Consistent with IEC 61400-11, the microphones were placed in the centre of a measurement board with a secondary windshield positioned over the microphone. An example of the near field noise monitoring installation utilised is shown in Figure 3 below.

[1] In accordance with AS/NZS IEC 61672.1-2019 *Electroacoustics – Sound Level Meters*

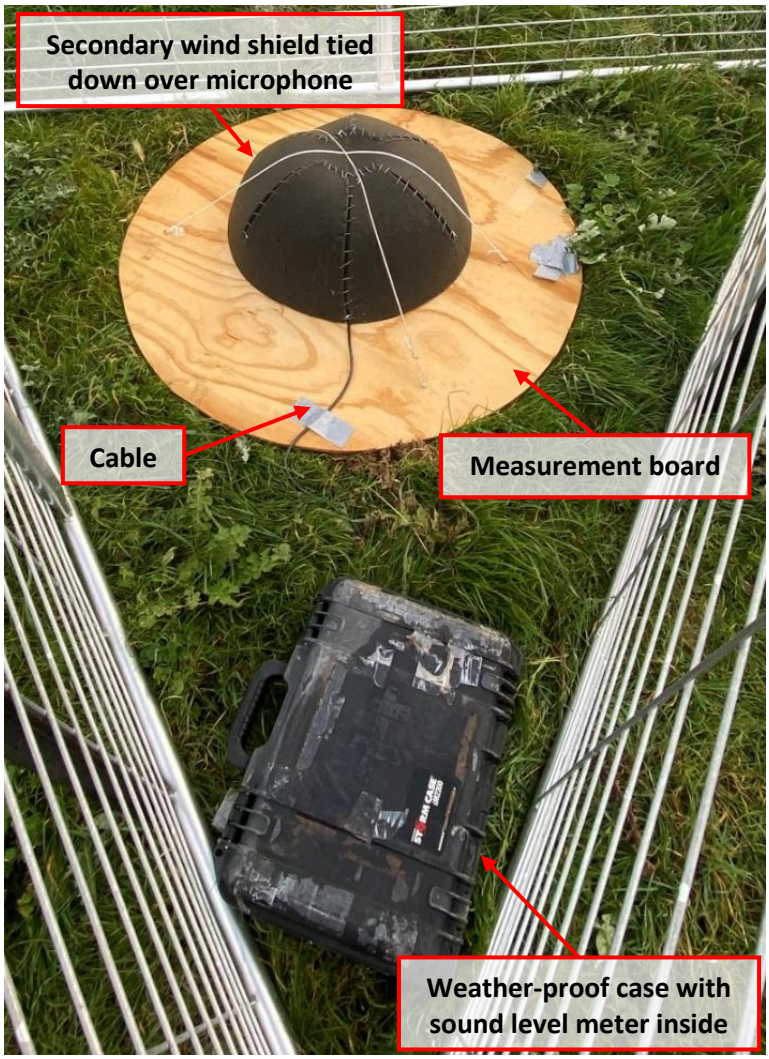

Figure 3: Example Nearfield Monitoring Setup

The insertion loss of the secondary windshield has previously been measured, and the results of the near field measurements have been corrected for its influence in accordance with IEC 61400-11. The insertion loss of the secondary windshield is summarised in Table 6 below.

Table 6: Secondary Wind Shield Insertion Loss and Uncertainty

Frequency 1/3-octave band (Hz)	**20**	**25**	**31.5**	**40**	**50**	**63**	**80**	**100**	**125**	**160**
Insertion loss (dB)	0.8	0.9	0.4	-0.2	0.4	0.0	-0.2	-0.1	0.1	0.0
Frequency 1/3-octave band (Hz)	**200**	**250**	**315**	**400**	**500**	**630**	**800**	**1000**	**1250**	**1600**
Insertion loss (dB)	-0.1	0.0	0.0	-0.1	0.2	0.3	0.4	0.1	0.1	0.5
Frequency 1/3-octave band (Hz)	**2000**	**2500**	**3150**	**4000**	**5000**	**6300**	**8000**	**10000**		
Insertion loss (dB)	0.1	0.3	0.3	0.3	0.4	0.5	0.6	0.6		

3.2 Sound Data

The equivalent A-weighted sound pressure levels were measured continuously at each of the downwind measurement positions throughout the downwind monitoring periods noted in Table 5 above. The sound pressure level data were averaged over 10 second periods to produce an overall *equivalent continuous A-weighted sound pressure level* (L_{Aeq}) and an A-weighted one-third octave L_{Aeq} spectrum (with centre frequencies between 20 Hz and 10 kHz inclusive) for each 10-second period.

3.3 Wind Speed and Direction Data

As per the procedure described in IEC 61400-11, the hub height wind speed data were derived in 10-second intervals based on the SCADA power output of the WTG and the power curve (where the power output of the WTG under test fell within the allowable range of the power curve). Outside of the allowable range, the hub height wind speed was derived from the normalised[2] wind speed from the nacelle anemometer.

3.4 Data Analysis

Prior to the data analysis, the data were filtered to exclude invalid data points from the analysis. Data points were removed from the dataset for the following reasons:

- Data corresponding to non-downwind conditions (defined as ±15 degrees relative to the downwind direction of the wind turbine).
- Data corresponding to intruding intermittent ambient noise (e.g. insects, birds or other noise sources)
- Data collected during start-up or shut-down of the turbines.
- Data below the cut-in wind speed of the WTG (3 m/s).

[2] based on the average ratio of the power-derived wind speed and the nacelle anemometer output within the allowable range as per IEC 61400-11.

Following the above data filtering process, the remaining data were sorted into wind speed bins, each ±0.25 m/s wide, centred at integer wind speeds. The number of valid data points remaining for each integer wind speed bin between cut-in (3 m/s) and rated power (12 m/s) are summarised in Table 7.

Table 7: Nearfield Valid Data Points

Wind Speed, V_{HH} (m/s)	WTG B01	WTG G05
3	1	2
4	2	37
5	30	91
6	57	189
7	130	219
8	222	174
9	127	120
10	25	32
11	56	18
12	39	5

3.5 Tonality

The nearfield measurements have been analysed for tonality in accordance with the procedure outlined in the NMP and the Technical Supplement (based on Annex K of ISO 1996-2:2017), based on the data collected under downwind conditions between cut-in and rated power.

Based on the analysis, tonality was not detected at any hub-height wind speed during the near field measurements at either B01 or G05, indicating that tonality is not a repeated characteristic of the noise emission from the WTGs. In accordance with the NMP, as tonality was not identified in a near field test at any wind speed tonality testing at residential noise monitoring locations is not required.

4 NOISE MONITORING – FAR FIELD

4.1 Monitoring Locations

Noise monitoring was conducted at five Critical Non-Associated Residences in the vicinity of the Wind Farm. The residences selected were consistent with those identified in the NMP. The coordinates of the noise monitor installed at each residential noise monitoring location, details of the sound level meter (**SLM**) used to conduct the monitoring at each monitoring location, and the dates of the monitoring at each monitoring location are provided in Table 8 below. The monitoring locations are also shown on Figure 1 and Figure 2 above.

Table 8: Residential Noise Monitoring Locations

Monitoring Location	Status	Sound Level Meter (Serial Number)	Monitoring Dates	Coordinates (WGS 84 UTM Zone 55S)	
				Easting	Northing
R11	Non-Associated	Rion NL-42A (01224053)	05/12/24 to 15/01/25	679639	6183590
R19	Non-Associated	Rion NL-42 (00510389)	05/12/24 to 15/01/25	676424	6181651
R38	Non-Associated	Rion NL-42A (00823571)	04/12/24 to 15/01/25	679647	6173627
R63	Non-Associated	Rion NL-42A (00923604)	04/12/24 to 15/01/25	683873	6149011
R113 (R24 proxy)	Non-Associated	Rion NL-42A (00923728)	04/12/24 to 15/01/25	683680	6179243

In general, the noise monitoring equipment was placed at a location consistent with the position used during the background noise monitoring, as required by the NMP.

Photographs of the noise monitoring equipment at each residential noise monitoring location are provided in Appendix C.

The Technical Supplement requires a minimum of 2,000 points of data be collected with at least 500 in the downwind direction (wind in the direction from the closest WTG to the residence), unless the monitoring is conducted for six weeks. The monitoring was conducted continuously over a six-week period between 4 December 2025 and 15 January 2025 (inclusive) to fulfil this requirement.

4.2 Intermediate Monitoring Locations

As per the NMP, noise monitors were placed at *Intermediate Monitoring Locations* between the residential noise monitoring locations and the nearest WTG for the duration of the monitoring period.

The purpose of the intermediate noise monitors was to assist with identifying periods at the corresponding residential noise monitoring location which may have been influenced by noise from sources other than the Wind Farm ("extraneous" noise sources).

The intermediate noise monitors were placed at locations between the residential noise monitoring locations and the nearest WTG absent from significant background and extraneous noise sources (such as trees, roads, domestic activity and domestic machines). As the contribution of noise from the Wind Farm will always be higher at the *Intermediate Monitoring Locations* (by virtue of being closer to the Wind Farm) and background noise is likely to be lower, noise from the Wind Farm will generally be more readily measurable above the level of background noise at these locations.

Intermediate noise monitors were placed for all residential noise monitoring locations except for the Proxy Location for R24 (R113). As the Proxy Location for R24 was a similar distance from the nearest WTG as R24 (within 100 metres) with a similar predicted Wind Farm noise level and no significant sources of extraneous noise, an intermediate position was not considered necessary.

The coordinates of the noise monitor installed at each Intermediate Monitoring Location, details of the SLM used to conduct the monitoring at each Intermediate Monitoring Location, and the dates of the monitoring at each location are provided in Table 9 below.

Table 9: Intermediate Noise Monitoring Locations

Monitoring Location	Sound Level Meter (Serial Number)	Monitoring Dates	Coordinates (WGS 84 UTM Zone 55S)	
			Easting	Northing
R11 intermediate	Rion NL-21 (01298933)	05/12/24 to 15/01/25	679626	6183380
R19 intermediate	Rion NL-21 (01298931)	05/12/24 to 15/01/25	676505	6181665
R38 intermediate	Rion NL-21 (00709523)	04/12/24 to 16/01/25	679911	6173984
R63 intermediate	Rion NL-21 (00354109)	04/12/24 to 16/01/25	684004	6149500

4.3 Equipment

At each noise monitoring location (including Intermediate Monitoring Locations), sound pressure level data were measured using a NATA calibrated (within the preceding 24 months) Class 2 SLM with a noise floor of less than 20 dB(A). Specifically, *Rion* NL-42 or NL-42A SLMs were used at each residential noise monitoring location, with *Rion* NL-21 SLMs used at each Intermediate Monitoring Location.

Each SLM was fitted with either a Rion WS 15 all-weather windshield (for residential noise monitoring locations) or a windshield with a diameter of at least 5 inches/125 mm (for Intermediate Noise Monitoring Locations).

The calibration of each SLM was checked immediately before and at the conclusion of the monitoring program using a NATA calibrated (within the preceding 12 months) Class 1 Rion NC-75 calibrator (serial number 34913547) with no significant drift observed. The serial numbers of the SLMs used at each location are provided in Table 8 (residential noise monitoring locations) and Table 9 (Intermediate Positions) above, with the corresponding calibration certificates for the calibrator and sound level meters provided in Appendix B.

4.4 Sound Data

As required by the NMP, sound pressure level data were gathered at each monitoring location in accordance with the requirements of the Technical Supplement. Specifically, A-weighted sound pressure level data were gathered in 10-minute intervals ($L_{A90,\ 10\ minute}$) consistent with the compliance checking procedures described in Section 4 of the SA Guidelines.

4.5 Local Weather Data

In addition to the noise monitoring, monitoring of local rainfall and wind speed was conducted at two locations (R38 and R63). The rainfall data and the measured wind speed at microphone height were used to identify periods where noise data might have been adversely affected by local weather conditions. Local weather data were collected at the following locations for the following periods:

Table 10: Local Wind and Rainfall Monitoring Locations

Monitoring Location	Parameters Monitored	Weather Monitoring Period	Coordinates (WGS 84 UTM Zone 55S)	
			Easting	Northing
R38	Wind Speed and rainfall	04/12/2024 to 16/01/2025	679651	6173621
R63	Wind Speed and rainfall	04/12/2024 to 16/01/2025	683874	6149023

For each noise monitoring location, data from the closest residence, where local weather monitoring was conducted, have been used in the analysis.

4.6 Wind Speed and Direction

At various times prior to construction of the Wind Farm, temporary "development" meteorological masts (**Met Masts**) were installed at the Wind Farm site for the purposes of assessing the feasibility of the site and refining the Wind Farm layout. All of the "development" Met Masts have since been decommissioned.

The Noise Criteria applicable at each residential noise monitoring location were determined based on a number of background noise monitoring campaigns conducted prior to construction of the Wind Farm, with the Noise Criteria for each location determined based on wind speed and direction data collected by the nearest Met Mast installed at the time of the measurements.

The co-ordinates of each "development" Met Mast, the corresponding residential noise monitoring locations, and the year of the background noise monitoring on which the criteria for each monitoring location are based are provided in Table 11 below.

Table 11: Development Met Mast Locations and Corresponding Residential Noise Monitoring Locations

Wind Mast	Coordinates [GDA94 MGA Zone 55]		Monitoring Locations
	Easting	Northing	
RYP_2	676503	6186530	R20 (2012)
RYP_6	678412	6182520	R11 (2021)
RYP_8	682351	6175087	R113/R24 Proxy (2020), R38 (2021)
Y_J (YASS1)	684969	6152742	R63 (2021)

To facilitate a consistent comparison of the post-construction noise monitoring results with the relevant noise criteria, the wind speed and direction data collected at permanent Met Masts PMM41 and PMM61 throughout the noise monitoring period were used to generate wake free wind speed and direction data at the location of the pre-construction meteorological masts (which have since been decommissioned). The co-ordinates of the permanent Met Masts are provided in Table 12 below.

Table 12: Meteorological Mast Locations

	Coordinates (WGS84 UTM zone 55S)	
	Easting	**Northing**
PMM41	682285	6169981
PMM61	686441	6154111

4.7 Data Analysis

The data measured at the residential noise monitoring locations were filtered in accordance with the process described in the NMP. Specifically, the NMP states that data should be removed in the following circumstances:

- Where the relevant period was affected by rain, hail, or wind based on a weather logger placed at an equivalent location to one of the noise loggers. Data were considered to be affected where the wind speed at the microphone position exceeded 5 m/s for 90% of the relevant 10-minute period, or where precipitation occurred either within the relevant 10-minute period or the 10-minute periods on either side.
- Where the Wind Farm was not operating, or was not operating in accordance with the Curtailment Strategy as described in the NMP.
- During abnormal periods, such as during local construction or maintenance activities or related to local extraneous noise sources. Digital audio recordings and spectral content were used to identify these periods.
- Where the wind direction within a relevant period was more than 45 degrees either side of the direct line between the nearest WTG and the relevant receiver (if sufficient data points can be collected using this method).
- Where noise at a residential noise monitoring location is higher than the noise measured closer to the nearest WTG at the relevant *Intermediate Monitoring Location* (confirming that the source of the noise at a receptor is not from the WTGs).

In addition, as per the SA Guidelines, the data were also filtered during periods where the hub height wind speed was below cut-in (3 m/s) or above the wind speed at which the WTGs attain rated power (12 m/s).

Following the above data filtering process, digital audio recordings and one-third octave band spectra were reviewed to determine the frequency content and noise sources contributing to the measured noise levels at residential noise monitoring locations. Based on the review, periods affected by extraneous noise sources (most frequently insects and birds) were manually filtered.

As the data have been filtered to remove additional data which were not removed from the pre-construction background noise monitoring, subtraction of the pre-construction background noise levels has not occurred, as per the procedure described in the NMP.

Following removal of adverse data, the remaining noise data for the full monitoring period were correlated with the corresponding wind speed recorded at the wind farm, in accordance with the Bulletin.

The number of valid data points remaining for each residential noise monitoring location following filtering of adverse data (and the number of data points filtered for each reason) is summarised in Table 13 below.

Table 13: Number of valid data pairs

Monitoring Location	Filtered for:					Total Data Points Removed	Valid Data Points
	Local Wind/Rain	Downwind Only	Wind Speed	Manually Filtered	Intermediate		
R11	266	5631	1032	9	2533	5828	101
R19	266	3634	981	1	4141	5304	589
R38	257	4828	1062	1	2210	5442	558
R63	174	4309	970	12	3281	5357	643
R113 (R24 proxy)	321	3573	1010	4	-	3996	1913

Following the above data filtering process, as a result of the prevailing wind conditions during the testing and the direction of the nearest WTG, fewer than 500 valid downwind datapoints remained to conduct the analysis at R11.

Notwithstanding that under the Technical Supplement this is acceptable where the monitoring is conducted over a six-week period, a further analysis was conducted over an expanded range of wind directions for this residence, including 45 degrees either side of the downwind direction for the next nearest WTGs (in addition to the nearest WTG).

An expanded range of wind directions 45 degrees either side of the downwind directions for the four WTGs within 2,000 metres of the residence (A03, A04, B14 and B15) were therefore analysed, resulting in an analysis range of wind directions between 70 and 270 degrees.

An overview showing R11, the nearest WTGs and the sectors of wind directions analysed is provided in Figure 4 below. The revised number of valid data points remaining based on the expanded range of wind directions following filtering of adverse data (and the number of data points filtered for each reason) is summarised in Table 14 below. A wind rose indicating the prevailing wind directions during the monitoring (based on the on-site LIDAR) is provided in Figure 5 below.

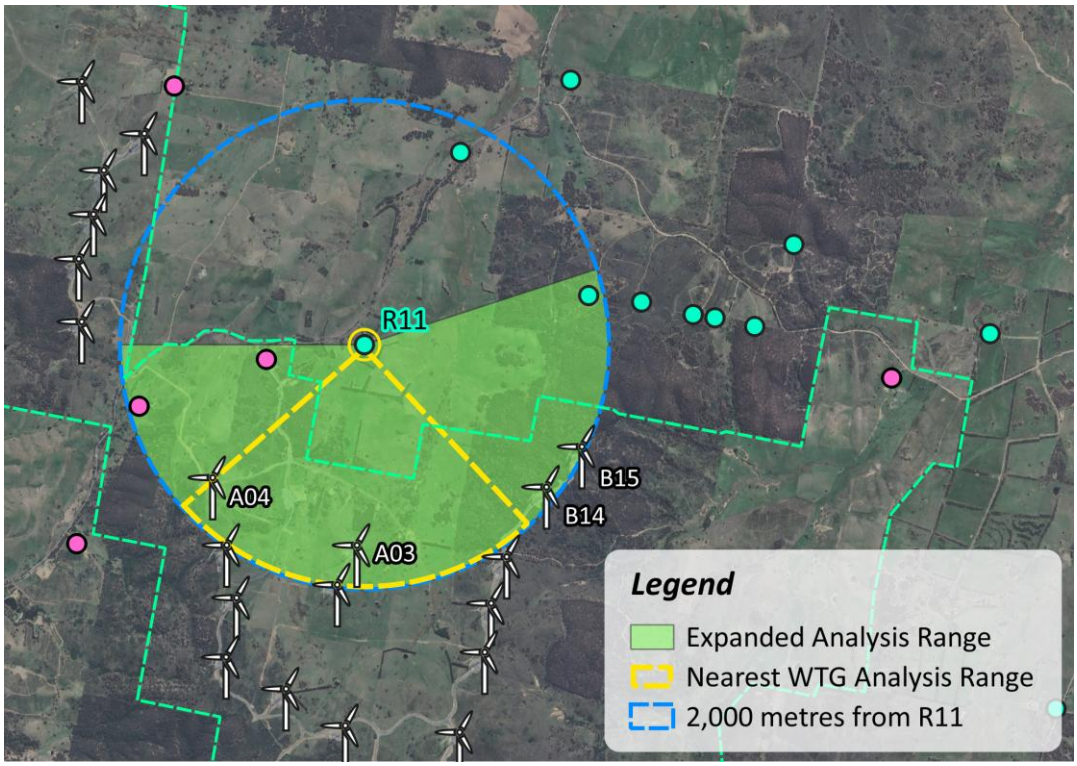

Figure 4: Downwind Analysis Directions - R11

Table 14: Number of valid data pairs (R11 expanded downwind direction)

Monitoring Location	Filtered for:					Total Data Points Removed	Valid Data Points
	Local Wind/Rain	Downwind Only	Wind Speed	Manually Filtered	Intermediate		
R11	266	2727	1032	9	2533	4586	1343

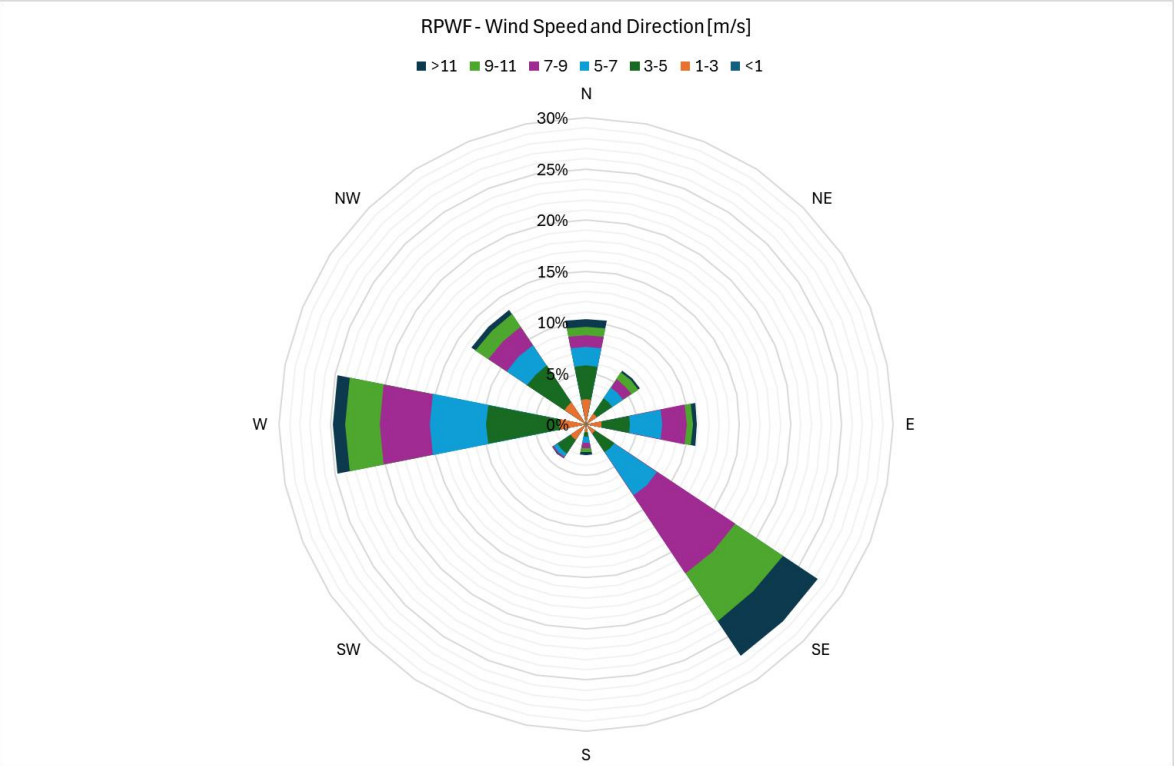

Figure 5: Prevailing Wind Speed and Direction during the Noise Monitoring

5 RESIDENTIAL NOISE MONITORING RESULTS

The bin analysis results and Noise Criteria are provided for each residential noise monitoring location in Figure 6 to Figure 10 below. The measured noise levels and Noise Criteria for each integer hub height wind speed from 3 m/s to 12 m/s have also been tabulated for each residential noise monitoring location in Table 15 below, along with the number of data points within each wind speed bin used in the analysis.

Table 15: Measured noise levels and Noise Criteria for Integer Hub Height Wind Speeds

Monitoring Location		Criteria and Measured Levels at integer Hub Height Wind Speeds [$L_{A90,\ 10\ minute}$, dB(A)]									
		3	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
R11	Measured	27	24	27	32	29	34	34	36	38	39
	Noise Criteria	35	35	35	35	35	35	35	36	40	44
	Number of data points	*7*	*3*	*8*	*24*	*52*	*44*	*40*	*46*	*30*	*10*
R19	Measured	23	26	30	31	32	35	34	35	37	37
	Noise Criteria	36	36	36	36	36	37	37	38	39	40
	Number of data points	*20*	*28*	*43*	*63*	*63*	*64*	*121*	*96*	*58*	*33*
R38	Measured	30	29	31	33	34	35	34	36	34	33
	Noise Criteria	35	35	35	35	35	35	38	41	45	49
	Number of data points	*80*	*127*	*116*	*72*	*57*	*25*	*29*	*23*	*20*	*9*
R63	Measured	28	28	31	33	31	33	34	34	37	34
	Noise Criteria	35	35	35	35	35	35	36	39	41	45
	Number of data points	*74*	*132*	*100*	*69*	*47*	*46*	*56*	*64*	*40*	*15*
R113 (R24 Proxy)	Measured	26	27	28	29	30	30	31	31	31	33
	Noise Criteria	35	35	35	35	35	35	35	35	35	35
	Number of data points	*135*	*316*	*331*	*243*	*185*	*181*	*199*	*186*	*114*	*23*

In accordance with the Development Consent Conditions, compliance is achieved where noise levels do not exceed 35 dB(A) or the background noise level plus 5 dB(A) (for Non-Associated Residences). Therefore, as the noise levels at each residence presented in the above table do not exceed the relevant criterion at each integer wind speed, compliance with the relevant noise criteria is achieved at each residential noise monitoring location.

5.1 Additional Analysis for R11

As noted above, the analysis for R11 was also conducted based on an expanded range of wind directions comprising 45 degrees either side of direct line between the residence and the nearest WTGs (being those within 2,000 metres of R11) rather than just the nearest WTG as per the NMP. The results of the additional analysis are provided in Table 16 below. The bin analysis results based on the expanded range of wind directions (for R11) are provided in Figure 6 below on the same set of axes as the analysis based on the nearest WTG only for this residence.

Based on the table below, the relevant criteria are also achieved at R11 at all relevant integer wind speeds when significantly more data than the minimum required by the Technical Supplement is considered.

Table 16: Measured noise levels and Noise Criteria for Integer Hub Height Wind Speeds (expanded wind direction range)

Monitoring Location		Criteria and Measured Levels at integer Hub Height Wind Speeds [$L_{A90,\ 10\ minute}$, dB(A)]									
		3	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
R11	Measured	28	27	28	32	32	34	35	36	38	39
	Noise Criteria	35	35	35	35	35	35	35	36	40	44
	Number of data points	*65*	*117*	*123*	*149*	*194*	*252*	*171*	*140*	*92*	*40*

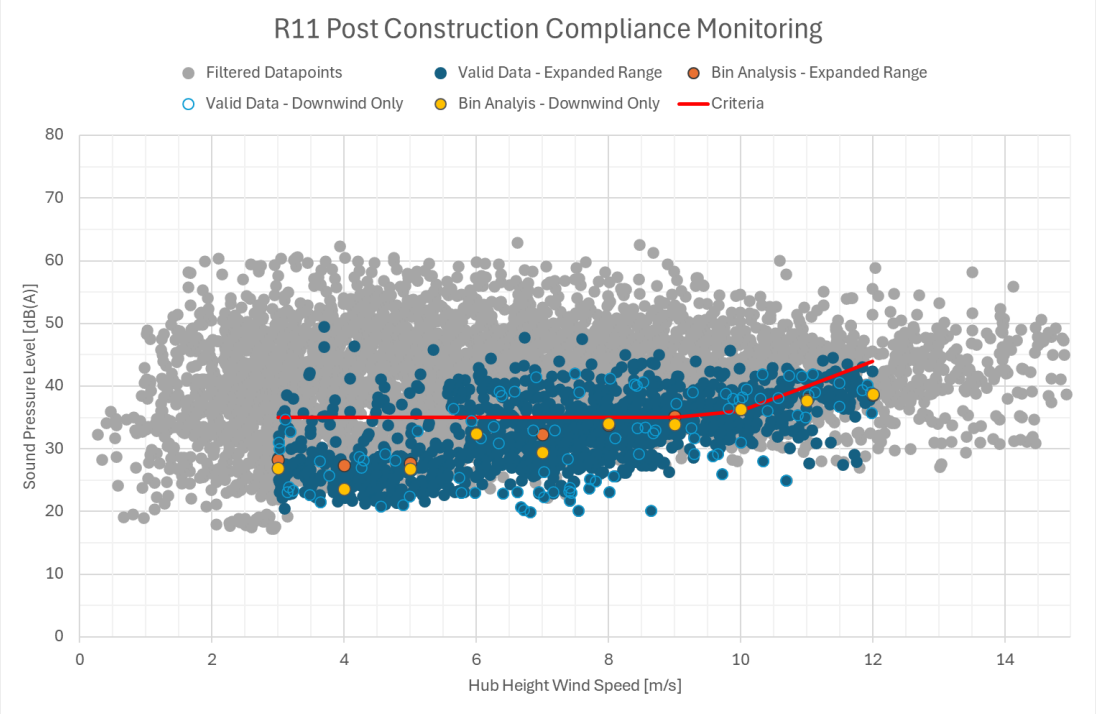

Figure 6: R11 Post-Construction Downwind Bin Analysis

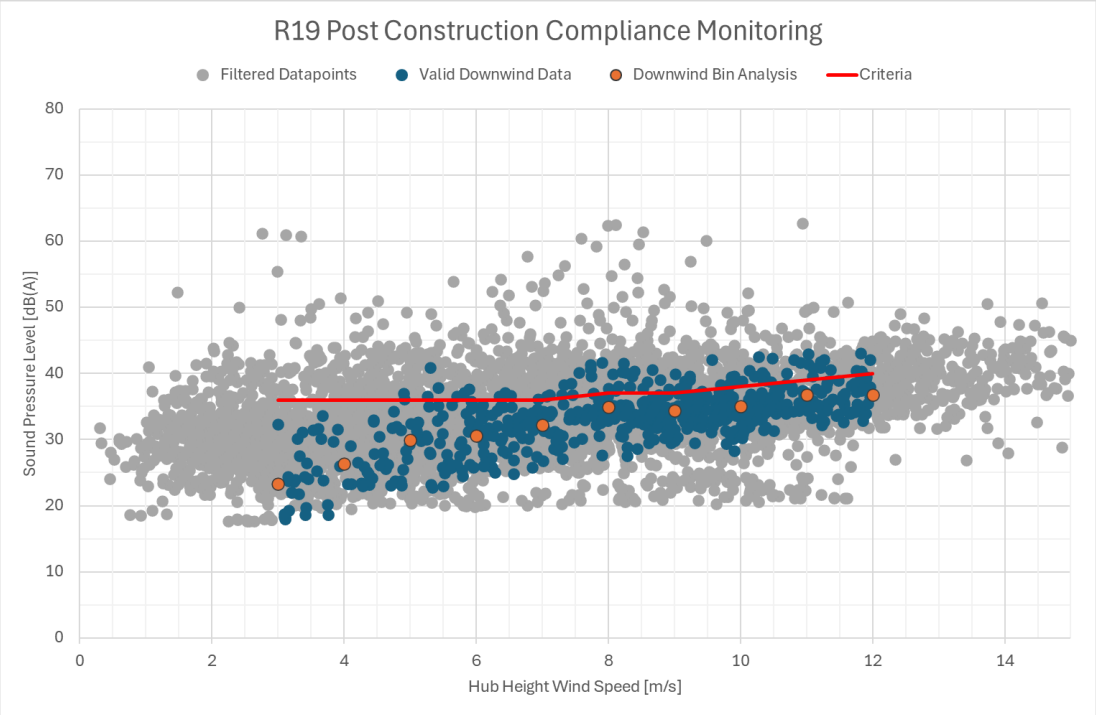

Figure 7: R19 Post-Construction Downwind Bin Analysis

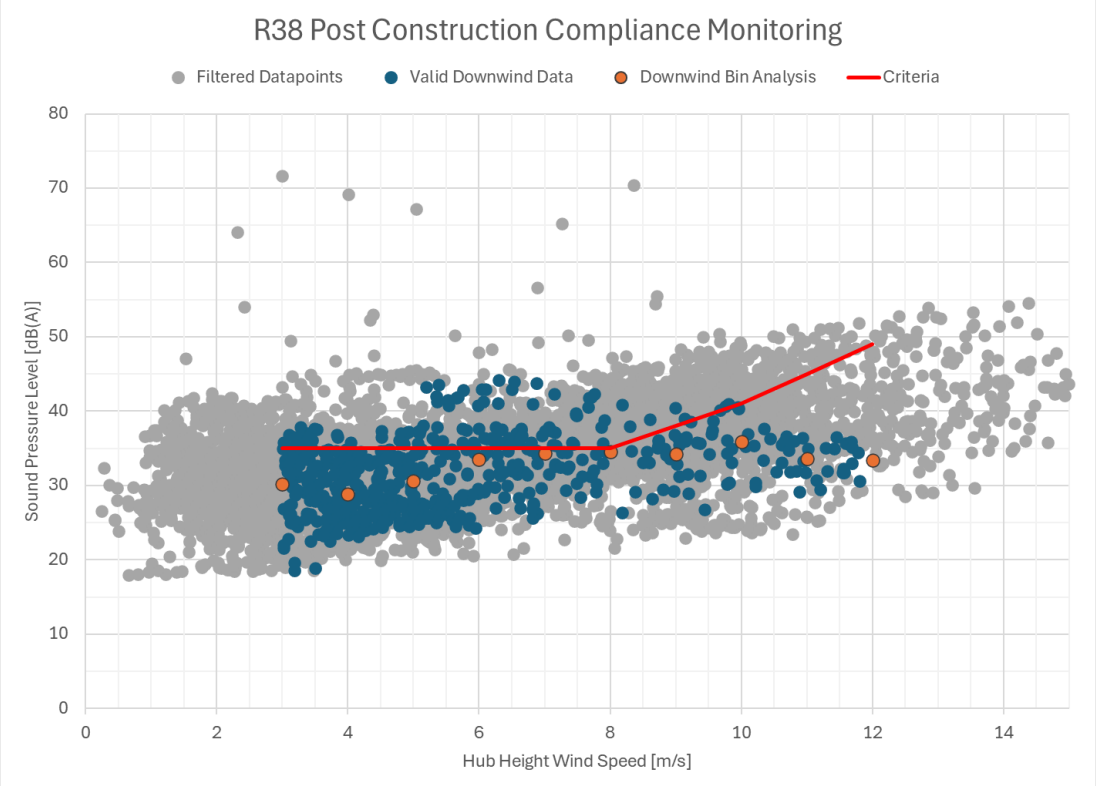

Figure 8: R38 Post-Construction Downwind Bin Analysis

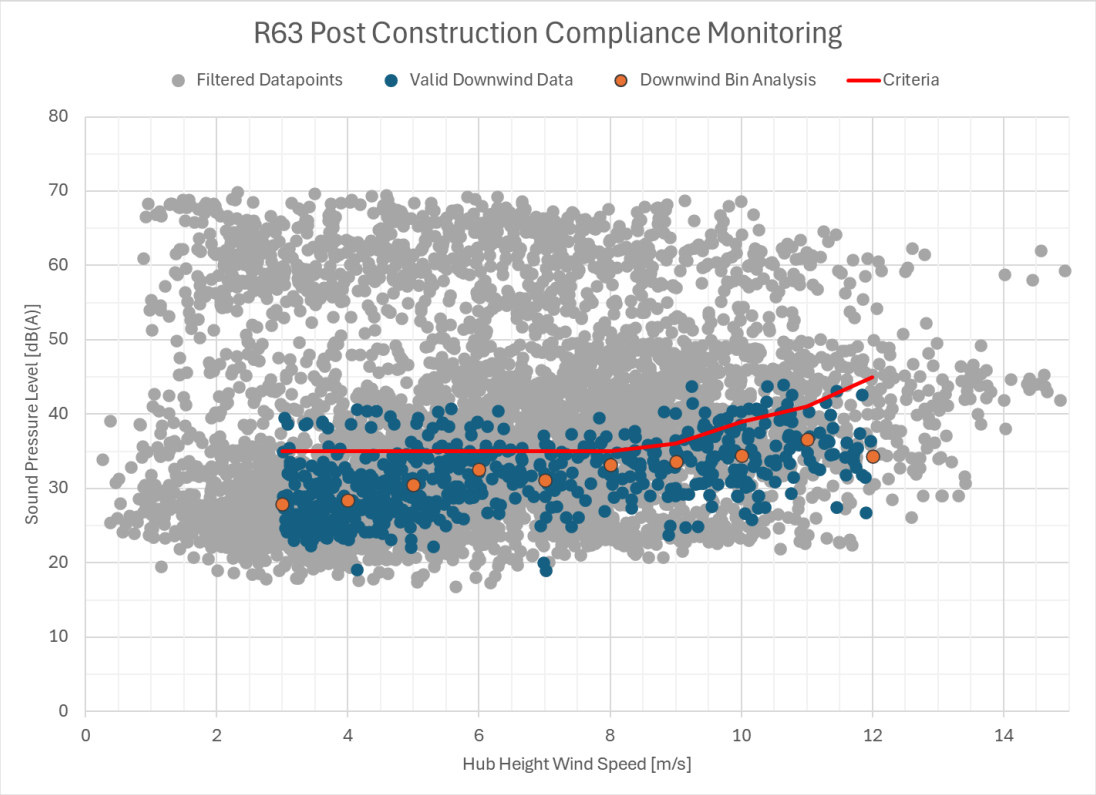

Figure 9: R63 Post-Construction Downwind Bin Analysis

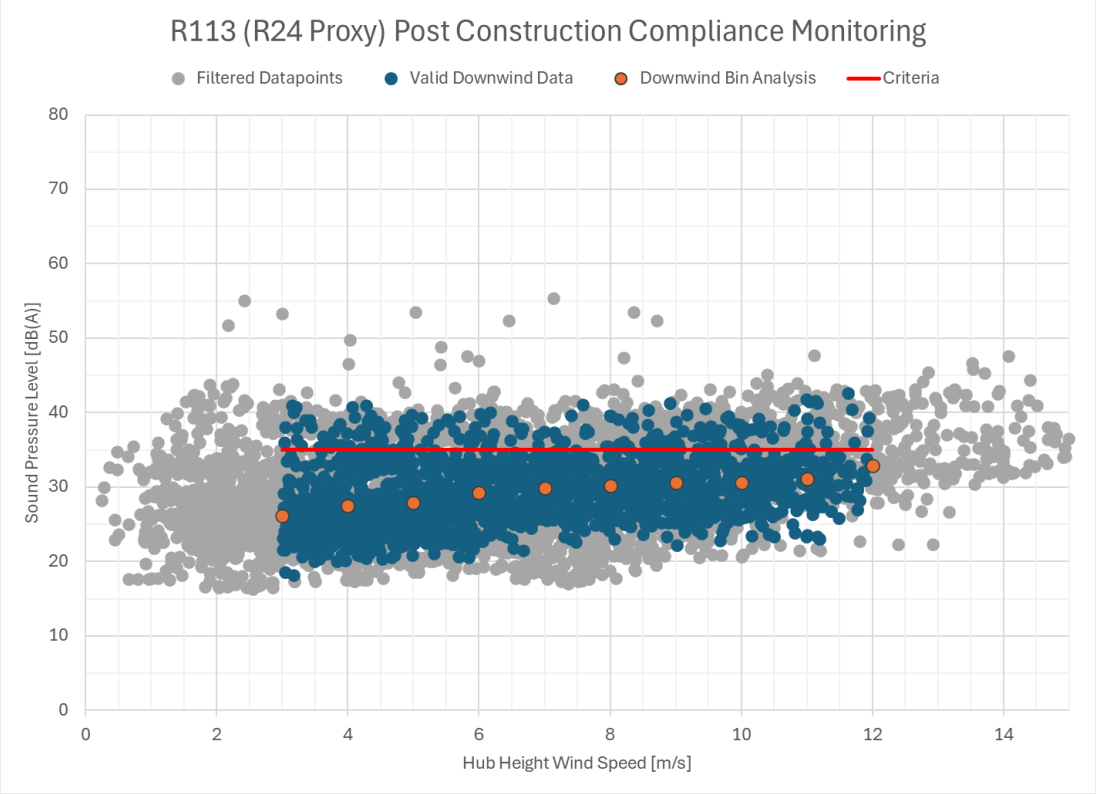

Figure 10: R113 (R24 Proxy) Post-Construction Downwind Bin Analysis

5.2 Special Audible Characteristics

5.2.1 Tonality

As per the NMP, tonality testing is to be conducted at all residential noise monitoring locations if tonality is found in a near field test at any wind speed.

As tonality was not found at any wind speed at either near field test location (B01 or G05), no further tonality testing was conducted at residential noise monitoring locations.

5.2.2 Low Frequency Noise

An assessment of the low frequency content has been conducted in accordance with the procedure outlined in the NMP as follows:

- At *Non-Associated Residence* R11
- At the integer hub height wind speed where the predicted noise level is the highest (10 m/s)
- Conducted under a downwind condition at night
- Over a 10-minute interval with the Wind Farm operational
- Collecting at least 5 measurement intervals where the wind farm is audible
- Comparing the C-weighted L_{90} noise level with the criterion of 60 dB(C)

As the C-weighted L_{eq} descriptor is measured directly by the sound level meter (and therefore does not require any additional data processing), this was used in lieu of the C-weighted L_{90} noise level for the purpose of the low frequency assessment. The L_{eq} descriptor also includes the influence of intermittent low frequency noise sources (such as vehicle pass-bys) which generally do not influence the L_{90} value. As such, the L_{eq} value will always be higher than the L_{90} value. Therefore, where the criterion is met using the L_{eq} descriptor, it will also be met when considering the L_{90} value.

Two suitable periods were identified, being between 5:10 am and 6:00 am on 31 December 2024, and between 10:40 pm and 11:50 pm on 1 January 2025 (a total of 10 suitable 10-minute periods were identified). Review of audio records confirmed that noise from the Wind Farm was audible during these periods. During these periods, the highest C-weighted noise level (in terms of the L_{Ceq} descriptor) was 53 dB(C) (at 11:00 pm on 1 January 2025). On this basis, low frequency noise (in terms of L_{90}) achieves the 60 dB(C) criterion applicable under the NMP at R11.

On this basis, no adjustment has been made to the measured Wind Farm noise levels for low frequency character, and no further analysis is required by the NMP.

6 AUXILIARY INFRASTRUCTURE

Noise from the collector sub-station, and the connection sub-station/switchyard were each measured at an intermediate distance between the substation and the closest residence during normal operation on 16 January 2025. The measurement position for each sub-station was selected such that noise from the substation was dominant in the ambient environment (approximately 150 metres from the sub-station in the direction of the nearest *Non-Associated Residence*).

Based on the measurements, a highest noise level of 41 dB(A) was measured at a distance of 150 metres from auxiliary infrastructure. This level was extrapolated to the nearest *Non-Associated Residence* (R38 for the collector sub-station and R63 for the connection substation and switchyard) based on a conservative approach which considers geometric spreading alone (and therefore does not consider the reduction in noise levels which will occur due to air absorption or shielding by terrain or other structures).

Based on the above, the highest noise level predicted at a *Non-Associated Residence* is 28 dB(A), including a conservative 5 dB(A) penalty for a 500 Hz tone measured at the collector sub-station intermediate measurement location in accordance with Fact Sheet C of the *Noise Policy for Industry* (**NPfI**)).

When extrapolated to the nearest *Non-Associated Residence,* noise from each sub-station is less than 35 dB(A) (including an adjustment for tonality in accordance with the NPfI). Therefore, in accordance with the NMP noise from the sub-stations is deemed to be compliant with the Development Consent Conditions.

APPENDIX A: NOISE CRITERIA

	Wind Speed (m/s) at 119m									
	3	4	5	6	7	8	9	10	11	12
R01, R02, R114, R14, R16, R20, R64, R25, R31, R34, R36, R72, R73, R41, R42, R44, R45, R46, R49, R51, R52, R66, R68, R54, R56, R60, R59, R61, R40, R80, R128, R15, R131, R132, R328, R113	45	45	45	45	45	45	45	45	45	45
R117, R118, R119, R120, R309	35	35	35	35	35	35	36	38	40	42
R04, R06, R07, R08, R09, R10, R115, R116, R286, R67, R102, R103, R104, R105, R106, R107, R108, R218, R296, R314, R315, Blakney Creek Township	35	35	35	35	35	35	35	35	36	37
R11	35	35	35	35	35	35	35	36	40	44
R17, R18	35	35	35	35	35	36	38	39	41	42
R19, R22, R267, R268, R288	36	36	36	36	36	37	37	38	39	40
R26, R29, R65, R69, R70, R71, R184, R192, R203, R204, R266, R271, R277, R279, R283, R284, R303, Rye Park Township, R24, R28, R112, R175, R202, R206, R319	35	35	35	35	35	35	35	35	35	35
R38, R74, R75, R76	35	35	35	35	35	35	38	41	45	49
R111	35	35	35	35	35	35	35	35	35	36
R81, R82	35	35	35	35	35	35	35	35	35	37
R109, R110, R170, R220, R317, R318	35	35	35	35	35	35	35	35	36	41
R47, R48, R83, R50, R53, R85, R86, R158, R159, R324, R326	35	35	35	35	35	35	35	36	37	39
R87, R88, R89, R149, R152, R154, R155, R156, R157, R213, R214, R217, R243, R244, R246, R259, R262, R323	35	36	37	38	38	39	40	41	43	45
R99, R101, R144, R146, R151, R153, R212, R216, R295, R313	35	35	35	35	35	35	35	36	38	40
R63, R90, R91, R92, R93, R94, R95, R96, R97, R98, R100, R129, R133, R135, R137, R138, R139, R140, R141, R142, R143, R145, R147, R148, R211, R290, R291, R294, R308	35	35	35	35	35	35	36	39	41	45
R77, R78, R79, R298, R304, R305, R307, R311, R327	35	35	35	35	35	37	38	40	41	43
R121, R122, R124, R125, R126, R127, R130, R207, R209, R210, R282, R289, R329, R330	37	37	38	38	39	40	41	42	43	45

APPENDIX B: CALIBRATION CERTIFICATES

Acoustic Research Labs Pty Ltd
Unit 36/14 Loyalty Rd
North Rocks NSW AUSTRALIA 2151
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Level Meter
IEC 61672-3:2013
Calibration Certificate

Calibration Number C23356

Client Details Sonus Pty Ltd
17 Ruthven Ave
Adelaide SA 5000

Equipment Tested/ Model Number : NL-52AEX
Instrument Serial Number : 00331171
Microphone Serial Number : 23075
Pre-amplifier Serial Number : 22646
Firmware Version : 2.0

Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditions	
Ambient Temperature :	22.4°C	**Ambient Temperature :**	22.6°C
Relative Humidity :	52.7%	**Relative Humidity :**	52.3%
Barometric Pressure :	101.8kPa	**Barometric Pressure :**	101.83kPa

Calibration Technician : Ken Williams
Secondary Check: Megan Williams
Calibration Date : 6 Jun 2023
Report Issue Date : 6 Jun 2023

Approved Signatory : Juan Aguero

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	*Pass*	17: Level linearity incl. the level range control	*N/A*
13: Electrical Sig. tests of frequency weightings	*Pass*	18: Toneburst response	*Pass*
14: Frequency and time weightings at 1 kHz	*Pass*	19: C Weighted Peak Sound Level	*Pass*
15: Long Term Stability	*Pass*	20: Overload Indication	*Pass*
16: Level linearity on the reference level range	*Pass*	21: High Level Stability	*Pass*

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
125Hz	*±0.13dB*	*Temperature*	*±0.1°C*
1kHz	*±0.13dB*	*Relative Humidity*	*±1.9%*
8kHz	*±0.14dB*	*Barometric Pressure*	*±0.014kPa*
Electrical Tests	*±0.13dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - Calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

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Sound Level Meter
IEC 61672-3:2013
Calibration Certificate

Calibration Number C23357

Client Details	Sonus Pty Ltd 17 Ruthven Ave Adelaide SA 5000
Equipment Tested/ Model Number :	NL-52AEX
Instrument Serial Number :	00331169
Microphone Serial Number :	23072
Pre-amplifier Serial Number :	22644
Firmware Version :	2.0

Pre-Test Atmospheric Conditions		**Post-Test Atmospheric Conditions**	
Ambient Temperature :	22.6°C	**Ambient Temperature :**	22.3°C
Relative Humidity :	52.2%	**Relative Humidity :**	52.7%
Barometric Pressure :	101.8kPa	**Barometric Pressure :**	101.9kPa

Calibration Technician :	Ken Williams	**Secondary Check:**	Megan Williams
Calibration Date :	6 Jun 2023	**Report Issue Date :**	6 Jun 2023

Approved Signatory : Juan Aguero

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	*Pass*	17: Level linearity incl. the level range control	*N/A*
13: Electrical Sig. tests of frequency weightings	*Pass*	18: Toneburst response	*Pass*
14: Frequency and time weightings at 1 kHz	*Pass*	19: C Weighted Peak Sound Level	*Pass*
15: Long Term Stability	*Pass*	20: Overload Indication	*Pass*
16: Level linearity on the reference level range	*Pass*	21: High Level Stability	*Pass*

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
125Hz	*±0.13dB*	*Temperature*	*±0.1°C*
1kHz	*±0.13dB*	*Relative Humidity*	*±1.9%*
8kHz	*±0.14dB*	*Barometric Pressure*	*±0.014kPa*
Electrical Tests	*±0.13dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

This calibration certificate is to be read in conjunction with the calibration test report.

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Sound Level Meter
IEC 61672-3:2013
Calibration Certificate

Calibration Number C23355

Client Details Sonus Pty Ltd
17 Ruthven Ave
Adelaide SA 5000

Equipment Tested/ Model Number : NL-42AEX
Instrument Serial Number : 01224053
Microphone Serial Number : 200734
Pre-amplifier Serial Number : 27272
Firmware Version : 2.0

Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditions	
Ambient Temperature :	20.4°C	**Ambient Temperature :**	21.3°C
Relative Humidity :	56.4%	**Relative Humidity :**	54%
Barometric Pressure :	101.4kPa	**Barometric Pressure :**	101.5kPa

Calibration Technician : Ken Williams
Calibration Date : 3 Jun 2023
Secondary Check: Megan Williams
Report Issue Date : 5 Jun 2023

Approved Signatory : Juan Aguero

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	*Pass*	17: Level linearity incl. the level range control	*N/A*
13: Electrical Sig. tests of frequency weightings	*Pass*	18: Toneburst response	*Pass*
14: Frequency and time weightings at 1 kHz	*Pass*	19: C Weighted Peak Sound Level	*Pass*
15: Long Term Stability	*Pass*	20: Overload Indication	*Pass*
16: Level linearity on the reference level range	*Pass*	21: High Level Stability	*Pass*

The sound level meter submitted for testing has successfully completed the class 2 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
125Hz	*±0.13dB*	*Temperature*	*±0.1°C*
1kHz	*±0.13dB*	*Relative Humidity*	*±1.9%*
8kHz	*±0.14dB*	*Barometric Pressure*	*±0.014kPa*
Electrical Tests	*±0.13dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - Calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

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Sound Level Meter
IEC 61672-3:2013
Calibration Certificate

Calibration Number C23219

Client Details	Sonus Pty Ltd 17 Ruthven Avenue Adelaide SA 5000
Equipment Tested/ Model Number :	Rion NL-42AEX
Instrument Serial Number :	00923728
Microphone Serial Number :	199624
Pre-amplifier Serial Number :	26771
Firmware Version :	1.1

Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditions	
Ambient Temperature :	22.8°C	**Ambient Temperature :**	22.8°C
Relative Humidity :	50%	**Relative Humidity :**	50.2%
Barometric Pressure :	101.3kPa	**Barometric Pressure :**	101.26kPa

Calibration Technician : Shaheen Boaz
Secondary Check: Max Moore
Calibration Date : 18 Apr 2023
Report Issue Date : 24 Apr 2023

Approved Signatory : Juan Aguero

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	*Pass*	17: Level linearity incl. the level range control	*N/A*
13: Electrical Sig. tests of frequency weightings	*Pass*	18: Toneburst response	*Pass*
14: Frequency and time weightings at 1 kHz	*Pass*	19: C Weighted Peak Sound Level	*Pass*
15: Long Term Stability	*Pass*	20: Overload Indication	*Pass*
16: Level linearity on the reference level range	*Pass*	21: High Level Stability	*Pass*

The sound level meter submitted for testing has successfully completed the class 2 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
125Hz	*±0.13dB*	*Temperature*	*±0.1°C*
1kHz	*±0.13dB*	*Relative Humidity*	*±1.9%*
8kHz	*±0.14dB*	*Barometric Pressure*	*±0.014kPa*
Electrical Tests	*±0.13dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - Calibration.

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Sound Level Meter
IEC 61672-3:2013
Calibration Certificate

Calibration Number C23216

Client Details	Sonus Pty Ltd 17 Ruthven Avenue Adelaide SA 5000
Equipment Tested/ Model Number :	Rion NL-42AEX
Instrument Serial Number :	00923604
Microphone Serial Number :	199489
Pre-amplifier Serial Number :	26647
Firmware Version :	1.1

Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditions	
Ambient Temperature :	22.7°C	**Ambient Temperature :**	22.7°C
Relative Humidity :	49.2%	**Relative Humidity :**	50.2%
Barometric Pressure :	101.44kPa	**Barometric Pressure :**	101.4kPa

Calibration Technician : Shaheen Boaz
Secondary Check: Max Moore
Calibration Date : 18 Apr 2023
Report Issue Date : 24 Apr 2023

Approved Signatory : Juan Aguero

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	*Pass*	17: Level linearity incl. the level range control	*N/A*
13: Electrical Sig. tests of frequency weightings	*Pass*	18: Toneburst response	*Pass*
14: Frequency and time weightings at 1 kHz	*Pass*	19: C Weighted Peak Sound Level	*Pass*
15: Long Term Stability	*Pass*	20: Overload Indication	*Pass*
16: Level linearity on the reference level range	*Pass*	21: High Level Stability	*Pass*

The sound level meter submitted for testing has successfully completed the class 2 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
125Hz	*±0.13dB*	*Temperature*	*±0.1°C*
1kHz	*±0.13dB*	*Relative Humidity*	*±1.9%*
8kHz	*±0.14dB*	*Barometric Pressure*	*±0.014kPa*
Electrical Tests	*±0.13dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

This calibration certificate is to be read in conjunction with the calibration test report.

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CERTIFICATE OF CALIBRATION

CERTIFICATE NO: SLM36376

EQUIPMENT TESTED: Sound Level Meter

Manufacturer:	Rion		
Type No:	NL-42	**Serial No:**	00510389
Mic. Type:	UC-52	**Serial No:**	190930
Pre-Amp. Type:	NH-24	**Serial No:**	03023

Owner: Sonus Pty Ltd
17 Ruthven Ave
Adelaide SA 5000

Tests Performed: IEC 61672-3:2013

Comments: All Tests passed for Class 2. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure	1016	hPa ±1 hPa	**Date of Receipt :**	31/05/2023
Temperature	26	°C ±1° C	**Date of Calibration :**	06/06/2023
Relative Humidity	42	% ±5%	**Date of Issue :**	06/06/2023

Acu-Vib Test Procedure: AVP10 (SLM) based on IEC 61672-3

CHECKED BY: ..... **AUTHORISED SIGNATURE:** .....

Bruce Meldrum

Accredited for compliance with ISO/IEC 17025 - Calibration
Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.

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Sound Level Meter
IEC 61672-3:2013
Calibration Certificate

Calibration Number C23208

Client Details	Sonus Pty Ltd 17 Ruthven Avenue Adelaide SA 5000
Equipment Tested/ Model Number :	Rion NL-42AEX
Instrument Serial Number :	00823571
Microphone Serial Number :	198932
Pre-amplifier Serial Number :	26604
Firmware Version :	1.1

Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditions	
Ambient Temperature :	22.8°C	**Ambient Temperature :**	23.4°C
Relative Humidity :	50.2%	**Relative Humidity :**	50.3%
Barometric Pressure :	101.18kPa	**Barometric Pressure :**	101.21kPa

Calibration Technician : Shaheen Boaz
Secondary Check: Max Moore
Calibration Date : 17 Apr 2023
Report Issue Date : 24 Apr 2023

Approved Signatory : Juan Aguero

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	*Pass*	17: Level linearity incl. the level range control	*N/A*
13: Electrical Sig. tests of frequency weightings	*Pass*	18: Toneburst response	*Pass*
14: Frequency and time weightings at 1 kHz	*Pass*	19: C Weighted Peak Sound Level	*Pass*
15: Long Term Stability	*Pass*	20: Overload Indication	*Pass*
16: Level linearity on the reference level range	*Pass*	21: High Level Stability	*Pass*

The sound level meter submitted for testing has successfully completed the class 2 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
125Hz	*±0.13dB*	*Temperature*	*±0.1°C*
1kHz	*±0.13dB*	*Relative Humidity*	*±1.9%*
8kHz	*±0.14dB*	*Barometric Pressure*	*±0.014kPa*
Electrical Tests	*±0.13dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

This calibration certificate is to be read in conjunction with the calibration test report.

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Sound Level Meter
IEC 61672-3:2013
Calibration Certificate

Calibration Number C24824

Client Details Sonus Pty Ltd
17 Ruthven Avenue
Adelaide SA, 5000

Equipment Tested/ Model Number : NL-21
Instrument Serial Number : 01298933
Microphone Serial Number : 127252
Pre-amplifier Serial Number : 31528
Firmware Version : N/A

Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditions	
Ambient Temperature :	22.1 °C	**Ambient Temperature :**	23.1 °C
Relative Humidity :	57.4 %	**Relative Humidity :**	63.8 %
Barometric Pressure :	100.55 kPa	**Barometric Pressure :**	100.46 kPa

Calibration Technician : Peter Elters
Calibration Date : 5 Nov 2024
Secondary Check: Cooper Sallway
Report Issue Date : 11 Nov 2024

Approved Signatory :  Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	*Pass*	17: Level linearity incl. the level range control	*Pass*
13: Electrical Sig. tests of frequency weightings	*Pass*	18: Toneburst response	*Pass*
14: Frequency and time weightings at 1 kHz	*Pass*	19: C Weighted Peak Sound Level	*Pass*
15: Long Term Stability	*Pass*	20: Overload Indication	*Pass*
16: Level linearity on the reference level range	*Pass*	21: High Level Stability	*Pass*

The sound level meter submitted for testing has successfully completed the class 2 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
125Hz	*±0.13 dB*	*Temperature*	*±0.1 °C*
1kHz	*±0.13 dB*	*Relative Humidity*	*±1.9 %*
8kHz	*±0.14 dB*	*Barometric Pressure*	*±0.11 kPa*
Electrical Tests	*±0.13 dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
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The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

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Sound Level Meter
IEC 61672-3:2013
Calibration Certificate

Calibration Number C24823_Reissued

Client Details Sonus Pty Ltd
17 Ruthven Avenue
Adelaide SA, 5000

Equipment Tested/ Model Number : NL-21
Instrument Serial Number : 01298931
Microphone Serial Number : 127250
Pre-amplifier Serial Number : 31526
Firmware Version : N/A

Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditions	
Ambient Temperature :	21.8 °C	**Ambient Temperature :**	21.7 °C
Relative Humidity :	54.6 %	**Relative Humidity :**	64.5 %
Barometric Pressure :	100.77 kPa	**Barometric Pressure :**	100.76 kPa

Calibration Technician : Peter Elters
Secondary Check: Cooper Sallway
Calibration Date : 5 Nov 2024
Report Issue Date : 6 Nov 2024

Approved Signatory : Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	*Pass*	17: Level linearity incl. the level range control	*Pass*
13: Electrical Sig. tests of frequency weightings	*Pass*	18: Toneburst response	*Pass*
14: Frequency and time weightings at 1 kHz	*Pass*	19: C Weighted Peak Sound Level	*Pass*
15: Long Term Stability	*Pass*	20: Overload Indication	*Pass*
16: Level linearity on the reference level range	*Pass*	21: High Level Stability	*Pass*

The sound level meter submitted for testing has successfully completed the class 2 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Uncertainties of Measurement -

Acoustic Tests		Environmental Conditions	
125Hz	*±0.13 dB*	*Temperature*	*±0.1 °C*
1kHz	*±0.13 dB*	*Relative Humidity*	*±1.9 %*
8kHz	*±0.14 dB*	*Barometric Pressure*	*±0.11 kPa*
Electrical Tests	*±0.13 dB*		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.

This calibration certificate is to be read in conjunction with the calibration test report.

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CERTIFICATE OF CALIBRATION

CERTIFICATE NO: SLM51751

EQUIPMENT TESTED: Sound Level Meter

Manufacturer:	Rion		
Type No:	NL-21	**Serial No:**	00709523
Mic. Type:	UC-52	**Serial No:**	130539
Pre-Amp. Type:	NH-21	**Serial No:**	33539

Owner: Sonus Pty Ltd
17 Ruthven Ave
Adelaide SA 5000

Tests Performed: IEC 61672-3:2013

Comments: All Tests passed for Class 2. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure	1000	hPa ±1 hPa	**Date of Receipt :**	01/11/2024
Temperature	24	°C ±1° C	**Date of Calibration :**	01/11/2024
Relative Humidity	45	% ±5%	**Date of Issue :**	01/11/2024

Acu-Vib Test Procedure: AVP10 (SLM) based on IEC 61672-3:

CHECKED BY: .....

AUTHORISED SIGNATURE: .....
Hein Soe

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CERTIFICATE OF CALIBRATION

CERTIFICATE NO: SLM51748

EQUIPMENT TESTED: Sound Level Meter

Manufacturer:	Rion		
Type No:	NL-21	**Serial No:**	00354109
Mic. Type:	UC-52	**Serial No:**	101436
Pre-Amp. Type:	NH-21	**Serial No:**	14744

Owner: Sonus Pty Ltd
17 Ruthven Ave
Adelaide SA 5000

Tests Performed: IEC 61672-3:2013

Comments: All Tests passed for Class 2. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure	1000	hPa ±1 hPa	**Date of Receipt :**	01/11/2024
Temperature	24	°C ±1° C	**Date of Calibration :**	01/11/2024
Relative Humidity	45	% ±5%	**Date of Issue :**	01/11/2024

Acu-Vib Test Procedure: AVP10 (SLM) based on IEC 61672-3

CHECKED BY: .....

AUTHORISED SIGNATURE: .....
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CERTIFICATE OF CALIBRATION

CERTIFICATE NO: C53563

EQUIPMENT TESTED : Acoustic Calibrator

Make & Model:	Rion NC-74	**Serial No:**	35094478
Class:	1		
Owner:	Sonus Pty Ltd 17 Ruthven Ave Adelaide SA 5000		
Tests Performed:	Measured Output Pressure level, Frequency & Distortion See Details and Class Tolerance overleaf.		
Comments:			

CONDITION OF TEST:

Ambient Pressure	1001	hPa ±1 hPa	**Date of Receipt :**	16/04/2025
Temperature	23	°C ±1° C	**Date of Calibration :**	28/04/2025
Relative Humidity	62	% ±5%	**Date of Issue :**	29/04/2025

Acu-Vib Test Procedure: AVP02 (Calibrators)
Test Method: AS IEC 60942 - 2017

CHECKED BY: KB

AUTHORISED SIGNATURE: .....

Hein Soe

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APPENDIX C: MONITORING LOCATION PHOTOGRAPHS

R11

R19

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R63

R113 (R24 Proxy)