Tathra Wind Farm

Noise & Vibration Impact Assessment

Synergy Renewable Energy Developments Pty Ltd

Level 23, 152–158 St Georges Terrace Perth WA 6000

Prepared by:

SLR Consulting Australia

Level 1, 500 Hay Street, Subiaco WA 6008,
Australia

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Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Synergy Renewable Energy Developments Pty Ltd (SynergyRED) (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

Executive Summary

SLR Consulting Australia Pty Ltd (SLR Consulting) has completed a noise and vibration impact assessment (NVIA) of the proposed Tathra Wind Farm. The methodology and criteria used in the assessment are supported by the Western Australian *Environmental Protection (Noise) Regulations* 1997 (EPNR), South Australia Environmental Protection Authority (SA EPA) *Environment Noise Guidelines for Wind Farms* (2009) and World Health Organisation (WHO) limits.

The project is proposed to include up to 140 wind turbine generators (WTGs) (total capacity of up to 1,000MW across the site), 500MW in solar and 500MW in battery storage, with supporting infrastructure (the Proposal). The Proposal, located on predominantly cleared land currently used for agriculture, will connect into the South- West Interconnected System (SWIS) via the existing 330kV transmission lines which are situated within the development envelope.

The make and model for the project will be determined through further technical studies and the procurement process. Therefore, a turbine make and model with a hub height of 150m and power sound level 107dB has been used for the noise assessment study, representing common wind turbine model options.

The results presented in this NVIA indicate that wind farm noise emissions:

- Non-involved receptors: compliant with an L_{A10} of 35 dB at Night period under the EPNR, which also ensures compliance at other times. The application of noise mitigation modes for selected wind turbines at the south-western corner of the project site is incorporated to achieve this compliant outcome.
- Project-involved receptors: Compliant: predicted emissions below the minimum L_{A10} 40 dB criteria accepted by DWER.
- Predicted noise emissions exceeding 35 dB extend beyond the project boundary at some locations. There are no existing residences in these areas, so as proposed the noise emissions are compliant. However, should a new residence be constructed within these areas, the noise emissions may be non-compliant and mitigation through modified operation of relevant wind turbines may be required.

Where predicted noise emissions exceed L_{Aeq} 35 dB for night works or L_{Aeq} 40 dB during Sunday or Public Holiday work, a Construction Noise Management Plan for relevant work near that receptor will be required. The predicted maximum footprint noise emissions shown in Appendix D demonstrate there are some construction work locations where a Construction Noise Management Plan may be required for out of hours work.

Vibration impacts from key construction activities have been assessed and the ‘worst case’ scenarios modelled were found to be acceptable.

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1.0 Introduction

SLR Consulting Australia Pty Ltd (SLR Consulting), has been engaged by SynergyRED Pty Ltd (the Proponent) as the acoustical consultants for the proposed Tathra Wind Farm.

This report describes the methodology and findings of the Noise and Vibration Impact Assessment (NVIA) for the proposed Tathra Wind Farm, forming part of the Environmental Impact Assessment for the proposed project. The proposed wind farm incorporates solar and BESS.

Detailed in this report are the main aspects of the proposed wind farm project, the acoustic criteria, the background noise measurements and the predicted noise levels at all potentially impacted receptors from the operation of the proposed wind farm. It also addresses the noise and vibration impact of the wind farm during the construction phase.

1.1 Project Description

Synergy Renewable Energy Developments (referred to as SynergyRED or the Proponent) proposes to develop a renewable energy project in the mid-west of Western Australia, referred to as the Tathra Wind Farm. The site is located within the Shire of Carnamah, approximately 15km east of Eneabba town site and approximately 300km north of Perth, Western Australia.

The project is proposed to include up to 140 wind turbine generators (WTGs) (total capacity of up to 1,000MW across the site), 500MW in solar and 500MW in battery storage, with supporting infrastructure (the Proposal). The Proposal, located on predominantly cleared land currently used for agriculture, will connect into the South- West Interconnected System (SWIS) via the existing 330kV transmission lines which are situated within the development envelope.

The make and model for the project will be determined through further technical studies and the procurement process. Therefore, a turbine make and model with a maximum hub height of 150m and power sound level 107dB has been used for the noise assessment study, representing common wind turbine model options.

The associated infrastructure for the Proposal comprises of the following:

- Up to 140 wind turbine generators (WTGs) with a total capacity of up to 1,000MW across the site.
- Up to 500MW capacity in solar and 500MW in Battery Energy Storage Systems (BESS), including associated roads, foundations and drainage.
- Associated turbine foundations and hard stand areas.
- A turbine design comprising:
  - Blade length up to 90m.
  - Tower/hub height between 110m and 160m; and
  - Turbine tip height up to 250m.
- Site entrances from public roads and internal access roads between wind turbines and supporting infrastructure.
- Overhead transmission poles or towers and power lines, and underground electrical cables.
- Electrical substations and switchyards, including ancillary electrical equipment (e.g. STATCOM).

- Operations and maintenance buildings, workshops, and associated car parking.
- Temporary construction facilities, including site offices, construction compounds, laydown areas, gravel borrow pits and concrete batching plant.
- Water abstraction bore(s) for construction activities and associated infrastructure (dams/turkey's nests).
- Fire water tanks.
- Communication towers and monitoring masts (meteorological masts) up to 150m tall.

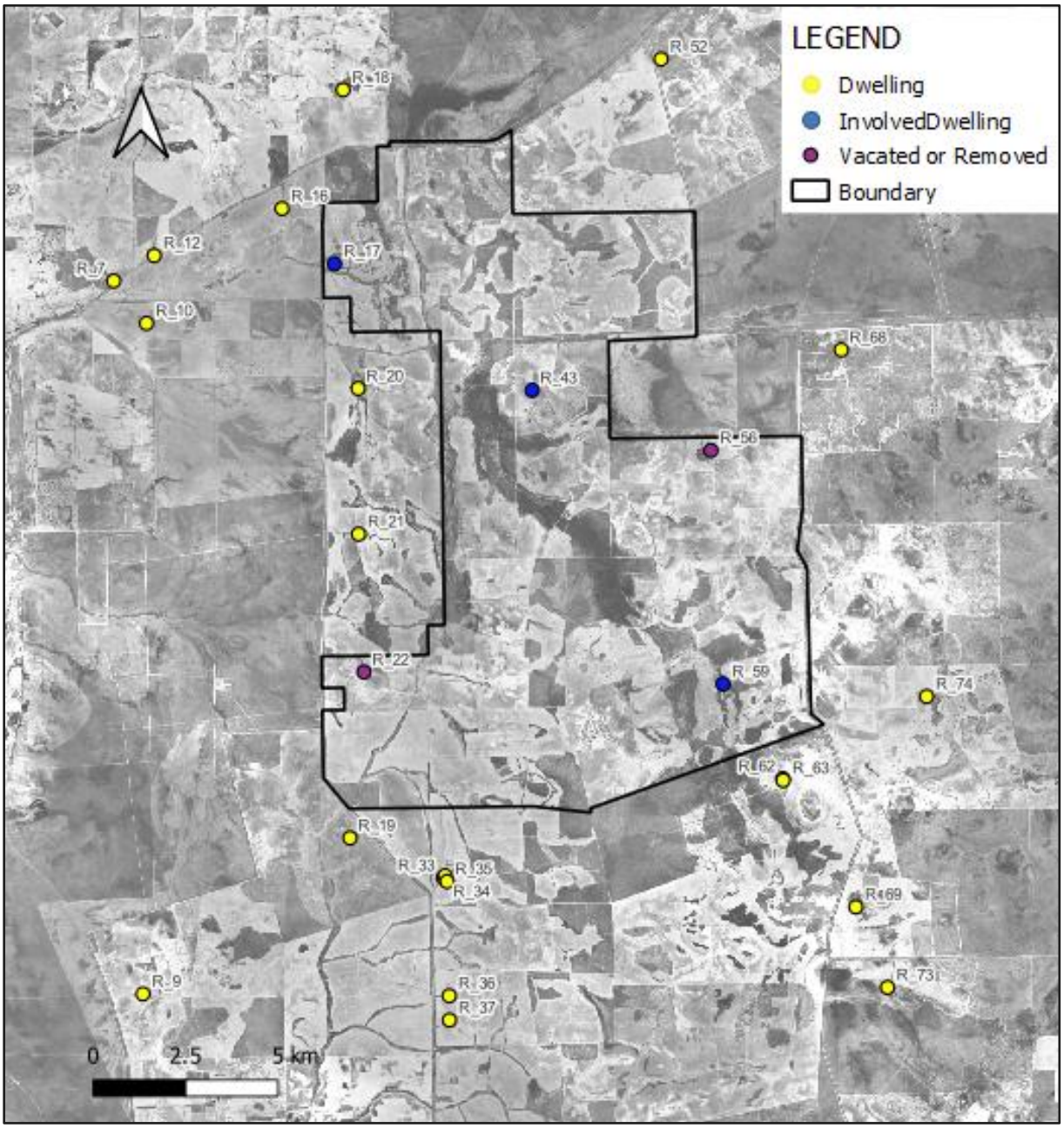
1.2 Receptor Locations

The assessment locations include all receptors (dwellings) located within 5 km of a proposed WTG. **Table 30 Appendix B** lists the receptors, the distance from the nearest proposed WTG and their project involved status. Some identified dwellings may be unoccupied.

Figure 1 shows the nearby receptor dwellings assessed for the project referenced by their reference number and the wind turbine project area.

Receptor co-ordinates are provided in Appendix B.

Figure 1: Receptor Locations and Project Area



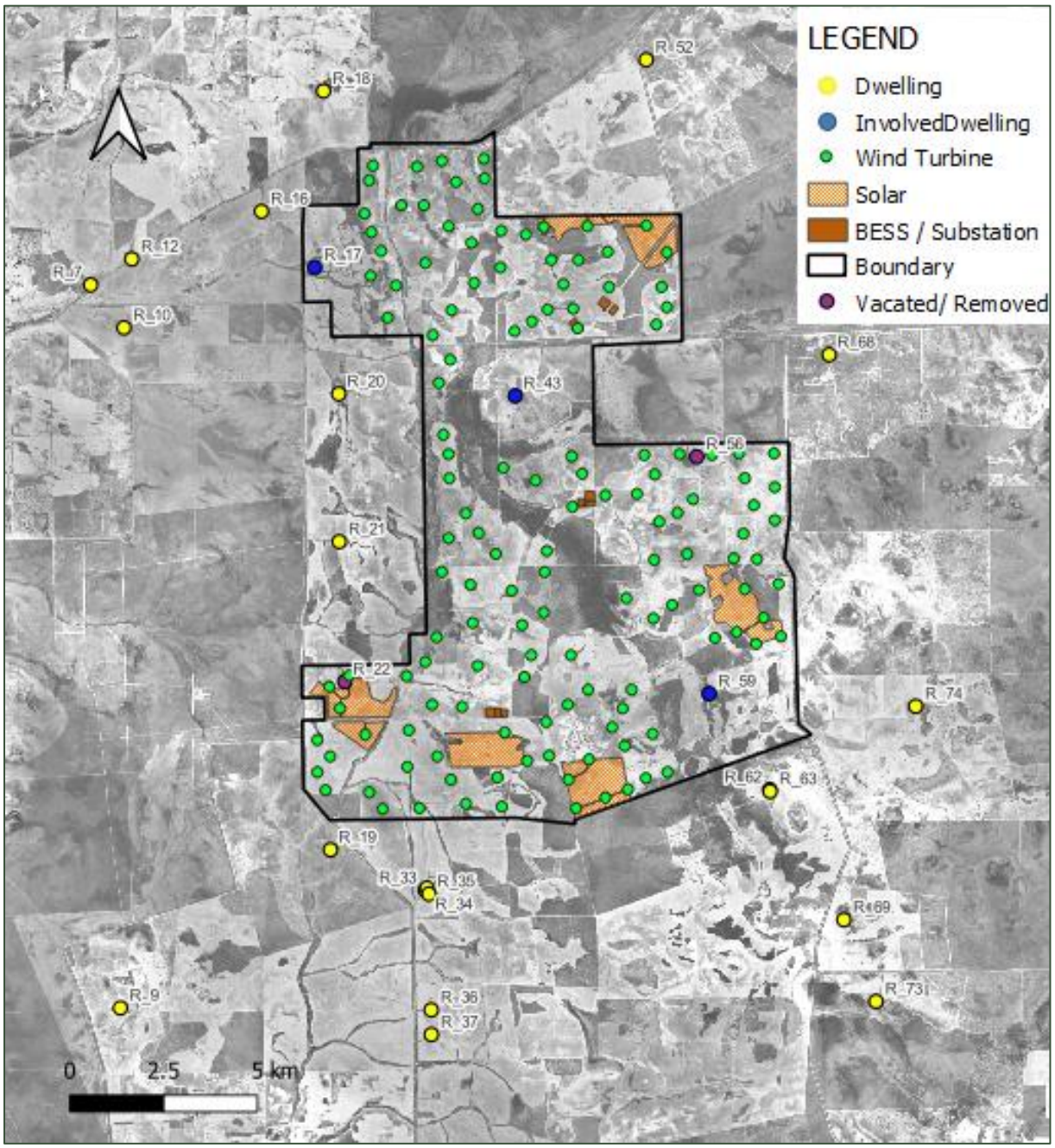
Receptors coloured yellow are identified non-involved residences, blue designates involved residences and pink denotes involved residences that will be vacated (some will be removed).

1.3 Proposed Wind Farm Layout

A tabulated listing of WTG coordinates for the layout is included in **Appendix B.** A revised noise and vibration impact assessment will be required for significant changes in layout.

Figure 2 shows the nearby receptor dwellings assessed for the project and the wind turbine project area. Wind turbines (green point) are shown, with solar farm and BESS shaded light and dark brown respectively. There are three sets of BESS units, a substation is associated with each of these.

Figure 2: WTG and Receptor Layout



1.4 BESS

This assessment incorporates a 500MW solar farm and 500MW battery storage system, divided into three nodes. Substations and STATCOM signal conditioning have been modelled at each BESS node.

2.0 Legislation & Guidelines

2.1 Overview

The WA Planning Commission 'Position Statement: Renewable energy facilities (March 2020), section 5.3.4 documents the requirements for assessment of environmental noise from wind farms.

Two assessments are required:

1 An assessment of noise emissions in accordance with the requirements of the *Environmental Protection (Noise) Regulations 1997* (EPNR), a mandatory requirement.

   Noise emissions from the combination of wind turbines and wind farm infrastructure such as substations should not exceed the EPNR 'Assigned Levels' when assessed in accordance with the 'default meteorological conditions' for noise modelling in published Department of Water and Environmental Regulation (DWER) guidelines.

2 An assessment under the South Australia EPA 'Wind Farms Environmental Noise Guidelines (2009)' (SA Guideline), referenced for assessment purposes.

   The principal acceptability limit criteria under the SA Guideline are that the wind farm $L_{eq,(10\ min)}$ noise should not exceed the greater of an amenity limit of 35 dB or the pre-existing background noise, $L_{90,(10\ min)}$ by more than 5 dB (for any given wind speed).

The methodology and acceptability limit criteria that have been applied to this study are based upon these documents.

The project requirements and wind farm acceptability limit criteria are discussed in **Section 4.0**.

2.2 WA Renewable Position Statement

The WA Planning Commission 'Position Statement: Renewable energy facilities (March 2020), section 5.3.4 documents the requirements for assessment of environmental noise from Wind Farms, as follows:

> *5.3.4 Noise impact (wind turbine proposals)*
>
> *The minimum recommended distance between noise-sensitive land uses and a wind turbine is 1,500 metres*.*
>
> *The minimum distance may be reduced with the approval of the local government, based upon advice from DWER.*
>
> *Proposals for new wind turbines within 1,500 metres of an existing or new noise- sensitive premises (excluding caretaker dwellings) will require an acoustic study to enable the local government to determine the acceptability of a lesser separation distance. The acoustic study should be completed by a qualified acoustic consultant and include the provision of suitable noise attenuation measures, where required. Noise emissions from renewable energy facilities, including wind turbines, are required to meet the standards prescribed under the Environmental Protection (Noise) Regulations 1997. The South Australian Environmental Protection Authority – Wind Farms Environmental Noise Guidelines (2009) should also be referenced for assessment purposes. These guidelines acknowledge the potential for operation in the presence of higher wind-induced background noise levels.*
>
> * Evidence suggests that there are unlikely to be any significant effects on physical or mental health for noise-sensitive land uses at distances greater than 1,500m from wind turbines Source: National Health and Medical Research Council (February 2015 ref # EH57)

2.3 WA Environmental Protection (Noise) Regulations

Environmental noise in Western Australia is regulated under the *Environmental Protection (Noise) Regulations 1997* ("EPNR", the "Regulations") as amended, under the *Environmental Protection Act 1986* (the "Act").

Unreasonable noise under the Act is described in clause s3(3):

> *For the purposes of this Act, noise is to be taken to be unreasonable if —*
>
> *(a) it is emitted, or the equipment emitting it is used, in contravention of —*
>
> *(i) this Act;*
>
> *(ii) any subsidiary legislation made under this Act; or*
>
> *(iii) any requirement or permission (by whatever name called) made or given by or under this Act;*
>
> *(b) having regard to the nature and duration of the noise emissions, the frequency of similar noise emissions from the same source (or a source under the control of the same person or persons) and the time of day at which the noise is emitted, the noise unreasonably interferes with the health, welfare, convenience, comfort or amenity of any person; or*
>
> *(c) it is prescribed to be unreasonable for the purposes of this Act.*

The Regulations, as subsidiary legislation made under this Act, are applicable to noise generated by the wind turbines, given that no exclusion within Regulation 3 appears applicable, and no specific approval or permit has been granted (yet) to exceed statutory requirements.

Both operational and construction noise are addressed through the regulations.

2.3.1 Operational Noise

The noise emissions from premises are regulated in Western Australia under the *Environmental Protection (Noise) Regulations 1997* (Noise Regulations) ('the Regulations'). Generally, to achieve compliance with the Regulations, the noise levels at nearby residential areas from the premise operations are not to exceed defined limits (assigned levels).

A summary of the applicable noise limits is provided in **Table 1**. These limits are determined from consideration of prevailing background noise levels and 'influencing factors' that considers the level of commercial and industrial zoning in the locality. The influencing factor (IF) considers zoning and road traffic within 450 metres of each noise sensitive premises.

Table 1: Assigned noise level summary

Part of premises receiving noise	Time of day	Assigned level, dB		
		L_{A10}	L_{A1}	L_{Amax}
Noise Sensitive premises at locations within 15 metres of a building directly associated with a noise sensitive use	0700 to 1900 hours Monday to Saturday *('Day')*	45 + IF	55 + IF	65 + IF
	0900 to 1900 hours Sunday and public holidays *('Sundays')*	40 + IF	50 + IF	65 + IF
	1900 to 2200 hours all days *('Evening')*	40 + IF	50 + IF	55 + IF

Part of premises receiving noise	Time of day	Assigned level, dB		
		L_{A10}	L_{A1}	L_{Amax}
	2200 hours on any day to 0700 Monday to Saturday and 0900 hours Sunday and public holidays *('Night')*	35 + IF	45 + IF	55 + IF
Noise Sensitive premises at locations further than 15 metres from a building directly associated with a noise sensitive use.	All hours	60	75	80
Commercial premises	All hours	65	75	80
Industrial and utility premises	All hours	65	80	90

The specific assigned level for each receptor is detailed in **Table 4**.

Under the Regulations, if noise emitted from any premises when received at any other premises cannot reasonably be free of intrusive characteristics of tonality, modulation and impulsiveness, a series of adjustments are added to the emitted levels (measured or calculated) and the adjusted level must comply with the assigned level. The adjustments are detailed in **Table 2** and are further defined in Regulation 9(1) of the Regulations.

Table 2: Definition of noise characteristics

Noise characteristic	Definition	Adjustment if present (Note[1])
Tones	Where the difference between the A weighted sound pressure level in any one third octave ban and the arithmetic average of the A weighted sound pressure levels in the two adjacent one third octave bands is greater than 3 dB in terms of $L_{Aeq,T}$ where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as L_{ASlow} levels.	+5 dB
Modulation	A variation in the emission of noise that – Is more than 3 dB LAFast or is more than 3 dB LAFast in any one third octave band; Is present for at least 10% of the representative assessment period; and, Is regular, cyclic and audible.	+5 dB
Impulsiveness	Present where the difference between the L_{APeak} and L_{Amax} is more than 15 dB when determined for single representative event.	+10 dB

Note 1 where noise emission is not music, these adjustments are cumulative to a maximum of 15 dB

The critical case is for the night-time period of the regulations, when 'worst case' climatic conditions are occurring. For many of the key receptors, compliance at night is achieved if the noise emission is predicted to be no greater than an L_{A10} of 35 dB.

2.3.2 Construction Noise

Regulation 13 of the *Environmental Protection (Noise) Regulations 1997 EPNR* as amended applies to management of noise from construction activities. The relevant section of Regulation 13 states the following:

13(2) Regulation 7 [assigned noise levels] does not apply to … construction work carried out between 0700 hours and 1900 hours on any day which is not a Sunday or public holiday if the occupier of the premises … shows that:

a) *The construction work was carried out in accordance with control of environmental noise practices set out in section 6 of AS 2436-1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites;*
b) *The equipment used on the premises was the quietest reasonably available; and*
c) *If the occupier was required to prepare a noise management plan … in respect of the construction site*
d) *The noise management plan was prepared and given in accordance with the requirement, and approved by the Chief Executive Officer; and*
e) *The construction work was carried out in accordance with the management plan.*

13(3) Regulation 7 does not apply to … construction work carried out other than between the [above] hours if the occupier of the premises … shows that –

a) *The construction work was carried out in accordance with control of environmental noise practices set out in section 6 of AS 2436-1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites;*
b) *The equipment used on the premises was the quietest reasonably available;*
c) *The construction work was carried out in accordance with a noise management plan in respect of the construction site –*
    i. *Prepared and given to the Chief Executive Officer not later than 7 days before the construction work commenced; and*
    ii. *Approved by the Chief Executive Officer;*
d) *At least 24 hours before the construction work commenced, the occupier of the construction site gave written notice of the proposed construction work to the occupiers of all premises at which noise emissions received were likely to fail to comply with the standard prescribed under regulation 7; and*
e) *It was reasonably necessary for the construction work to be carried out at that time.*

From the above, the assigned noise levels do not apply to construction sites where the proponent:

- Demonstrates that the construction work is carried out in accordance with section 4 of AS 2436-2010;
- Uses the quietest reasonably available equipment;
- Prepares and supplies the CEO with an approved construction noise management plan (CNMP) no later than 7 days before the proposed works;
- And where the works to take place outside standard hours,
    - Provides notice to potentially affected residents at least 24 hours prior the start of the proposed works; and
    - Provides reasons for why it was necessary for the construction work to be carried out at that time.

2.4 SA EPA Guideline

The Position Statement references the 2009 revision of the SA Guidelines. This has been revised (November 2021), with reportedly minor changes.

The *SA EPA Guideline recommends the following noise criteria for new wind farms,*

> *"The predicted equivalent noise level ($L_{Aeq, 10min}$), adjusted for tonality in accordance with these guidelines, should not exceed:*
>
> - 35 dB, or
> - the background noise level by more than 5 dB,
>
> *whichever is the greater, at all relevant receivers for each integer wind speed from cut-in to rated power of the WTG."*

The Guideline also provides information on measuring the background noise levels, locations and requirements on the number of valid data points to be obtained and the methodology for excluding invalid data points. It also outlines the process for determining lines of best fit for the background data, and determination of the noise limit.

The Guideline explicitly states that the "swish" or normal modulation noise from wind turbines is a fundamental characteristic of such turbines; however, it specifies that tonal or annoying characteristics of turbine noise should be penalised.

A 5 dB penalty should be applied to the measured noise level if an "authorised" officer or an acoustical engineer determines that tonality is an issue and that tonality should be assessed in a way acceptable to the EPA. The tonality assessment procedure is detailed in the International Standard IEC 61400-11.

The Guideline does not provide an assessment for the potential of low frequency noise or infrasound, but it does state that recent turbine designs do not appear to generate significant levels of infrasound, as the earlier turbine models did.

The Guideline accepts that wind farm developers commonly enter into agreements with private landowners in which they are provided compensation. The guideline is intended to be applied to premises that do not have an agreement with the wind farm developer. This does not absolve the obligations of the wind farm developer entirely as appropriate action can be taken under the *Environmental Protection Act* if a development 'unreasonably interferes' with the amenity of an area. The guideline lists that there is unlikely to be unreasonable interference if:

- a formal agreement is documented between the parties;
- the agreement clearly outlines to the landowner the expected impact of the noise from the wind farm and its effect on the landowner's amenity; and
- the likely impact of exposure will not result in adverse health impacts (e.g. the level does not result in sleep disturbance).

The proponent has discussed the possible noise implications of the proposed turbine layout with the involved residents whose property the turbines would be located on and will enter into agreements with these parties.

2.5 World Health Organisation (WHO) Guidelines

Where noise levels at project-involved residences do not comply with the SA EPA Guidelines, the proponent intends to enter into agreements with the owners of those residences to achieve noise criteria in accordance with World Health Organisation (WHO) Guidelines. The proponent will apply those guidelines as necessary to ensure that the project does not result in an 'unreasonable interference' with the amenity or cause any adverse health effects at those residences.

The WHO publication '*Compendium of WHO and UN guidance on health and environment (2022)*[1] provides a summary of its guidance as of 2022, and it is considered current.

In the referenced guidelines[2], the WHO 'conditionally' recommends an outdoor target of L_{den} 45 dB, but notes that there is *"wide variability in the values and preferences of the population, with particularly strong negative attitudes in populations living in the vicinity of wind turbines … Based on the low quantity and heterogeneous nature of the evidence, the [WHO Guideline Development Group] was not able to formulate a recommendation addressing sleep disturbance due to wind turbine noise at night time."*

For the assessment of project involved residences the adopted external criteria of 45 dB or the level given by the SA EPA Guideline criteria, where higher, will be adopted.

Effectively this becomes L_{Aeq} 45 dB or background + 5 dB, whichever is the higher.

2.6 Vibration Guidelines

Impacts from vibration can be considered both in terms of effects on building occupants (human comfort) and the effects on the building structure (building damage). Of these considerations, the human comfort limits are the most stringent. Therefore, for occupied buildings, if compliance with human comfort limits is achieved, it will follow that compliance will be achieved with the building damage objectives.

2.6.1 Human Comfort

The NSW Department of Planning and Environment (former Department of Environment, Climate Change and Water (DECCW)) Assessing Vibration: A Technical Guideline provides acceptable values for continuous and impulsive vibration based upon guidelines contained in BS 6472–1992, Evaluation of human exposure to vibration in buildings (1–80 Hz).

Both preferred and maximum vibration limits are defined for various locations and are shown in **Table 3** with the preferred night-time PPV criteria of 0.2 mm/s being the most relevant to the project.

[1] https://cdn.who.int/media/docs/default-source/who-compendium-on-health-and-environment/who_compendium_noise_01042022.pdf

[2] World Health Organisation (2018), *Environmental noise guidelines for the European Region*, Regional Office for Europe. https://iris.who.int/handle/10665/279952

Table 3: Preferred and maximum values for continuous and impulsive vibration

Location	Assessment period[1]	Preferred values RMS acceleration m/s²		Maximum values RMS acceleration m/s²		Peak Velocity PPV mm/s	
		z-axis	x- and y-axes	z-axis	x- and y-axes	Preferred	Maximum
Continuous vibration							
Critical areas[2]	Day- or night-time	0.0050	0.0036	0.010	0.0072	0.14	0.28
Residences	Daytime	0.010	0.0071	0.020	0.014	0.28	0.56
	night-time	0.007	0.005	0.014	0.010	0.20	0.40
Offices, schools, educational institutions and places of worship	Day- or night-time	0.020	0.014	0.040	0.028	0.56	1.1
Workshops	Day- or night-time	0.04	0.029	0.080	0.058	1.1	2.2
Impulsive vibration							
Critical areas[2]	Day- or night-time	0.0050	0.0036	0.010	0.0072	0.14	0.28
Residences	Daytime	0.30	0.21	0.60	0.42	8.6	17.0
	night-time	0.010	0.0071	0.020	0.014	2.8	5.6
Offices, schools, educational institutions and places of worship	Day- or night-time	0.64	0.46	1.28	0.92	18.0	36.0
Workshops	Day- or night-time	0.64	0.46	1.28	0.92	18.0	36.0

Note1: Daytime is 7.00 am to 10.00 pm and night-time is 10.00 pm to 7.00 am

Note 2: Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. There may be cases where sensitive equipment or delicate tasks require more stringent criteria than the human comfort criteria specified above. Stipulation of such criteria is outside the scope of this policy, and other guidance documents (e.g. relevant standards) should be referred to. Source: BS 6472–1992

These limits relate to a long-term (16 hours for daytime), continuous exposure to vibration sources. Where vibration is intermittent, a higher level of vibration is typically acceptable.

2.6.2 Building Damage

In regard to potential building damage, the German Standard DIN4150 recommends a limit of 10 mm/s PPV within any building and the British Standard BS7385: Part 2 – 1993 sets a limit within buildings which depends upon the vibration frequency but is as low as 7.5 mm/s PPV (at 4.5 Hz). For the purposes of ensuring a reasonable factor of safety, a conservative limit of approximately 5 mm/s PPV has been applied for this project.

3.0 Existing Environment

The project is located in a remote region which is sparsely populated and predominantly made up of broad acreage farming.

All receptors surrounding the proposed Wind Farm site have an ambient background noise environment that is determined by pre-dominantly natural sources, including those which are wind influenced such as wind noise in foliage.

3.1 Ambient Noise Monitoring

In order to establish the intrusive noise limit, background noise monitoring is required to establish the pre-existing ambient noise environment as a function of wind speed. As wind speed increases the ambient noise level at most receptors generally also increases as natural sources such as wind in trees begin to dominate. The variation of background noise with wind speed is usually quite site specific and related to various physical characteristics such as topographic shielding and the extent and height of exposed vegetation.

Noise monitoring is completed for a period of approximately 8 weeks and correlated to synchronous wind speed and direction data measured at the wind farm monitoring mast. The L_{A90} (Fast response) statistical noise level for each 10-minute measurement period is used for assessment.

The captured data is screened for validity, with data monitored during periods of rain or where the average wind speed at the microphone position likely exceeded 7 m/s (where large windsocks are fitted to microphones) being discarded from the data set. The hub height wind speed bin average of all valid data is used to determine the baseline noise in accordance with the procedure outlined in the South Australian Wind Farms Environmental Noise Guidelines (2009), section 3.3 (page 13).

3.2 Baseline surveys

3.2.1 Tathra Wind Farm

To quantify the existing ambient noise environment baseline noise monitoring was conducted at 5 reference receptor locations in the project area over the period 3rd March to 1st May 2025.

The monitoring campaign included periods of rain, which were removed from the analysed data set.

At each location, noise monitoring equipment was placed in the vicinity of the buildings and trees, at a location representative of occupied residences in the local area. Locations were selected within 30m of buildings, at distances from trees equivalent to the distance of trees to the windows of the house, to replicate background noise at the house. Consideration was given to avoiding other potential sources of extraneous noise and the position of the monitoring equipment was documented with photographs.

The baseline surveys utilised noise monitoring equipment that meets the sound level meter requirements of IEC 61672-1:2002 – Class 1, with current NATA calibration and they utilised high performance microphone windsocks (130 mm diameter). The M3 site also included a local weather station, which was used to evaluate local rainfall and local wind speed to assist in the screening of valid data. Pre and post survey acoustic calibrations were completed on-site.

Reference wind speed was provided by the client from wind and temperature measurements on the site met mast, with the upper wind speed and direction sensors at 150m AGL.

A consolidated wind data set from the above was used and from this the local noise data was then correlated to the 150 m AGL wind speed.

3.2.2 Warradarge Wind Farm Baseline

Bright Energy Investments (BEI), of which SynergyRED is a joint venture partner, operate the Warradarge Wind Fam, located immediately south of the proposed Tathra Wind Farm. SynergyRED were able to provide a copy of an acoustic assessment of the Warradarge Wind Farm, Stage 2. This report, titled 'Warradarge Wind Farm Stage 2 – Wind Turbine Noise Assessment' with reference P240657RP1 Revision B, dated 11 October 2024, includes reporting on baseline noise monitoring conducted prior to operation of that wind farm. Receptors where baseline noise was measured for the Warradarge Wind Farm are shown with a pink circle in **Figure 3**.

Figure 3: Tathra Layout showing Warradarge Baseline Monitoring Locations

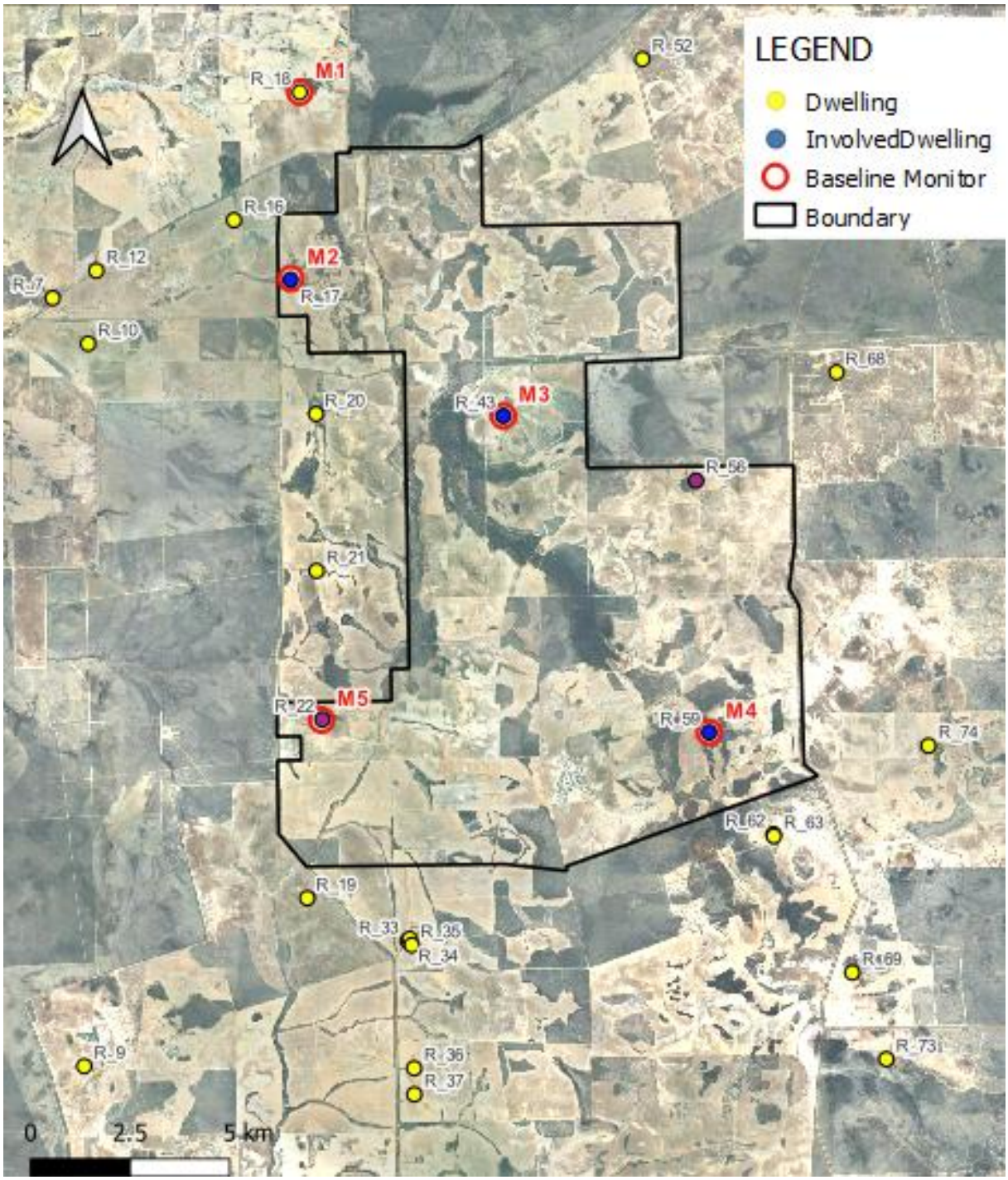
Refer to **Section 4.2** of this report for application of this baseline data to the Tathra Wind Farm assessment.

3.3 Measurement Locations

The locations for the background noise measurements were selected by SLR Consulting on the basis of preliminary predicted WTG noise levels, accessibility, as well as proximity and similarity to other receptors.

The monitoring locations are shown in **Figure 4.** Monitoring location M3 consists of both a noise monitor and weather station (at microphone height, 1.4m AGL).

Figure 4: Baseline monitoring locations



3.4 Measurement Details

The measurement location, monitoring period, and serial number of the noise loggers for all testing are summarised in **Appendix A** along with the number of valid data points for each location.

The SA EPA Guideline recommends a set of approximately 2,000 valid data points. Any data points adversely affected by periods of rain or extraneous noise were excluded. The equipment used, the period of monitoring at each location, number of valid data points (with all thresholds set by the Guidelines being reached) and other related information is provided in **Appendix A**.

The measured background noise levels (L_{A90}) are then plotted against the hub height wind speed to obtain a background versus wind speed characteristic. The average wind speed bin noise level for the data set is then determined, as required by the SA EPA Guideline.

The baseline noise monitoring survey locations are pictured along with data and results which are detailed fully in **Appendix A**.

It is noted that slightly less than 2,000 data points were measured at location M5, due to equipment issues. After deployment of the monitoring equipment at location M5 (R22) , agreement was reached with SynergyRED that the residence will be vacated if the wind farm proceeds.

4.0 Operational Noise Criteria

Wind turbine operational noise criteria are determined separately for EPNR and SA Guidelines. In addition, the EPNR criteria apply to the cumulative wind turbine and infrastructure noise emissions. Infrastructure includes substations and any other operational equipment associated with the wind farm proposal.

4.1 Sensitive receptor EPNR criteria

The three residential receptors within the wind farm project area all have commercial agreements with the wind farm and are considered as ‘caretakers’ under the regulations.

There remain obligations to ensure those receptors have reasonable amenity. This has historically been assessed as an external noise level no greater than 45 dB from the wind farm noise sources. However, DWER (based on direct engagement with SynergyRED, and public review of other wind farm applications) consider an external noise level of 40 dB(A) to be an acceptable guideline from wind farm generated noise to involved receptors.

The locality is predominantly rural, the receptors surrounding the wind farm project are all assessed as having a zero ‘influencing factor’ under the ENPR, with nighttime ‘Assigned Level’ of L_{A10} of 35 dB.

The EPNR noise criteria are as per **Table 4**.

Table 4: WTG EPNR noise criteria summary

Project involved status	Minimum criteria (L_{A10})
No (residential)	35 dB
Yes (residential)	40 dB

4.2 SA Guideline Wind Turbine Noise Criteria

The assessment of the acceptability of wind farm noise was undertaken at all assessment residential receptors (located within 5 km of a WTG) using the noise limit set in SA EPA Guidelines. Dwellings further than this distance are deemed to comply if dwellings closer to turbines comply with the SA EPA noise limit.

The proponent intends to enter into noise agreements with all project involved residences prior to construction. Under the SA EPA Guidelines these residences are not required to comply to the 35 dB or 'background + 5 dB' limits.

However, it is necessary to ensure that the project does not result in an 'unreasonable interference' with the amenity of these areas or cause any adverse health effects. Therefore, for the assessment of project involved residences the adopted external criteria of 45 dB (as per the WHO Guideline) or the level given by the SA EPA Guideline criteria, where higher, will be adopted. Effectively this becomes 45 dB or background + 5 dB, whichever is the higher.

Background noise as determined using the methods of the SA Guidelines for the five monitoring locations are shown in **Table 5**.

Table 5: Measured background noise vs HH wind speed, L_{A90} dB (ten minute)

Wind speed m/s	3	4	5	6	7	8	9	10	11	12	13	14	15
M1	27	27	29	29	31	34	36	37	37	38	39	41	42
M2	29	31	31	31	32	33	35	34	34	34	35	36	38
M3	29	30	30	31	32	34	35	36	35	36	36	38	40
M4	22	23	24	25	26	28	30	30	30	29	28	28	28
M5	24	27	30	30	32	35	38	38	41	45	45	42	42

Background noise levels exceeding L_{A90} of 30 dB shown shaded in green.

The maximum sound power generated by the wind turbine is for hub height wind speed of 10 m/s or higher. Within the hub height speed range 10 – 15 m/s, the lowest "background plus 5" criterion level will control compliance at maximum wind turbine sound power emission.

Table 6: Guidelines "background plus 5" vs HH wind speed, L_{A90} dB (ten minute)

Wind speed m/s	3	4	5	6	7	8	9	Lowest of range 10 – 15 m/s
M1	35	35	35	35	36	39	41	42
M2	35	36	36	36	37	38	40	39
M3	35	35	35	36	37	39	40	40
M4	35	35	35	35	35	35	35	35
M5	35	35	35	35	37	40	43	43

It is not practical to re-measure background noise within the zone where Warradarge Wind Farm is emitting noise, as background noise by definition must exclude wind farm generated noise. The only acceptable method would be to undertake monitoring with Warradarge Wind Farm shut off. Hence the baseline monitoring results for the Warradarge Wind Farm apply to southern receptors close to Tathra Wind Farm. This background noise is relevant to the

application of the South Australian Guidelines, in setting acceptance criteria for different hub height wind speeds.

Because of the different hub heights of the two wind farms, the Warradarge Wind Farm background noise must be mapped to the adopted Tathra Wind Farm noise assessment hub height of 150m AGL.

Receptors where baseline noise was measured for the Warradarge Wind Farm are shown with a pink circle in **Figure 3**. With the exception of receptors R33, R34 and R35 (Warradarge R4), baseline noise was measured below 30 dB(A) for all wind speeds. Mapping of the baseline noise for Warradarge R4 to the 150m hub height wind speed was undertaken and is reflected in **Table 15** of this report.

5.0 Wind Farm Assessment Methodology

5.1 Tathra WTG Source levels

The wind turbine generators (WTGs) nominally selected for the Project are representative of available 6 – 7MW wind turbines at a maximum hub height of 160m, with a sound power of 107 dB(A) at maximum noise emission.

The wind farm noise levels from the proposed WTG layout are calculated for a 150-metre hub height wind condition. Sensitivity analysis for the maximum hub height of 160m shows negligible difference in predicted noise emissions to far field receptors, so are representative for the maximum hub height nominated.

The typical variation of generated sound power with hub height wind speed is provided in **Table 7**. If noise emissions of the final selection of wind turbine are higher than the data in this report, then a revised Noise and Vibration Impact Assessment will be required. This applies not only to the maximum sound power emission, but also for hub height wind speeds of seven to nine m/s.

Table 7: Wind Turbine Sound Power vs Hub Height Wind Speed

Wind speed m/s	4	5	6	7	8	9	10 – 15 m/s
Standard serrated blade	93.8	95.7	99.2	102.5	104.7	106.7	107

The wind turbine noise emission increases from cut in speed until attaining a maximum noise emission at hub height wind speeds of 10 m/s to cut out wind speed above 15 m/s.

Noise mitigation modes are available on the modelled wind turbine. Particular modes limit rotational speed and therefore limit the sound power generated by the wind turbine. The wind turbine operates normally until reaching the mitigation mode wind speed.

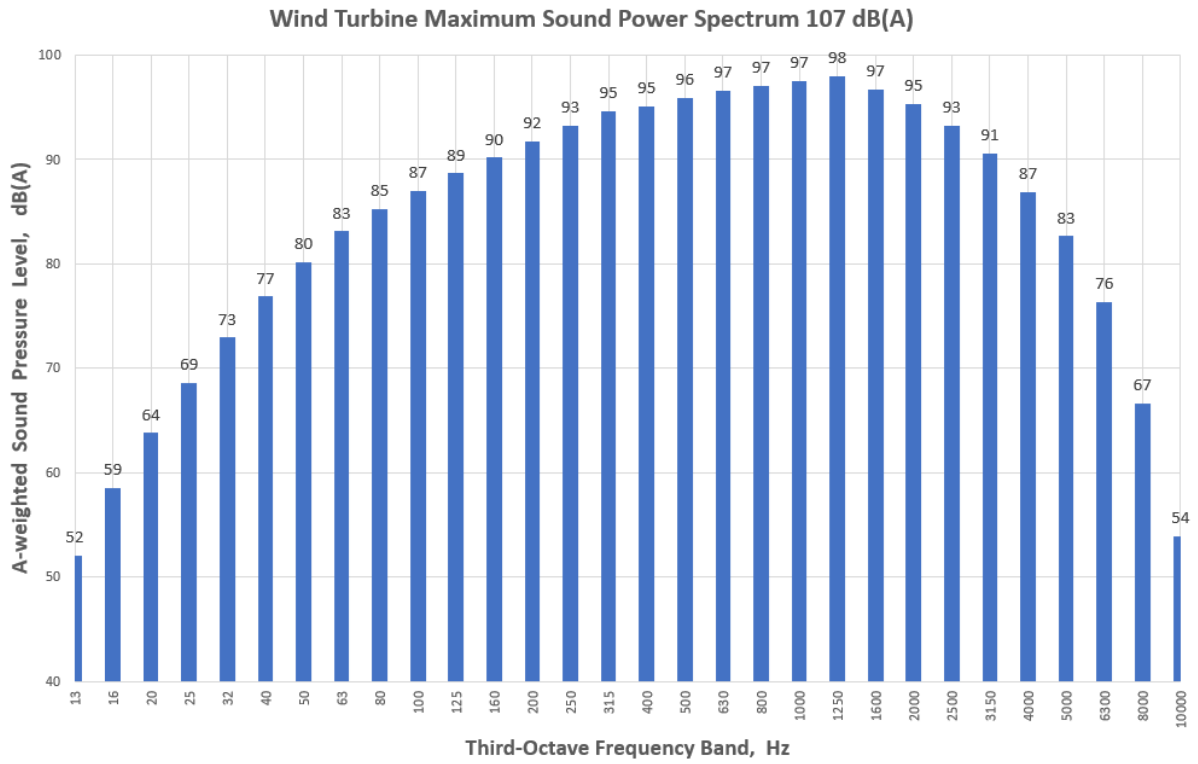
Table 8: Wind Turbine Sound Power vs Noise Mitigation Mode - Nominal

Operating Mode	Standard	-1 dB	-2 dB	-4 dB	-7 dB	-8 dB
Sound Power Limit dB(A)	107	106	105	104	100	99
Hub height wind speed m/s	9.7	9.28	8.88	8.5	7.13	6.83

The noise spectra generated by a wind turbine must be considered when modelling to far field locations. There may be minor differences between wind turbine makes in terms of source frequency distribution, which can affect predicted emissions at distance due to the

variation of 'air absorption' with frequency. The noise spectrum of the wind turbine maximum sound power used for modelling is shown in **Figure 5**.

Figure 5: Wind Turbine Spectra



5.2 BESS and Substation Noise Source Levels

The sound power data used to model the noise emitting infrastructure for the proposed BESS and substation is provided in **Table 9.** Sound power levels for the BESS units and inverters have been provided by SynergyRED.

Table 9: BESS and Substation Sound Power Levels

Equipment	Overall Sound Power, L_{wA} dB
BESS – 3 x 264 units: each	85
Inverter – 3 x 115: each	88
330 kV Transformer – 3 x 2: each	95
STATCOM - 3:- 1 per substation	91

5.3 Warradarge WTG Source Levels

Cumulative noise emissions need to be assessed under the Western Australian *Environmental Protection (Noise) Regulations 1997*. To the immediate south of the proposed Tathra Wind Farm is the existing Warradarge Wind Farm (Stage 1). Stage 2 was approved with Stage 1 of the Warradarge Wind Farm and is currently under construction. Warradarge Wind Farm is a separate premises to Tathra Wind Farm. Wind turbine locations and details have been provided to facilitate assessment of cumulative noise.

The wind turbines for the Warradarge Wind Farm have a hub height of 84m. The turbines are:

Vestas V136-3.6MW, with a maximum sound power of 105.5 dB(A) at a cut in speed of 10 m/s. The operating windspeed range is 3 – 12 m/s at 84m hub height.

Due to wind shear effects, during a wind speed at an 84m hub height of 10 m/s, the wind speed at 150m hub height (Tathra Wind Farm noise assessment height) is assessed to be 11 m/s.

Put simply, there is an operating condition where wind turbines from both wind farms can be at maximum sound power generation, the worst-case scenario. This is only relevant for the application of the Western Australian EPNR as assessments under the South Australian Guidelines do not consider cumulative noise from separate wind farms.

Detailed sound power data for the Warradarge wind turbines is available in detail from the report 'WarradargeWind Farm Stage 2 – Wind Turbine Noise Assessment, P240657RP1 Revision B, dated 11 October 2024'. The sound power level associated with different hub height wind speeds are provided in Table 10, for standard turbine operation, excluding noise mitigation modes. Wind turbine locations for both Stage 1 (existing) and Stage 2 are provided in the report and have been used to predict cumulative noise emissions.

Table 10: Warradarge Wind Turbine Sound Power Levels

Hub height wind speed, m/s	3	4	5	6	7	8	9	10	11	12
Sound Power level, dB L_{WA}	94.1	94.5	95.0	97.3	100.3	103.2	105.3	105.5	105.5	105.5

5.4 Wind Farm Noise Level Prediction

The respective noise modelling guidelines for assessment in accordance with Western Australian EPNR and SA Guidelines are detailed in this section. It is noted that the guidelines used are the latest version issued.

5.4.1 EPNR Noise Emission Modelling

Assessment of wind farm noise against the 'Assigned Levels' of the Western Australian *Environmental Protection (Noise) Regulations 1997* (EPNR) has been undertaken using the ISO 9613-2:2024 Appendix D methodology. SLR Consulting were advised by SynergyRED that this is a method accepted by DWER as being suitable for assessment of wind farm noise (and associated infrastructure), citing a number of emails between DWER and SynergyRED verifying this methodology.

SynergyRED have elected to be conservative and model using the maximum wind turbine sound power emission.

Where exceedances are predicted at receptors, SynergyRED have elected to use the nominal wind turbine curtailment modes as a means of limiting the sound power emission. The need for mitigation is dependent on wind direction as propagated noise will be less with winds away from a receptor. The ISO 9613-2 algorithm is not able to predict noise emissions specific to wind direction, however CONCAWE has this capability. For the determination of noise emission with direction, CONCAWE algorithm has been used, calibrated to the predicted emission generated using ISO 9613-2 for the maximum noise emission condition.

Construction noise has been assessed using the historically conventional CONCAWE algorithm with night-time modelling conditions as previously published by DWER.

5.4.1.1 ISO 9613-2:2024 Appendix D

The modelling conditions specified in ISO 9613-2:2024 Appendix D are described in **Table 11**.

Table 11: Appendix D conditions for noise modelling

Parameter	'Day' 0700-1900
Temperature	10°C
Relative Humidity	80%
Ground Absorption Coefficient	0.5
Receptor Height	4m AGL

5.4.2 Construction Noise

The CONCAWE prediction methodology was utilised within SoundPLAN. The CONCAWE prediction method is specially designed for large facilities and incorporates corrections to account for the potential influence of wind effects and atmospheric stability conditions.

5.4.2.1 Modelling parameters

The 'default meteorological conditions' for noise modelling in published DWER guidelines have been adopted. The weather conditions summarised in **Table 12** used to approximate the typical 'worst-case' scenario for enhancement of sound propagation in each time period.

Table 12: Default 'worst-case' meteorological conditions for noise modelling

Parameter	'Day' 0700-1900	'Evening' and 'Night' 1900-0700
Wind Speed and Direction	4 m/s source to receptor	3 m/s source to receptor
Temperature inversion lapse rate	0°C per 100m	2°C per 100m
Pasqual stability class	E	F
Temperature	20°C	15°C
Relative Humidity	50%	50%
Ground Absorption Coefficient	0.6	0.6
Receptor Height	1.5m AGL	1.5m AGL

As construction may occur during both day and night periods, only the more critical night period has been modelled. The 'Assigned Level' for the day period being at least 5 dB higher for the same noise source, compliance for the Night period ensures compliance during the Day period.

5.4.2.2 Uncertainty of prediction

The statistical accuracy of environmental noise predictions using CONCAWE was investigated by Marsh (Applied Acoustics 15 - 1982). Marsh concluded that CONCAWE under controlled conditions was accurate to within ±2 dB in any one octave band between 63 Hz and 4 kHz and ± 1 dB overall.

It is important to understand that this variance is specific to where the modelled meteorological conditions match actual. The frequency at which 'worst case' wind conditions

occur depends on local meteorological statistics, noting that received levels at other times would generally be less.

5.4.3 SA Wind Farms Guidelines Noise Emission Modelling

5.4.3.1 Environmental propagation

A three-dimensional SoundPLAN computer noise model was used to predict L_{Aeq} noise levels from all WTGs at all surrounding residential dwellings within 5km of a turbine.

The ISO 9613 noise model incorporates a 'hard ground' assumption and includes one-third octave band calculated effects for air absorption, ground attenuation and topographic shielding with amendments in accordance with the Institute of Acoustics (IoA) *Good Practice Guide on Wind Turbine Noise*.

It is noted that ISO 9613 equations predict for average downwind propagation conditions and also hold for average propagation under a well-developed moderate ground-based temperature inversion.

The stated uncertainty of this prediction standard is 3 dB.

5.4.3.2 Modelling parameters

The modelling conditions specified within the SA Guidelines have been adopted. These are shown in **Table 13.**

Table 13: Default 'worst-case' meteorological conditions for noise modelling

Parameter	Value	SA Guideline Reference
Temperature	10°C	Section 3.3, page 11
Relative Humidity	80	Section 3.3, page 11
Ground Absorption Coefficient	0 (hard ground)	Section 3.3, page 11
Receptor Height	1.5m AGL	Accepted practise for assessments carried out in Western Australia for application of the South Australian Guidelines.
Acoustic parameter	$L_{Aeq,10}$	Predicted noise level, Glossary 7

Where exceedances are predicted at receptors, SynergyRED have elected to use the wind turbine curtailment modes as a means of limiting the sound power emission. The need for mitigation is dependent on wind direction as propagated noise will be less with winds away from a receptor.

The ISO 9613-2 algorithm is not able to predict noise emissions specific to wind direction, however CONCAWE has this capability. For the determination of noise emission with direction, CONCAWE algorithm has been used, calibrated to the predicted emission generated using ISO 9613-2 for the maximum noise emission condition.

5.5 Assessment Procedure

In general, the assessment procedure contains the following steps:

1 Predict and plot the L_{Aeq} 35 dB noise level contour from the wind farm under reference conditions. Results at receptors outside these contours are predicted to be within acceptable wind farm noise levels.

2 Establish the pre-existing background noise level at each of the relevant assessment receptors within the L_{Aeq} 35 dB noise level contour through background noise monitoring.

3 Predict wind farm noise levels at all relevant assessment receptors for the wind range from cut-in of the WTG to approximately 15 m/s (at hub height).

4 Assess the acceptability of wind farm noise at each relevant assessment receiver to the established limits, following advice that L_{Aeq} results may be directly compared to L_{A10} assigned levels.

In addition, where the assessment of a receptor has predicted unacceptable wind farm noise levels, a process of noise mitigation and alternative wind farm layouts is considered and Steps 3 and 4 are repeated until an acceptable arrangement is developed.

6.0 Assessment of Operational Noise

6.1 Introduction

The prediction and assessment of wind farm noise for the respective EPNR and SA Guidelines may be different, not only due to the different modelling methods and inputs, but because sometimes the criteria under the SA Guidelines for different hub height wind speeds is different.

In accordance with requirements, the assessment of wind farm noise is a combination of the wind turbine noise emission and other infrastructure such as sub-stations and BESS.

Both sets of results are presented to assess compliance.

6.2 EPNR - Predicted Noise Emissions

The wind farm noise levels from the proposed WTG layout and other noise emitting infrastructure is calculated for a hub height wind condition of 10 m/s, being the SynergyRED nominated maximum sound power condition, with predicted listed in **Table 14.** The predicted noise contour plot is presented in Appendix C for both the Tathra Wind Farm and the cumulative emission of Tathra Wind Farm and the existing / proposed Warradarge Wind Farm stages 1 & 2. As the Tathra Wind Farm incorporates 500MW of BESS and solar farm, the contribution of noise emission from the BESS is also shown separately, allowing an understanding of the contribution.

The EPNR contains provisions where cumulative noise from multiple premises causes an exceedance of the ‘Assigned Level’. The adjacent Warradarge Wind Farm has been modelled based on information contained within acoustic assessment reports submitted during the environmental approvals process, to predict the cumulative noise emission and identify if the provisions of section 7 (2) ‘Significantly contributing’ apply.

Table 14: EPNR - Predicted noise emissions to key receptors, L_{Aeq} dB

Receptor	Nighttime Assigned Level, L_{Aeq} dB	Noise Level, BESS only L_{Aeq} dB	Noise Level, All Sources L_{Aeq} dB	Noise Level, Cumulative with Warradarge WF L_{Aeq} dB	Compliant Night & other periods ##
R_7	35	-	18	18	Yes
R_9	35	-11	11	11	Yes
R_10	35	-	19	19	Yes
R_12	35	-	20	20	Yes
R_16	35	-1	30	30	Yes
R_17	40 (involved)	4	36	36	Yes
R_18	35	0	30	30	Yes
R_19	35	14	35	**36**	**1 dB exceedance**
R_20	35	8	32	32	Yes
R_21	35	12	32	32	Yes
R_22	60 (vacated)	38	50	50	Yes
R_33	35	14	33	35	Yes
R_34	35	14	33	35	Yes
R_35	35	14	32	34	Yes
R_36	35	5	24	35	Yes
R_37	35	4	22	32	Yes
R_43	40 (involved)	19	38	38	Yes
R_52	35	7	26	26	Yes
R_56	60 (vacated)	20	47	47	Yes
R_59	40 (involved)	17	38	38	Yes
R_62	35	11	30	34	Yes
R_63	35	11	30	34	Yes
R_68	35	10	29	29	Yes
R_69	35	-1	20	38	Tathra compliant
R_73	35	-8	14	32	Yes
R_74	35	5	26	28	Yes

Note: Exceedance of less than 5 dB are only non-compliant during the regulation ‘night-time’ period.

Exceedance of the regulation LA10 ‘Assigned Level’ during the night-time period are predicted for:

- R19 – 1 dB associated with cumulative Wind Farm noise emissions.
- R69 – 3 dB associated with cumulative noise emissions. However, the contribution from Tathra Wind Farm is less than 5 below the ‘Assigned Level’ (i.e.: less than 30 dB), therefore the proposed Tathra Wind Farm is compliant. The modelling of

Warradarge Wind Farm use in this assessment does not include application of operational curtailment for noise mitigation; therefore, the cumulative may be overpredicted at receptor R69.

6.3 SA Guidelines - Predicted Wind Turbine Noise Levels

The wind farm noise levels from the proposed WTG layout are calculated for a 150-metre hub height wind condition in the operating range of 4 – 15 m/s, listed in **Table 15.** The predicted noise contour plots are presented in **Appendix D.**

Predicted noise emissions for each hub height wind speed are compared to the 'baseline plus 5' criteria for the nearest baseline monitoring point. For receptors close to Warradarge Wind Farm, the baseline criteria from that assessment has been used.

Where applicable, the baseline levels for Warradarge Wind Farm have been re-calculated to apply to the Tathra Wind Farm noise assessment hub height of 150m. Warradarge Wind Farm hub height is 84m, therefore wind speeds at the higher elevation have increased velocity.

Wind turbine sound power emissions are the same from 10 m/s to 15 m/s hub height wind speed as the wind turbines are speed limited from 10 m/s wind speed.

Table 15: SA Guidelines - Predicted noise emissions to key receptors and compliance status, L_{Aeq} dB

Receptor	4 m/s	5 m/s	6 m/s	7 m/s	8 m/s	9 m/s	10 m/s	11 m/s	12 m/s	13 m/s	14 m/s	15 m/s
Involved Receptors	**45**	**45**	**45**	**45**	**45**	**45**	**45**	**45**	**45**	**45**	**45**	**45**
R_17	31	31	34	34	36	38	38	38	38	38	38	38
R_43	33	33	36	36	38	39	40	40	40	40	40	40
R_59	33	33	35	35	37	39	39	39	39	39	39	39
Vacated - Involved	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**
R_22	46	46	48	48	50	52	52	52	52	52	52	52
R_56	41	41	44	44	46	48	49	49	49	49	49	49
M1 Baseline	**35**	**35**	**35**	**36**	**39**	**41**	**42**	**42**	**43**	**44**	**46**	**47**
R_18	24	25	28	28	30	31	32	32	32	32	32	32
R_52	22	22	24	24	26	27	28	28	28	28	28	28
M2 Baseline	**36**	**36**	**36**	**37**	**38**	**40**	**39**	**39**	**39**	**40**	**41**	**43**
R_7	11	11	14	14	15	17	17	17	17	17	17	17
R_10	13	14	16	16	18	19	20	20	20	20	20	20
R_12	15	16	18	18	20	21	22	22	22	22	22	22
R_16	25	25	28	28	30	32	32	32	32	32	32	32
R_20	28	28	30	30	32	34	34	34	34	34	34	34
M3 Baseline	**35**	**35**	**36**	**37**	**39**	**40**	**41**	**40**	**41**	**41**	**43**	**45**
R_68	25	25	27	27	29	30	31	31	31	31	31	31
M5 Baseline	**35**	**35**	**35**	**37**	**40**	**43**	**43**	**46**	**50**	**50**	**47**	**47**

Receptor	4 m/s	5 m/s	6 m/s	7 m/s	8 m/s	9 m/s	10 m/s	11 m/s	12 m/s	13 m/s	14 m/s	15 m/s
R_21	26	26	29	29	30	32	32	32	32	32	32	32
Warradarge Baseline	**35**	**35**	**35**	**35**	**35**	**35**	**35**	**36**	**36**	**36**	**37**	**39**
R_9	8	8	10	10	12	13	14	14	14	14	14	14
R_36	21	21	23	23	25	26	27	27	27	27	27	27
R_37	19	19	21	21	23	24	25	25	25	25	25	25
R_62	26	26	29	29	31	32	32	32	32	32	32	32
R_63	26	26	29	29	30	32	32	32	32	32	32	32
R_69	16	16	18	18	20	21	22	22	22	22	22	22
R_73	11	11	13	13	15	17	17	17	17	17	17	17
R_74	22	22	24	24	26	28	28	28	28	28	28	28
Warradarge R4 Baseline	**35**	**35**	**35**	**35**	**36**	**36**	**37**	**39**	**40**	**37**	-	-
R_19	31	31	34	34	35	**37**	37	37	37	37	37	37
R_33	29	29	31	31	33	34	35	35	35	35	35	35
R_34	29	29	31	31	33	35	35	35	35	35	35	35
R_35	28	28	31	31	33	34	34	34	34	34	34	34

Note: Receptors allocated to nearest baseline monitor, with the associated ‘baseline plus 5’ criteria shown for each baseline location.

Figures in bold highlight indicate an exceedance of the criteria.

Under the South Australian Guidelines there is a predicted exceedance at 9 m/s hub height wind speed of 1 dB(A) for Receptor 19.

6.4 Compliance through WTG Noise Mitigation Modes

Receptor R19 receives noise from wind turbines at the south-western corner of the Tathra Wind Farm. There is a predicted exceedance of 1 dB(A) for 150m hub-height wind speed of 9 m/s under the South Australian Guidelines, and 1 dB(A) under the EPNR for wind speeds of 10 m/s or higher (at 150m AGL). The EPNR exceedance is based on the cumulative Tathra and Warradarge Wind Farm emissions exceeding 35 dB(A).

An analysis of eight wind directions and the relevant wind speeds has been undertaken, with identification of a set of noise mitigation wind turbine operating modes to achieve compliance for the range of wind directions and wind speeds. The noise mitigation modes were selected to achieve compliance while optimising wind farm power generation. This mitigation has been determined seperately for:

- SA Guideline exceedance of 1 dB(A) at 9 m/s wind speed (150m AGL)
- EPNR exceedance of 1 dB(A) at 10 m/s wind speed (150m AGL) and greater wind speeds

Table 16: 9 m/s HH (Sound Power reduction, dB) compliance – SA Guidelines

WTG	N	NE	E	SE	S	SW	W	NW
TS_3	2	2	1	-	-	-	-	2
TS_10	1	1	-	-	-	-	-	-

Noise mitigation requirements were initially determined to achieve compliance with the South Australian Guidelines (which apply at all times of the day).

The noise mitigation measures were then reviewed to also ensure compliance with the requirements of the Western Australian *Environmental Protection (Noise) Regulations 1997*, during the night-time period and at other times.

The contribution from Warradarge Wind Farm to receptor R34 requires mitigation of Tathra Wind Farm emissions to ensure the cumulative emission is no greater than 35 dB(A). This follows from regulation 7 (2) ‘significantly contributing’ provisions, in the event that multiple premises cause an exceedance, noise emissions shall be reduced to 5 dB below the ‘Assigned Level’, or until the cumulative emission is compliant. The mitigation scenario reduces Tathra Wind Farm noise emissions to ensure cumulative emission compliance at the receptor.

Table 17: From 10 m/s HH (Sound Power reduction, dB) compliance – EPNR

WTG	N	NE	E	SE	S	SW	W	NW
TS_3	2	2	1	-	-	-	-	-

The mitigation modes should be applied as follows:

- 9 m/s hub height wind speed – as per **Table 16**.

- 10 m/s to cut out hub height wind speed – as per **Table 17**.

It is noted that there are combinations of mitigation modes and wind turbines that can achieve the same outcome. The option provided is one compliant scenario.

6.5 Wind Farm Noise Assessment

Assessments against the mandatory EPNR and the required SA Guidelines were carried out.

The results presented in this NVIA indicate that wind farm noise emissions:

- Most non-involved receptors: compliant with an L_{A10} of 35 dB for the Night period under the EPNR, which also ensures compliance at other times. Compliant with the minimum criteria of L_{Aeq} of 35 dB under the SA Guidelines.
- Project-involved receptors: Compliant, predicted emissions below the minimum L_{A10} 40 dB criteria applicable to the WA EPNR regulations, and also below the SA Guidelines recommended limit of 45 dB(A).
- Predicted noise emissions exceeding 35 dB extend beyond the project boundary at some locations. There are no existing residences in these areas, so as proposed the noise emissions are compliant.

The following receptors are predicted to demonstrate an exceedance of the WA EPNR and the SA Guidelines:

- R19.

Options to operate selected wind turbines to curtail noise emissions under specific wind direction and wind speed conditions to show compliance at all times are provided in **Section 6.4** of this report.

6.6 Vibration Assessment

There are no expected impacts from vibration during normal operation. The highest levels of ground vibration are expected from the substation transformers. This will not be perceptible at distances greater than 50m from the substation. There are no identified ‘vibration sensitive’ infrastructure close to proposed operating equipment.

7.0 Assessment of Construction Noise & Vibration

7.1 Background

A number of key construction activities associated with the building of wind farm infrastructure have been evaluated, including:

- construction of access roads;
- establishment of turbine tower foundations and electrical substation;
- digging of trenches to accommodate underground power cables;
- erection of turbine towers and assembly of WTG’s;
- The equipment required to complete the above tasks will typically include;
- Excavator/grader, bulldozer, dump trucks, vibratory roller;
- bucket loader, rock breaker, drill rig, excavator/grader, bulldozer, dump truck, flat bed truck, concrete truck; and

- cranes, fork lift, and various 4WD and service vehicles.

The Operational noise of a temporary concrete batching plant to facilitate foundation construction have also been assessed.

It is assumed that up to two trucks will be batching at any one time. Other plant and equipment that have been assumed to be on site as a worst-case scenario are:

- front end loader;
- material conveying system;
- cement silo dust extraction fans;
- concrete mix trucks loading under silos;
- concrete mix trucks slumping;
- batch hopper;
- concrete mix truck idling;
- concrete mix truck moving slowly on site;
- concrete mix truck at washout; and
- bulk material truck delivery and unloading.

7.2 Criteria

Regulation 13 of the *Environmental Protection (Noise) Regulations 1997* sets out the requirements in terms of acceptable construction noise. Construction contractors may determine the most efficient method to undertake the required work at the time of contract, or event modify during construction. It is therefore common practise to provide contractual obligations with the contractor(s) to ensure compliance with Regulation 13, including preparation of Construction Environmental Noise Management Plans where applicable.

The extent of likely noise emission from construction operations can be estimated through modelling of the highest expected noise sources and generate on the maximum noise emission contour around infrastructure areas to be developed during wind farm construction.

7.3 Construction Noise Modelling

In order to predict the potential noise levels from construction equipment associated with the project, a SoundPLAN computer noise model was developed.

The model used the standard Nighttime modelling parameters for WA EPNR modelling with the CONCAWE algorithm.

The model used the following noise sources to represent a normal maximum noise emission from the respective locations as follows:

Table 18: Construction Noise Modelling Sources

Location	Maximum noise emission item	Sound Power (dB)
Roads and trench areas	Vibratory 12-ton roller	111
Wind turbine pads	Rock breaker	121
Concrete batching plant	Mixer and agitator slumping, concurrent	116

The predicted noise footprint is an estimate of the impact extent of proposed construction, excluding traffic increases on gazetted roads.

Normal construction progresses across the site over the anticipated construction timeframe, which is likely to be 12 – 18 months per potential stage, therefore only a portion of the site is experiencing noisy construction activity at any one time.

Appendix E contains an aerial map of the site with the predicted construction noise maximum contours overlaid. Receptors are also shown.

It should be assumed that construction may occur during the night period, however this has not been determined, and until the construction contractor is engaged the extent of any night works will not be known.

As a guide, where predicted noise emissions exceed 35 dB for night works or 40 dB during Sunday or Public Holiday work, a Construction Noise Management Plan for relevant work near that receptor will be required. The predicted maximum footprint noise emissions shown in Appendix D demonstrate there are some construction work locations where a Construction Noise Management Plan may be required for out of hours work.

7.4 Construction Vibration Assessment

Vibration generated by construction has the potential to impact on occupants (human comfort) and structures (building damage).

The activities and equipment with the potential to generate the highest levels of ground vibration are the operation of vibratory rollers during construction of access roads and the operation of any rock breakers during establishment of turbine tower foundations. Typical vibration levels from these sources are presented in **Table 19**.

Table 19: Typical Vibration Emission Levels from Construction Plant

Activity	Minimum limit PPV mm/s					
	Human comfort	Building damage	10m	20m	30m	100m
4-Tonne Vibratory Roller	0.2	7.5	2.0 - 2.4	0.4 - 1.2	0.2 - 0.8	<0.2
Hydraulic Hammer (30t)	0.2	7.5	3	1.5	1.0	<0.5

It is evident that given the large distances between receptors and structures where construction works are likely to be undertaken, that the building damage and human comfort vibration criteria will easily be met during construction.

8.0 Conclusion

8.1 Operational Noise

The results presented in this NVIA indicate that the proposed Tathra Wind Farm, Solar and BESS noise emissions will be compliant with the Western Australian environmental noise requirements. Specifically:

- Non-involved receptors: compliant with an L_{A10} of 35 dB at Night period under the EPNR, which also ensures compliance at other times. The application of noise mitigation modes for selected wind turbines at the south-western corner of the project site is incorporated to achieve this compliant outcome.
- Project-involved receptors: Compliant: predicted emissions below the minimum L_{A10} 40 dB criteria accepted by DWER.
- Predicted noise emissions exceeding 35 dB extend beyond the project boundary at some locations. There are no existing residences in these areas, so as proposed the noise emissions are compliant.

8.2 Construction Noise and Vibration

Regulation 13 of the *Environmental Protection (Noise) Regulations 1997* sets out the requirements in terms of acceptable construction noise.

Construction contractors may determine the most efficient method to undertake the required work at the time of contract, or event modify during construction. It is therefore common practise to provide contractual obligations with the contractor(s) to ensure compliance with Regulation 13, including preparation of Construction Environmental Noise Management Plans where applicable.

A noise impact prediction for the maximum noise generating activity for each work area has been carried out and is presented in **Appendix E**, showing the expected maximum extent of noise impact during construction.

As a guide, where predicted noise emissions exceed L_{Aeq} 35 dB for night works or 40 dB during Sunday or Public Holiday work, a Construction Noise Management Plan for relevant work near that receptor will be required. The predicted maximum footprint noise emissions shown in Appendix D demonstrate there are some construction work locations where a Construction Noise Management Plan may be required for out of hours work.

In order to ensure all appropriate measures are being taken to manage construction noise, a more detailed construction management plan should be developed by the proponent or construction contractor. This document will provide detailed guidance on various noise mitigation strategies for the construction stage.

Vibration impacts from key construction activities have been assessed and the ‘worst case’ scenarios modelled were found to be acceptable.

Appendix A Baseline Noise Monitoring

Tathra Wind Farm

Noise & Vibration Impact Assessment

Synergy Renewable Energy Developments Pty Ltd

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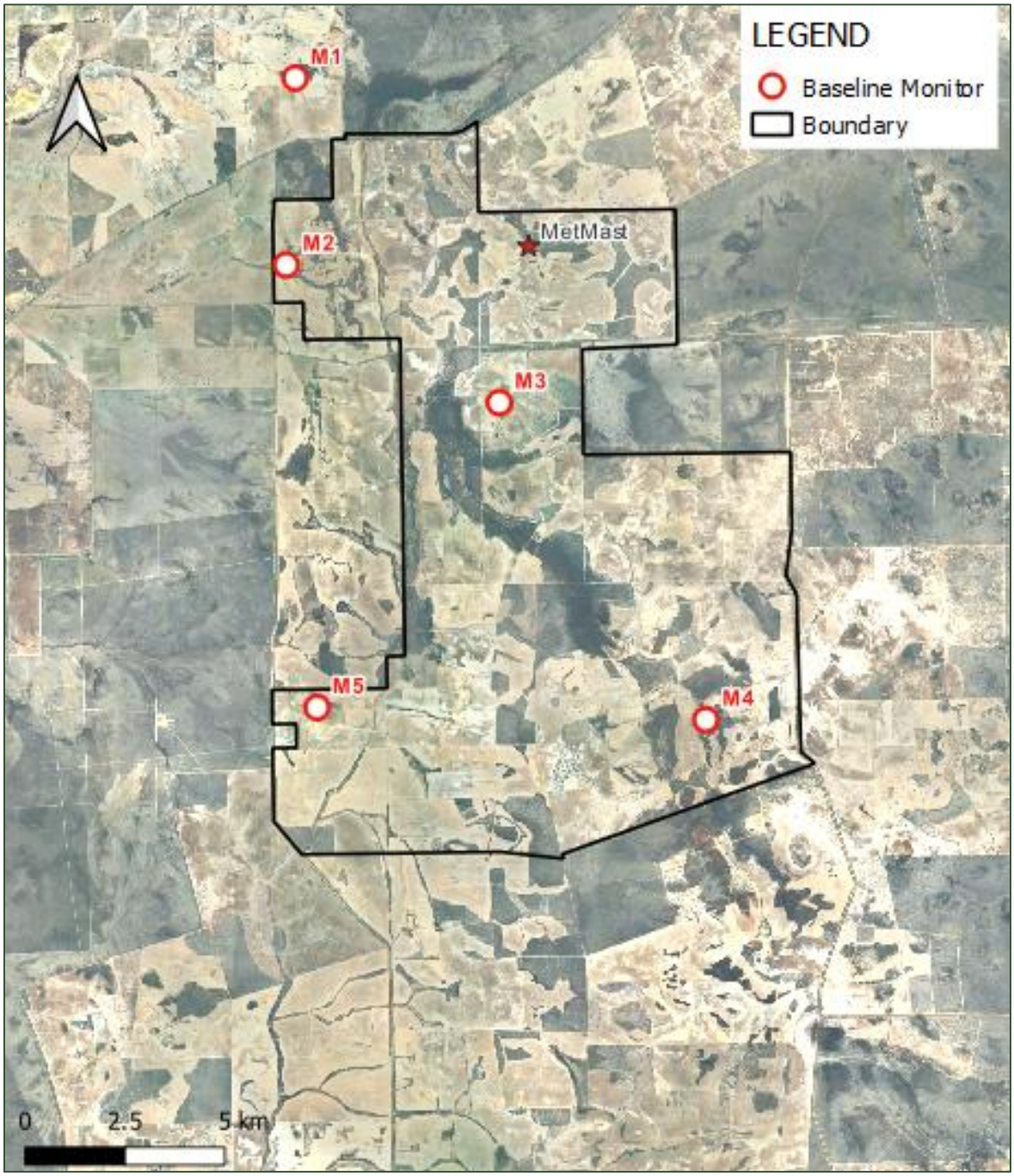
Baseline noise monitors were located near buildings on landholdings with agreements for windfarm development, there being authorised access to these locations. Care was taken to locate noise monitors so that they were at an equivalent distance from trees surrounding the building as the distance from trees to the façade of the building. The location of baseline monitors is shown in **Figure 6**.

Figure 6: Baseline Noise Monitor locations



As background noise associated with wind is mostly generated by tree foliage movement, the baseline noise measured is representative of noise received at a residence. The selected locations are in a similar area to residences surrounding the proposed wind farm. A review of aerial imagery indicated that these residences generally have a similar tree surround to those where the monitors were located.

Monitor M1

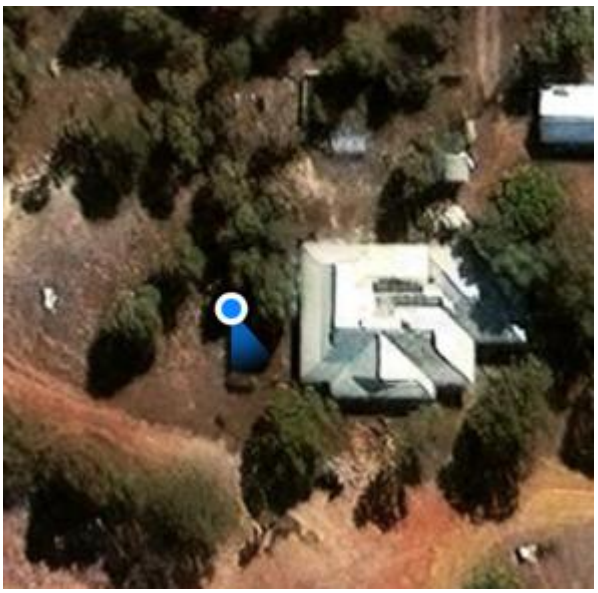
This is an occupied residence of a non-Wind Farm involved farm. Appreciation is extended to the landowner for allowing baseline noise monitoring at this location. The location is considered representative of surrounding residences.

Figure 7: Location M1 photographs

Looking north, adjacent residence

Looking south

Aerial view



The installed noise monitor was a SVAN SV903A sound meter with current NATA calibration, serial number 151617. A 150 mm windsock was fitted to the microphone to limit regenerated (wind induced) noise at the microphone.

The monitoring period was from 03rd March to 01st May 2025, with 8,069 valid 10-minute measurement periods.

The results of the background noise monitoring showing the L_{A90} data points, excluded data points due to rain and average background noise level for each hub-height integer windspeed bin are shown in **Figure 8**. A 150-metre hub height windspeed provided by SynergyRED from the site met mast was used in the assessment.

Table 20: Location M1 – Average L_{A90} Noise vs 150m Hub Height Wind Speed, dB

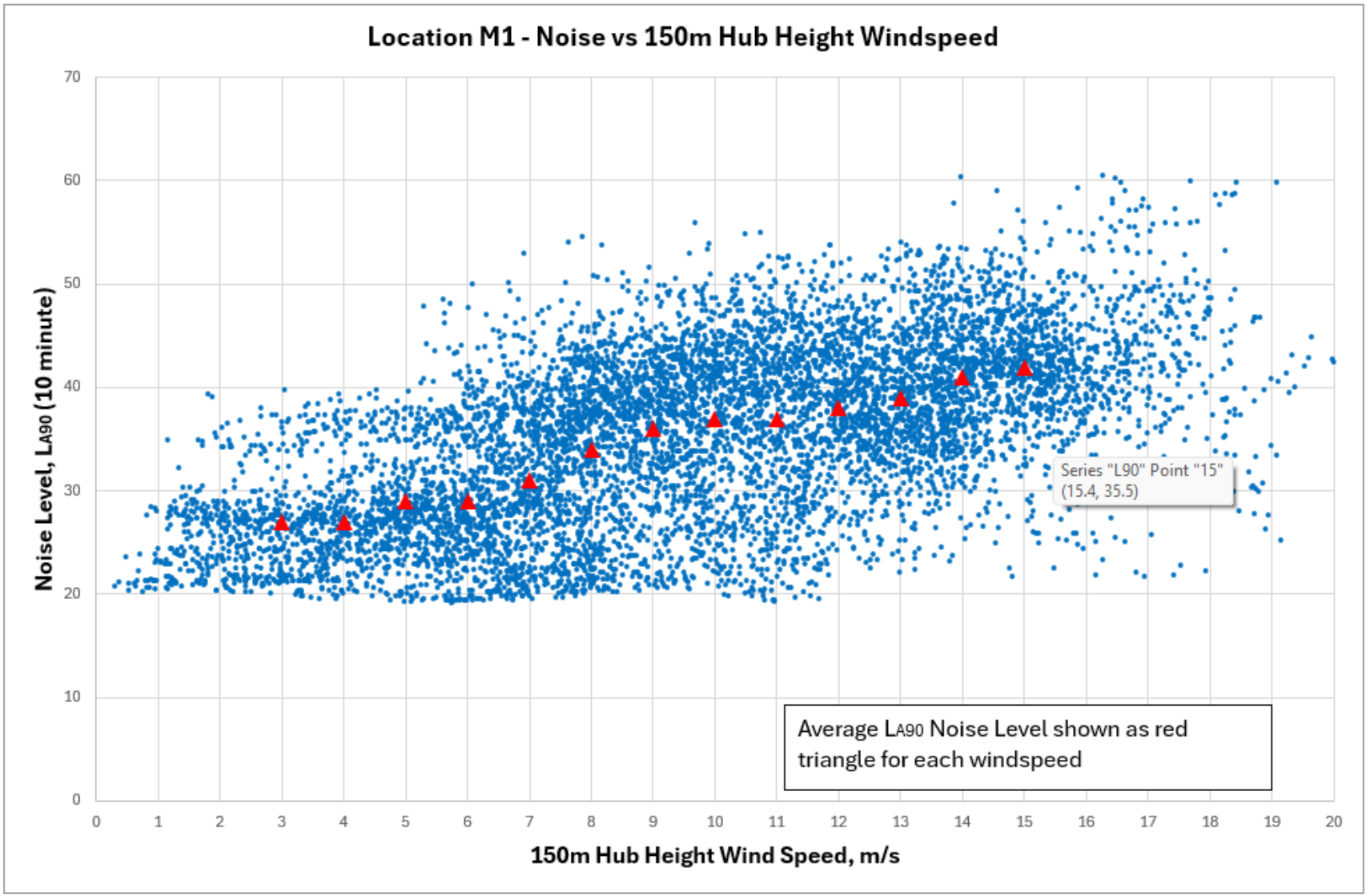
Wind speed m/s	3	4	5	6	7	8	9	10	11	12	13	14	15
Average noise level, dB	27	27	29	29	31	34	36	37	37	38	39	41	42

The number of data samples for wind coming from specific wind directions are shown in **Table 21**.

Table 21: Location M1 – Data Sample Count by Direction

N	NE	E	SE	S	SW	W	NW
202	785	1769	1987	1407	771	657	323

Figure 8: Location M1 Graph - LA_{90} vs HH Wind Speed



Monitor M2

This is a lived in residence, on the western internal edge of the project area, being a project involved receptor.

Figure 9: Location M2 photographs

Looking west

Aerial View

The installed noise monitor was a SVAN SV903A sound meter with current NATA calibration, serial number 137613. A 150 mm windsock was fitted to the microphone to limit regenerated noise at the microphone.

The monitoring period was from 03rd March to 01st May 2025, with 7,238 valid 10-minute measurement periods.

The results of the background noise monitoring showing the L_{A90} data points, excluded data points due to rain and average background noise level for each hub-height integer windspeed bin are shown in **Figure 8**. A 150-metre hub height windspeed provided by SynergyRED from the site met mast was used in the assessment.

Table 22: Location M2 – Average L_{A90} Noise vs 150m Hub Height Wind Speed, dB

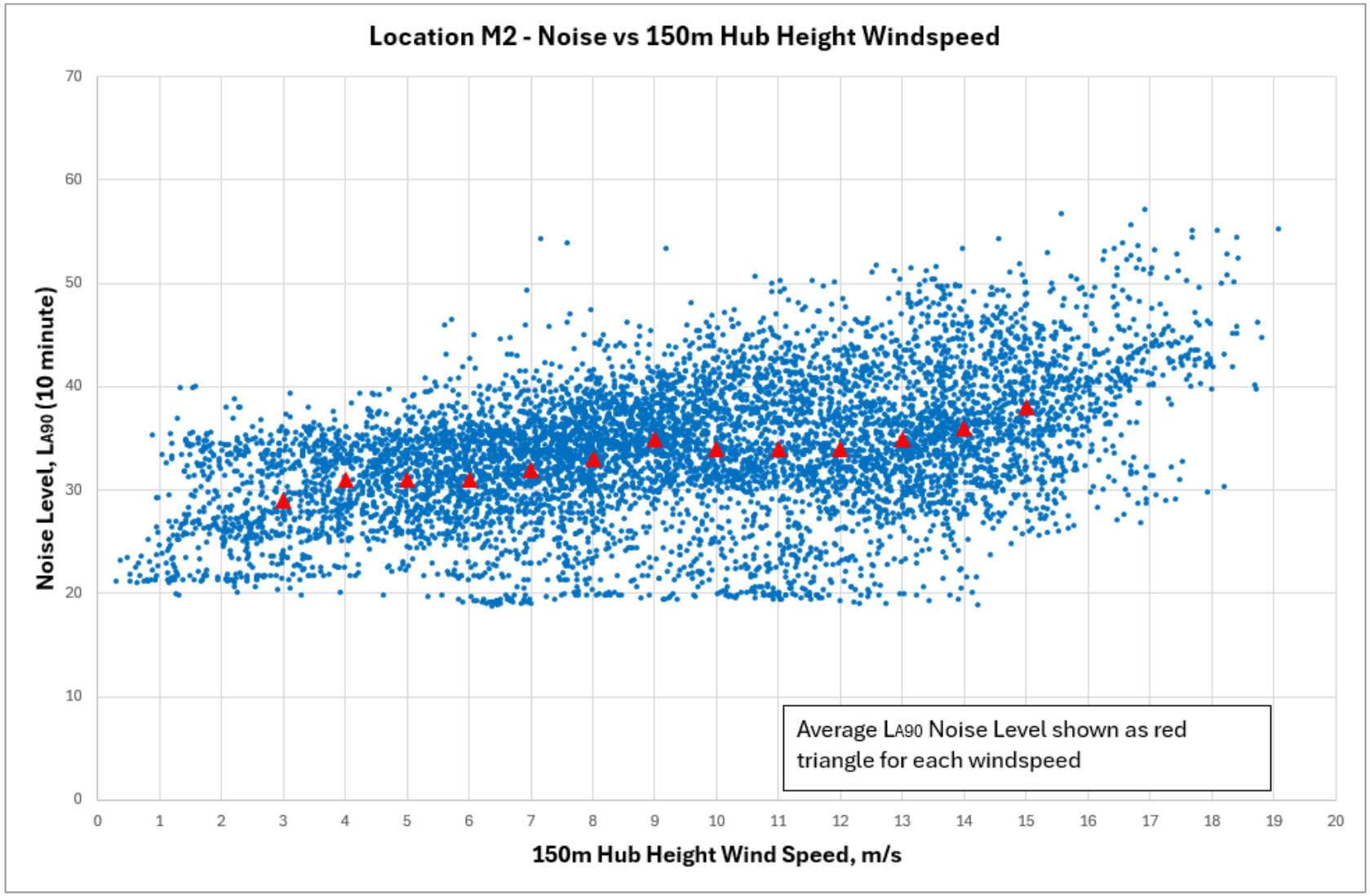
Wind speed m/s	3	4	5	6	7	8	9	10	11	12	13	14	15
Average noise level, dB	29	31	31	31	32	33	35	34	34	34	35	36	38

The number of data samples for wind coming from specific wind directions are shown in **Table 23**.

Table 23: Location M2 – Data Sample Count by Direction

N	NE	E	SE	S	SW	W	NW
198	658	1,443	1,621	1,408	771	664	332

Figure 10: Location M2 Graph - LA90 vs HH Wind Speed



Monitor M3

This residence is located in the centre of the project area; the resident is a project involved resident.

Figure 11: Location M3 photographs

Looking south, house on the right

Looking west

Aerial View

The installed noise monitor was a SVAN 307A sound meter with current NATA calibration, serial number 137616. A 150 mm windsock was fitted to the microphone to limit regenerated noise at the microphone. The sound meter was complimented with a "GMX600 weather station positioned at microphone height, to identify local rain events and windspeed at the microphone.

The monitoring period was from 03rd March to 01st May 2025, with 8,095 valid 10-minute measurement periods.

The results of the background noise monitoring showing the L_{A90} data points, excluded data points due to rain and average background noise level for each hub-height integer windspeed bin are shown in **Figure 8**. A 150-metre hub height windspeed provided by SynergyRED from the site met mast was used in the assessment.

The tabulated background noise levels are found in **Table 24**.

Table 24: Location M3 – Average L_{A90} Noise vs 150m Hub Height Wind Speed, dB

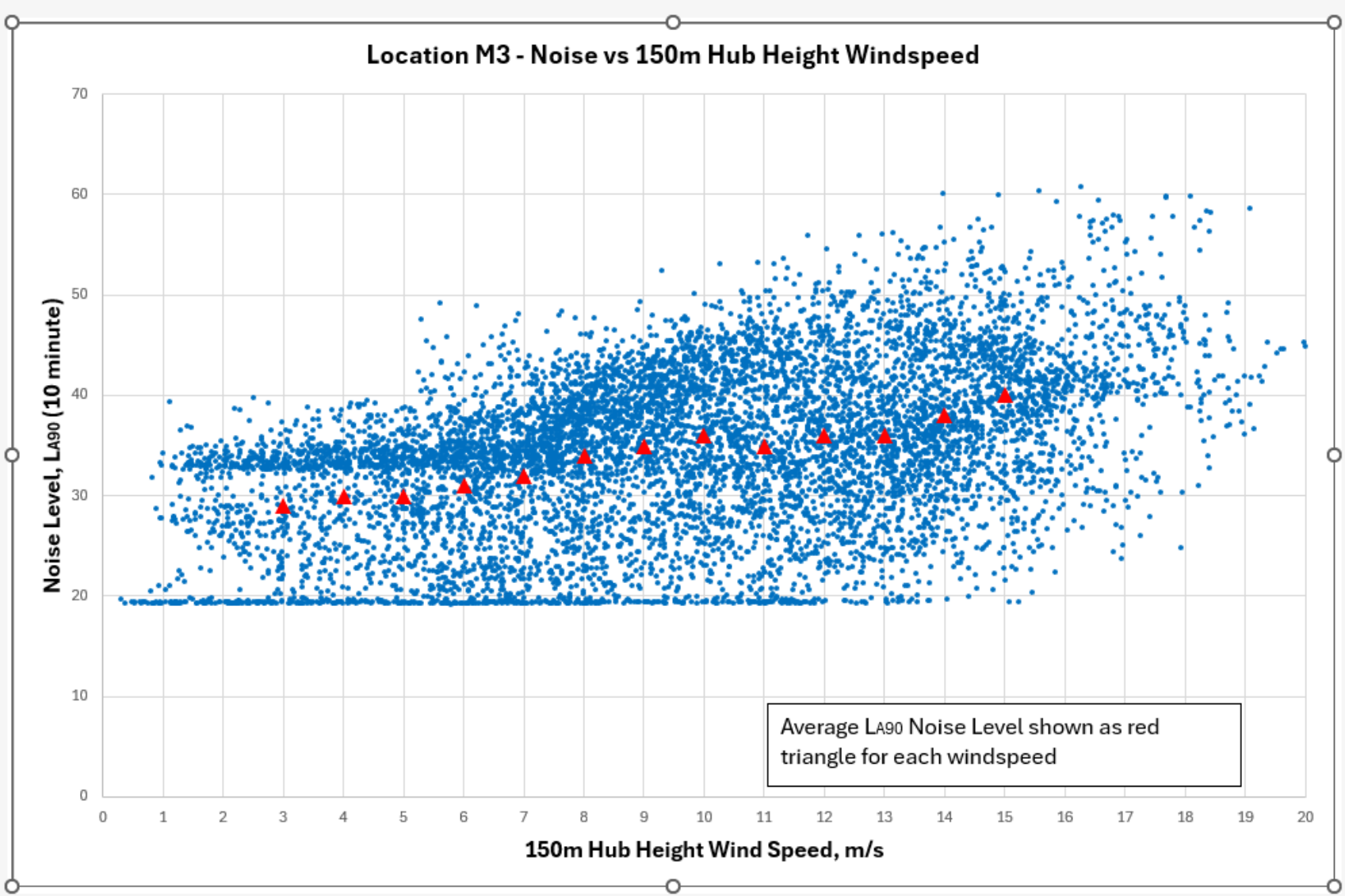
Wind speed m/s	3	4	5	6	7	8	9	10	11	12	13	14	15
Average noise level, dB	29	30	30	31	32	34	35	36	35	36	36	38	40

The number of data samples for wind coming from specific wind directions are shown in **Table 25**.

Table 25: Location M3 – Data Sample Count by Direction

N	NE	E	SE	S	SW	W	NW
205	792	1,754	1,990	1,412	775	665	333

Figure 12: Location M3 Graph - LA90 vs HH Wind Speed



Monitor M4

This is a lived in residence, being a project involved receptor at the south-east of the project area. The residence is on a partially recessed portion of a hill / scarp, looking out to the west. The monitor was located on the elevated land near to the house, at a similar distance from trees as the house.

Figure 13: Location M4 photographs

Looking north towards house

Aerial View

The installed noise monitor was a SVAN 957 sound meter with current NATA calibration, serial number 23243. A 150mm windsock was fitted to the microphone to limit regenerated noise at the microphone.

The monitoring period was from 03rd March to 01st May 2025, with 8,214 valid 10-minute measurement periods.

The results of the background noise monitoring showing the L_{A90} data points, excluded data points due to rain and average background noise level for each hub-height integer windspeed bin are shown in **Figure 8**. A 150-metre hub height windspeed provided by SynergyRED from the site met mast was used in the assessment.

The tabulated background noise levels are found in **Table 26**.

Table 26: Location M4 – Average L_{A90} Noise vs 150m Hub Height Wind Speed, dB

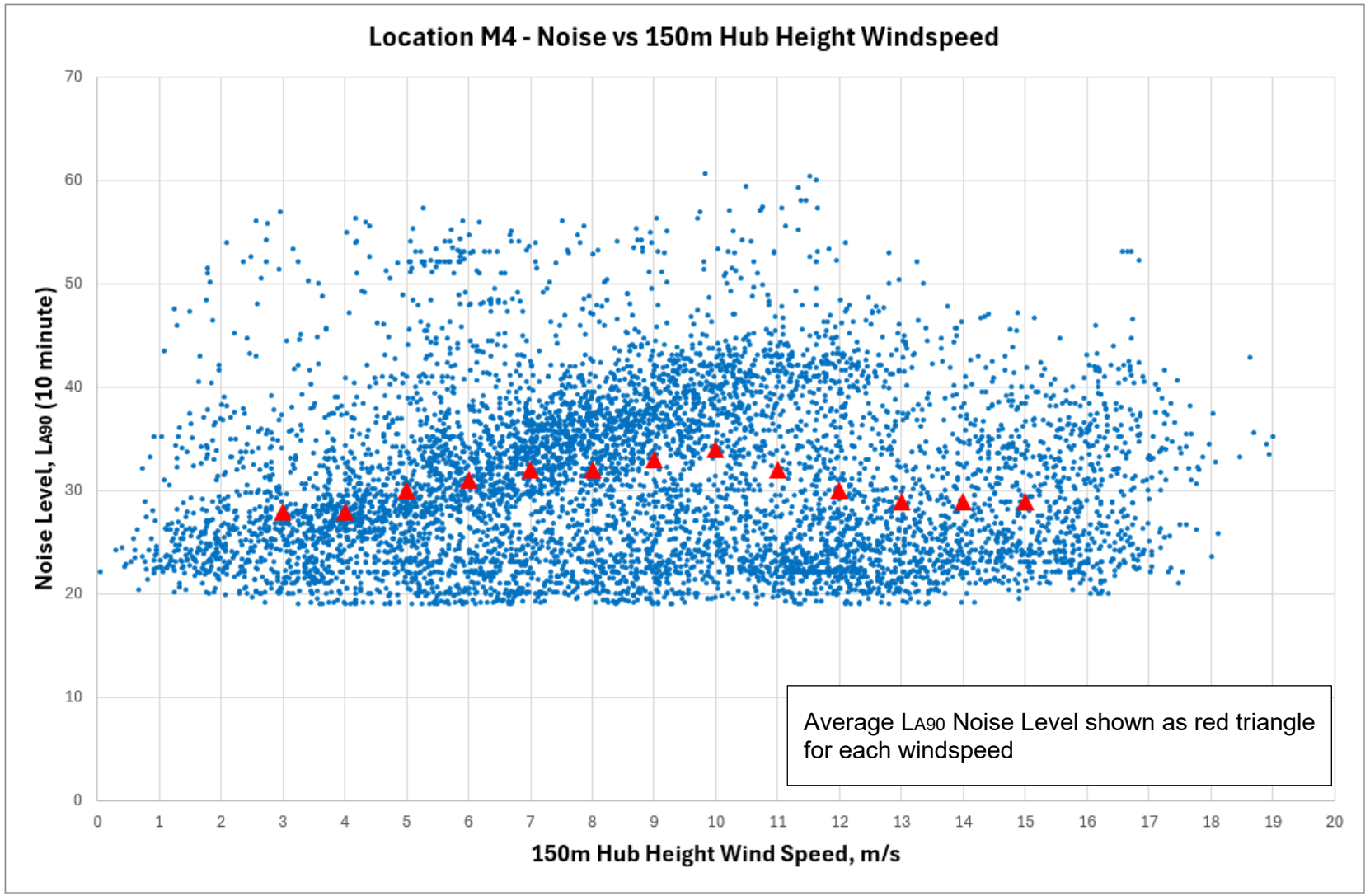
Wind speed m/s	3	4	5	6	7	8	9	10	11	12	13	14	15
Average noise level, dB	22	23	24	25	26	28	30	30	30	29	28	28	28

The number of data samples for wind coming from specific wind directions are shown in **Table 21**.

Table 27: Location M4 – Data Sample Count by Direction

N	NE	E	SE	S	SW	W	NW
202	754	1,745	1,993	1,418	781	669	338

Figure 14: Location M4 Graph - LA_{90} vs HH Wind Speed



Monitor M5

This was a lived in residence, it is understood that an agreement has been reached that the resident will live elsewhere and the house will be removed.

Figure 15: Location M5 photographs

Looking north-east

Aerial View

The installed noise monitor was a SVAN 957 sound meter with current NATA calibration, serial number 20674. A 150mm windsock was fitted to the microphone to limit regenerated noise at the microphone.

The monitoring period was from 03rd March to 01st May 2025, with 1,649 valid 10-minute measurement periods. This location has less valid measurement periods due to an equipment issue.

The results of the background noise monitoring showing the L_{A90} data points, excluded data points due to rain and average background noise level for each hub-height integer windspeed bin are shown in **Figure 8**. A 150-metre hub height windspeed provided by SynergyRED from the site met mast was used in the assessment.

The tabulated background noise levels are found in **Table 28**.

Table 28: Location M5 – Average L_{A90} Noise vs 150m Hub Height Wind Speed, dB

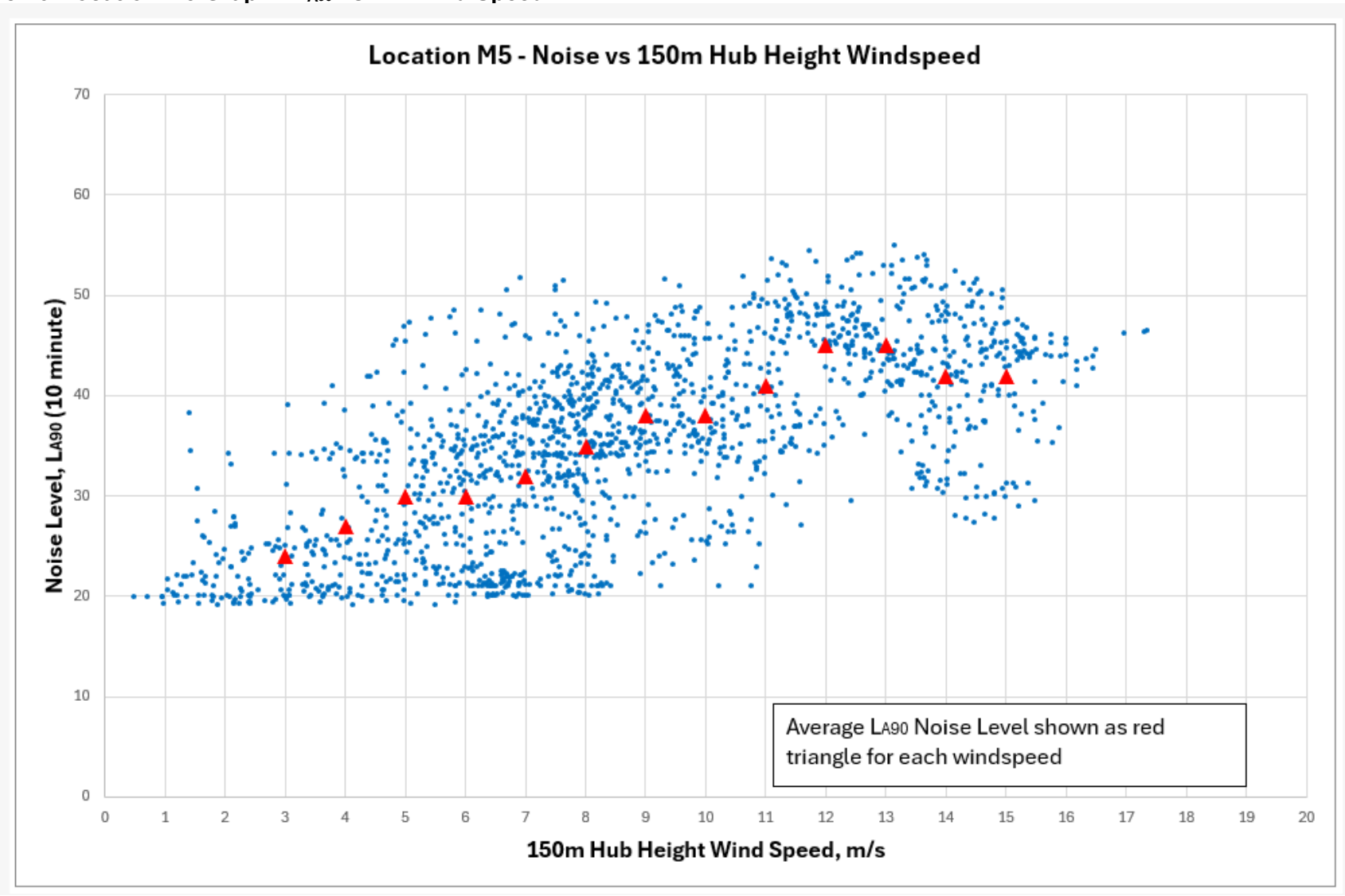
Wind speed m/s	3	4	5	6	7	8	9	10	11	12	13	14	15
Average noise level, dB	24	27	30	30	32	35	38	38	41	45	45	42	42

The number of data samples for wind coming from specific wind directions are shown in **Table 29**.

Table 29: Location M5 – Data Sample Count by Direction

N	NE	E	SE	S	SW	W	NW
39	57	116	399	297	286	252	165

Figure 16: Location M5 Graph - L_{A90} vs HH Wind Speed



Appendix B WTG & Receptor Coordinates

Tathra Wind Farm

Noise & Vibration Impact Assessment

Synergy Renewable Energy Developments Pty Ltd

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Table 30: Wind Turbine Layout – Coordinates

Turbine No	Easting	Northing	Turbine No	Easting	Northing
ES_1	346080.1	6705431	TN_24	356060.1	6699031
ES_2	346200.1	6706311	TN_25	356180.1	6696891
ES_3	346240.1	6703771	TN_26	356220.1	6695411
ES_4	346260.1	6704931	TN_27	356220.1	6698371
ES_5	346305.5	6706705	TN_28	356460.1	6697651
ES_6	346520.1	6704431	TN_29	356520.1	6693951
ES_7	346700.1	6702651	TN_30	356540.1	6696211
ES_8	346920.1	6703511	TN_31	356720.1	6694651
ES_9	347060.1	6705651	TN_32	357000.1	6699031
ES_10	347480.1	6706671	TN_33	357020.1	6698131
ES_11	347660.1	6705651	TN_34	357020.1	6697251
ES_12	347700.1	6704111	TN_35	357120.1	6695551
ES_13	347900.1	6702191	TN_36	357180.1	6694151
ES_14	348060.1	6700911	TS_1	344820.1	6690531
ES_15	348140.1	6706831	TS_2	344820.1	6691391
ES_16	348180.1	6699531	TS_3	345040.1	6690051
ES_17	348320.1	6699011	TS_4	345135.9	6692807
ES_18	348320.1	6705091	TS_5	345160.1	6690951
ES_19	348340.1	6698371	TS_6	345421.6	6692231
ES_20	348360.1	6701531	TS_7	345667	6693108
ES_21	348400.1	6702851	TS_8	346100.1	6691531
ES_22	348520.1	6706271	TS_9	346200.1	6689991
ES_23	348927.9	6704648	TS_10	346560.1	6689551
ES_24	348999	6703578	TS_11	347200.1	6693091
ES_25	349100.1	6705551	TS_12	347220.1	6690671
ES_26	349260.1	6706891	TS_13	347260.1	6691651
ES_27	349280.1	6706371	TS_14	347540.1	6689571
ES_28	349700.1	6703991	TS_15	347700.1	6693471
ES_29	349720.1	6704971	TS_16	347880.1	6692331
ES_30	350080.1	6702291	TS_17	348000.1	6694131
ES_31	350380.1	6704871	TS_18	348020.1	6690951
ES_32	350540.1	6702551	TS_19	348140.1	6695871
ES_33	350860.1	6705071	TS_20	348320.1	6696771
ES_34	350960.1	6702871	TS_21	348380.1	6690331
ES_35	351060.1	6704191	TS_22	348680.1	6692271

Turbine No	Easting	Northing	Turbine No	Easting	Northing
ES_36	351380.1	6703551	TS_23	348780.1	6689691
ES_37	351640.1	6702891	TS_24	348780.1	6697431
ES_38	351760.1	6702371	TS_25	348900.1	6695531
ES_39	351780.1	6704191	TS_26	348960.1	6694511
ES_40	352020.1	6705091	TS_27	349100.1	6693371
ES_41	352560.1	6704411	TS_28	349120.1	6696911
ES_42	352600.1	6703471	TS_29	349580.1	6696351
ES_43	353600.1	6705111	TS_30	349620.1	6690391
ES_44	353860.1	6702471	TS_31	349740.1	6689611
ES_45	354000.1	6703471	TS_32	349820.1	6691591
ES_46	354140.1	6704391	TS_33	350000.1	6695371
ES_47	354140.1	6702931	TS_34	350280.1	6694451
TN_1	349780.1	6698651	TS_35	350340.1	6693071
TN_2	350640.1	6698311	TS_36	350420.1	6690831
TN_3	351600.1	6698951	TS_37	350520.1	6693651
TN_4	351620.1	6697611	TS_38	350860.1	6694791
TN_5	351880.1	6698491	TS_39	350880.1	6695871
TN_6	352500.1	6697911	TS_40	350920.1	6691871
TN_7	353060.1	6695171	TS_41	350940.1	6696431
TN_8	353340.1	6697951	TS_42	351000.1	6690971
TN_9	353540.1	6698991	TS_43	351500.1	6692331
TN_10	353780.1	6694631	TS_44	351520.1	6690331
TN_11	353800.1	6696191	TS_45	351580.1	6693651
TN_12	353820.1	6698471	TS_46	351720.1	6689571
TN_13	353940.1	6697211	TS_47	352040.1	6692731
TN_14	354280.1	6694991	TS_48	352060.1	6690871
TN_15	354420.1	6697451	TS_49	352500.1	6689851
TN_16	354480.1	6699011	TS_50	352680.1	6691731
TN_17	354680.1	6696351	TS_51	352960.1	6692231
TN_18	354840.1	6697811	TS_52	353020.1	6691231
TN_19	355000.1	6695391	TS_53	353100.1	6690071
TN_20	355340.1	6698991	TS_54	353200.1	6692731
TN_21	355420.1	6694111	TS_55	353580.1	6690371
TN_22	355920.1	6696231	TS_56	353760.1	6691551
TN_23	356000.1	6694271	TS_57	354160.1	6690531

Note: Co-ordinates referenced to GDA2020 (EPSG 7850)

Receptors identified and shown in this assessment are described by the SynergyRED receptor number, with co-ordinates provided in **Table 31**.

Table 31: Receptor Coordinates

Receptor Number	Easting	Northing	Type	Project Relationship
R_7	338774	6703527	House	-
R_9	339567	6684241	House	-
R_10	339663	6702383	House	-
R_12	339871	6704214	House	-
R_16	343329	6705485	House	-
R_17	344751	6703992	House	Involved, within project
R_18	344982	6708697	House	-
R_19	345169	6688460	House	-
R_20	345390	6700619	House	-
R_21	345402	6696679	House	-
R_22	345549	6692946	House	Involved, vacated
R_33	347696	6687380	House	-
R_34	347742	6687440	House	-
R_35	347794	6687281	House	
R_36	347856	6684189	House	Involved, within project
R_37	347860	6683532	House	-
R_43	350095	6700569	House	Involved, within project
R_52	353588	6709529	House	-
R_56	354936	6698942	House	Involved, vacated
R_59	355265	6692624	House	Involved, within project
R_62	356880	6690067	House	-
R_63	356892	6690018	House	-
R_68	358466	6701664	House	-
R_69	358858	6686593	House	-
R_73	359716	6684416	House	-
R_74	360775	6692288	House	-

Appendix C EPNR Noise Contours

Tathra Wind Farm

Noise & Vibration Impact Assessment

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SLR

Figure 16: EPNR – BESS Only Noise Contours, L_{Aeq}, dB

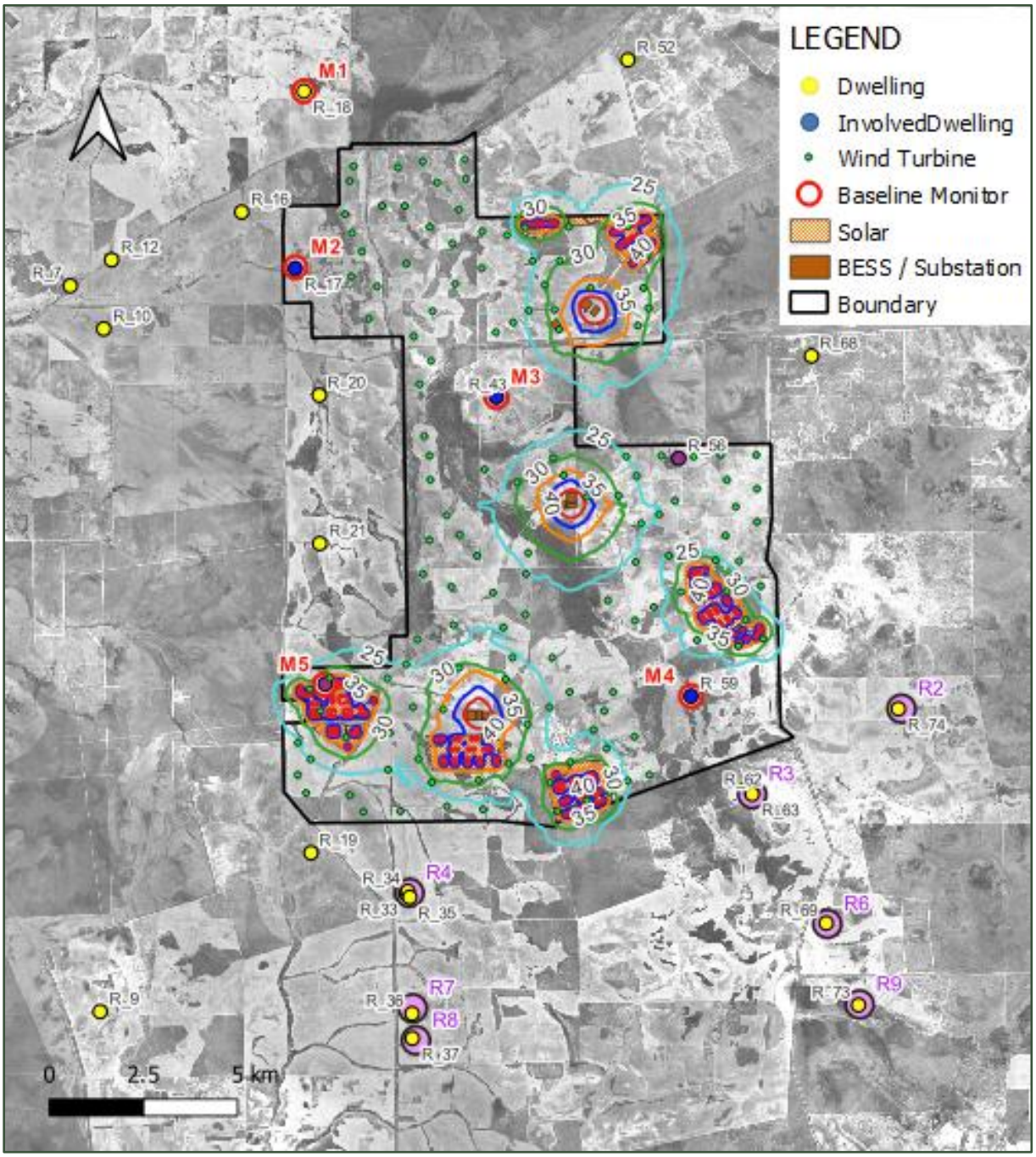


Figure 17: EPNR Tathra Wind Farm Noise Contours, L_{Aeq}, dB

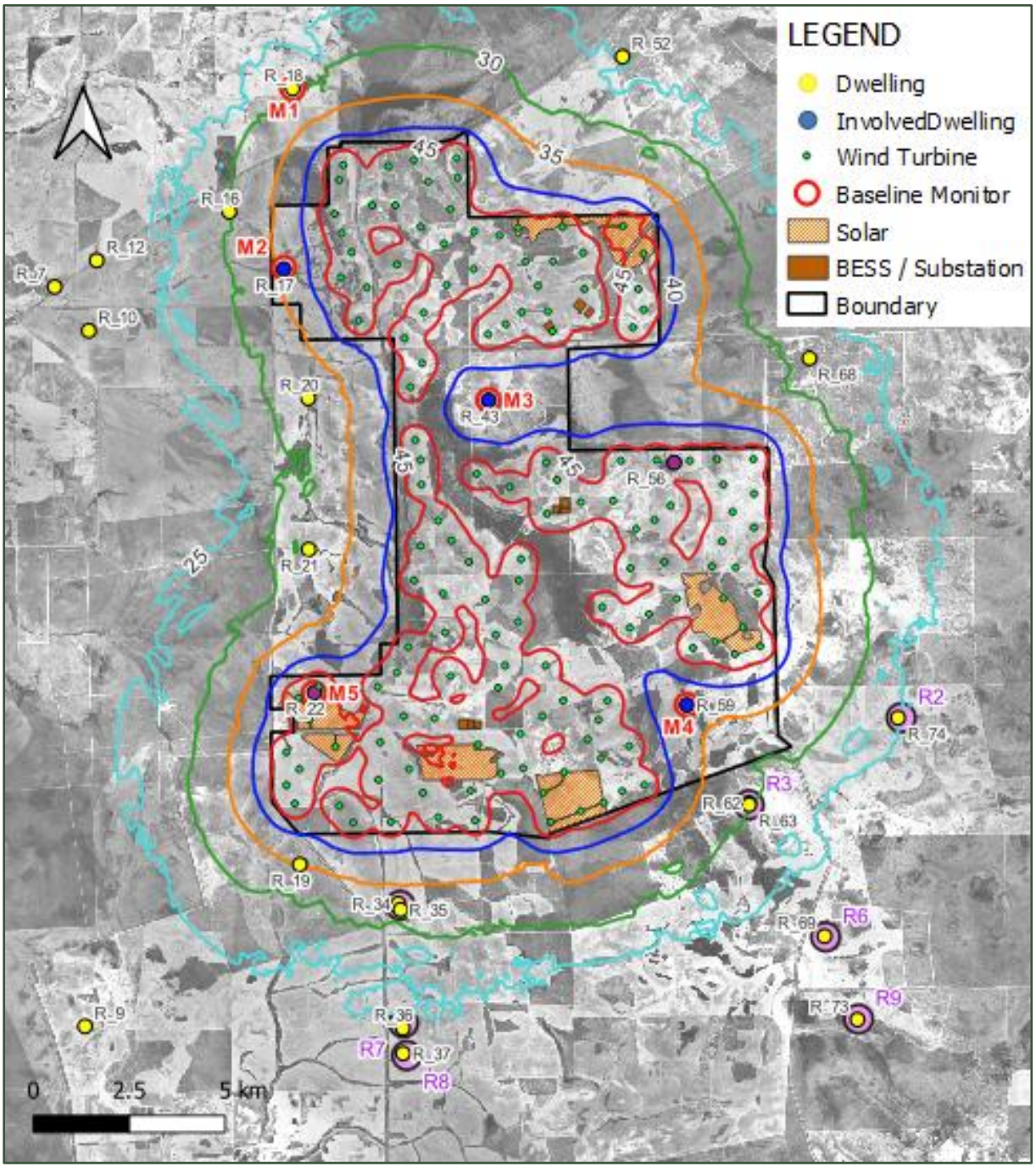
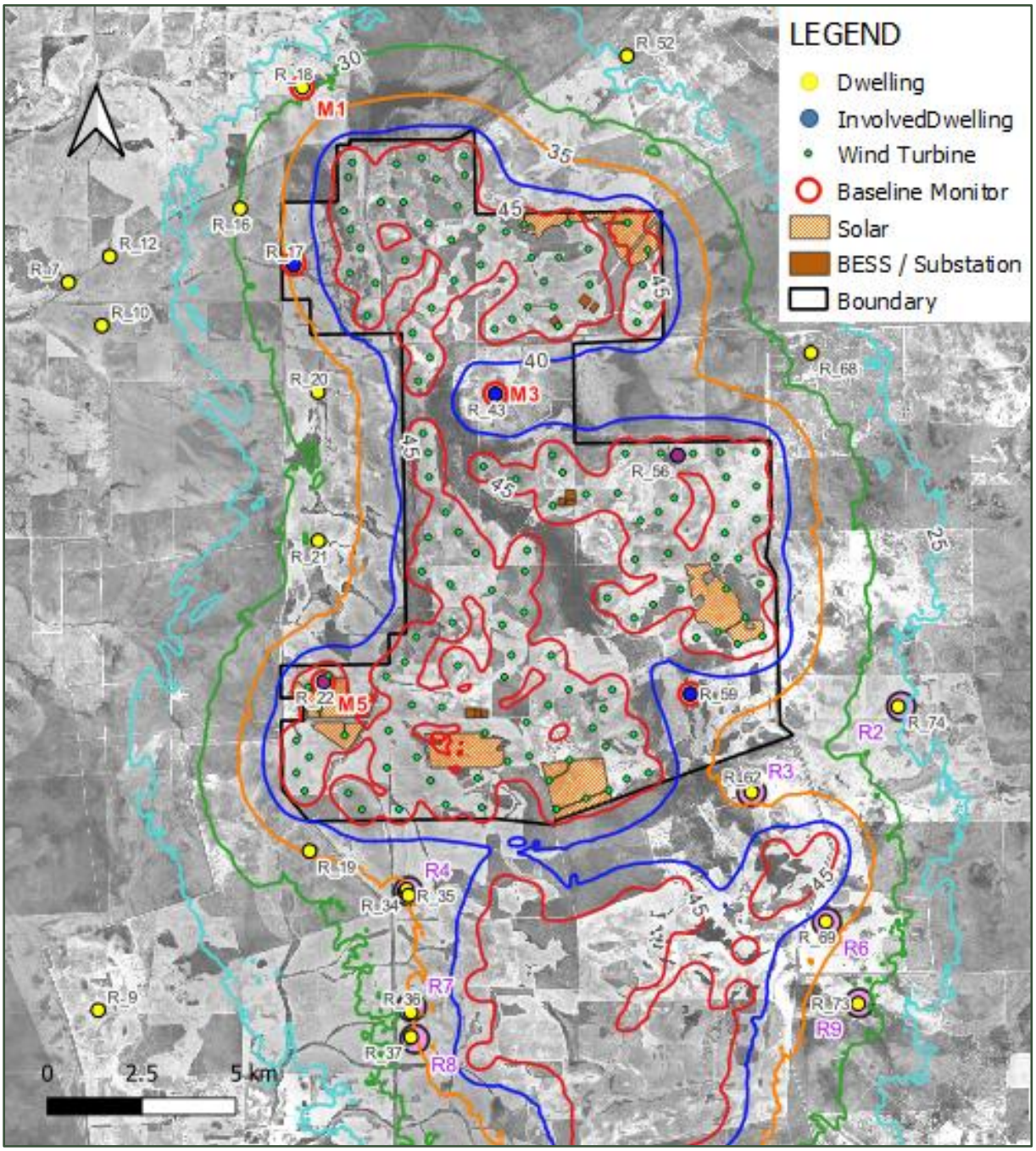


Figure 18: EPNR Tathra & Future Warradarge Wind Farms Cumulative Noise, L_{Aeq}, dB



Appendix D SA Guideline Noise Contours

Tathra Wind Farm

Noise & Vibration Impact Assessment

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Figure 19: 10m/s HH Wind - 107 L_{WA} Noise Contours, L_{Aeq}, dB

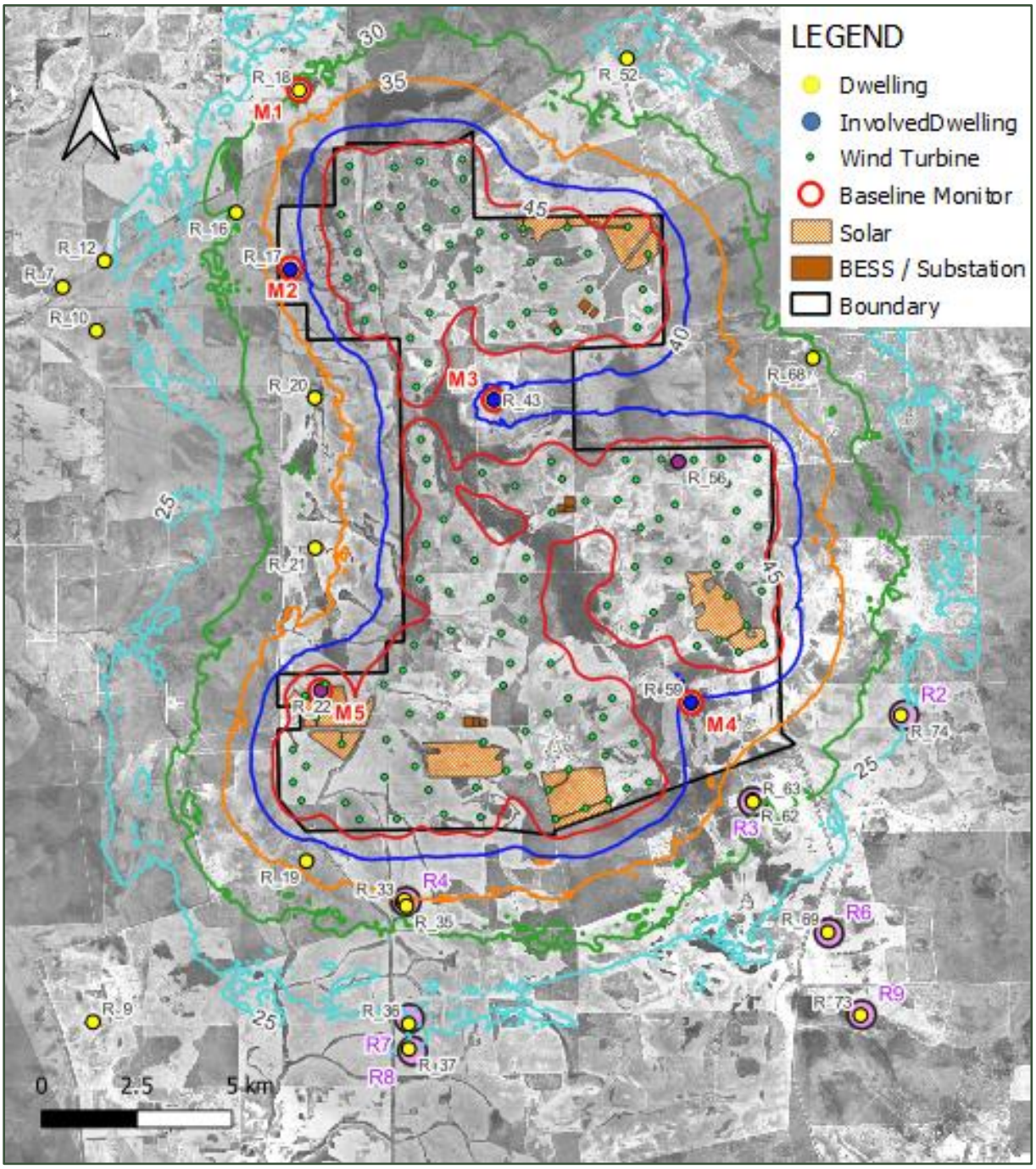


Figure 20: 9m/s HH Wind – 106.7 L_{WA} Noise Contours, L_{Aeq}, dB

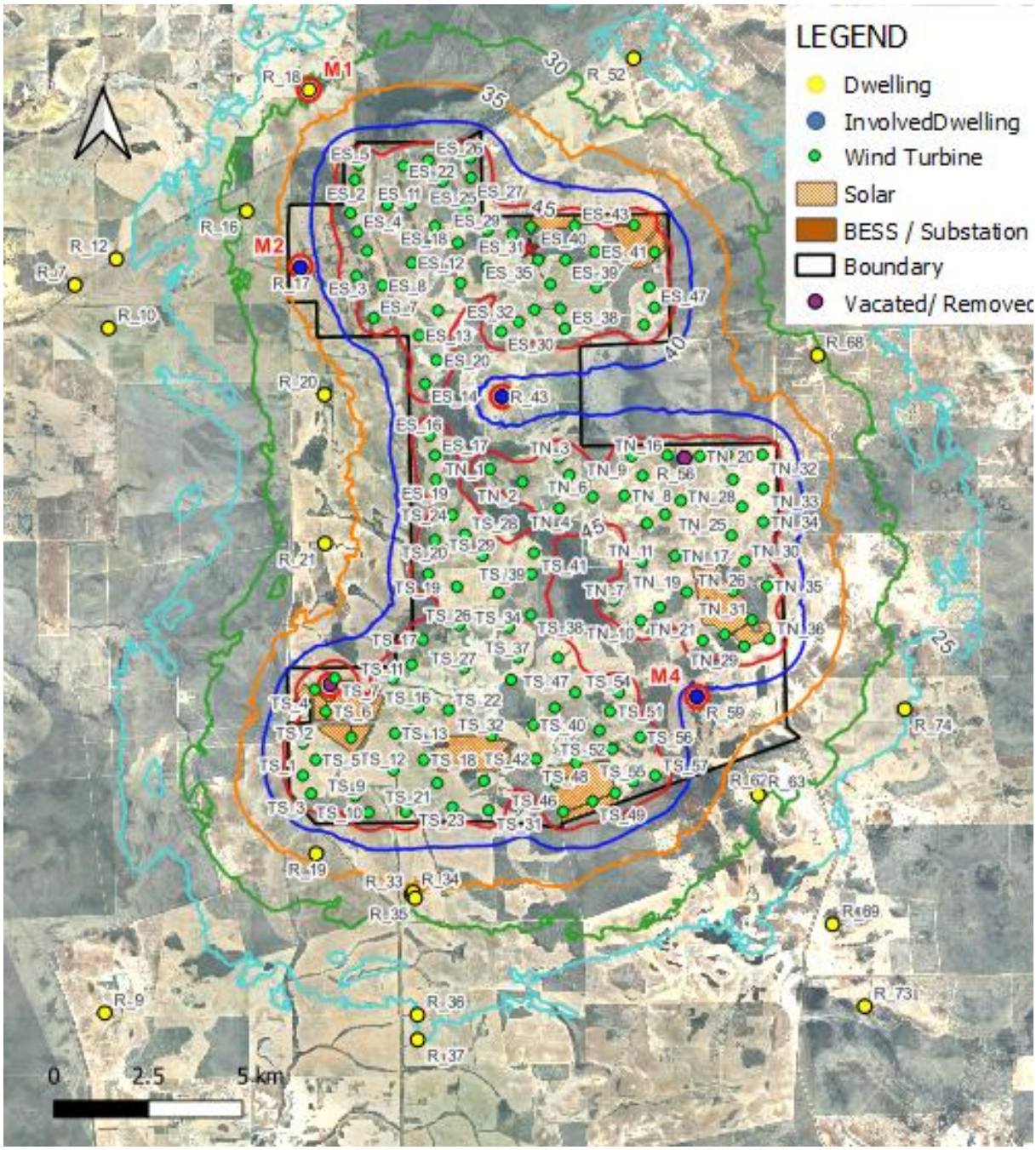


Figure 21: 8m/s HH Wind – 104.5 L_{WA} Noise Contours, L_{Aeq}, dB

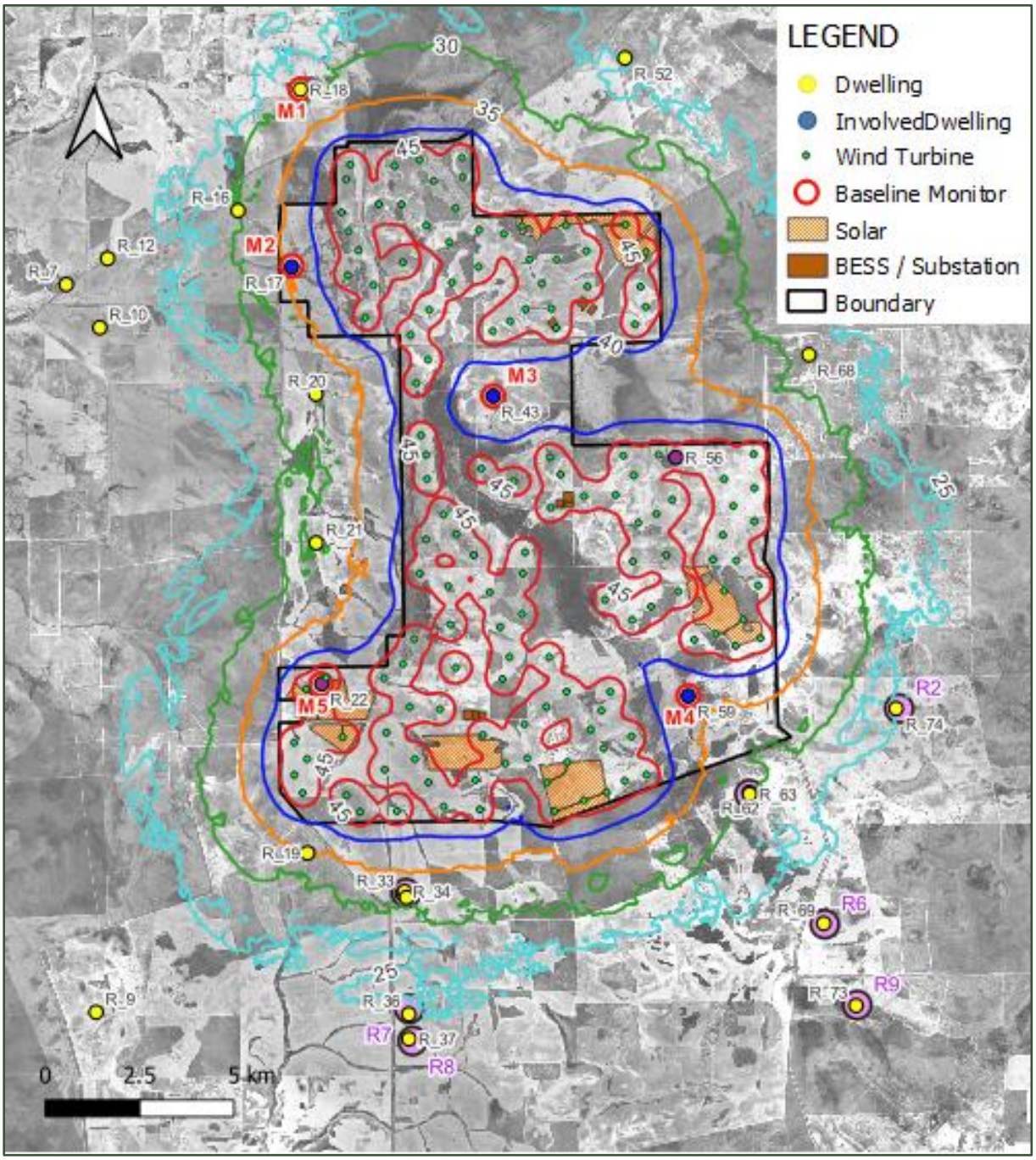


Figure 22: 7m/s HH Wind – 102.5 L_{WA} Noise Contours, L_{Aeq}, dB

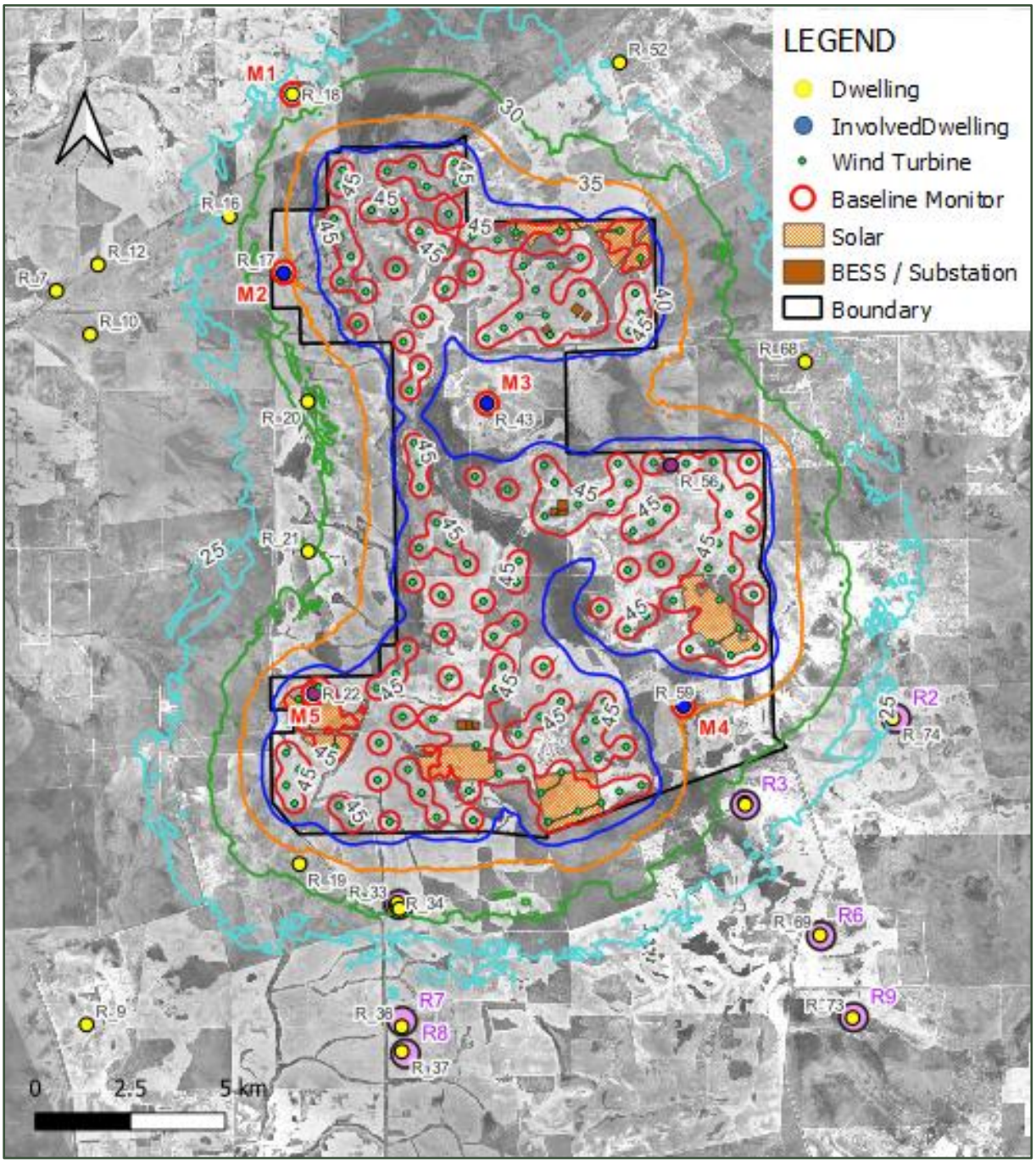


Figure 23: 6m/s HH Wind – 99.2 L_{WA} Noise Contours, L_{Aeq}, dB

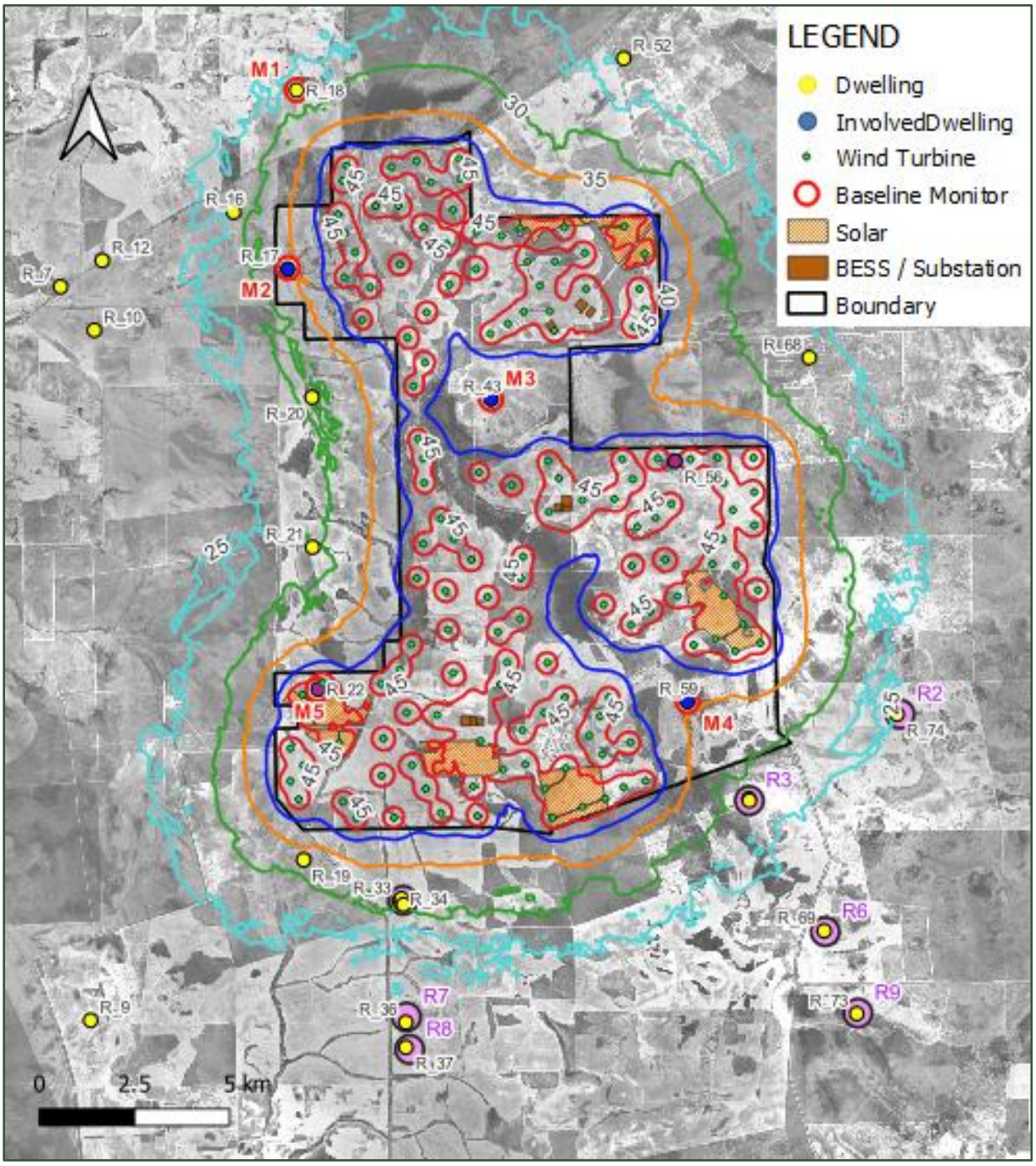


Figure 24: 5m/s HH Wind – 95.7 L_{WA} Noise Contours, L_{Aeq}, dB

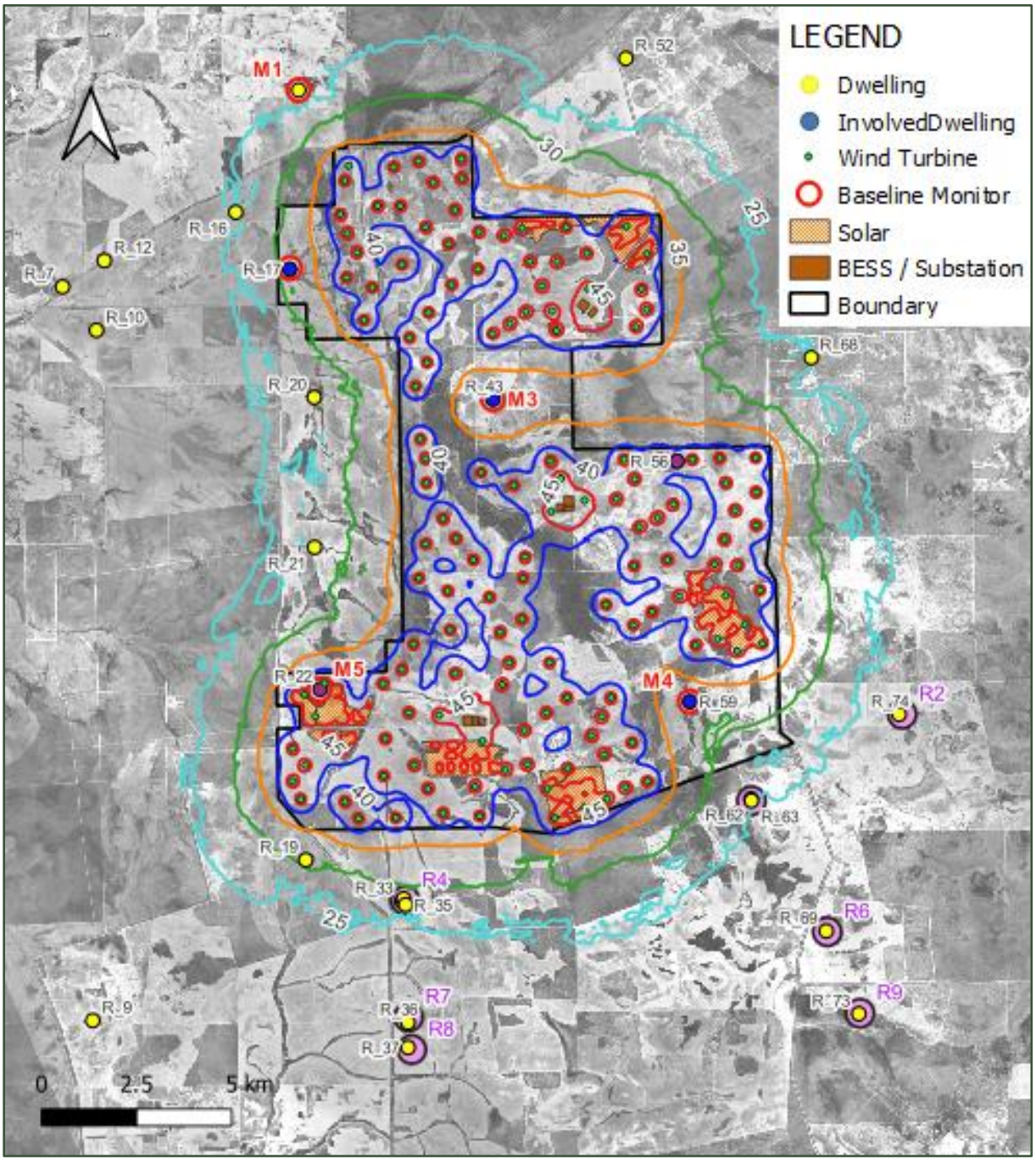
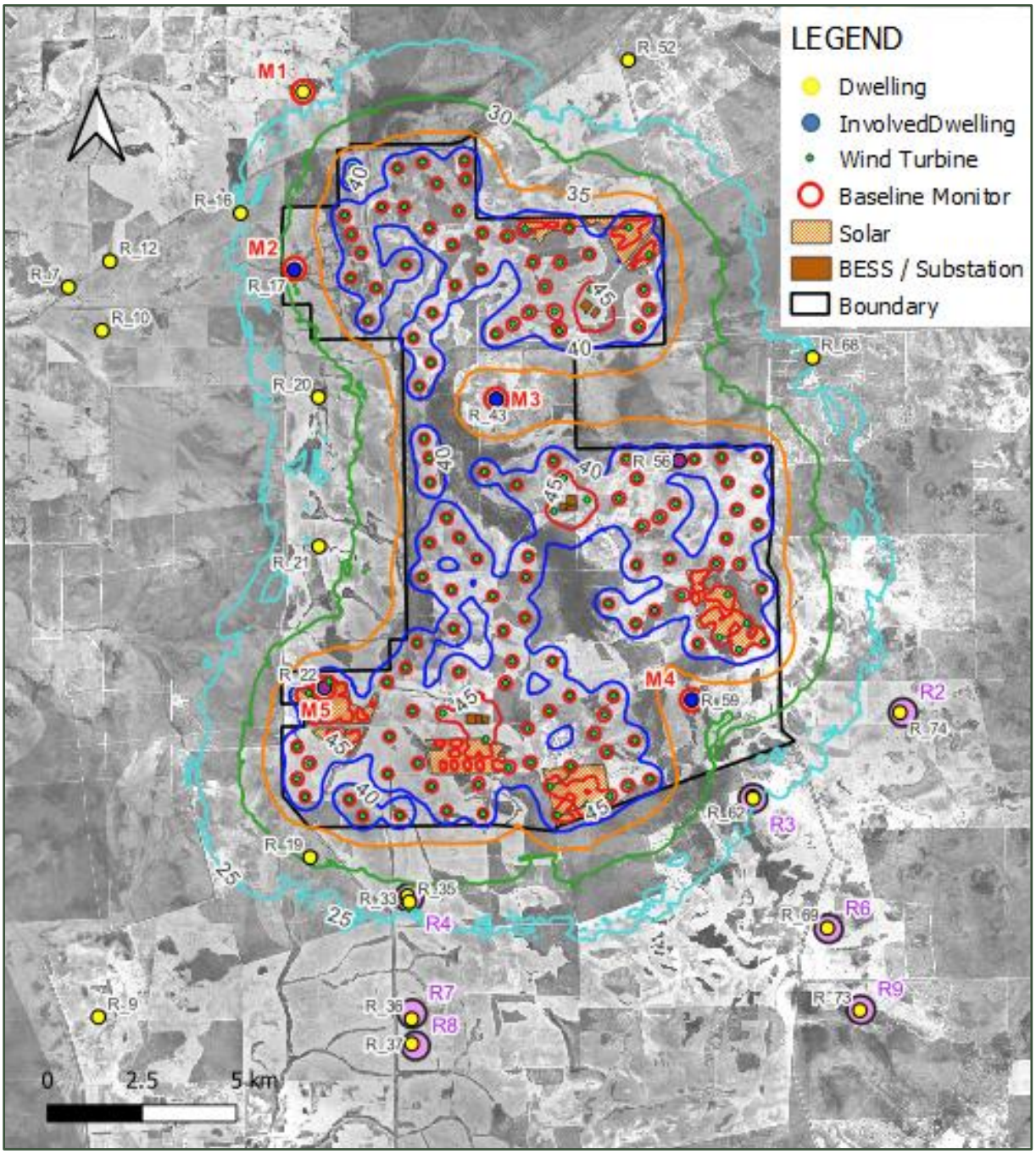


Figure 25: 4m/s HH Wind – 93.8 L_{WA} Noise Contours, L_{Aeq}, dB



Appendix E Construction Plan Layout

Tathra Wind Farm

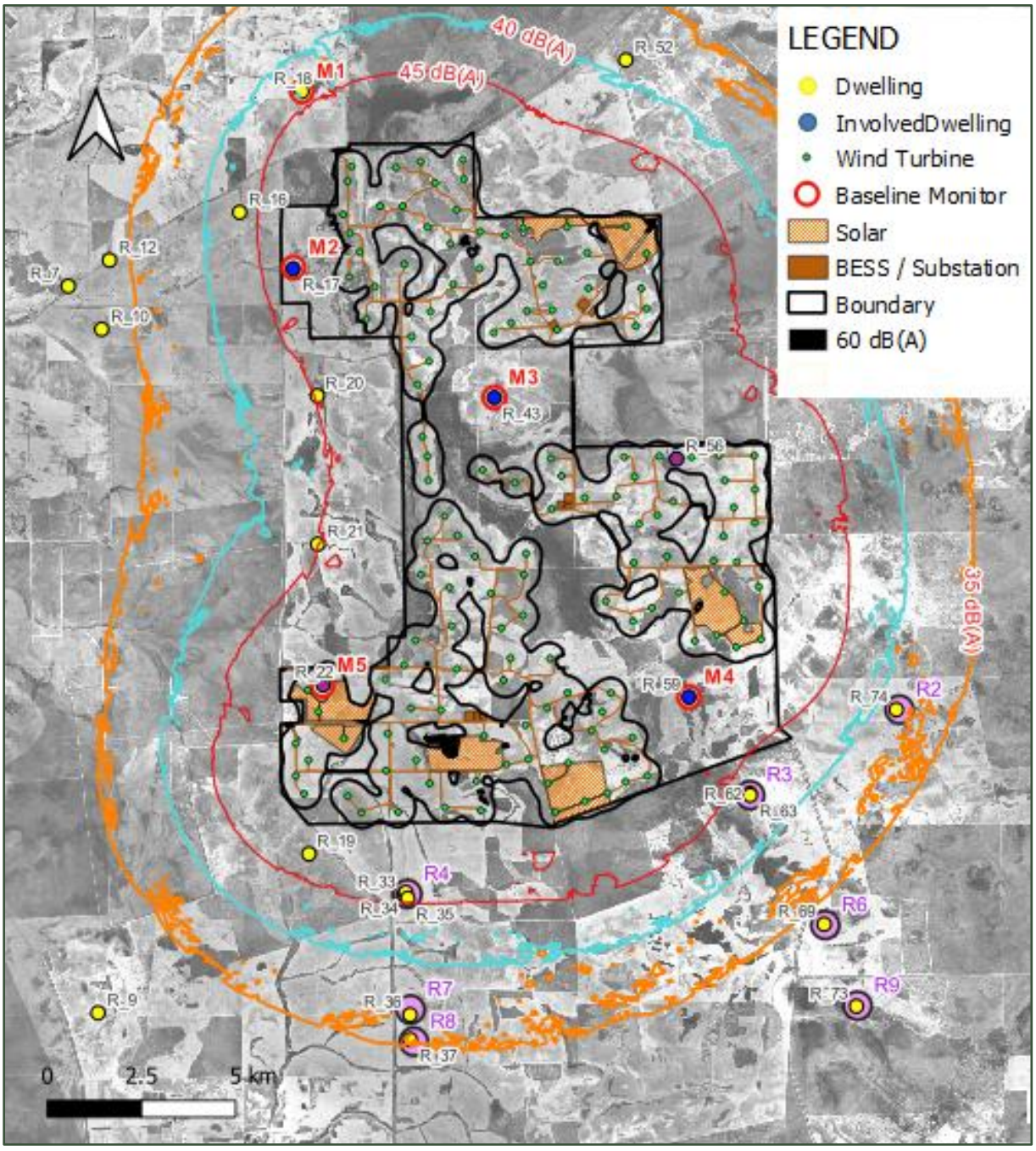
Noise & Vibration Impact Assessment

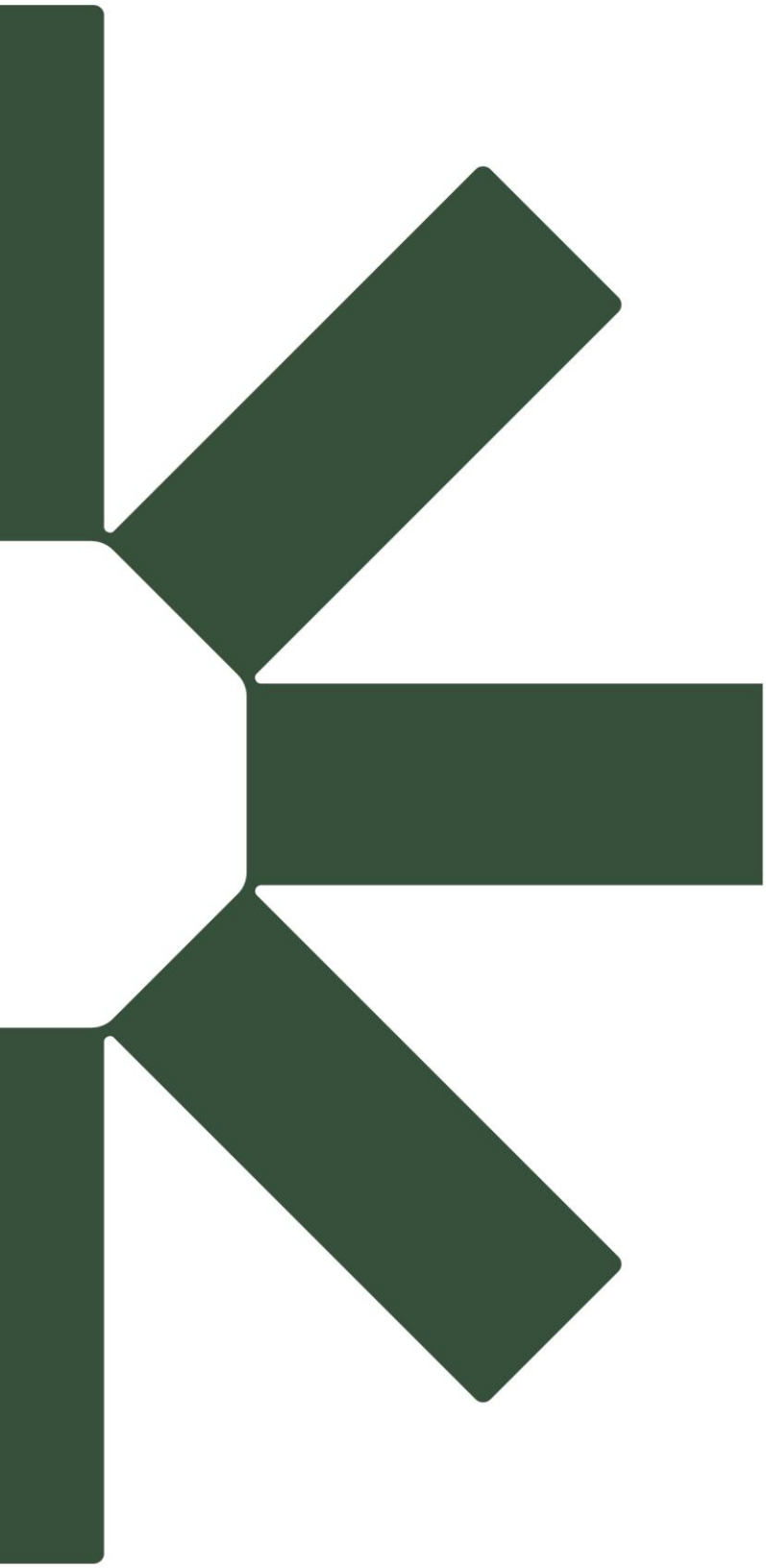
Synergy Renewable Energy Developments Pty Ltd

Report 675.072982.00001-R01

7 August 2025

Figure 26: Construction Footprint Maximum Extent Noise Contours, L_{Aeq}, dB





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