Appendix I

Noise and Vibration Assessment

ib vogt

Giddi BESS and Trafalgar East Hybrid Solar Farm

Operational Noise Assessment

December 2025

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Giddi BESS and Trafalgar East Hybrid Solar Farm
Operational Noise Assessment

ib vogt

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00	03/10/2025	Internal Draft Issue
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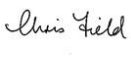
	Name	Date	Signature
Prepared by:	Ed Taylor	01/12/2025	
Reviewed by:	Chris Field	01/12/2025	
Approved by:	Alex Moody	01/12/2025	

WSP acknowledges that every project we work on takes place on First Peoples lands.
We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

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Glossary

Term	Definition / description
Decibel, dB	The decibel (dB) is a logarithmic scale that allows a wide range of sound pressures to be represented in a more comprehensible range, typically 0 dB to 120 dB. The decibel is ten times the logarithm of the ratio of sound energy (i.e. power squared or pressure squared) relative to a reference level squared. The reference level for sound pressure is typically 20 µPa which is the approximate threshold of human hearing.
Decibel (A-weighted), dBA	A-weighting was devised to attempt to account for human response to sound not being equally sensitive at all frequencies; it consists of an electronic filter in a sound level meter, which attempts to build in this variability into the indicated noise level reading so that it will correlate, approximately, with human response.
Equivalent Continuous Sound Level, $L_{eq,T}$	Many sounds, such as road traffic noise or construction noise, vary repeatedly in level over a given time period. $L_{eq,T}$ is the equivalent continuous sound level over a given time period (T). It is often referred to as the 'average' level.
Sound Power Level, L_w or SWL	The Sound Power Level is the inherent noise of the source and is the total power radiated by the source, in dB. Sound Power Level does not vary with distance from the noise source or within a different acoustic environment.
Sound Pressure Level, L_p or SPL	The Sound Pressure Level of a source, in dB, varies with distance from the noise source and with the environment in which it is located.
Statistical Noise Levels, L_n (L_{90}, L_{10}, L_{50}, etc.)	The noise level that is exceeded for the stated percentage of the noise measurement period. For example, L_{90} is the noise level that is exceeded for 90% of the noise measurement period. L_{90} is commonly referred to as the 'background' noise level. L_{10} is commonly referred to the 'intrusive' noise level. L_1 may refer to the 'average maximum" noise level.
L_{max}	L_{max} is the absolute maximum sound level recorded over the measurement period.

Term	Definition / description
Decibel, dB	The decibel (dB) is a logarithmic scale that allows a wide range of sound pressures to be represented in a more comprehensible range, typically 0 dB to 120 dB. The decibel is ten times the logarithm of the ratio of sound energy (i.e. power squared or pressure squared) relative to a reference level squared. The reference level for sound pressure is typically 20 µPa which is the approximate threshold of human hearing.

Executive summary

WSP was engaged by ib vogt Development Australia Pty Ltd to assess operational noise impacts for the proposed Giddi Battery Energy Storage System (BESS) and Trafalgar East Hybrid Solar Farm in Victoria. The project is divided into two stages. Stage 1 (Giddi BESS) includes a 360 MW BESS and grid connection infrastructure at Rowells Road. Stage 2 (Trafaglar East Hybrid Solar Farm) will add a 200 MW BESS and a 200 MW solar array across adjacent properties (see Section 2.1).

The assessment was conducted in accordance with the Environmental Protection Act 2017, General Environmental Duty (GED), and EPA Publication 1826. Residential noise-sensitive areas (NSAs) within 1000 metres of each stage were identified and noise levels from the Project were modelled via SoundPLAN 9.1 (see Section 4.1.1). Cumulative noise from nearby facilities such as the Heartsridge Road Substation was considered, and adjusted criteria were applied where necessary (see Section 3.6).

In accordance with the GED, reasonable and practicable noise mitigation measures were applied, including inverter and BESS attenuation kits that reduce emissions by approximately 6 dBA (see Section 4.1.4).

Predicted Effective Noise Levels (ENL) for Stage 1 ranged from 25 to 35 dBA across NSAs, all of which are below the derived EPA limits (see Table 4.4).

Predicted Effective Noise Levels (ENL) for Stage 1 and 2 (cumulative) ranged from 17 to 39 dBA across NSAs, all of which are below the derived EPA limits.

At this stage, no residual mitigation is required, and the project satisfies all relevant legislative obligations requirements (see Section 5).

1 Introduction

1.1 Background

ib vogt Development Australia Pty Ltd (the Client) has engaged WSP Australia Pty Ltd (WSP) to provide an operational noise impact assessment, including a review for the proposed Giddi BESS and Trafalgar East Solar Hybrid projects (the Project) in Trafalgar East, Victoria.

Noise levels emanating from the premises must not exceed those required to be met under EPA Publication 1826.5 (the Noise Protocol). The objective of this study is to evaluate reasonable and practicable noise mitigation strategies to ensure compliance with the Noise Protocol, and to support the Client in meeting its obligations under the General Environmental Duty (GED).

Planning applications for the Project are proposed to be undertaken over two stages (Stage 1, and Stage 2). As such, the noise level predictions and assessment have been broken down into:

- Stage 1 (BESS, substation and 220 kV connection works)
- Stage 1 and Stage 2 (Stage 1 + solar array and additional BESS capacity)

1.2 Reference documentation

This document has been produced with reference to the following documentation:

- EnerC+306 Sound Power & Sound Pressure Test Report - EnerC+306 noiseTest Report CATL, dated 30 October 2024
- *Noise Emission MVPS-K2 and SC(S)-UP TECHNICAL NOTE – TN0056LI – 6. 20250505_Sound Power Level MVPS-S2*, dated 05 May 2025
- *Testlab Document SCS3950UP-XT Silencer kit - 1.TR_EMC_SCS3950UP-XT_Acoustic_11E1624, dated 07 May 2024*
- Sound Power Measurements on SCS 3950 UP-XT central inverter - White Paper BU-LS-005: Sunny Central Storage UP, dated 20 August 2024
- Noise Performance of SCS UP-S Product family - 20250710 SCS UP-S Noise Performance_, dated 10 July 2025
- White Paper BU-LS-005 SCS UP - Silencer - Translation SCS UP Models_20240605, not dated
- Stage 1 BESS Layout Rev F drawings - AUS0003.DEV.M2.001.0.F_Trafalgar_BESS_Array_Layout_Ph_1, dated 08 September 2025
- Stage 2 GIS Shapefiles (.SHP) as provided by ib vogt via email on 27 October 2025

1.3 Legislation

The following legislation guides the acceptability of industrial noise within Victoria and has been used to guide this assessment:

- Environmental Protection Act 2017: General Environmental Duty
- EPA Publication 1826.5: Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues (Noise Protocol)
- EPA publication 1997: Technical Guide: Measuring and analysing industry noise and music noise

2 Project description

2.1 Project overview

ib vogt Development Australia Pty Ltd (ib vogt) is seeking to develop the Giddi Battery Energy Storage System (BESS) and Trafalgar East Hybrid Solar Farm, collectively referred to as the Project. The Project is located in Trafalgar East, approximately 130 kilometres (km) east of Melbourne (see Figure 2.1), and spans two properties with a combined area of approximately 360 hectares. The Project layout can be seen in Figure 2.2.

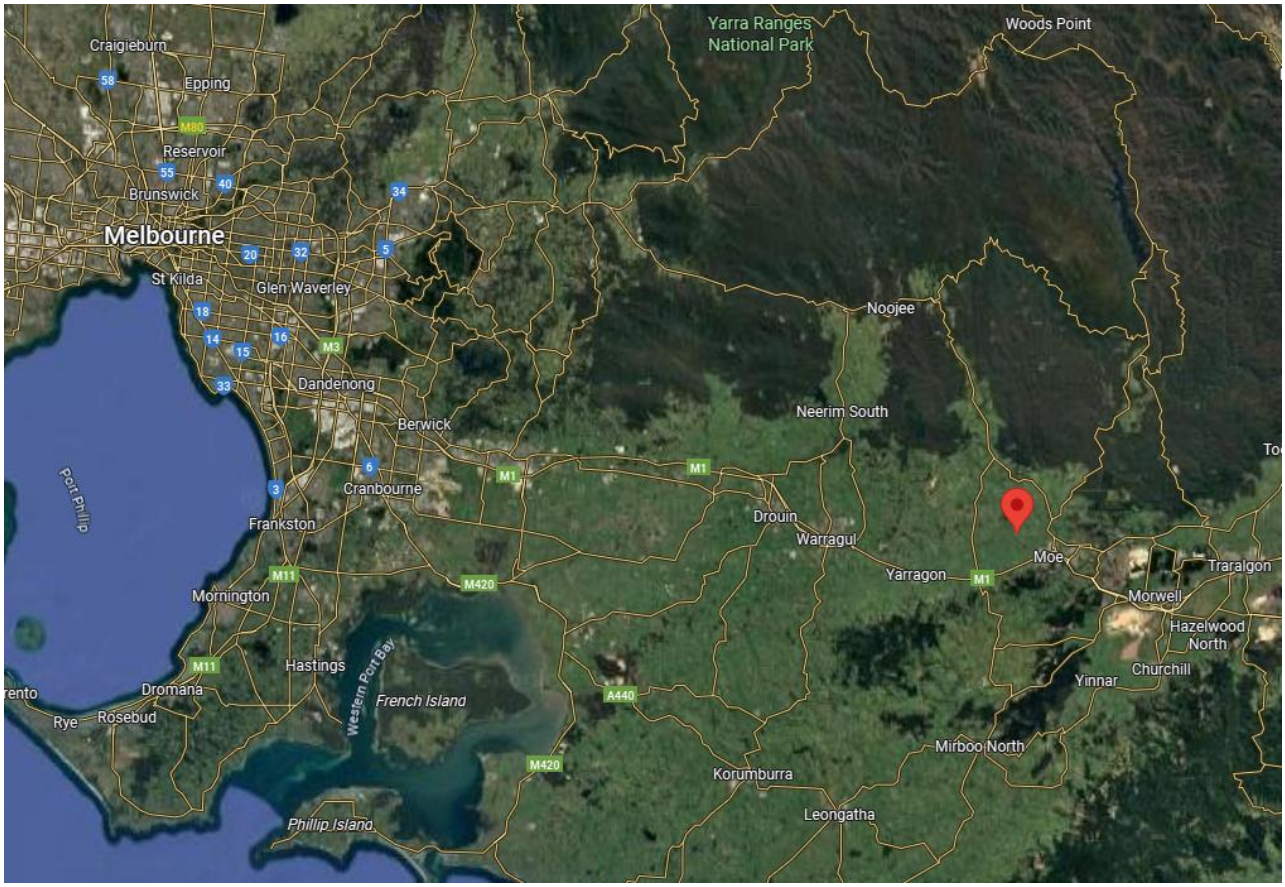


Figure 2.1 Project location as indicated by red arrow

To meet grid connection requirements the Project will be delivered across two stages. Giddi BESS (Stage 1), includes the installation of a 360-megawatt (MW) BESS, a substation, and a 220 kilovolt (kV) connection to the existing AusNet transmission line (Rowville to Yallourn) that traverses the Site. This stage will be located on the property at 59 Rowells Road, Trafalgar East, which is currently used for growing commercial feed for cattle and sheep, and includes a goat dairy. The Project layout is shown in Figure 2.2.

Infrastructure associated with the Giddi BESS (Stage 1) includes:

- A 360MW BESS
- Inverters and transformers
- Rooms for control, operation and maintenance
- A switchyard
- A 220kV substation

- Internal access roads
- Perimeter boundary fencing

The Trafalgar East Hybrid Solar Farm (Stage 2) includes the installation of an additional 200 MW BESS and a 200 MW solar power generation array configured with a single 200MW point of connection. This stage is located across the remainder of the Rowells Road property and the adjacent property at 363 Embletons Road which is currently used for grazing beef cattle.

Infrastructure associated with the Trafalgar East Hybrid Solar Farm (Stage 2) includes:

- A 200MW BESS
- A 200MW solar array
- Inverters and transformers
- Rooms for control, operation and maintenance
- A switchyard
- A 220kV substation
- Internal access roads
- Perimeter boundary fencing

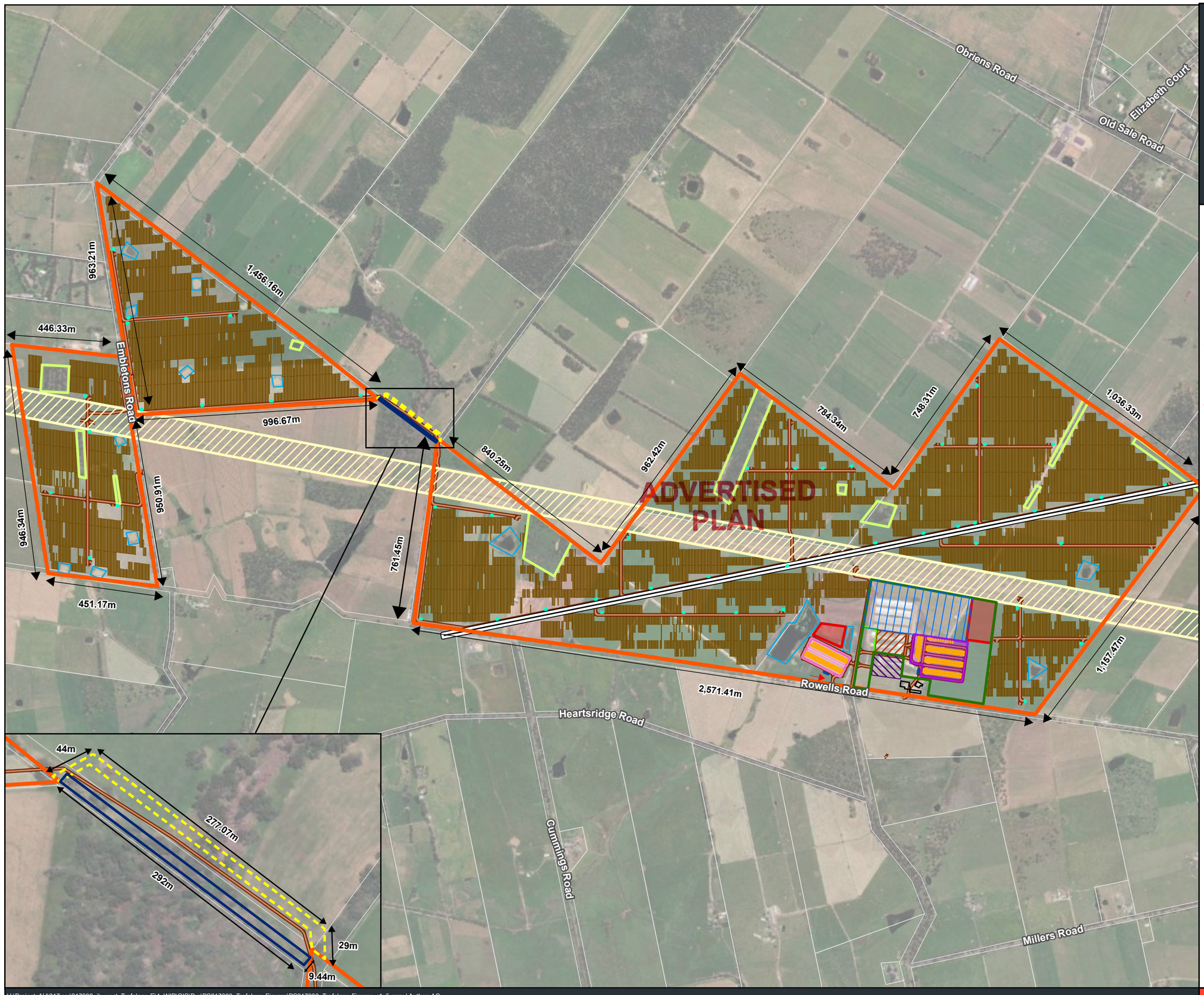
A small transmission easement will be required to connect the two properties. It is proposed that this connection utilise an existing council road easement between the sites or adjacent private land.

2.2 Noise Sensitive Areas (NSAs)

The study area for this assessment has been adopted as 1000 m from each project site. The subject NSAs identified within the study area are all residential and are shown in Figure 2.3 and Table 2.1.

Table 2.1 Identified NSAs

NSA	Address
Giddi BESS	
R1	31 Millers Rd, Trafalgar East Vic 3824
R2	221 Heartsridge Rd, Trafalgar East Vic 3824
R21	197 Millers Rd, Westbury Vic 3825
R24	73 Millers Rd, Trafalgar East Vic 3824
Trafalgar East Solar Hybrid	
R1	31 Millers Rd, Trafalgar East Vic 3824
R2	221 Heartsridge Rd, Trafalgar East Vic 3824
R3	241 Heartsridge Rd, Trafalgar East Vic 3824
R4	170 Cummings Rd, Trafalgar East Vic 3824
R5	361 Heartsridge Rd, Trafalgar East Vic 3824
R6	381 Heartsridge Rd, Trafalgar East Vic 3824
R7	415 Heartsridge Rd, Trafalgar East Vic 3824
R8	29 Gibson Brothers Rd, Trafalgar East Vic 3824
R9	310 Embletons Rd, Trafalgar East Vic 3824
R10	322 Embletons Rd, Trafalgar East Vic 3824
R11	421 Embletons Rd, Trafalgar East Vic 3824
R12	447 Embletons Rd, Trafalgar East Vic 3824
R13	485 Embletons Rd, Trafalgar East Vic 3824
R14	316 Obriens Rd, Westbury Vic 3825
R15	446 Obriens Rd, Westbury Vic 3825
R16	4170 Old Sale Rd, Westbury Vic 3825
R17	4200 Old Sale Rd, Westbury Vic 3825
R18	4220 Old Sale Rd, Westbury Vic 3825
R19	4244 Old Sale Rd, Westbury Vic 3825
R20	4284 Old Sale Rd, Westbury Vic 3825
R21	197 Millers Rd, Westbury Vic 3825
R22	146 Millers Rd, Westbury Vic 3825
R23	100 Millers Rd, Westbury Vic 3825
R24	73 Millers Rd, Trafalgar East Vic 3824

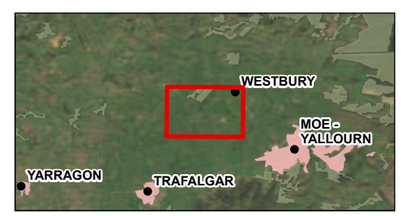


PS217303
Trafalgar East BESS and Solar

Figure 2.2
Giddi BESS and Trafalgar East Hybrid Solar Layout

Legend

- PCS + Transformer
- Watercourses
- Water Tank
- Array
- Existing Structure
- Environmental Protection Zones
- Existing Pipeline Easement
- Transformer Station
- Access Road
- Main Access Gate
- Transmission Corridor Option 1
- Transmission Corridor Option 2
- Giddi BESS Planning Boundary
- Giddi BESS
- Trafalgar East Hybrid Solar
- Trafalgar Hybrid Solar BESS
- Trafalgar East Hybrid Solar Planning Boundary
- 60m Easement
- Existing 220kV Power Line Easement
- Giddi Substation
- TNSP Switchyard
- Trafalgar East Hybrid Solar Substation
- Cadastre



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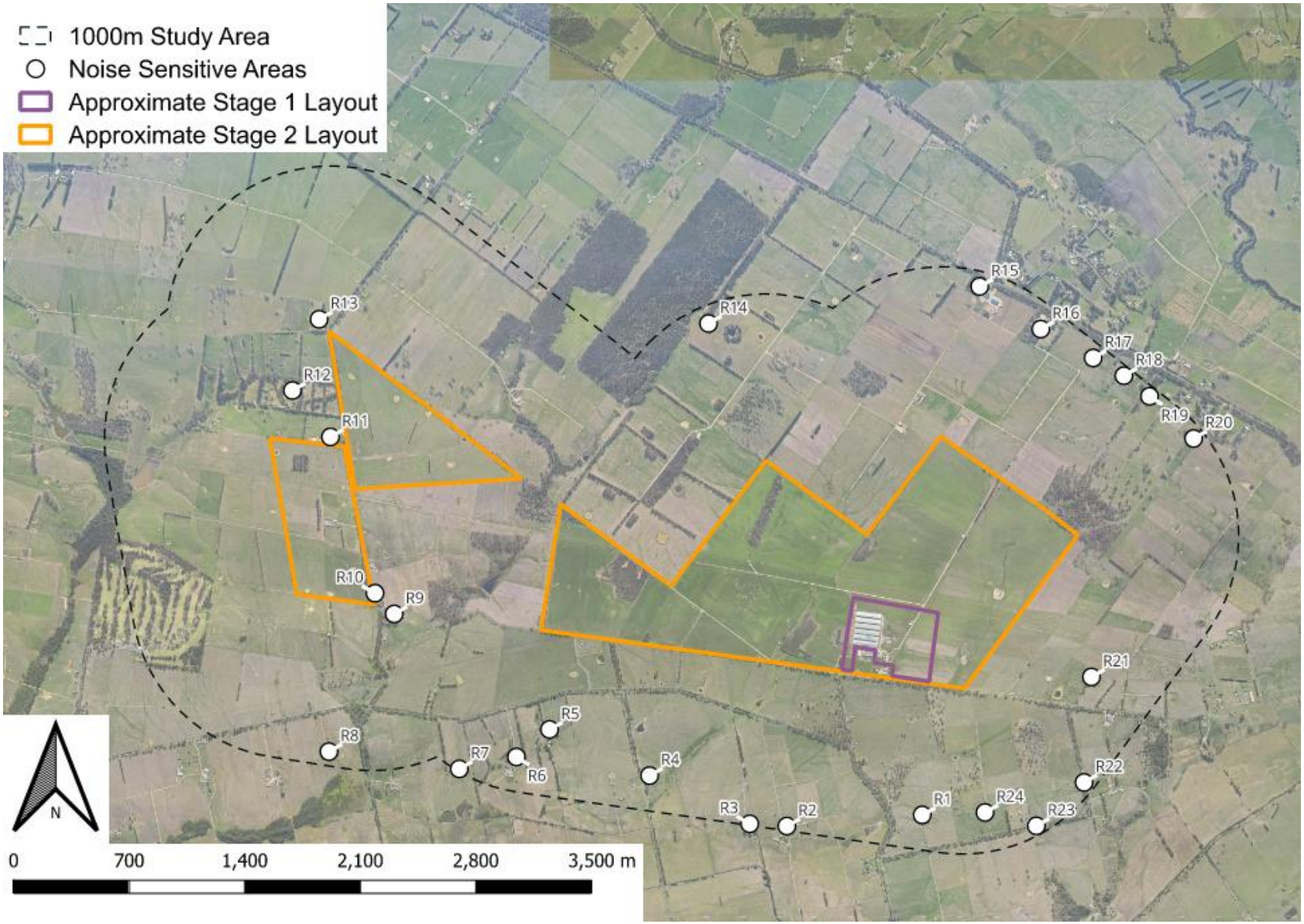

Figure 2.3 Project location and NSA

3 Environmental noise criteria

The following sections present the applicability and derivation of environmental noise criteria for the Project.

3.1 Victorian Environment Protection Act 2017

The Environment Protection Act 2017 (the Act) provides the following framework for the assessment of environmental noise:

- Describes objectives and a governance structure for the Environment Protection Authority (EPA).
- Sets out principles of environmental noise protection.
- Mandates a General Environmental Duty (GED) to minimise risk of harm to human health and the environment from pollution. The GED is at the centre of the Act.
- Provides the EPA with a framework and authority enabling authorised officers to enforce compliance prior to environmental harm occurring, a key change to the previous Environment Protection Act 1970.

Relevant to noise, a person undertaking a Design or Construction Activity is obligated to do the following:

- **General Environmental Duty (GED):** Minimise risks of harm to human health or the environment from pollution or waste (noise) which may arise from the design or construction activity so far as reasonably practicable and therefore perform their duty under Section 25(1) of the Act.
- **Unreasonable Noise:** Ensure that no unreasonable noise is emitted or permitted to be emitted from the facility and therefore satisfy their obligations under Section 166 of the Act.

3.2 Environment Protection Regulations (EPR)

The *Environment Protection Regulations 2021* (EPR) give effect to the Act by imposing obligations in relation to noise pollution and permissible activities under the Act, specifying matters in relation to environmental noise.

The Regulations made under the Act:

1. Provide regulations necessary to enable elements of the environment protection legislation to function
2. Prevent significant consequences from specific types of pollution or waste
3. Prevent significant risk of mismanagement
4. Provide certainty and consistency required by duty holders.

The EPR defines noise sensitive receivers as:

- Residential premises
- Retirement villages
- Hospitals
- Child-care centres
- Kindergartens
- Primary and secondary schools
- Tourist establishments
- Camping grounds
- Caravan parks in rural areas.

3.2.1 Time period definitions

Table 3.1 details the time periods for the assessment of commercial, industrial and trade premises noise, as defined by the EPR.

Table 3.1 Time period definitions

Weekday	Time period		
	Day	Evening	Night
Monday to Saturday	0700 to 1800 hours	1800 to 2200 hours	2200 to 0700 hours
Sundays and Public Holidays	-	0700 to 2200 hours	

3.3 General Environmental Duty (GED)

The Act introduced a new approach for environmental protection and human health focused on a prevention-based approach rather than reactive measures to reduce risk of environmental harm. This approach is underpinned by the General Environment Duty (GED), which is outlined under Section 25(1) (Part 3.2) of the Act.

A definition of GED and its implications are provided below (excerpt from EPA 1741.1 *Industry guidance: supporting you to comply with the general environmental duty*):

> *A person who is engaging in an activity that may give rise to risks of harm to human health or the environment from pollution or waste must minimise those risks, so far as reasonably practicable.*
>
> *Reasonably practicable means putting in controls that are proportionate to the risk.*
>
> *It relates to the chance of harm occurring and potential impacts on the environment. It also relates to what controls are available, their cost, and considers what an industry generally knows about the risk and control options. This is termed the 'state of knowledge'.*
>
> *The expression, 'state of knowledge', describes the body of accepted knowledge that is known or ought to be reasonably known about the harm or risks of harm to human health and the environment and the controls for eliminating or reducing those risks.*
>
> *Under the GED, you are required to have reasonable knowledge about the risks your activities pose, and how to address them.*

Additionally, EPA Publication *1856 Reasonably Practicable* (EPA 1856) focuses on the GED to minimise risks of harm to human health or the environment, so far as reasonably practicable. 'Reasonably practicable' means that you must put in proportionate controls to mitigate or minimise the risk of harm. Typically, this would mean elimination or substitution of the source, followed by engineering/building controls and finally by training and site management (often a combination of all mitigations).

Proportionate means the greater the risk of harm, the greater the expectation for you to manage it. This is done by demonstrating you've considered the most suitable controls available to eliminate/minimise the risk of harm. Six factors come into play: Elimination, Likelihood, Degree (consequence of harm), Knowledge of Risk, Availability and Suitability of Controls, and Costs.

It is important to note that responding to duties under Section 25(1) of the Act is separate from the obligations outlined under Section 166 of the Act (unreasonable noise).

3.4 Unreasonable noise

Under Section 166 of the Act, a person must not emit or permit the emission of unreasonable noise from a place or premises that are not residential premises. For clarity, Section 168 of the Act also defines 'aggravated noise', which is applicable to the following:

- Commercial, industrial and trade premises
- Entertainment venues
- Events.

Unreasonable noise is defined in section 3(1)(a) of the Act as noise that is unreasonable having regard to the following:

(i) its volume, intensity or duration

(ii) its character

(iii) the time, place and other circumstances in which it is emitted

(iv) how often it is emitted

(v) any prescribed factors.

Unreasonable noise may also be defined as noise that is prescribed in the Regulations to be unreasonable noise or prescribed to be not unreasonable noise.

EPA considers noise from the following sources as able to generate unreasonable noise:

- Commercial, industrial and trade premises
- Indoor entertainment venues
- Outdoor entertainment venues and events
- Construction and demolition sites
- Transport infrastructure such as roads and railways (passenger services exempted).

While the Regulations do not prescribe what is unreasonable noise for construction and demolition sites and transport infrastructure, those sources must comply with section 166 of the Act by reference to paragraph (a) of the definition of unreasonable noise and the GED. The legislative exceptions to this are presented in the following section.

3.5 EPA Publication 1826 (Noise Protocol)

EPA Publication 1826.4 *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (EPA 1826) is the applicable legislative document for the assessment of environmental noise from commercial, industrial, and trade premises within Victoria.

The protocol prescribes a methodology to determine noise limits to protect people from noise emissions from the facility. It particularly refers to noise emissions that may affect normal domestic or recreational activities, such as sleep during the night period.

Definitions adopted by EPA 1826 are outlined in Section 5.3 (Noise) of the EPR.

A Noise Sensitive Area (NSA) is defined in the EPR as that part of the land within the apparent boundaries of any piece of land, which is within a distance of 10 m outside the external walls of a noise sensitive building (such as residential buildings or buildings with similar types of accommodation, and sensitive educational uses). The noise limits are to be determined for the noise sensitive area that may be the worst affected by noise emitted from a facility.

To determine if noise is 'unreasonable' per Section 166 of the Act, the effective noise level (L_{eff}) from the industry is compared with the derived noise limits. The effective noise level (L_{eff}) is the level due to the industry measured or

predicted at a residential dwelling or noise sensitive location over a continuous 30-minute period, which has had adjustments applied to account for certain characteristics such as tonality, impulsiveness, duration, intermittency, etc.

3.5.1 Noise limits - Rural area method

As the Project site and surrounding noise sensitive areas are located well outside of the Melbourne Urban Growth Boundary (UGB) and any identified Major Urban Areas (i.e. UGB identified in the planning scheme where the population is greater than 7,000 people), noise limits have been derived in accordance with EPA 1826 Part I.A.2 *Noise Limits – Rural Area Method*.

The method uses land use zoning of the industry and receiver as the basis for establishing noise limits. Where the receiver is in a background relevant area (for example, where the ambient noise environment is dominated by high levels of road traffic/Freeway noise), adjustments can be applied to increase the noise limits. Other adjustments can be included where there are multiple industries, based on the distance to the industry/boundary, or where the noise source under assessment is classified as an extractive industry.

Full derivation of noise limits is shown in Appendix A, and a summary of the noise limits is presented in Table 3.2.

Table 3.2 Noise limits

Noise Sensitive Area	**EPA 1826 limits, dBA**		
	Day	**Evening**	**Night**
All	45	39	34

3.6 Adjustments for noise character

In addition to the assessment of unreasonable noise against the operational noise limits outlined above, EPA 1997 requires the consideration of potentially annoying noise characteristics. These may include:

- Impulsive noise
- Tonal noise
- Low frequency noise

Impulsive noise is defined as impulses of noise from a Project with a gap between impulses of approximately 10 seconds.

Annex C of EPA 1826 describes the methodology for determining the extent of tonal noise associated with a Project. This method is based on the analysis of 1/3 octave noise levels, where a single octave extends more than 3 dB above the level of adjacent octave bands.

Low frequency noise is defined and assessed using EPA Publication 1996 *Assessing low frequency noise – June 2021* (EPA 1996)

3.7 Cumulative noise

Regulation 119 under the EPR states the following with respect to cumulative noise:

> *If 2 or more commercial, industrial and trade premises (whether existing or proposed) emit, or are likely to emit, noise that contributes to the effective noise level, a person in management or control of one or more of those premises must take all reasonable steps to ensure that the contribution from each of the premises, when combined, does not exceed the noise limit for the noise sensitive area.*

Given the other facilities located in the area (Heartsridge Rd Substation), cumulative noise needs to be considered. EPA 1997 provides guidance to account for noise emissions from more than one industry. The noise limits should be reduced

by an amount calculated from the number of premises contributing to the noise, establishing project specific criteria to be met.

The following considerations were noted with respect to cumulative noise:

- NSAs R4, R5 and R6 are located within 1 km of the Heartsridge Rd Substation, which may contribute to the effective noise level when cumulatively assessed with the Project.

The noise limits have been reduced by to account for equal contribution from other facilities in the area, as shown in Table 3.3.

Table 3.3 Reduced noise limits to account for cumulative noise

NSA	Reduced EPA 1826 noise limits, dBA		
	Day	Evening	Night
R4, R5, R6	42	36	31
All other NSA	45	39	34

4 Operational noise assessment

4.1 Assessment inputs

4.1.1 Modelling method

A noise model was created with SoundPLAN 9.1 modelling software, and noise modelling of the Project was undertaken using the methodology provided in *International Standard ISO9613-2:2024 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation (ISO 9613-2:2024).*

This internationally recognised standard was designed to assume conditions that favour the propagation of noise from meteorological effects, described as a slight wind (1 to 5 m/s) blowing from source to NSA, or a well-developed moderate ground-based temperature inversion. As such, the standard always predicts noise levels slightly higher than levels under calm or neutral propagation conditions and represents a conservative approach.

Key modelling parameters and assumptions are shown in Table 4.1.

Table 4.1 Operational noise modelling inputs and assumptions

Parameter	Modelling input
Ground absorption	0% on the Project site due to the proposed concrete slab. 60% porous for the remaining area, which is indicative of grass / open vegetation located throughout the study area.
Terrain data	Terrain data have been downloaded from VICMAP. Topography within the site boundary has been flattened to account for the approximately final elevation.
Meteorological conditions	Winds (1 to 5 m/s) blowing from source to NSA, or a well-developed moderate ground-based temperature inversion (i.e. moderate worst case).
Buildings	The sensitive NSA is modelled as point NSAs only (free-field levels).
NSA height	Point NSAs within 10 m of the most exposed façade. The NSA heights are set at 1.5 m above ground level.
Location of noise sources	Refer Figure 4.1 for Stage 1, Figure 4.2 for Stage 2 (BESS) and Figure 4.3 for Stage 2 (Solar)
Modelled sound power levels	As described in Section 4.1.5. Detailed information regarding noise sources was not available for the transformer, therefore assumptions have been made based on similar projects.
Assessment parameter/ duration	$L_{Aeq,\ 30\ minutes}$ (all noise sources assessed as part of this scope of works)

4.1.2 Location of noise sources

The location of the assessed noise sources is presented in Figure 4.1 for Stage 1, Figure 4.2 for Stage 2 (BESS) and Figure 4.3 for Stage 2 (Solar).

Figure 4.1 Stage 1 Location of noise sources

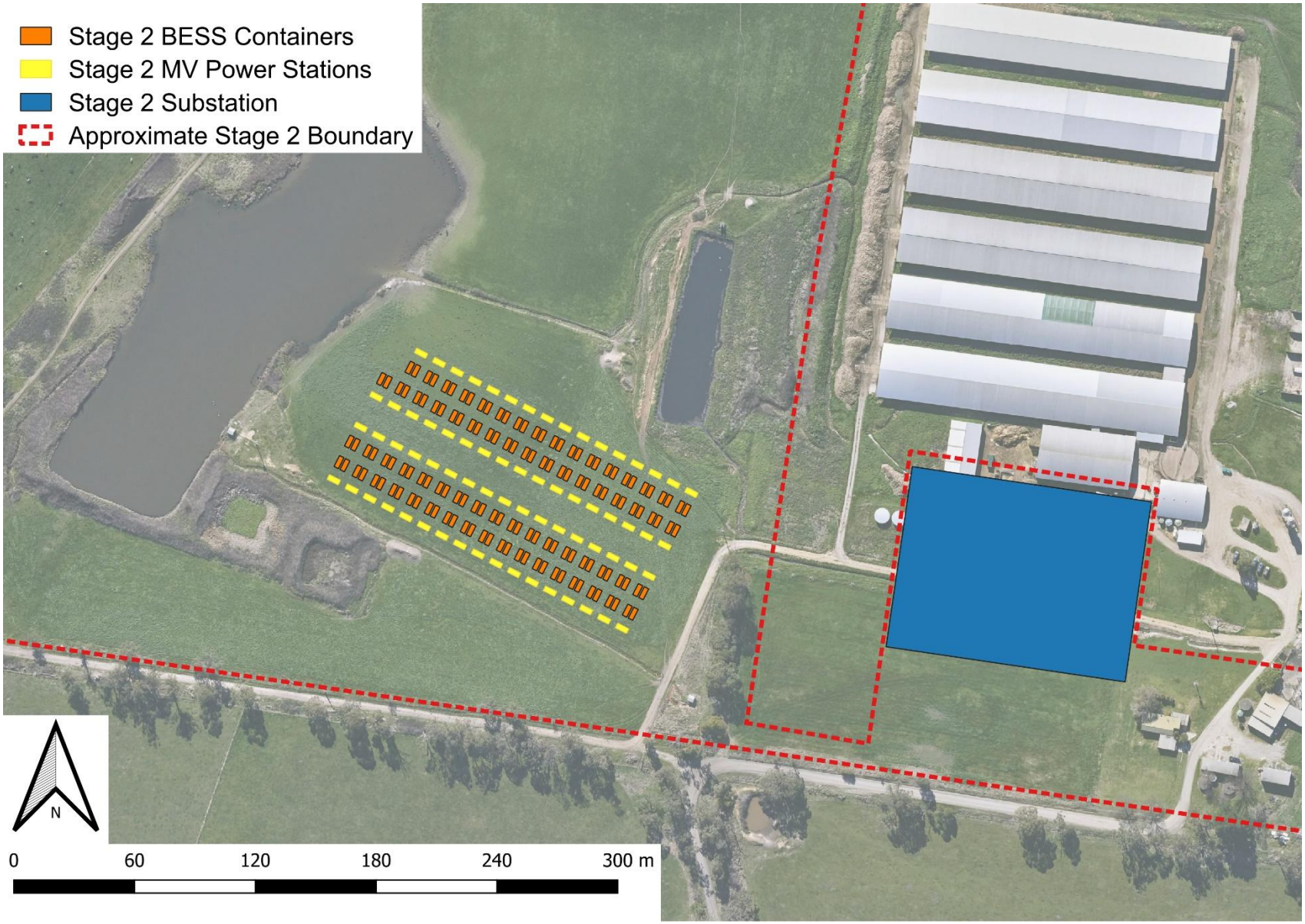

Figure 4.2 Stage 2 (BESS) Location of noise sources

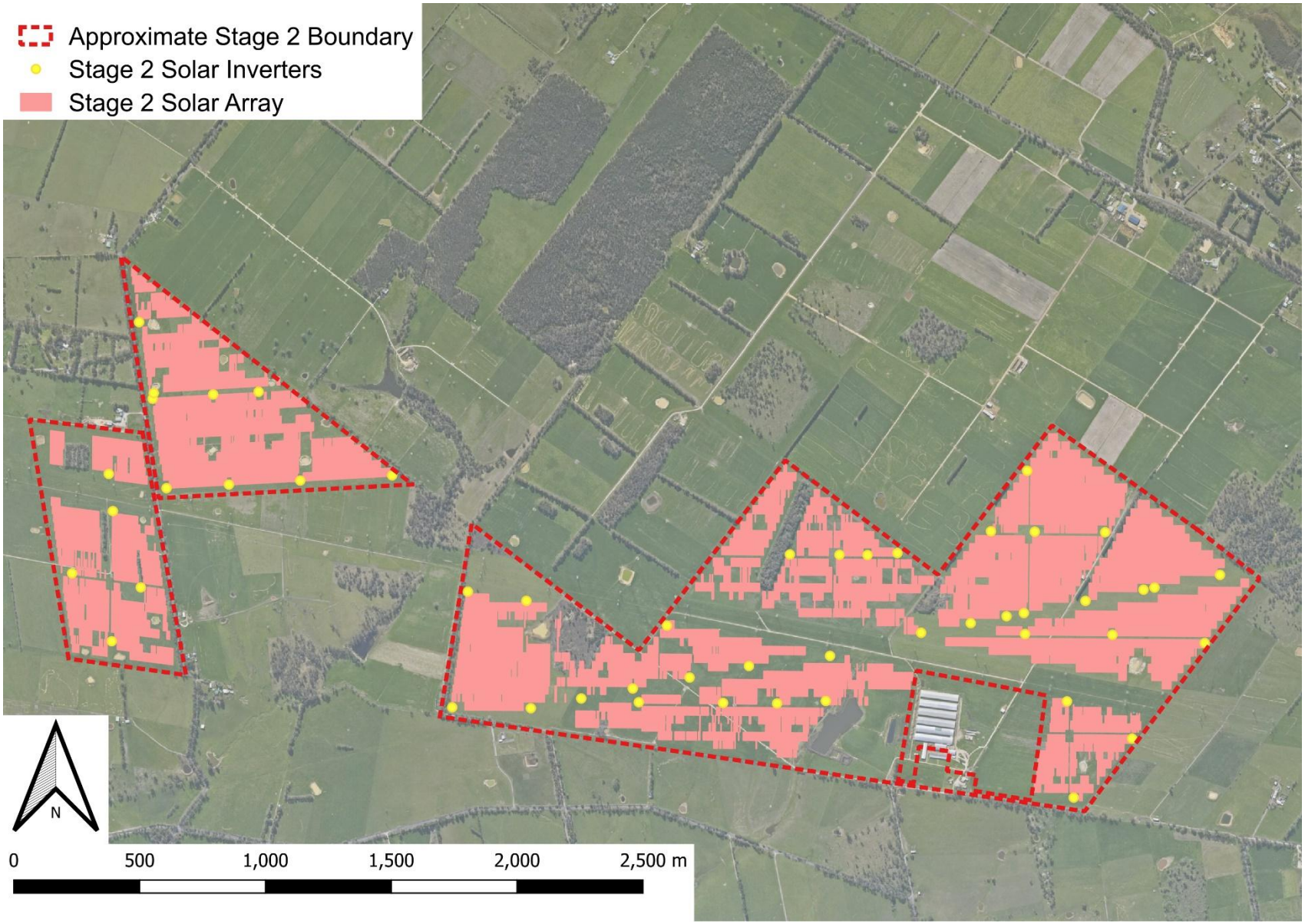

Figure 4.3 Stage 2 (Solar) Location of noise sources

4.1.3 Operating scenarios

Table 4.2 presents the expected operating scenarios for each stage and time period.

Table 4.2 Expected operating scenarios per stage and time period

Stage	Expected operations per time period	
	Day/Evening	**Night**
1	BESS Equipment operational (BESS containers at 79.5% duty).	BESS Equipment operational (BESS containers at 70% duty).
2	BESS Equipment operational (BESS containers at 79.5% duty). Solar equipment (incl tracking motors and inverters) operational.	BESS Equipment operational (BESS containers at 70% duty). Solar equipment (incl tracking motors and inverters) not operational.

4.1.4 Noise mitigation

As part of the obligations under the GED, the following reasonable and practicable mitigation options have been considered.

4.1.4.1 MV power stations source noise control

As the proposed MV power stations are expected to be the primary dominant noise source from the Project, noise mitigation considerations have been focused on this equipment. MV power station source noise mitigation is available for the inverter element, with sound power levels for the mitigated units (as provided by the manufacturer) outlined below

– SWL - MVPS-S2 (Medium Voltage Power Station including SCS4600-UP-S)) - No attenuation: 91 dB $L_{Aeq,30min}$

– SWL - MVPS-S2 (Medium Voltage Power Station including SCS4600-UP-S)) -with inverter noise reduction kit: 85 dB $L_{Aeq,30min}$

4.1.4.2 BESS source noise control

As the proposed BESS units are expected to be a secondary dominant noise source from the Project, noise mitigation has also been considered for this equipment. BESS source noise mitigation is available, with sound power levels for the mitigated units (as provided by the manufacturer) outlined below:

– SWL - EnerC+306 (79.5% load) - No attenuation: 85 dB $L_{Aeq,30min}$

– SWL - EnerC+306 (79.5% load) – With sound cover: 79 dB $L_{Aeq,30min}$

4.1.4.3 Solar inverter source noise control

As the proposed solar inverters are expected to be a secondary dominant noise source from the Project, noise mitigation has also been considered for this equipment. Solar inverter source noise mitigation is available, with sound power levels for the mitigated units (as provided by the manufacturer) outlined below

– SWL – SCS3800-UP-XT - No attenuation: 92 dB $L_{Aeq,30min}$

– SWL - SCS3800-UP-XT - with noise reduction kit: 86 dB $L_{Aeq,30min}$

4.1.4.4 Best practicable option

Based on an available inverter attenuation reducing noise emissions by 6 dBA, and the available BESS unit attenuation reducing noise emissions by 6 dBA these attenuation packages are proposed to be adopted by the client and represent the best practicable option for noise mitigation for the Project.

4.1.5 *Sound power levels*

The key infrastructure components associated with the Project is captured in Table 4.3 together with estimated Sound Power Levels (SWLs). Information captured in Table 4.3 has been modelled for the Project, based on available Project information provided.

Table 4.3 Primary noise generating equipment at the Project Site

Equipment	Make / Model	Number of plant (indicative)	SWL dBA, per unit (indicative)	Modelled noise source height, m
Stage 1				
Substation	220 kV	1	85 $L_{eq,30min}$	1.8
Battery Energy Storage System	EnerC+306 - With sound cover 79.5% load during day/evening 70% load during night	243	79 $L_{eq,30min}$ at 79.5% load 76 $L_{eq,30min}$ at 70% load	2.3
MV Power Station (Incl. PCS, Transformer and Switchgear) (1)	SMA MVPS-S2 (Including SC(S)-UP PCS) (100% speed) - With noise reduction kit	126	85 $L_{eq,30min}$	2.3
Stage 2				
Substation	220kV	1	85 $L_{eq,30min}$	1.8
Battery Energy Storage System	EnerC+306 - With sound cover 79.5% load during day/evening 70% load during night	134	79 $L_{eq,30min}$ at 79.5% load 76 $L_{eq,30min}$ at 70% load	2.3
MV Power Station (Incl. PCS, Transformer and Switchgear) (1)	SMA MVPS-S2 (Including SC(S)-UP PCS) (100% speed) - With noise reduction kit	167	85 $L_{eq,30min}$	2.3
Solar Inverters (1)	SCS3800-UP-XT - with noise reduction kit	50	86 $L_{eq,30min}$	2.3
Solar Tracking Motors	Nextracker PV Tracking System	2604	50 $L_{eq,30min}$	1

(1) Modelled as point source located at an assumed height of unit. The same noise level is emitted in all directions. One Third Octave SWLs have been modelled based on information received to date.

4.1.6 Adjustments for noise character

In consideration of the noise characteristics of the project noise sources, potential corrections may be required for tonal noise. Other noise characteristics are not considered a risk to this project. A tonality assessment of the predicted noise spectrum at each NSA has been conducted to examine its tonal characteristics for each stage. The analytical methodology detailed in Annex C of EPA 1826.5 has been used to conduct this assessment. Calculation of tonal correction has been provided in Appendix B.

4.2 Predicted noise levels

4.2.1 Stage 1

The predicted operational noise assessment (including adjustments for tonal characteristics) for Stage 1 is shown in Table 4.4. A comparison of the cumulative predicted noise levels from the site have then been compared against the EPA 1826 limits to assess compliance.

Table 4.4 Stage 1 noise assessment

NCAs	Predicted noise level, L_{eq} dBA			Tonal noise character adjustment, L_{eq} dBA			Effective noise level, L_{eff} dBA			EPA 1826 limits[1], dBA			Complies?		
	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N
R1	35	35	29	0	0	2	35	35	31	45	39	34	Yes	Yes	Yes
R2	30	30	25	0	0	0	30	30	25	45	39	34	Yes	Yes	Yes
R21	32	32	27	0	0	0	32	32	27	45	39	34	Yes	Yes	Yes
R24	34	34	28	0	0	0	34	34	28	45	39	34	Yes	Yes	Yes

Based on Table 4.4, the predicted cumulative noise levels for all assessed periods comply with the EPA 1826 limits at the identified noise-sensitive locations, satisfying the applicable planning permit. Additionally, the Project obligations under the GED can be satisfied by adopting reasonable and practicable noise controls. As a result, no residual noise mitigation is required for the Project.

4.2.2 Stage 1 and 2 (cumulative)

The predicted operational noise assessment (including adjustments for tonal characteristics) for Stage 1 and 2 (cumulative) is shown in Table 4.4. A comparison of the cumulative predicted noise levels from the site have then been compared against the EPA 1826 limits to assess compliance.

Table 4.5 Stage 1 and 2 (cumulative) noise assessment

NCAs	Predicted noise level, L_{eq} dBA			Tonal noise character adjustment, L_{eq} dBA			Effective noise level, L_{eff} dBA			EPA 1826 limits, dBA			Complies?		
	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N
R1	36	36	33	0	0	0	36	36	33	45	39	34	Yes	Yes	Yes
R2	33	33	31	0	0	0	33	33	31	45	39	34	Yes	Yes	Yes
R3	32	32	30	0	0	0	32	32	30	45	39	34	Yes	Yes	Yes
R4[1]	32	32	29	0	0	0	32	32	29	42	36	31	Yes	Yes	Yes
R5[1]	27	27	25	0	0	0	27	27	25	42	36	31	Yes	Yes	Yes
R6[1]	26	26	24	0	0	0	26	26	24	42	36	31	Yes	Yes	Yes
R7	24	24	22	0	0	0	24	24	22	45	39	34	Yes	Yes	Yes
R8	19	19	17	0	0	2	19	19	19	45	39	34	Yes	Yes	Yes
R9	23	23	20	2	2	2	25	25	22	45	39	34	Yes	Yes	Yes
R10	25	25	19	5	5	2	30	30	21	45	39	34	Yes	Yes	Yes
R11	34	34	16	5	5	2	39	39	18	45	39	34	Yes	Yes	Yes
R12	25	25	15	5	5	2	30	30	17	45	39	34	Yes	Yes	Yes
R13	22	22	15	5	5	2	27	27	17	45	39	34	Yes	Yes	Yes
R14	25	25	23	0	0	2	25	25	25	45	39	34	Yes	Yes	Yes
R15	24	24	21	0	0	2	24	24	23	45	39	34	Yes	Yes	Yes
R16	24	24	21	0	0	2	24	24	23	45	39	34	Yes	Yes	Yes
R17	24	24	22	0	0	2	24	24	24	45	39	34	Yes	Yes	Yes
R18	24	24	22	0	0	2	24	24	24	45	39	34	Yes	Yes	Yes
R19	24	24	22	0	0	2	24	24	24	45	39	34	Yes	Yes	Yes
R20	24	24	21	0	0	2	24	24	23	45	39	34	Yes	Yes	Yes
R21	33	33	30	0	0	0	33	33	30	45	39	34	Yes	Yes	Yes
R22	31	31	30	0	0	0	31	31	30	45	39	34	Yes	Yes	Yes
R23	31	31	29	0	0	0	31	31	29	45	39	34	Yes	Yes	Yes
R24	34	34	32	0	0	0	34	34	32	45	39	34	Yes	Yes	Yes

Notes:

1) NSA R4, R5 and R6 have reduced noise criteria to account for cumulative noise. See Section 3.7 for details.

Based on Table 4.5, the predicted cumulative noise levels for all assessed periods comply with the EPA 1826 limits at the identified noise-sensitive locations, satisfying the applicable planning permit. Additionally, the Project obligations under the GED can be satisfied by adopting reasonable and practicable noise controls. As a result, no residual noise mitigation is required for the Project.

5 Conclusion

An operational noise assessment has been undertaken for the proposed Solar Farm and BESS at the Trafalgar East Solar Farm in accordance with the requirements of the Environmental Protection Act 2017, the General Environmental Duty (GED), and EPA Publication 1826. The assessment is undertaken for Stage 1 only, and for Stage 1 and 2 cumulatively.

Predicted noise levels from both Stage 1, and cumulatively from Stage 1 and Stage 2 at all identified noise-sensitive areas comply with the applicable EPA 1826 noise limits for day, evening, and night periods.

Mitigation options have been explored, including source noise attenuation for the solar inverters, BESS units and MV Power Stations, which has been determined as the best practicable option for noise mitigation.

As the Project (including mitigation) is predicted to comply with applicable noise limits and fulfil the GED obligations, no residual noise mitigation is required.

6 Limitations

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Appendix A

Noise limit derivation

Project No.	217303	**Date**	10 November 2025	**Sheet**	1
Project Title	Trafalgar East BESS and Solar operational no	**Engineer**	ET	**Rev**	1
Description	Rural Method - R4, R5, R6	**Reviewer**	CF	**Type**	Rural

		Zone Name
Generating Zone (GZ)	FZ	Farming Zone
Receiving Zone (RZ)	FZ	Farming Zone

		Adjustment
Distance from GZ to RZ boundary	0 m	0 dBA

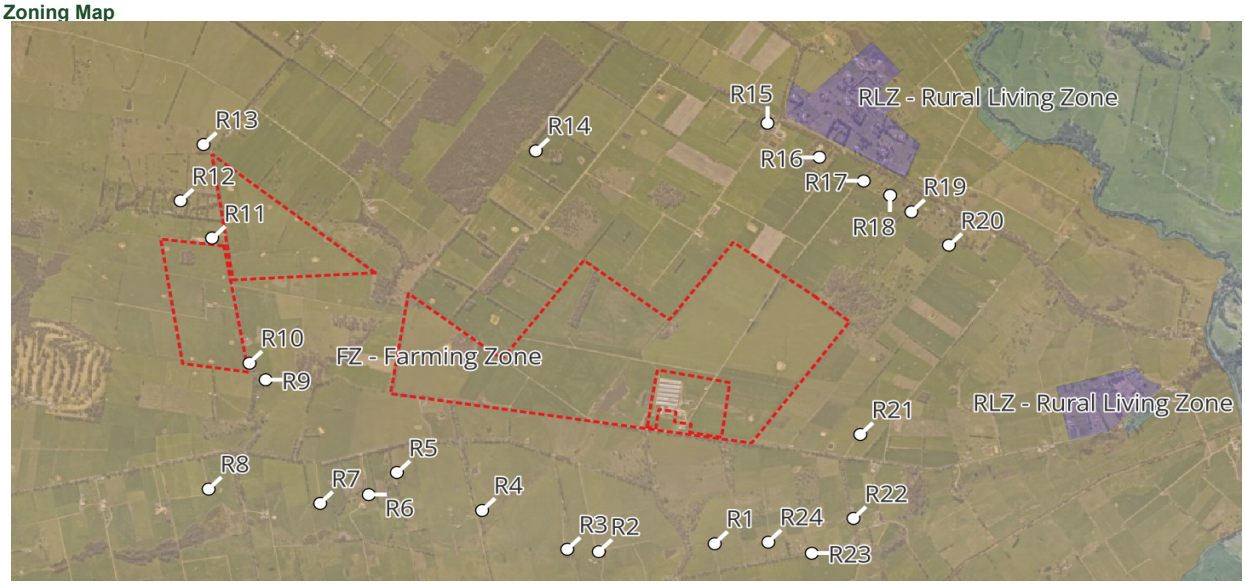
	Apply Earth Resources Levels?
Earth Resources?	No

	Apply Utilities Levels?
Utilities?	Yes
Is the utility in a Road Zone?	No

Clause / Ref	**Description / Comment**	**Period**		
		Noise level, dBA		
		Day	*Evening*	*Night*
19	Zone Limits	46	41	36
19	Earth Resources Levels	-	-	-
19	Utilities Levels	45	39	34
20	Apply Distance Adjustment (0m, 0 dBA)	45	39	34
EPR	Base Limits	45	37	32
18	Base Limits Check	45	39	34
	Measured Background Noise (optional)			
24	Correction for clause 24	+8	+5	+5
24	Noise limit at clause 24	45	39	34
25	High Traffic Noise Levels, L_{eq}			
26	Reference values for high traffic noise	55	50	45
27	High Traffic Noise Adjustment	45	39	34
	Noise Limit	**45**	**39**	**34**

	Multiple pemises correction			
	Number of premises in the area - refer to EPA 1997	2	Adjustment	-3
	Noise Limit per premise	**42**	**36**	**31**

Zoning Map



https://mapshare.vic.gov.au/vicplan/

Project No.	217303	**Date**	10 November 2025	**Sheet**	2
Project Title	Trafalgar East BESS and Solar operational no	**Engineer**	ET	**Rev**	1
Description	Rural Method - All Other NSA	**Reviewer**	CF	**Type**	Rural

		Zone Name
Generating Zone (GZ)	FZ	Farming Zone
Receiving Zone (RZ)	FZ	Farming Zone

		Adjustment
Distance from GZ to RZ boundary	0 m	0 dBA

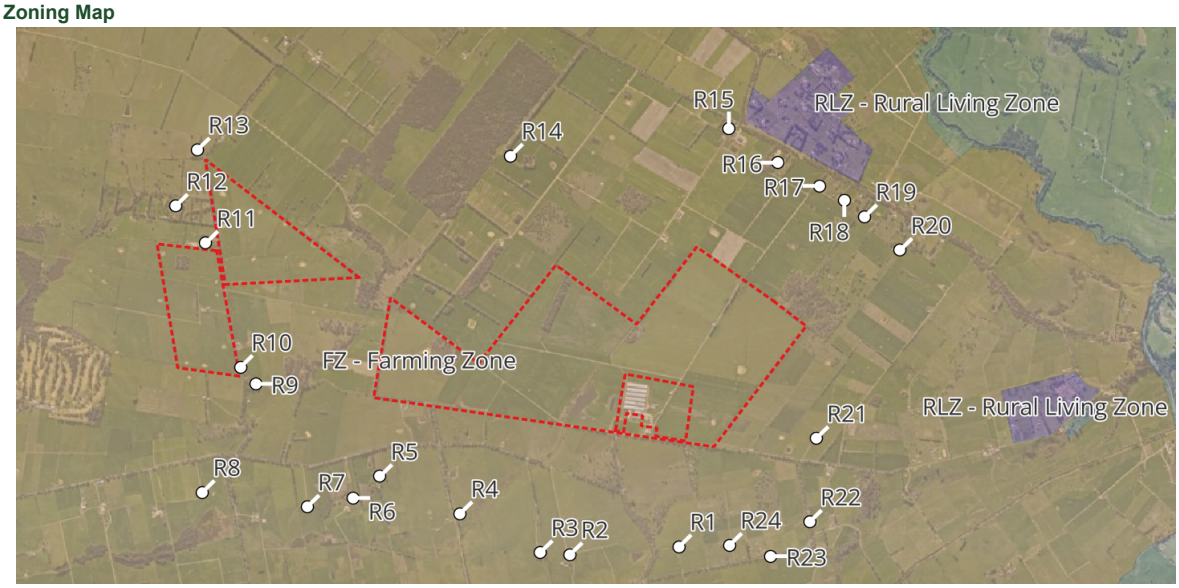
	Apply Earth Resources Levels?
Earth Resources?	No

	Apply Utilities Levels?
Utilities?	Yes
Is the utility in a Road Zone?	No

Clause / Ref	**Description / Comment**	**Period**		
		Noise level, dBA		
		Day	*Evening*	*Night*
19	Zone Limits	46	41	36
19	Earth Resources Levels	-	-	-
19	Utilities Levels	45	39	34
20	Apply Distance Adjustment (0m, 0 dBA)	45	39	34
EPR	Base Limits	45	37	32
18	Base Limits Check	45	39	34
	Measured Background Noise (optional)			
24	Correction for clause 24	+8	+5	+5
24	Noise limit at clause 24	45	39	34
25	High Traffic Noise Levels, L_{eq}			
26	Reference values for high traffic noise	55	50	45
27	High Traffic Noise Adjustment	45	39	34
	Noise Limit	**45**	**39**	**34**

	Multiple pemises correction			
	Number of premises in the area - refer to EPA 1997	1	Adjustment	0
	Noise Limit per premise	**45**	**39**	**34**

Zoning Map



Appendix B

Noise character assessment

Stage 1: Tone Corrected Level, L_TC	One-third Octave Band Centre Frequency, Hz																							Tonal Correction
	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	
R1 Day	4.8	7.6	10.1	14	16	18	15	16	16	19	22	22	23	25	26	30	29	26	24	20	16	16	-8	-23	0
R1 Night	5.6	8.6	11.3	15	16	18	15	11	13	24	17	20	21	22	23	26	25	22	20	16	13	14	-12	-26	0
R2 Day	0.2	3.0	6.0	10	13	14	12	13	13	16	20	19	19	22	23	27	26	23	21	16	11	10	-15	-34	0
R2 Night	3.4	6.4	9.0	11.9	12.8	14.0	12.8	8.9	11.3	22.2	15.4	17.6	18.8	19.5	19.9	23.7	22.3	19.9	17.9	13.1	8.5	7.4	-17.8	-35.9	0
R3 Day	-0.3	2.5	5.4	10	12	14	12	12	12	16	19	19	19	21	23	26	25	23	20	15	10	8	-18	-37	0
R3 Night	3.7	6.8	9.4	12.2	12.9	14.0	13.1	9.0	11.2	22.1	15.3	17.3	18.7	19.6	20.8	23.4	21.7	19.6	17.2	12.3	7.1	5.4	-20.6	-39.9	0
R4 Day	1.2	4.0	6.8	11	13	14	12	12	12	15	18	18	19	21	22	25	24	22	19	13	8	10	-22	-42	0
R4 Night	2.0	5.1	8.0	11.5	12.7	13.9	11.6	7.5	9.7	20.2	13.5	15.6	17.0	17.8	18.4	21.5	20.4	17.7	14.9	9.2	3.7	1.4	-27.1	-47.8	0
R5 Day	-2.3	0.4	3.3	8	10	11	9	9	9	12	16	15	15	17	18	20	19	16	12	6	2	11	-27	-36	0
R5 Night	-1.4	1.6	4.6	8.3	9.5	10.8	9.1	4.9	7.1	17.6	10.8	12.9	14.5	15.6	16.1	18.3	16.2	13.0	9.4	2.7	-4.7	-14.4	-43.0	-71.3	0
R6 Day	-3.4	-0.6	2.2	6	9	10	8	8	8	11	14	14	14	16	16	18	17	14	10	3	-1	6	-35	-47	0
R6 Night	-2.2	0.7	3.6	7.2	8.4	9.6	7.9	3.7	5.9	16.4	9.6	11.5	12.5	13.9	14.6	16.7	14.4	10.8	6.9	-0.6	-9.3	-21.5	-52.0	-85.0	0
R7 Day	-4.7	-1.9	1.0	5	7	9	7	7	7	10	13	12	12	14	14	16	14	11	6	-2	-7	-1	-45	-61	0
R7 Night	-3.7	-0.7	2.2	5.9	7.1	8.3	6.6	2.3	4.5	14.8	7.9	9.8	10.9	12.0	12.5	14.5	11.9	7.8	3.2	-5.2	-15.7	-30.3	-65.0	-104.0	0
R8 Day	-8.5	-5.7	-2.8	2	4	6	4	3	3	6	8	8	7	9	8	11	8	2	-3	-13	-6	2	-41	-55	0
R8 Night	-7.7	-4.7	-1.8	2	3	4	3	-2	0	11	4	6	6	7	7	8	5	0	-6	-17	-31	-51	-94	1	2
R9 Day	-6.8	-3.8	-0.8	4	7	9	7	6	6	8	11	12	11	14	13	14	12	8	4	-3	13	22	-14	-19	2
R9 Night	-6.1	-3.1	-0.2	3.6	4.7	5.9	4.5	0.2	2.3	12.7	5.9	7.7	8.5	9.5	10.3	12.1	9.0	4.5	-0.9	-10.4	-22.4	-39.8	-76.8	0.5	2
R10 Day	-7.0	-3.9	-0.9	4	7	9	7	6	6	9	12	13	11	19	13	15	12	8	4	-1	17	27	-7	-9	5
R10 Night	-6.3	-3.3	-0.3	3.4	4.5	5.8	4.3	0.1	2.2	12.8	5.8	7.6	8.6	9.4	10.1	12.1	8.9	4.2	-1.4	-11.4	-24.1	-42.3	-81.0	0.5	2
R11 Day	-7.1	-2.8	0.6	8	11	13	14	10	10	10	12	20	14	21	15	17	16	12	11	8	28	39	7	7	5
R11 Night	-7.8	-4.9	-1.9	2.0	3.3	4.6	2.9	-1.5	0.3	10.5	3.5	5.3	5.3	5.3	4.6	5.9	2.6	-2.7	-9.1	-20.6	-34.1	-54.3	-102.7	0.5	2
R12 Day	-9.0	-5.6	-2.5	3	6	8	7	5	4	7	9	11	9	12	10	11	9	5	3	0	19	28	-6	-8	5
R12 Night	-8.6	-5.6	-2.6	1.3	2.5	3.7	2.1	-2.3	-0.4	10.2	2.9	4.6	4.8	4.8	4.3	5.6	1.8	-3.8	-11.1	-23.7	-39.1	-61.9	-113.0	0.5	2
R13 Day	-9.2	-5.9	-2.8	3	5	8	5	4	3	6	8	9	8	11	8	10	8	3	1	-3	15	24	-10	-14	5
R13 Night	-8.6	-5.4	-2.4	1.3	2.5	3.7	2.0	-2.4	-0.5	9.6	2.5	4.1	4.0	3.9	3.2	4.6	1.2	-4.4	-11.6	-24.3	-40.1	-63.4	-116.1	0.5	2
R14 Day	-3.7	-0.9	2.1	7	9	10	8	8	8	11	14	13	13	15	16	19	17	13	9	1	-6	-11	-49	-71	0
R14 Night	-2.5	0.5	3.4	6.8	7.7	9.0	7.3	3.2	5.4	16.1	9.2	11.2	12.1	12.9	13.2	15.3	12.8	9.2	5.2	-2.6	-11.4	-23.8	-57.4	-92.9	2
R15 Day	-5.3	-2.5	0.4	5	7	9	7	7	7	10	13	12	12	14	16	18	15	12	7	-1	-6	-8	-45	-62	0
R15 Night	-4.4	-1.4	1.5	5.3	6.4	7.7	6.2	1.9	4.0	14.5	7.8	9.8	10.2	10.6	12.2	14.1	11.3	8.3	3.7	-4.3	-13.4	-26.0	-62.0	-98.4	2
R16 Day	-5.0	-2.2	0.7	5	7	9	7	7	7	10	13	13	12	14	14	17	14	11	7	-1	-6	-1	-45	-62	0
R16 Night	-4.0	-1.1	1.9	5.7	6.8	8.1	6.5	2.3	4.4	14.9	8.2	10.2	10.6	11.0	11.1	13.5	10.8	7.2	3.5	-4.3	-12.7	-24.4	-58.6	-92.3	2
R17 Day	-5.0	-2.2	0.7	5	7	9	7	7	7	10	13	13	12	14	15	17	16	13	8	0	-5	-1	-44	-61	0
R17 Night	-4.1	-1.1	1.8	5.6	6.8	8.0	6.5	2.3	4.3	14.8	8.1	10.2	10.6	11.0	11.0	13.5	11.9	8.5	4.5	-3.5	-11.7	-23.0	-57.7	-91.3	2
R18 Day	-5.2	-2.4	0.6	5	7	9	7	7	7	10	13	12	12	14	14	18	16	12	8	0	-6	-8	-44	-61	0
R18 Night	-4.2	-1.2	1.7	5.5	6.7	8.0	6.4	2.2	4.3	14.7	8.0	10.1	10.5	10.9	11.1	13.8	12.2	8.5	4.4	-3.5	-11.3	-22.4	-58.1	-91.5	2
R19 Day	-5.2	-2.4	0.5	5	7	9	7	7	7	10	13	12	12	14	15	17	16	13	8	0	-6	-8	-44	-60	0
R19 Night	-4.3	-1.3	1.7	5.5	6.7	8.0	6.4	2.2	4.2	14.7	8.0	10.0	10.4	11.2	11.3	13.8	11.9	8.7	4.5	-3.6	-11.6	-23.1	-58.6	-92.6	2
R20 Day	-5.4	-2.6	0.3	5	7	9	6	6	6	10	13	12	12	14	14	17	15	12	7	-1	-7	-9	-45	-61	0
R20 Night	-4.4	-1.5	1.5	5.4	6.6	7.9	6.3	2.0	4.1	14.5	7.8	9.8	10.3	11.0	11.4	13.7	11.3	7.7	3.5	-4.1	-12.8	-24.7	-59.9	-95.1	2
R21 Day	0.4	3.2	6.2	11	13	15	13	13	13	17	20	20	20	23	23	26	25	22	19	14	11	17	-16	-29	0
R21 Night	1.5	4.6	7.6	11.6	12.9	14.3	12.9	8.8	11.1	21.7	15.3	17.6	18.6	19.6	20.4	23.0	21.2	18.4	16.0	10.8	7.0	7.7	-21.3	-38.3	0
R22 Day	-0.9	1.9	4.8	9	11	13	11	11	12	15	18	18	18	20	21	24	23	20	17	11	6	6	-25	-46	0
R22 Night	1.9	5.0	7.8	11.0	11.9	13.2	12.1	8.2	10.7	21.7	15.0	17.2	18.8	19.7	20.2	22.9	21.1	18.1	15.1	9.3	4.0	-2.3	-28.1	-48.9	0
R23 Day	0.0	2.8	5.7	10	12	14	11	12	12	15	18	18	18	21	21	25	24	21	18	13	8	7	-22	-43	0
R23 Night	1.6	4.4	7.4	11.2	12.4	13.8	11.8	7.7	9.9	20.4	13.9	16.3	17.4	18.8	19.5	22.4	20.8	18.0	15.2	10.1	5.6	5.0	-25.5	-45.6	0
R24 Day	3.3	6.1	8.9	13	15	16	14	14	15	18	21	21	21	24	24	28	27	25	23	18	13	13	-12	-30	0
R24 Night	3.6	6.5	9.6	13	15	16	14	10	12	22	16	18	20	21	22	25	23	21	19	14	10	11	-17	-32	0

Stage 1 and 2 (cumulative): Tone Corrected Level, L_TC	One-third Octave Band Centre Frequency, Hz																							Tonal Correction
	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	
R1 Day	3.8	6.6	8.9	12	14	16	14	15	15	17	21	20	21	24	25	29	28	25	23	19	15	15	-8	-24	0
R1 Night	4.7	7.7	10.3	14	15	20	8	4	7	16	10	12	17	18	18	22	21	18	17	12	9	11	-15	-29	0
R2 Day	-2.1	0.7	3.6	8	10	12	10	10	11	14	17	17	17	19	20	24	23	21	18	13	8	6	-20	-40	0
R2 Night	-1.0	2.0	5.0	9.0	10.4	15.5	5.7	1.7	4.0	13.6	7.0	9.0	14.5	15.3	15.6	17.0	16.3	13.9	11.3	6.4	2.2	2.1	-27.0	-45.9	0
R3 Day	-2.8	0.0	2.9	7	9	11	9	10	10	13	16	16	16	19	20	23	22	20	17	12	6	3	-25	-47	0
R3 Night	-0.7	2.3	5.2	8.7	9.8	14.9	4.9	1.0	3.4	13.1	6.5	8.6	13.9	14.9	15.4	17.3	15.8	13.7	10.9	5.5	0.6	-0.3	-31.0	-52.2	0
R4 Day	-2.8	-0.1	3.0	7	9	11	8	9	9	12	15	15	15	17	18	21	20	18	15	9	1	-8	-34	-62	0
R4 Night	-1.7	1.3	4.4	8.4	9.8	15.0	3.1	-0.7	1.8	11.9	5.1	7.0	12.2	13.2	13.9	16.1	14.3	11.5	8.1	1.6	-3.9	-11.9	-41.1	-67.0	0
R5 Day	-4.1	-1.4	1.4	5	7	9	7	7	7	10	13	12	13	15	15	18	15	12	8	1	-8	-21	-53	-89	0
R5 Night	-2.9	0.0	3.1	6.7	8.0	13.1	0.9	-3.1	-0.6	9.0	2.3	4.2	9.2	9.6	9.6	11.6	9.7	6.4	2.5	-5.1	-13.2	-25.0	-59.5	-94.2	0
R6 Day	-5.0	-2.3	0.5	5	7	8	5	6	6	9	12	11	12	14	14	16	14	11	6	-1	-11	-27	-61	-101	0
R6 Night	-3.8	-0.8	2.2	5.7	7.0	12.1	-0.1	-4.1	-1.7	7.9	1.2	3.0	8.0	8.4	8.4	10.2	8.1	4.4	-0.1	-8.5	-17.7	-31.0	-68.4	-106.9	0
R7 Day	-6.2	-3.5	-0.7	3	5	7	4	5	5	7	11	10	10	12	12	14	11	8	3	-5	-17	-35	-73	-120	0
R7 Night	-4.9	-2.0	1.0	4.6	5.8	11.0	-1.4	-5.4	-3.0	6.4	-0.3	1.4	6.3	6.6	6.4	7.9	5.6	1.5	-3.6	-13.0	-23.8	-39.8	-81.0	0.5	0
R8 Day	-10.9	-8.2	-5.3	-1	1	3	0	0	0	3	6	5	5	6	6	8	4	-1	-7	-18	-33	-56	-103	1	0
R8 Night	-9.8	-6.9	-3.9	0	1	6	-4	-8	-6	3	-4	-3	2	2	2	2	-1	-6	-12	-23	-38	-59	-109	1	0
R9 Day	-9.4	-6.6	-3.7	0	2	4	2	3	2	5	8	7	7	9	10	11	8	4	-3	-13	-27	-46	-88	1	0
R9 Night	-8.3	-5.3	-2.3	1.5	2.7	7.7	-2.3	-6.4	-4.2	5.4	-1.7	-0.2	4.7	4.9	4.9	4.9	1.7	-3.3	-9.7	-19.9	-31.9	-49.8	-94.7	0.5	2
R10 Day	-9.5	-6.7	-3.9	0	2	4	2	3	2	5	9	7	8	10	10	12	9	4	-2	-13	-28	-49	-91	1	2
R10 Night	-8.4	-5.4	-2.4	1.3	2.5	7.5	-2.7	-6.8	-4.5	5.0	-1.8	0.0	5.2	5.6	5.5	5.4	2.0	-3.1	-9.7	-20.4	-33.5	-52.7	-98.3	0.5	0
R11 Day	-11.2	-8.5	-5.6	-1	1	2	0	0	0	3	5	4	4	5	5	7	3	-3	-10	-21	-37	-61	-110	1	0
R11 Night	-10.1	-7.2	-4.2	-0.3	1.0	5.9	-4.0	-8.2	-6.3	3.2	-4.3	-2.9	1.5	1.4	0.8	0.4	-2.8	-8.1	-14.9	-26.9	-41.5	-64.1	-115.6	0.5	0
R12 Day	-12.3	-9.5	-6.6	-2	0	1	-1	-1	-2	1	4	2	2	3	3	4	0	-6	-10	-27	-44	-69	13	1	0
R12 Night	-11.2	-8.2	-5.2	-1.2	0.1	5.0	-5.1	-9.5	-7.7	1.6	-5.9	-4.6	-0.1	-0.4	-1.3	-1.7	-5.5	-11.0	-18.9	-32.1	-47.7	-72.0	12.9	0.5	0
R13 Day	-11.9	-9.1	-6.3	-2	0	1	-1	-1	-1	2	4	3	3	4	4	5	1	-4	-7	-24	-42	-69	13	1	2
R13 Night	-10.7	-7.8	-4.8	-1.0	0.2	5.1	-4.9	-9.0	-6.9	2.4	-5.1	-3.7	0.3	0.3	-0.3	-0.4	-3.9	-9.5	-17.2	-30.2	-46.8	-72.0	12.9	0.5	2
R14 Day	-5.2	-2.6	0.4	5	7	8	5	6	6	9	12	11	11	13	13	17	14	11	7	-2	-11	-25	-59	-96	0
R14 Night	-3.8	-0.9	2.1	5.6	6.5	11.7	0.3	-3.5	-1.0	8.6	1.9	3.7	8.8	9.2	9.5	10.3	7.9	4.4	0.0	-8.2	-16.6	-28.5	-65.0	-100.6	0
R15 Day	-7.1	-4.3	-1.4	3	5	7	4	5	5	8	11	10	10	12	13	15	13	10	5	-3	-13	-26	-60	-98	0
R15 Night	-6.0	-3.0	0.0	4.0	5.3	10.3	0.4	-3.8	-1.6	7.8	0.9	2.7	7.7	8.0	8.6	9.6	7.0	4.1	-0.8	-8.9	-17.5	-29.7	-65.8	-101.8	2
R16 Day	-6.6	-3.9	-1.0	3	5	7	5	5	5	8	11	11	11	12	13	16	13	9	6	-2	-11	-24	-56	-91	0
R16 Night	-5.5	-2.6	0.5	4.4	5.7	10.7	0.9	-3.3	-1.1	8.3	1.5	3.3	8.3	8.7	8.6	9.5	6.9	3.0	-1.0	-8.5	-16.4	-27.7	-62.0	-95.4	0
R17 Day	-6.6	-3.9	-1.0	3	5	7	5	5	5	8	11	11	11	13	13	16	15	12	7	-1	-10	-22	-54	-89	0
R17 Night	-5.5	-2.6	0.5	4.4	5.7	10.8	0.9	-3.3	-1.1	8.3	1.5	3.3	8.3	8.7	8.7	9.5	8.2	5.0	0.6	-7.3	-15.2	-26.3	-61.0	-94.5	2
R18 Day	-6.7	-4.0	-1.1	3	5	7	5	5	5	8	11	11	11	12	13	16	15	11	7	-1	-10	-22	-55	-90	2
R18 Night	-5.6	-2.7	0.4	4.4	5.7	10.7	0.8	-3.4	-1.2	8.2	1.4	3.2	8.2	8.6	8.9	9.9	8.6	5.0	0.4	-7.4	-14.8	-25.7	-61.4	-94.7	2
R19 Day	-6.8	-4.0	-1.1	3	5	7	5	5	5	8	11	11	11	12	14	16	14	12	7	-1	-10	-22	-56	-91	2
R19 Night	-5.7	-2.7	0.3	4.3	5.6	10.7	0.7	-3.4	-1.3	8.3	1.3	3.1	8.2	9.2	9.3	10.2	8.0	4.9	0.4	-7.4	-15.0	-26.3	-61.9	-95.7	2
R20 Day	-6.9	-4.1	-1.2	3	5	7	5	5	5	8	11	10	10	12	13	15	14	11	6	-1	-11	-24	-57	-93	2
R20 Night	-5.8	-2.8	0.2	4.2	5.5	10.5	0.6	-3.6	-1.4	8.0	1.1	2.9	8.0	8.7	9.2	9.9	7.6	3.9	-0.6	-7.8	-16.2	-28.0	-63.1	-98.2	2
R21 Day	-0.6	2.2	5.2	10	12	13	11	12	12	16	19	19	19	22	23	26	24	22	19	14	9	8	-18	-36	2
R21 Night	0.4	3.4	6.6	10.7	12.1	17.3	6.7	2.8	5.3	14.8	8.4	10.5	16.3	17.2	17.8	19.0	17.3	14.7	12.1	7.2	3.7	4.6	-24.4	-41.2	5
R22 Day	-2.1	0.6	3.5	8	10	11	9	10	10	13	17	16	17	19	20	22	22	19	16	11	5	2	-25	-47	5
R22 Night	-0.6	2.2	5.2	9.0	10.2	15.3	5.1	1.2	3.7	13.5	6.7	8.9	14.0	14.8	15.3	17.1	15.6	13.0	10.0	4.7	0.3	-0.4	-31.3	-51.9	2
R23 Day	-1.0	1.8	4.7	9	11	13	10	11	11	14	17	17	17	20	20	24	23	21	18	13	7	5	-22	-44	2
R23 Night	0.2	3.0	6.1	10.1	11.4	16.7	5.3	1.4	3.8	13.5	7.0	9.2	14.6	15.8	16.4	18.5	16.8	14.1	11.3	6.5	2.3	1.9	-28.5	-48.5	2
R24 Day	2.1	4.9	7.7	11	13	15	12	13	13	16	20	19	20	22	23	27	26	24	22	17	13	12	-13	-30	2
R24 Night	2.2	5.3	8.3	12	13	18	7	3	6	15	9	11	16	17	18	20	19	17	15	10	7	8	-20	-35	2

Stage 1 and 2 (cumulative): Tone Corrected Level, L_TC	One-third Octave Band Centre Frequency, Hz																							Tonal Correction
	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	
R1 Day	3.8	6.6	8.9	12	14	16	14	15	15	17	21	20	21	24	25	29	28	25	23	19	15	15	-8	-24	0
R1 Night	4.7	7.7	10.3	14	15	20	8	4	7	16	10	12	17	18	18	22	21	18	17	12	9	11	-15	-29	0
R2 Day	-2.1	0.7	3.6	8	10	12	10	10	11	14	17	17	17	19	20	24	23	21	18	13	8	6	-20	-40	0
R2 Night	-1.0	2.0	5.0	9.0	10.4	15.5	5.7	1.7	4.0	13.6	7.0	9.0	14.5	15.3	15.6	17.0	16.3	13.9	11.3	6.4	2.2	2.1	-27.0	-45.9	0
R3 Day	-2.8	0.0	2.9	7	9	11	9	10	10	13	16	16	16	19	20	23	22	20	17	12	6	3	-25	-47	0
R3 Night	-0.7	2.3	5.2	8.7	9.8	14.9	4.9	1.0	3.4	13.1	6.5	8.6	13.9	14.9	15.4	17.3	15.8	13.7	10.9	5.5	0.6	-0.3	-31.0	-52.2	0
R4 Day	-2.8	-0.1	3.0	7	9	11	8	9	9	12	15	15	15	17	18	21	20	18	15	9	1	-8	-34	-62	0
R4 Night	-1.7	1.3	4.4	8.4	9.8	15.0	3.1	-0.7	1.8	11.9	5.1	7.0	12.2	13.2	13.9	16.1	14.3	11.5	8.1	1.6	-3.9	-11.9	-41.1	-67.0	0
R5 Day	-4.1	-1.4	1.4	5	7	9	7	7	7	10	13	12	13	15	15	18	15	12	8	1	-8	-21	-53	-89	0
R5 Night	-2.9	0.0	3.1	6.7	8.0	13.1	0.9	-3.1	-0.6	9.0	2.3	4.2	9.2	9.6	9.6	11.6	9.7	6.4	2.5	-5.1	-13.2	-25.0	-59.5	-94.2	0
R6 Day	-5.0	-2.3	0.5	5	7	8	5	6	6	9	12	11	12	14	14	16	14	11	6	-1	-11	-27	-61	-101	0
R6 Night	-3.8	-0.8	2.2	5.7	7.0	12.1	-0.1	-4.1	-1.7	7.9	1.2	3.0	8.0	8.4	8.4	10.2	8.1	4.4	-0.1	-8.5	-17.7	-31.0	-68.4	-106.9	0
R7 Day	-6.2	-3.5	-0.7	3	5	7	4	5	5	7	11	10	10	12	12	14	11	8	3	-5	-17	-35	-73	-120	0
R7 Night	-4.9	-2.0	1.0	4.6	5.8	11.0	-1.4	-5.4	-3.0	6.4	-0.3	1.4	6.3	6.6	6.4	7.9	5.6	1.5	-3.6	-13.0	-23.8	-39.8	-81.0	0.5	0
R8 Day	-10.9	-8.2	-5.3	-1	1	3	0	0	0	3	6	5	5	6	6	8	4	-1	-7	-18	-33	-56	-103	1	0
R8 Night	-9.8	-6.9	-3.9	0	1	6	-4	-8	-6	3	-4	-3	2	2	2	2	-1	-6	-12	-23	-38	-59	-109	1	0
R9 Day	-9.4	-6.6	-3.7	0	2	4	2	3	2	5	8	7	7	9	10	11	8	4	-3	-13	-27	-46	-88	1	0
R9 Night	-8.3	-5.3	-2.3	1.5	2.7	7.7	-2.3	-6.4	-4.2	5.4	-1.7	-0.2	4.7	4.9	4.9	4.9	1.7	-3.3	-9.7	-19.9	-31.9	-49.8	-94.7	0.5	2
R10 Day	-9.5	-6.7	-3.9	0	2	4	2	3	2	5	9	7	8	10	10	12	9	4	-2	-13	-28	-49	-91	1	2
R10 Night	-8.4	-5.4	-2.4	1.3	2.5	7.5	-2.7	-6.8	-4.5	5.0	-1.8	0.0	5.2	5.6	5.5	5.4	2.0	-3.1	-9.7	-20.4	-33.5	-52.7	-98.3	0.5	0
R11 Day	-11.2	-8.5	-5.6	-1	1	2	0	0	0	3	5	4	4	5	5	7	3	-3	-10	-21	-37	-61	-110	1	0
R11 Night	-10.1	-7.2	-4.2	-0.3	1.0	5.9	-4.0	-8.2	-6.3	3.2	-4.3	-2.9	1.5	1.4	0.8	0.4	-2.8	-8.1	-14.9	-26.9	-41.5	-64.1	-115.6	0.5	0
R12 Day	-12.3	-9.5	-6.6	-2	0	1	-1	-1	-2	1	4	2	2	3	3	4	0	-6	-10	-27	-44	-69	13	1	0
R12 Night	-11.2	-8.2	-5.2	-1.2	0.1	5.0	-5.1	-9.5	-7.7	1.6	-5.9	-4.6	-0.1	-0.4	-1.3	-1.7	-5.5	-11.0	-18.9	-32.1	-47.7	-72.0	12.9	0.5	0
R13 Day	-11.9	-9.1	-6.3	-2	0	1	-1	-1	-1	2	4	3	3	4	4	5	1	-4	-7	-24	-42	-69	13	1	2
R13 Night	-10.7	-7.8	-4.8	-1.0	0.2	5.1	-4.9	-9.0	-6.9	2.4	-5.1	-3.7	0.3	0.3	-0.3	-0.4	-3.9	-9.5	-17.2	-30.2	-46.8	-72.0	12.9	0.5	2
R14 Day	-5.2	-2.6	0.4	5	7	8	5	6	6	9	12	11	11	13	13	17	14	11	7	-2	-11	-25	-59	-96	0
R14 Night	-3.8	-0.9	2.1	5.6	6.5	11.7	0.3	-3.5	-1.0	8.6	1.9	3.7	8.8	9.2	9.5	10.3	7.9	4.4	0.0	-8.2	-16.6	-28.5	-65.0	-100.6	0
R15 Day	-7.1	-4.3	-1.4	3	5	7	4	5	5	8	11	10	10	12	13	15	13	10	5	-3	-13	-26	-60	-98	0
R15 Night	-6.0	-3.0	0.0	4.0	5.3	10.3	0.4	-3.8	-1.6	7.8	0.9	2.7	7.7	8.0	8.6	9.6	7.0	4.1	-0.8	-8.9	-17.5	-29.7	-65.8	-101.8	2
R16 Day	-6.6	-3.9	-1.0	3	5	7	5	5	5	8	11	11	11	12	13	16	13	9	6	-2	-11	-24	-56	-91	0
R16 Night	-5.5	-2.6	0.5	4.4	5.7	10.7	0.9	-3.3	-1.1	8.3	1.5	3.3	8.3	8.7	8.6	9.5	6.9	3.0	-1.0	-8.5	-16.4	-27.7	-62.0	-95.4	0
R17 Day	-6.6	-3.9	-1.0	3	5	7	5	5	5	8	11	11	11	13	13	16	15	12	7	-1	-10	-22	-54	-89	0
R17 Night	-5.5	-2.6	0.5	4.4	5.7	10.8	0.9	-3.3	-1.1	8.3	1.5	3.3	8.3	8.7	8.7	9.5	8.2	5.0	0.6	-7.3	-15.2	-26.3	-61.0	-94.5	2
R18 Day	-6.7	-4.0	-1.1	3	5	7	5	5	5	8	11	11	11	12	13	16	15	11	7	-1	-10	-22	-55	-90	2
R18 Night	-5.6	-2.7	0.4	4.4	5.7	10.7	0.8	-3.4	-1.2	8.2	1.4	3.2	8.2	8.6	8.9	9.9	8.6	5.0	0.4	-7.4	-14.8	-25.7	-61.4	-94.7	2
R19 Day	-6.8	-4.0	-1.1	3	5	7	5	5	5	8	11	11	11	12	14	16	14	12	7	-1	-10	-22	-56	-91	2
R19 Night	-5.7	-2.7	0.3	4.3	5.6	10.7	0.7	-3.4	-1.3	8.3	1.3	3.1	8.2	9.2	9.3	10.2	8.0	4.9	0.4	-7.4	-15.0	-26.3	-61.9	-95.7	2
R20 Day	-6.9	-4.1	-1.2	3	5	7	5	5	5	8	11	10	10	12	13	15	14	11	6	-1	-11	-24	-57	-93	2
R20 Night	-5.8	-2.8	0.2	4.2	5.5	10.5	0.6	-3.6	-1.4	8.0	1.1	2.9	8.0	8.7	9.2	9.9	7.6	3.9	-0.6	-7.8	-16.2	-28.0	-63.1	-98.2	2
R21 Day	-0.6	2.2	5.2	10	12	13	11	12	12	16	19	19	19	22	23	26	24	22	19	14	9	8	-18	-36	2
R21 Night	0.4	3.4	6.6	10.7	12.1	17.3	6.7	2.8	5.3	14.8	8.4	10.5	16.3	17.2	17.8	19.0	17.3	14.7	12.1	7.2	3.7	4.6	-24.4	-41.2	5
R22 Day	-2.1	0.6	3.5	8	10	11	9	10	10	13	17	16	17	19	20	22	22	19	16	11	5	2	-25	-47	5
R22 Night	-0.6	2.2	5.2	9.0	10.2	15.3	5.1	1.2	3.7	13.5	6.7	8.9	14.0	14.8	15.3	17.1	15.6	13.0	10.0	4.7	0.3	-0.4	-31.3	-51.9	2
R23 Day	-1.0	1.8	4.7	9	11	13	10	11	11	14	17	17	17	20	20	24	23	21	18	13	7	5	-22	-44	2
R23 Night	0.2	3.0	6.1	10.1	11.4	16.7	5.3	1.4	3.8	13.5	7.0	9.2	14.6	15.8	16.4	18.5	16.8	14.1	11.3	6.5	2.3	1.9	-28.5	-48.5	2
R24 Day	2.1	4.9	7.7	11	13	15	12	13	13	16	20	19	20	22	23	27	26	24	22	17	13	12	-13	-30	2
R24 Night	2.2	5.3	8.3	12	13	18	7	3	6	15	9	11	16	17	18	20	19	17	15	10	7	8	-20	-35	2