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Baranduda BESS, VIC

Noise Impact Assessment

Prepared for: Birdwood Energy

Project No: MEL3908
Date: 16 May 2024
Revision: 03

Creating great environments with great people

Project:	Baranduda BESS, VIC
Location:	Lot-11-PS340793 Kiewa Valley Highway Baranduda, VIC 3691
Prepared by:	ADP Consulting Pty Ltd Level 13, 55 Collins Street Melbourne VIC 3000
Project No:	MEL3908
Revision:	03
Date:	16 May 2024

Rev	Date	Comment	Author	Signature	Technical Review	Signature	Authorisa-tion & QA	Signature
00	03.11.2023	Issue	ML		WG		WG	
01	06.02.2023	Issue	WG		ML		WG	
02	09.02.2023	Issue	WG		WG		WG	
03	16.05.2023	Update	WG		WG		WG	

Project Team

Client / Principal	Birdwood Energy Reserve Pty Ltd ABN 77 158 663 851

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1. Context

Birdwood Energy propose to develop the land at Lot 11, Kiewa Valley Highway, Baranduda (the Subject Site) into an energy storage facility.

The proposed development includes up to:

- 496 Battery Energy Storage System (BESS) containers
- 124 Inverters
- 1 substation including 4 main transformers
- An extension to the existing Wodonga Terminal Station including a new 330kV bus, circuit breakers meters and overhead lines

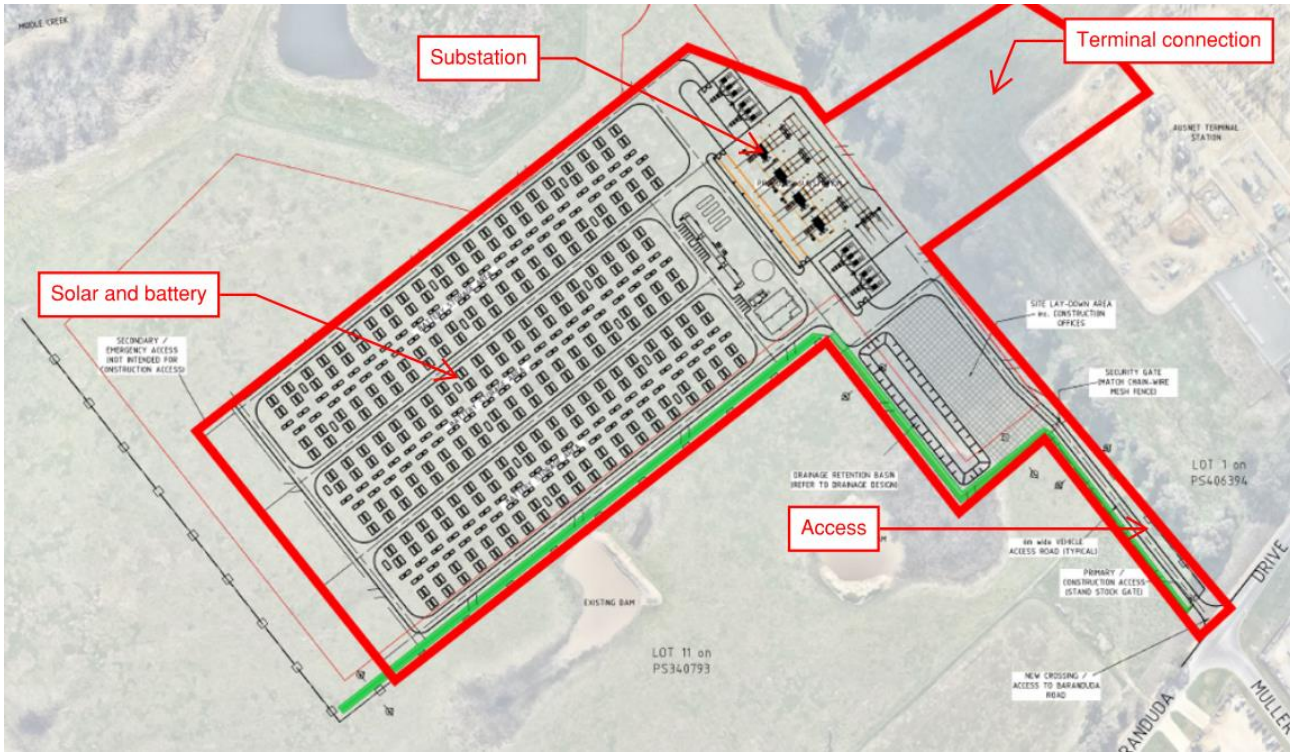
The equipment may run all together during any time period over 24 hours. This report provides a noise impact assessment of the Subject Site to inform the development application and includes:

- Site description and environmental noise measurement
- Summary of relevant noise guidelines, standards and criteria
- Assessment of noise and any noise mitigation requirements

Acoustic recommendations that may form part of any permit conditions are provided in Section 7 of this document.

The site layout is provided in Figure 1 below.

Figure 1 Site layout.



2. Site Description

The Subject Site is in an industry zone (IN1Z) and major urban area. The nearest noise-sensitive receivers are in Urban Growth Zone (UGZ1) or Farm Zone (FZ).

The nearest noise-sensitive receivers are dwellings at the following addresses:

> 122 Kiewa Valley Highway, Bandiana 3691 approx. 600m to the west.

> 61 Clandeboye Road, Baranduda 3691 approx. 1,275m to the south east.

> 311 Whytes Road Baranduda 3691 approx. 1,500m to the south east.

The Subject Site and surrounding context is provided in Figure 2.

Figure 2 Sensitive receivers and zoning

3. Noise Measurement

3.1 Methodology

Noise monitoring was undertaken in general accordance with the EPA Noise Protocol at three (3) locations representative of surrounding sensitive receivers in the period between 21 and 26 December 2023. The purpose of the noise measurement is to confirm the background noise level for calculation of the EPA Noise Protocol criteria.

Noise measurement during the holiday period may not be typical however the night-time background noise level which is used to determine the noise criteria is considered conservative and appropriate for this assessment.

The locations where the long-term noise monitors were installed are detailed below.

> Location A: Towards Kiewa Valley Highway and the western site boundary, approximately 250m from the highway and representative of the sensitive receiver R1. The microphone was placed approximately 1.5m above ground level and had 180 degrees view of the road partially shielded by grass and terrain.

> Location B: Adjacent to Whytes Road and the eastern site boundary, approximately 10m from the kerb and representative of the sensitive receivers adjacent to Whytes Road. The microphone was placed approximately 1.5m above ground level and had 180 degrees view of the road. This location may be affected by the existing switchyard which is considered in the measurement analysis.

> Location C : A central site location over 500m from Kiewa Vally Highway and representative of sensitive receivers far from any road traffic noise source. The microphone was placed approximately 1.5m above ground level.

The noise monitoring locations are provided in Figure 1above and location detail is provided in Appendix A.

Weather during the noise monitoring period included some periods of rain and wind which have been considered in the measurement analysis.

3.2 Results

The noise environment at receivers adjacent to the proposed redevelopment is predominantly road traffic noise from Kiewa Valley Highway, light industry from the surrounding commercial or farm operations and some noise from the existing Ausnet terminal station.

The arithmetic average of the measured hourly L_{90} background noise level is provided in Table 1 below for the time periods defined in the Noise Protocol. The measurement details including the date, hourly data and specific measurement location is provided in Appendix A.

Table 1: Measured background sound pressure noise levels

Location	Day, dBL_{A90} (7am to 6pm)	Evening, dBL_{A90} (6pm to 10pm)	Night, dBL_{A90} (10pm to 7am)
A	38	35	35
B	40	37	34
C	39	37	35

4. Criteria

The proposed development may introduce industrial noise emission from the battery storage, inverters and transformers. No significant noise is expected from upgrades associated with the terminal connection. The noise criteria for this assessment are in accordance with the EPA Noise Protocol[1] and apply to each sensitive receiver based on the existing background noise levels and zoning information.

A summary of the noise criteria for assessment is provided in Table 2 below and detail is provided in Appendix B.

Table 2: Noise Assessment Criteria

Reference	Location	Day (7am to 6pm)	Evening (6pm to 10pm)	Night (10pm to 7am)
R1	122 Kiewa Valley Highway	45	40	40
R2	61 Clandeboye Road	50	44	39
R3	311 Whytes Road	54	48	44

These are external noise criteria to be measured outside the nearest sensitive receiver.

The proposed development may operate at any time period and so the most onerous night-time noise criteria is used for assessment. If the night-time period criteria is met, then daytime and evening noise criteria will also be met.

[1] Environment Protection Agency Victoria, *Publication 1826.4 Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues*, May 2021

5. Modelling

CandaA 3d noise prediction software has been used to calculate noise emission for this project. The 3d acoustic model includes design elevation data, the existing environmental features, surrounding receivers, the proposed development and associated noise sources.

CandaA has been used to implement the ISO 9613[2] noise prediction methodology with the following major noise sources:

- 496 Battery Energy Storage System (BESS) containers across the site
- 124 Inverters located between BESS containers (1 inverter for every 4 BESS containers)
- 4 substations located together on the east side of the development

The following assumptions are made as part of the commercial noise assessment:

- All sources operating simultaneously at full capacity for the full period of assessment.
- Ground conditions between the Subject Site and receivers is soft (absorption factor is 1)

Noise level data is based on manufacturer data for selected equipment where available and supplemented by typical equipment noise levels if required. A summary of noise levels used for acoustic modelling is provided in Table 3 below and detail is provided in Appendix C.

Table 3: Modelled sound power levels

Equipment	Sound Power Level
Inverter	93 dB(A)
Transformer	96 dB(A)
BESS	75 dB(A)

No significant noise is expected from upgrades associated with the terminal connection and it is not included in the acoustic modelling.

[2] ISO 9613.1:1993 *Acoustics – Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere*, 1 June 1993 (ISO 9613-)

6. Assessment

The predicted noise emission contours for the proposed development are provided in Appendix D and a summary of the predicted noise level at receivers is provided in Table 4 below.

The predicted noise level at receiver locations is tonal in character and an adjustment in accordance with the EPA noise protocol is applied. Detail of the tonal adjustment is provided in Appendix E.

Table 4: Predicted and Assessment Noise Levels

Location	Predicted Noise Level	Adjusted Noise Level	Criteria
122 Kiewa Valley Highway	35 dB(A)	40 dB(A)	40 dB(A)
61 Clandeboye Road	27 dB(A)	32 dB(A)	39 dB(A)
311 Whytes Road	26 dB(A)	31 dB(A)	44 dB(A)

The predicted noise level, including adjustment for tonality meet the noise criteria.

7. Recommendations

The noise emission from the proposed development is predicted to meet the EPA noise criteria. The assessment is considered conservative on the basis that it is unlikely that all equipment will run simultaneously during the night-time period.

The following is recommended to confirm noise emission compliance for the proposed development:

> Finalised equipment selections and associated noise level are to be review by the acoustic engineer.

> Post construction noise monitoring should be undertaken to confirm compliance with noise criteria.

These recommendations are to be implemented following project approval.

8. Summary

The proposed Baranduda BESS is predicted to meet the EPA noise criteria. The assessment is considered conservative on the basis that it is unlikely that all equipment will run simultaneously during the night-time period.

Noise mitigation is integrated into the BESS units and additional noise mitigation is not required.

Review of finalised equipment selection and post construction noise monitoring is recommended to confirm noise emission compliance for the proposed development.

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Appendix A
Noise Monitoring

A.1 Methodology

Long term noise monitoring and attended noise measurements were undertaken between 21 and 26 December 2023 to provide an understanding of the noise environment. Noise monitoring was undertaken in general accordance with the EPA Noise Protocol and Australian Standards 1055[3] and 2702[4] requirements.

Noise monitors were installed at 1.5m above ground level in free field conditions with time response set to *fast*..

Noise measurement locations are provided in the figure below.

Full meteorological details that may impact on noise were obtained from the nearest Bureau of Meteorology station and may be provided on request.

[3] AS1005-1997 *Acoustics – Description and measurement of Environmental Noise,* Standards Australia
[4] AS2702-1984 *Acoustics – Methods for the measurement of Road Traffic Noise,* Standards Australia

A.2 Equipment

The equipment used to measure the noise levels is provided the table below

Manufacturer	Name	Serial Number
Convergence Instruments	NSRT mk3 sentry 02	IEC61672-2002-02
Convergence Instruments	NSRT mk3 sentry 05	IEC61672-2002-05
Convergence Instruments	NSRT mk3 sentry 07	IEC61672-2002-07
Brüel and Kjær	Type 4321 Calibrator	2713576

The equipment holds current NATA calibration and equipment was calibrated before and after measurements, with no significant drift occurring.

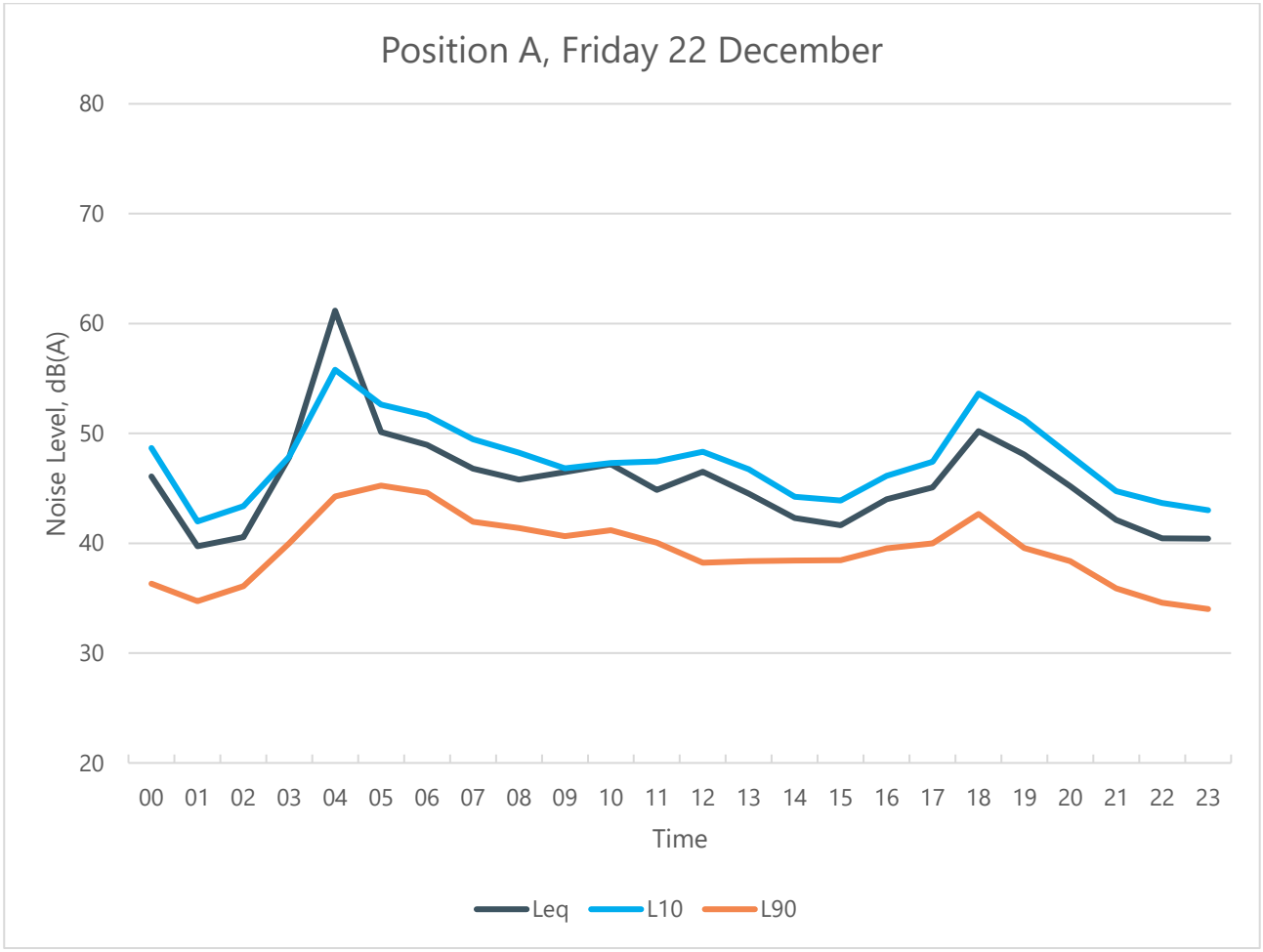
A.3 Discussion

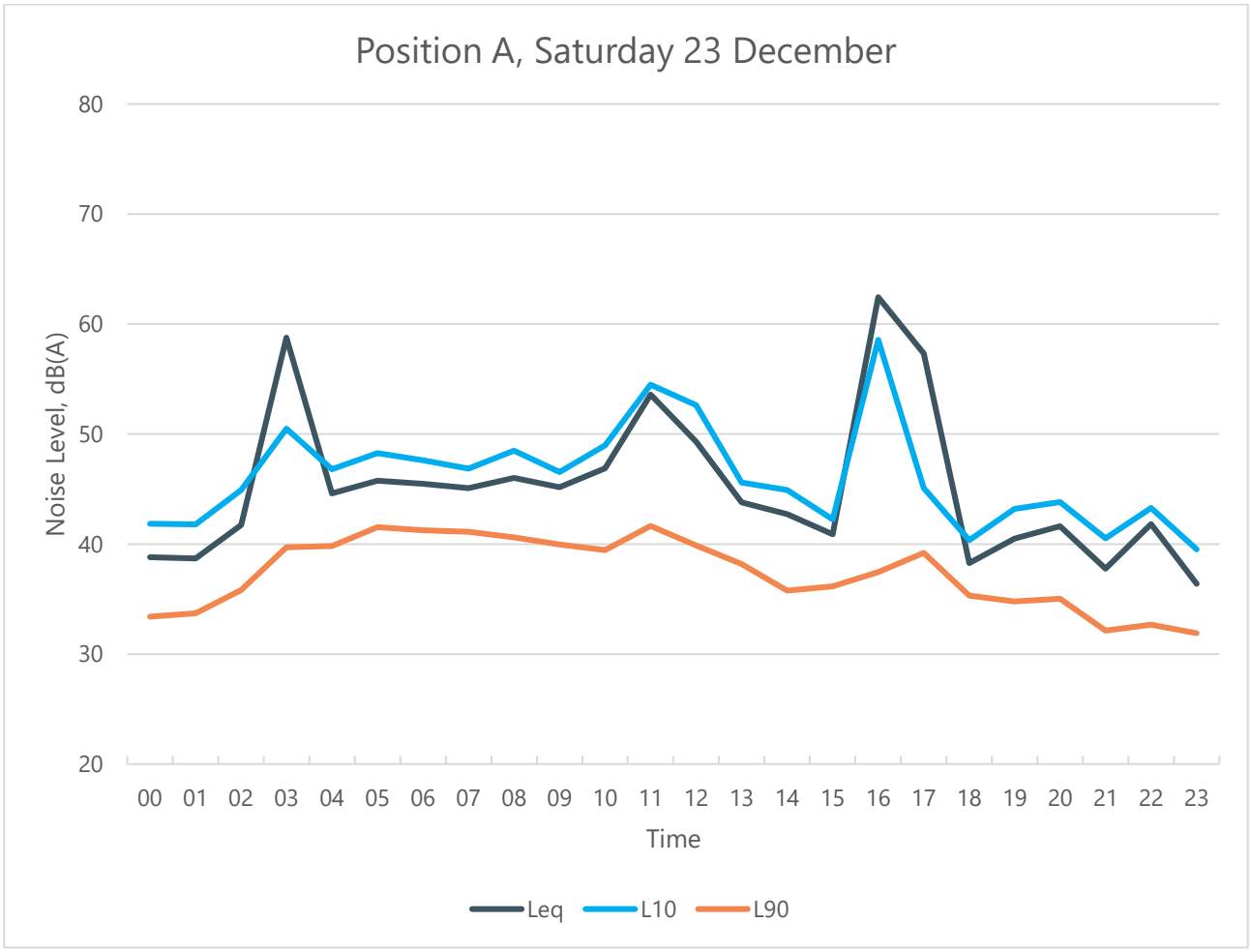
Noise measurements were undertaken during the holiday period which may include atypical noise levels associated with; different traffic and travel patterns or in the case of this site, different power usage that may affect noise from the existing terminal station.

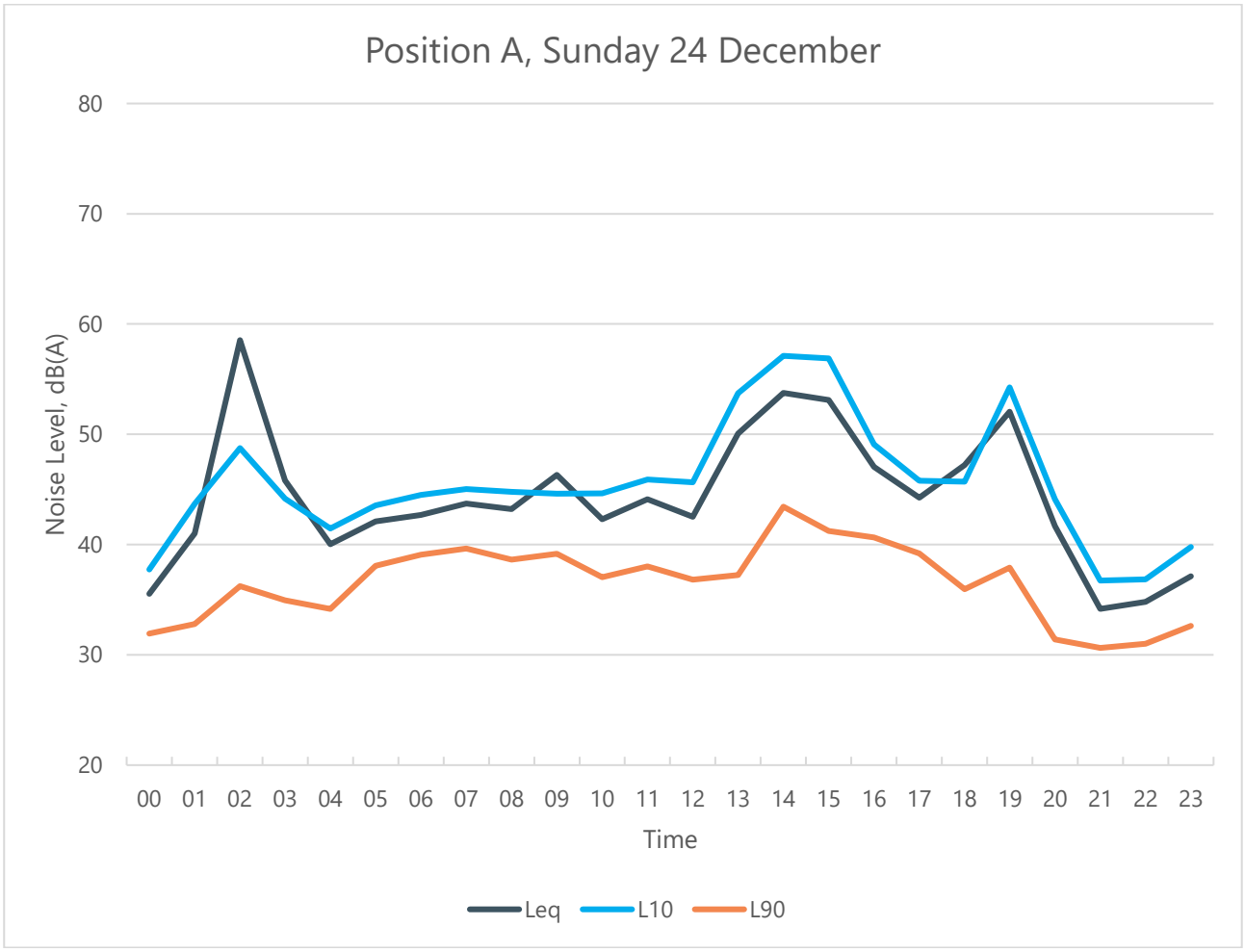
On this basis, the noise levels may not be reflective of typical noise levels and should not be used without detailed consideration.

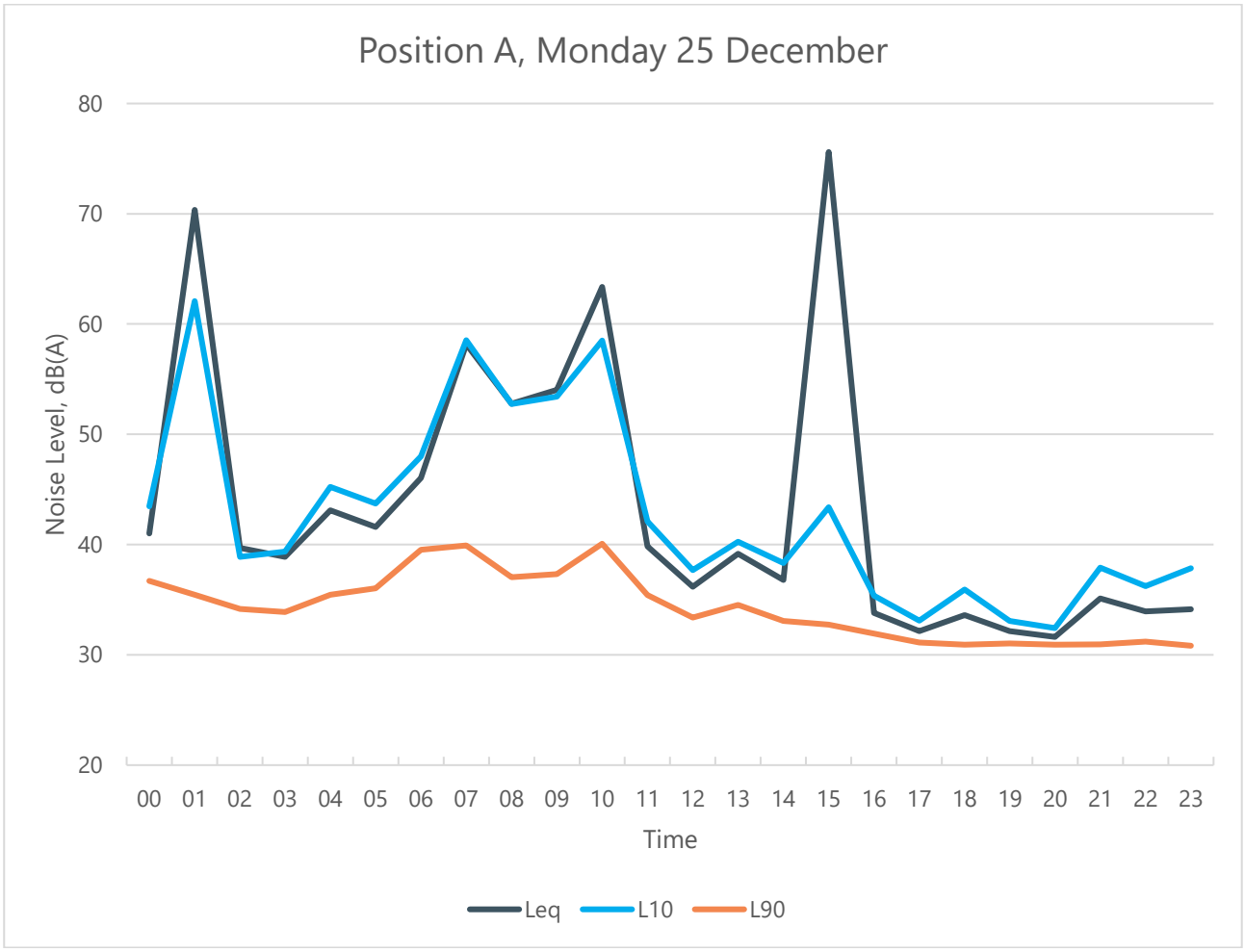
These noise levels are suitable to determine a conservative minimum background noise level (ie how low does the noise level get during the night-time period). This noise level is the level used to determine the night-time noise criteria and is used to confirmed compliance.

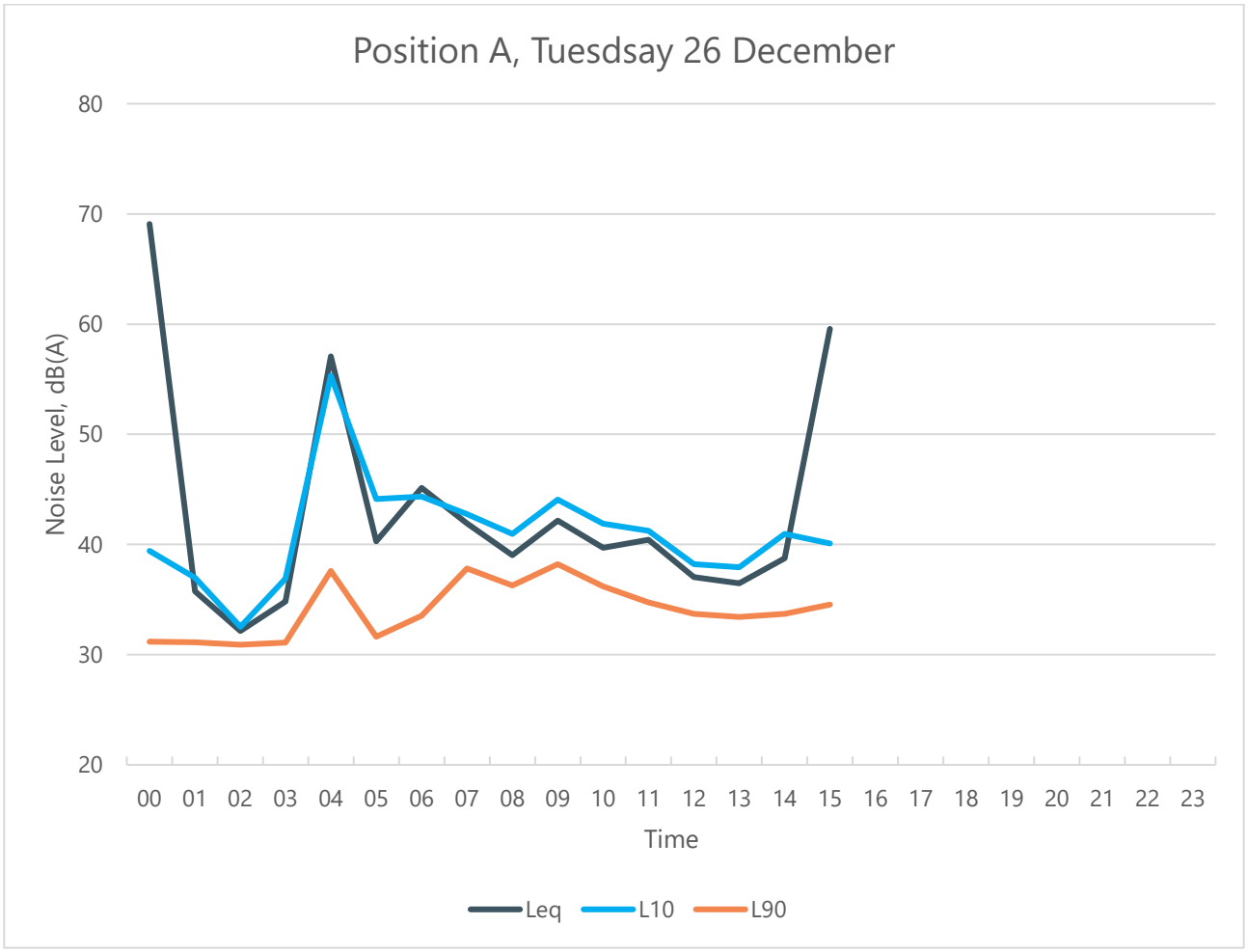
A.4 Location A Results











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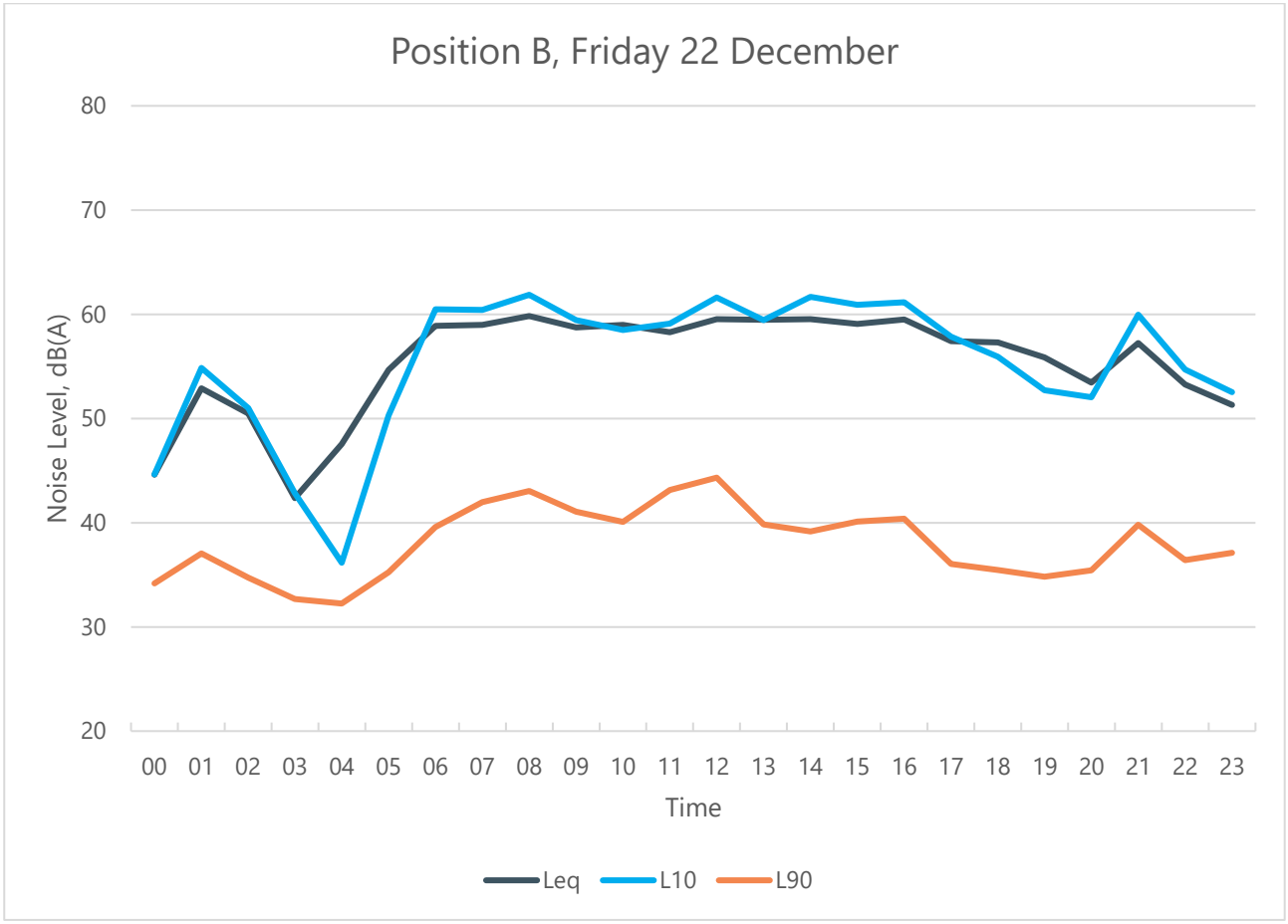

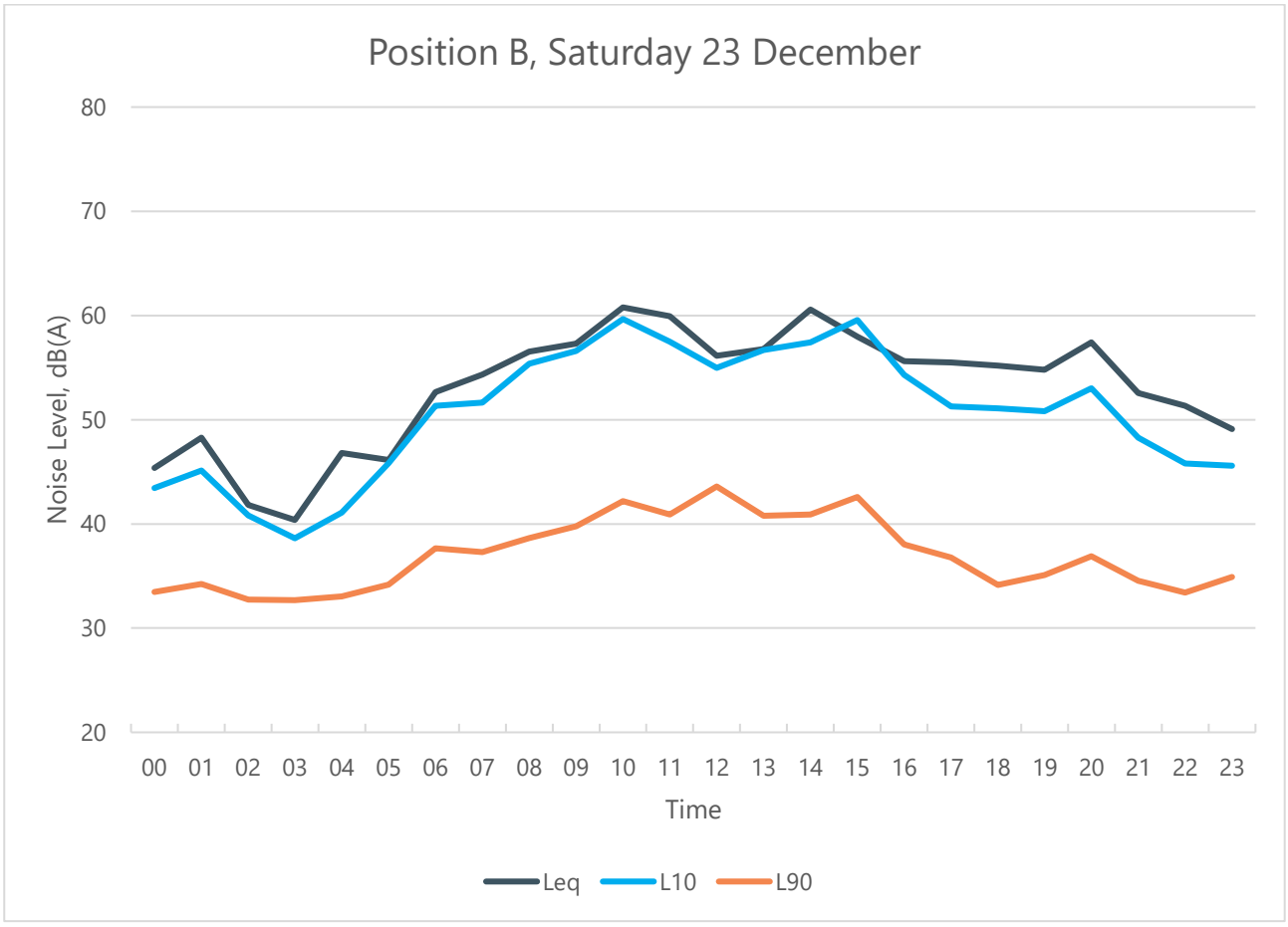

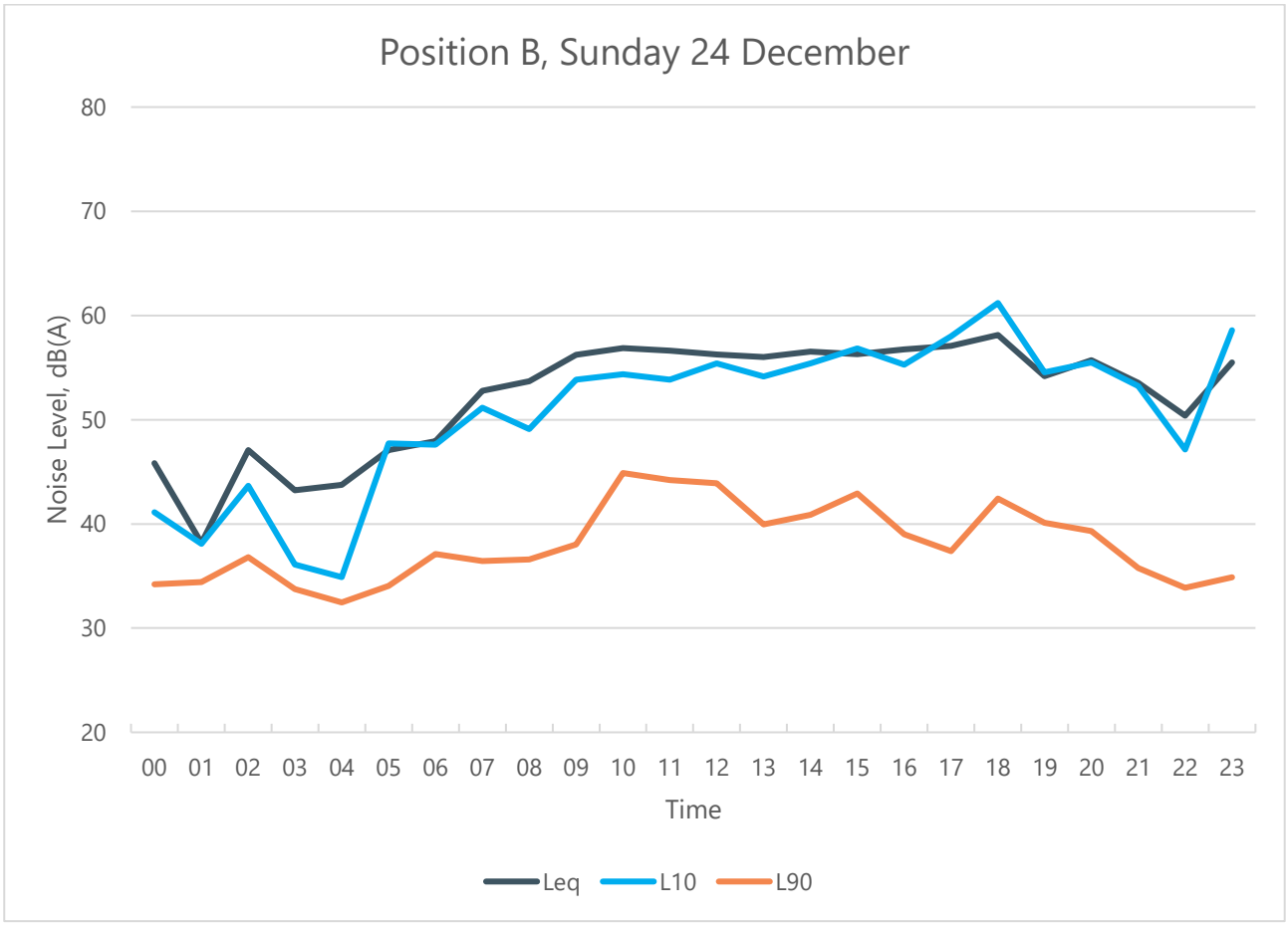

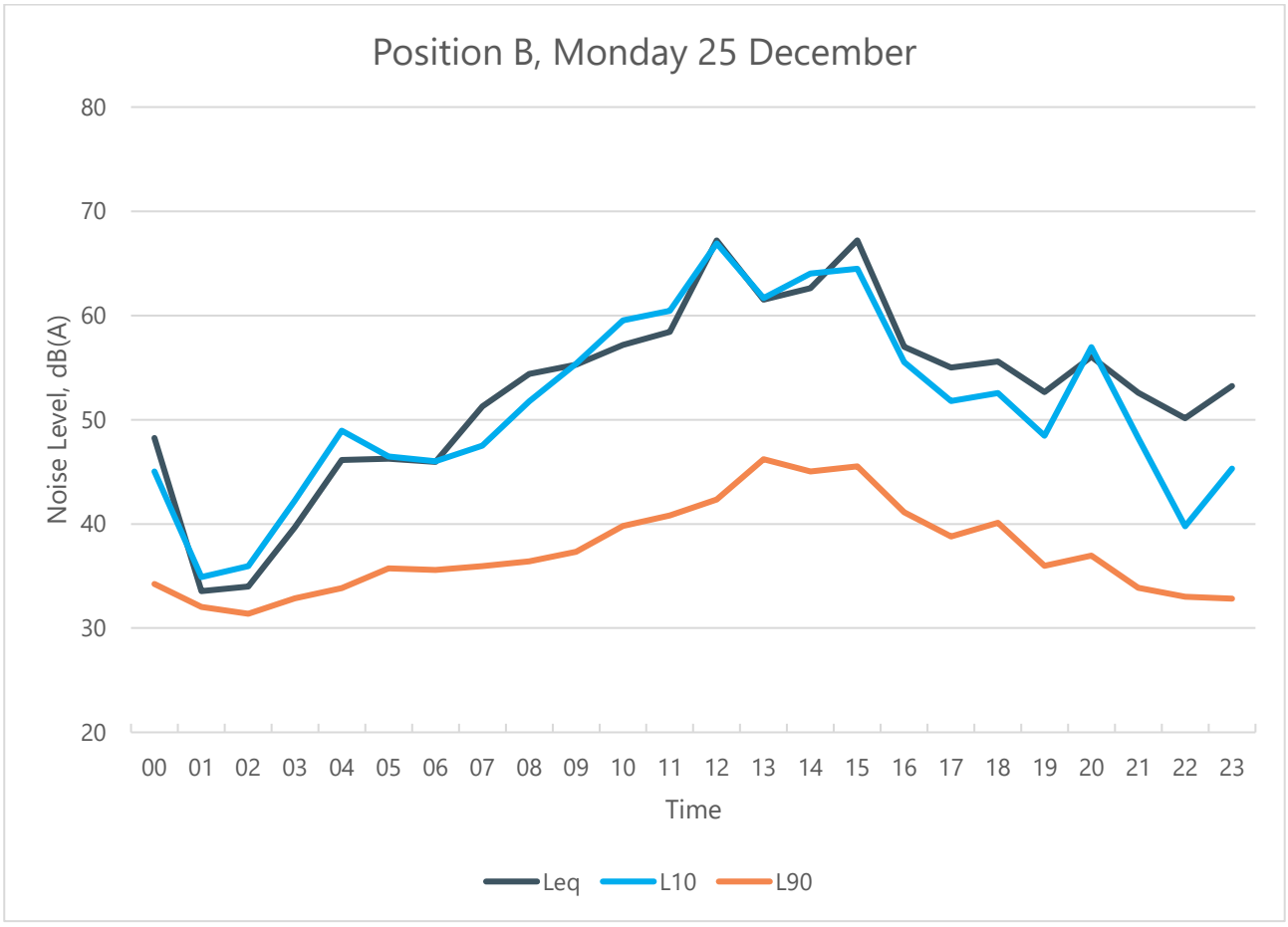

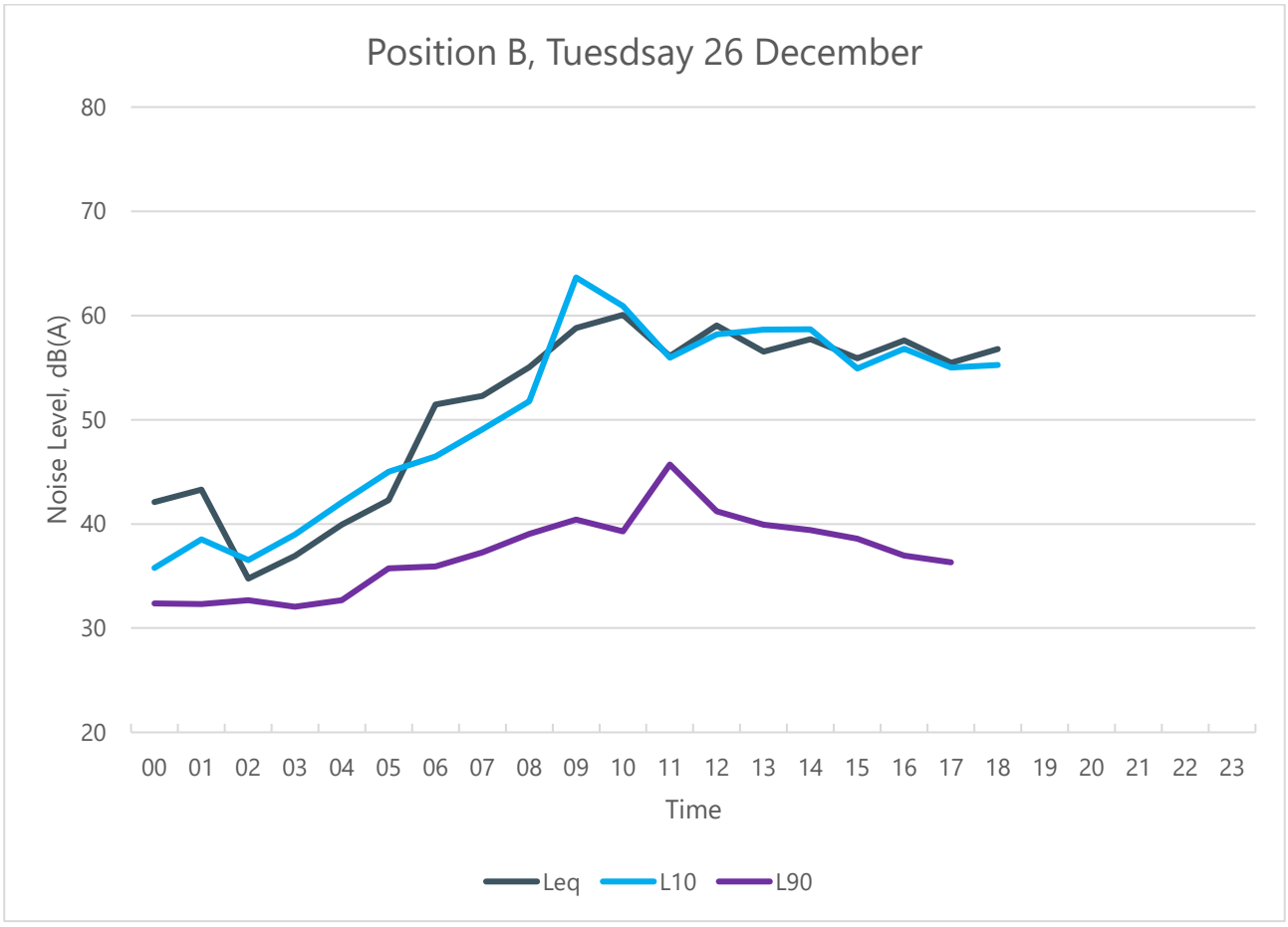

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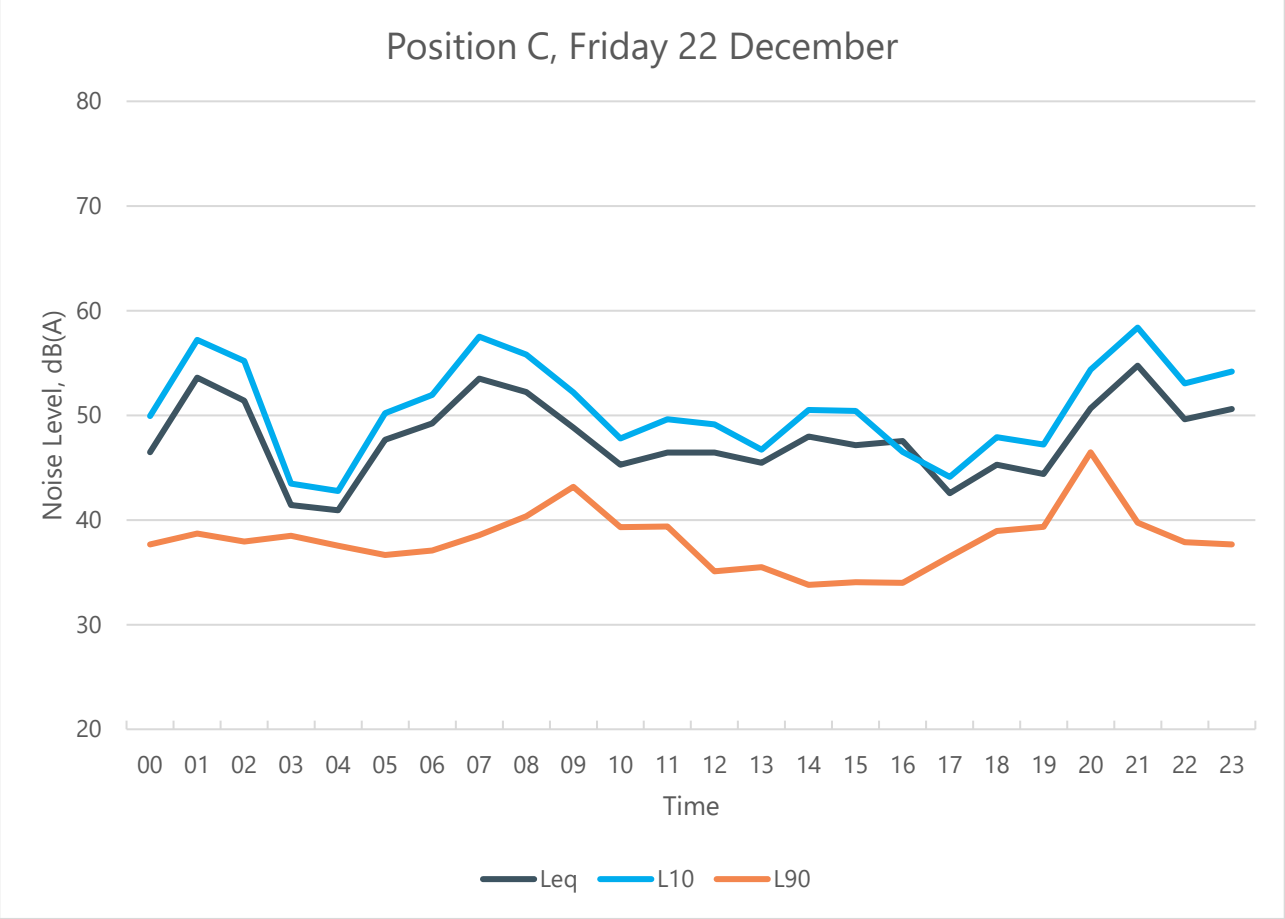

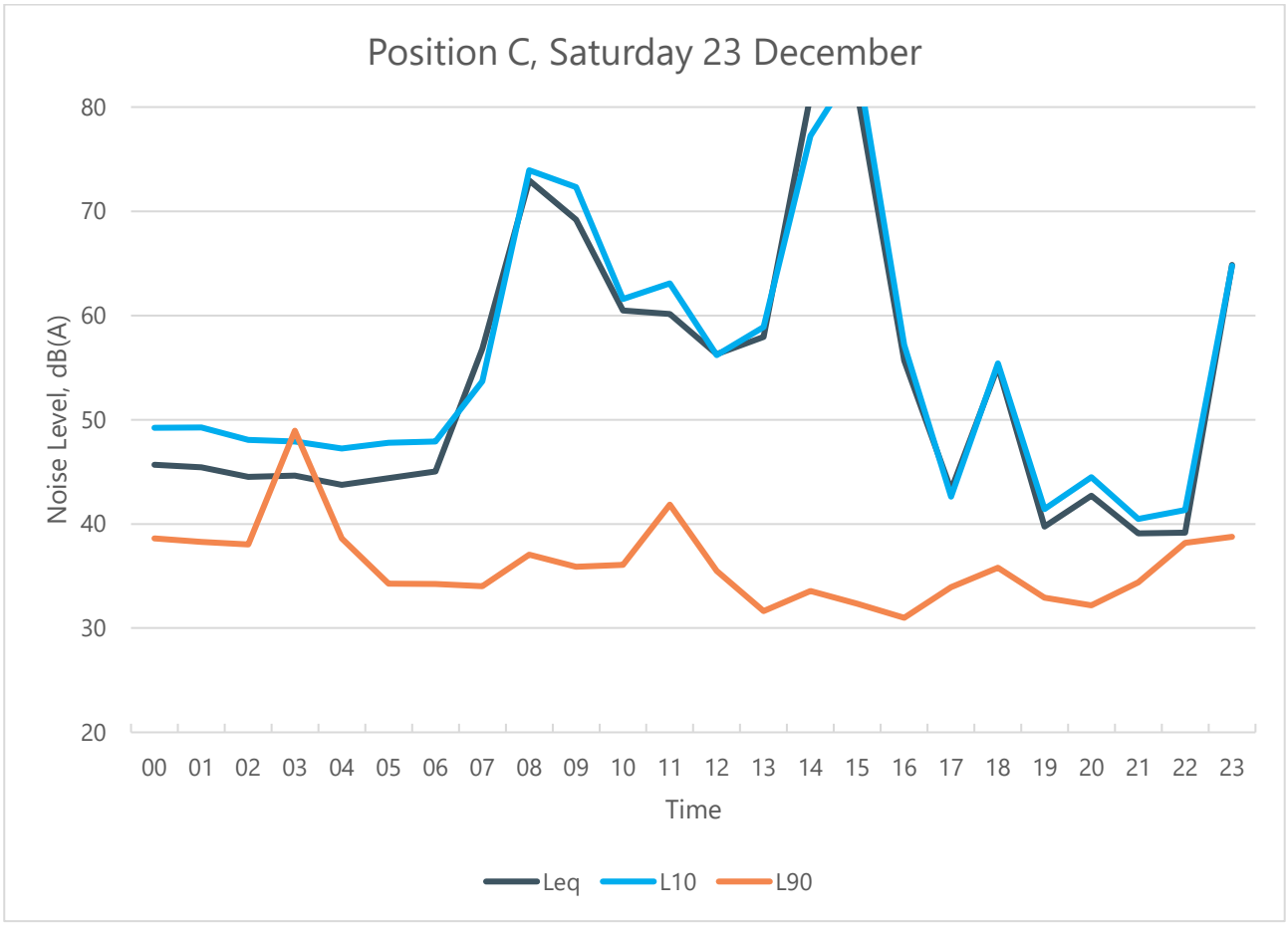

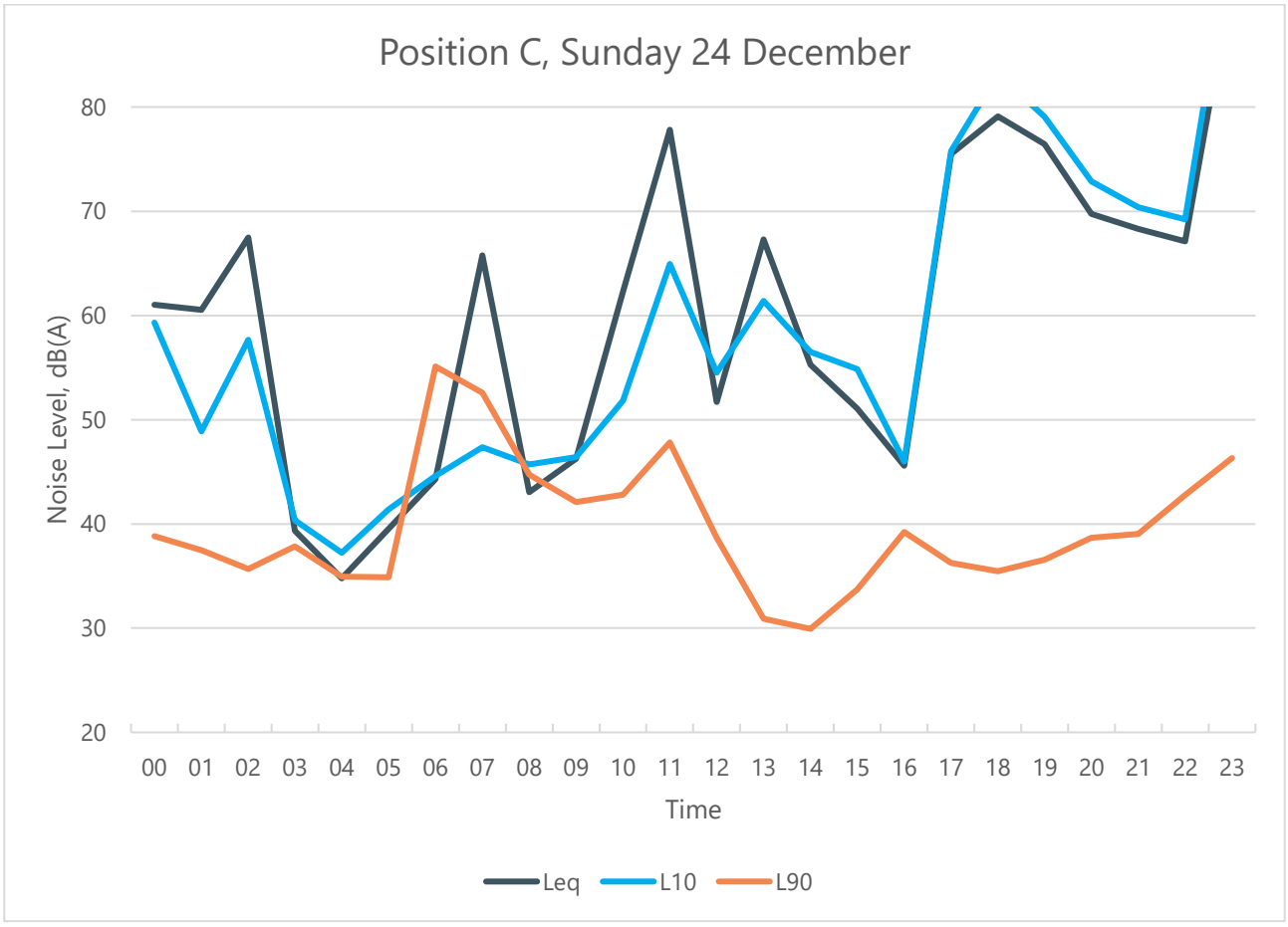

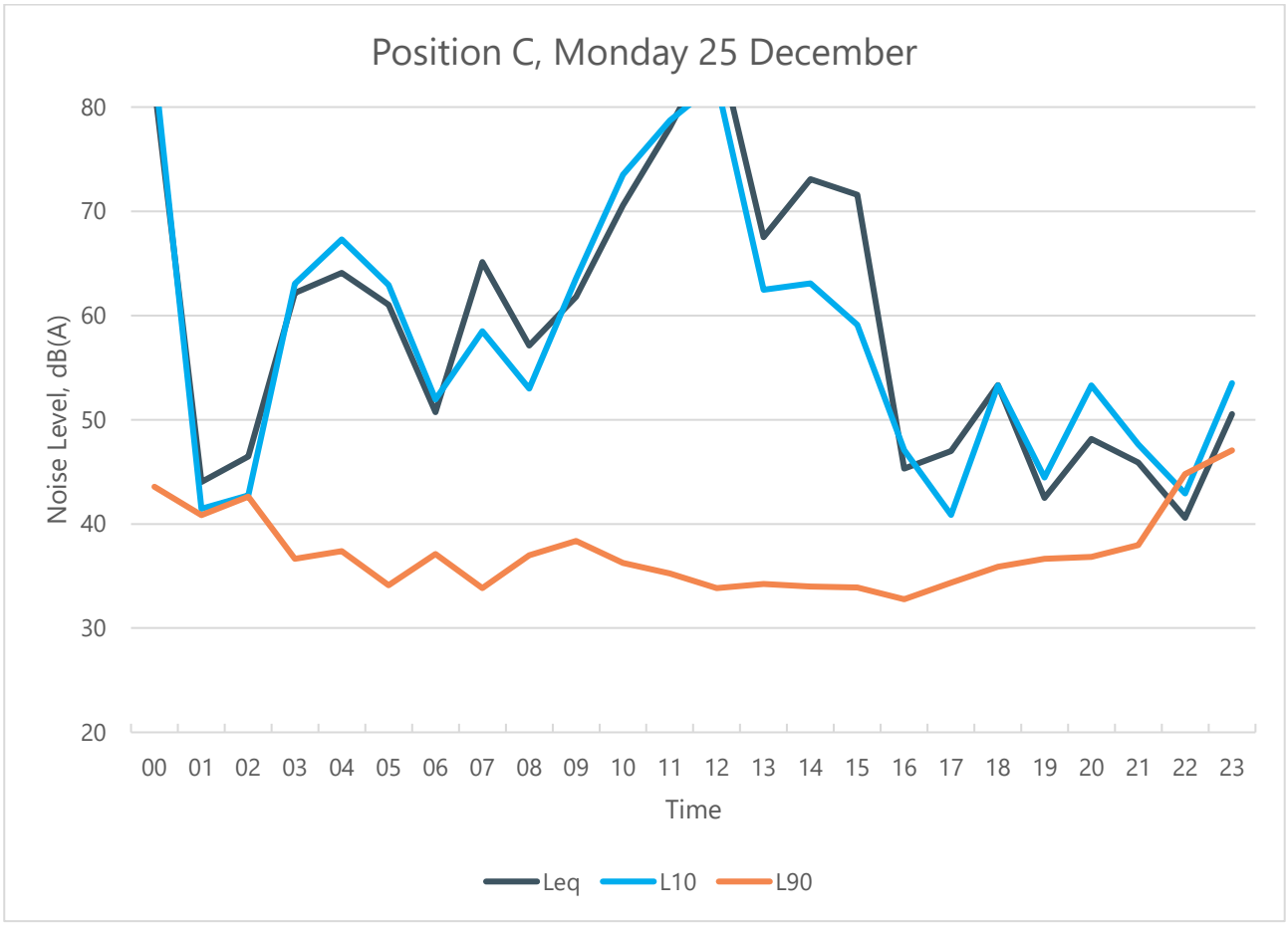

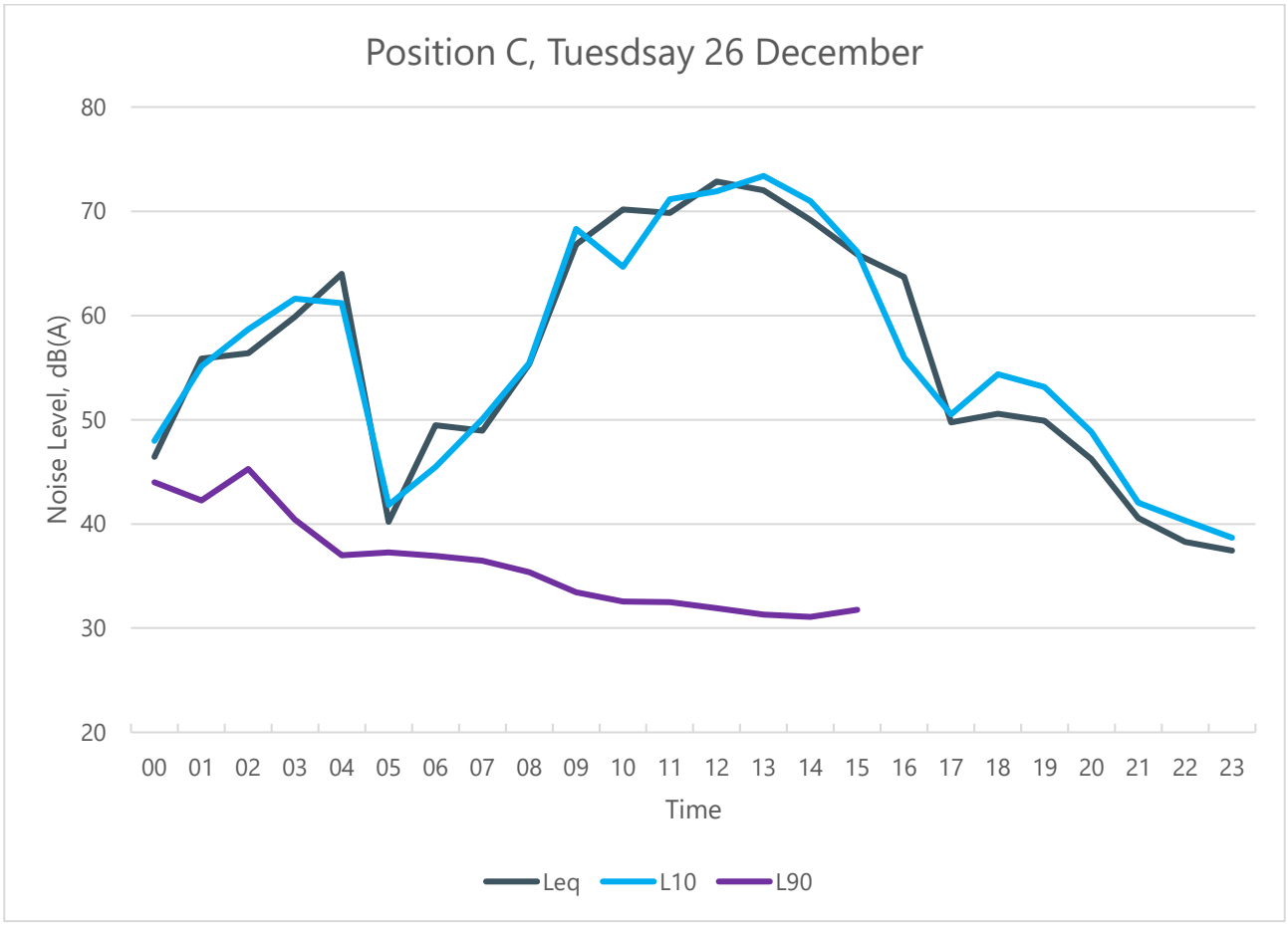

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Appendix B
Noise Criteria

B.1 Context

Industrial noise is assessed under the environmental protection (EP) legislation the Environment Protection Act 2017 (the Act) as amended by the Environment Protection Amendment Act 2018.

The EP legislation includes a General Environmental Duty (GED). The GED requires Victorians to understand and minimise their risks of harm to human health and the environment from pollution and waste (including noise). The Act provides Section 166 – Unreasonable noise, to provide a legislative control for any noise emitted from a place or premises.

Under the GED, anyone who is engaging in an activity that poses risk of harm to human health and the environment, from pollution or waste, must manage that risk. Noise and vibration are covered under this definition. Risks are required to be eliminated or reduced as far as reasonably practicable, by implementing appropriate controls.

The Act establishes a permission framework to regulate activities that pose significant risks of harm to human health and environment, which enables the Environment Protection Authority (EPA) to manage noise pollution in Victoria. The Environment Protection Regulations 2021 (the Regulations) is part of the subordinate legislation tool that support the Act to manage noise emission by setting noise limits that apply to commercial, industrial and trade premises within the Melbourne Metropolitan Region.

The Regulations require that noise limits are defined for noise emissions from the operating project, above which the noise emissions may be considered unreasonable, as prescribed in the Regulations schedule 118.

EPA Victoria has published EPA Publication 1826.4 (the Noise Protocol) 5 that prescribes the methodology and measurement procedure used to determine the applicable noise limits and compliance assessment. Compliance with these limits is mandatory under the Act and GED.

The industrial noise limits for the Project have been calculated in accordance with the procedure described in Part 1:A of the Noise Protocol.

The noise limits are dependent on:

- Zoning levels, based on land zoning within 70 m and 200 m of the noise sensitive area
- The time of day, i.e. different limits apply at different times of the day
- The background noise level (dBLA90) in the noise sensitive area, in the absence of noise due to commercial, industrial or trade operations

Under the Noise Protocol, noise from the source under consideration is measured to determine its impact over a continuous 30-minute period. Adjustments to the measured noise level are applied to account for the effects of duration, tonality, intermittency and impulsiveness. The adjusted 'effective noise level', Leff, is compared against the noise limit to assess compliance with the Noise Protocol.

The policy sets noise limits for the day, evening and night periods as described in the table below.

Period	Day of week	Time period
Day	Monday – Saturday	0700-1800hrs
Evening	Monday – Saturday	1800-2200hrs
	Sunday, Public Holidays	0700-2200hrs
Night	Monday – Sunday	2200-0700hrs

[5] *EPA Victoria, 2021. EPA Publication 1826.4 – Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises, May 2021.*

The Environment Reference Standard (ERS) provides objectives for the ambient sound environment which are dependent on land use as defined by planning zones. This describes the ambient sound environment that supports desirable outcomes, such as sleep in the night and child learning and development, for a range of different land use settings. This includes natural environments, where ambient noise can affect the environment's restorative value on human health.

While the ERS is not a compliance standard for business, EPA and councils will need to take it into account in relevant decisions. The reference standards for noise have been developed to reflect the current ambient acoustic soundscape associated with different areas, from highly urbanised areas to natural environments. The intention is to assist noise monitoring and reporting so that, over time, changes to the acoustic environment can be mapped for the whole of Victoria.

Part 3 of the ERS sets out the environmental values of the ambient sound environment and defines a number of indicators and objectives for different land use categories. The nearest sensitive receivers to The Project site are in an area zoned GRZ, which corresponds to Land Use Category III in Part 3 of the ERS, and are subject to the following ambient noise objectives:

- Outdoor $L_{Aeq,16h}$ <50 dB(A) from 6am to 10pm (Day)
- Outdoor $L_{Aeq,8h}$ <40 dB(A) from 10pm to 6am (Night)

The operational noise limits for the project are provided in the table below and determined in accordance with the process outlined in the Noise Protocol.

B.2 122 Kiewa Valley Highway, Baranduda

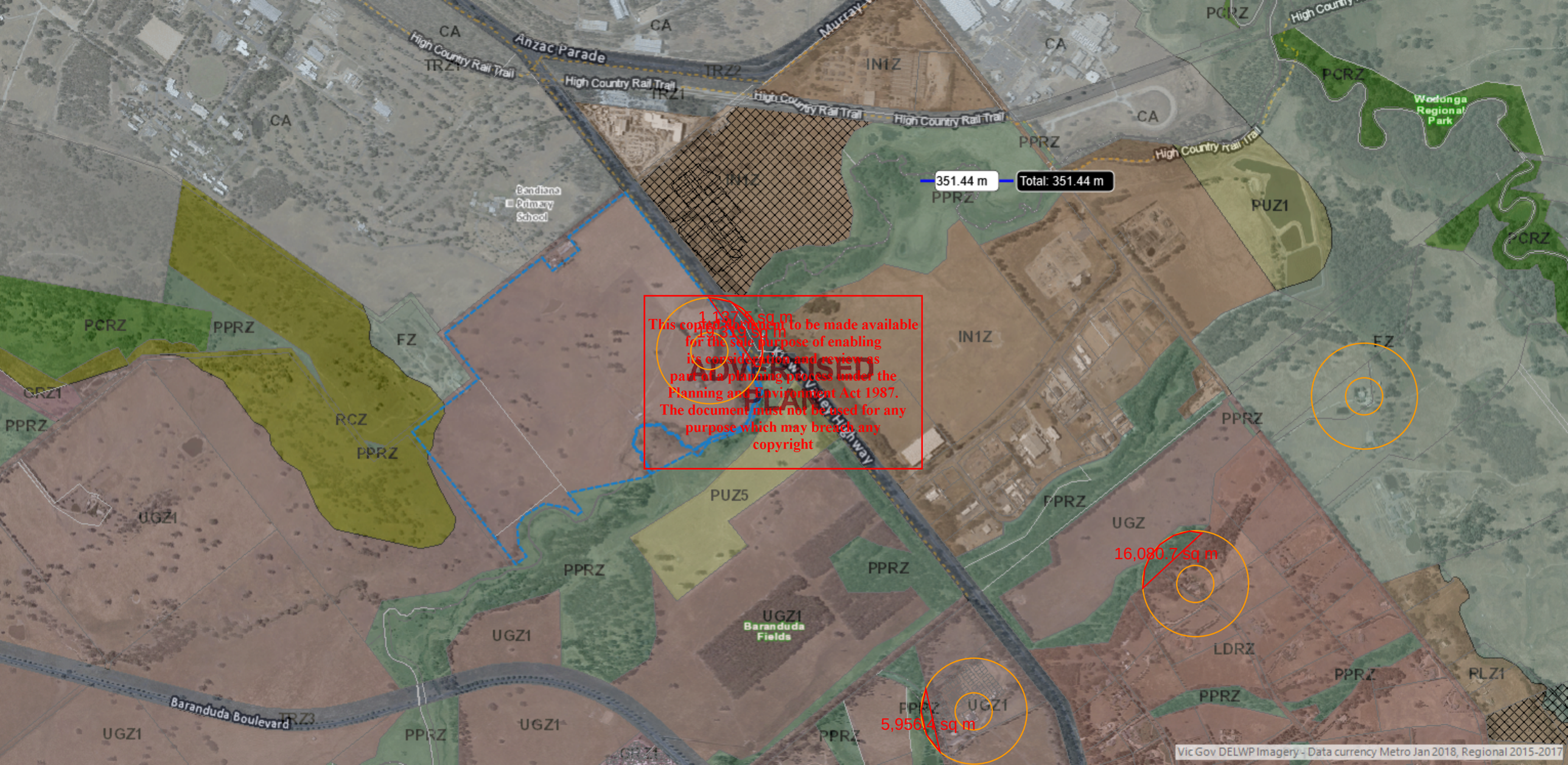
Period	Zoning Level, dBL_{Aeq}	Measured Background Noise Level, dBL_{A90}	Background Noise Level Designation (High/Neutral/Low)	Noise Limit, dBL_{Aeq}
Day	51	38	Low	45
Evening	45	35	Low	40
Night	40	35	Neutral	40

B.3 311 Whytes Road, Baranduda

Period	Zoning Level, dBL_{Aeq}	Measured Background Noise Level, dBL_{A90}	Background Noise Level Designation (High/Neutral/Low)	Noise Limit, dBL_{Aeq}
Day	59	40	Low	54
Evening	53	37	Low	48
Night	48	34	Low	44

B.4 61 Clanboye, Baranduda

Period	Zoning Level, dBL_{Aeq}	Measured Background Noise Level, dBL_{A90}	Background Noise Level Designation (High/Neutral/Low)	Noise Limit, dBL_{Aeq}
Day	50	39	Neutral	50
Evening	44	37	Neutral	44
Night	39	35	Neutral	39


CA
TRZ1
High Country Rail Trail
Anzac Parade
TRZ2
IN1Z
PCRZ
Wodonga Regional Park
PPRZ
351.44 m
Total: 351.44 m
Bandiana Primary School
PUZ1
FZ
RCZ
GRZ1
UGZ1
PUZ5
Hume Freeway
ADVERTISED PLAN
This copy has been made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright
UGZ
16,080.7 sq m
LDRZ
RLZ1
Baranduda Fields
Baranduda Boulevard
TRZ3
5,956.4 sq m
Vic Gov DELWP Imagery - Data currency Metro Jan 2018, Regional 2015-2017

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Appendix C
Noise Data

C.1 Inverter

The proposed inverter is a Freemaq PCSK 4390kW with dimensions approximately 3 x 2 x 2.2(h) and including optional noise reduction kit.

Noise associated with the unit is fan noise running the cooling system. For this assessment, the fan is assumed to operate at 100% capacity.

The PCSK inverter type has been acoustically measured with a detailed acoustic technical report[6] provided and the following average sound power level is extracted.

		Sound Power Level, dB Octave Band Centre Frequency, Hz							
Description	**dB(A)**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
PSCK inverter	**98**	**96**	**96**	**100**	**92**	**94**	**86**	**84**	**79**

The sound power level provided is calculated based on sound pressure levels measured at 1 m around the unit with an average sound pressure level of 76 dB(A) at 1m.

When checked through conformal surface area calculation, the sound power level results in sound pressure level of 79dB(A) at 1m. This means that the sound power level is conservative (likely due to absorptive ground during testing) and will be used for this assessment.

An additional noise reduction technical report[7] has been provided with the PCSK noise reduction kit showing a 5dB(A) reduction. This reduction has been applied to the PSCK inverter sound power level and the modelled noise level for this assessment is provided in the table below.

		Sound Power Level, dB Octave Band Centre Frequency, Hz							
Description	**dB(A)**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
PSCK inverter	**93**	**91**	**91**	**95**	**89**	**91**	**83**	**81**	**76**

This sound power level is equivalent to an average of 71dB(A) at 1m.

[6] 2023, Acoustic Characterisation Power Electronics Inverter, +Technical.
[7] September 2023, Noise Reduction for PCSK Gen3 inverters, Power Electronics

C.2 Transformer

Transformer noise levels are based on measured values of transformers converted to an overall sound power level. The transformers do not significantly contribute to the predicted noise level at receivers.

		Sound Power Level, dB Octave Band Centre Frequency, Hz							
Description	**dB(A)**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Typical transformer	74	67	68	75	72	67	64	63	47

C.3 Battery Energy Storage System (BESS)

The BESS is a Containerised Liquid Cooling Battery System (CATL) at 4.07MW each. The proposed product is the Ener C+ with a documented noise level of <75dB(A). No detailed noise data is available.

The modelled noise level for the BESS is based on a similar product spectrum adjusted to be 10dB below the inverter noise level and confirming that it is achievable with respect to the Ener C+ documented noise level.

		Sound Power Level, dB Octave Band Centre Frequency, Hz							
Description	**dB(A)**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Typical BESS Spectrum	-	67	68	75	72	67	64	63	47
Adjusted to 10dB below inverter	82	75	76	83	80	75	72	71	55

This sound power level is equivalent to an average of 64 dB(A) at 1m.

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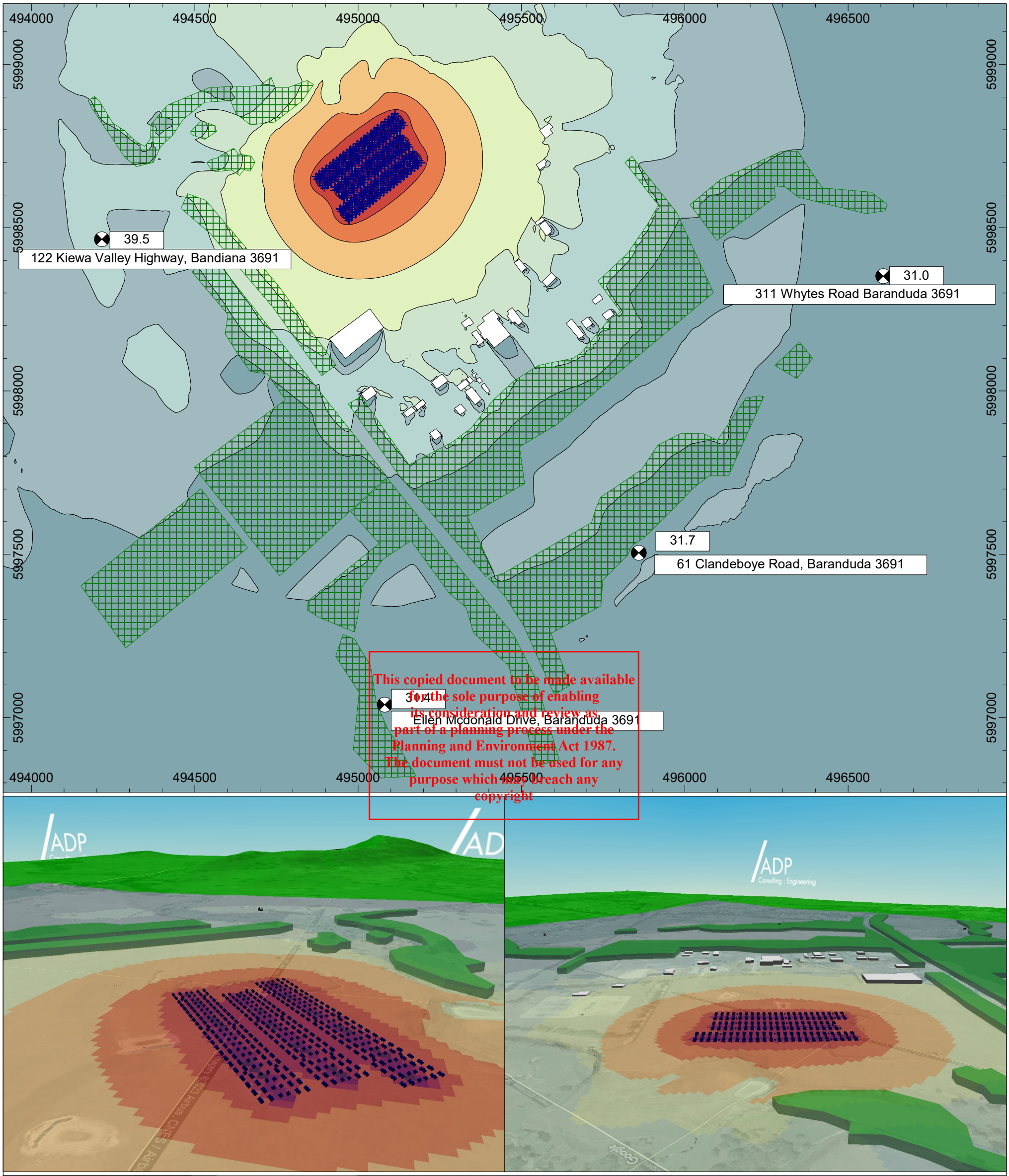
Appendix D
Predicted Noise Contours



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ADVERTISED PLAN

N

Project:	Baranduda Battery Farm	**Job Number:**	MEL3908
Title:	Acoustic Modelling Noise Contours	**Date:**	21/12/2023
Variant:	No acosutic treatments - base acosutic model	**Revision:**	01

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Appendix E
Tonality Correction

E.1 Correction Approach

The EPA Noise Protocol, Appendix C, includes an objective method for adjustment of noise level due to tonal noise contribution.

The method uses L_{eq} one-third octave band analysis between 25Hz and 16kHz to determine a single dB(A) correction that is to be applied.

Following assessment, tonal adjustments are either 0, 2 or 5dB.

61 Clandeboye Road, Baranduda 3691

Description	6.3Hz	8Hz	10Hz	12.5Hz	16Hz	20Hz	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz	20kHz	SUM
Enter Spectrum to Review										6.0	8.0	11.0	2.0	6.0	9.0	14.0	16.0	13.0	16.0	17.0	15.0	15.0	15.0	22.0	10.0	6.0	2.0	-6.0	-17.0	-32.0	-61.0	-80.0	-82.0				26.9
A-weighting	-85.3	-77.8	-70.4	-63.4	-56.7	-50.5	-44.7	-39.4	-34.6	-30.2	-26.2	-22.5	-19.1	-16.1	-13.4	-10.9	-8.6	-6.6	-4.8	-3.2	-1.9	-0.8	0.0	0.6	1.0	1.2	1.3	1.2	1.0	0.5	-0.1	-1.1	-2.5	-4.3	-6.6	-9.3	
Add A-weighting (y/n)?	n																																				
Spectrum and A-weighting [Appen.C 143]	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	8.0	11.0	2.0	6.0	9.0	14.0	16.0	13.0	16.0	17.0	15.0	15.0	15.0	22.0	10.0	6.0	2.0	-6.0	-17.0	-32.0	-61.0	-80.0	-82.0	-82.0	-82.0	-82.0	27.1
Band Exceedance [Appen.C 146]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	-0.5	6.0	-6.5	0.5	-1.0	1.5	2.5	-3.0	1.0	1.5	-1.0	0.0	-3.5	9.5	-4.0	0.0	2.0	1.5	2.0	7.0	-5.0	8.5	-1.0	0.0	0.0	0.0	
Tonality Review Options:																																					
6. Tonality [EPA VIC 1826.4 (July2021)] [Appen.C 146, 147, 148]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	8.0	15.3	2.0	6.0	9.0	14.0	16.0	13.0	16.0	17.0	15.0	15.0	15.0	29.7	10.0	6.0	2.0	-6.0	-17.0	-32.0	-61.0	-80.0	-82.0	0.0	0.0	0.0	31.1
																																			4.0	5.0	**32**

122 Kiewa Valley Highway, Bandiana 3691

Description	6.3Hz	8Hz	10Hz	12.5Hz	16Hz	20Hz	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz	20kHz	SUM
Enter Spectrum to Review										5.0	7.0	10.0	9.0	13.0	16.0	21.0	23.0	20.0	23.0	24.0	23.0	22.0	23.0	31.0	20.0	18.0	15.0	10.0	3.0	-4.0	-21.0	-45.0	-78.0				34.8
A-weighting	-85.3	-77.8	-70.4	-63.4	-56.7	-50.5	-44.7	-39.4	-34.6	-30.2	-26.2	-22.5	-19.1	-16.1	-13.4	-10.9	-8.6	-6.6	-4.8	-3.2	-1.9	-0.8	0.0	0.6	1.0	1.2	1.3	1.2	1.0	0.5	-0.1	-1.1	-2.5	-4.3	-6.6	-9.3	
Add A-weighting (y/n)?	n																																				
Spectrum and A-weighting [Appen.C 143]	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	7.0	10.0	9.0	13.0	16.0	21.0	23.0	20.0	23.0	24.0	23.0	22.0	23.0	31.0	20.0	18.0	15.0	10.0	3.0	-4.0	-21.0	-45.0	-78.0	-78.0	-78.0	-78.0	34.8
Band Exceedance [Appen.C 146]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	-0.5	2.0	-2.5	0.5	-1.0	1.5	2.5	-3.0	1.0	1.0	0.0	-1.0	-3.5	9.5	-4.5	0.5	1.0	1.0	0.0	5.0	3.5	4.5	-16.5	0.0	0.0	0.0	
Tonality Review Options:																																					
6. Tonality [EPA VIC 1826.4 (July2021)] [Appen.C 146, 147, 148]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	7.0	10.0	9.0	13.0	16.0	21.0	23.0	20.0	23.0	24.0	23.0	22.0	23.0	38.7	20.0	18.0	15.0	10.0	3.0	-4.0	-21.0	-45.0	-78.0	0.0	0.0	0.0	39.6
																																			4.8	5.0	**40**

311 Whytes Road Baranduda 3691

Description	6.3Hz	8Hz	10Hz	12.5Hz	16Hz	20Hz	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz	20kHz	SUM
Enter Spectrum to Review										-1.0	1.0	4.0	2.0	6.0	9.0	15.0	17.0	14.0	16.0	17.0	15.0	14.0	14.0	21.0	9.0	5.0	0.0	-8.0	-20.0	-37.0	-66.0	-80.0	-82.0				26.5
A-weighting	-85.3	-77.8	-70.4	-63.4	-56.7	-50.5	-44.7	-39.4	-34.6	-30.2	-26.2	-22.5	-19.1	-16.1	-13.4	-10.9	-8.6	-6.6	-4.8	-3.2	-1.9	-0.8	0.0	0.6	1.0	1.2	1.3	1.2	1.0	0.5	-0.1	-1.1	-2.5	-4.3	-6.6	-9.3	
Add A-weighting (y/n)?	n																																				
Spectrum and A-weighting [Appen.C 143]	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	1.0	4.0	2.0	6.0	9.0	15.0	17.0	14.0	16.0	17.0	15.0	14.0	14.0	21.0	9.0	5.0	0.0	-8.0	-20.0	-37.0	-66.0	-80.0	-82.0	-82.0	-82.0	-82.0	26.5
Band Exceedance [Appen.C 146]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	-0.5	2.5	-3.0	0.5	-1.5	2.0	2.5	-2.5	0.5	1.5	-0.5	-0.5	-3.5	9.5	-4.0	0.5	1.5	2.0	2.5	6.0	-7.5	-6.0	-1.0	0.0	0.0	0.0	
Tonality Review Options:																																					
6. Tonality [EPA VIC 1826.4 (July2021)] [Appen.C 146, 147, 148]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-1.0	1.0	4.0	2.0	6.0	9.0	15.0	17.0	14.0	16.0	17.0	15.0	14.0	14.0	28.7	9.0	5.0	0.0	-8.0	-20.0	-37.0	-66.0	-80.0	-82.0	0.0	0.0	0.0	30.3
																																			3.8	5.0	**31**

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