Acoustic Engineering

Town Planning Acoustic Report

18-24 Scott Street, Dandenong, VIC

Project No: 213566-A
Date: 16/05/2025
Revision: 1

Document Control

Document Title: Town Planning Acoustic Report

Project: 18-24 Scott Street, Dandenong, VIC

Project No: 213566-A

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Revision History

Doc.	Rev.	Date	Purpose	Author	Reviewer
TPR	0	24/04/2025	Not for endorsement	I Goel	T Chong
TPR	1	16/05/2025	For Endorsement	I Goel	T Chong

Executive Summary

DDEG has been appointed by Scott St Dandenong Pty Ltd to provide acoustic engineering consulting services associated with the proposed residential development at 18-24 Scott Street, Dandenong, VIC.

Advice in relation to the following acoustic engineering elements has been requested, and is presented in this document:

Table 1 Acoustic Engineering Elements and Reference Criteria

Acoustic Engineering Element	Reference Criteria
External noise ingress via building facade and roof	▪ Request for Further Information Item 5 ▪ Victoria Planning Provisions Clause 53.06 ▪ Victoria Planning Provisions Clause 58.04-3 ▪ AS/NZS 2107:2016

A review of the above elements has been undertaken and it is considered that the proposed project will satisfy the reference criteria with inclusion of the following acoustic engineering measures:

Table 2 Recommended Acoustic Engineering Measures

System	Acoustic Engineering Measure
External Glazing	▪ Acoustic-rated glazing is recommended to windows and sliding doors of all bedrooms and living areas. ▪ The recommended glazing specifications vary depending on room from $R_w + C_{tr} \geq 27$ rated systems (6 mm thick single glazing or 4 mm glass + 12 mm air gap + 4 mm laminated glass double glazing) up to $R_w + C_{tr} \geq 37$ rated systems (8 mm glass + 16 mm gap + 10.5 mm Viridian VLam Hush acoustical glass double glazing). ▪ Full details are presented in Section 6.3.1.
External Walls	▪ The external walls of the building should be designed to achieve not less than $R_w + C_{tr}$ 45. ▪ External wall designs comprising at least one leaf of brickwork, concrete blockwork, or concrete panels, will comply with these ratings without further acoustic treatment, provided all penetrations are sealed. ▪ Where lightweight external wall construction is proposed, as a minimum, fibrous bulk insulation batts should be included in the wall cavity between the external cladding and internal wall lining, and all penetrations must be sealed. Depending on the selected external cladding materials, additional acoustic treatment may be required. ▪ Specific details of any lightweight external wall assemblies should be reviewed by an acoustic engineer at design stage unless a proprietary wall system that has been evaluated to achieve the required acoustic rating is used.

System	Acoustic Engineering Measure
	▪ Refer to Section 6.3.2 for further details.
Ceiling / Roof	▪ The roof of the building should be designed to achieve not less than $R_w + C_{tr}$ 40. ▪ Concrete roofs will comply with this rating without the need for additional acoustic treatment measures provided all penetrations are sealed. ▪ Lightweight roofs are likely to require fibrous bulk insulation batts, one or more layers of acoustic plasterboard as the ceiling lining, and/or a ceiling mounted to the supporting structure via resilient mounts or hangers. ▪ Specific details of proposed ceiling / roof assemblies should be reviewed by an acoustic engineer at design stage unless a proprietary ceiling / roof system that has been evaluated to achieve the required acoustic rating is used. ▪ Refer to Section 6.3.3 for further details.
Heating / Cooling and Ventilation	▪ The design internal noise levels will only be achieved when all external windows and doors are closed. It is recommended that the mechanical services design should consider whether a mechanical HVAC system is required to enable the building to be adequately heated, ventilated, and cooled if the occupant chooses not to open the windows and/or doors. ▪ If additional heating, ventilation, or cooling is determined to be required, then sound-attenuated passive ventilation openings (e.g. Silence Air wall vents), or an acoustically treated mechanical ventilation / AC system should be installed. ▪ Refer to Section 6.3.4 for further details.

Contents

1 Introduction

1.1 Purpose

DDEG has been appointed by Scott St Dandenong Pty Ltd to provide acoustic engineering consulting services in relation to the proposed residential development at 18-24 Scott Street, Dandenong, VIC.

This document has been prepared in response to a request for information (RFI) by the State of Victoria Department of Transport and Planning on the Planning Permit Application which has been submitted for the project.

The scope of this document comprises review of existing environmental noise levels at the site and provision of advice on noise attenuation measures to protect future occupants from external noise.

A glossary of the acoustic nomenclature used in this document is presented in Appendix A.

1.2 Reference Documentation

This document is based on information contained in the following documents and drawings:

Table 3 Reference Documentation

Document	Prepared by	Issue
Town Planning Architectural Drawings; Job No. 23196; Drawing No. TP.1100 to TP.1103, TP.1110, TP.2100, TP.2101 to TP.2103	Cera Stribley	Received – 20/02/2025
Request for Information (RFI), Ref No. PA2503483	State of Victoria Department of Transport and Planning	11/02/2025

1.3 Document Limitations

The following limitations are applicable with respect to the acoustic advice presented in this document:

- DDEG has prepared this document for the sole use of the relevant stakeholders and approval authorities and for the specific purpose expressly stated in the document. No other party should rely on this document without the prior written consent of DDEG. DDEG undertakes no duty, nor accepts any responsibility, to any third party who may rely upon or use this document.

- The information contained in this document provides advice in relation to acoustics and vibration only. No claims are made and no liability is accepted in respect of design and construction issues falling outside of the specialist field of acoustics and vibration engineering including and not limited to structural integrity, fire rating, architectural buildability and fitness-for-purpose, waterproofing and the like. Supplementary professional advice should be sought in respect of these issues.
- Documents marked 'Not for Construction' or 'Draft' may be subject to change and are not released as final documents. DDEG accepts no liability pending release of the final version of the document.
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- The recommendations, data and methodology presented in this document are based on the listed reference documentation. The recommendations apply specifically to the project under consideration and must not be utilised for any other purpose. Any modifications or changes to the project from that described in the listed reference documentation may invalidate the advice provided in this document, necessitating a revision.
- Subject to the above conditions, this document may be transmitted, reproduced or disseminated only in its entirety.

2 Project Characteristics

2.1 Site Location

The project site is located at 18-24 Scott Street, Dandenong, VIC, as shown in Figure 1.

The following entertainment venue featuring music has been identified within 50 m of the site:

Table 4 Music Entertainment Venue Within 50 m of the Project Site

Venue No.	Venue Name and Address	Venue Operating Hours	Type of Music	Distance from Project Site, m
1	Players Hotel, 1-5 Scott St, Dandenong VIC	10 am to 4 am; Monday to Sunday	Foreground	20

In accordance with *Victoria Planning Provisions Clause 53.06-3*, potential noise impacts due to live music entertainment venues within 50 m of the proposed development must be considered in the design. Note that Albion Hotel at 327 Lonsdale Street is another licensed venue within 50 m of the project site however music was not audible from this venue during DDEG's site visits and measurements.

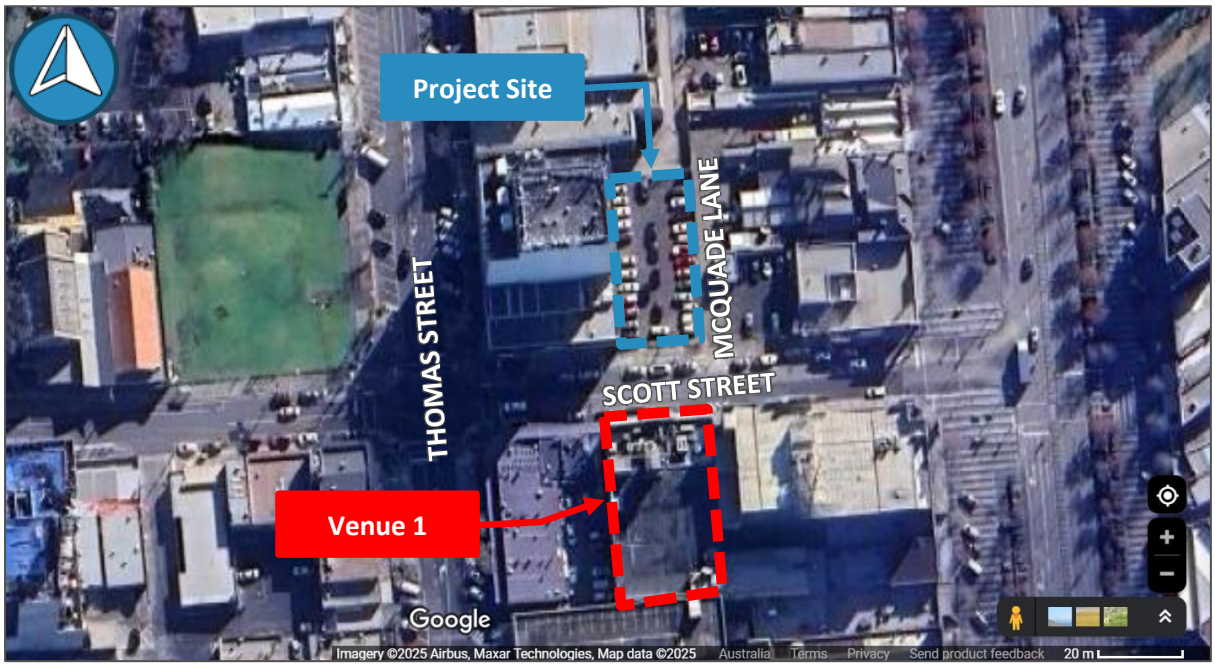


Figure 1 Aerial Image of Site (Aerial Photo Source: Google Maps)

2.2 Proposed Project

The project comprises of a thirteen-storey apartment building with a shared carpark and communal area.

Figure 2 to Figure 5 show the proposed floor plans.

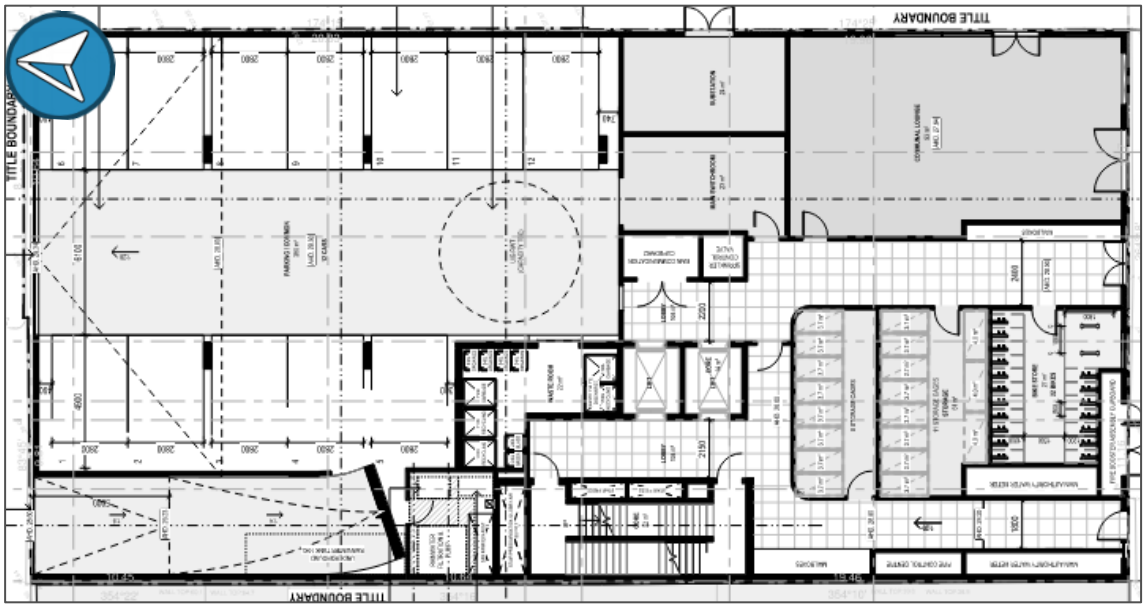


Figure 2 Proposed Ground Floor Plan (Image Source: Cera Stribley)

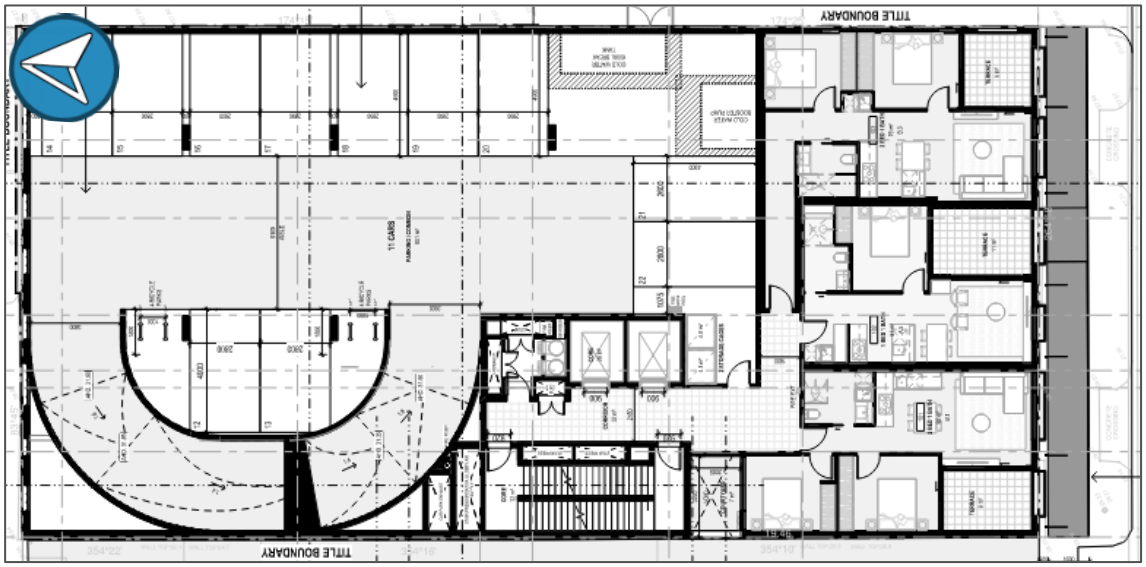


Figure 3 Proposed Level 01 Plan (Image Source: Cera Stribley)

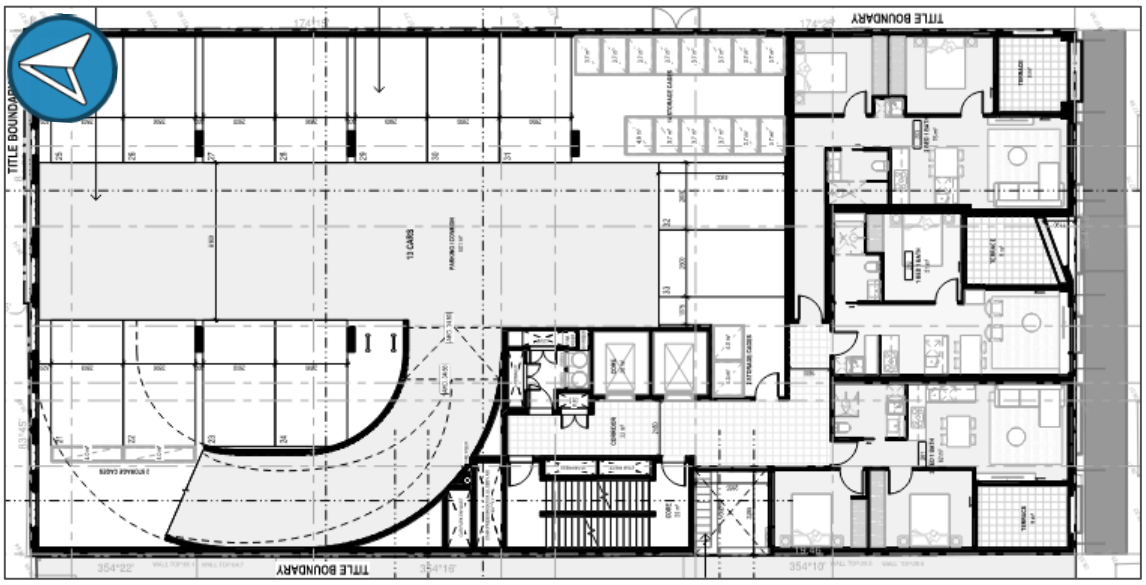


Figure 4 Proposed Level 02 Plan (Image Source: Cera Stribley)

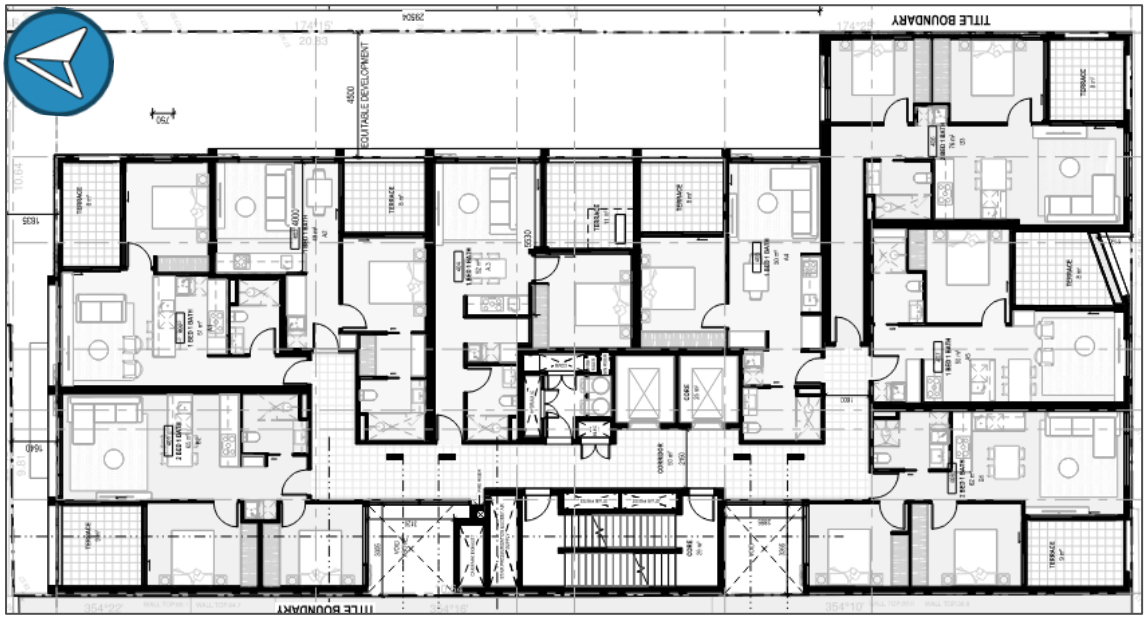


Figure 5 Proposed Level 03-12 Plan (Image Source: Cera Stribley)

3 Legislation and Guidelines

3.1 Summary of Relevant Documents

Table 5 presents a summary of the relevant legislation and guidelines. The information contained in these documents forms the basis of the design criteria and advice presented in this document.

Table 5 Summary of Relevant Statutory Requirements and Guidelines

Document	Status	Relevance to this Project
Victoria Planning Provisions Clause 53.06 (State of Victoria, 2022)	Legislation	Provides guidance on internal noise levels for noise sensitive residential uses within 50 m of live music entertainment venues.
Victoria Planning Provisions Clause 58.04-3 (State of Victoria, 2022)	Legislation	Prescribes maximum interior noise levels for new apartments five or more storeys within prescribed distances of high traffic roads, railways and industrial areas.
Environment Protection Regulations 2021 (EPRs) (State of Victoria, 2021)	Legislation	Defines unreasonable or aggravated noise from commercial, industrial and trade premises, as well as from entertainment venues and outdoor entertainment events.
EPA Publication 1826 – Noise Limit and Assessment Protocol for the Control of Noise from Commercial, Industrial and Trade Premises and Entertainment Venues (EPA Noise Protocol) (EPA Victoria, 2021)	Legislation	Prescribes the methods for determining the statutory environmental noise limits that apply to noise emissions from industrial, commercial, and trade premises within Victoria, and the methods to be used for assessment.
AS/NZS 2107:2016 Acoustics – Design Sound Levels and Reverberation Times for Building Interiors (Standards Australia, 2016)	Guideline	Provides guidance on internal noise levels and reverberation times for different types of spaces. The guidance provided is relevant to the development in respect of noise intrusion from external sources.

3.2 Victoria Planning Provisions 53.06-3

Victoria Planning Provisions Clause 53.06-3 (State of Victoria, 2022) requires that a live music entertainment venue must be designed, constructed and managed to minimise noise emissions from the premises and provide acoustic attenuation measures that would protect a noise sensitive residential use within 50 metres of the venue.

Clause 53.06-3 also states that a noise sensitive residential use must be designed and constructed to reduce noise levels from any indoor live music entertainment venue to below the noise limits specified in *Environment Protection Regulations 2021* (EPRs) (State of Victoria, 2021)and the incorporated *EPA Publication 1826 – Noise Limit and Assessment Protocol for the Control of Noise from Commercial, Industrial and Trade Premises and Entertainment Venues* (EPA Noise Protocol) (EPA Victoria, 2021).

4 Town Planning Requirements

Request for Information (RFI) (Ref No. PA2503483) issued by the State of Victoria Department of Transport and Planning specifies items that need to be addressed in the planning permit application for the development. Table 6 presents the relevant acoustic item(s):

Table 6 Relevant Acoustic Item(s) from Request for Information (RFI)

Item No.	Text from Request for Information (RFI)
5	Confirmation of whether the site is in proximity to any entertainment venues / noise sources. If so, an acoustic report is required.

5 Existing Acoustic Conditions

5.1 Exterior Soundscape

During our site visits on 4 and 11 April 2025, the soundscape was dominated by music noise from the Players Hotel on the opposite side of Scott Street. There was also minor traffic noise from Scott Street and Thomas Street which contributed to the overall soundscape.

5.2 Noise Measurement Locations and Periods

Environmental measurements were conducted to establish the noise levels due to existing environmental noise sources at the locations detailed in Table 7 and Figure 6. Details of each measurement are presented in Table 8. Details of the measurement methodology are presented in Appendix B.

Table 7 Noise Measurement Location Details

Location Reference	Measurement Description	Microphone Height Above Ground Level
1	Environmental noise logging	1.6 m
2	Environmental noise measurement – Scott Street / Players Hotel	1.5 m
3	Environmental noise measurement – McQuade Lane / Players Hotel	1.5 m

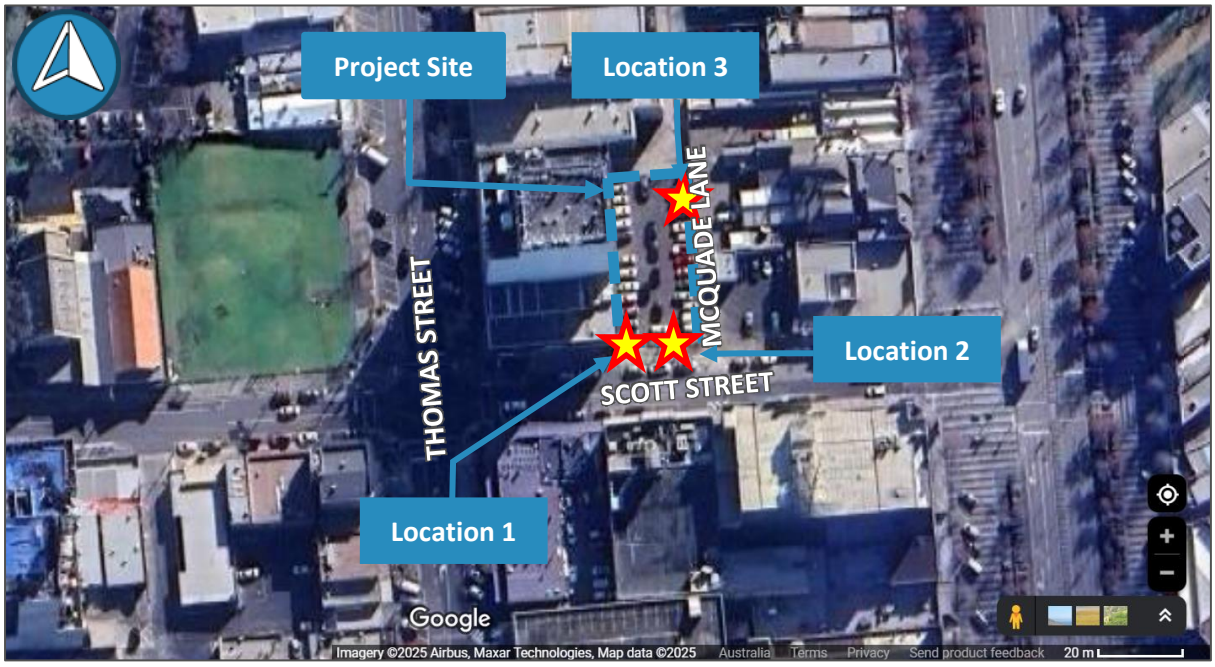


Figure 6 Noise Measurement Locations (Aerial Photo Source: Google Maps)

Table 8 Details of Measurement Period

Location Ref.	Measurement Type		Start Time	Start Date	End Time	End Date
	Attended	Unattended				
1	☐	☒	9:45 PM	Friday 4/04/2025	8:30 AM	Friday 11/04/2025
2	☒	☐	9:46 PM	Friday 4/04/2025	10:01 PM	Friday 4/04/2025
3	☒	☐	10:02 PM	Friday 4/04/2025	10:17 PM	Friday 4/04/2025

5.3 Environmental Noise Levels

5.3.1 Attended Measurements

Attended noise measurements were performed at Location 2 and Location 3 to establish the existing environmental noise levels. At the time of the measurements at these locations, music from Players Hotel was the dominant source of noise. Details of the measurement methodology are presented in Appendix B.

Table 9 presents the measured music levels.

Table 9 Measured Sound Pressure Levels

Location Ref.	Overall, L_{Aeq} dB(A)	Unweighted Octave Band Sound Pressure Level, L_{OCT10} (dB)						
		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
2	61	62	60	54	57	59	55	41
3	56	59	58	53	52	52	48	40

Comparison between the noise logging data (presented in the following Section 5.3.2) and the simultaneous noise data from the attended measurements indicates that:

- The noise levels measured at the noise logging location (Location 1) are approximately the same as the noise levels measured at Location 2.
- The noise levels measured at the noise logging location (Location 1) are approximately 7 dB higher than the noise levels measured at Location 3.

5.3.2 Noise Logging

Environmental noise logging was performed at Location 1 to establish the road traffic and music noise. Details of the measurement methodology are presented in Appendix B.

Table 10 presents a summary of the measured Sound Pressure Levels. Graphs showing the variation of the Sound Pressure Levels over the full measurement period are presented in Appendix C.

Further to the comparison between attended measurements and noise logging results detailed in Section 5.3.1, an adjustment of -7 dB will be made to the noise logging results at Location 3 to represent the noise levels at the southern facade and parts of the western and eastern facade.

Table 10 Summary of Measured Environmental Noise Levels

Date	Measured Sound Pressure Level, dB(A)	
	Day Period (6 am to 10 pm) Overall $L_{Aeq,16hr}$	Night Period (10 pm to 6 am) Overall $L_{Aeq,8hr}$
Friday, 4 February 2022	61[1]	66
Saturday, 5 April 2025	64	62
Sunday, 6 April 2025	64	62
Monday, 7 April 2025	65	62
Tuesday, 8 April 2025	63	63
Wednesday, 9 April 2025	63	62
Thursday, 10 April 2025	63	61
Friday, 11 April 2025	63[2]	-
Adopted Design Sound Level	**65**	**66**

1 Partial measurement period: 9:45 pm to 10 pm only.

2 Partial measurement period: 6 am to 8:30 am only.

6 External Noise Intrusion

6.1 Design Criteria

6.1.1 Residential Areas

6.1.1.1 Victoria Planning Provisions 53.06-3

Victoria Planning Provisions Clause 53.06-3 (State of Victoria, 2022) prescribes noise impacts objectives for a noise sensitive residential use within 50 m of a live music entertainment venue, where the residential use is the agent of change.

The following base (minimum) noise limits apply in accordance with the *Environment Protection Regulations 2021* (State of Victoria, 2021) inside a habitable room of a noise sensitive residential use with windows and doors closed. The 'Night' period music noise limits apply inside a habitable room normally used for the purpose of sleeping.

- **Day / Evening:** 32 dB(A) $L_{Aeq,T}$
- **Night:** L_{OCT10} base noise limits as per Table 11.

Table 11 Night Period Base Noise Limits for Music

Frequency (Hz)	63	125	250	500	1000	2000	4000
Base Noise Limit, dB L_{OCT10}	40	30	20	20	15	10	10

6.1.1.2 Victoria Planning Provisions Clause 58.04-3

Victoria Planning Provisions (VPP) *Clause 58.04-3* (State of Victoria, 2022) prescribes noise impacts objectives for apartment developments near major roads, railways, and industry.

Clause 58.04-3 specifies that apartment developments within a noise influence area should be designed and constructed to comply with the internal noise levels specified in Table 12.

Whilst the proposed apartment development is not within a Noise Influence Area, designing the development to achieve the VPP internal noise levels is considered appropriate for the purpose of protecting future occupants from external noise. Table 12 presents the adopted internal noise level design criteria in accordance with VPP Clause 58.04-3. The design internal noise levels are to be assessed in unfurnished rooms with a finished interior and all windows closed.

Table 12 Victoria Planning Provisions Clause 58.04-3 Design Internal Noise Levels

Type of Occupancy / Activity	Applicable Times	Design Internal Noise Levels, dB(A)
Living areas	6 am to 10 pm	$L_{Aeq,16hr} \leq 40$
Sleeping areas	10 pm to 6 am	$L_{Aeq,8hr} \leq 35$

6.1.2 Communal Area

Table 13 presents the internal noise level criteria for the communal lounge based on the recommendations of *AS/NZS 2107:2016 Acoustics – Design Sound Levels and Reverberation Times for Building Interiors* (Standards Australia, 2016).

Table 13 Internal Noise Level Criteria for Communal Area

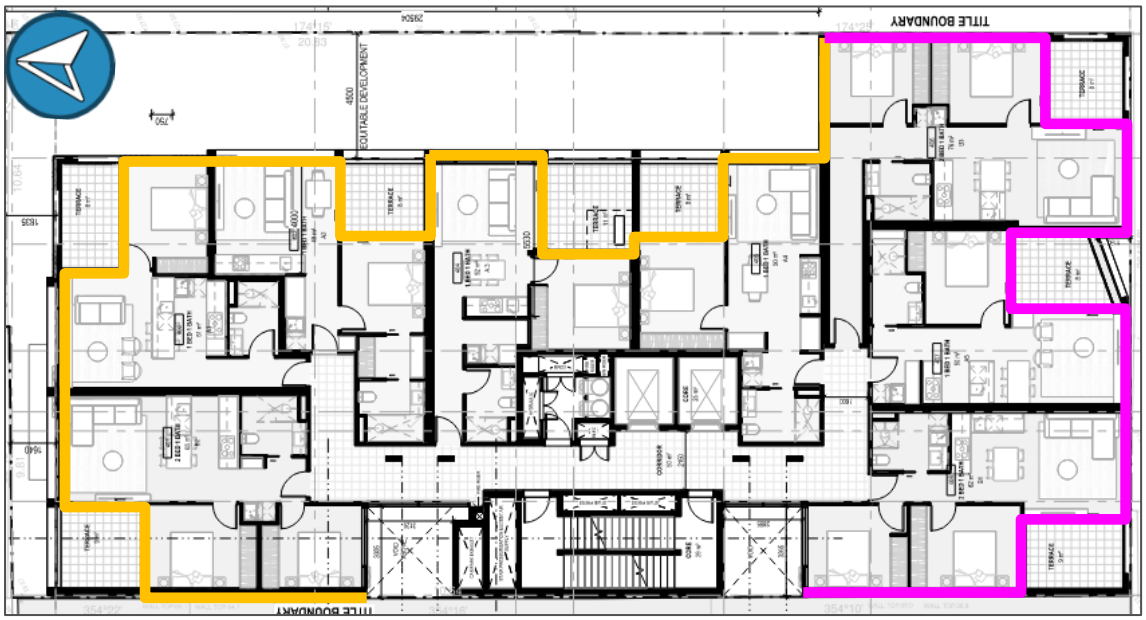
Type of Occupancy / Activity	Recommended Design Internal Noise Level, L_{Aeq}, dB(A)
Communal Lounge	40 to 45

6.2 Adopted External Noise Levels at Building Facade

External noise levels received at the building facades have been calculated based on the noise logging and attended measurements results which have been adjusted for distance of the proposed facades from the noise source.

Music noise has been identified as the primary external noise source influencing the design. Accordingly, it will serve as the controlling design criterion for this assessment. Compliance with the music noise requirements is expected to ensure that all other external noise intrusion criteria are also met.

Figure 8 presents the external noise levels that will be adopted at the project building facades for the purpose of calculating noise intrusion from music noise.



Facade	Day / Evening Period, L_{Aeq} dB(A)	Night Period, L_{OCT10} dB						
		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz
	65	62	60	54	57	59	55	41
	58	59	58	53	52	52	48	40

Figure 7 Adopted Facade Noise Levels – Level 03-12 Shown (Image Source: Cera Stribley)

6.3 Recommended Building Envelope Design

Based on the adopted facade noise levels, the following construction specifications are recommended to achieve compliant internal noise levels.

6.3.1 External Glazing

Table 14 presents recommended external glazing specifications to comply with the design criteria. Figure 8 to Figure 10 present external glazing demarcations indicating the coverage of each recommended external glazing type.

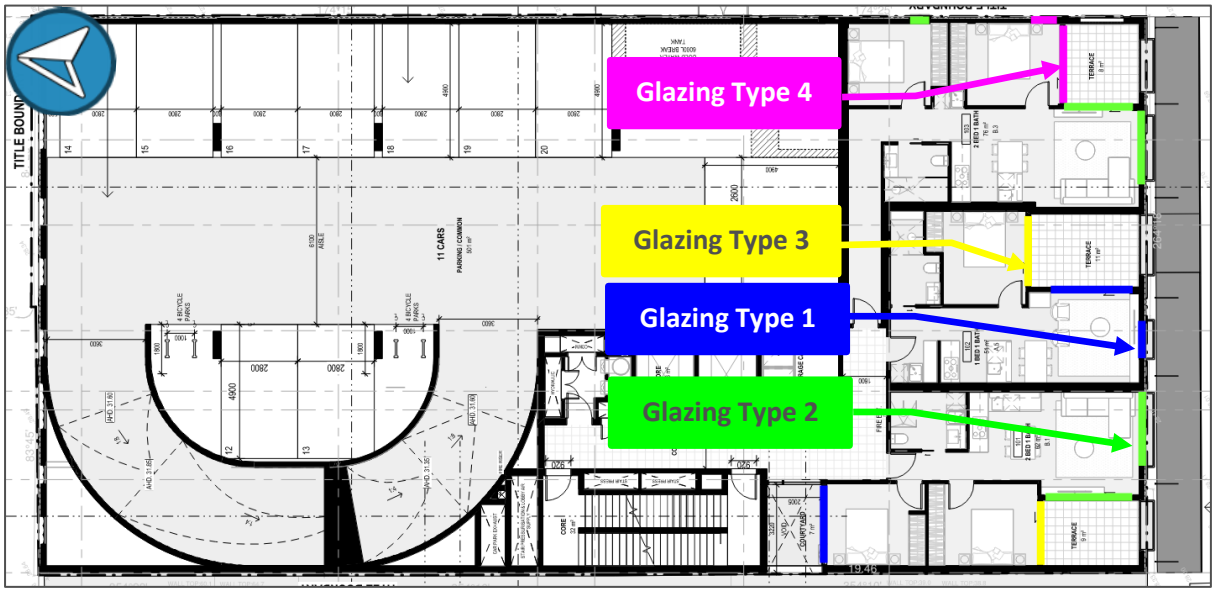


Figure 8 External Glazing Demarcations – Level 01 (Image Source: Cera Stribley)

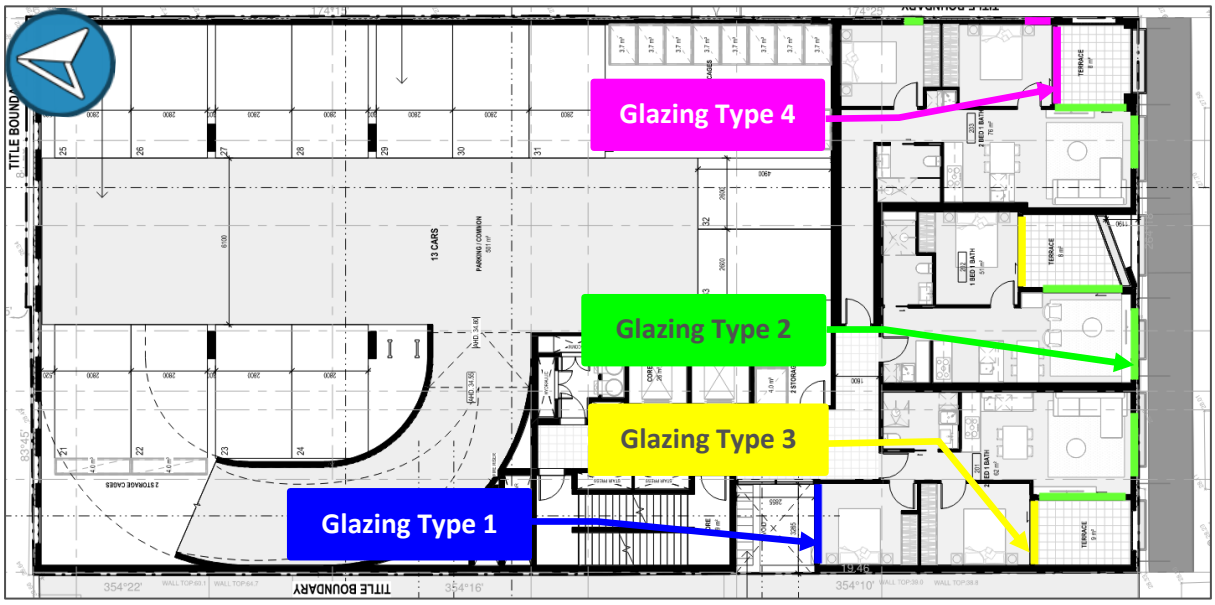


Figure 9 External Glazing Demarcations – Level 02 (Image Source: Cera Stribley)

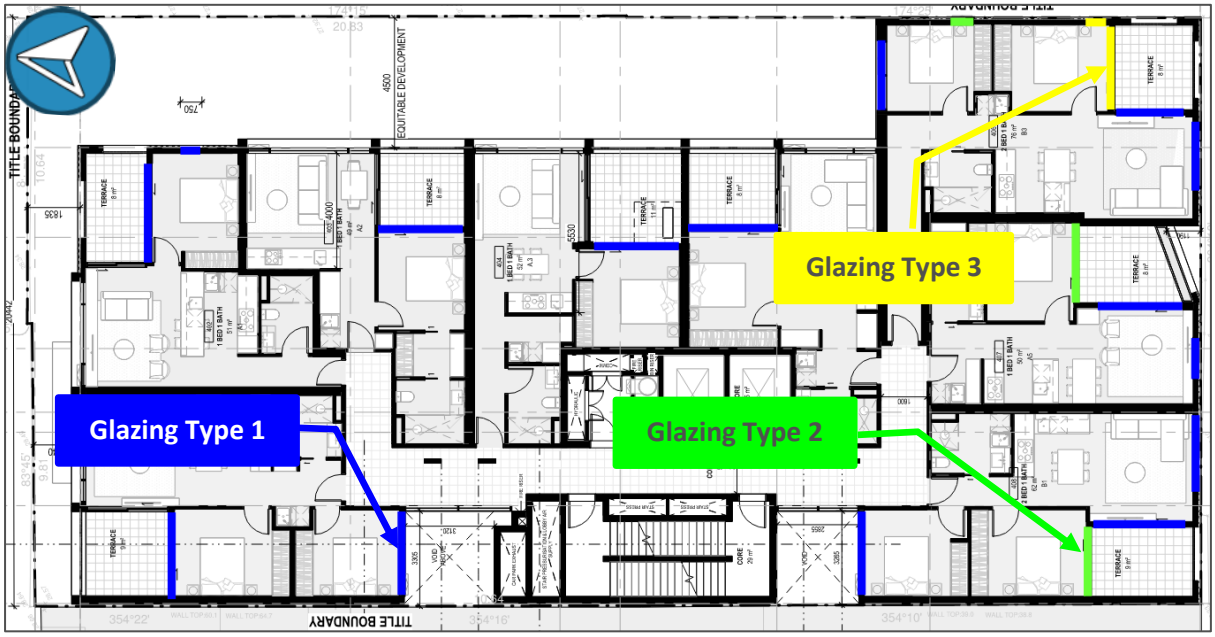


Figure 10 External Glazing Demarcations – Level 03-12 (Image Source: Cera Stribley)

Table 14 Recommended External Glazing Specifications

External Glazing Type	Recommended External Glazing Specifications
Unmarked external glazing areas	▪ Single glazing unit consisting of 6 mm thick glass; or ▪ Double glazing unit consisting of 4 mm glass + 12 mm air gap + 4 mm glass; or ▪ Alternative equivalent glazing system rated to $R_w + C_{tr} \geq 27$. ▪ Framing must be specified to match the required acoustic rating of the glazing. ▪ Openable windows must include rubber or dense foam acoustic seals e.g. Schlegel Q-Lon or equivalent.
Glazing Type 1	▪ Single glazing unit consisting of 10 mm thick glass; or ▪ Double glazing unit consisting of 10 mm glass + 12 mm air gap + 4 mm glass; or ▪ Alternative equivalent glazing system rated to $R_w + C_{tr} \geq 31$. ▪ Framing must be specified to match the required acoustic rating of the glazing. ▪ Openable windows must include rubber or dense foam acoustic seals e.g. Schlegel Q-Lon or equivalent.

External Glazing Type	Recommended External Glazing Specifications
Glazing Type 2	▪ Single glazing unit consisting of 12.38 mm thick laminated glass; or ▪ Double glazing unit consisting of 10 mm glass + 12 mm air gap + 6 mm glass; or ▪ Alternative equivalent glazing system rated to $R_w + C_{tr} \geq 34$. ▪ Framing must be specified to match the required acoustic rating of the glazing. ▪ Openable windows must include rubber or dense foam acoustic seals e.g. Schlegel Q-Lon or equivalent.
Glazing Type 3	▪ Single glazing unit consisting of 12.5 mm thick Viridian VLam Hush acoustical glass; or ▪ Double glazing unit consisting of 10 mm glass + 12 mm gap + 6.38 mm laminated glass; or ▪ Alternative equivalent glazing system rated to $R_w + C_{tr} \geq 35$. ▪ Framing must be specified to match the required acoustic rating of the glazing. ▪ Openable windows must include rubber or dense foam acoustic seals e.g. Schlegel Q-Lon or equivalent.
Glazing Type 4	▪ Double glazing unit consisting of 8 mm glass + 16 mm gap + 10.5 mm Viridian VLam Hush acoustical glass; or ▪ Alternative equivalent glazing system rated to $R_w + C_{tr} \geq 37$. ▪ Framing must be specified to match the required acoustic rating of the glazing. ▪ Openable windows must include rubber or dense foam acoustic seals e.g. Schlegel Q-Lon or equivalent.

6.3.2 External Walls

External wall design details to satisfy the design criteria will need to be developed and/or reviewed as part of the acoustic engineering for the project.

To provide sufficient insulation from music noise and other existing sources of environmental noise, it is indicatively recommended that the external walls of the building are designed to achieve a sound insulation rating of not less than $R_w + C_{tr}$ 45. External wall designs comprising at least one leaf of brickwork, concrete blockwork, or concrete panels, will comply with this rating without the need for additional acoustic treatment measures provided all penetrations are sealed.

Where lightweight external wall construction is proposed, as a minimum, fibrous bulk insulation batts should be included in the wall cavity between the external cladding and internal wall lining, and all penetrations must be sealed. Depending on the selected external cladding materials, additional acoustic treatment may be required to meet the specified sound insulation rating, such as the use of acoustic plasterboard as the interior wall lining, multiple layers of interior wall linings, and/or multiple layers of external cladding.

Specific details of any lightweight external wall assemblies should be reviewed by an acoustic engineer at design stage to ensure that the required sound insulation rating of $R_w + C_{tr}$ 45 is achieved in the proposed design unless a proprietary wall system that has been evaluated to achieve the required acoustic rating is used.

6.3.3 Ceiling / Roof

Ceiling / roof design details to satisfy the design criteria will need to be developed and/or reviewed as part of the acoustic engineering for the project.

To provide sufficient insulation from music noise and other existing sources of environmental noise, it is indicatively recommended that the roof of the building is designed to achieve a sound insulation rating of not less than $R_w + C_{tr}$ 40. Concrete roofs will comply with this rating without the need for additional acoustic treatment measures provided all penetrations are sealed.

Lightweight roofs are likely to require fibrous bulk insulation batts, one or more layers of acoustic plasterboard as the ceiling lining, and/or a ceiling mounted to the supporting structure via resilient mounts or hangers.

Note that areas of the ceiling / roof below roof-mounted mechanical equipment may require higher sound insulation ratings.

Specific details of proposed ceiling / roof assemblies should be reviewed by an acoustic engineer at design stage to ensure that the required sound insulation rating of $R_w + C_{tr}$ 40 is achieved in the proposed design unless a proprietary ceiling / roof system that has been evaluated to achieve the required acoustic rating is used.

6.3.4 Heating / Cooling and Ventilation

The design internal noise levels will only be achieved when all external windows and doors are closed. It is recommended that the mechanical services design should consider whether a mechanical HVAC system is required to enable the building to be adequately heated, ventilated, and cooled if the occupant chooses not to open the windows and/or doors.

It is recommended that externally connected ventilation or ductwork paths serving bedrooms and living areas should be designed to achieve a minimum sound reduction of 35 dB(A) from outside to inside.

Indicatively, this level of sound reduction may be achieved by:

- Installing acoustic-rated passive ventilation systems (such as those offered by Silence Air);
- Installing sufficient lengths of acoustically treated ductwork between internal and external openings;
- Flexible ductwork should be acoustic flexible duct;
- Sheetmetal ductwork should be internally lined with acoustic insulation;
- Fitting dampers and insulated plenums where ductwork exhausts or intakes air at the external wall or roof.

Inclusion of one or more of the above acoustic treatment measures should be determined as part of the mechanical services design for the development.

6.4 Calculated Compliance with Recommended Building Envelope Design

Table 15 presents the results of internal noise level calculations with the recommended building envelope design specifications implemented.

Table 15 Calculated Compliance with Recommended Building Envelope Design

Unit; Room	Compliance Status							
	Day / Evening L_{Aeq} dB(A)	Night, L_{OCT10} (dB)						
	≤ 32	63 Hz ≤ 40	125 Hz ≤ 30	250 Hz ≤ 20	500 Hz ≤ 20	1 kHz ≤ 15	2 kHz ≤ 10	4 kHz ≤ 10
Apartment 101; Bedroom	✓	✓	✓	✓	✓	✓	✓	✓
Apartment 101; Living Room	✓	-	-	-	-	-	-	-
Apartment 102; Bedroom	✓	✓	✓	✓	✓	✓	✓	✓
Apartment 102; Living Room	✓	-	-	-	-	-	-	-
Apartment 103; Bedroom	✓	✓	✓	✓	✓	✓	✓	✓
Apartment 103; Living Room	✓	-	-	-	-	-	-	-
Apartment 401; Bedroom	✓	✓	✓	✓	✓	✓	✓	✓

Apartment 401; Living Room	✓	-	-	-	-	-	-	-
Apartment 402; Bedroom	✓	✓	✓	✓	✓	✓	✓	✓
Apartment 402; Living Room	✓	-	-	-	-	-	-	-

Subject to the advice presented in Section 6.2, it is considered that the proposed development will satisfy the internal noise level criteria applicable to the development.

7 Conclusion

This document has presented an external noise intrusion assessment for the proposed residential development at 18-24 Scott Street, Dandenong, VIC.

The assessment has been undertaken with regard to the acoustic requirements prescribed by the *Victoria Planning Provisions Clause 53.06* and 58.04, *Environment Protection Regulations 2021, EPA Publication 1826 – Noise Limit and Assessment Protocol for the Control of Noise from Commercial, Industrial and Trade Premises and Entertainment Venues* (EPA Noise Protocol),as well as the guidelines prescribed by *AS/NZS 2107:2016 Acoustics – Design Sound Levels and Reverberation Times for Building Interiors*.

Acoustic engineering advice for the proposed project has been presented in Section 6.

Subject to implementation of the advice presented in this document, it is considered that the proposed project will satisfy the applicable acoustic legislation and guidelines.

8 References

EPA Victoria. (2021, May). EPA Publication 1826 – Noise Limit and Assessment Protocol for the Control of Noise from Commercial, Industrial and Trade Premises and Entertainment Venues. Victoria.

Standards Australia. (2016, October). AS/NZS 2107:2016 Acoustics - Recommended Design Sound Levels and Reverberation Times for Building Interiors.

State of Victoria. (2021). *Environment Protection Regulations 2021 - Statutory Rule Number 47/2021.*

State of Victoria. (2022). *Victoria Planning Provisions.* Victoria.

Appendix A Glossary of Acoustic Terms

dB / dB(A) — Decibels or 'A'-weighted Decibels, the units of Sound Pressure Level and Sound Power Level. 'A'-weighting adjusts the levels of frequencies within the sound spectrum to better reflect the sensitivity of the human ear to different frequencies at Sound Pressure Levels typical of everyday sounds. [Unit: dB / dB(A)]

The following are examples of the decibel readings of everyday sounds;

- 0 dB The faintest sound we can hear
- 30 dB A quiet library or in a quiet location in the country
- 45 dB Typical office space. Ambience in the city at night
- 60 dB The sound of a vacuum cleaner in a typical lounge room
- 70 dB The sound of a car passing on the street
- 80 dB Loud music played at home
- 90 dB The sound of a truck passing on the street
- 100 dB The sound of a rock band
- 120 dB Deafening

C_{tr} — A spectrum adaptation term, commonly used with R_w and $D_{nT,w}$. C_{tr} adjusts the sound insulation ratings to better describe the performance of the particular construction under consideration when subject to low frequency noise, such as noise from heavy vehicle traffic or subwoofers. [Unit: dB]

Frequency — The rate of repetition of a wave i.e. the number of cycles per second [Unit: Hz]

$L_{A90,T}$ — The value of A-weighted Sound Pressure Level which is exceeded for 90 percent of the time during given measurement period T. This is commonly used to represent the background noise level. [Unit: dB / dB(A)]

$L_{Aeq,T}$ — The Equivalent Continuous A-weighted Sound Pressure Level measured over the period T (also known as Time-Average Sound Pressure Level). The Equivalent Continuous A-weighted Sound Pressure Level is the constant value of A-weighted Sound Pressure Level for a given period that would be equivalent in sound energy to the time-varying A-Weighted Sound Pressure Level measured over the same period. In simple terms, this can be thought of as the average Sound Pressure Level. [Unit: dB / dB(A)]

L_{OCT10} — Means the C-weighted or Linear Sound Pressure Level for a specified octave band that is exceeded for 10 per cent of the time interval considered. [Unit: dB]

R_w	Weighted Sound Reduction Index. A single number rating of the airborne sound insulation performance of a specific building element in the absence of flanking transmission. R_w is a laboratory test rating for a single building element (e.g. a door, a window or a wall) determined under ideal conditions with minimal flanking transmission, and is largely independent of partition size and room effects. R_w ratings cannot be accurately tested outside of a controlled laboratory environment. A higher R_w value indicates better airborne sound insulation. [Unit: dB]
Sound Pressure Level	A measure of the magnitude of a sound wave. Mathematically, it is twenty times the logarithm to the base ten of the ratio of the root mean square sound pressure at a point in a sound field, to the reference sound pressure; where sound pressure is defined as the alternating component of the pressure (Pa) at the point, and the reference sound pressure is $2x10^{-5}$ Pa. [Unit: dB]

Appendix B Noise Measurement Methodology

B.1 Measurement Photographs

Figure B.1 to Figure B.3present photographs of the noise measurement locations.

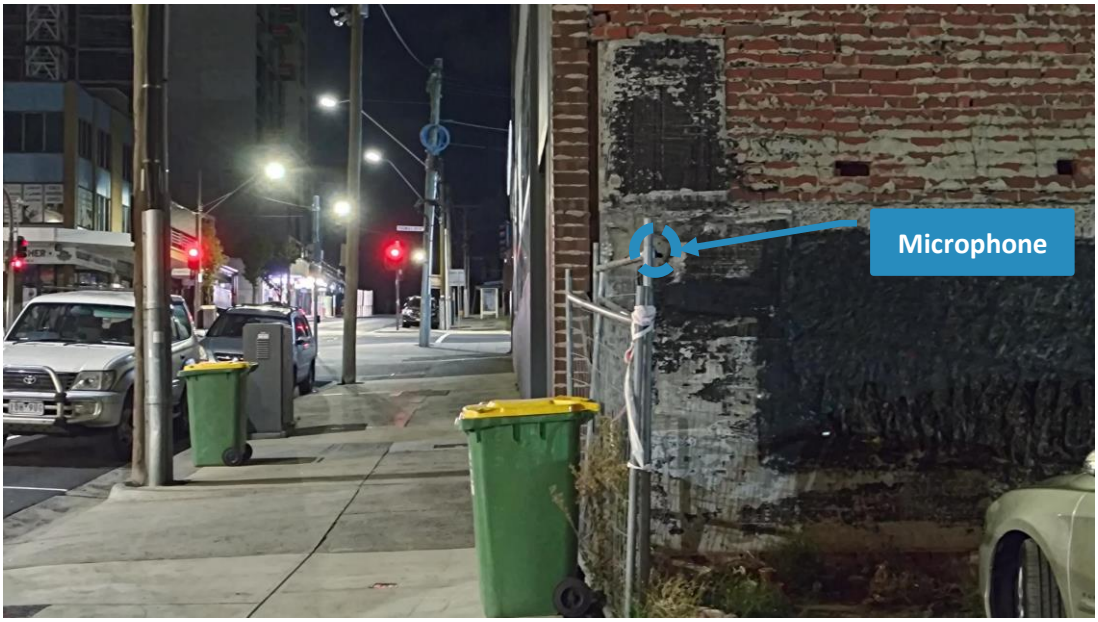


Figure B.1 Noise Measurement Location 1 – Photo Facing West

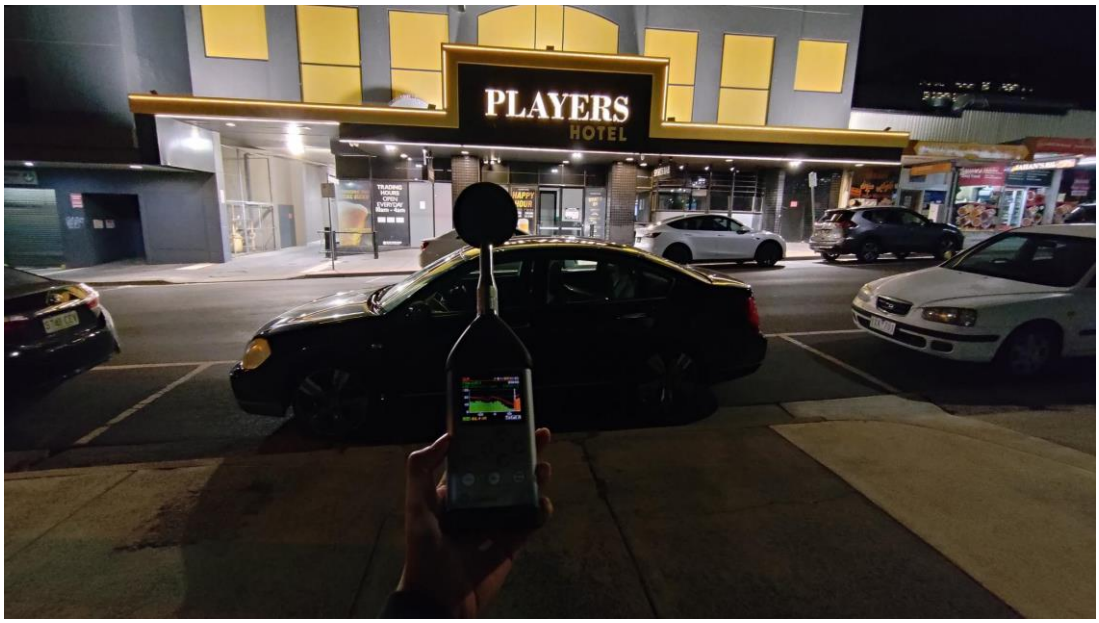


Figure B.2 Noise Measurement Location 2 – Photo Facing South

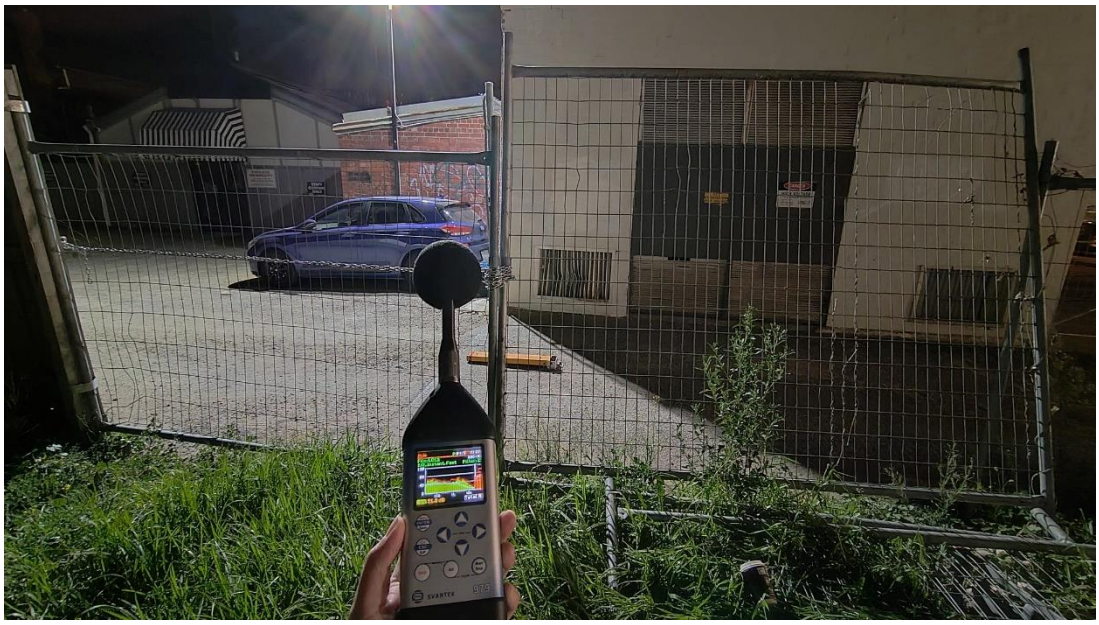


Figure B.3 Noise Measurement Location 3 – Photo Facing East

B.2 Measurement Procedure

The equipment was configured to provide the measurement results as a continuous series of 1 second A- and Z-weighted Sound Pressure Levels. Metrics used for the assessment were then post-processed from this data.

A foam windscreen was installed on each microphone to minimise the effect of wind-induced pressure fluctuations on the measurements.

B.3 Instrumentation

All acoustic instrumentation used for the measurements held a current certificate of calibration from a National Association of Testing Authorities (NATA) accredited laboratory or from the manufacturer at the time of the measurements.

A field check to confirm correct calibration of the instrumentation was performed at the beginning and end of the measurement period using a laboratory calibrated portable Sound Level Calibrator. At the time of each check the instrumentation was found to be reading correctly and the deviation between consecutive checks was found to be less than 1 dB.

Details of the acoustic instrumentation used for measurements are presented in Table B.1.

Table B.1 Acoustic Instrumentation Details

Location Reference	Instrument Description	Serial No.	Date of Last Laboratory Calibration*
1	Convergence Instruments NSRT_mk2 Type 1 Sound Level Meter	CFh+pP0YcdWXKjNgSyLRHD	10/10/2018
2, 3	Svantek 979 Class 1 Sound Level Meter	92946	25/10/2023
-	Svantek SV35A Portable Sound Level Calibrator	58054	05/08/2024

* In accordance with AS 1055 and National Association of Testing Authorities Guidelines, Sound Level Calibrators require calibration annually.

B.4 Meteorological Data

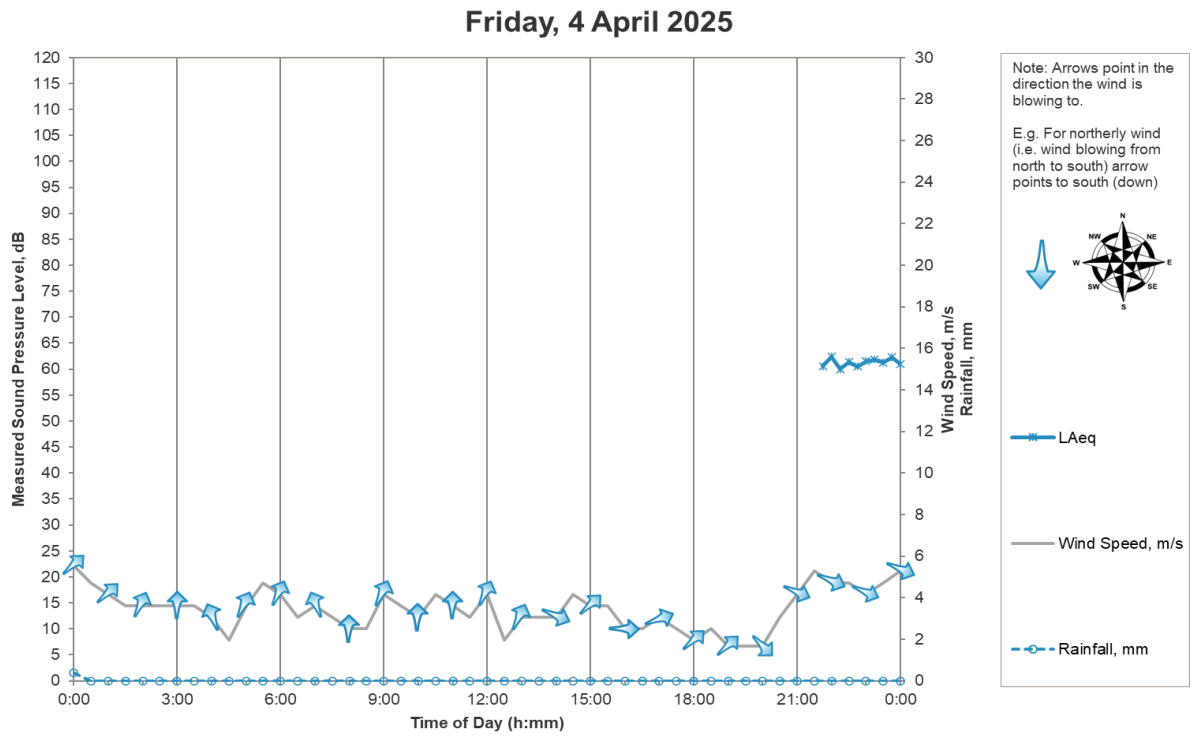
Weather observations during the monitoring period were taken from the Bureau of Meteorology Weather Station at Moorabbin Airport, approximately 10 km away. Appendix C shows the meteorological observations plotted against the measured L_{Aeq} Sound Pressure Levels for the duration of the measurement period.

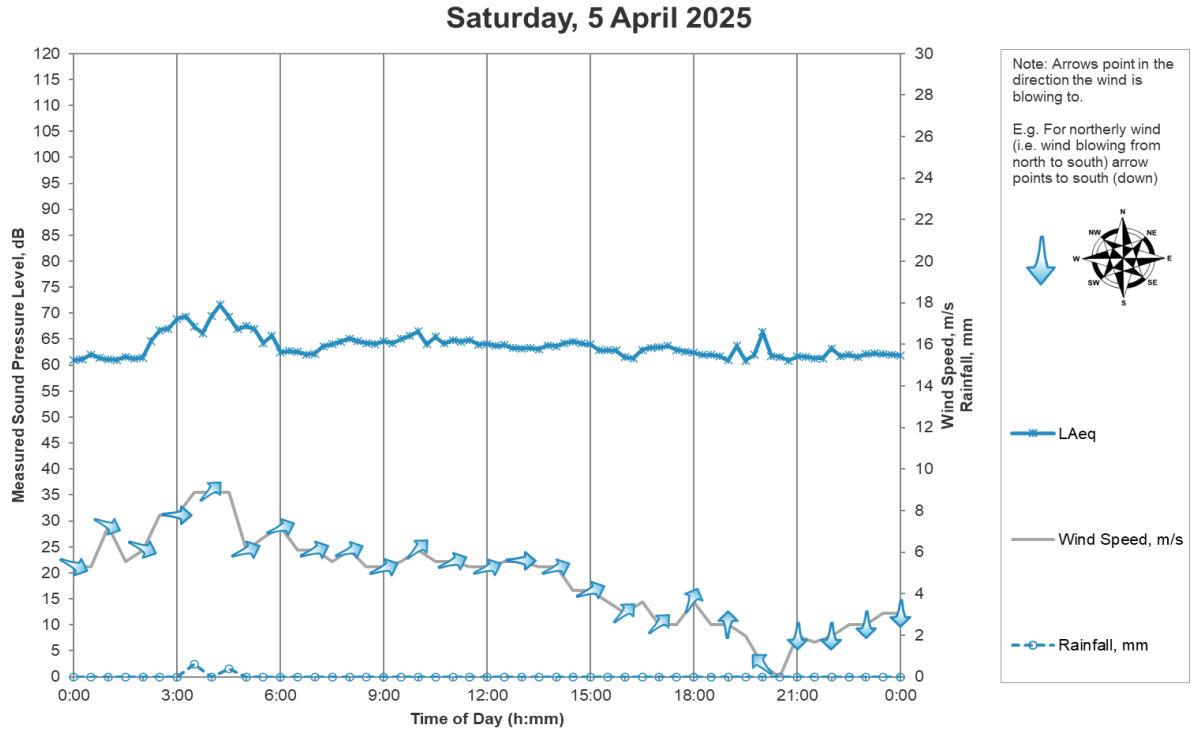
B.5 Weather Conditions

The weather during the attended measurements was fine with calm winds. Conditions were dry.

Appendix C Graphed Noise Measurement Results

No adjustment for acoustic reflections off nearby acoustically reflective surfaces has been applied to the Sound Pressure Levels presented in this appendix.





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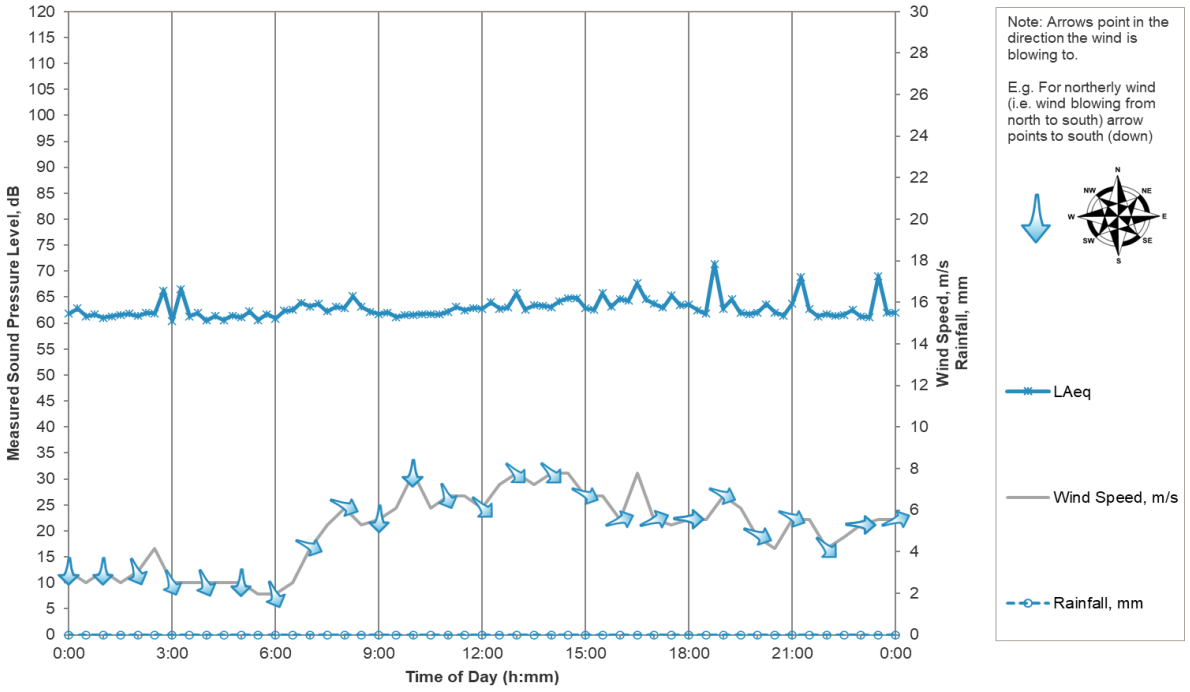

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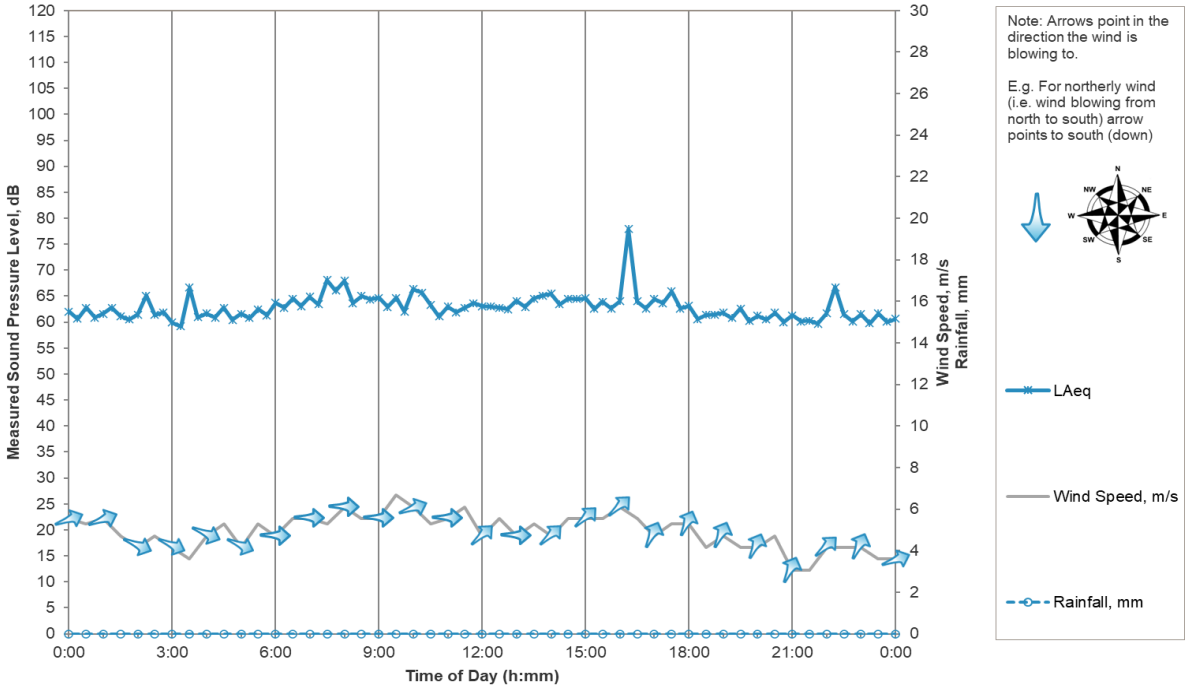

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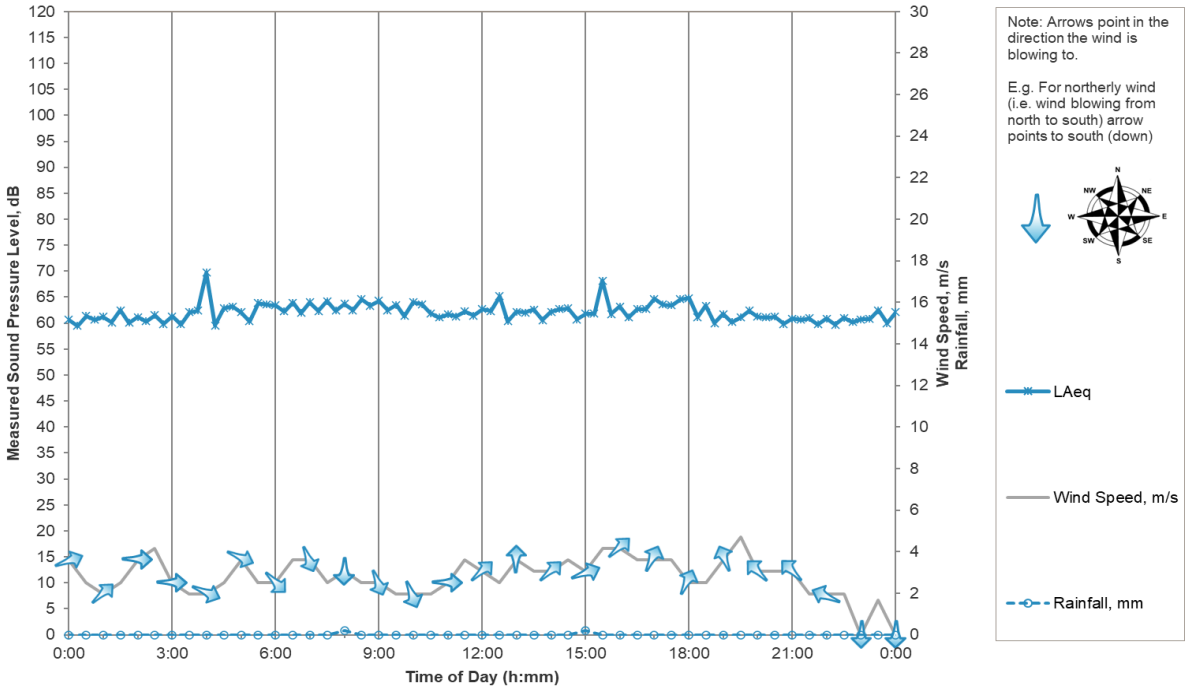
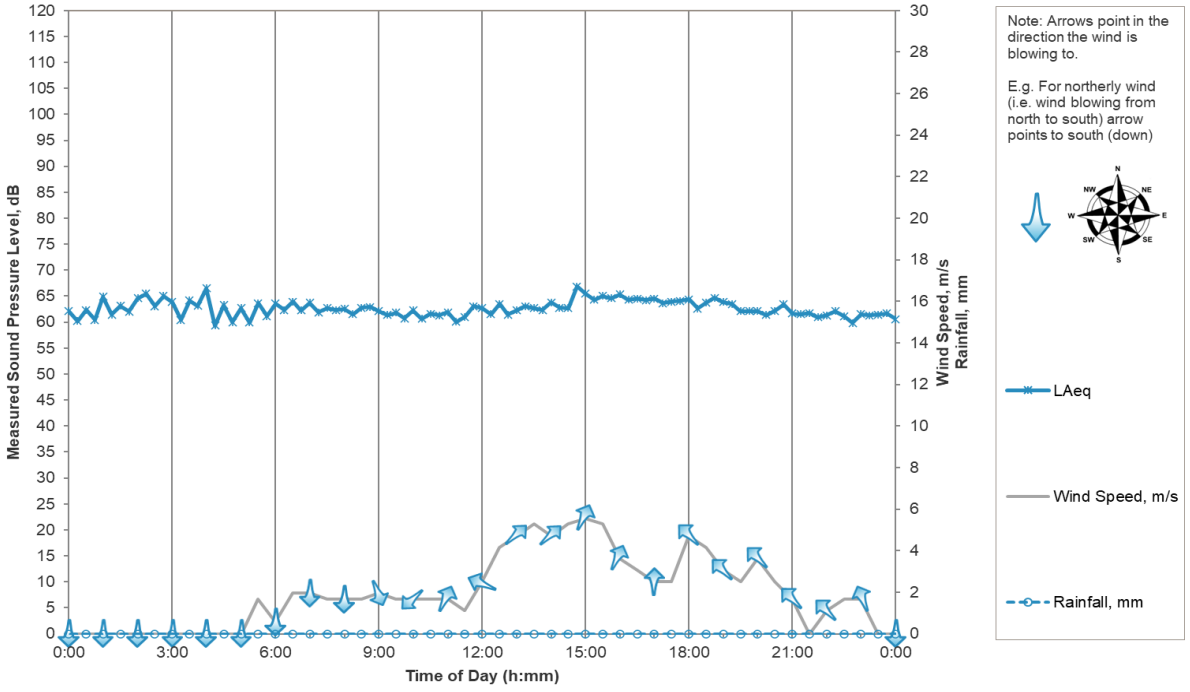
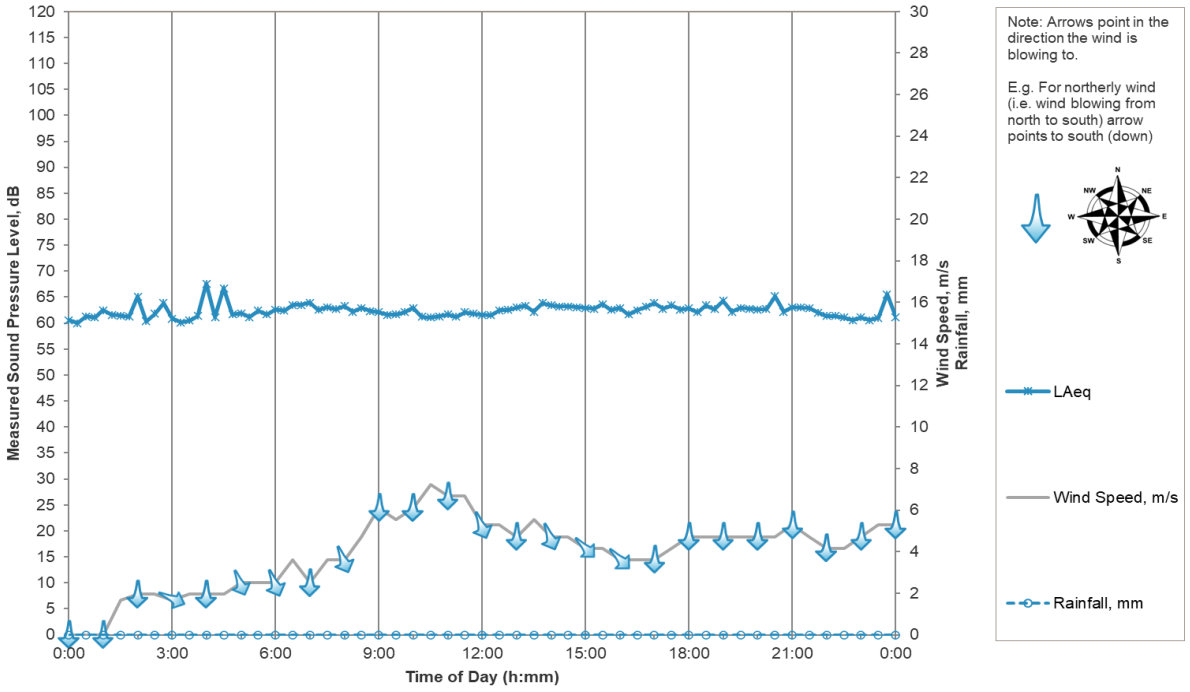


Wednesday, 9 April 2025



Thursday, 10 April 2025



Friday, 11 April 2025