DDEG

Acoustic Engineering

Town Planning Acoustic Report

567-569 High Street, Northcote, VIC

Project No: 201792-A
Date: 20/08/2024
Revision: 2

Fire Engineering | Acoustics | Access | Building Solutions | Façade Testing

Document Control

Document Title: Town Planning Acoustic Report

Project: 567-569 High Street, Northcote, VIC

Project No: 201792-A

Prepared For: Property Change

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Revision History

Doc.	Rev.	Date	Purpose	Author	Reviewer
AER	0	22/12/2023	Not for endorsement	A Horng	A Mitchell
AER	1	07/02/2024	For endorsement	A Horng	A Mitchell
AER	2	20/08/2024	Amended for Comments	A Horng	A Mitchell

Executive Summary

DDEG has been appointed by Property Change to provide acoustic engineering consulting services associated with the proposed wine bar / restaurant at 567-569 High Street, Northcote, 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
Music noise emissions	▪ Environment Protection Regulations 2021 ▪ Part II of EPA Publication 1826 – Noise Protocol ▪ Darebin Planning Scheme / Victoria Planning Provisions Clause 53.06
Environmental noise emissions due to patron activities within indoor and outdoor areas of the site	▪ City of Yarra Guidelines – Managing Noise in Urban Development (in the absence of any City of Darebin Guidelines or other statutory requirements)
Environmental noise emissions due to mechanical plant serving common areas and commercial parts of the building	▪ Environment Protection Regulations 2021 ▪ Part I of EPA Publication 1826 – Noise Protocol
Environmental noise emissions due to deliveries and private waste collections	▪ EPA Publication 1254 – Noise Control Guidelines

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

Table 2 Recommended Acoustic Engineering Measures

System	Acoustic Engineering Measure
Music Noise	▪ It is expected that music noise emissions from music played indoors will comply with Part II of the EPA Noise Protocol for all relevant operating hours, on the basis that music will be played as background / ambience music only. ▪ Music played in the outdoor courtyard should be restricted to only the 'Day / Evening' period prescribed by Part II of the EPA Noise Protocol. No music should be played outdoors during the 'Night' period (i.e. after 10 pm on a Sunday or Public Holiday, or after 11pm on any other day). ▪ Doors and windows of the premises should be kept closed when music is being played indoors. ▪ Refer to Section 7 for further details.

System	Acoustic Engineering Measure
Patron Noise	▪ Patron noise levels are expected to be within an acceptable range, subject to a maximum occupancy in the courtyard of 60 persons, and the courtyard not being used after 10 pm. ▪ If it is desired to accommodate more than 60 patrons in the courtyard, additional acoustic treatment measures will need to be developed and implemented to achieve acceptable noise levels at nearby noise sensitive areas. The required treatment measures should be determined by a suitably qualified acoustic engineer, and it is recommended that operational noise monitoring should be undertaken following implementation of the measures to verify that compliance is achieved with the patron noise guidelines presented in Section 8.1. ▪ Refer to Section 8 for further details.
Mechanical Plant	▪ Mechanical plant noise emissions are expected to comply with the EPA Noise Protocol Noise Limits, subject to any new mechanical plant installed at the premises adhering to the calculation parameters in Section 9.2.1. ▪ If the final mechanical plant installation will differ from the calculation parameters in Section 9.2.1, an updated mechanical plant noise assessment should be undertaken by a suitably qualified acoustic engineer. ▪ Refer to Section 9 for further details.
Deliveries and Waste Collection	▪ Deliveries and private waste collections associated with the bar / restaurant should be conducted between the hours presented in Table 23 in accordance with Section 6 and Section 9 of the EPA Noise Control Guidelines. ▪ Disposal of empty bottles into outdoor receptacles should only take place between 9 am and 8 pm. ▪ No bottle-crushing should be performed on the premises without further acoustic assessment and consideration of the location of the bottle crusher.

Contents

1 Introduction

1.1 Purpose

DDEG has been appointed by Property Change to provide acoustic engineering consulting services in relation to the proposed wine bar / restaurant at 567-569 High Street, Northcote, VIC.

This document has been prepared for the purpose of informing a Planning Permit Application to Council.

The scope of this document comprises:

- Assessment of music noise emissions in relation to the acoustic requirements prescribed by the EPA Noise Protocol (EPA Victoria, 2021).
- Prediction and review of potential patron noise emissions from the premises.
- Assessment of noise due to mechanical plant in relation to the acoustic requirements prescribed by the EPA Noise Protocol (EPA Victoria, 2021).
- Review of potential noise due to other activities associated with the proposed use, such as private waste collections and deliveries.

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
Redline Plan – 567-569 High St, Thornbury	Property Change	Received – 6/12/2023
Email To: Alex Horng CC: Dave Membery, Jeremy Gordon Subject: Re: 201792 - 567-569 High Street NORTHCOTE VIC 3070	Lloyd Anderson, Property Change	Wed 6/12/2023 8:44 AM
Email To: Alex Horng, Jeremy Gordon Subject: FW: 567-569 High Street NORTHCOTE VIC 3070 (D/479/2023)	Lloyd Anderson, Property Change	Tue 12/12/2023 4:59 PM

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.
- In preparing this document DDEG may have relied upon information provided by the Client and other third parties, some of which may not have been verified. DDEG accepts no responsibility or liability for any errors or omissions which may be incorporated into this document as a result.
- 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 567-569 High Street, Northcote, VIC, as shown in Figure 1. The topography in the area of the site is flat.

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

2.2 Proposed Project

The project is understood to comprise a proposed wine bar / restaurant.

Figure 2 shows the proposed floor plan.

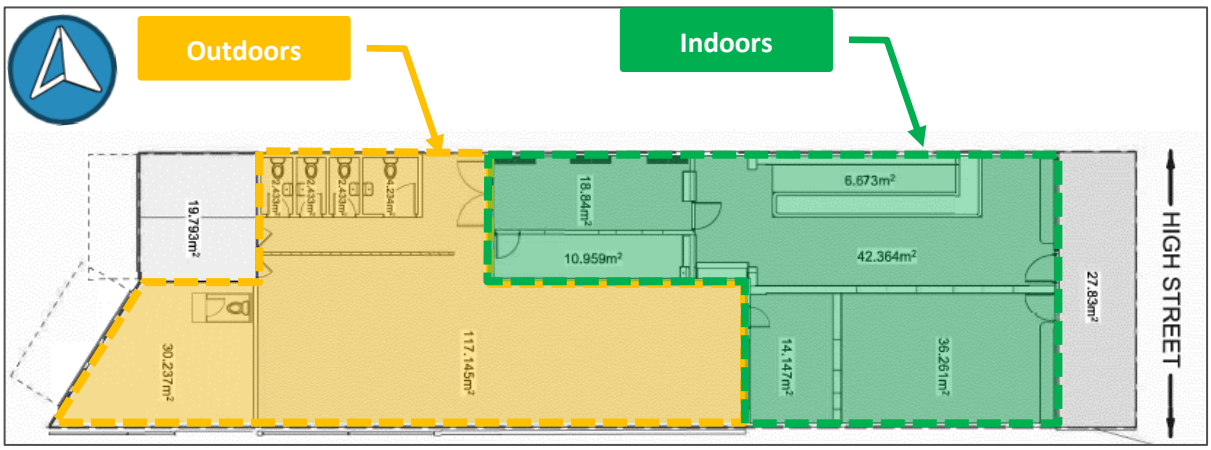

Figure 2 Proposed Floor Plan

2.3 Operating Hours

The proposed operating hours of the premises are as follows:

- 11 am and 1 am Sunday to Thursday;
- 11 am to 3 am Friday to Saturday.

2.4 Occupancy Characteristics

The premises has a proposed maximum capacity of 250 patrons, comprising 125 patrons indoors and 125 patrons outdoors.

3 Legislation and Guidelines

3.1 Summary of Relevant Documents

Table 4 presents a summary of the relevant legislation and guidelines applicable to the proposed project. The information contained in these documents forms the basis of the design criteria and advice presented in this document. Further details in relation to each document are presented in the subsequent subsections.

Table 4 Summary of Relevant Statutory Requirements and Guidelines

Document	Status	Relevance to this Project
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. Mechanical plant noise emissions due to the development will be subject to the requirements of the EPA Noise Protocol. Prescribes the procedures used to determine limits for, and assess, music noise emissions from public premises.
Darebin Planning Scheme Clause 53.06, which is identical to Victoria Planning Provisions Clause 53.06 (State of Victoria, 2022)	Legislation	Provides guidance for live music venues within 50 m of noise sensitive receivers.
Guidelines - Managing Noise Impacts in Urban Development (City of Yarra, 2022)	Guideline	Provides guidance in relation to assessing patron noise. The guidelines are a City of Yarra document that has been developed based on industry guidance and is consistent with the approach commonly adopted in Victoria for assessment of patron noise from bars and entertainment venues. The City of Yarra guidelines have been adopted for this assessment in the absences of patron noise guidelines specific to City of Darebin or any applicable statutory noise requirements in relation to patron noise.

Document	Status	Relevance to this Project
EPA Publication 1254 – Noise Control Guidelines (EPA Victoria, 2021)	Guideline	Provides guidance in relation to appropriate delivery and waste collection times to control noise impacts on adjacent residences.

3.2 Environment Protection Regulations 2021

Noise emissions from commercial, industrial and trade premises, and from entertainment venues, must comply with the *Environment Protection Regulations 2021* (EPRs) (State of Victoria, 2021).

The EPRs prescribe the time periods, relevant noise sources, base noise limits, and specify the noise levels above which noise emitted is defined as 'Aggravated Noise'.

For the purpose of assessing noise emissions in relation to the requirements of the EPRs, prediction, measurement, and assessment of noise from commercial, industrial and trade premises, and from entertainment venues, must be conducted in accordance with *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).

3.3 EPA Publication 1826 – Noise Protocol

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) prescribes the procedures used to determine limits for, and assess, environmental noise emissions from sources such as mechanical equipment and activities associated with commercial, industrial or trade operations, as well as music noise emissions from entertainment venues.

The limits prescribed by the EPA Noise Protocol apply at or within Noise Sensitive Areas, such as residential dwellings as defined in Appendix A.

3.3.1 Part I – Commercial, Industrial and Trade Premises

Part I of the EPA Noise Protocol (EPA Victoria, 2021) prescribes the procedures used to determine limits for, and assess, environmental noise emissions from sources such as mechanical equipment and activities associated with commercial, industrial or trade operations.

The limits applicable to commercial, industrial and trade premises are dependent on a number of factors including:

- The time of day at which the noise emissions occur;
- The planning zone types in the area of the Noise Sensitive Area; and
- The background noise levels at the Noise Sensitive Area.

In accordance with the EPA Noise Protocol, noise emissions from the source under consideration are measured so as to obtain an L_{Aeq} Sound Pressure Level that is representative of the audible noise at the Noise Sensitive Area over a continuous 30-minute period. Adjustments to the measured level are applied where necessary to account for characteristics such as duration, intermittency, reflections, impulsiveness, tonality, and measurement location. The adjusted noise level is termed the Effective Noise Level, and it is the Effective Noise Level that is assessed in relation to the noise limits.

3.3.2 Part II – Entertainment Venues

Part II of the EPA Noise Protocol (EPA Victoria, 2021) prescribes the procedures used to determine limits for, and assess, music noise emissions from entertainment venues and events.

For indoor venues, the noise limits prescribed by the EPA Noise Protocol are dependent on the background noise levels at the Noise Sensitive Area, and on the time of day, as follows:

Table 5 Part II EPA Noise Protocol Noise Limit Calculation

Period	Applicable Times	Noise Limit, dB / dB(A)
Day / Evening	▪ Monday to Saturday (other than a public holiday) from 7 am to 11 pm; ▪ Sunday or a public holiday (other than if either is preceding a public holiday) from 9 am to 10 pm; ▪ Sunday or a public holiday (if either is preceding a public holiday), from 9 am to 11 pm.	$L_{Aeq} \leq L_{A90}$ Background Noise + 5 dB(A)
Night	▪ Monday to Friday (other than a public holiday or a day preceding a public holiday), from 11 pm to 7 am the following day; ▪ Saturday or any day preceding a public holiday, from 11 pm to 9 am the following day; ▪ Sunday or a public holiday (if neither is preceding a public holiday), from 10 pm to 7 am the following day.	$L_{OCT10} \leq L_{OCT90}$ Background Noise + 8 dB

The following base (minimum) noise limits apply in accordance with the Environment Protection Regulations 2021 where background noise levels are very low:

- **Day / Evening:** 32 dB(A) L_{Aeq}
- **Night:** L_{OCT10} base noise limits as per Table 6.

Table 6 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

The noise levels are to be assessed over a 15-minute period, and, except where the conditions prescribed by Clause 106 of the EPA Noise Protocol apply, the noise limits apply outdoors within 'Noise Sensitive Areas' defined by the Environment Protection Regulations 2021.

Generally, a Noise Sensitive Area is the part of a property that is within 10 m of a residential dwelling or other type of building where people may sleep, or within 10 m of a school or childcare building during the operating hours of the school / childcare centre - see Appendix A for full definition.

3.4 Victoria Planning Provisions 53.06

Victoria Planning Provisions Clause 53.06 (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. Music noise emissions will be assessed against EPA Noise Protocol Part II (refer to Section 3.3.2)

3.5 Guidelines - Managing Noise Impacts in Urban Development

The City of Yarra's *Guidelines – Managing Noise Impacts in Urban Development* considers all of the following criteria and approaches to be suitable for assessing patron noise from outdoor areas:

- EPA Noise Protocol – While the EPA Noise Protocol does not strictly apply to patron noise, it nevertheless provides a useful assessment methodology and is considered acceptable tool for assessing patron noise impacts.
- Background Noise (L_{A90}) + 5 dB – This is a standard basis for quantifying the intrusiveness of noise. It is a useful assessment tool for patron noise, although the Guidelines note that day and evening limits can be impractically low.
- Background Noise (L_{A90}) + 10 dB during the day and evening periods (including weekends).

Note that the above criteria are not noise limits, but rather guidelines. Modelling or predictions that show exceedance of the adopted noise guidelines will represent a risk of nuisance rather than grounds for stopping a project from going ahead.

3.6 EPA Publication 1254 – Noise Control Guidelines

EPA Publication 1254 – Noise Control Guidelines (EPA Victoria, 2021) provides guidance relating to assessment and management of noise from a range of specific sources. It addresses a number of sources that are not explicitly covered by other policies and guidelines, and provides complementary guidance for some types of noise that are also addressed by other noise legislation, policies and guidelines.

The guidelines are primarily intended to assist in the resolution of complaints or to avert a possible noise nuisance. Many of the guidelines do not require an actual measurement of the noise, but rather prescribe parameters (such as operating hours or minimum separation distances) outside of which an activity would be likely to be unreasonable noise.

4 Town Planning Requirements

Request for Information (RFI) (Ref No. D/479/2023) issued by Darebin City Council specifies items that need to be addressed in the planning permit application for the development. Table 7 presents the relevant acoustic items:

Table 7 Relevant Acoustic Items from |TP Requirement Type|

Item No.	Text from RFI
6	An Acoustic Report to the satisfaction of the Responsible Authority must be provided. The Acoustic Report must be prepared by a suitably qualified acoustic engineer and must demonstrate how the use will comply the relevant EPA noise controls, or outline any measures considered necessary to achieve compliance with relevant EPA noise controls. The requirements of the endorsed Acoustic Report must be implemented and complied with to the satisfaction of the Responsible Authority

5 Noise Sensitive Areas

Table 8 and Figure 3 identify the nearest and potentially most-affected Noise Sensitive Areas (NSAs) that have been identified in the vicinity of the project site, as defined by the relevant environmental noise legislation.

Assessment of environmental noise emissions due to the project will be undertaken at these locations. It is expected that compliance with the environmental noise criteria at these locations will also result in compliance at all other nearby NSAs.

Table 8 Details of Potentially Most-Affected Noise Sensitive Areas (NSAs)

NSA Ref.	Address	No. Storeys	NSA Type	Notes
1	22 Johnson Street, Northcote	2	Single Dwelling	West of Project Site
2	20 Johnson Street, Northcote	1	Single Dwelling	West of Project Site
3	24 Johnson Street, Northcote	1	Single Dwelling	West of Project Site

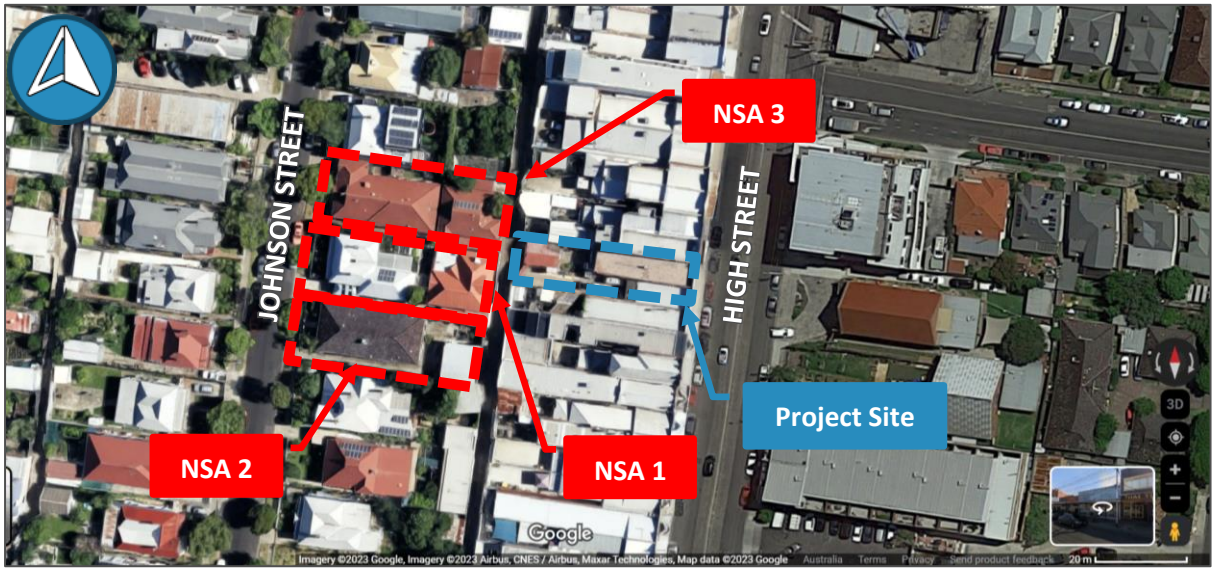

Figure 3 Locations of Potentially Most-Affected Noise Sensitive Areas (NSAs) (Aerial Photo Source: Google Maps)

Note: City of Darebin advised via email on 12 December 2024 that there is no record of residential permits for the upper floor 571-573 High Street (the building immediately to the north of the project site). It has therefore been assumed that 571-573 High Street does not contain residential dwellings, and has not been considered as a Noise Sensitive Area in this assessment.

6 Existing Acoustic Conditions

6.1 Exterior Soundscape

DDEG visited the site on the evening of 15 December 2023 and early morning of 16 December 2023. During our site visits, the main features of the soundscape were road traffic noise from vehicles and trams passing on High Street, and other more-distant traffic noise.

6.2 Background Noise Levels

Attended noise measurements were conducted to establish the background noise levels during the EPA Noise Protocol 'Evening' and 'Night' period. The measurements were performed in the alleyway adjacent the nearest Noise Sensitive Areas, between 10:11 pm and 10:42 pm on Friday 15 December, and between 3:05 am and 3:35 am on the morning of Saturday 16 December 2023.

The background noise level measured between 10:11 pm and 10:42 pm on Friday 15 December is likely to be lower than the typical daytime background noise levels, and provides a guide to the background noise levels present at the end EPA Noise Protocol 'Evening' period when background noise levels for that period would be at their lowest. It is noted that slightly lower background noise levels may be present at the same time on evenings during the early to mid-part of the week, and this factor has been given consideration in the determining the findings of assessment. However, the Friday evening background noise levels remain relevant to the assessment since more intense activity is be expected at the premises on a Friday evening than a typical weeknight, and this period therefore remains a controlling period.

The background noise level measurements between 3:05 am and 3:35 am on the morning of Saturday 16 December 2023 reflect the latest proposed operating time on Friday and Saturday nights (3 am), and the results are considered representative of the lowest background noise levels that would be experienced at any time during the proposed operating hours.

The noise measurement results are presented in Table 9. Details of the measurement location and measurement methodology are presented in Appendix B.

Table 9 Measured Background Noise Levels

Period	Measurement Time	$L_{OCT90,15min}$ Background Noise Level, dB							$L_{A90,15min}$ Background Noise Level, dB(A)
		63	125	250	500	1K	2K	4K	
Evening	10:11 PM to 10:26 PM	51	46	43	42	40	35	26	45
Evening	10:27 PM to 10:42 PM	51	45	43	41	43	36	25	46
Night	3:05 AM to 3:20 AM	36	29	28	27	29	23	15	32
Night	3:20 AM to 3:35 AM	37	30	28	27	29	24	18	33

6.3 Review of Existing Building Construction

Based on observations conducted during our site visit, Table 10 presents a summary of the adopted existing building construction parameters which will be used in the assessment of potential noise egress from the premises, and the octave band Sound Transmission Loss values calculated for each building element.

Table 10 Sound Transmission Loss for Building Elements

<table>
<tr><th>Building Element</th><th>Details</th></tr>
<tr><td>External Walls</td><td>

Noise egress calculations have been based on each external wall being of double brick construction.
The calculated Sound Transmission Loss is presented below:

<table>
<tr><th rowspan="2">R_w</th><th colspan="7">Sound Transmission Loss, dB</th></tr>
<tr><th>63</th><th>125</th><th>250</th><th>500</th><th>1k</th><th>2k</th><th>4k</th></tr>
<tr><td>66</td><td>22</td><td>46</td><td>55</td><td>70</td><td>70</td><td>70</td><td>70</td></tr>
</table>
</td></tr>
<tr><td>External Glazing</td><td>

Noise egress calculations have been based on external glazing consisting of 6 mm thick single glazed windows.
The calculated Sound Transmission Loss is presented below:

<table>
<tr><th rowspan="2">R_w</th><th colspan="7">Sound Transmission Loss, dB</th></tr>
<tr><th>63</th><th>125</th><th>250</th><th>500</th><th>1k</th><th>2k</th><th>4k</th></tr>
<tr><td>30</td><td>15</td><td>19</td><td>23</td><td>28</td><td>32</td><td>30</td><td>35</td></tr>
</table>
</td></tr>
<tr><td>External Doors</td><td>

Noise egress calculations have been based on all external doors being solid timber doors with no acoustic seals.
The calculated Sound Transmission Loss is presented below:

<table>
<tr><th rowspan="2">R_w</th><th colspan="7">Sound Transmission Loss, dB</th></tr>
<tr><th>63</th><th>125</th><th>250</th><th>500</th><th>1k</th><th>2k</th><th>4k</th></tr>
<tr><td>19</td><td>6</td><td>11</td><td>15</td><td>15</td><td>18</td><td>23</td><td>25</td></tr>
</table>
</td></tr>
<tr><td>Roof / Ceiling</td><td>

Noise egress calculations have been based on the roof / ceiling assembly being of the following construction:

</td></tr>
</table>

<table>
<tr>
<td></td>
<td>

0.42 mm BMT corrugated metal sheeting with nominally 200 mm thick insulation installed in the ceiling cavity.
10 mm thick standard plasterboard ceiling installed 300 mm below the underside of the roof sheeting.

The calculated Sound Transmission Loss is presented below:

<table>
<tr><th rowspan="2">R_w</th><th colspan="7">Sound Transmission Loss, dB</th></tr>
<tr><th>63</th><th>125</th><th>250</th><th>500</th><th>1k</th><th>2k</th><th>4k</th></tr>
<tr><td>42</td><td>6</td><td>17</td><td>31</td><td>41</td><td>51</td><td>53</td><td>49</td></tr>
</table>
</td>
</tr>
<tr>
<td>Rear Boundary</td>
<td>

Based on the referenced site plan, it is understood that the western boundary adjacent the alleyway will include a roller door. The roller door is understood to not be used for the ingress or egress of patrons, and only by staff outside of operating hours.
The roller door is assumed to comprise 0.42 mm BMT corrugated metal sheeting. The calculated Sound Transmission Loss is presented below:

<table>
<tr><th rowspan="2">R_w</th><th colspan="7">Sound Transmission Loss, dB</th></tr>
<tr><th>63</th><th>125</th><th>250</th><th>500</th><th>1k</th><th>2k</th><th>4k</th></tr>
<tr><td>19</td><td>6</td><td>9</td><td>12</td><td>17</td><td>21</td><td>18</td><td>19</td></tr>
</table>
The remainder of the rear boundary comprises garage with metal cladding and roof, which is likely to be used for storage only. Doors to the garage will generally be kept closed during operating hours. Acoustic screening due to the garage occupying that part of the boundary has been included in the modelling calculations.
</td>
</tr>
</table>

7 Music Noise Assessment

7.1 Assessment Criteria

Table 11 presents the EPA music noise limits that have been determined to apply at the potentially most-affected Noise Sensitive Areas in accordance with Part II of the EPA Noise Protocol.

Table 11 EPA Noise Protocol Part II Noise Limits – Music Noise

<table>
<tr><th>Period</th><th>Applicable Times During Proposed Operating Hours</th><th>Music Noise Limits</th></tr>
<tr><td>Day / Evening</td><td>▪ Monday to Saturday from 11 am to 11 pm;
▪ Sunday from 11 am to 10 pm</td><td>50 dB(A) L_{Aeq}</td></tr>
<tr><td>Night</td><td>▪ Monday to Thursday from 11 pm to 1 am;
▪ Friday to Saturday from 11 pm to 3 am;
▪ Sunday from 10 pm to 1 am</td><td><table><tr><th>Freq, Hz</th><th>L_{OCT10}, dB</th></tr><tr><td>63</td><td>44</td></tr><tr><td>125</td><td>37</td></tr><tr><td>250</td><td>36</td></tr><tr><td>500</td><td>35</td></tr><tr><td>1k</td><td>37</td></tr><tr><td>2k</td><td>31</td></tr><tr><td>4k</td><td>23</td></tr></table></td></tr>
</table>

7.2 Music Noise Characteristics

It is understood that the proposed wine bar / restaurant will play pre-recorded background music in indoor and outdoor areas, as well as live acoustical / jazz background music within indoor areas. It is expected that music will be provided mostly for background ambience . Where music is played for this purpose the *Association of Australasian Acoustical Consultants Licensed Premises Noise Assessment Technical Guideline* (AAAC Guideline) (AAAC, 2023) and DDEG's previous experience suggest that music noise levels will typically range from 74 to 77 dB(A).

Table 12 presents the music levels that have been adopted for this assessment.

Table 12 Typical Music Noise Levels

Description	L_{Aeq}, dB(A)	Unweighted Octave Band L_{OCT10} Sound Pressure Level, dB						
		63	125	250	500	1k	2k	4k
Live Acoustical Background Music (Jazz or similar)*	78	66	79	79	79	76	72	66
Pre-Recorded Background Music	74	67	67	79	74	72	67	58

* Measurement from a similar venue – Underwood Wine Bar, 181 St Georges Road, Fitzroy North.

7.3 Music Noise Input Parameters

SoundPLAN environmental noise modelling software was used to model the potential music noise emissions from the venue. Modelling has been conducted according to the calculation methodology prescribed by ISO 9613-2 *'Acoustics - Attenuation of Sound During Propagation Outdoors - Part 2: General Method of Calculation'* (ISO, 1996).

Calculation of music noise has been conducted based on the following input parameters

- Music will be played at level no greater than those presented in Table 12, measured as a spatial average within the relevant area of the premises.
- Live music will only be played within indoor areas of the wine bar / restaurant.
- Pre-recorded background music will potentially be played in both indoor and outdoor areas.
- Noise egress calculations have been based on the Sound Transmission Loss values adopted for exterior building elements, as presented in Table 10.
- All external doors and windows of the wine bar /restaurant will be kept closed except to allow for the entry and exit of patrons and staff.

7.4 Calculated Music Noise Levels

Music noise levels at the nearest Noise Sensitive Areas have been calculated based on the calculation parameters presented in Section 7.3 and the typical music noise levels presented in Table 12.

Table 13 and Table 14 presents the calculated music noise levels at the nearest Noise Sensitive Areas.

Table 13 Calculated Music Noise Levels at NSAs – Music in Both Indoor and Outdoor Areas

Parameter	Unweighted Octave Band L_{OCT10} Sound Pressure Level							Overall L_{Aeq}, dB(A)
	63	125	250	500	1k	2k	4k	
Music Noise at NSA 1	43✓	43✗	55✗	50✗	49✗	44✗	35✗	50✓
Music Noise at NSA 2	32✓	31✓	40✓	32✓	29✓	22✓	<10✓	32✓
Music Noise at NSA 3	36✓	34✓	50✗	45✗	42✗	37✗	27✗	44✓
Day / Eve Period Limit	-	-	-	-	-	-	-	**50**
Night Limit	**44**	**37**	**36**	**35**	**37**	**31**	**23**	-

Table 14 Calculated Music Noise Levels at NSAs – Indoor Live Music Only

Parameter	Unweighted Octave Band L_{OCT10} Sound Pressure Level							Overall L_{Aeq}, dB(A)
	63	125	250	500	1k	2k	4k	
Music Noise at NSA 1	33✓	36✓	28✓	27✓	24✓	16✓	<10✓	26✓
Music Noise at NSA 2	25✓	26✓	15✓	13✓	<10✓	<10✓	<10✓	<20✓
Music Noise at NSA 3	27✓	27✓	21✓	16✓	<10✓	<10✓	<10✓	<20✓
Day / Eve Period Limit	-	-	-	-	-	-	-	**50**
Night Limit	**44**	**37**	**36**	**35**	**37**	**31**	**23**	-

Based on the above results, it is considered that music played in outdoor areas may exceed the EPA Noise Protocol Part II noise limits during the 'Night' period by up to 5 dB(A). Music played indoors is calculated to comply with the noise limits for all relevant operating periods.

7.5 Noise Control Recommendations

To avoid music noise emissions exceeding the noise limits set under Part II of the EPA Noise Protocol, it is recommended that noise control measures be implemented as follows:

- The volume of the outdoor speaker system should be limited to no higher than 74 dB(A) when measured at 1 m distance from the speaker. This may be achieved by having staff or the manager regularly measure music levels using a standalone low cost Sound Level Meter to confirm that the appropriate volume has been set.
- Music in the outdoor courtyard should be restricted to the 'Day / Evening' period only.
- All external doors and windows of the wine bar / restaurant should be kept closed except to allow for the entry and exit of patrons and staff.
- Music with high bass content should be avoided during the EPA Part II 'Night' period.
- If after commencing operations it is found that the venue is not effectively and reliably managing music levels in compliance with the EPA Noise Protocol through the above administrative means, then an electronic music noise limiter should be installed. The limiter should be calibrated to achieve compliant levels by a suitably qualified acoustic engineer.

8 Patron Noise Assessment

8.1 Assessment Criteria

8.1.1 Adopted Noise Guidelines for Patron Noise

There are no statutory environmental noise limits or EPA Guidelines which apply to patron noise emissions from commercial premises in Victoria. In the absence of established policy or guidelines, patron noise emissions have been assessed using guidance from the City of Yarra *Guidelines – Managing Noise Impacts in Urban Development* (City of Yarra, 2022).

The City of Yarra Guidelines present a number of supported approaches for assessing patron noise, including:

- Adopting the EPA Noise Protocol Part I noise limits; and
- Adopting noise limits based on background noise level (L_{A90}) + 10 dB for the Day and Evening periods and background + 5 dB for the Night period (referred to herein as the "background-plus" approach).

Based on the measured background noise levels, adopting the "background-plus" approach results in a more conservative assessment (lower guideline criteria) for this project site than adopting EPA Noise Protocol Part I noise limits (see Section 9.1 for the calculated EPA Noise Protocol Part I Noise Limits). On this basis, the "background-plus" approach has been adopted for the patron noise assessment in this report.

Additionally, the City of Yarra guidelines include recommended maximum (L_{AFmax}) noise levels outside bedroom windows to avoid sleep disturbance.

Table 15 presents the noise guidelines that would apply based on the City of Yarra "background-plus" approach, along with the recommended maximum noise levels.

Table 15 City of Yarra Patron Noise Assessment Guidelines – Based on Background Noise Levels

Period	Applicable Times During Proposed Operating Hours	Guideline Noise Levels	
		L_{Aeq}, dB(A)	L_{AFmax}, dB(A)
Day / Evening	▪ Monday to Sunday from 11 am to 10 pm.	55	-
Night	▪ Sunday to Thursday from 10 pm to 1 am; ▪ Friday to Saturday from 10 pm to 3 am.	38	65*

* Externally outside openable bedroom window.

When assessing patron noise within major urban areas, it is important to acknowledge that maintaining a vibrant night life is vital to Melbourne's urban culture and economy. Basing noise level guidelines on the background noise levels in the area is considered to be an appropriate way to take the existing ambience into account.

The City of Yarra guideline notes that the patron noise levels should not be considered as hard noise limits, but rather as a benchmark for assessment of modelling predictions that, if exceeded, represents a risk of nuisance, rather than grounds for stopping a project from going ahead.

8.1.2 Reviewing Patron Noise Level Results

The adopted noise guidelines presented in Table 15 are not intended to be limits above which the amenity of residents will be impacted, but rather to be used as an indication of the level of risk to amenity. Response to noise is subjective and will vary dependant on the hearing abilities of the listener and the spectral characteristics of the noise source.

The following interpretation of patron noise levels has been adopted with reference to the City of Yarra patron noise guidelines:

- 0 dB exceedance: Although patron noise is expected to be audible, there is minimal risk of unreasonable impact to amenity at nearby residences. No noise control measures are considered to be necessary.
- 1-3 dB exceedance: Patron noise levels only marginally exceed the adopted noise guidelines, and will generally result in a noise level which is indistinguishable from a fully compliant noise level. Further assessment may be warranted for particularly noise-sensitive receivers. In many cases, a predicted noise level exceedance is due to conservatism in the calculation method and/or modelling software.
- 4-7 dB exceedance: There is a possibility of patron noise levels impacting amenity at nearby residential receivers. Administrative noise control measures such as limiting patron numbers should be considered to reduce noise emissions, and physical noise control treatments (such as acoustic fencing or absorptive panels) may be required.
- 8 dB and more exceedance: It is very likely that patron noise emissions will impact amenity at nearby residential receivers. Engineered noise control measures such as acoustic screening, building upgrades, or changes to site layout, should be considered in addition to limiting patron numbers and/or implementing other administrative controls in combination. Outdoor patron areas may need to be covered if overlooked by the affected noise sensitive receivers.

8.2 Assessment Input Parameters

SoundPLAN environmental noise modelling software was used to model the patron noise emissions. Modelling has been conducted according to the calculation methodology prescribed by ISO 9613-2 *'Acoustics - Attenuation of Sound During Propagation Outdoors - Part 2: General Method of Calculation'* (ISO, 1996).

8.2.1 Modelling Parameters for Indoor Patrons

Noise emissions due to indoor patrons have been based on the following parameters:

- Building and site layout as per reference architectural drawings.
- Building construction details as specified in Section 6.3
- All other external doors of the venue kept closed during operating hours except as necessary for patron and staff access and egress.
- Overall L_{Aeq} indoor patron noise levels have been predicted based on the formula developed by (Rindel, 2010; Rindel, 2015) as follows:

$$L_{Aeq} = 93 - 20\log\left(\frac{A}{N_S}\right)$$

Where N_S is the number of people speaking. An average of one in three patrons has been assumed to be speaking simultaneously.

Where A is the average absorption area calculated in accordance with the following formula:

$$A = 0.16\frac{V}{RT_{60}}$$

Where V is the volume of the room.

Where RT_{60} is the reverberation time in the room. The reverberation time within the wine bar / restaurant has been assumed to be at 1.0 second given the expected majority of hard, sound-reflective surfaces within the venue.

- Based on the 125-patron capacity within the wine bar / restaurant, the overall average indoor L_{Aeq} within the proposed premises as a result of speaking indoor patrons is calculated to be 91 dB(A).

Further details of the noise modelling input parameters, assumptions, and data sources are presented in Appendix D.

8.2.2 Modelling Parameters for Outdoor Patrons

Noise emissions due to outdoor patrons have been based on the following parameters:

- The Sound Power Level (L_W) of each outdoor area has been calculated using the data presented in Table 16 below. It is understood that this data was originally compiled by Marshall Day Acoustics, and has been accepted previously in past Victorian planning decisions.

Table 16 Outdoor Patron Sound Power Levels

Patron Type	Average Sound Power Level per Speaking Patron, L_{Aeq} dB(A)[1]	Maximum Sound Power Level of Individual Patron, $L_{AF,max}$ dB(A)[2]	Patron Type Definition
Smoking Areas	73	98	Primary activity is smoking
Restaurant and Dining	78	98	Mostly seated patrons. Primary activity is dining and socialising whilst alcohol consumption may occur
Taverns with Significant Food Offering	83	104	Mix of seated and standing patrons. Primary activity is alcohol consumption and socialising whilst dining may occur
Vertical Consumption	88	104	Mostly standing patrons. Primary activity is alcohol consumption and socialising

1. Typically only one in three patrons will be talking at any one time. The Sound Power Level of the crowd is scaled as 3 dB per doubling of patron number.

2. The maximum Sound Power Level has been based on two patrons shouting at each other. This Sound Power Level does not scale with patron numbers.

- Based on the proposed use of the wine bar / restaurant, the Sound Power Level of outdoor patrons has been calculated based on 'taverns with significant food offerings'. The calculated total Sound Power Level in outdoor areas is presented in Table 17 below.

Table 17 Calculated Outdoor Patron Sound Power Levels

Outdoor Area	Patron Type	Number of Patrons	Total Sound Power Level, dB(A)
Rear Courtyard	Restaurant and Dining	125	99

Further details of the noise modelling input parameters, assumptions, and data sources are presented in Appendix D.

8.3 Predicted Patron Noise Levels – With Baseline Modelling Parameters

Table 18 presents the predicted patron noise levels outside the nearest and potentially most-affected NSAs based on the above input parameters.

Table 18 Predicted Patron Noise Levels – With Baseline Modelling Parameters

NSA Ref.	Calculated Effective Noise Level		Adopted Patron Noise Guideline and Compliance		
	L_{Aeq}, dB(A)	L_{AFmax}, dB(A)	Day / Evening Period (L_{Aeq} ≤ 55 dB(A))	Night Period (L_{Aeq} ≤ 38 dB(A))	L_{AFmax} ≤ 65 dB(A)
1	60	69	✗	✗	✗
2	44	52	✓	✗	✓
3	51	58	✓	✗	✓

The results presented above indicate that patron noise levels are expected to exceed the adopted patron noise criteria by up to 5 dB during the 'Day / Evening' period and by over 10 dB(A) for the night period. From analysis of the noise model, the exceedances are a result of the outdoor area only (i.e. not due to patrons indoors).

8.4 Recommended Noise Mitigation Measures

It is recommended that the maximum number of patrons in the rear courtyard be limited for each period as specified in Table 19 below.

Table 19 Maximum Allowable Number of Patrons in the Rear Courtyard

Period	Applicable Times	Max Patrons in Rear Courtyard
Day / Evening	▪ Monday to Sunday from 11 am to 10 pm.	60
Night	▪ Sunday to Thursday from 10 pm to 1 am; ▪ Friday to Saturday from 10 pm to 3 am.	0

A potential alternative to limiting patron numbers would be to enclose the rear courtyard area with higher walls and an acoustically solid roof in order to mitigate patron noise emissions. Should it be desired to purse this approach, detailed specifications for the required treatment measures should be determined by a suitably qualified acoustic engineer. It is additionally, recommended that operational noise monitoring should be undertaken following implementation of such measures to verify that compliance is achieved with the patron noise guidelines.

8.5 Predicted Patron Noise Levels with Noise Mitigation Measures

Table 20 present the predicted patron noise levels outside the nearest and potentially most-affected NSAs based on the above input parameters.

Table 20 Predicted Patron Noise Levels – With Noise Mitigation Measures

NSA Ref.	Calculated Effective Noise Level, Evening / Night Period, L_{Aeq}, dB(A)			Adopted Patron Noise Guideline and Compliance, L_{Aeq}, dB(A)	
	From Indoor Patrons	From Outdoor Patrons	Combined Patrons	Day / Evening Period (L_{Aeq} ≤ 55 dB(A))	Night Period (L_{Aeq} ≤ 38 dB(A))
NSA 1	35/35	57/0	57/35	O*	✓
NSA 2	22/22	41/0	41/22	✓	✓
NSA 3	25/25	48/0	48/25	✓	✓

*O Marginal exceedance

Based on the results above, it is predicted that patron noise levels will only marginally exceed the adopted guidelines during the 'Day / Evening' period. As per the discussion in Section 8.1.2, a noise level that is 2-3 dB higher is barely distinguishable from a fully compliant noise level and unlikely to present any significant risk of unreasonable impact to amenity.

9 Review of Mechanical Plant Noise

9.1 Acoustic Criteria

The noise limits presented in Table 21 have been determined to apply at the potentially most affected Noise Sensitive Areas in accordance with *Part I of 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). Details of the Zoning Level and noise limit calculations are presented in Appendix C.

Table 21 EPA Noise Protocol Part I Noise Limits

Period	Applicable Times	Noise Limit, L_{eff}, dB(A)
Day	▪ 7 am to 6 pm Monday to Saturday	55
Evening	▪ 6 pm to 10 pm Monday to Saturday ▪ 7 am to 10 pm Sundays and Public Holidays	49
Night	▪ 10 pm to 7 am All Days	42

9.2 Assessment of Mechanical Plant Noise

9.2.1 Calculation Parameters

SoundPLAN environmental noise modelling software was used to model the future noise emissions from mechanical plant equipment. At the time of writing, only preliminary mechanical services information is available. It is understood that the following mechanical plant items will be installed at the project site:

- 2-off air-conditioning condenser units with a Sound Power Level of 71 dB(A) each (e.g. Daikin RXYMQ5AV4A or similar), installed in the rear courtyard (as shown in Figure 4);
- Kitchen exhaust fan with a Sound Power Level of 75 dB(A) (e.g. Fantech HUD506 or similar), installed on the roof (as shown in Figure 4).
- A tonality adjustment of +2 dB(A) has been applied to the calculated mechanical plant noise levels to account for potential tonal characteristics of the equipment, in accordance with the procedures prescribed by Part I of the EPA Noise Protocol.

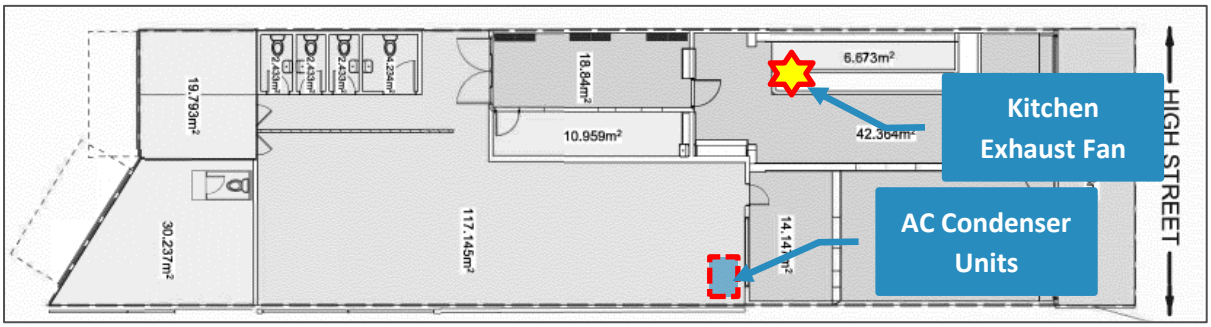

Figure 4 Mechanical Plant Locations

Further details of the noise modelling input parameters, assumptions, and data sources are presented in Appendix D.

9.2.2 Calculated Noise Levels from Mechanical Plant

Table 22 presents the calculated noise level at the nearest NSAs, due to proposed mechanical plant.

Table 22 Calculated Effective Noise Levels from Mechanical Plant

NSA Ref.	Calculated Noise Level, L_{Aeq}, dB(A)	EPA Noise Protocol Net Adjustment, dB(A)	Calculated Effective Noise Level, L_{eff}, dB(A)	EPA Noise Protocol Day Period Compliance (L_{eff} ≤ 55 dB(A))	EPA Noise Protocol Evening Period Compliance (L_{eff} ≤ 49 dB(A))	EPA Noise Protocol Night Period Compliance (L_{eff} ≤ 42 dB(A))
NSA 1	40	+2	42	✓	✓	✓
NSA 2	24	+2	26	✓	✓	✓

The results above indicate that mechanical plant noise levels at the nearest NSAs will comply with the EPA Noise Protocol Part I noise limits for all relevant periods, subject to calculation parameters presented in Section 9.2.1.

10 Deliveries and Waste Collection

Based on the reference documentation and the existing ambient noise levels in the vicinity of the site, it is considered that the noise due to deliveries and private waste collections associated with the venue will not adversely impact on the adjacent NSAs provided that such deliveries and collections are conducted between the hours presented in Table 23 below, in accordance with Section 6 and 9 of the EPA Noise Control Guidelines (EPA Victoria, 2021).

Table 23 Deliveries and Private Waste Collection Schedules

Activity Type	Permitted Times
Deliveries	7 am to 10 pm Monday to Saturday 9 am to 10 pm Sundays and Public Holidays
Private Waste Collections	7 am to 8 pm Monday to Saturday 9 am to 8 pm Sundays and Public Holidays

It is understood that empty bottles will be stored inside the main building during night-time operating hours and disposed into outdoor bins the following day. It is considered that noise due to disposal of empty bottles will not have an adverse impact on nearby residences, provided that it only occurs between 9:00 am and 8:00 pm.

No bottle-crushing should be performed on the premises without further acoustic assessment and consideration of the location of the bottle crusher.

11 Conclusion

This document has presented an acoustic assessment for the proposed wine bar / restaurant at 567-569 High Street, Northcote, VIC.

The assessment has been undertaken with regard to the acoustic requirements prescribed by *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), *Darebin Planning Scheme / Victoria Planning Provisions Clause 53.06* (State of Victoria, 2022) and the recommendations contained in *City of Yarra Guidelines – Managing Noise Impacts in Urban Development* (City of Yarra, 2022).

Based on the typical music levels, noise emissions from live and pre-recorded 'background music' is expected to comply with Part II of the EPA Noise Protocol for all relevant operating hours, subject to music not being played in the outdoor courtyard during the EPA Noise Protocol Part II "Night" period and compliance being maintained with the other music parameters set out in Section 7. Recommended measures to maintain ongoing compliance with the EPA Noise Protocol are presented in Section 7.5.

An assessment of patron noise emissions from the premises indicates that with a maximum capacity of 60 patrons in the outdoor courtyard, noise levels received at the nearby Noise Sensitive Areas will be within an acceptable range, subject to the rear courtyard not being used after 10 pm.

An assessment of mechanical plant noise emissions from the premises indicates that new mechanical plant will comply with the EPA Noise Protocol noise limits for all proposed operating hours, subject to the calculation parameters presented in Section 9.2.1.

12 References

AAAC. (2023, April). Association of Australasian Acoustical Consultants Licensed Premises Noise Assessment Technical Guideline V3.0.

City of Yarra. (2022, April). Guidelines - Managing Noise Impacts in Urban Development.

EPA Victoria. (2021, May). EPA Publication 1254 - Noise Control Guidelines. Victoria.

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.

ISO. (1996). ISO 9613-2:1996 Acoustics - Attenuation of Sound During Propogation Outdoors - Part 2: General Method of Calculation. International Standards Organisation.

Rindel. (2010). Verbal Communication and Noise in Eating Establishments.

Rindel. (2015). The Acoustics of Places for Social Gatherings Presented at Euronoise 2015 Maastricht.

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 every day 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

$L_{A90,T}$ — 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)]

$L_{AFmax,T}$ — The maximum value of A-weighted, F time-weighted Sound Pressure Level which occurs during a given measurement period T. [Unit: dB / dB(A)]

L_{eff} — See 'Effective Noise Level'.

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]

L_{OCT90} — Means the C-weighted or Linear Sound Pressure Level for a specified octave band that is exceeded for 90 per cent of the time interval considered. [Unit: dB]

Noise Sensitive Area

For the purposes of assessment of noise levels in relation to *Environment Protection Regulations 2021*, a Noise Sensitive Area is defined as:

a) That part of the land within the boundary of a parcel of land that is–
   i. within 10 metres outside the external walls of any of the following buildings–
      A. a dwelling (including a residential care facility but not including a caretaker's house);
      B. a residential building;
      C. a noise sensitive residential use; or
   ii. within 10 metres of the outside of the external walls of any dormitory, ward, bedroom or living room of one or more of the following buildings–
      A. a caretaker's house;
      B. a hospital;
      C. a hotel;
      D. a residential hotel;
      E. a motel;
      F. a specialist disability accommodation;
      G. a corrective institution;
      H. a tourist establishment;
      I. a retirement village;
      J. a residential village; or
   iii. within 10 metres of the outside of the external walls of a classroom or any room in which learning occurs in the following buildings (during their operating hours)–
      A. a child care centre;
      B. a kindergarten;
      C. a primary school;
      D. a secondary school; or

b) subject to paragraph c), in the case of a rural area only, that part of the land within the boundary of–
   i. a tourist establishment;
   ii. a campground;
   iii. a caravan park; or

c) despite paragraph b), in the case of a rural area only, where an outdoor entertainment event or outdoor entertainment venue is being operated, that part of the land within the boundary of the following are not noise sensitive areas for the purposes of that event or venue–
   i. a tourist establishment;
   ii. a campground;
   iii. a caravan park.

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 Power Level	A measure of the total sound energy radiated by a source, per unit time. Mathematically, it is ten times the logarithm to the base ten of the ratio of the sound power (W) of the source to the reference sound power; where the reference sound power is $1x10^{-12}$ W. [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 Location

Table B.1 presents details of the noise measurement locations. Figure B.1 to Figure B.2 present a map and a photograph of the noise measurement location.

Table B.1 Noise Measurement Location Details

Location Reference	Measurement Description	Microphone Height Above Ground Level
1	Background noise measurements	1.5 m

Figure B.1 Noise Measurement Locations (Aerial Photo Source: Google Maps)

Figure B.2 Noise Measurement Location 1 – Photo Facing West

B.2 Measurement Procedure

Noise measurements were performed at the site to establish the environmental noise levels. Table B.2 presents details of each measurement:

Table B.2 Details of Measurement Period

Location Ref.	Measurement Type		Start Time	Start Date	End Time	End Date
	Attended	Unattended				
1	☐	☒	10:11 PM	Friday 15/12/2023	10:42 PM	Friday 15/12/2023
	☐	☒	3:05 AM	Saturday 16/12/2023	3:35 AM	Saturday 16/12/2023

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 60 mm diameter foam windscreen was installed on the 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.3.

Table B.3 Acoustic Instrumentation Details

Location Reference	Instrument Description	Serial No.	Date of Last Laboratory Calibration*
1	Svantek 979 Class 1 Sound Level Meter	92946	25/10/2023

* In accordance with AS 1055.1-1997 and National Association of Testing Authorities Guidelines, Sound Level Meters and Environmental Noise Loggers are required to have comprehensive laboratory calibration checks carried out at intervals not exceeding two years. Sound Level Calibrators require calibration annually.

B.4 Weather Conditions

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

Appendix C EPA Noise Protocol Zoning Level and Noise Limit Calculations

C.1 22 Johnson Street, Northcote

Zoning Map

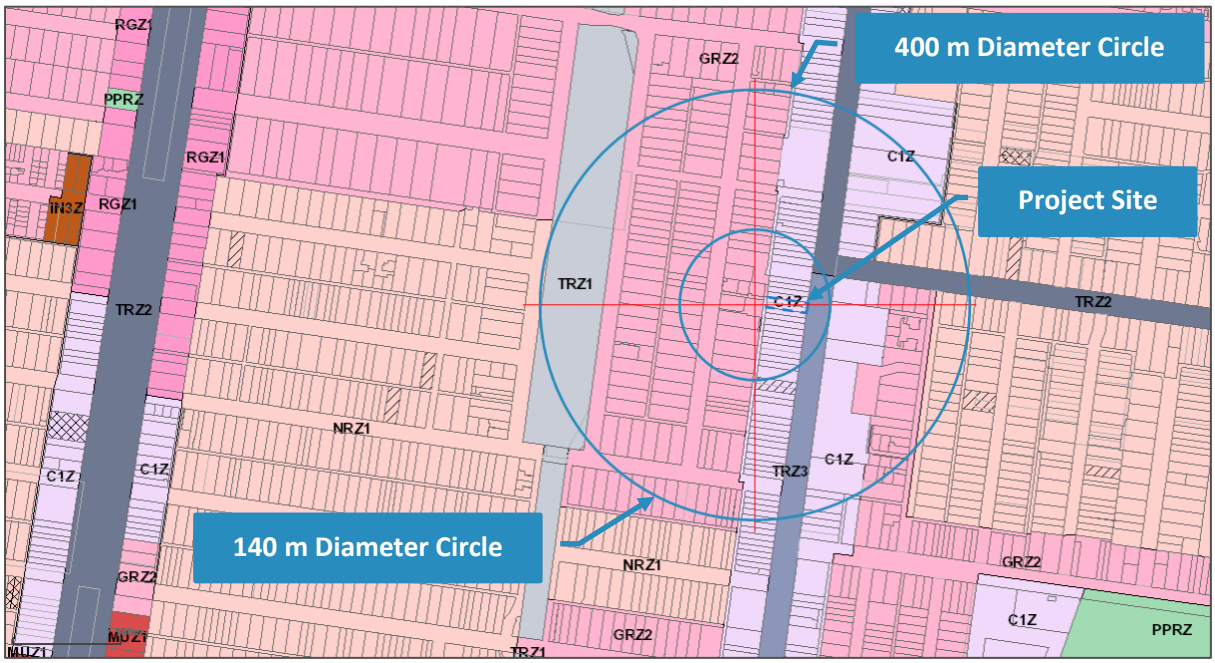

Figure C.1 Zoning Circles (Image Source: https://mapshare.vic.gov.au/vicplan/)

Zone Areas

Zone Type Designation	Applicable Zones	% Area of 140m Circle	% Area of 400m Circle
Type 1	GRZ2, NRZ1	57%	56%
Type 2	TRZ1, C1Z	34%	36%
Type 3	TRZ3	10%	9%

Influencing Factor: 0.27

Zoning Levels and Noise Limits

Period	Zoning Level, dB(A)	L_{A90} Background Noise Level, dB(A)	Background Noise Classification	EPA Noise Protocol Noise Limits, dB(A)
Day	55	-*	Neutral	55
Evening	49	45	Neutral	49
Night	44	33	Low	42

* Background noise measurements were not conducted during the EPA Noise Protocol Part I 'Day' period. Based on the background measurements and resulting classification of the EPA Noise Protocol Part I 'Evening' and 'Night' periods, it is anticipated that the 'Day' classification is likely to be 'Neutral'.

C.2 Explanatory Notes to EPA Noise Protocol Noise Limit Derivation

In accordance with the EPA Noise Protocol, the Influencing Factor (IF) for an assessment location is calculated as follows:

$$IF = 0.25(Sum\ of\ Type\ 2\ fractions\ for\ both\ cicles) + 0.5(Sum\ of\ Type\ 3\ fractions\ for\ both\ circles)$$

The Zoning Levels are calculated according to the following equations:

$$Day\ Period\ Zoning\ Level = 18 \times IF + 50$$
$$Evening\ Period\ Zoning\ Level = 17 \times IF + 44$$
$$Night\ Period\ Zoning\ Level = 17 \times IF + 39$$

The Background Noise Levels are classified as follows:

Period	Classification Criteria	Background Noise Classification
Day	Background Noise Level > Zoning Level - 6 dB(A)	High
	Background Noise Level < Zoning Level - 12 dB(A)	Low
	Otherwise	Neutral
Evening and Night	Background Noise Level > Zoning Level - 3 dB(A)	High
	Background Noise Level < Zoning Level - 9 dB(A)	Low
	Otherwise	Neutral

The noise limits are determined based on the background noise classification, according to the following equations:

Period	Classification	Noise Limit
Day	High	Background Noise Level + 6 dB(A)
	Neutral	Zoning Level
	Low	0.5 x (Zoning Level + Background Noise Level) + 4.5 dB(A)
Evening and Night	High	Background Noise Level + 3 dB(A)
	Neutral	Zoning Level
	Low	0.5 x (Zoning Level + Background Noise Level) + 3 dB(A)

The Environment Protection Regulations 2021 specify that the noise limits may not be less than 45 dB(A) for the Day period, 40 dB(A) for the Evening period, and 35 dB(A) for the Night period.

Appendix D Modelling Parameters

General Parameters

Parameter	Description
Software	SoundPLAN Version 7.4
Calculation Method	ISO 9613-2:1996 (ISO, 1996)

Geometrical Parameters

Parameter	Description
Site Layout	▪ As per reference documentation.
Terrain	▪ Ground modelled as flat.
Ground absorption	▪ All areas modelled as a hard ground using a ground factor of 0.
Buildings	▪ Buildings in the vicinity of the project site modelled according to the latest Google Earth satellite imagery.
Receptors	▪ Facade noise levels calculated at receiver positions located at 1 m in front of the building facade and 1.5 m above floor level for each floor.

Environmental Parameters

Parameter	Description
Air absorption Calculation	ISO 9613-2:1996
Air Temperature	10 degrees Celsius
Air Pressure	1013.3 mbar
Humidity	70%
Propagation Conditions	▪ The propagation conditions used in the modelling are the standard ISO 9613-2 conditions. These represent downwind propagation with: – Wind direction ± 45 degrees of the direction connecting the centre of the dominant sound source and the centre of the specified receiver region, with the wind blowing from source to receiver; and – Wind speed between approximately 1 m/s and 5 m/s, measured at a height of 3 m to 11 m above ground. ▪ The modelled conditions would similarly represent average propagation under a well-developed moderate ground-based temperature inversion, such as commonly occurs on clear, calm nights. ▪ Such conditions result in enhanced noise propagation and can be considered to represent a typical worst-case scenario for noise propagation.

Noise Source Parameters

<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td>Indoor Live Music</td><td>The following parameters have been used in modelling of indoor live music noise:
Noise breakout from glazing, doors and roof of the building has been calculated based on the adopted existing construction (refer to Table 10).
The octave band spectrum Sound Power Level for noise emitting through the modelled building elements is as follows:
<table>
<tr><th rowspan="2">Frequency, Hz</th><th colspan="8">Sound Power Level, dB(Z) / m²</th></tr>
<tr><th>63</th><th>125</th><th>250</th><th>500</th><th>1K</th><th>2K</th><th>4K</th><th>Total dB(A)</th></tr>
<tr><td>Glazing</td><td>45</td><td>54</td><td>50</td><td>45</td><td>38</td><td>36</td><td>25</td><td>47</td></tr>
<tr><td>Door</td><td>54</td><td>62</td><td>58</td><td>58</td><td>52</td><td>43</td><td>35</td><td>58</td></tr>
<tr><td>Roof</td><td>54</td><td>56</td><td>42</td><td>32</td><td>19</td><td>13</td><td>11</td><td>41</td></tr>
</table></td></tr>
<tr><td>Outdoor Music</td><td>The following parameters have been used in modelling of outdoor music noise:
The outdoor speaker will be installed at high level in the outdoor courtyard.
The octave band spectrum Sound Power Level for the speaker is as follows:
<table>
<tr><th>Frequency, Hz</th><th>63</th><th>125</th><th>250</th><th>500</th><th>1K</th><th>2K</th><th>4K</th><th>Total dB(A)</th></tr>
<tr><td>Sound Power Level, dB(Z)</td><td>78</td><td>78</td><td>90</td><td>85</td><td>83</td><td>78</td><td>69</td><td>74</td></tr>
</table></td></tr>
<tr><td>Indoor Patrons (125 Patrons)</td><td>The following parameters have been used in the modelling of indoor patron noise:
Noise breakout from the roof, rear door, and glazing has been calculated based on the existing construction.
As it will contribute very little to the noise levels calculated at the NSAs, noise breakout through brick walls has not been considered in the calculation.
The octave band spectrum Sound Power Level for noise emitting through the modelled building elements is as follows:
<table>
<tr><th rowspan="2">Frequency, Hz</th><th colspan="8">Sound Power Level, dB(Z) / m²</th></tr>
<tr><th>63</th><th>125</th><th>250</th><th>500</th><th>1K</th><th>2K</th><th>4K</th><th>Total dB(A)</th></tr>
<tr><td>Door</td><td>61</td><td>63</td><td>69</td><td>69</td><td>61</td><td>52</td><td>46</td><td>68</td></tr>
<tr><td>Glazing</td><td>52</td><td>54</td><td>60</td><td>56</td><td>47</td><td>45</td><td>36</td><td>57</td></tr>
<tr><td>Roof</td><td>61</td><td>56</td><td>52</td><td>43</td><td>28</td><td>22</td><td>22</td><td>47</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td>Outdoor Patrons (125 Patrons)</td><td>Patron noise in the outdoor courtyard has been modelled as:
▪ An area source the same size as the seating area in the courtyard at 1.3 m above ground level.
▪ The octave band spectrum Sound Power Level for 125 patrons is as follows:
<table>
<tr><th>Frequency, Hz</th><th>63</th><th>125</th><th>250</th><th>500</th><th>1K</th><th>2K</th><th>4K</th><th>Total dB(A)</th></tr>
<tr><td>Sound Power Level, dB(Z)</td><td>81</td><td>88</td><td>98</td><td>99</td><td>94</td><td>90</td><td>86</td><td>99</td></tr>
</table>
▪ The octave band spectrum Sound Power Level for noise emitting through the modelled roller door is as follows:
<table>
<tr><th rowspan="2">Frequency, Hz</th><th colspan="8">Sound Power Level, dB(Z) / m²</th></tr>
<tr><th>63</th><th>125</th><th>250</th><th>500</th><th>1K</th><th>2K</th><th>4K</th><th>Total dB(A)</th></tr>
<tr><td>Roller Door</td><td>46</td><td>50</td><td>56</td><td>53</td><td>43</td><td>42</td><td>37</td><td>53</td></tr>
</table></td></tr>
<tr><td>Outdoor Patrons (60 Patrons)</td><td>Patron noise in the outdoor courtyard has been modelled as:
▪ An area source the same size as the seating area in the courtyard at 1.3 m above ground level.
▪ The octave band spectrum Sound Power Level for 60 patrons is as follows:
<table>
<tr><th>Frequency, Hz</th><th>63</th><th>125</th><th>250</th><th>500</th><th>1K</th><th>2K</th><th>4K</th><th>Total dB(A)</th></tr>
<tr><td>Sound Power Level, dB(Z)</td><td>78</td><td>85</td><td>94</td><td>96</td><td>90</td><td>86</td><td>82</td><td>96</td></tr>
</table>
▪ The octave band spectrum Sound Power Level for noise emitting through the modelled roller door is as follows:
<table>
<tr><th rowspan="2">Frequency, Hz</th><th colspan="8">Sound Power Level, dB(Z) / m²</th></tr>
<tr><th>63</th><th>125</th><th>250</th><th>500</th><th>1K</th><th>2K</th><th>4K</th><th>Total dB(A)</th></tr>
<tr><td>Roller Door</td><td>41</td><td>45</td><td>51</td><td>48</td><td>38</td><td>37</td><td>32</td><td>48</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td>Mechanical Plant</td><td>Mechanical plant noise has been modelled as:
▪ 2-off AC condenser units have been modelled in the outdoor courtyard each with the following octave band spectrum Sound Power Level:
<table>
<tr><th>Frequency, Hz</th><th>63</th><th>125</th><th>250</th><th>500</th><th>1K</th><th>2K</th><th>4K</th><th>Total dB(A)</th></tr>
<tr><td>Sound Power Level, dB(Z)</td><td>76</td><td>73</td><td>72</td><td>67</td><td>66</td><td>63</td><td>58</td><td>71</td></tr>
</table>
▪ 1-off kitchen exhaust fan has been modelled on the roof with the following octave band spectrum Sound Power Level:
<table>
<tr><th>Frequency, Hz</th><th>63</th><th>125</th><th>250</th><th>500</th><th>1K</th><th>2K</th><th>4K</th><th>Total dB(A)</th></tr>
<tr><td>Sound Power Level, dB(Z)</td><td>75</td><td>78</td><td>74</td><td>73</td><td>70</td><td>65</td><td>58</td><td>75</td></tr>
</table>
</td></tr>
</table>