Willow Acoustics Pty Ltd ABN 94 660 341 337 Trading as
noiseconsult.com.au
AUDIOMETRIC & ACOUSTIC SERVICES
(03) 9817 5517
info@noiseconsult.com.au

17th February 2025

Report No. 25019

Title: **Acoustic assessment and report for a 8-unit development at 750 Barkly Street, West Footscray VIC.**

Brief: **Investigate existing noise levels at 750 Barkly Street, West Footscray VIC from traffic and other sources and provide recommendations for suitable construction to achieve design criteria as required. Provide recommendations for domestic mechanical plant.**

Client: **Thuy Linh Vu**
750 Barkly St
West Footscray
VIC

Contact:

Thang Le
Arc Zero Pty Ltd

Executive Summary

Audiometric and Acoustic Services (A&AS) has completed an environmental acoustic assessment for a proposed 8-unit residential development located at 750 Barkly Street, West Footscray, VIC.

Construction as per the recommendations in Section 8 is considered adequate for the noise attenuation requirements for external traffic noise intrusion and to reduce noise levels of the proposed car stacker so far as reasonably practicable and in line with any legislative requirements.

The acoustic recommendations of Section 8 are presented below.

Acoustic Requirements

<table>
<tr><th>System</th><th>Acoustic Engineering Measures</th></tr>
<tr><td>External Walls</td><td>External walls should be constructed as below for Dwellings 1 and 2.
<table>
<tr><th>Room</th><th>Recommended Construction</th></tr>
<tr><td>First Floor Dwelling 1 & 2</td><td>▪ Standard Hebel Powerpanel or minimum 9 mm cement board construction with 90 mm stud, R1.5 insulation and standard 10 mm thick plasterboard.
▪ Or any other system achieving R_w > 35 dB.</td></tr>
<tr><td>Ground Floor Dwelling 1 & 2</td><td>▪ External wall construction is understood to be standard brickwork construction with an air cavity, 10 mm plasterboard lining and R1.5 insulation within the 90 mm studwork.
▪ Or any other system achieving R_w > 35 dB.</td></tr>
</table></td></tr>
<tr><td>Roof / Ceiling Assembly</td><td>Standard metal deck roofing with insulation of min R3.0 fibrous batts and Bradford Anticon 60 MD insulation over battens, with internal lining of standard 10 mm plasterboard will be adequate to meet the requirements for all rooms of Dwellings 1 and 2.</td></tr>
<tr><td>Glazing</td><td>Double glazing is understood to be used in all living and bedroom areas. Glazing must achieve the minimum R_w value presented in the glazing schedule (Table 10) for Dwellings 1 and 2.
<table>
<tr><th>Room</th><th>Minimum Required Rw</th><th>Typical Construction</th></tr>
<tr><td>DW 1 Living / Dining / Kitchen</td><td>28</td><td>6 mm Single or 6 mm - 12 mm - 6 mm Double Glazed</td></tr>
<tr><td>DW 2 Bed 1</td><td>26</td><td>4 mm Single or 4 mm - 10 mm argon - 4 mm Double Glazed</td></tr>
<tr><td>DW 2 Bed 2</td><td>18</td><td>4 mm Single or 4 mm - 10 mm argon - 4 mm Double Glazed</td></tr>
<tr><td>DW 1 Bed 1</td><td>26</td><td>4 mm Single or 4 mm - 10 mm argon - 4 mm Double Glazed</td></tr>
<tr><td>DW 1 Bed 2</td><td>22</td><td>4 mm Single or 4 mm - 10 mm argon - 4 mm Double Glazed</td></tr>
<tr><td>DW 2 Living / Kitchen / Dining</td><td>29</td><td>6 mm Single or 6 mm - 12 mm - 6 mm Double Glazed</td></tr>
</table></td></tr>
</table>

Ventilation	To meet attenuation requirements for Dwellings 1 and 2, all doors and windows would theoretically have to remain closed, so cooling systems such as an evaporative cooler are not suited to noise exposed houses. A split system air conditioner would be suited, if required. A split system air conditioner would be suited, if required. Note that these installations must comply with the EPA's Environment Protection Regulations 2021 (State of Victoria, 2021). A forced mechanical ventilation system is not necessary. Any Whirly Birds should not be situated over any of habitable rooms.
Car Stacker	The chosen car stacker should not exceed an SPL > 70 dB(Z) at 1 m or emit a L_{Amax} > 80 dB at 1 m without further acoustic assessment.
Dwelling 8 Floor	The entire floor / ceiling area as per Figure 3should be constructed as follows: • CSR 6322 (d) –, Minimum 150 mm thick concrete slab, clips direct fixed to slab at 600 mm centres, minimum 40 mm cavity, Rondo furring channels N129 at 600mm max centres, 14 kg, 50 mm thick Acoustigard & ceiling lining of 2 x 16mm thick Gyprock Fyrchek Plasterboard. The floor coverings shall be either Timber or Tile + 4.5 mm thick acoustic underlay, or carpet with underlay. The system is specified to achieve $R_w + C_{tr}$ = 55 dB and Ln,w less than 62.
Party Wall	The wall separating the common garage from Unit 7 as per Figure 4 is required to be constructed as per CSR 4005 (b) or any other wall type achieving a minimum R_w > 50 dB and discontinuous construction. • CSR 4005 (b) – internal lining of 1 x 13 mm thick Gyprock Standard Plasterboard, fixed to minimum 92 mm stud depth with 90 Gold Batts 2.0 insulation within the cavity the brick, block or concrete wall should achieve a minimum Rw 45 and and be separated from the studwork by a minimum 20 mm. The concrete wall should have a lining of 1 x 6 mm CeminSeal to the garage side.Studwork should be at 600 mm maximum centres. The system is specified to achieve R_w = 56 dB and is discontinuous providing a minimum 20 mmm gap between the stud and the concrete wall.

Contents

1 Introduction

Audiometric and Acoustic Services (A&AS) has been commissioned by Thuy Linh Vu to investigate existing noise levels at 750 Barkly Street, West Footscray, VIC and provide recommendations for suitable construction to achieve design criteria to attenuate traffic noise and provide recommendations for proposed car stacker.

The proposed development is understood to be for a Class 2, 8-unit residential development proposed for 750 Barkly Street, West Footscray, VIC.

This report presents the measured traffic noise levels affecting the project site and provides recommended construction to meet internal acoustic design criteria for proposed residential dwellings.

Additionally, recommendations are provided regarding the proposed car stackers that may affect the amenity of dwellings 7 & 8.

A glossary of the acoustic terminology used in this report is presented in Appendix A.

1.1 Reference Documentation

The report is based on the following reference documentation.

Table 1 Reference Documentation

Document	Author	Issue
TP01A_BARKLY750_PART 2 Of 2.pdf	Arc Zero Pty Ltd	November 2024

2 Site Description

The project site is located at 750 Barkly Street, West Footscray, VIC as shown below in Figure 1.

The topography in the immediate area between the site and the road is relatively flat for the purposes of acoustic calculation.

Figure 1 Location of Proposed Dwellings (Image Source: Google Maps 2025)

The noise levels received on site are observed to be primarily of intermittent traffic.

3 Legislation

The following legislation and guidelines apply to the project site.

3.1 General Environmental Duty

Section 25 (1) of the Environment Protection Act (State of Victoria, 2017) sets forth the General Environmental Duty (GED), which states:

"A person who is engaging in an activity that may give rise to risks of harm to human health or the environment from pollution or waste must minimise those risks, so far as reasonably practicable."

The GED requires all Victorians to understand and minimise their risks of harm to human health and the environment from pollution and waste, including noise. The definition of noise includes sound and vibration. Developing land that will include noise sensitive uses near existing sources of noise may be regarded as an activity that may give rise to risks of harm to human health from pollution.

As a person engaging in that activity, a developer may be required, under the GED, to minimise those risk of harm so far as reasonably practicable.

3.2 Environment Protection (Residential Noise) Regulations 2021

The *Environment Protection Act* (State of Victoria, 2017) states it's an offence to make unreasonable noise from a residence.

The *Environment Protection Regulations* (State of Victoria, 2021) cover specific types of noise (prescribed items) and times noise is unreasonable (prohibited times).

Table 2 Restricted Times for Noise from Item Group 6

Group	Prescribed Items	Prohibited Times
6	An item of electrical equipment that does not fall within item group 2, 3 or 5, other than an item for personal care or grooming or for food heating, food refrigeration or food preparation	Monday to Friday: Before 7:00 am or after 8:00 pm Weekends and public holidays: Before 9:00 am and after 8:00 pm

3.3 Building Code of Australia Acoustic Requirements

The residential development at the subject premises falls under the performance provisions and requirements established within the National Construction Code, Building Code of Australia BCA for "Sound Insulation".

The intent of the BCA is to provide sufficient insulation against the transmission of airborne and impact sound to prevent illness or loss of amenity to building occupants.

The sound reduction properties of the proposed building elements are defined by its R_w or $R_w + C_{tr}$ ratings. R_w is a measure of the sound insulation performance of a building element, or the 'Weighted Sound Reduction Index'. Note that it is measured in highly controlled laboratory conditions.

C_{tr} is a value used to modify the measured sound insulation performance of the wall or floor assembly and is often referred to as a 'spectrum adaptation value'. The R_w value alone is not always adequate when dealing with low frequency noise, such as from music played in an adjacent space.

Compliance with the BCA is achieved by satisfying the Performance Requirements.

These performance requirements can be satisfied by using sound insulation solutions that have been demonstrated to comply with the Deemed-To-Satisfy (DTS) Provisions (Acceptable Construction Provisions) by way of laboratory testing or other documentary evidence.

Alternatively, the requirements can be satisfied by a Performance Solution, which is a design that has not been demonstrated to comply with the DTS Provisions but is shown to comply with the Performance Requirements of the BCA by way of an evaluation or verification testing.

4 Design Criteria

The following design criteria are applied to the site regarding external noise intrusion.

4.1 Victorian Planning Provision

It is understood that Victorian Planning Provision Clause 55.04-8 (2017) for noise impact objectives for townhouses and unit dwellings applies to the project site.

The VPP requires the following:

"Dwellings and residential buildings close to busy roads; railway lines or industry should be designed to limit noise levels in habitable rooms."

The provision does not specify a criterion. AS/NZS 2107:2016 Acoustics – 'Recommended design sound levels and reverberation times for building interiors' (Standards Australia, 2016) is therefore used as design criteria.

4.2 Traffic Noise

The design internal noise levels are addressed by application of AS3671 – 1989, Acoustics - Road Traffic Noise Intrusion – Building Siting and Construction (Standards Australia, 1989). Note that AS3671 requires design to sound levels specified in AS2107 – 1987 Acoustics - Recommended design sound levels and reverberation times for building interiors. This has been superseded by AS2107 – 2016 (Standards Australia, 2016).

Noise exposure levels can be measured or predicted. Where relevant and practicable, actual measurements are preferred.

For residential dwellings the $L_{A10,T}$ is the descriptor with "T" being the time period. Commonly the 18-hour period is used from 06:00 – 0:00 as required by AS3671 - 1989. This approach eliminates the dilution of the effective noise level by the quieter night period.

More commonly in recent years, Responsible Authorities request for all noise including industry, commerce and traffic to be assessed by application of the measured $L_{Aeq(16hr)}$ for the 'day' period for living spaces and $L_{Aeq(8hr)}$ for the 'night' period for bedrooms.

Where more than traffic is required to be assessed the L_{Aeq} should be used as the effective noise level. Additionally, if the 'day' period is affected by extraneous noise the $L_{Aeq(8hr)}$ for the 'night' period may be more appropriate for bedrooms.

An adjustment of 0.3 dB is applied to the $L_{A10(18hour)}$ or $L_{Aeq,T}$ for a 10% increase of noise to accommodate increases in noise levels over the next 10 years.

A façade adjustment of +2.5 dB(A) is applied to the effective noise level should the logger not be within 2-3 m of an acoustically reflective surface.

4.2.1 AS2107

The recommended design sound levels from AS2107 – 2016 (Standards Australia, 2016) for relevant areas in residential premises are shown below.

Table 3 AS2107 – 2016 Internal Design Sound Levels for Residential Premises

Location	Activity	Design Sound Level ($L_{Aeq.t}$) range	
Near a 'Minor Road'	Living Areas	30	40
	Sleeping areas (night-time)	30	35

Note that AS3671 and AS2107 do not specify sound levels for wet areas such as laundries and bathrooms and as such these have not been calculated unless ensuites are adjoining bedrooms.

Application of AS2107 for the purposes of traffic noise attenuation will moderately attenuate other noise sources from that may arise from local commerce, on site operations of plant and tram / rail noise if applicable to the project site.

4.3 Residential Mechanical Plant

The adopted criterion for residential mechanical plant is inaudibility within a habitable room during the 'night' period as per the prohibited times under the EP Regulations.

Table 4 Mechanical Plant Noise Limit

Prescribed Items	Prohibited Times
An item of electrical equipment that does not fall within item group 2, 3 or 5, other than an item for personal care or grooming or for food heating, food refrigeration or food preparation	Monday to Friday: Before 7:00 am or after 8:00 pm Weekends and public holidays: Before 9:00 am and after 8:00 pm

4.4 Building Code of Australia Acoustic Requirements

It is understood that the project comprises the construction of a double-storey residential building containing Class 2 apartments and a shared garage of different classification.

The development at the subject premises falls under the technical provisions and requirements established within the National Construction Code, Building Code of Australia Volume 1, Part F7 of the BCA "Sound Transmission and Insulation".

4.4.1 Sound Insulation of Internal Walls DTS Provisions

The Building Code of Australia requires the adjoining wall assembly between sole occupancy units in a Class 2 building have a sound insulation of $R_w + C_{tr}$ (airborne) not less than 50 dB.

The wall assembly must also have an R_w (airborne) not less than 50 dB if it separates a sole occupancy unit from a public corridor, plant room, lift shaft, stairway, or the like.

Discontinuous construction is required where a bathroom, sanitary compartment, laundry, or kitchen in one sole-occupancy unit adjoins a habitable room (other than a kitchen) in an adjoining unit; or where a sole-occupancy unit adjoins a plant room or lift shaft.

The door assembly incorporated into the wall in a Class 2 building separating a sole occupancy unit from a public corridor, stairway or the like must have a minimum R_w = 30 dB.

Note: The BCA does not specify wall separation requirements within each unit beyond separations for pipework and habitable rooms / wet areas.

The following table summarises the DTS provisions:

Table 5 BCA DTS Sound Insulation Requirements for Walls in Class 2 Buildings

Space Type 1	**Space Type 2**	**BCA DTS Sound Insulation Requirement**	
		Airborne	**Impact**
Habitable room of a sole occupancy unit	Habitable room of adjoining sole occupancy unit	$R_w + C_{tr} \geq 50$	-
Bathroom, sanitary compartment, laundry or kitchen of a sole occupancy unit	Bathroom, sanitary compartment, laundry or kitchen of adjoining sole occupancy unit	$R_w + C_{tr} \geq 50$	-
Habitable room of a sole occupancy unit other than a kitchen	Bathroom, sanitary compartment, laundry or kitchen of adjoining sole occupancy unit	$R_w + C_{tr} \geq 50$	Discontinuous construction
Sole occupancy unit (any room)	Stairway, public corridor, public lobby or the like, or parts of a different classification	$R_w \geq 50$	-
Sole occupancy unit (any room)	Plant room or lift shaft	$R_w \geq 50$	Discontinuous construction

Discontinuous construction means a wall having a minimum 20 mm cavity between two separate leaves of the wall construction.

For masonry, where wall ties are required to connect leaves, the ties are to be of the resilient type.

For other than masonry, there is to be no mechanical linkage between leaves except at the periphery.

4.4.2 Sound Insulation DTS Provisions of Floor / Ceiling Assemblies

A floor /ceiling assembly in a Class 2 building must provide insulation against the transmission of airborne and impact generated sound sufficient to prevent illness or loss of amenity to the occupants.

The following table presents the minimum BCA 'Deemed to Satisfy' requirements:

Table 6 BCA DTS Requirements for Floor / Ceiling Assemblies in Class 2 Buildings

Space Type 1	**Space Type 2**	**BCA DTS Sound Insulation Requirement**	
		Airborne	**Impact**
Sole occupancy unit (any room)	Adjoining sole occupancy unit (any room)	$R_w + C_{tr} \geq 50$	$L_{n,w} \leq 62$
Sole occupancy unit (any room)	Plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification	$R_w + C_{tr} \geq 50$	$L_{n,w} \leq 62$

5 Existing Noise Levels

Audiometric and Acoustic Services undertook environmental noise logging from Monday 17th February 2025 until Friday 21st February 2025 to establish effective noise levels that would be received at the project site.

A noise logger was installed in line with the most affected proposed facade (MP 1) of the project site as per Figure 2 to measure noise levels from existing traffic noise sources that would be received at the proposed dwellings.

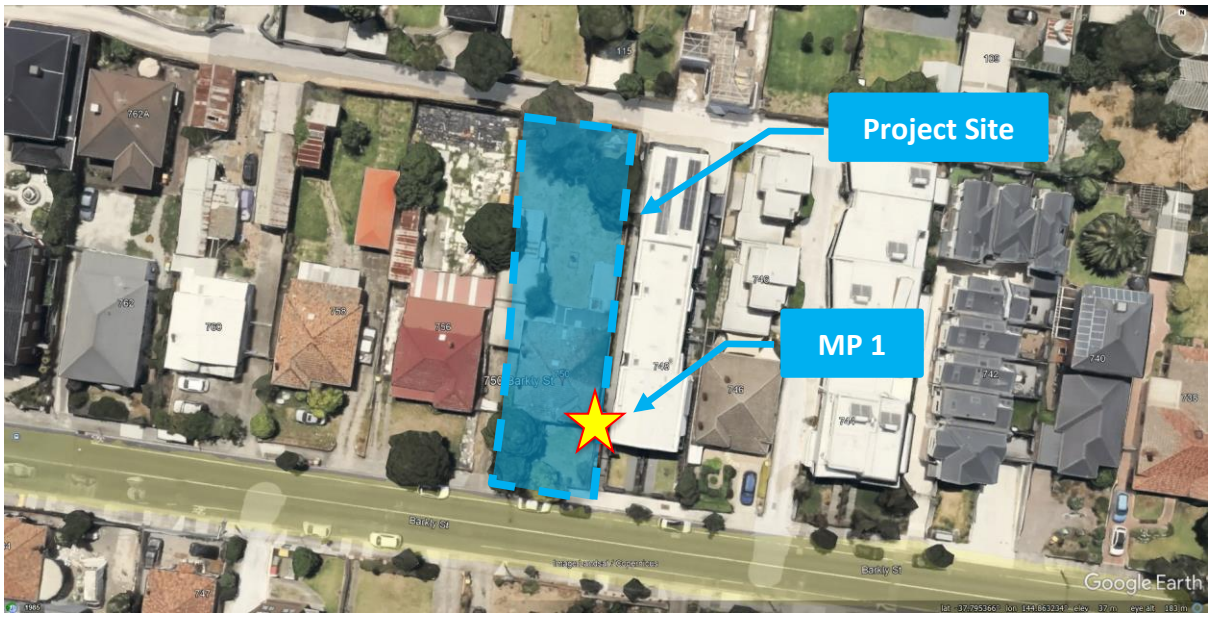

Figure 2 Location of Noise Loggers (Image Source: Google Maps 2025)

5.1 Traffic Noise Levels Received at Most Affected Proposed Facade

Table 7 presents the unadjusted noise levels measured from the logging device at 1hr intervals located at the existing facade.

Table 7 Noise Levels from Logging Device at MP1

Date	Average $L_{A10(18hr)}$ (dB)	Average $L_{Aeq(16hour)}$ (dB)	Average $L_{Aeq(8hour)}$ (dB)
Monday, 17 February 2025			47.8
Tuesday, 18 February 2025	59.6	57.9	50.9
Wednesday, 19 February 2025	59.9	57.6	51.8
Thursday, 20 February 2025	59.0	56.3	48.9
Average	59.5	57.3	50.2
10year Increase	+0.3	+0.3	+0.3
Total	60	58	51

*Noise levels have been edited for any adverse weather.

No façade adjustment required.

5.1.1 Effective Noise Levels

The effective noise level at the proposed facade of the development has been calculated to be L_{Aeq} = 58 dB for the day period and L_{Aeq} = 51 dB for the night period.

6 Nominated Standard Construction Details

The following construction is taken for the proposed dwellings at the project site.

6.1 External Wall Construction

External wall construction for the habitable rooms of dwellings is understood to be undetermined at this stage but taken to be brick veneer on the ground floor and lightweight construction on the first floor. Therefore, the recommended construction options will be provided in Section 7.

6.2 Roofing

The roof construction is taken to be metal deck roofing with insulation taken to be of min R3.0 fibrous batts and Bradford Anticon 60 MD insulation over battens, with internal lining of standard 10 mm plasterboard.

This system is calculated to achieve $R_w > 41$.

6.3 Glazing

Double glazing is taken to be used in all living and bedroom areas. This is taken to be a minimum 4 – 10 - 4 mm and achieve a minimum $R_w = 27$.

Other non-habitable rooms are not included in the assessment unless the bedroom includes an ensuite with an external window or similar.

6.4 Doors

Doors are taken to provide a comparable sound insulation to the glazing specified. Drop seals and perimeter acoustic seals are anticipated.

6.5 Ventilation

To be designed not to de-rate the overall performance of the building façade.

7 Minimum Required Attenuation

The building components used in this situation must attenuate the external traffic noise to achieve the indoor design noise levels.

Table 8 shows the minimum required R_w ratings calculated (in dB) for the building façade components for the differing rooms of the most affected proposed dwelling. In the Standard Construction column, the comment "Improve" implies that components with higher attenuation than those specified will be required to achieve the desired attenuation. Construction assemblies for the dwelling should follow the recommendations in Section 8.

Table 8 Rw Summary Sheet

Room	Construction Item	R_w Rating	Standard Construction
DW 1 Living / Dining / Kitchen	Roof / Ceiling	31	OK
	Glazing and Door	28	Improve
	External Walls	30	OK
DW 2 Bed 1	Roof / Ceiling	29	OK
	Glazing	26	OK
	External Walls	30	OK
DW 2 Bed 2	Roof / Ceiling	26	OK
	Glazing	18	OK
	External Walls	19	OK
DW 1 Bed 1	Roof / Ceiling	31	OK
	Glazing	26	Improve
	External Walls	32	OK
DW 1 Bed 2	Roof / Ceiling	30	OK
	Glazing	22	Improve
	External Walls	29	OK
DW 2 Living / Kitchen / Dining	Roof / Ceiling	34	OK
	Glazing	29	Improve
	External Walls	30	OK

8 Recommendations

Attenuation requirements have been calculated as per Table 8 for the most affected rooms of the dwellings.

The incidence of traffic noise is moderate to low at the proposed façade of the most affected dwelling. Therefore, construction as follows will be suitable to attenuate all relevant external noise from traffic for all dwellings.

The following subsections provide the acoustic requirements.

8.1 External Walls

The following external walls will be sufficient to attenuate the effective noise level.

Table 9 External Wall Construction

Room	Recommended Construction
First Floor Dwelling 1 & 2	▪ Standard Hebel Powerpanel or minimum 9 mm cement board construction with 90 mm stud, R1.5 insulation and standard 10 mm thick plasterboard. Or any other system achieving R_w > 35 dB. ▪
Ground Floor Dwelling 1 & 2	▪ External wall construction is understood to be standard brickwork construction with an air cavity, 10 mm plasterboard lining and R1.5 insulation within the 90 mm studwork. ▪ Or any other system achieving R_w > 35 dB.

8.2 Roof and Ceiling

Standard metal deck roofing with insulation of min R3.0 fibrous batts and Bradford Anticon 60 MD insulation over battens, with internal lining of standard 10 mm plasterboard will be adequate to meet the requirements for all rooms.

8.3 Glazing

Double glazing is understood to be used in all living and bedroom areas. Glazing must achieve the minimum Rw value presented in the glazing schedule (Table 10).

It is recommended that ensuites receive the same treatments as the bedroom they serve.

The R_w rating for glazing is particularly dependent on frame material and quality of construction as well as effective resilient mounting of the glass, plus the mass of the glass and the size of the air gap in the case of double glazing. Technically an R_w rating for a glazed window or door is specific to a product which has been through a test process to obtain the R_w rating. Extrapolation of an R_w value to other products in the range is often done but is not advised, because conditions in both manufacturing and installation will vary from ideal laboratory conditions.

The main features required for good acoustic performance are an adequate glass section, a good resilient seal between glass and frame, and between fixed and openable frames. Good acoustic performance is achieved by either maximising the airgap between panes (where double glazing is used) or using panes of greater than standard thickness. In addition, good quality frames with adequate mass is necessary. To gain the benefit of the rating, care should be taken with installation. All windows must be flush fitting with the walls and any gaps filled with a suitable material, such as rubber strip or non-setting mastic.

Table 10 Glazing Schedule

Room	Minimum Required Rw	Typical Construction
DW 1 Living / Dining / Kitchen	28	6 mm Single or 6 mm - 12 mm - 6 mm Double Glazed
DW 2 Bed 1	26	4 mm Single or 4 mm - 10 mm argon - 4 mm Double Glazed
DW 2 Bed 2	18	4 mm Single or 4 mm - 10 mm argon - 4 mm Double Glazed
DW 1 Bed 1	26	4 mm Single or 4 mm - 10 mm argon - 4 mm Double Glazed
DW 1 Bed 2	22	4 mm Single or 4 mm - 10 mm argon - 4 mm Double Glazed
DW 2 Living / Kitchen / Dining	29	6 mm Single or 6 mm - 12 mm - 6 mm Double Glazed

8.4 Ventilation

To meet attenuation requirements, all doors and windows would theoretically have to remain closed, so cooling systems such as evaporative coolers are not suited to noise exposed houses.

A split system air conditioner would be suited, if required. Note that these installations must comply with the EPA's Environment Protection Regulations 2021 (State of Victoria, 2021). It is advisable to locate condensers away from other dwellings.

A forced mechanical ventilation system is not necessary.

Any Whirly Birds should not be situated over any of habitable rooms.

8.5 Car Stacker

It is understood that the floor ceiling separating the common garage containing car stackers and Dwelling 8 is a floor / ceiling assembly separating a Sole occupancy unit (any room) from a plant room, and parts of a different classification as per Table 11.

Table 11 BCA DTS Requirements for Floor / Ceiling Assemblies in Class 2 Buildings

Space Type 1	Space Type 2	BCA DTS Sound Insulation Requirement	
		Airborne	Impact
Sole occupancy unit (any room)	Plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification	$R_w + C_{tr} \geq 50$	$L_{n,w} \leq 62$

It is understood the following criteria applies to the wall separating the common garage from Dwelling 7.

Table 12 BCA DTS Sound Insulation Requirements for Walls in Class 2 Buildings

Space Type 1	Space Type 2	BCA DTS Sound Insulation Requirement	
		Airborne	Impact
Sole occupancy unit (any room)	Stairway, public corridor, public lobby or the like, or parts of a different classification	$R_w \geq 50$	-
Sole occupancy unit (any room)	Plant room or lift shaft	$R_w \geq 50$	Discontinuous construction

The prevailing criteria is $R_w \geq 50$ with discontinuous construction.

8.5.1 Floor / Ceiling

The entire floor / ceiling area as per Figure 3should be constructed as follows:

- CSR 6322 (d) –, Minimum 150 mm thick concrete slab, clips direct fixed to slab at 600 mm centres, minimum 40 mm cavity, Rondo furring channels N129 at 600mm max centres, 14 kg, 50 mm thick Acoustigard & ceiling lining of 2 x 16mm thick Gyprock Fyrchek Plasterboard. The floor coverings shall be either Timber or Tile + 4.5 mm thick acoustic underlay, or carpet with underlay.

The system is specified to achieve $R_w + C_{tr}$ = 55 dB and Ln,w less than 62.

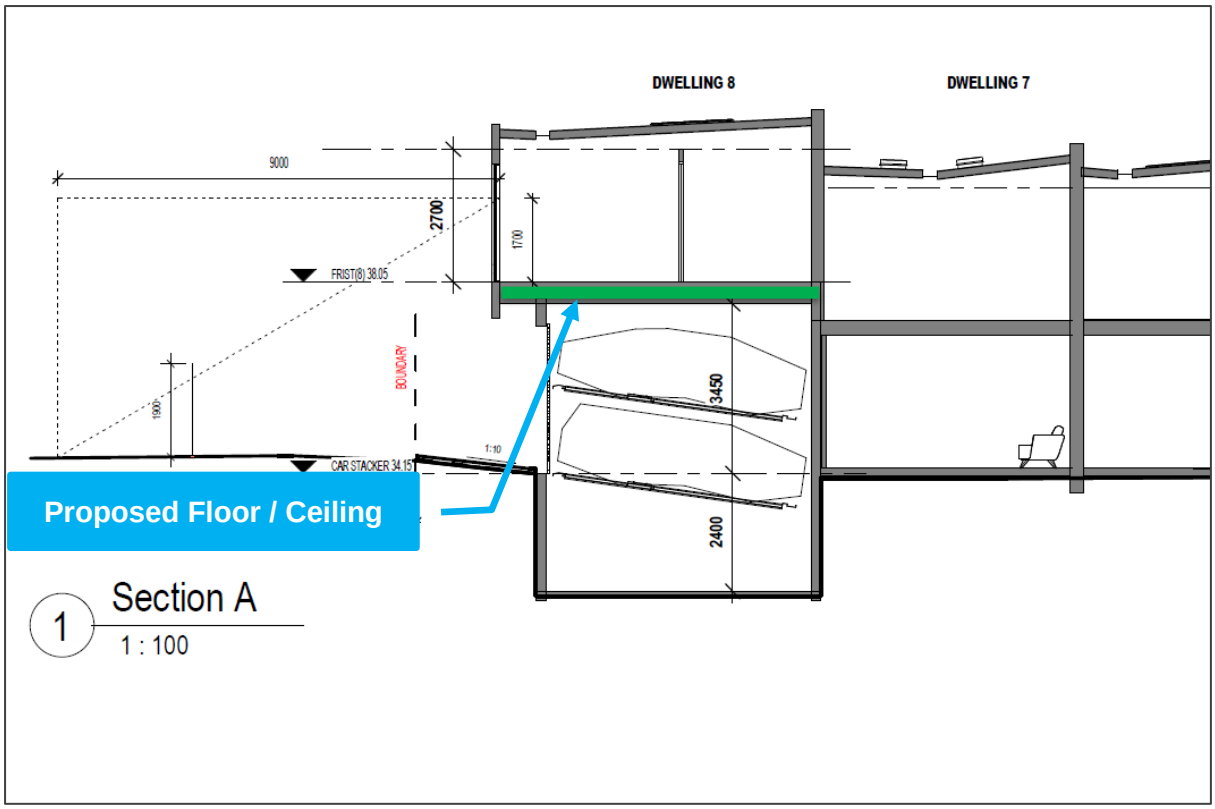

Figure 3 Floor / Ceiling (Image Source: ARC ZERO PTY LTD)

Any junctions or areas for potential flanking should be reviewed by an acoustic consultant during the design development stage.

8.5.2 Wall

The wall separating the common garage from Unit 7 as per Figure 4 is required to be constructed as per CSR 4005 (b) or any other wall type achieving a minimum R_w > 50 dB and discontinuous construction.

- CSR 4005 (b) – internal lining of 1 x 13 mm thick Gyprock Standard Plasterboard, fixed to minimum 92 mm stud depth with 90 Gold Batts 2.0 insulation within the cavity the brick, block or concrete wall should achieve a minimum Rw 45 and and be separated from the studwork by a minimum 20 mm. The concrete wall should have a lining of 1 x 6 mm CeminSeal to the garage side.Studwork should be at 600 mm maximum centres.

The system is specified to achieve R_w = 56 dB and is discontinuous providing a minimum 20 mmm gap between the stud and the concrete wall.

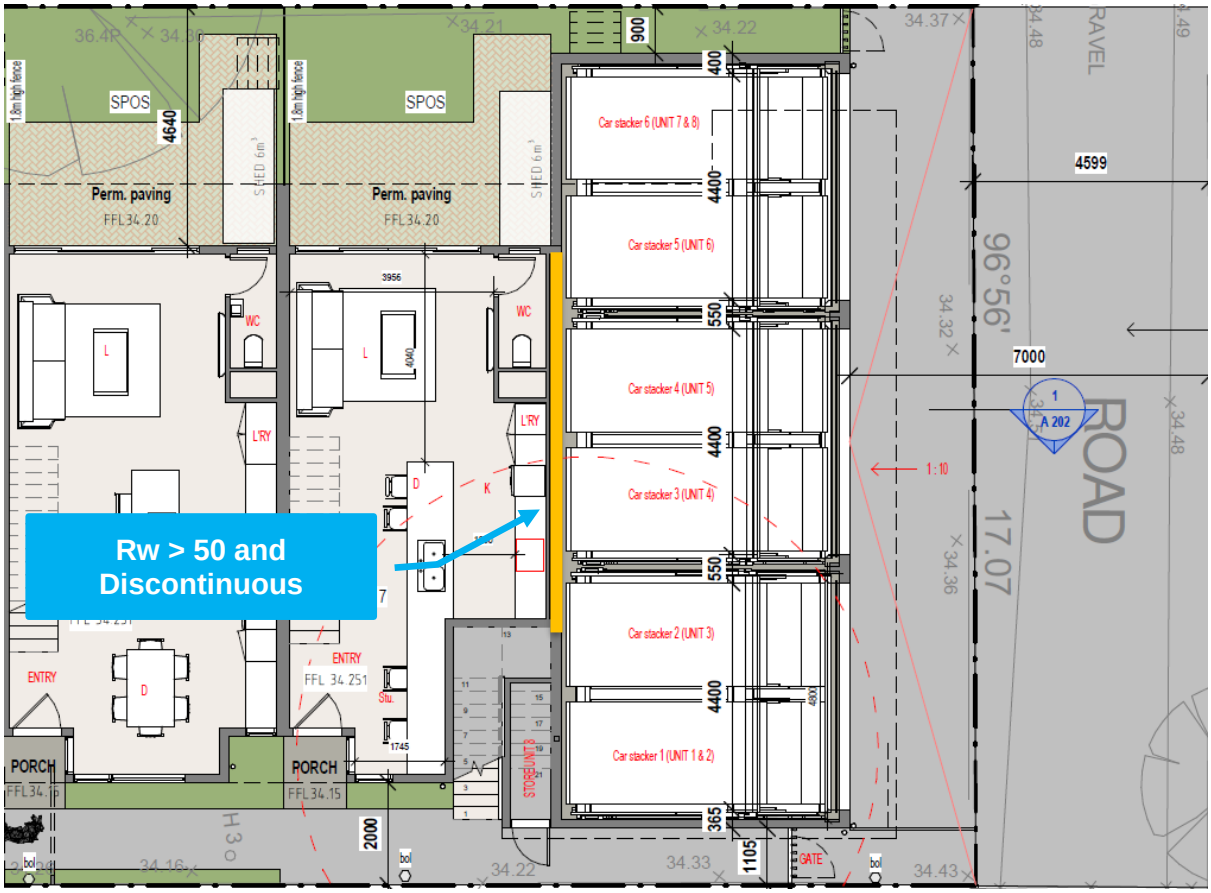

Figure 4 Dwelling 7 Wall (Image Source: ARC ZERO PTY LTD)

8.5.3 Maximum Noise Levels for the Car Stacker

The chosen car stacker should not exceed an SPL > 70 dB(Z) at 1 m or emit a L_{Amax} > 80 dB at 1 m without further acoustic assessment.

The calculation is based on 2 (double) car stackers creating a reverberant room level of 60 dB being below 30 dB(A) within an adjacent habitable room of either Unit 7 or 8.

The estimate of three car stackers is taken to be a likely worst-case scenario.

The criteria of 30 dB(A) is taken to present inaudibility based on the design levels of AS2107 presented in Table 3.

It is also recommended to isolate any plant form the wall and floor and locate any plant away from the separating tenancy wall.

9 Summary

Audiometric and Acoustic Services (A&AS) has completed an environmental acoustic assessment for a proposed 8 -unit residential development located at 750 Barkly Street, West Footscray, VIC.

Construction as per the recommendations in Section 8 is considered adequate for the noise attenuation requirements for external traffic noise intrusion.

Recommendations are provided regarding air conditioning condensers that may affect the amenity of other dwellings with the development and any existing neighbouring dwellings.

Please feel free to contact us should any additional detail be required. This applies to any parties that have legitimate access to this report.

Respectfully,

R.Feltwell
Acoustic Consultant
B.Mus

Reviewed by S. Henderson, Principal Acoustic Consultant.

10 References

Standards Australia. (1989). AS 3671:1989 Acoustics – Road Traffic Noise Intrusion – Building Siting and Construction.

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

State of Victoria. (2017). Environment Protection Act 2017. *(Authorised Version No. 005 incorporating amendments as at 1 July 2021), No. 51 of 2017*. Victoria.

State of Victoria. (2021). Environmental Protection Regulations S.R. No. 47/2021. Victoria, Australia: EPA.

Appendix A Definitions of Terminology

decibel	Unit usually used to define sound pressure level relative to a reference pressure. $dB = 20 \log_{10} \left(\frac{P}{Pref} \right)$ 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 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 115 dB Limit of sound permitted in industry 120 dB Deafening
(A)	Reference to particular weighting network within a Sound Level Meter which modifies the linear response. 'A' weighting is designed to approximate the response of the human ear.
(C)	Reference to a weighting network within a Sound Level Meter. Modifies the Linear response only slightly on the lower frequency range.
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	The root-mean-square values of the pressure fluctuations above and below atmospheric pressure caused by the passage of a sound wave, usually expressed in decibels (re 20 µ Pa)
Free Field	In acoustics a free field is a measurement area not subject to significant reflection of acoustical energy. A free field measurement is typically not closer than 3.5 metres to any large flat object (other than the ground) such as a fence or wall or inside an anechoic chamber.
Effective Noise Level	The level of noise emitted from the commercial, industrial or trade premises ($L_{Aeq,30min}$), adjusted if appropriate for character and duration. [Unit: dB(A)]
Fast - F	Dynamic characteristic - time averaging constant is 125m sec.
$L_{90,T}$	The noise level exceeded for 90% of a measurement period. Commonly accepted as the natural Background Noise Level as an A-weighted value.
Ambient Noise	The ambient noise level at a particular location is the overall environmental noise level caused by all noise sources in the area, both near and far, including all forms of traffic, industry, lawnmowers, wind in foliage, insects, animals, etc. Usually assessed as an energy average over a set time period 'T' (L_{Aeq}, T).

$L_{eq,T}$	Equivalent Continuous Sound Level. This is calculated on the basis of the average of the Sound Pressure Level (acoustic energy) over a period of time and is expressed in decibels. Tthis can be thought of as the time average sound pressure level. [Unit: dB / dB(A)]
$L_{Aeq,T}$	The 'A' weighted Equivalent Continuous Sound Level.
$L_{Aeq(8hr)}$	The L_{Aeq} for the night period between 10pm and 6am. Typically applied to internal noise intrusion regarding transport noise.
$L_{Aeq(16hr)}$	The L_{Aeq} for the day period between 6am and 10 pm. Typically applied to internal noise intrusion regarding transport noise.
L_{eff}	See 'Effective Noise Level'.
Octave band	Division of the frequency range used for the purposes of acoustic design and noise assessment, allowing for a more targeted control of sound as it varies with frequency. Noise is measured in octave bands using frequency filters as specified in Australian standard AS IEC 61260.1:2019, Electroacoustics - Octave-band and Fractional-octave-band Filters.
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. A higher R_w value indicates better airborne sound insulation. [Unit: dB]
Transmission Loss	The amount in decibels by which a random sound is reduced as it passes through a sound barrier. A method for the measurement of airborne Sound Transmission Loss of a building partition is given in Australian Standard AS1191 - 2002.
Airborne noise	Airborne noise comes from common sound sources such as voices, TVs and radios.
Sound Attenuation	A reduction of sound due to distance, enclosure or some other devise. If an enclosure is placed around a machine, or an attenuator (muffler or silencer) is fitted to a duct, the noise emission is reduced or attenuated. An enclosure that attenuates the noise level by 20 dB reduces the sound energy by one hundred times.

Appendix B Instrumentation

Equipment

Convergence	Sound Sentry NSRT Type 1 Serial No. CltWr%04W1+1AjPwy+BRvD
NTi Audio	Type 1 Sound Level Meter NTI XL2-TA Device Info: XL2, SNo. A2A-16630-E0, FW3.11 Type Approved Mic Type: NTi Audio M2230, SN. 8481 NATA Laboratory calibration due 23rd October 2025
Bruel & Kjaer	Sound Level Calibrator Serial No. 1 441 408 NATA Laboratory calibration due 22nd October 2025.

The instrument was check calibrated before and after the measurements. No significant change was found to have occurred.