187 Bourke Street, Goulburn

Shoptop Housing – Traffic Noise Assessment

Goulburn Commercial Group

Report number: 250398 - 187 Bourke St, Goulburn - Traffic Noise Intrusion Assessment - R0
Date: 4 July 2025
Version: For Information

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DOCUMENT CONTROL

Project Name	187 Bourke Street, Goulburn
Project Number	250398
Report Reference	2250398 - 187 Bourke St, Goulburn - Traffic Noise Intrusion Assessment - R0
Client:	Goulburn Commercial Group

Revision	Description	Reference	Date	Prepared	Checked	Authorised
0	For Information	250398 - 187 Bourke St, Goulburn - Traffic Noise Intrusion Assessment - R0	4 July 2025	Alicia Leffler	Ben White	Ben White

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1 INTRODUCTION

Pulse White Noise Acoustics (PWNA) has been engaged to undertake an acoustic assessment of traffic noise intrusion into a proposed shop top, dual occupancy housing to be located at 187 Bourke St, 2580 NSW. The property is formally described as Lot 5/DP 778947.

This report provides an investigation into the existing noise environment, discusses the findings, and provides architectural treatments recommendations to achieve compliance with the assessment criteria.

A glossary of acoustic terminology used in this report, is included in Appendix A.

1.1 Site Description

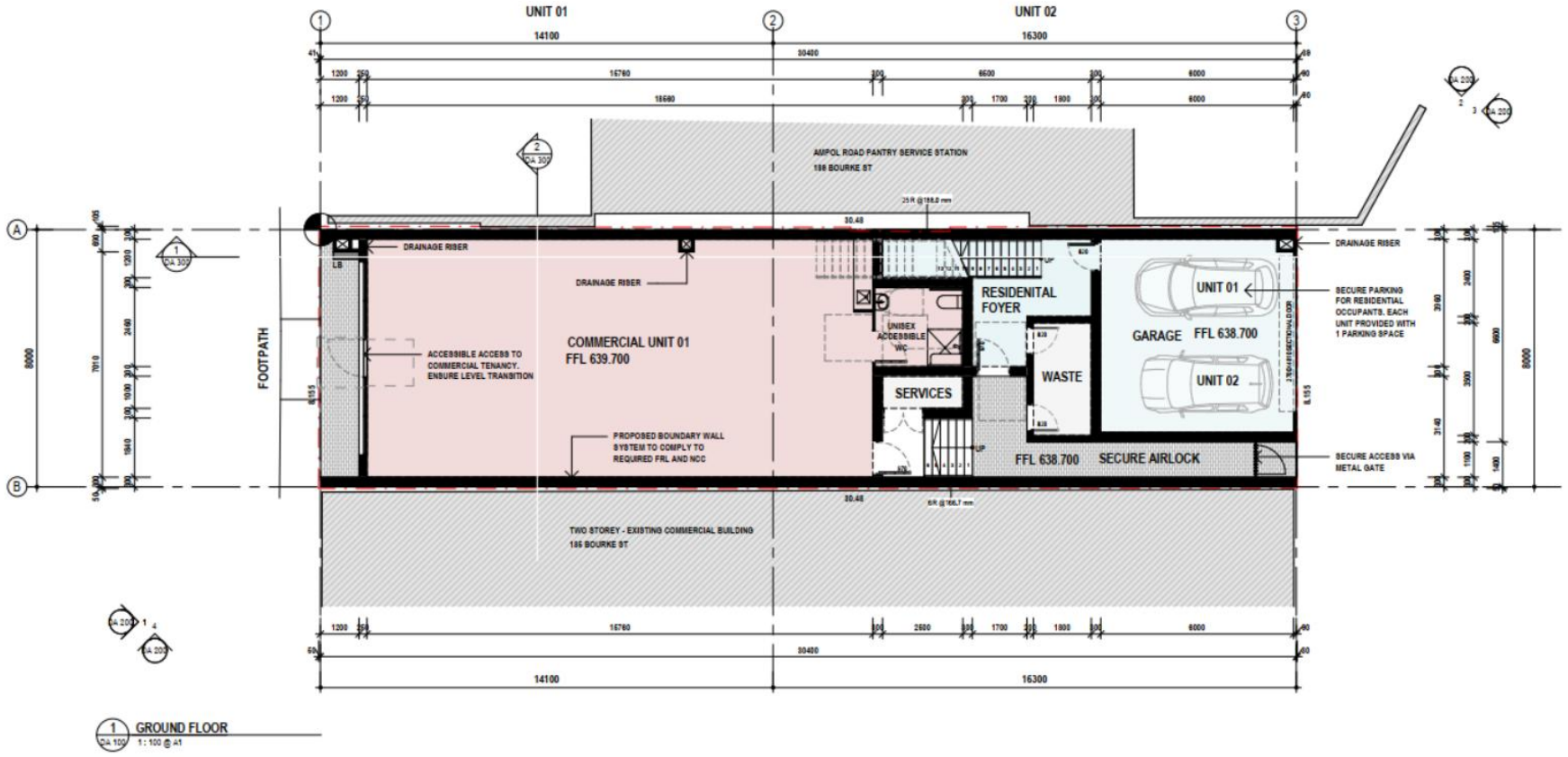
The proposed shop top housing is to be located at 187 Bourke Street Goulburn, NSW.

The proposed development is located centrally within the Goulburn metropolitan area, with Bourke Street to the Norst West of the site. No significant barriers are positioned between the project site and the road (i.e. the proposed development will be directly exposed to traffic noise from Bourke Street).

Architectural plans of the proposed development have been provided by *Kensit* and are dated April 2025 and details of the project are included in Figure 1 below and the project site location is included in Figure 2.

The site is located on a roadway which is not defined as a busy road which carries over 20,000 AADT based on the NSW EPA Road Traffic maps.

Figure 1 Project Architectural Details



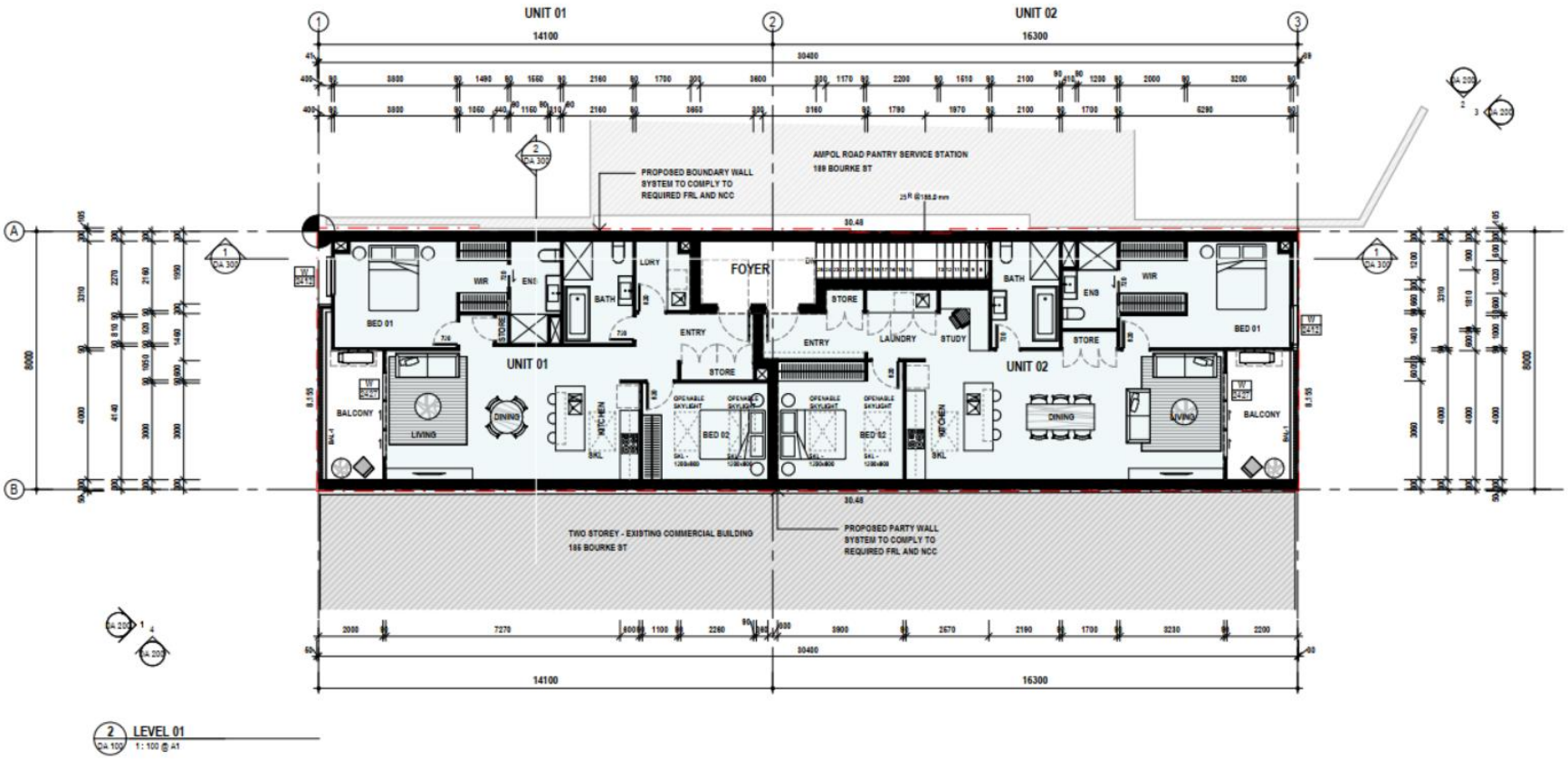

UNIT 01
14100
UNIT 02
16300
30400
AMPOL ROAD PANTRY SERVICE STATION
189 BOURKE ST
PROPOSED BOUNDARY WALL SYSTEM TO COMPLY TO REQUIRED FRL AND NCC
FOYER
ENTRY
STORE
LAUNDRY
STUDY
BATH
WIR
ENS
BED 01
BED 02
KITCHEN
DINING
LIVING
BALCONY
SKL
OPENABLE SKYLIGHT
UNIT 01
UNIT 02
TWO STOREY - EXISTING COMMERCIAL BUILDING
185 BOURKE ST
PROPOSED PARTY WALL SYSTEM TO COMPLY TO REQUIRED FRL AND NCC
30.48
8000
14100
16300
2 LEVEL 01
DA 100 1 : 100 @ A1

Figure 2 Project Site Location

2 NOISE INTRUSION ASSESSMENT CRITERIA

Details of the project internal noise level requirements are included in the following sections.

2.1 State Government State Environmental Planning Policy (Transport and Infrastructure) 2021

Section – 2.120 Impact of road noise or vibration on non-road developments states the following:

2.120 Impact of road noise or vibration on non-road development

1) This clause applies to development for any of the following purposes that is on land in or adjacent to the road corridor for a freeway, a tollway or a transitway or any other road with an annual average daily traffic volume of more than 20,000 vehicles (based on the traffic volume data published on the website of RMS) and that the consent authority considers is likely to be adversely affected by road noise or vibration—

- *Residential accommodation,*
- *A place of public worship,*
- *A hospital,*
- *An educational establishment or centre-based childcare facility.*

2) Before determining a development application for development to which this clause applies, the consent authority must take into consideration any guidelines that are issued by the Secretary for the purposes of this clause and published in the Gazette.

3) If the development is for the purposes of residential accommodation, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded—

- *In any bedroom in the residential accommodation—35 dB(A) at any time between 10 pm and 7 am,*
- *Anywhere else in the residential accommodation (other than a garage, kitchen, bathroom or hallway)—40 dB(A) at any time.*

4) In this clause, freeway, tollway and transitway have the same meanings as they have in the Roads Act 1993.

2.1.1 NSW Department of Planning and Environmental Development Near Rail Corridors and Busy Roads – Interim Guideline 2008

NSW Department of Planning's document DNRCBR adopts the same internal noise criteria outlined in the SEPP infrastructure identified above. Table 3.1 from the DNRCBR required the following airborne noise levels from the operation of the adjacent road network.

Figure 3 Extract – DBRCBR – Table 3.1

Table 3.1: Noise criteria

Residential Buildings			
Type of occupancy		Noise Level dBA	Applicable time period
Sleeping areas (bedroom)		35	Night 10 pm to 7 am
Other habitable rooms (excl. garages, kitchens, bathrooms & hallways)		40	At any time
Non–Residential Buildings			
Type of occupancy			Recommended Max Level dBA
Educational Institutions including child care centres			40
Places of Worship			40
Hospitals	- Wards		35
	- Other noise sensitive areas		45

Note: airborne noise is calculated as L_{eq} (9h) (night) and L_{eq} (15h)(day). Groundborne noise is calculated as L_{max} (slow) for 95% of rail pass-by events.

If internal noise levels with windows or doors open exceed the criteria by more than 10 dB(A), the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also meet the ventilation requirements of the National Construction Code 2014 (NCC).

Where windows must be kept closed, the adopted ventilation systems must meet the requirements of the national Construction Code and Australian Standard 1668 – The use of ventilation and air conditioning in buildings.

2.2 Project Requirements

Based on the details included in the sections above the project internal noise level requirements are included in the following table.

Table 1 Project Internal Noise Level Requirements

Room Type	Project Noise Level Requirement
Residential – Living Areas	35 dB(A) $L_{Aeq(9\ hours)}$ (10pm to 7am)
Residential – Bedrooms	40 dB(A) $L_{Aeq(15\ hours)}$ (7am to 10pm)
Commercial areas	45 dB(A) $L_{Aeq(15\ hours)}$ (7am to 10pm)

3 SITE ACOUSTIC SURVEY

Details of the site survey undertaken at the site are included in this section of the report.

3.1 Attended Noise Monitoring

An attended noise survey was conducted on 4th of July 2025 between 2pm and 3pm at the site facing Bourke Street, outside the proposed development at 187 Bourke Street, Goulburn. The results of the attended noise measurement are presented in Table 2 below.

The attended noise measurements were conducted using a Brüel & Kjær Type 2270 sound level meter (serial number 2679267). Calibration of the sound level meter was checked prior to and following the measurements using a Brüel & Kjær Type 4231 sound calibrator (serial number 3009148). The calibrator emitted a calibration tone of 94 dB at 1 KHz. The drift in calibration did not exceed ±0.5 dB. All equipment carries appropriate and current NATA (or manufacturer) calibration certificates.

Table 2 Measured Ambient Noise levels (L_{Aeq})

Measurement Location	Measured Noise Levels dBA	
	L_{A90}[2] (dBA)	L_{Aeq}[3] (dBA)
187 Bourke Street, Goulburn	42	58

Note 1: The L_{A90} noise level is representative of the "average minimum background sound level" (in the absence of the source under consideration), or simply the background level.

Note 2: The L_{Aeq} is the energy average sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.

4 ACOUSTIC RECOMMENDATIONS

In order to achieve the interior noise levels nominated in Section 2, the recommended building envelope constructions are detailed below.

Façade construction details are indicative only, and a detailed review of the façade constructions should be conducted during the design phase of the project and provided as part of the construction certificate documentation.

The recommendations which are outlined below are based on the following assumptions. In the event the assumptions outlined below are altered, verification from a qualified acoustic consultant is required to ensure the recommendations outlined in the following sections are still valid.

- Bedrooms have a soft floor finish and a resultant reverberation time within the space of 0.6 seconds.
- Other living areas have a hard floor finish and a resultant reverberation time within the space of 0.8 seconds.
- Bathrooms, Ensuites, and Laundry are tiled and a resultant reverberation time within the space of 1.5 seconds.

4.1 Recommended Glazed Window / Door Construction

The recommended sound transmission loss requirements required to satisfy the specified internal noise levels outlined above are summarised in Table 3 below.

Table 3 Recommended Glazed Window/Door Construction

Façade Orientation	Occupancy Area	Minimum Glazing Requirements [1]	Indicative Construction [1]
Facing Bourke Street	Commercial Areas	Rw 28	6mm Float or Toughened
	Residential - Bedrooms	Rw 30	6.38mm Laminated
	Residential - Living Areas	Rw 30	6.38mm Laminated
All Other Orientations	Commercial Areas	Rw 28	6mm Float or Toughened
	Residential - Bedrooms	Rw 28	6mm Float or Toughened
	Residential - Living Areas	Rw 28	6mm Float or Toughened

Note 1: Acoustic performance to include the glass in frame minimum requirements.

Please note that for windows, this performance is not only subject to the final glazing selection but also to the construction of the window frame and the frame seal selection. Therefore, it is recommended that the window manufacturer should confirm that the required sound insulation can be achieved. It is anticipated that the window system should comprise Q-Lon (or equivalent) or fin seals with deep C channels as part of the window track (i.e. performance levels outlined above need to be achieved with glazed panels + frame + seals).

4.2 Recommended External Wall Constructions

For areas which are constructed from light weight external wall systems, the recommended constructions in the table below should be adopted.

Table 4 Recommended External Wall Construction

Occupancy Area	Acoustic Performance	Recommended Construction
All Areas	Rw 45	Standard light weight or masonry construction without additional acoustic upgrades.

If penetrations through any external skin are required, all gaps remaining in the penetration are to be filled with an acoustic grade sealant which provides an equal or better performance to the system being penetrated.

4.3 Recommended External Roof Constructions

Future external roofs are recommended to be constructed from a metal sheeting system; therefore, the following construction is recommended. Other light-weight roof constructions are possible.

Table 5 Recommended External Roof Construction

Occupancy Area	Acoustic Performance	Recommended Construction
All Areas	Rw 40	Standard external roof construction without additional acoustic upgrades required.

5 CONCLUSION

Pulse White Nosie Acoustics (PWNA) has conducted an assessment of traffic noise intrusion for the proposed shop top dual occupancy residential dwelling to be located at 187 Bourke Street, Goulburn, 2580 NSW.

Based on this assessment, architectural treatments have been proposed to achieve compliance with the assessment criteria, including all relevant requirements have been undertaken and the recommended acoustic treatments are included in Section 4 of this report.

For any additional information please do not hesitate to contact the person below.

Regards

Ben White
Director
Pulse White Noise Acoustics

APPENDIX A: ACOUSTIC TERMINOLOGY

The following is a brief description of the acoustic terminology used in this report.

Sound power level	The total sound emitted by a source
Sound pressure level	The amount of sound at a specified point
Decibel [dB]	The measurement unit of sound
A Weighted decibels [dB(A])	The A weighting is a frequency filter applied to measured noise levels to represent how humans hear sounds. The A-weighting filter emphasises frequencies in the speech range (between 1kHz and 4 kHz) which the human ear is most sensitive to, and places less emphasis on low frequencies at which the human ear is not so sensitive. When an overall sound level is A-weighted it is expressed in units of dB(A).
Decibel scale	The decibel scale is logarithmic in order to produce a better representation of the response of the human ear. A 3 dB increase in the sound pressure level corresponds to a doubling in the sound energy. A 10 dB increase in the sound pressure level corresponds to a perceived doubling in volume. Examples of decibel levels of common sounds are as follows:

0 dB(A)	Threshold of human hearing
30 dB(A)	A quiet country park
40 dB(A)	Whisper in a library
50 dB(A)	Open office space
70 dB(A)	Inside a car on a freeway
80 dB(A)	Outboard motor
90 dB(A)	Heavy truck pass-by
100 dB(A)	Jackhammer/Subway train
110 dB(A)	Rock Concert
115 dB(A)	Limit of sound permitted in industry
120 dB(A)	747 take off at 250 metres

Frequency [f]	The repetition rate of the cycle measured in Hertz (Hz). The frequency corresponds to the pitch of the sound. A high frequency corresponds to a high pitched sound and a low frequency to a low pitched sound.
Ambient sound	The all-encompassing sound at a point composed of sound from all sources near and far.
Equivalent continuous sound level [L_{eq}]	The constant sound level which, when occurring over the same period of time, would result in the receiver experiencing the same amount of sound energy.
Reverberation	The persistence of sound in a space after the source of that sound has been stopped (the reverberation time is the time taken for a reverberant sound field to decrease by 60 dB)
Air-borne sound	The sound emitted directly from a source into the surrounding air, such as speech, television or music
Impact sound	The sound emitted from force of one object hitting another such as footfalls and slamming cupboards.
Air-borne sound isolation	The reduction of airborne sound between two rooms.
Sound Reduction Index [R] (Sound Transmission Loss)	The ratio the sound incident on a partition to the sound transmitted by the partition.
Weighted sound reduction index [R_w]	A single figure representation of the air-borne sound insulation of a partition based upon the R values for each frequency measured in a laboratory environment.
Level difference [D]	The difference in sound pressure level between two rooms.

Normalised level difference [D_n]	The difference in sound pressure level between two rooms normalised for the absorption area of the receiving room.
Standardised level difference [D_{nT}]	The difference in sound pressure level between two rooms normalised for the reverberation time of the receiving room.
Weighted standardised level difference [$D_{nT,w}$]	A single figure representation of the air-borne sound insulation of a partition based upon the level difference. Generally used to present the performance of a partition when measured in situ on site.
C_{tr}	A value added to an R_w or $D_{nT,w}$ value to account for variations in the spectrum.
Impact sound isolation	The resistance of a floor or wall to transmit impact sound.
Impact sound pressure level [L_i]	The sound pressure level in the receiving room produced by impacts subjected to the adjacent floor or wall by a tapping machine.
Normalised impact sound pressure level [L_n]	The impact sound pressure level normalised for the absorption area of the receiving room.
Weighted normalised impact sound pressure level [$L_{n,w}$]	A single figure representation of the impact sound insulation of a floor or wall based upon the impact sound pressure level measured in a laboratory.
Weighted standardised impact sound pressure level [$L'_{nT,w}$]	A single figure representation of the impact sound insulation of a floor or wall based upon the impact sound pressure level measured in situ on site.
C_I	A value added to an L_{nW} or $L'_{nT,w}$ value to account for variations in the spectrum.
Energy Equivalent Sound Pressure Level [$L_{A,eq,T}$]	'A' weighted, energy averaged sound pressure level over the measurement period T.
Percentile Sound Pressure Level [$L_{Ax,T}$]	'A' weighted, sound pressure that is exceeded for percentile x of the measurement period T.

*Definitions of a number of terms have been adapted from Australian Standard AS1633:1985 *"Acoustics – Glossary of terms and related symbols"*