NATIONAL NOISE & VIBRATION

2-4 VIMY ST, BANKSTOWN NSW 2200

DA ACOUSTIC ASSESSMENT

MAY 2, 2025

Engineering Sciences
P (02) 9157 4090
E SALES@ENGINEERINGSCIENCES.COM.AU
WWW.NATIONALNOISE.COM.AU
ABN 23 682 260 402

Project Information

Details	
Report Title:	DA ACOUSTIC ASSESSMENT
Address:	2-4 Vimy St, Bankstown NSW 2200
Client:	JS Architects

Document Control

Reference	Issue Date	Details	Revision	Prepared	Reviewed	Authorised
J1109	May 2, 2025			MP	MP	MP

TABLE OF CONTENTS

1 INTRODUCTION

Engineering Sciences has been engaged by JS Architects to carry out a DA ACOUSTIC ASSESSMENT for the proposed residential apartment building to be located at 2-4 VIMY ST, BANKSTOWN NSW 2200. This assessment specifically addresses mechanical plant and equipment associated with the development and acoustic privacy within the apartments.

The assessment addresses acoustic privacy between habitable spaces within the development, with reference to the National Construction Code (NCC) 2022, Volume One – Section F5: Sound Transmission and Insulation. This includes the evaluation of sound transmission through walls, floors, and ceilings between sole-occupancy units and between apartments and common areas such as corridors and plant rooms. In addition, the assessment considers the potential noise emissions from external mechanical plant and equipment associated with the development. Where appropriate, recommendations have been made to ensure compliance with both internal acoustic separation requirements and external environmental noise limits, preserving the amenity of occupants and surrounding properties.

The assessment has been conducted with reference to the following key standards and guidelines:

- NSW Environment Protection Authority (EPA) – Noise Policy for Industry (NPfI), 2017
- National Construction Code (NCC) 2022, Volume One – Section F5: Sound Transmission and Insulation

This report has been prepared with reference to the architectural drawings prepared by JS Architects, summarised in Table 1.

Table 1 - Architectural Drawings

Drawing. No	Drawing Title	Revision	Date
A101	Cover Page	A	30/04/2025
A105	Perspective 04		
A106	BASIX		
A107	BASIX		
A108	Data Calculation Table		
A109	Site Analysis		
A110	Site Plan		
A111	Basement 2 Floor Plan		
A112	Basement 1 Floor Plan		
A113	Ground Floor Plan		
A114	Level 1 Floor Plan		
A115	Level 2 Floor Plan		
A116	Level 3 Floor Plan		
A117	Level 4 Floor Plan		
A118			
A119			
A120	Roof Terrace Plan		
A120A	Roof Plan		
A121	East Elevation		
A122	West Elevation		
A123	South Elevation		
A124	North Elevation		
A125	Driveway Section		
A126	Section 02		
A127	Section 03		
A128	Door Schedule		
A129	Window Schedule		

2 SITE DESCRIPTION

2.1 Project Description

The proposal involves the construction of a new residential flat building located at 2–4 Vimy Street, Bankstown NSW 2200. The development comprises a 5-storey building containing:

- Two levels of basement car parking
- One ground floor level including the main entry lobby, waste rooms, residential apartments and communal open space
- Four dedicated residential levels above, accommodating a mix of two and three-bedroom apartments
- A roof terrace providing additional communal open space and service areas

Access to the site is provided via a driveway crossover from Vimy Street, leading to the basement levels. Vehicular parking, bicycle storage, and plant/service rooms are located within the basement. The building is designed with podium and tower elements and incorporates balconies, private open spaces, and landscaped communal areas at the ground and rooftop levels.

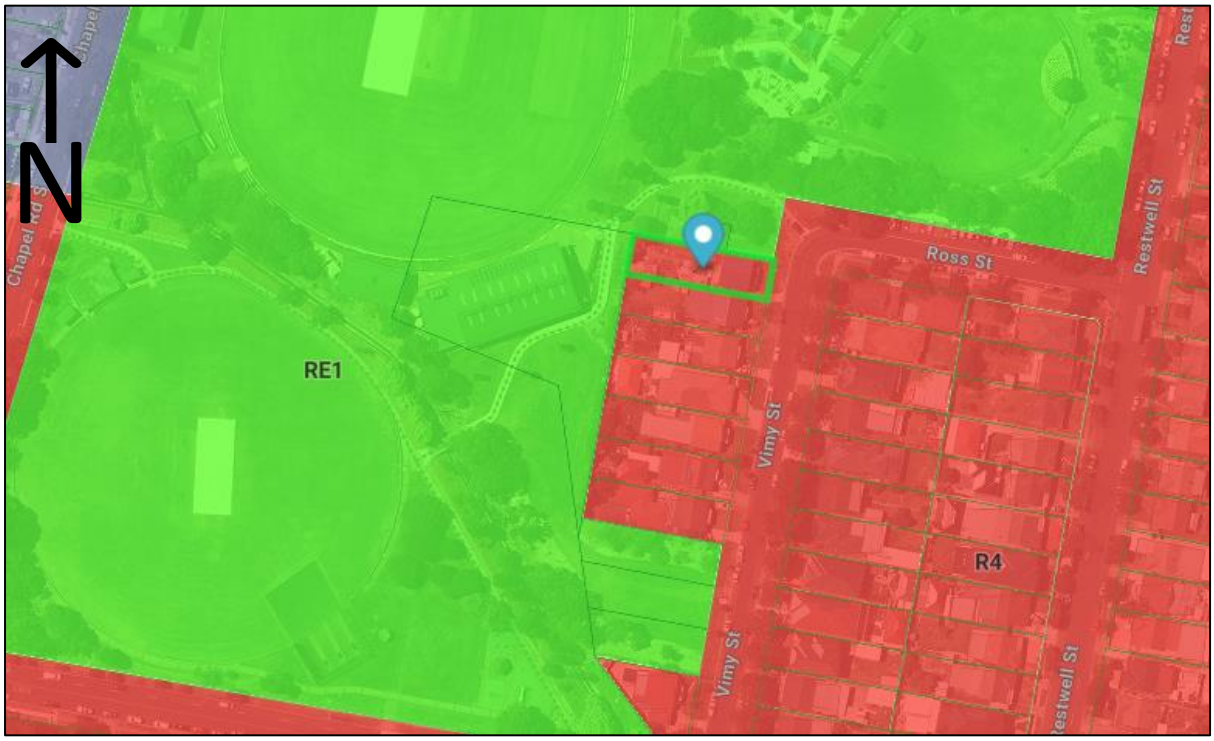
Figure 1 – Proposed Site Perspective

2.2 Project Locality

The subject site, outlined in a solid green line (Figure 2), is located within an R4 High Density Residential zone.

This zoning classifications indicate a diverse neighbourhood of residential, educational, and mixed-use areas, with infrastructure support in the vicinity.

Figure 2 -Subject Site and Land Zoning of Surrounding Areas (Mecone Mosaic)

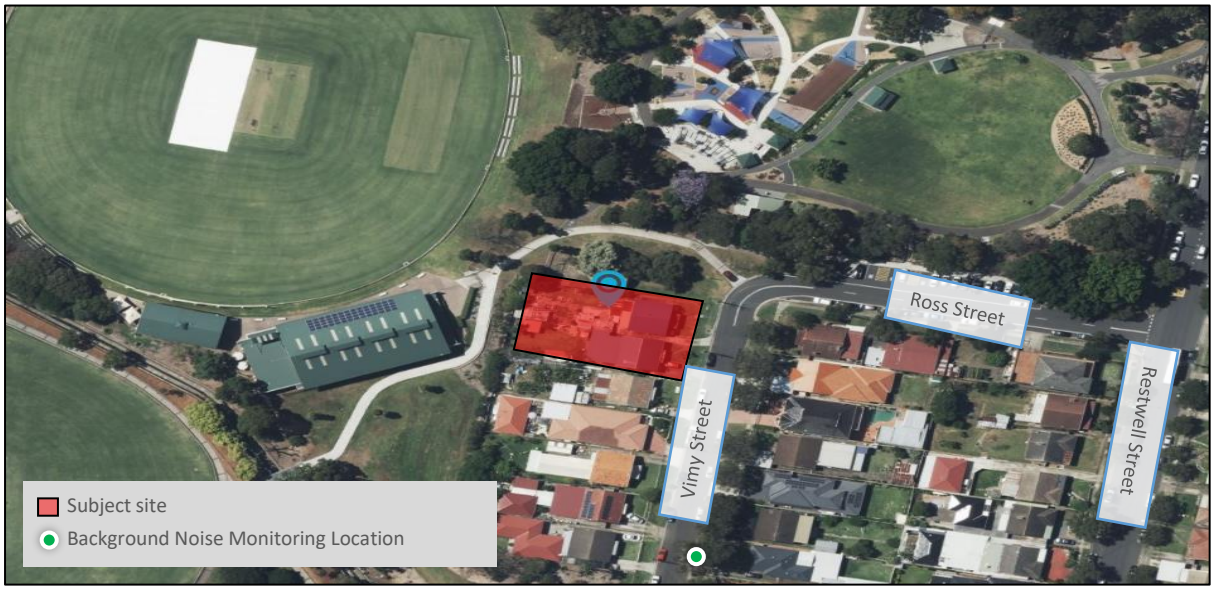


The subject site is located approximately 500 metres from the nearest railway corridor and SEPP-classified major road, and approximately 3.4 kilometres from Bankstown Airport. These separations are significantly beyond the relevant thresholds defined in Clause 2.118 and Clause 2.121 of the *State Environmental Planning Policy (Transport and Infrastructure) 2021*, which require consideration of transport and aircraft noise only when residential developments are located within 60–80 metres of a rail or road corridor, or within 20 ANEF contours of an airport. As the site is well outside these zones of influence, no detailed transport or aircraft noise intrusion assessment is required.

2.3 Nearest Noise Sensitive Receivers

The site aerial image background noise monitoring location is also included in Figure 3.

Figure 3 - Aerial imagery of Project Site (Google Earth)



3 EXISTING AMBIENT NOISE LEVELS

3.1 Sound level Descriptors

Noise level descriptors used in the assessment are explained below. For analysing noise, the following descriptors are used:

- L_{90} is known as background noise. L_{90} is a statistical sound level which describes the percentage of times a sound level is exceeded. This parameter is used to set up the allowable noise levels for intrusive noise sources since the level of disturbance of the intrusive noise source will be dependent on how audible it is above the existing noise environment.
- L_{eq} is the equivalent sound level which represents the average noise level during a measurement period. L_{eq} describes a receiver's cumulative noise exposure from all events over a specified period for compliance assessment purposes.
- L_{01} is the noise level exceeded for 1% of the measurement period. During the measurement period, the noise level is below the L_{01} level for 99% of the time
- L_{10} is the noise level exceeded for 10% of the measurement period. During the measurement period, the noise level is below the L_{10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise
- L_{Amax} is the maximum instantaneous noise level during a measurement period
- A-weighted Sound Level (instantaneous) is the most common weighting used in noise measurements, and it represents the frequency range detectable by the human ear. A-weighted is used for noise measurements and prediction purposes.

3.2 Unattended Background Noise Measurements

Long-term environmental noise monitoring was conducted to quantify the existing ambient background levels of the area. The noise logger was placed in the location shown in Figure 3.

Unattended background noise monitoring was conducted using a Ngara ARL Environmental Noise Logger set on A-weighted fast response mode and recording in 15-minute intervals. Unattended noise measurements were undertaken with the microphone located 1.5m above the natural surface level and at least 3m from buildings, fences, and other reflective surfaces.

Instrument calibration was checked before and after measurements, with variation in calibrated levels not exceeding ±0.5dB. The acoustic instrumentation employed was designed to comply with the requirements of AS IEC 61672.1—2004 – Electroacoustics—Sound level meters, Part 1: Specifications and carries current manufacturer calibration certificates.

Unattended Noise Monitoring Results are shown below in Table 2. Full unattended noise monitoring data is included in **Error! Reference source not found.**.

Table 2 – Unattended Background Noise Monitoring Results

Unattended Measurement Location	Date	Measured Background Noise Level, L_{90} dB(A)		
		Day (7am – 6pm)	Evening (6pm – 10pm)	Night (10pm – 7am)
9 VIMY STREET BANKSTOWN NSW 2200	Wednesday, 23 April 2025	53	47	39
	Thursday, 24 April 2025	46	47	44
	Friday, 25 April 2025	52	47	43
	Saturday, 26 April 2025	52	49	42

	Sunday, 27 April 2025	52	50	42
	Monday, 28 April 2025	51	51	42
	Tuesday, 29 April 2025	51	47	41
	Overall Background Noise Level	**52**	**48**	**42**
Note:	- Long-term background measurements were taken as unaffected by adverse meteorological conditions including abnormal wind conditions above 5ms^{-1} or any precipitation.			

4 NOISE EMISSION CRITERIA

4.1 City of Canterbury Bankstown - Development Control Plan 2023

In the absence of defined noise emission criteria for mechanical plant and building services within the City of Canterbury Bankstown Development Control Plan 2023, this assessment adopts the methodology and noise criteria outlined in the NSW EPA Noise Policy for Industry (NPfI, 2017). The NPfI provides a recognised framework for assessing intrusive and amenity-based noise impacts from industrial and commercial sources on residential receivers and is considered the most appropriate guideline for this development context.

4.2 NSW EPA Noise Policy for Industry 2017

Noise sources covered by this code will be operational noise, including noise from mechanical plant and equipment. The *EPA Noise Policy for Industry (NPfI) 2017* has developed a method for determination of a Project Noise Trigger Level, such that exceedances of the trigger level require a management response. The Project Noise Trigger Level is determined by the most stringent of the Intrusiveness and Amenity Criteria.

4.2.1 Project Intrusiveness Criteria

The intrusiveness guideline is intended to limit the degree of change that a new noise source introduces to an existing environment for residential receivers only. It requires to measure the noise emissions from a source (using the L_{Aeq} descriptor), measured over a 15-minute period, and ensure it does not exceed the Rating Background Level (RBL) by more than 5dB. The resultant Project Intrusiveness Criterion is stated in Table 3.

Table 3 – Project Intrusiveness Criterion (NPfI)

Location	Period	Measured RBL, $L_{90,period}$ dB(A)	Project Intrusiveness Criterion (RBL +5dB), $L_{eq,15min}$ dB(A)
Residential	Day	52	57
	Evening	48	53
	Night	42	47

4.2.2 Project Amenity Criteria

A project amenity criterion is determined based on the land use in the area to limit the ambient noise level within an area to a level that is consistent with the general environment, categorised as rural, urban or suburban. The subject site is classified as urban in accordance with the criteria established in Table 2.3 of the NPfI 2017 policy documentation.

4.2.3 Project Amenity Time Correction

Under the NPfI, the assessable L_{Aeq} is determined over a 15-minute period for the project intrusiveness noise level and over an assessment period (day, evening and night) for the project amenity noise level. Under section 2.2 of the NPfI, the assessable L_{Aeq} is determined over a 15-minute period for the project

intrusiveness noise level and over an assessment period (day, evening and night) for the project amenity noise level. This leads to the situation where, because of the different averaging periods, the same numerical value does not necessarily represent the same amount of noise heard by a person for different time periods. To standardise the time periods for the intrusiveness and amenity noise levels, the following correction applicable under the NPfI has been adopted:

- **ANL $L_{Aeq,15min}$ will be taken to be equal to RANL L_{Aeq}, period + 3 decibels (dB).**

The established amenity criteria for the project has been established based on the EPA's NPfI Section 2.2 and 2.4 project corrections made to the Recommended Amenity Noise Levels (RANL), as shown in Table 4 below.

Table 4 – Amenity Noise Criterion (NPfI)

Receiver	Period	Recommended Amenity Noise Level (ANL), $L_{eq,period}$ dB(A)	Project Amenity Criterion (ANL-5dB + 3dB), $L_{eq,period}$ dB(A)
Residential - Urban	Day	60	58
	Evening	50	48
	Night	45	43
Note:	Assessment Period is defined in accordance with the NPfI as: Day: - 7 am to 6 pm Monday to Saturday or - 8 am to 6 pm on Sundays and public holidays Evening: - 6 pm to 10 pm Night: - All other times		

4.3 Resultant Criteria

Following a review of the relevant noise regulations and standards in this Section, the resultant criteria applicable to this project have been established and presented in the Table below. These criteria are tailored to ensure that all operational noise levels meet the stipulated guidelines for environmental noise control.

Table 5 – Project Noise Trigger Levels (PNTLs)

Receiver	Period	Project Noise Trigger Levels, $L_{eq,15min}$ dB(A)
Residential	Day	57
	Evening	48
	Night	43

5 NOISE EMISSION REQUIREMENTS

At the time of writing this report, detailed mechanical design plans (including equipment specifications, locations, and acoustic treatment) had not been provided. This level of design information is typically finalised and submitted at the Construction Certificate (CC) stage. A detailed mechanical noise emission assessment should be undertaken once equipment selections and layouts are confirmed, with reference to the criteria and methodology established within this report to ensure compliance with applicable noise limits and to protect the acoustic amenity of surrounding receivers.

6 ACOUSTIC DESIGN ASSESSMENT

This section provides preliminary acoustic design guidance based on the architectural layout and the requirements of Section F5 of the National Construction Code (NCC) 2022, Volume One. The design aims to address acoustic privacy between sole-occupancy units (SOUs) and between habitable rooms and service/common areas.

6.1 Walls

Walls separating sole-occupancy units (SOUs) must comply with the acoustic performance requirements of NCC 2022 Volume One – Section F5.5, which mandates:

- Rw + Ctr not less than 50 for walls between adjoining SOUs.

To achieve this, the following construction specification is recommended:

Recommended Wall Construction:

- Discontinuous double-stud wall system, comprising:
  - Two independent 64–92mm steel studs, separated by a 20–50mm gap (discontinuous frame);
  - Two layers of 13mm acoustic-grade plasterboard (e.g. Gyprock Aquachek, CSR Fyrchek) to each face;
  - 75mm minimum glasswool or polyester insulation (min. 14 kg/m³ density) in the cavity.

Key Design Considerations:

- Wall junctions at floors, ceilings, and external facades should be sealed with acoustic mastic or compressible backing rod.
- Where walls terminate at concrete slabs, ensure full slab contact with no gaps or cavities.
- Avoid installation of mirrored wall-mounted fixtures (e.g. TVs, cupboards, power points) on both sides of the wall.
- Service penetrations (e.g., GPOs, plumbing) should be offset or sealed with acoustic putty pads if unavoidable.

6.2 Floors

Floor and ceiling systems separating sole-occupancy units (SOUs) are required to comply with Section F5.4 of the NCC 2022, Volume One, which specifies:

- Airborne sound insulation: minimum Rw + Ctr ≥ 50
- Impact sound insulation: maximum Ln,w ≤ 62

These requirements apply to habitable floor slabs (e.g., bedroom over bedroom, or living area over bedroom) between vertically stacked apartments.

Recommended Floor/Ceiling Construction:

- Concrete slab: minimum 150mm thick reinforced concrete;
- Acoustic underlay: if using hard floor finishes (e.g. tile, engineered timber, vinyl plank), include a resilient acoustic underlay rated to achieve Ln,w ≤ 62 (e.g., Regupol 4515, Acoustica AngelStep, or equivalent);
- Hybrid flooring does not require additional underlay.
- Ceiling system (optional but beneficial):
  - 13mm plasterboard on resilient furring channels;
  - 75mm glasswool or polyester insulation batts in ceiling cavity.

Wet Areas Above Habitable Rooms:

Where a bathroom, WC or ensuite is located directly above a habitable room in a separate unit, additional acoustic measures are required to mitigate plumbing and impact-related noise. The following is required:

- Waste and water pipes must be acoustically lagged using minimum 4.5kg density pipe wrap (e.g., Soundlag 4525C or equivalent);
- All hydraulic service risers should be constructed with:
  - Minimum 2 layers of 16mm acoustic-rated plasterboard to the outside face;
  - Fully lined internally with bulk insulation (e.g., 75mm glasswool at ≥14 kg/m³);
- Shower bases and baths should be isolated from the floor structure using acoustic pads or resilient mounts;
- Ceilings beneath wet areas should include high-density insulation and, where appropriate, double-layer plasterboard lining to improve acoustic separation.

Key Design Considerations:

- Underlays must be continuous under all floor finishes, including kitchen and hallway joinery areas.
- Avoid direct fixing of rigid flooring to concrete. Floating floors or floors with isolators should be used to control impact noise.
- Ensure all penetrations through the floor slab (e.g., services, waste stacks) are acoustically sealed with mastic and fire-rated acoustic collars or putty.

6.3 Doors

Acoustic performance of doors plays a critical role in maintaining privacy between sole-occupancy units (SOUs) and in limiting noise intrusion from common corridors, lobbies, and service areas.

Under Section F5.5 of the NCC 2022, walls between SOUs and common areas must achieve Rw ≥ 45, but this rating is compromised if door assemblies are not treated acoustically.

Entry Doors to Apartments (from Corridors or Lobbies):
To preserve acoustic separation and meet performance expectations:

- Doors must be solid-core, minimum 35mm thick, constructed of timber or other dense material;
- Door assemblies must include:
  - Perimeter acoustic seals to jambs and head (e.g., Raven RP78 or equivalent);
  - Automatic drop seal or acoustic threshold seal to the bottom rail;
  - Well-fitted door frame with compression or brush-type seals.

These provisions help limit airborne noise from entering apartments, particularly from lift lobbies, communal halls, or garbage areas.
Internal Doors (within Apartments):

General Design Considerations:

- Gaps under doors should be avoided unless acoustic seals or drop-down mechanisms are installed;
- Ensure no return-air path through door undercuts from noisy common areas into habitable rooms;
- Where a fire-rated door is required, select a model tested with integrated acoustic performance.

6.4 Hydraulic Services

Hydraulic services, including water supply and sanitary plumbing, are a common source of unwanted noise in apartment buildings, particularly when located adjacent to or above habitable spaces such as bedrooms and living areas.

Although not explicitly covered by performance values in NCC Section F5, their treatment is essential to maintain acoustic amenity and ensure compliance with the broader intent of acoustic privacy provisions.

Pipe Acoustic Treatment:

- All waste, water, and vent pipes located within or near habitable rooms are to be:
  - Fully lagged with acoustic pipe wrap (e.g., Soundlag 4525C, Pyrotek Sorberwrap or equivalent), with minimum 4.5kg density;
  - Installed in rigid wall or ceiling cavities lined with 75mm glasswool or polyester insulation (minimum 14 kg/m³ density).

Service Riser Construction:

- All hydraulic risers should be:
  - Fully enclosed in shaft walls constructed with minimum 2 x 16mm acoustic-rated plasterboard on steel furring channels;
  - Fully lined internally with bulk insulation (e.g., 75mm glasswool at ≥14 kg/m³);
  - Designed to avoid flanking paths around pipe penetrations — gaps must be sealed with fire-rated acoustic sealant.

Fixtures and Penetrations:

- Use rubber mountings or resilient brackets to decouple fixtures (e.g., wall-hung toilets, basins) from wall structure;
- Penetrations through intertenancy walls and floors must be:
  - Tightly sleeved and sealed with fire-rated mastic or putty pads;
  - Avoid oversized cut-outs or open cavities around pipes.

Wet Area Design Tips:

- Consider locating wet areas in stacked vertical shafts, away from the building perimeter or sensitive spaces;
- Where possible, group plumbing services in non-habitable zones (e.g., between bathrooms or adjacent to laundries).

6.5 Services and Plant Rooms

Mechanical plant and service rooms—including spaces housing air conditioning condensers, ventilation systems, lift motor rooms, electrical switchboards, and car park exhaust systems—can be significant sources of airborne and structure-borne noise if not acoustically treated. These spaces require careful separation from habitable areas to maintain compliance with the NCC 2022 – Section F5 and to protect residential amenity.

Performance Requirements:

- Under NCC Section F5.5, walls separating plant rooms or service spaces from SOUs must achieve a minimum Rw ≥ 45.
- Doors and penetrations into these rooms must not compromise this minimum rating.

Recommended Construction:

- Walls:
  - Minimum 2 x 13mm acoustic plasterboard (e.g., CSR Fyrchek) on 64mm steel studs, with 75mm acoustic insulation in cavity;
  - For higher-risk equipment (e.g., fans, compressors), consider concrete block walls or additional lining layers to improve low-frequency attenuation.
- Doors:
  - Solid-core doors with perimeter seals and acoustic drop seals;
  - Avoid louvre or perforated doors unless located in unoccupied plant zones with acoustic shielding externally.
- Ceilings and Roofs:
  - Where plant is roof-mounted or on upper terraces above SOUs, floors should incorporate:
    - Concrete slab ≥ 150mm
    - Resiliently mounted bases or inertia pads for all plant
    - Flexible connections to isolate vibration from ductwork or conduits

Penetration and Isolation Treatments:

- All wall and ceiling penetrations for ductwork, cabling, or pipework must be:
  - Tightly fitted and sealed using acoustic-rated fire mastic or putty pads;
  - Large duct penetrations should be boxed or sleeved and acoustically insulated.

Location and Layout Considerations:

- Wherever possible, plant rooms should not be located adjacent to or directly above bedrooms or living areas;
- Use buffer zones (e.g., corridors, storage rooms) to spatially separate noisy equipment from sensitive spaces;
- Rooftop plant should be setback from unit boundaries and, where feasible, enclosed by acoustic screens or barriers.

7 CONCLUSION

An acoustic assessment has been carried out for the proposed residential development at 2–4 Vimy Street, Bankstown, addressing both internal acoustic privacy and external mechanical noise emissions in accordance with the National Construction Code (NCC) 2022 – Section F5 and the NSW EPA Noise Policy for Industry (NPfI, 2017).

The site is located beyond the thresholds outlined in SEPP (Transport and Infrastructure) 2021 and AS 2021 for transport and aircraft noise, and as such, no further assessment of noise intrusion from rail, road or air sources is required.

Existing background noise levels were measured through unattended monitoring and have been used to establish appropriate Project Noise Trigger Levels (PNTLs) for any external mechanical plant. At the time of reporting, detailed mechanical design specifications had not been provided; these are typically finalised during the Construction Certificate (CC) stage. A follow-up mechanical noise emission assessment is recommended at that stage to confirm compliance.

Acoustic design advice has been provided for intertenancy walls, floor/ceiling systems, door sets, hydraulic services, and service/plant rooms, based on NCC minimum requirements and current best practice in multi-residential construction. Implementation of these design treatments will support acoustic privacy, minimise amenity impacts, and facilitate compliance.

Engineering Sciences is available to assist with review of finalised documentation at CC stage to ensure that all relevant acoustic requirements are met.

Please contact us if you have any further queries.

Sincerely,

Michael Phillips

Head of Engineering
M.A.A.S.
MArchSc (Audio & Acoustics), AssocDeg (Audio Eng.)

P (02) 9199 9689
E hello@nationalnoise.com.au
W www.nationalnoise.com.au