Resonate

44-52 Anderson Street, Chatswood

Planning Proposal Acoustic Report

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Resonate

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Glossary

'A' Weighted	A spectrum adaption that is applied to measured noise levels to represent human hearing. A-weighted levels are used as human hearing does not respond equally at all frequencies.
Daytime (NPI)	Between 7.00 a.m. and 6 p.m. as defined in the INP. (See NPI)
dB	Decibel—a unit of measurement used to express sound level. It is based on a logarithmic scale which means a sound that is 3 dB higher has twice as much energy. We typically perceive a 10 dB increase in sound as a doubling of that sound level.
dB(A)	'A' Weighted sound level in dB.
Evening	Between 6.00 p.m. and 10 p.m. as defined in the NPI. (See NPI)
Frequency (Hz)	The number of times a vibrating object oscillates (moves back and forth) in one second. Fast movements produce high frequency sound (high pitch/tone), but slow movements mean the frequency (pitch/tone) is low. 1 Hz is equal to 1 cycle per second. The human ear responds to sound in the frequency range of 20 Hertz to 20,000 Hz.
Ground-borne noise	Ground-borne vibration transferred into a structure causing building elements to vibrate and radiate noise.
NPI	New South Wales EPA Noise Policy for Industry.
Intrusive Noise	Noise emission that when assessed at a noise-sensitive receiver (principally a residential premises boundary) is greater than 5 dB above the background (L_{90}) noise level.
L_{10}	Noise level exceeded for 10 % of the measurement time. The L_{10} level is commonly referred to as the average maximum noise level.
L_{90}	Noise level exceeded for 90 % of the measurement time. The L_{90} level is commonly referred to as the background noise level.
L_{eq}	Equivalent Noise Level—Energy averaged noise level over the measurement time.
Night-time (NPI)	Between 10.00 p.m. on one day and 7.00 a.m. on the following day as defined in the NPI. (See NPI).
Rating Background Level (RBL)	Overall single-figure A-weighted background level representing an assessment period (day/evening/night). For the short-term method, the RBL is simply the measured $L_{90,15min}$ noise level. For the long-term method it is the median value of all measured background levels during the relevant assessment period.

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1 Introduction

Resonate has been engaged by Heworth Holdings Group to undertake a planning proposal acoustic review for the proposed mixed-used development to be located at 44 – 52 Anderson Street, Chatswood NSW.

This report outlines potential acoustic requirements for consideration during the Development Application phase. It is noted that this report is at a desktop level and incorporates advice based on our experience on similar projects.

2 Project Description

The proposed mix-use development would be located at 44 – 52 Anderson Street, Chatswood, as shown in **Error! Reference source not found.**. The proposal consists of a 28-storey design with basement car parking, two levels of commercial/retail spaces and 20 levels of residential apartments.

The proposal site is located adjacent to the North Shore railway line, and close to the Pacific Highway, which experiences high road traffic volumes.

The current land uses surrounding the development are summarised as follows:

- South: Day Street and residential receivers beyond
- North: O'Brien Street and residential receives beyond
- East: Anderson Street and residential receivers beyond
- West: North Shore railway line, residential receivers and Pacific Highway

Figure 1 Proposal site map

3 Potential Acoustic Constraints

Any proposed development will encounter acoustic constraints in relation to noise both on the development itself and from it to the surrounding environment. This section outlines potential constraints and provides examples of ways to minimise noise and vibration impacts through effective design.

3.1 Internal amenity – Airborne noise intrusion

Due to the proximity of the proposed development to the North Shore railway line and the Pacific Highway, rail and road traffic noise may impact on internal amenity. Noise surveys conducted for other similar developments on Pacific Highway indicate that this may be the case. Therefore, glazing design recommendations would be necessary to achieve targeted internal design sound levels in bedrooms and living areas. This is based on an internal design sound level of 35 dB(A) for a bedroom (*Infrastructure SEPP and DoP's Development Near Rail Corridors and Busy Roads*) and previously measured L_{Aeq} noise levels on Pacific Highway in the order of 60 dB(A).

Based on a review of current planning documentation and our previous experience on a similar project in close proximity to the North Shore railway line and the Pacific Highway, we have predicted road traffic external noise levels up the façade of the building. One or a combination of the following measures could be implemented in order to comply with the likely internal design sound level targets:

- Proprietary single laminated glazing systems.
- A 'winter garden' type strategy for the low-rise portion (or entire of the tower) depending on architectural strategy.
- Deep void double glazed systems.

It should be noted that a detailed program of airborne noise measurements would be conducted in order to inform the development application assessment and design process.

3.2 Internal amenity – Ground-borne noise and vibration intrusion

Ground-borne noise and vibration due to pass-by of trains on the adjacent North Shore railway line may impact on internal amenity. Although, due to the high exposure to airborne noise from the railway corridor and road traffic on Pacific Highway, ground-borne noise is not expected to be the controlling source in general. However, ground-borne noise and vibration may be the controlling source at lower levels of the tower. The development application would include the following tasks in order to quantify the potential impacts and derive management strategies for incorporation into the design.

- A detailed program of vibration measurements would be conducted in order to quantify the existing train pass-by vibration levels at the site.
- The measurement results would be used to assess tactile vibration levels as well as predict likely ground-borne noise levels within the development.

If the predictions indicate that ground-borne noise and vibration levels are likely to exceed the design targets, the following measures would be investigated for consideration as part of the design:

- Full or partial vibration isolation applied to the base of the building,
- Configuration of the building such that less sensitive usages are placed in areas where higher ground-borne noise and vibration levels are predicted.

3.3 Ventilation

It is likely that windows will need to remain closed to ensure internal noise criteria can be satisfied. It is therefore likely that an alternative means of ventilation would be required for residential spaces on noise-affected façades. An alternative means of ventilation may take the form of:

- Air conditioning with an outside/fresh air component (not a conventional 'split' system).
- Mechanical ventilation drawn from a 'quiet' side of the building and/or with an acoustically attenuated intake path.
- An open window on a 'quiet' side of the building (should single-sided ventilation be possible).

It is recommended that acoustical modelling be undertaken at the detailed design stage once development approval is granted to optimise glazing selections and the ventilation strategy.

3.4 Mechanical services noise emission

Mechanical services noise from equipment servicing the proposed development would be designed to comply with relevant environmental noise criteria (likely to be related to the NSW EPA NPI and council requirements). Numerous options for mechanical services noise control are available for consideration including:

- Selecting the quietest plant for a given task.
- Judicious location and orientation.
- Use larger fans at a slower speed rather than smaller fans at a higher speed.
- Using variable speed drives to lower fan speed in response to lower duty/load requirements.
- Use of barriers, both incidental and purpose designed.
- Internally lined ducts and bends, external duct and equipment wrapping, silencers.

4 Proposed Development Application Methodology

In the context of the potential acoustic constraints outlined in Section 3, the following is a proposed methodology in preparing a planning stage acoustic report for the Development Application:

- Establish development specific acoustic criteria based on relevant planning approval pathways, including:
  - Willoughby City Council – Willoughby Development Control Plan (WDCP)
  - Willoughby Local Environment Plan 2012 (WLEP 2012)
  - NSW Noise Policy for Industry (NPI)
  - Building Code of Australia (BCA)
  - Development Near Rail Corridors and Busy Roads (DOP)
- Conduct a comprehensive program of noise and vibration measurements at the proposed site.
- Calculate glazing and other acoustically related façade requirements based on noise survey information and determine minimum requirements to achieve internal design sound levels as set out in AS2107 and *DoP's Development Near Rail Corridors and Busy Roads*.
- Predict internal ground-borne noise and vibration levels within the proposed building and determine design strategies to mitigate potential impacts.
- Predict environmental noise emissions from external mechanical services and other operational noise emissions relating to the commercial tenancies at adjacent noise sensitive receivers and conduct and assessment in accordance with the NPI and/or DCP.
- Demonstrate how environmental noise criteria can be complied with.

5 Conclusion

A high-level desktop assessment of potential acoustic considerations has been undertaken for a proposed development to be located at 44 – 52 Anderson Street, Chatswood.

Key acoustic constraints in relation to environmental noise and vibration on the proposed development and its potential impacts to the surrounding area have been outlined.

Acoustic design considerations have been summarised that show these constraints may be addressed through effective design in the development phase.