Mixed-Use Development at 613-627 Pacific Highway, Chatswood

Planning Proposal Acoustic Report

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Resonate

Document Information

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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	Between 7.00 a.m. and 6.00 p.m. as defined in the 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 10.00 p.m. as defined in the 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	NSW Environmental Protection Authority's *Noise Policy for Industry* (2017).
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	Between 10.00 p.m. on one day and 7.00 a.m. on the following day as defined in the 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 Consultants (Resonate) has been engaged by Antaeus Group Pty Ltd to undertake a planning proposal acoustic review for the proposed mixed-use development (the Project) at 613-627 Pacific Highway, Chatswood.

This report outlines potential acoustic requirements for consideration during the Development Application stage of the Project. This planning proposal is a preliminary desktop level assessment, which incorporates advice based on Resonate's past experiences on similar projects.

2 Project Description

The proposed mixed-use development would be located at 613 – 627 Pacific Highway, Chatswood as shown in Figure 1. The Project site is currently occupied by a commercial/retail building and a six storey mixed-used building with retail tenancies on the ground floor and residential apartment on Levels 1 to 5. The location of the site is bounded by a two storey car mechanic to the north (which has been approved for a multi-storey mixed-use development), Nelson Street to the south, medium density residential apartment blocks to the east and Pacific Highway to the west. The site is approximately 100 metres (m) from the North Shore railway line to the east.

The Project would consist of 27 above ground levels and four basement parking levels. The above ground levels would include two levels of commercial podium on the ground and Level 1, one residential tower consisting of 25 levels of residential apartments from Level 2 to Level 26, and a plant room on Level 27.

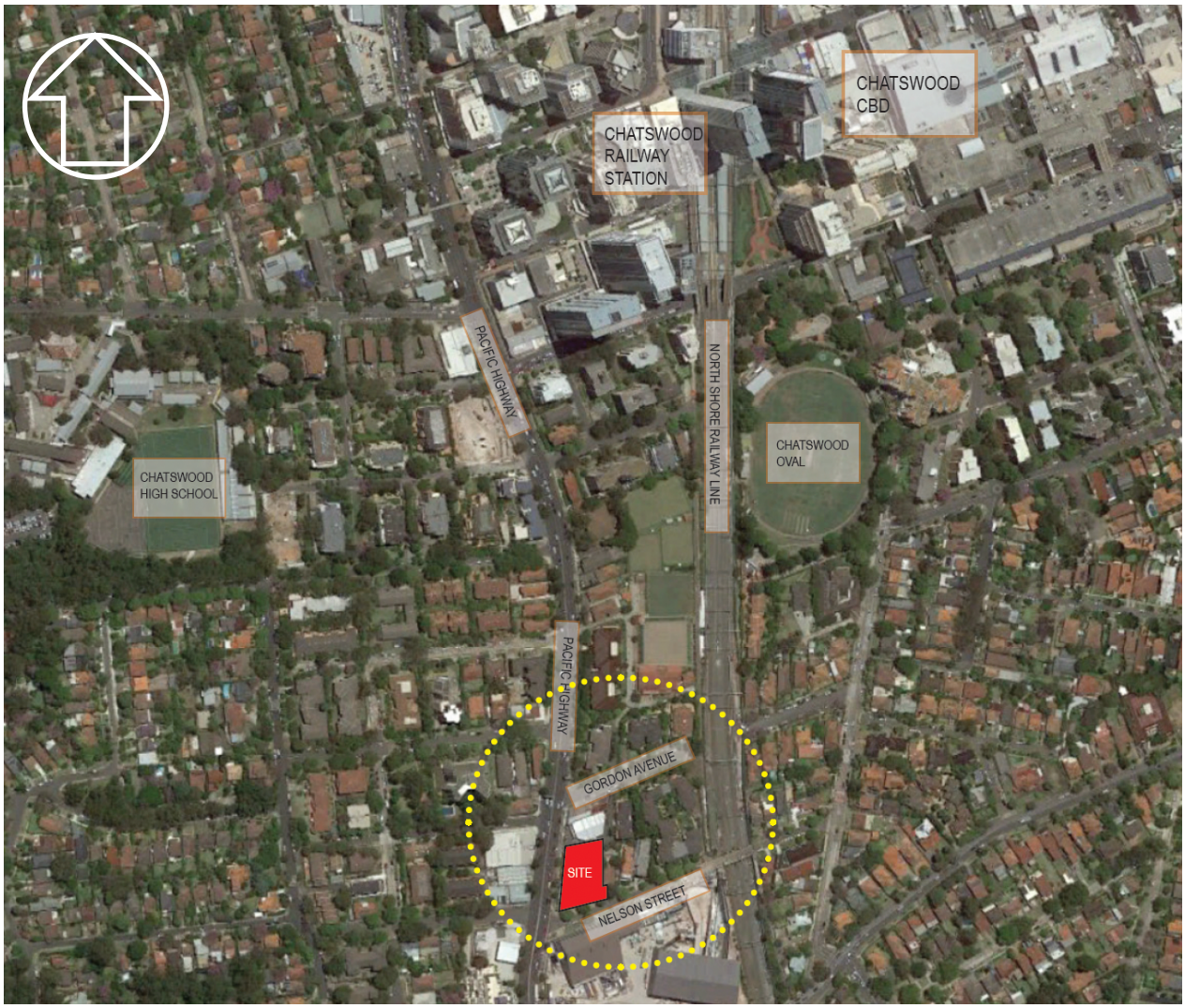

Figure 1 Project site location (image courtesy of GWYL Architecture)

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 the internal amenity of the residential apartments. 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 Clause 87(3)[1] and DPIE[2]'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 facade 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

Due to the intervening distance (approximately 100 m) between the Project site and the rail corridor, ground-borne noise and vibration due to train pass-bys on the North Shore railway line are unlikely to be perceptible. Based on this understanding, ground-borne noise and vibration from train pass-bys on the North Shore railway line are unlikely to have adverse impact on the internal amenity of the Project.

3.3 Ventilation

It would be possible 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 in combination with the proposed ventilation strategy.

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[1] NSW State Environmental Planning Policy (Infrastructure) 2007 Clause 87(3).

[2] NSW Department of Planning, Industry and Environment.

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's NPI[3] 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.
- Placement of plant inside plant rooms where possible.
- Internally lined ducts and bends, external duct and equipment wrapping, silencers.

[3] Noise Policy for Industry, 2017.

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)
  - NSW EPA's *Noise Policy for Industry* (NPI)
  - Building Code of Australia (BCA)
  - NSW DPIE's *Development Near Rail Corridors and Busy Roads – Interim Guideline*
- Conduct a comprehensive program of noise 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 AS/NZS 2107:2016[4] and NSW DPIE's *Development Near Rail Corridors and Busy Roads*.
- 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 an assessment in accordance with the NPI and/or WDCP.
- Demonstrate how environmental noise criteria can be complied with.

[4] AS/NZS 2107:2016 *Acoustics – Recommended design sound levels & reverberation times for building interiors*

5 Conclusion

A high-level desktop assessment of potential acoustic considerations has been undertaken for a proposed mixed-use development to be located at 613-627 Pacific Highway, 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.