



10 Gordon Avenue and 15-19 Nelson Street Chatswood

Planning Stage Acoustic Report

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Glossary

A-weighting	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.
Characteristic	Associated with a noise source, means a tonal, impulsive, low frequency or modulating characteristic of the noise that is determined in accordance with the Guidelines for the use of the Environment Protection (Noise) Policy (Noise EPP) to be fundamental to the nature and impact of the noise.
Continuous noise level	A-weighted noise level of a continuous steady sound that, for the period over which the measurement is taken using fast time weighting, has the same mean square sound pressure as the noise level which varies over time when measured in relation to a noise source and noise-affected premises in accordance with the Noise EPP
Day	Between 7 am and 10 pm as defined in the Noise EPP
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 loudness.
dB(A)	Units of the A-weighted sound level.
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.
Indicative noise level	Indicative noise level determined under clause 5 of the Noise EPP.
L ₁₀	Noise level exceeded for 10 % of the measurement time. The L ₁₀ level represents the typical upper noise level and is often used to represent traffic or music noise.
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.
L _{max}	The maximum instantaneous noise level.
Night	Between 10.00 p.m. on one day and 7.00 a.m. on the following day as defined in the Noise EPP
Noise source	Premises or a place at which an activity is undertaken, or a machine or device is operated, resulting in the emission of noise
Quiet locality	A locality is a quiet locality if the Development Plan provisions that make land use rules for the locality principally promote land uses that all fall within either or both of the following land use categories: (a) Residential; (b) Rural Living;
Reverberation Time (RT)	Of a room, for a sound of a given frequency or frequency band, the time that would be required for the reverberantly decaying sound pressure level in the room to decrease by 60 decibels.

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1 Introduction

Resonate Consultants (Resonate) has been engaged by Develotek to undertake a planning proposal acoustic review for the proposed mixed-use development (the Project) at 10 Gordon Avenue and 15-19 Nelson Street, Chatswood.

This report outlines potential acoustic requirements for consideration during the Development Application (DA) 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.

This report has been prepared for the purpose of a planning proposal and will be subjected to further assessment at the DA stage.

2 Project Description

The proposed mixed-use development would be located within Willoughby Councils' Chatswood CBD strategy at 10 Gordon Avenue and 15-19 Nelson Street, Chatswood.

The land of the existing Project site is described by the following as presented in Figure 1:

- Strata Plan 85403, No 10 Gordon Avenue, Chatswood - Three storey apartment building
- Strata Plan 89243 No. 15 Nelson Street, Chatswood - Three storey apartment building
- Strata Plan 76342 No. 17 Nelson Street, Chatswood – Three storey apartment building
- Lot 1 DP 1237932 No. 19 Nelson Street, Chatswood – Single storey residence

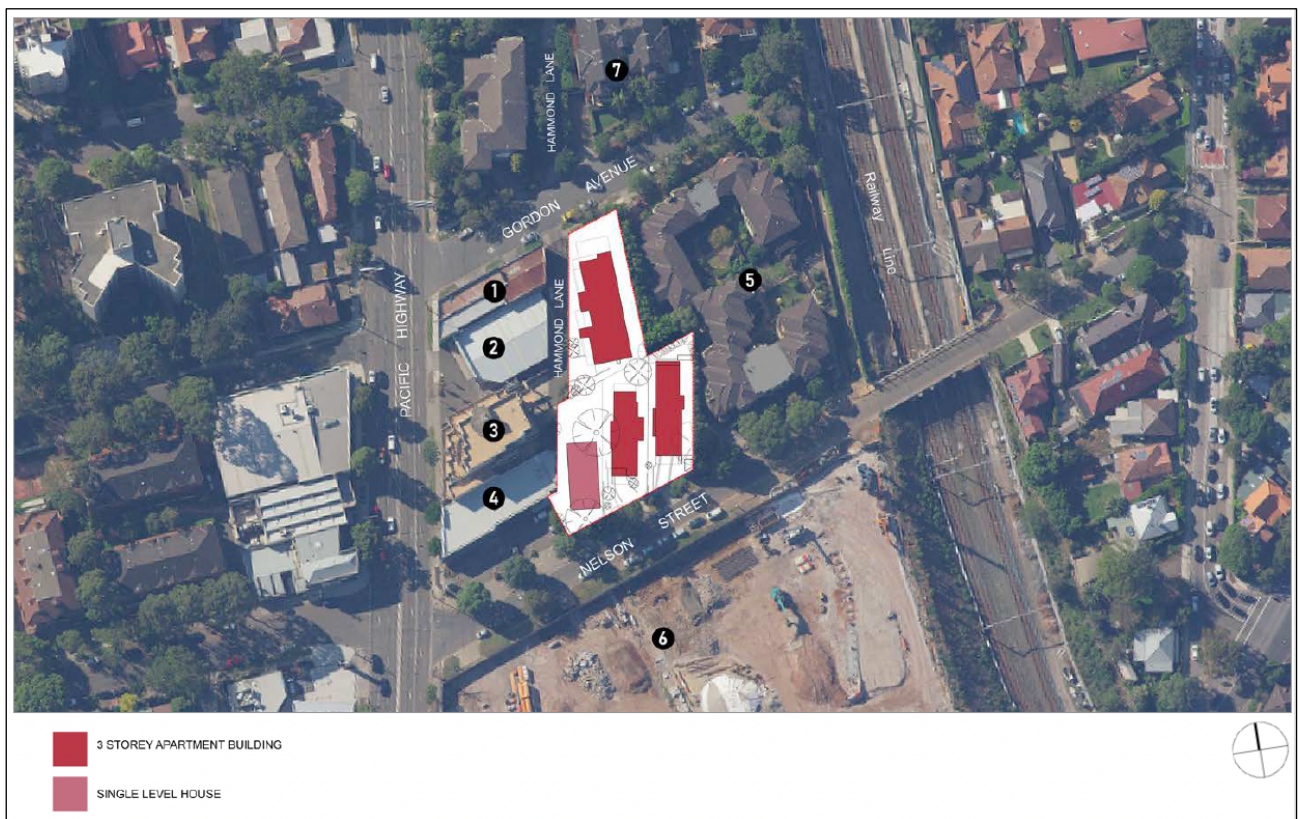


Figure 1 Project site and adjacent commercial and residential buildings (image courtesy of DEM)

The Project site as shown in Figure 2 is surrounded by the following:

- Chatswood Railway Station approximately 600m north of the site.
- The Pacific Highway is located approximately 50m west of the site.
- Commercial and mixed-use developments front the Pacific Highway to the west of the site.
- North of Gordon Avenue, the Pacific Highway corridor is characterised by two – three storey apartment buildings.
- A three storey apartment complex, extending from Gordon Avenue to Nelson Street, is located to the east of the site.
- The Sydney Metro Chatswood Dive Site is located immediately south of Nelson Street and extends from the Pacific Highway to the railway line and south to Mowbray Road.

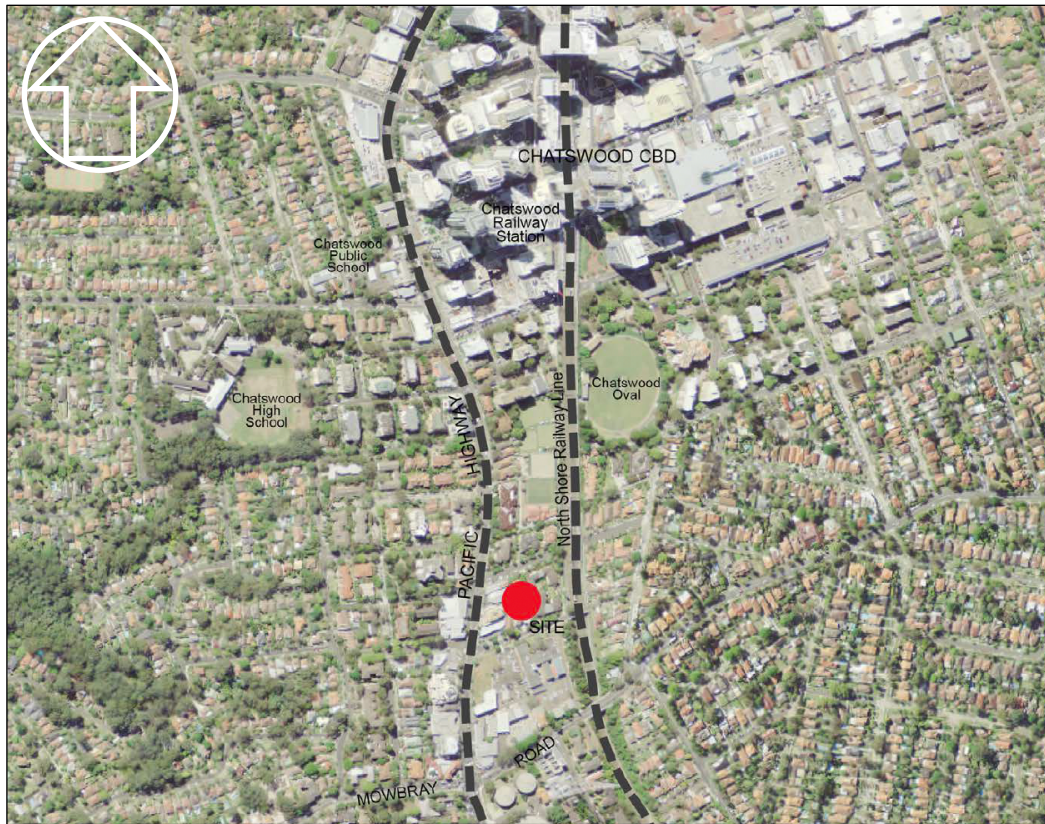


Figure 2 Project site location (image courtesy of DEM)

The Project as presented in Figure 3 would consist of a mixed-use building with a total height of a two-storey podium and 25 storey residential tower (27 storeys in total) which includes the following:

- A ground floor loading for service vehicles, waste storage and collection.
- 3 levels of basement parking with bicycle storage, end of trip facilities and services.
- Two-storey commercial podium floor retail and commercial.
- Communal roof open space on ground and level 2.



Figure 3 3D view of project (blue) with existing context (white) (image courtesy of DEM)

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 DPIE²'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 60 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 would need to remain closed to ensure internal noise criteria could 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 'quieter' 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.

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 NPI³ 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 NSW Environmental Protection Agency (EPA) 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/National Construction Code (BCA/NCC)
 - 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 2107:2016⁴ 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.
- Provide acoustic recommendations in order to demonstrate compliance against established noise criteria.

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 10 Gordon Avenue and 15-17 Nelson Street, Chatswood NSW 2067.

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.

This report has been prepared for the purpose of a planning proposal and will be subject to further assessment at the DA stage.