

Tessa Benjamin & Greg Lozelle

14 Mt Vernon Road, Mt Vernon

Aircraft Noise Assessment

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1 Introduction

The following report has been prepared by Acouras Consultancy on behalf of Tessa Benjamin & Greg Lozelle to undertake a noise impact assessment for the proposed new residential dwelling located at 14 Mt Vernon Road, Mt Vernon. The proposed alterations and additions will include:

- Carpark and storage on lower ground level.
- Family, living, dining, kitchen and music room.
- Four (4) bedrooms.

The site location is shown in Figure 1.

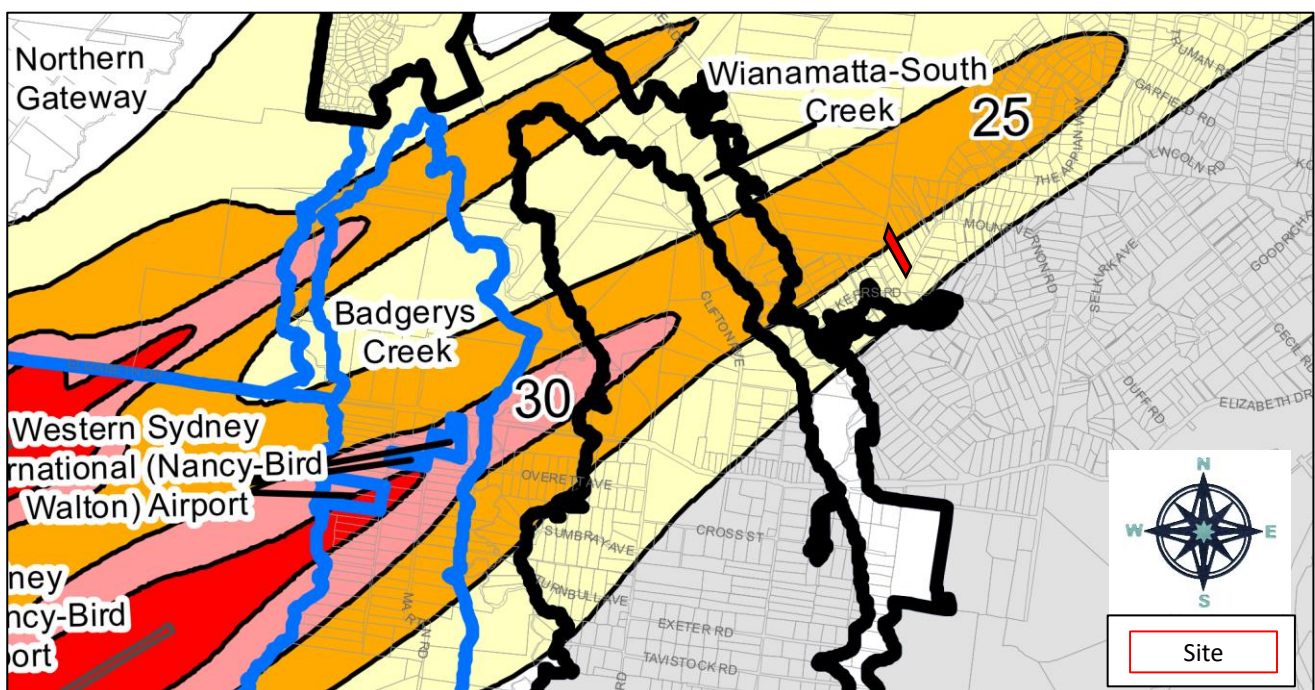


Figure 1 – Western Sydney Airport and Site Location

2 Noise Criteria

The following standards and guidelines are applicable to this project:

- Penrith Development Control Plan (2014).
- State Environmental Planning Policy (Western Sydney Aerotropolis) 2020
- Australian standard AS 2021-2015: Acoustics – Aircraft Noise Intrusion – Building siting and construction.
- Australian standard AS 1055.1-1997: Acoustics – Description and measurement of environmental noise - General procedures.

2.1 Penrith DCP

The Penrith DCP Section C12.3 “Aircraft Noise” indicates that for the residential development, the AS/NZS 2107 outlines the acceptable internal noise levels such that a satisfactory acoustic environment within residential and non-residential spaces in new and existing buildings. The DCP states that:

a) Council will not grant consent to any development unless it is demonstrated to Council’s satisfaction that:

i) The building site is considered acceptable for the proposed development based upon ANEF (Australian Noise Exposure Forecast) zones in accordance with Australian

Standard 2021-2000.

ii) Where a building site is classified by AS 2021-2000 as ‘conditionally acceptable’, an assessment of the proposed development is to be conducted by an accredited acoustical consultant in accordance with the procedures set out in Australian Standard 2021-2000 to ensure that the indoor design sound levels of the Standard are achieved within the various areas of occupancy.

2.2 Aircraft Noise Intrusion

For in insulation of sound intrusion from external noise sources, the Australian standard AS 2021-2015 requires the residential development be designed to meet the following internal noise levels.

Table 1 – AS2021 Noise Intrusion Criteria

Space	AS2021 Maximum L_{Amax} dB
Sleeping areas, dedicated lounges	50
Other Habitable Areas	55
Bathrooms, toilets, laundries	60

Applying the procedure given in the Australian Standard to assess aircraft noise flyovers the following Table 2 provides the distance co-ordinates relative to Western Sydney Airport's runway.

Table 2 – Distance Co-ordinates from Western Sydney Airport

Western Sydney Airport Runway	
DS (m)	750
DT (m)	10,000
DL (m)	6,400

Using the above co-ordinates, aircraft noise levels given in standard indicates that the highest L_{Amax} level at this site are from take-off of Boeing 747-400 (long haul) at L_{max} 78dBA heading in the north direction.

To achieve the internal design noise levels of AS2021-2015, the aircraft noise reduction (ANR) required for the project is 28dBA.

3 Assessment and Recommendations

3.1 Façade Glazing Requirements

Acoustic glazing for the apartments are given in Table 3 are required to reduce noise impact on the internal occupants and should result in noise levels within such units in accordance with the Penrith DCP and the Australian Standards for aircraft noise intrusion.

Table 3 – Schedule of Window and Glazing (R_w)

Space	Glazing Thickness	Minimum R_w (Glazing+Frame)
Kitchen/Living/Dining/Family	6.38mm laminated	30
Music	6.38mm laminated	30
Bed 1, 2 3 & Bed 4	10.38mm laminated	32

All Windows/doors should be well sealed (air tight) when closed with good acoustic seals around the top and bottom sliders. Mohair seals are not considered to be acoustic seals.

3.2 Building Façade Construction

To provide sufficient acoustic attention of noise, the general external construction of the proposed building would need to be constructed as detailed in Table 4.

Table 4 – External Façade Construction (R_w)

Building Element	Proposed Construction	Minimum R_w
New External Wall	External brick veneer.	50
	Internal 1x13mm plasterboard lining on 90mm timber stud.	
	Cavity filled with 75mm thick acoustic insulation.	
New Roof and Ceiling	Tiled or metal/Colorbond roof on timber frame.	45
	Internal 1x13mm fire-rated plasterboard ceiling.	
	Cavity filled with 75mm thick acoustic insulation	
External Door	35mm solid core door.	30
	Acoustic perimeter seals (such as Raven RP10) and drop seals (such as Raven RP38) for the bottom of the door with a compatible threshold plate.	

4 Conclusion

An acoustic assessment of the proposed residential development has been carried out in accordance with the requirements of Penrith DCP and Australian Standards.

Construction for glazing, external walls and the roof/ceiling systems have been provided to achieve the internal noise criteria and are detailed in Section 3.1 and Section 3.2 based on the impact of railway and aircraft noise.

Providing the recommendations in this report are implemented, the noise from the proposed development is predicted to comply with acoustic requirements of the Penrith DCP and the Australian Standard for aircraft noise.

Appendix A – Acoustic Terminology

Decibel, dB: A dimensionless unit which denotes the ratio between two quantities that are proportional to power, energy or intensity. One of these quantities is a designated reference by which all other quantities of identical units are divided. The sound pressure level in decibels is equal to 10 times the logarithm (to the base 10) of the ratio between the pressure squared divided by the reference pressure squared. The reference pressure used in acoustics is 20 micro Pascals.

A-WEIGHTING: A measure of sound pressure level designed to reflect the response of the human ear, which does not respond equally to all frequencies. To describe sound in a manner representative of the human ear's response it is necessary to reduce the effects of the low and high frequencies with respect to medium frequencies. The resultant sound level is said to be A-weighted, and the units are in decibels (dBA). The A-weighted sound level is also called the noise level.

Sound Pressure Level, L_p (dB), of a sound: 20 times the logarithm to the base 10 of the ratio of the r.m.s. sound pressure to the reference sound pressure of 20 micro Pascals. Sound pressure level is measured using a microphone and a sound level meter, and varies with distance from the source and the environment.

Ambient Noise/Sound: All noise level present in a given environment, usually being a composite of sounds from many sources far and near. Traffic, HVAC, masking sound or even low-level background music can contribute to ambient level of noise or sound.

Percentile Level - L₉₀ , L₁₀ , etc: A statistical measurement giving the sound pressure level which is exceeded for the given percentile of an observation period, e.g. L₉₀ is the level which is exceeded for 90% of a measurement period. L₉₀ is commonly referred to as the "background" sound level.

Background Noise (L₉₀): The sum total of all unwanted residual noise generated from all direct and reflected sound sources in a space that can represent an interface to, or interfere with good listening and speech intelligibility.

Rating Background Level – RBL: Method for determining the existing background noise level which involves calculating the tenth percentile from the L_{A90} measurements. This value gives the Assessment Background Noise Level (ABL). Rating Background Level is the median of the overall ABL.

L_{AEQ,T}: Equivalent continuous A-weighted sound pressure level. The value of the A-weighted sound pressure level of a continuous steady sound that, within a measurement time interval T, has the same A-weighted sound energy as the actual time-varying sound.

Appendix B – Architectural Drawings

This assessment was based on the following architectural drawings provided by ATJ Architects.

Drawing	Issue	Date	Description
A01	A	Jan 21	Site Plan
A02	A	Jan 21	Floor & Roof Plan