Statewide Planning Pty Ltd

Stage 4 Werrington

Acoustic Assessment for Subdivision

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1 Introduction

The following report has been prepared by Acouras Consultancy on behalf of Statewide Planning Pty Ltd to assess the potential for noise impact associated with the Stage 4 Werrington. The residential development for Stage 4 will include a sub-division of 134 lots.

The proposed residential development is surrounded by existing and new residential dwellings. Traffic noise along the Great Western Highway Road contributes to the surrounding ambient noise levels. The site location is shown in Figure 1 and the overall masterplan layout is shown in Appendix B

Figure 1 – Site Location, Nearest Residents and Noise Logger Position

2 Noise Criteria

The following standards and guidelines are applicable to this project:

- Penrith City Council's Development Control Plan 2010 Part C12.
- Werrington Mixed-Use Area Development Control Plan (DCP).
- NSW Department of Planning "Development Near Rail Corridors and Busy Roads".
- NSW EPA "Noise Guide for Local Government" (NGLG).
- Australian standard AS/NZS 2107-2016: Acoustics – Recommended design sound levels and reverberation times for building interiors.
- Australian standard AS 1055.1-1997: Acoustics – Description and measurement of environmental noise - General procedures.

2.1 Internal Noise Levels

The Penrith DCP's do not provide a specific acoustic requirement for the control of noise intrusion of traffic noise from surrounding streets. Therefore, an appropriate standard is the Department of Planning (DoP) "Development near Rail Corridors and Busy Roads – Interim Guideline", Infrastructure SEPP clause 102 (road) requires that if the development is for the purpose of residential use, the consent authority must be satisfied that appropriate measures will be taken to ensure that the following L_{Aeq} levels are not exceeded.

Table 1— Development near Rail Corridors and Busy Roads – Interim Guideline

Residential Space	Internal Noise Criteria
in any bedroom in the building	35dB(A) at any time 10pm–7am
anywhere else in the building (other than a garage, kitchen, bathroom or hallway)	40dB(A) at any time

Mitigation measures are based on having windows and external doors closed. If internal noise levels with windows or doors open exceed the criteria by more than 10dBA, the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia.

2.2 Railway Noise and Vibration Impact

For this proposed development, the NSW Department of Planning "Development Near Rail Corridors and Busy Roads-Interim Guideline" provides the appropriate procedure and screening method in determining the likelihood of noise and vibration from rail corridors. DOP guideline outlines in Section 3.5.1 (Figure 3.1 and 3.2) the assessment zone for a noise and vibration sensitive building is to be within 80m from rail noise and 60m for rail vibration of the nearest rail corridor. The subject site is located more than 230 from the nearest rail corridor and therefore an assessment of railway noise and vibration is not required.

2.3 Noise Survey and Project Specific Limits

An unattended noise survey was carried out at the site to measure the background and ambient noise levels. Noise monitoring was conducted between Tuesday 12th to Tuesday 19th September 2017. The monitor was positioned at the corner of the Great Western Highway and French Street as shown in Figure 1.

Measurements were conducted using the following equipment:

- SVAN 958A Type 1 Real time Analyser/Noise Logger. Serial No. 36624.
- SVAN SV30A Type 1 Sound Level Calibrator. Serial No. 31830.

Noise monitoring was conducted in general accordance with Australian standard AS 1055.1-1997: Acoustics-Description and measurement of environmental noise-General procedures.

The noise analyser was calibrated immediately before and after measurements were taken with no discernible differences between these two recorded levels. The sound analyser is Type 1 and complies with Australian standard AS1259.2: 1990.

2.3.1 Traffic Noise

Table 2 presents a summary of the measured ambient noise level and traffic noise impacting the development from the Great Western Highway.

Table 2 – Measured Ambient and Traffic Noise and Levels, dBA

Location	Period	Average L_{eq}	Highest L_{eq} 1hr
Great Western Highway (GWH)	Day (07:00-22:00)	63	67
	Night (22:00-07:00)	58	64

Figure 2 – GWH Traffic Noise Contour (Day-time)

Figure 3 – GWH Traffic Noise Contour (Night-time)

2.3.2 Project Noise Limits

The Penrith City Council DCP's does not have any specific guide for controlling noise emission from the operation of mechanical equipment associated with the development. However, the EPA Noise Guide for Local Government (NGLG) does provides a guide into considering intrusive impact to nearby receivers from this residential development.

The assessment of intrusive noise levels has been conducted in general accordance with the procedures as set out in the NSW Industrial Noise Policy, which defines intrusive noise as 5 decibels above the background noise level. For the purpose of the assessment, the background noise level has been determined using the RBL. Table 3 presents a summary of the measured background noise level and the allowable intrusive noise limit for this project.

Table 3—Noise Survey Summary and Project Limits, dBA

Time Period	Existing Noise Levels		NGLG Noise Limits, L_{eq}
	$L_{eq\ (period)}$	RBL	
Day (07:00-18:00)	63	51	56
Evening (18:00-22:00)	61	49	54
Night (22:07:00)	58	35	40

During detailed design stage, the design and selection of the mechanical equipment required to service the proposed development will be required to achieve the EPA NGLG noise limits as presented in the table above.

During the monitoring period any adverse weather condition have been excluded. The noise logger results are presented in Appendix C.

3 Assessment and Recommendations

3.1 Façade Glazing Requirements

Acoustic glazing for the dwellings are given in Table 4 are required to reduce noise impact on the internal occupants and should result in noise levels within such units in accordance with the Department of Planning Noise Guidelines and AS/NZS 2107:2016.

Table 4 – Schedule of Window and Glazing (R_w)

Lot	Time	Noise Contour	Façade	Space	Glazing Thickness	Minimum R_w (Glazing+Frame)	Alternate Ventilation
1-30	Day time	60-65	All	Living	10.38mm laminated	32	Y
	Night time	60-65	All	Bedroom	10.38mm laminated	32	Y
31-134	Day time	Less than 60	All	Living	6.38mm laminated	30	N
	Night time	Less than 60	All	Bedroom	6.38mm laminated	30	N

All other non-habitable spaces, such as bathrooms and laundries require minimum 6mm monolithic glass (Rw 28). 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 5.

Table 5 – External Façade Construction (R_w)

Building Element	Proposed Construction	Minimum R_w
External Wall	Brick veneer with insulation in cavity. Insulation as per ESD/BASIX requirements.	45
Roof and ceiling	Metal or ceramic tiled roof with a plasterboard cavity ceiling. Insulation as per ESD/BASIX requirements.	45

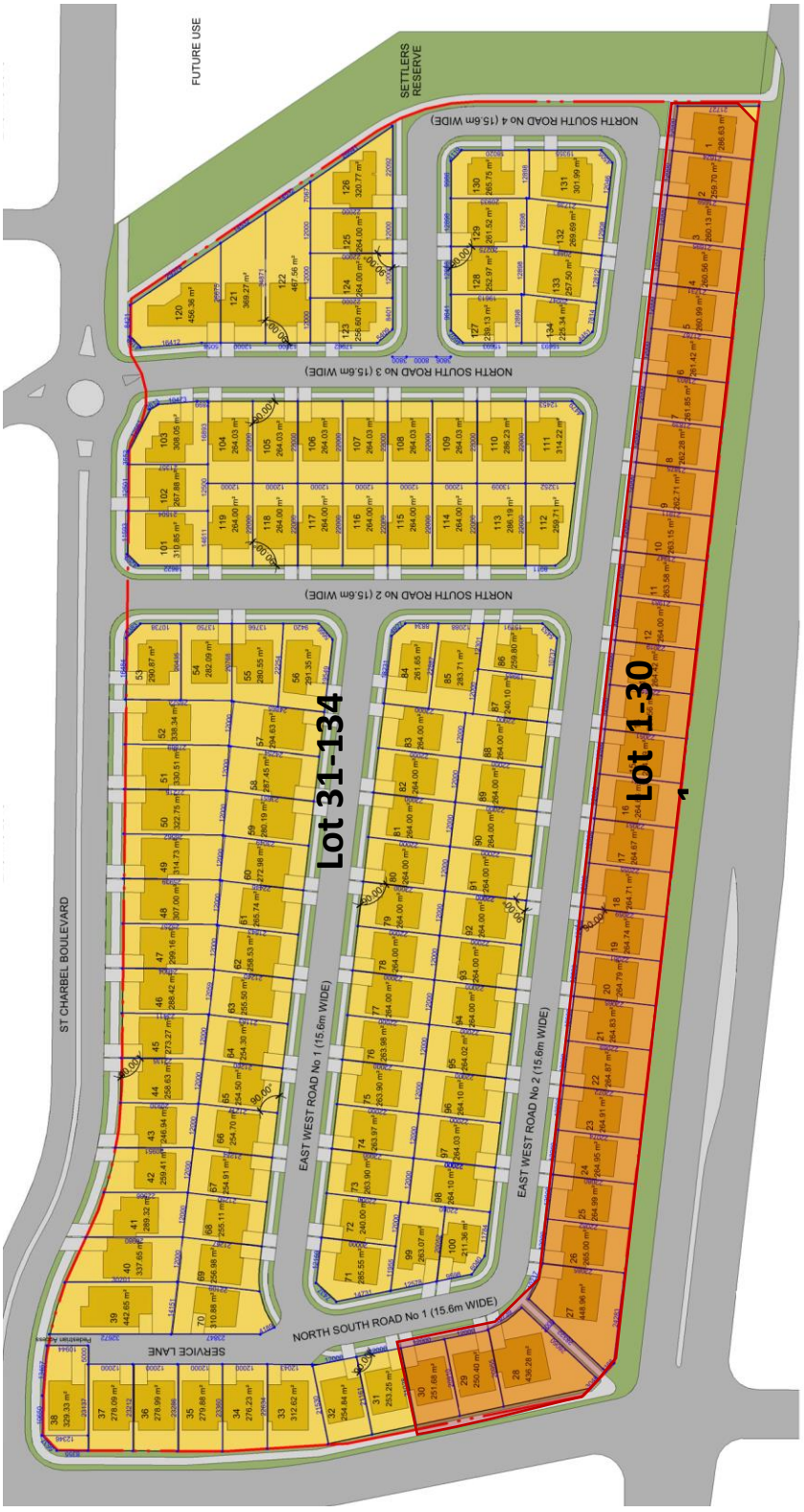

Figure 4 – Stage 4 Acoustic Design Zones (Refer to Table 4)

3.3 Residential Air-Conditioning Units

At this stage, the design and selection of mechanical equipment, such as A/C condensers have not been finalised. Following the DA approval for each individual lot, any new mechanical equipment is to be selected to ensure compliance with the EPA noise criteria (refer to Table 3).

As a guide, following details the recommended maximum noise level of any new proposed outdoor A/C condenser associated with each residential development lot. At this stage, the selection of the outdoor condensers have not been finalised and therefore predicted noise level as given in Table 6 details the maximum noise level allowable for the a single or double outdoor condenser.

Table 6—Maximum Allowable Noise Emission for Condensers, dBA

Equipment	Quantity	Noise Limits, $L_{eq,\ 15min}$ (Daytime/Evening)	Maximum Sound Power Level, dBA	Maximum Sound Pressure Level, dBA @1m
Outdoor Condenser	1	56/54	68	60
	2	56/54	65	57

It is recommended that any equipment, such as A/C condensers is to be turned off during the night periods (10pm-7am).

4 Conclusion

An acoustic assessment of the proposed development has been carried out in accordance with the requirements of Penrith City Council DCP's and the Department of Planning.

An environmental noise survey of the site has been conducted and the noise limiting criteria for mechanical plant/equipment noise emission has been determined based on the EPA NGLG. The limits are presented in Table 3. At this stage, the selection of the outdoor condensers have not been finalised and therefore the maximum allowable noise emission from each condenser unit has been predicted. The maximum allowable noise levels are given in Table 6.

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 road, rail and aircraft noise.

Providing the recommendations in this report are implemented, the proposed sub-division development would comply with acoustic requirements of the Penrith City Council DCP's, Department of Planning and EPA noise limits.

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 - L 90 , L 10 , etc: A statistical measurement giving the sound pressure level which is exceeded for the given percentile of an observation period, e.g. L 90 is the level which is exceeded for 90% of a measurement period. L 90 is commonly referred to as the "background" sound level.

Background Noise (L 90): 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 – List of Drawings

This assessment was based on the following drawings provided by Statewide Planning.

Drawing	Issue	Date	Description
DA 001	B	15.09.20	Cover Sheet
DA 101	B	15.09.20	Site Plan
DA 102	B	15.09.20	Subdivision
DA 103	B	15.09.20	Footprints
DA 104	B	15.09.20	Lot Area Schedule

Appendix C – Noise Logger Results