Noise Impact Assessment
Proposed Land Rezoning
Appin, NSW

Prepared for:

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EXECUTIVE SUMMARY

An acoustic assessment has been undertaken into the potential for noise emanating from various existing and proposed significant noises sources to impact on the Appin (Part 2) Precinct that is proposed for rezoning for residential purposes.

Appropriate noise criteria were developed for the overall Appin Precinct in our report 212214R-29780 dated September 2022 (denoted SA1 and attached to this report for reference) based on procedures in the applicable Australian Standards and Government guidelines and policies.

The SA1 assessment considered theoretical noise emissions from a number of existing industrial noise sources and also from existing and proposed roads in the area and those findings have been reviewed for application to the Appin (Part 2) Precinct.

Noise control options and noise management techniques were advised, as required, to enable compliance with the relevant noise criteria at future residential, and other, receivers.

The assessment concludes that the proposed Part 2 development may be supported provided the appropriate noise attenuation measures are incorporated at key existing noise generating sites and proposed infrastructure deliverables for the project.

1.0 THE APPIN (PART 2) PROJECT

Walker Corporation Pty Ltd and Walker Group Holdings Pty Ltd (together the **Proponent**) has prepared the subject submission to rezone 100.30 hectares of land (the **Site**) within the Appin Precinct from *RU2 Rural Landscape* to the following zones:

Urban Development Zone

Zone 1 Urban Development (UDZ)

Special Purposes Zone

Zone SP2 Infrastructure (SP2)

Conservation Zone

Zone C2 Environmental Conservation (C2)

The Site is known as the Appin (Part 2) Precinct. The Site directly adjoins the Appin (Part 1) Precinct – refer to **Figure 1**.

The Appin (Part 2) Precinct Plan (**the precinct plan**) shows the proposed new zones. 'The precinct plan' will be incorporated into the *State Environmental Planning Policy (Precincts – Western Parkland City) 2021* and contain the provisions (clauses and maps) that will apply to 'the Site.' 'The precinct plan' envisages the delivery of the following:

- 1,312 dwellings (as a mix of low-density, medium density and apartments)
- 30,312 sqm of gross lettable retail/commercial floor area
- 16.91ha conservation land

The planning proposal submission is aligned with strategic land use planning, State and local government policies, infrastructure delivery and PP-2022-3979. The development potential is tempered by a landscape-based approach that protects the environment and landscape values, shaping the character of new communities. A series of residential neighbourhoods are to be delivered within the landscape corridors of the Nepean and Cataract Rivers, supported by local amenities, transit corridors and community infrastructure.

2.0 INTRODUCTION

Spectrum Acoustics Pty Ltd was engaged by the Proponent in 2022 to prepare an acoustical assessment (referenced herein as SA1) to support a Structure Plan for the Appin Precinct. The present report has been commissioned to assess potential noise impacts on, and propose general mitigation methods for, residences in the proposed Appin (Part 2) Precinct.

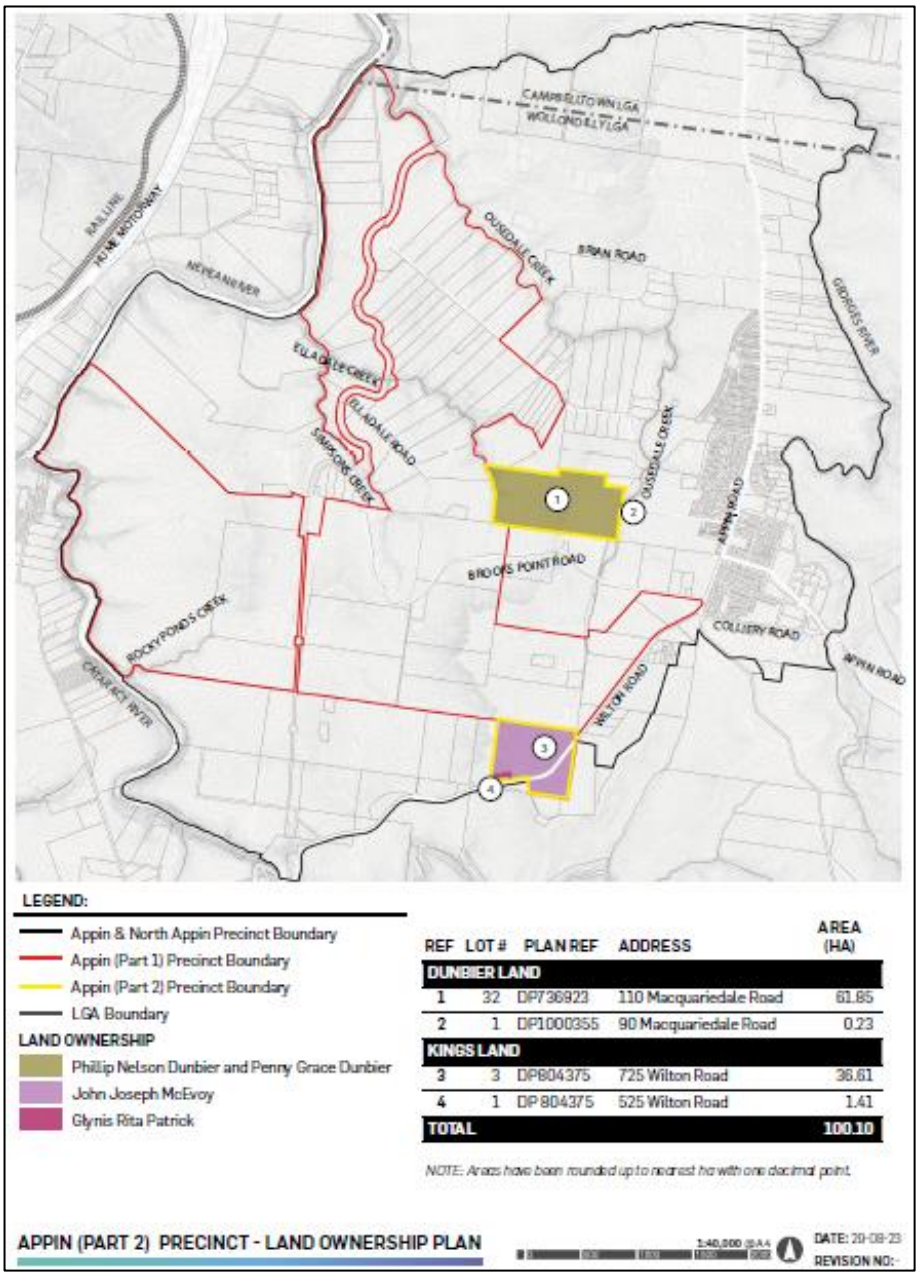


Figure 1: Appin (Part 2) Precinct Boundary

This report summarises the potential for noise emanating from various existing and proposed significant noises sources to impact on parts of the Appin (Part 2) Precinct that is proposed for rezoning for residential purposes.

The objectives of the report are to apply the findings from SA1 for the Appin Precinct to the parcels of land comprising Part 2, as applicable.

The assessment has indicated that a combination of relatively common architectural treatments and noise control such as construction of noise barriers, can be employed to achieve an adequate acoustic amenity at future residences.

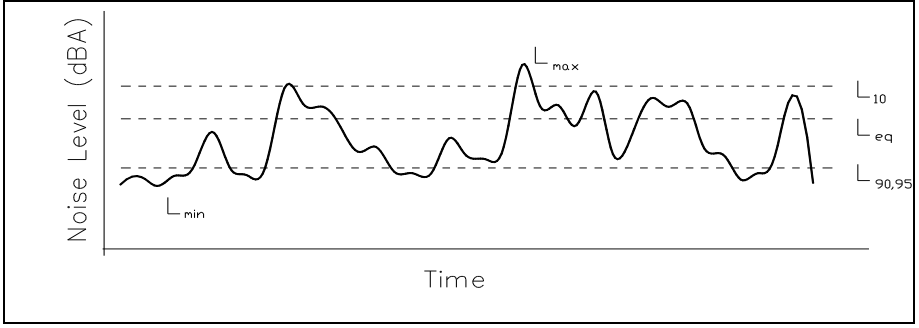
Detailed and specific acoustic assessment will be required for the key existing and proposed noise generating sources identified in this report.

From an acoustic point of view, the proposed development may be supported provided the appropriate noise attenuation measures are incorporated in proposed infrastructure deliverables for the project.

3.0 DESCRIPTION OF TERMS

Table 1 contains the definitions of commonly used acoustical terms and is presented as an aid to understanding this report.

Table 1: Definition of acoustical terms

Term	Definition
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L10	Average Maximum Noise Level - the level exceeded for 10% of the monitoring period.
L90	Average Minimum Noise Level - the level exceeded for 90% of the monitoring period and recognised as the Background Noise Level. In this instance, the L90 percentile level is representative of the noise level generated by the surrounds of the residential area.
	

4.0 NOISE SOURCES

The area proposed for rezoning adjoins the western and southwestern extremities of the West Appin Precinct. There are several known

existing and proposed significant noises sources in the area which are shown in **Figure 2**, and detailed below;

- Appin Motocross Track,
- Appin Power Station,
- South 32 Ventilation Shaft,
- Proposed Outer Sydney Orbital Phase 2,
- Existing Hume Highway,
- Existing Wilton Road, and
- Existing Appin Road.

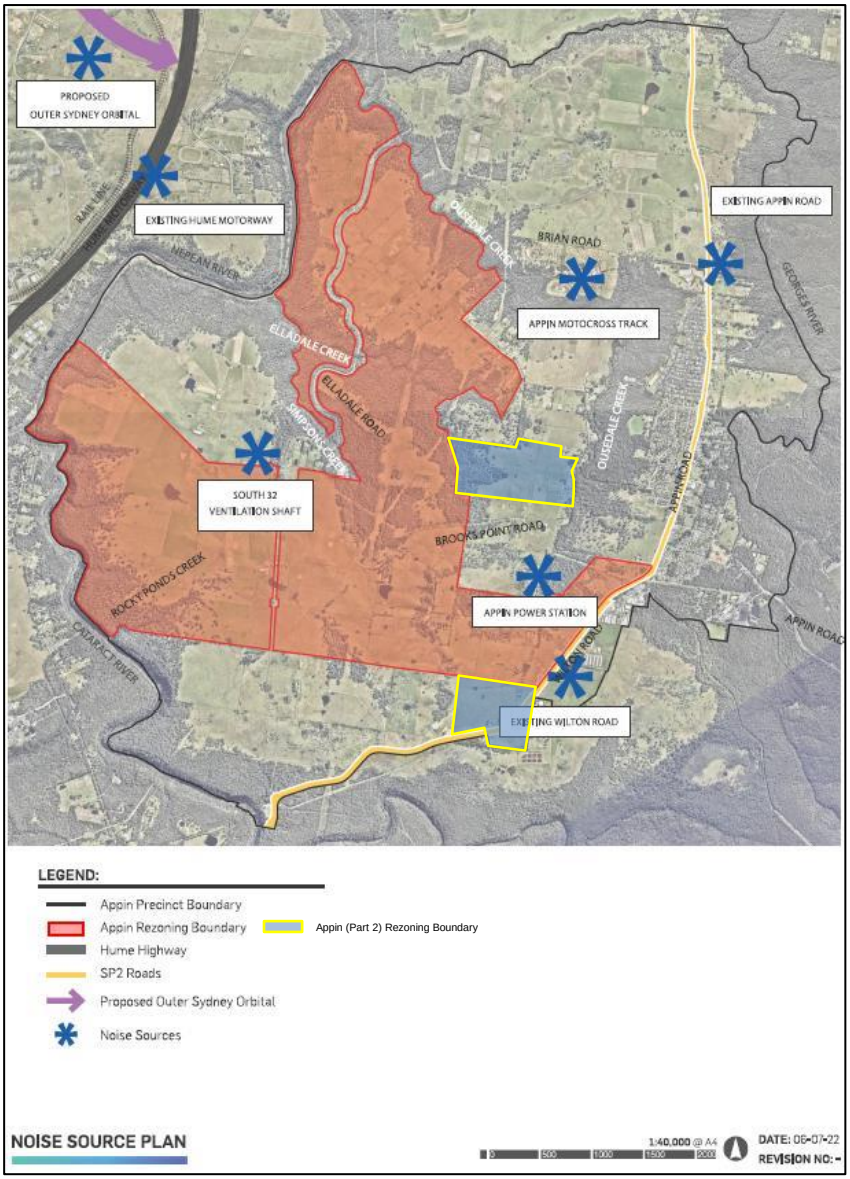


Figure 2: Noise Sources

Each of these noise sources was considered separately in SA1 for compliance with the relevant impact criteria. The sources relevant to the current assessment of Part 2 are the Appin power station and Wilton Road. Assessment of each of these sources is reproduced below from SA1.

4.1 Appin Power Station

Appin Power Station utilises waste coal mine gas to supply generators that produce electricity for supply to the power grid (shown as a star in **Figure 3**).

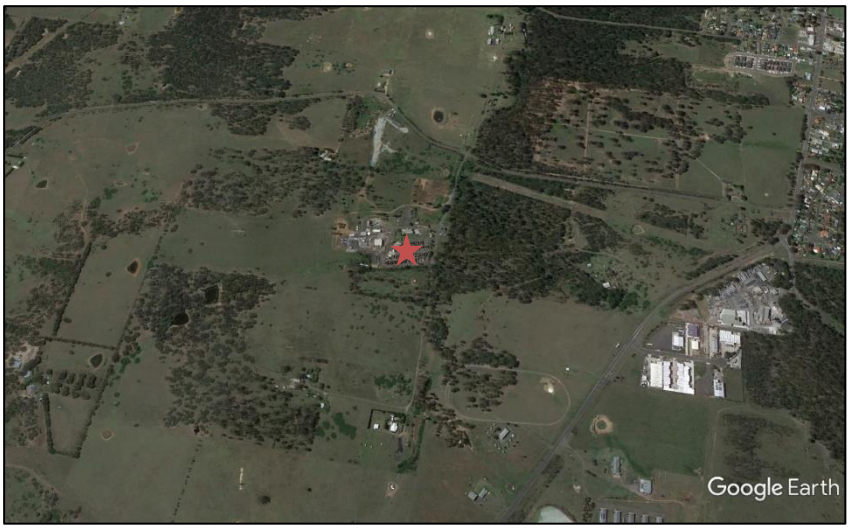


Figure 3: Appin Power Station Location

Assuming that the power station and mine facilities are currently operating in compliance with the adopted noise criteria, implies that the noise at the receiver approximately 450m from the site is less than 41 dB(A) L_{Aeq} (15 min). It can also be assumed that noise generation from the power station doesn't contain any directional components and, therefore, the noise propagation would be similar in all directions from the site.

Under such circumstances, the noise at receivers that are about 200m from the power station could be up to 47 dB(A) L_{Aeq} (15 min). This would be 6 dB(A) over the adopted day, evening and night time noise criteria for the site.

In the current situation a noise barrier would have to be constructed close to the power station. From an acoustic point of view, a single noise barrier, built around a noises source is, usually, preferable to applying multiple noise control options and many receivers.

Any acoustic assessment would also require quantification of the Lw of the power station, and other mine facilities at the site, throughout all times of the day, evening and night and under all operating conditions. Calculation of received noise at all potentially affected receivers would subsequently need to be performed. (SA1, pp 18-19)

The power station is approximately 720m south of the southern boundary of the northern portion of the Part 2 lands. Based on the calculation in SA1, the noise level from the power station would be less than 36 dB(A), which is 5 dB below the established night time noise criterion and no mitigation will be required.

4.2 Wilton Road

Assessment of road traffic noise in SA1 resulted in general noise control recommendations that are applicable to the southern portion of Part 2 lands. These recommendations are reproduced below with section headings changed for consistency with this report.

In general the Guideline indicates that where a new residential development is planned to occur near a busy road appropriate building design, layout and construction techniques should be applied to minimise noise intrusion and provide suitable internal noise levels for sleeping and other uses.

The following sections provide some general information in relation to incorporating sound acoustic practises in house design.

4.2.1 Walls

Masonry walls typically have better noise insulation properties than other elements in the building envelope. Generally, walls are not a significant noise transmission path. Therefore attention should be given to the windows, doors, roof and ventilation openings as these elements will not insulate as well as the walls.

Walls of lightweight construction (e.g. weatherboard, compressed fibrous cement sheeting, timber slats, timber sheeting etc.) provide less noise insulation than masonry walls to low frequency noise. On noisy sites lightweight cladding should be avoided unless specifically designed to provide adequate insulation.

Whether the walls are masonry or of light-weight construction, the wall's insulation capacity will be weakened if it contains ventilators, doors or windows of a lesser insulation capacity. To improve insulation response, ventilators can be treated with sound-absorbing material or located on walls which are not directly exposed to the external noise.

4.2.2 Windows

In acoustic terms windows are one of the weakest parts of a facade. An open or acoustically weak window will severely negate the effect of an acoustically strong facade. Whenever windows are incorporated in a building design their effect on acoustic performance of the building facade should be considered. Reducing the numbers of windows and/or appropriately positioning them away from the road can be beneficial.

Proper sealing is crucial to the success of noise reduction of windows. To prevent sound leaks, windows should be caulked (with a flexible sealant such as mastic or silicone) thoroughly from the inside, and outside between the wall opening and the window frame. Usually the best option is use one of the many commercially available double glazed or laminated windows with acoustic seals.

Laminated glass is usually cheaper and easier to install than double glazing and is relatively effective in reducing moderate to high levels of traffic noise as indicated previously in this report. Double-glazing: is cost-effective when a very high level of noise attenuation is required. When using double-glazing, the wider the air space between the panes the higher the insulation.

Other factors influencing the acoustic performance of windows include:

- *Window seals: ensure windows are fitted with high quality acoustic seals and close windows to reduce internal noises levels.*

- *Reduction in window size, recognising that reducing the proportion of window to wall size from 50% to 25% reduces noise by only 3 decibels.*

- *Increase the glass thickness: the thicker the glass the more noise resistance it provides. However, glass thickness is only practical up to a point before the costs exceed the acoustic benefits of increasing glass thickness.*

- *The presence of absorbent materials on the window reveals will improve noise insulation.*

- *Window frames and their installation in wall openings must be air tight and operable. Windows must incorporate acoustic seals for optimal noise insulation.*

The Guideline also indicates that external areas at residences should be shielded from high levels of noise.

Whilst it may not be possible to acoustically shield the entire yard of a house it is usually relatively simple to shield smaller active recreation

areas such as courtyards. Such courtyard areas can be located to be acoustically shielded by the building elements of the house or garage or can be otherwise shielded by the construction of solid fencing or walls. To act as an acoustic barrier any fencing or walls must be solid to the intended height (to be determined by individual assessment) with no gaps for the passage of sound. (SA1, pp 27-29)

5.0 CONCLUSION

An acoustic assessment has been undertaken into the potential for noise emanating from various existing and proposed significant noises sources to impact on the Appin (Part 2) Precinct that is proposed for rezoning for residential purposes.

The assessment has identified several existing noise sources and the typical noise levels from them. Based on this general noise control options have been detailed.

The assessment has indicated that a combination of relatively common architectural treatments and noise control such as construction of noise barriers, can be employed to achieve an adequate acoustic amenity at future residences.

In conclusion, from an acoustic point of view, the proposed development may be supported provided the appropriate noise attenuation measures are incorporated at key existing noise generating sites and proposed infrastructure deliverables for the project.