



Doc. No: 242439-10472

Noise Impact Assessment Proposed Manufactured Housing Estate 34 Wyndella Road, Lochinvar, NSW

Prepared for:

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April 2025



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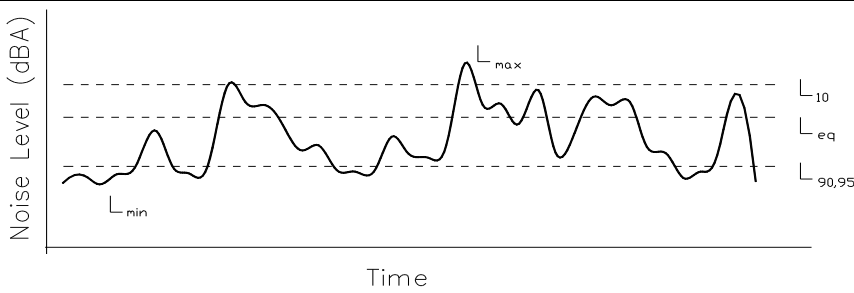
1. INTRODUCTION

This report provides the results, findings and recommendations arising from an acoustical assessment of minor modifications to a proposed manufactured housing estate (MHE) at 34 Wyndella Road, Lochinvar NSW, previously assed by Spectrum Acoustics in 2024.

This revision of the report also includes our previous response to a an RFI from Council following their review of the initial report.

Table 1 contains a glossary of commonly used acoustic 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.



The graph illustrates the noise level (dBA) over time. The y-axis is labeled 'Noise Level (dBA)' and the x-axis is labeled 'Time'. A fluctuating line represents the noise level. Horizontal dashed lines indicate specific noise levels: L_{min} (the lowest point of the fluctuation), L_{max} (the highest peak), L_{10} (the level exceeded for 10% of the time), L_{eq} (the equivalent continuous noise level), and $L_{90,95}$ (the level exceeded for 90% and 95% of the time, respectively).

2. BACKGROUND TO THE PROPOSAL

The proposed development application seeks consent for development of a MHE comprising:

- Site area 10.75 Ha
- 182 home sites
- Private internal roads
- Communal landscaped areas
- Caravan and visitor parking
- Central facility enclosing function room with stage, gym, lounges
- Bowling green, pickle ball and pool external to central facility

An aerial view of the site and nearest residential receivers is shown in **Figure 1**. A layout of the overall proposal is shown in **Figures 2 and 3**. The central facility layout is shown in **Figure 4**. Finer details of the central facility are available elsewhere in the DA documentation.

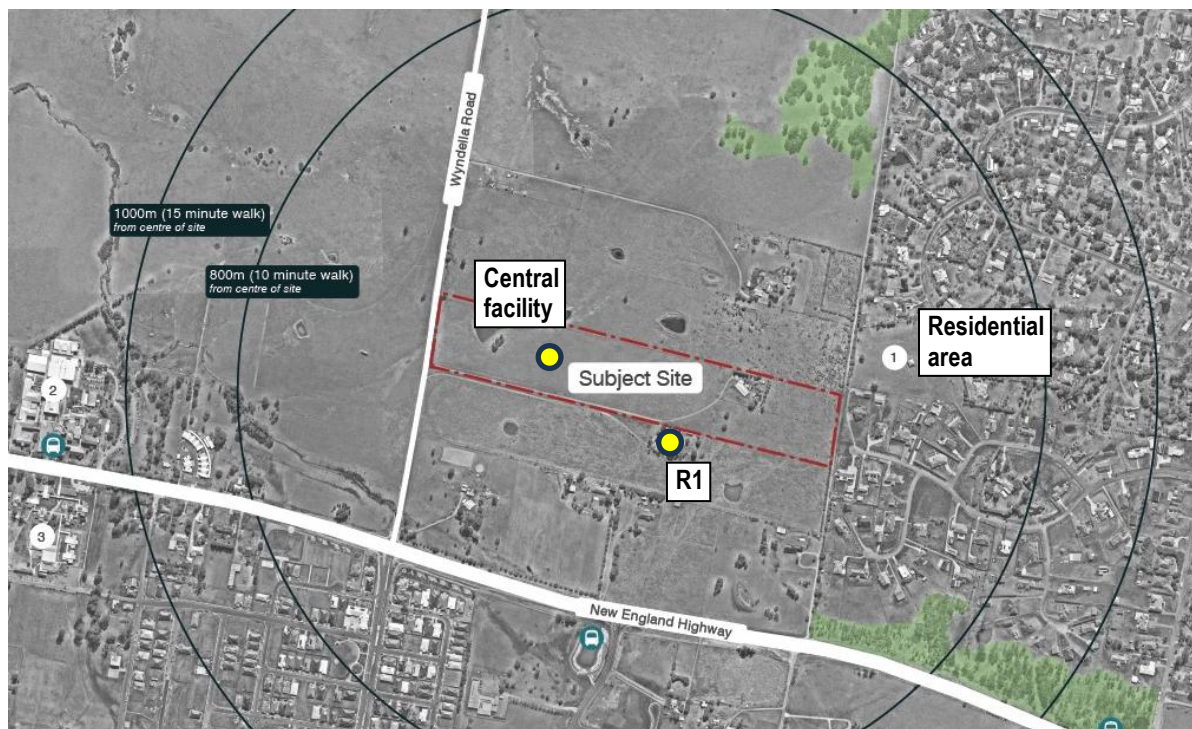


Figure 1 – Aerial view of project site (source: Google Earth)

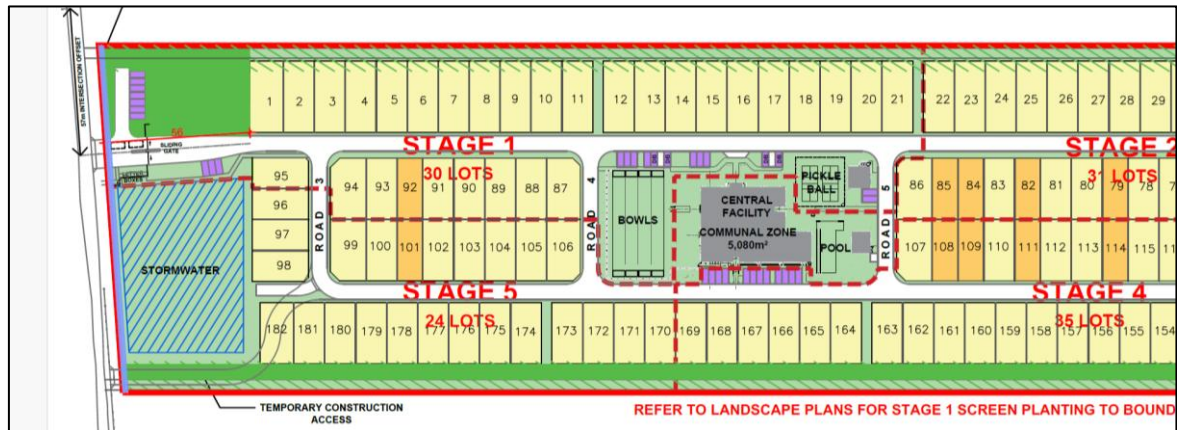


Figure 2 – Proposed site layout (west)



Figure 3 – Proposed site layout (east)

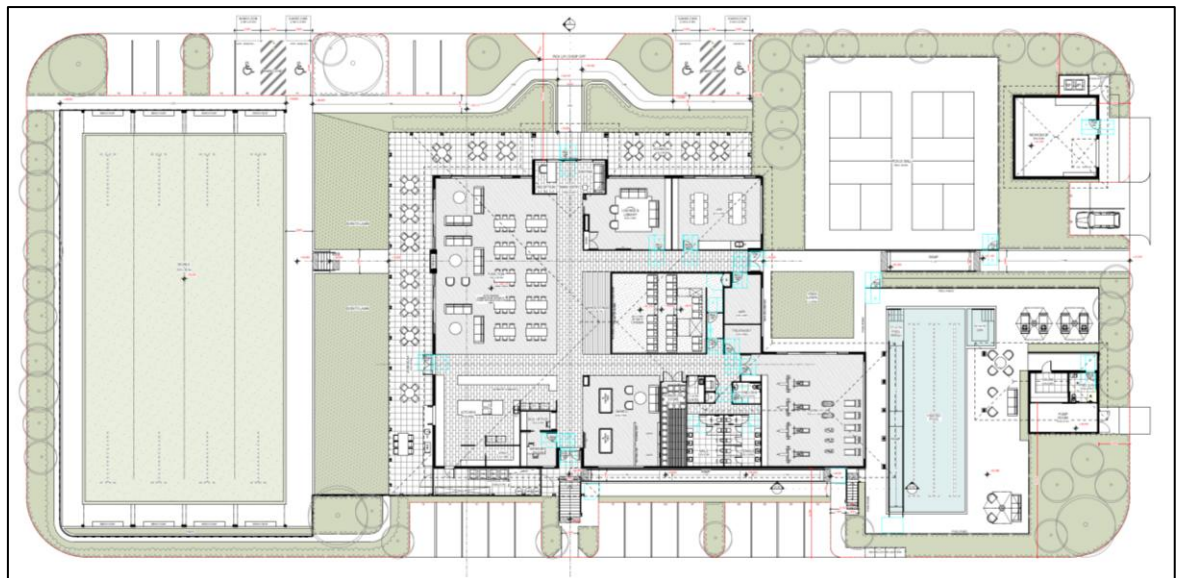


Figure 4 – Proposed central facility layout.

3. EXISTING ACOUSTIC ENVIRONMENT

The site and surrounding residences is located within 500 m of the New England Highway and will experience traffic noise. For conservatism, the default minimum 30 dB(A) background level for evening and night has been adopted in accordance with section 3.1.2 of the NSW Noise Policy for Industry (NPfI).

Due to the inclusion of a function room and bar, the site will be assessed as a licensed premises.

4. NOISE IMPACT CRITERIA

Premises which are licensed under the Liquor Act may be a source of offensive noise for neighbouring residents as a result of activities on the premises, or the activity of patrons arriving and departing.

The Police Department, GNSW and EPA have agreed that the GNSW will accept primary responsibility for the control of noise from licensed premises. Following are the Standard Noise Conditions imposed by GNSW;

“The LA10 noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5 Hz - 8 kHz inclusive) by more than 5 dB between 7.00 a.m. and 12.00 midnight at the boundary of any affected residence.

The LA10 noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5 Hz - 8 kHz inclusive) between 12.00 midnight and 7.00 a.m. at the boundary of any affected residence.

Notwithstanding compliance with the above, the noise from the licensed premises shall not be audible within any habitable room in any residential premises between the hours of 12:00 midnight and 07:00 a.m.”

GNSW criteria specifically relate to noise in octave band centre frequencies. In order to accurately assess the potential impacts of noise from patron activity, frequency spectral data were taken from attended noise surveys detailed in the Spectrum Acoustics technical database.

The database contains background noise levels measured in similar acoustic environments, in octave bands, with a Bruel & Kjaer Type 2260 Precision Sound analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 “Sound Level Meters”. Calibration of the

instrument was confirmed with a Bruel & Kjaer Type 4231 Sound Level Calibrator prior to, and at the completion of measuring.

The background noise level used in this assessment for setting the GNSW criteria has been derived by adjusting a typical background octave band spectrum to match the adopted evening background L90 level of 30 dB(A). This will represent the worst case trading hours that may extend into the evening (6pm – 10pm) and night (after 10pm) periods.

The adopted background noise level and GNSW criteria for assessing noise emission from the site are shown in **Table 2**.

TABLE 2 MEASURED NOISE LEVELS (L90) and GNSW CRITERIA (L10)										
		Octave Band Centre Frequency, Hz								
	dB(A)	31.5	63	125	250	500	1k	2k	4k	8k
L ₉₀	30	10	17	20	22	23	24	21	21	19
GNSW	35	15	22	25	27	28	29	26	26	24

5. QUANTIFICATION OF NOISE SOURCES

The Applicant has advised that there may be live music and other events organised by the residents a few times a year. Another noise source requiring assessment is use of the outdoor areas such as the pool, pickle ball courts and bowling greens.

As shown in Figure 2, the central facility is optimally located for acoustic screening relative to off-site receivers, being at the western and of the site and fully surrounded by MHE home sites. Locations for music and people in the external recreation spaces are shown in Figure 5.

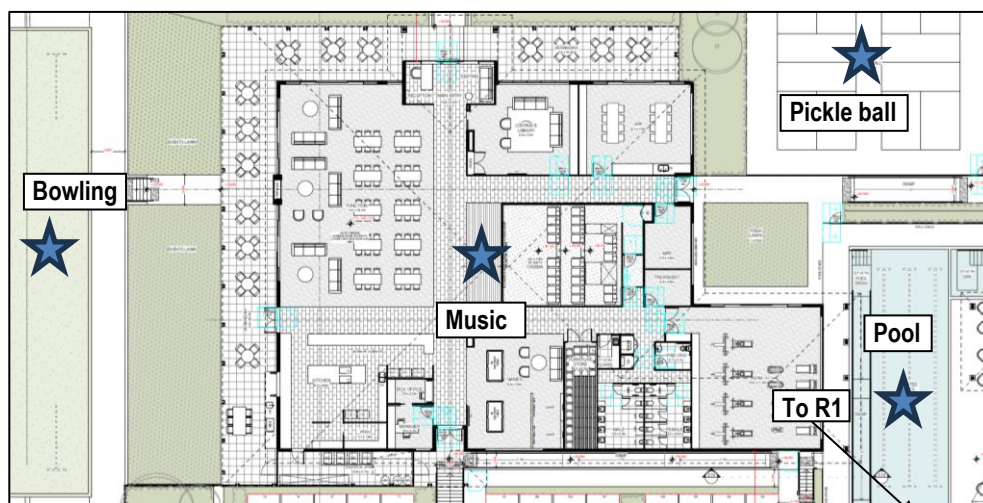


Figure 2 – Potential location for music and external recreation sources

The adopted LA10 sound power level of typical amplified singer style music spectrum previously measured by Spectrum Acoustics is shown in **Table 3**.

Allowing for a group of nominally 20 patrons in each of the outdoor areas and with ten people in each group speaking in raised voices at the same time, a typical sound power level of 80 dB(A) has previously been adopted for similar assessments.

TABLE 3 Lw of singer performance and patrons									
	Octave Band Centre Frequency, Hz dB(A)								
	dB(A)	63	125	250	500	1k	2k	4k	8k
Music	100	48	69	80	90	94	95	92	84
Patrons	80	23	45	61	71	74	74	69	60

6. RESULTS AND DISCUSSION

The nearest potentially impacted receiver is R1 in Figure 1 at a distance of 350m from the central facility.

The noise representing a music performance in the centre of the function room was then theoretically propagated through the Service Area doors, assumed open to the nearest receiver R1 taking into account the effects of hemispherical spreading (distance loss), ground and atmospheric absorption, with results in **Table 4**.

TABLE 4 CALCULATED MUSIC SPL AT RECEIVER R1									
	Octave Band Centre Frequency, Hz								
Item	dB(A)	31.5	63	125	250	500	1K	2K	4K
Source Lw	100	48	69	80	90	94	95	92	84
Internal dist. loss (10m)		15	15	15	15	15	15	15	15
Break-out loss (doors)		10	10	10	10	10	10	10	10
Distance loss (350m)		59	59	59	59	59	59	59	59
Ground absorption		6	6	6	6	6	6	6	6
Barrier loss (MHE)		5	5	5	5	5	5	5	5
Atmospheric absorption		0	0	0	1	2	3	6	12
SPL @ receiver	<0	<0	<0	<0	<0	<0	<0	<0	<0
Criterion (GNSW)	35	15	22	25	27	28	29	26	26

The above table of results show that noise emissions from a performer/singer within the central facility would be below audible thresholds at the nearest receiver. Noise emissions from patrons in the outdoor would each emit 10 dB lower levels than the internal music performance but would not benefit from losses from within a building

A basic calculation similar to that in Table 4 confirms that noise from the outdoor areas will be <10 dB at R1 and remain well below the 35 dB(A) default minimum GNSW criterion.

Lower levels than those predicted above for R1 would be experienced at all other more distant receivers such as houses east of the site.

Regarding vehicle movements on site, these would be residents' private vehicles entering and exiting via Wyndella Road in the west and moving at very low speeds on the internal roads with no potential for adverse impacts on residents east of River Road.

Waste collection would be by way of kerbside pick-up via the internal road network, again with negligible potential to impact off-site receivers who would presumably also have kerbside waste collection on the same day/s.

Mechanical plant would again be internal to the site with negligible potential to approach the levels predicted above for the central facility and external recreation areas.

7. RECOMMENDATIONS AND CONCLUSION

An acoustical assessment of a proposed manufactured housing estate (MHE) at 34 Wyndella Road, Lochinvar NSW has been completed. The results of the assessment have shown that the received noise as a result of worst case noise emissions from the proposal will be well below the adopted default minimum GNSW noise criteria at the nearest potentially impacted receiver. Accordingly, we see no acoustic reason why the proposal should not be approved.

Response to Council RFI – October 2024

MEMBER FIRM



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Attention:	Max Wheen	Date:	24/10/2024
From:	Neil Pennington	Ref:	242439-Lt1
Copies to:	--	Pages:	1

☐ Urgent ☐ Please Reply ☒ For your files ☐ No action required

Subject: Response to Council RFI: 34 Wyndella Road, Lochinvar

Dear Mr Wheen,

This letter presents a response to issues raised by Maitland City Council in an RFI following their review of our acoustic assessment 242439-10472 for this project. The issues raised and responses are given below.

The noise report has not had noise measurements undertaken. It's a model.

Correct, the EPA default minimum noise trigger levels were adopted without the need for background noise measurement. Modelling of noise emissions is necessary for any development that does not currently exist.

They only have 1 x sensitive receiver called R1 which is 350m away from the site.

Noise from the proposed central facilities requires assessment and R1 is the closest existing receiver by a considerable margin. Compliance at the most impacted receiver implies compliance at all more distant receivers.

The noise assessment does not consider the impact of the noise from the Mobile Homes at the location. It does not appear to have been factored this into the cumulative noise impact.

No formally assessable noise sources associated with the mobile homes themselves was identified. Please see further discussion below.

It is Council's opinion that noise at the eastern end of the site (near Pennparc Drive) should be assessed as sensitive receivers. 194 MHE and the cumulative noise from vehicle movements, garbage collection, TV's operating, residents mowing their strip, stereos operating etc needs to be assessed and added into the assessment. These sensitive receivers (Pennparc Drive) will be closer than the R1 that is modelled in the assessment.

Residential activities such as TV's operating, residential mowing and stereos are outside the scope of engineering noise assessments. Such matters would be addressed by Council with guidance from the EPA's Noise Guide for Local Government on the consideration of "offensive noise" and restricting activities such as lawn mowing to daytime hours. Having noted that, it is inconceivable that use of televisions or stereos inside a dwelling in the MHE would produce unacceptable noise levels at the nearest Pennparc Drive residence without damaging the hearing of the person(s) operating the TV or stereo. Even in the case of excessively loud music, this would be in contravention of by-laws of the MHE as the impact on adjoining residents in the MHE would be unacceptable. Compliance with site rules regarding noise will automatically ensure no off-site adverse impacts.

Vehicle movements on site would be at close to idle speed in regular passenger cars. With a nominal sound power level of 75 dB(A) and duration of possibly 10 seconds per event, the approximate level of <25 dB(A), Leq(15min) at 40m to the nearest Pennparc Drive residence poses no potential for adverse impacts.

The assessment shows that they have adopted a background level of 30bBA with a criterion of 35 that should not be exceeded. Whilst it could be assumed that this loss may occur to the nearest sensitive receiver, the assessment does not include assessment of outdoor areas, the pool and the pickleball courts. They will all be in operation and will contribute to noise from the property that is likely to affect the nearest sensitive receiver. These areas will likely be used up until about 9pm, particularly during daylight savings time. This needs to be added to the assessment for cumulative noise from the proposed development.

The outdoor areas including pool, pickleball courts and bowling greens are closest to R1 and at greater distance from Pennparc Drive residences. The cumulative predicted noise level of <10 dB at R1 in our acoustic assessment will be lower at Pennparc Drive. These are imperceptible noise levels at all off-site receivers.

It is noted that music (live) is to occur in the recreation room – It is not clear if this is a singer, a band, or a stereo operating and until what time. The worst-case scenario should be put forward in the noise assessment. Including music with the doors open, a band, singer with acoustic guitar etc and the times will most likely be in the evening noise period. The noise will of course be louder if a singer was to perform on the Sunday afternoon on the recreation area deck. This does occur and needs to be factored into the assessment.

The Applicant has advised there will be no bands hired in for entertainment. Rather, the possibility of live music would be limited to residents of the estate forming an ensemble and occasionally having a short performance internal to the building as considered in our assessment. The predicted level at R1 was 0 dB which is below hearing threshold. Even lower levels would result at the more distant Pennparc Drive residences. The Applicant has also advised that these community-based performances would not occur on an outside deck, but there is no acoustic restriction to this occurring with levels not exceeding 15 dB(A) at off-site receivers being possible.

The noise assessment allows 20 patrons with 10 people speaking in the outdoor area. This is assumed to be on 2 sides of the recreational facility. It is Council's opinion that this calculation should be doubled at least, given that 194 residents (assuming 1 person per unit) are to be occupying the site. From Council's experience residents flock to these locations at about 4pm and don't leave until about 9pm. It is suggested that this impact will be a lot higher, and this noise will travel towards the highway and maybe towards Pennparc.

Considering 100 people speaking rather than 10 as adopted in our assessment, the sound power level of patrons would increase by 10 dB relative to the 80 dB(A) adopted in our assessment. Our assessment was incomplete as a propagation calculation for this source was not conducted. In completing that calculation using the same methodology as presented in Table 4 of our report, excluding internal losses and breakout from the building, the predicted level of 10 dB(A) at R1 remains well below the noise trigger level.

Waste collection is mentioned in the report but the impact has not been reflected in the noise assessment for the development. Garbage trucks, noise from collection is loud and offensive particularly given reference to the current location being very quiet – it's a rural property and none of these noises currently occur on the site. Commercial waste collection services generally operate between 4am-6am which would be offensive noise.

Waste collection would be by private contractor and the Applicant is accepting of limiting waste collection to occur during normal daytime hours of 7am – 6 pm.

Mechanical ventilation and positioning should also be factored into the acoustic report. These details are not in the report and the mechanical ventilation for the recreation room, gym, etc, needs to be included in the acoustic report. In addition to this, 194 air conditioning systems from each mobile home needs to be factored into the cumulative affects of the development.

Along the southern side of the proposal, 57 HME dwellings could have AC units exposed to R1. At a typical sound power level of 65 dB(A) for a domestic condenser unit the combined sound power level is 83 dB(A). Propagating this to R1 over 350m results in a mid-frequency level of 16 dB(A).

Along the eastern side of the proposal, 5 HME dwellings could have AC units exposed to Pennparc Drive. At a typical sound power level of 65 dB(A) for a domestic condenser unit the combined sound power level is 72 dB(A). Propagating this to the nearest Pennparc Drive residential boundary over 40m could result in a mid-frequency level of up to 30 dB(A). This remains 5 dB below the default minimum night time noise trigger level of 35 dB(A).

Heat pumps for the pool and spa have very low noise emissions with levels at low as 40 dB(A) at 3m having been measured by Spectrum Acoustics. There is no potential for adverse off-site noise impacts.

Plans of the proposed Central Facilities building indicate a service area outside the western end of the southern wall that would contain mechanical plant for the facility. This is exposed to R1 but at significantly greater distance from Pennparc Drive and shielded by MHE structures. Allowing up to 90 dB(A) combined sound power from these plant items, the predicted level at R1 is 22 dB(A) which remains well below the night time noise trigger level of 35 dB(A).

Traffic noise also needs to be factored into the acoustic report. There is no public transport and the site is at least 5 kilometres from the nearest shopping centre. It is suggested that the applicant utilise the estimated vehicle trip rates provided in the TIA to factor in potential noise impacts as a result of vehicle movements.

The TIA for the proposal states that "To incorporate TfNSW's advice an increased peak hour traffic generation rate of 0.65 vehicles / dwelling has been adopted consistent with the upper end of traffic forecasts for townhouses noted in the RMS Guide to Traffic Generating Developments document."

With 195 dwellings proposed, the peak hour traffic generation is 127 vehicle movements. Using standard calculations for intermittent traffic (US EPA, 1974), an assumed speed of 40km/h as vehicles are closest to the nearest Pennparc Drive residence and close to entering/exiting the MHE entrance and a separation distance of nominally 30m from the centre of the road the calculated level is 41.3 dB(A),Leq(1hr).

Table 3 of the EPA Road Noise Policy (RNP, 2011) recommends that traffic generated on a local road by a land use development should not exceed 55 dB(A),Leq(1hr) during the day and 50 dB(A),Leq(1hr) during the night at existing residences. The predicted level of 41 dB(A) is well below these recommended levels.

The last item that should be assessed in the noise assessment is climatic conditions. This area gets significant fogs throughout the winter months. Temperature inversions occur and this needs to be factored into the noise assessment. Noise travels further in these conditions and can be louder."

Having formerly been a researcher for the Australian Coal Association studying the effects of atmospheric conditions on sound propagation and developing mathematical algorithms to calculate these effects for nonlinear vertical sound speed profiles (ACARP Project C11044, 2003-2004) I have considerable expertise in this area.

Council is correct that sound travels further in fogs (due to high relative humidity damping the dissipative effects of O₂ molecular excitation which converts noise energy into heat) and under temperature inversion conditions (in which one of the primary effects of downward refraction is an increase in reflection angles with the ground surface and the resultant loss of ground absorption).

These effects are negligible over distances of a hundred metres but in a worst case there could be a 5 dB increase at 350m distance based on the ISO 9613-2 methodology. This could increase the level of 23 dB(A) at R1 from full exposure to mechanical plant to 28 dB(A) which remains well below the default minimum night time noise trigger level of 35 dB(A). The worst case level of 15 dB(A) predicted for music on the outdoor deck could increase to 20 dB(A) under these conditions.

In summary, it is my professional opinion and experience that this proposal is acoustically benign with negligible potential to give rise to adverse impacts on the amenity of off-site residential receivers,

I trust this letter satisfies your requirements at this time.

Regards,



Neil Pennington

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