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MF004-01F01 Acoustic Report (r0).docx

Lighthouse Christian College

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Lighthouse Christian College, Keysborough - PAC Acoustic Assessment

Renzo Tonin & Associates has been requested to review placement of proposed PAC units for the proposed multi-purpose hall located 927-937 Springvale Road, Keysborough (Subject Development).

Acoustic measures have been set out in this report to achieve compliance with EPA Publication 1826 noise protocol limits.

As set out in this document the proposed use is predicted to conform with EPA Noise Protocol 1826 at all times.

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APPENDIX B EPA Publication 1826 Noise Protocol

EPA Publication 1826 'Noise Limit and Assessment Protocol for the Control of Noise from Commercial, Industrial and Trade Premises and Entertainment Venues' (EPA 1826) came in to effect from 1 July 2021 (superseding State Environment Protection Policies N-1 and N-2).

The Environment Protection Act 2017 is supported by the Environment Protection Regulations 2021; EPA 1826 sets the methodology for assessing the effective noise level to determine unreasonable noise under the Environment Protection Regulations 2021.

Part 1.A.1 of EPA 1826 Noise Protocol governs noise from commercial premises affecting residential properties within major urban areas; but is explicitly not applicable for voices or private vehicles. EPA 1826 commercial noise limits are calculated from planning overlays; and background noise levels measured within an area, in absence of intrusive commercial noise sources.

EPA Pub. 1826-P1 noise limits are calculated from planning overlays and background noise levels measured within an area in absence of intrusive commercial noise sources. The table below presents the applicable noise limits.

EPA 1826-P1 night-time noise limits are more stringent than that of the day or evening periods. As such, compliance during the night-time period implies compliance during the evening and day periods, where the source noise level does not vary. For this assessment the applicable location of assessment is outside surrounding dwellings, assessed over a 30-minute period.

Table 1: EPA Pub. 1826-P1 Noise Protocol commercial limits

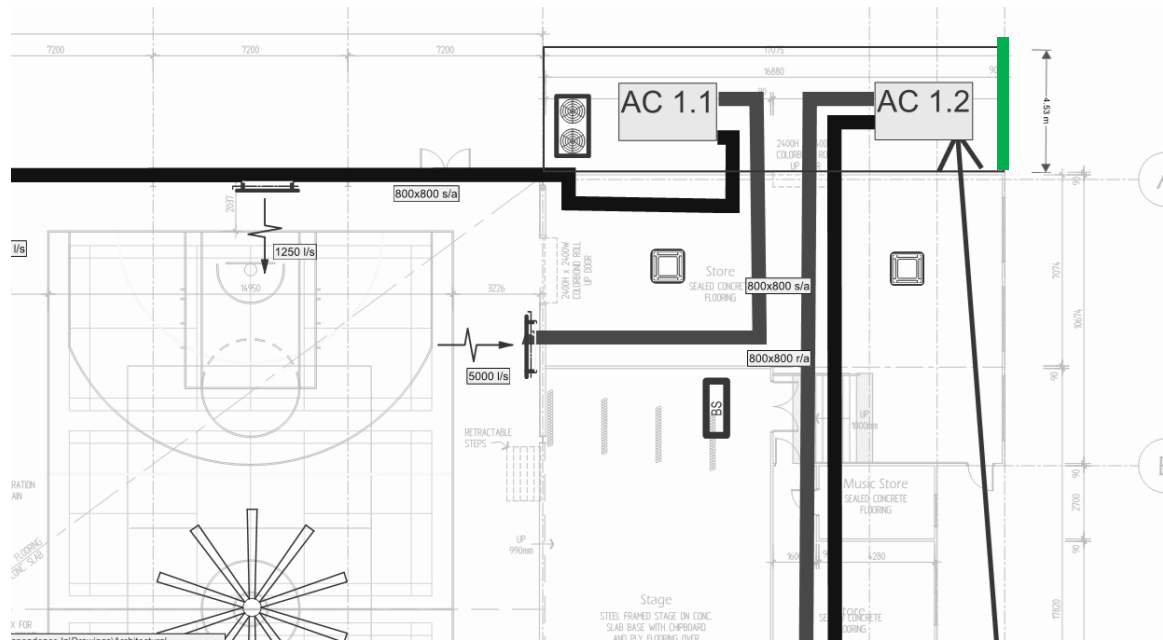
Period	Location	EPA 1826-P1 Noise limit L_{eq} dB(A)
Day	Nearest residential receivers	50
Evening		44
Night		39
EPA 1826 / EP Reg 2021 period definitions:	Day: Monday-to-Saturday 7am-to-6pm; Evening: Monday-to-Saturday 6pm-to-10pm; Night: All days 10pm-to-7am	Sundays NA Sundays and public holidays 7am-to-10pm
Notes:	Neutral classification noise limits	

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APPENDIX C Acoustic measures

The following acoustic barrier is proposed:



Acoustic barrier

1. (green) The proposed acoustic barrier shall be built to a minimum of 3.5 metres total height.
3. Acoustic barriers may be constructed using any of treated timber, glass, precast concrete panels, lightweight aerated concrete, transparent acrylic panels, profiled metal sheet cladding, and/or fibre cement sheeting as long as the selected material (or combined skins) has a mass of at least 8kg/m².
4. Where the above condition is not demonstrated, the overall sound transmission loss through the material of which the fence is to be constructed shall not be less than R_w 20, to be approved by a suitably qualified acoustic consultant.
5. Acoustic barriers and parapets shall have no gaps or holes, and shall be designed so that there is no likelihood of them occurring through natural causes or deformations which would allow noise to pass through.
6. The barrier must be designed and built in an acceptable manner so that noise will not pass underneath it.

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APPENDIX D Mechanical services noise assessment

It is understood that two packaged air-conditioning units are proposed to be located on the north boundary of the proposed multi-purpose hall, in front of the storeroom.

The following sound power levels have been considered in this assessment.

Table 2: Mechanical services, Sound Power $L_{W,eq}$ dB

Noise source	Overall dB(A) per unit	Octave Band Centre Frequency (Hz)							
		125	250	500	1k	2k	4k	8k	
Outdoor packaged air conditioning unit (Ref Actron Air PKY960T):									
Low mode	78	84	78	75	73	69	60	54	
High mode	83	89	83	80	78	74	64	60	

The following scenario has been modelled:

All day operation – Everyday

- 2x packaged air conditioning (PAC) outdoor units $L_{W,eq}$ 78-83 dB(A) each, located ground level north of the proposed multi-purpose hall, operating on all modes

Based on the proposed multi-purpose hall construction details and acoustic measures, the table below presents predicted noise levels from the proposed multi-purpose hall to the nearest dwellings. As shown, noise from the proposed PAC units on the Subject Development is predicted to conform with EPA 1826-P1 Noise Protocol at all times.

Table 3: EPA 1826 noise assessment, L_{eq} dB(A)

Assessment location	Predicted noise L_{eq} dB(A) – Low mode	Predicted noise L_{eq} dB(A) – High mode	Conforms with EPA 1826 Noise Protocol? Day/Eve/Night 50/44/39
12 Stanford Ave	30	35	Yes
14 Stanford Ave	32	37	Yes
16 Stanford Ave	30	35	Yes
18 Stanford Ave	24	28	Yes
20 Stanford Ave	21	26	Yes

Notes: Noise levels at other dwellings more distant are predicted to be less.

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APPENDIX E Glossary of terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment period	The period in a day over which assessments are made.
Assessment point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of every day sounds: 0dB The faintest sound we can hear 30dB A quiet library or in a quiet location in the country 45dB Typical office space. Ambience in the city at night 60dB CBD mall at lunch time 70dB The sound of a car passing on the street 80dB Loud music played at home 90dB The sound of a truck passing on the street 100dB The sound of a rock band 120dB Deafening
dB(A)	A-weighted decibels. The A- weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Leq	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.

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Document control

Date	Revision history	Non-issued revision	Issued revision	Prepared	Instructed	Reviewed / Authorised
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