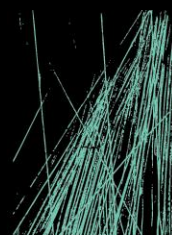




ACOUSTIC REPORT FOR DEVELOPMENT APPLICATION

**UNITING EDINGLASSIE STAGE 2 -
ILU REDEVELOPMENT**



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1 INTRODUCTION

JHA Consulting Engineers has been engaged by Midson Group Pty Ltd to provide a noise impact assessment for the proposed stage 2 re-development of the Uniting Edinglassie site located at 1-3 Emerald St, Emu Plains NSW 2750.

The existing 45 ILUs are in the south eastern and north western portions of the site and were constructed in the 1970's as villa style developments. Their design and features are out of step with contemporary demand and requiring increasing levels of maintenance to keep them to a serviceable condition. For these reasons, the proposal is to demolish and replace them with a more contemporary design and greater product mix that make greater use of the valuable site and provides Uniting an opportunity to accommodate and assist more residents in the Emu Plains area. The proposed redevelopment will provide 147 ILU's with a unique identity and character that not only underpins all aspects of design and reflects the Uniting values, but also reflects upon Emu Plains as an established suburb in the west of Sydney.

An acoustic assessment has been undertaken and is detailed in this report along with the findings and recommendations. This report has been prepared as part of the Development Application to be submitted to Penrith City Council.

This report shall be read in conjunction with the Architectural design drawings and other consultant design reports submitted as part of the application.

The objectives of this acoustic assessment are:

- Identify noise sensitive receivers that will potentially be affected by the operation of the proposed development.
- Carry out noise surveys to determine existing ambient and background noise levels on site.
- Establish appropriate noise criteria in accordance with the relevant standards, guidelines and legislation for noise emissions.
- Determine whether the relevant criteria can be achieved based on the proposed operations. Where applicable, provide recommendations for any necessary acoustic control measures that will need to be incorporated into the development or use in order to ensure with the assessment criteria.
- Carry out a traffic noise impact assessment to define the building envelope's sound insulation requirements to achieve compliance with the relevant noise level criteria within the spaces.

This report provides:

- A statement of compliance with the relevant statutory criteria for the proposed use development within the vicinity of the nearest potentially affected receivers.
- Recommendations for noise mitigation measures for the proposed development in order to meet the relevant criteria when compliance is not achieved.

The following documentation has been used for the preparation of this report:

- Architectural documentation prepared by Group GSA Pty Ltd.
- Traffic Impact Assessment prepared by TTW
- Noise data collected on site through the use of noise loggers and a handheld spectrum analyser.

This document and related work have been prepared following JHA Consulting Engineers Quality and Environmental Management Systems, which are based on AS/NZS ISO 9001:2015 and ISO 14001:2015.

2 DESCRIPTION OF THE SITE AND PROPOSAL

2.1 LOCATION AND SITE DESCRIPTION

Emu Plains is a suburb of Sydney in the state of New South Wales. It is 58Km west of the Sydney central business district, in the local government area of the City of Penrith and is part of the Greater Western Sydney region. The proposed Stage 2 redevelopment of Uniting Edinglassie site is located on 1-3 Emerald St, Emu Plains NSW and it is legally known as Lot 10/DP1242243 with an approximate site area of 18,200m².

The surrounding development is mainly low density residential and the surrounding land uses are as follows:

- *North:* Medium density residential development (R3) and Local Centre (B2).
- *East:* Low-density residential development (R2).
- *South:* Low-Medium density residential development (R2 – R3).
- *West:* Low-density residential development (R2).

Figure 1 shows the site boundary (red outline) and the redevelopment area (orange shading).



Figure 1: Site boundary (red outline) and the redevelopment area (orange shading).

2.2 SURROUNDING RECEIVERS

The location and summary of the nearest noise sensitive receivers surrounding the site are shown in Figure 2 and Table 1 respectively, including assumed approximate distances from the buildings with noise sources to the receiver boundaries, noting the type of noise receiver and if the receiver is existing or future.



Figure 2: Nearest noise sensitive receivers surrounding the site location.

ID	Sensitive Receiver	Receiver Status	Receiver Type	Approx. Distance, m
1	253 Great Western Highway	Existing	Residential	50
2	1 Pyramid Street	Existing	Commercial	50
3		Existing	Commercial	55
4	12 Emerald Street	Existing	Residential	20
5	13 Emerald Street	Existing	School	<5
6	10 Troy Street	Existing	Residential	<5
7	15 Troy Street	Existing	School	40
8	7 Troy Street	Existing	Residential	15

Table 1: Nearest sensitive receivers surrounding the site.

3 SITE MEASUREMENTS

3.1 GENERAL

An unattended noise survey has been conducted in order to establish the ambient and background noise levels of the site and surrounds, and to determine traffic noise levels incident upon the proposed development. The location at L1 was found to be representative of the nearest most affected residential receivers in regards to background noise levels. Noise surveys have been carried out in accordance with the method described in the AS/NZS 1055:2018 '*Acoustics – Description and measurement of environmental noise*'.

An attended noise measurements was carried out at location M1 in order to determine noise levels from traffic incident upon the facades of the development located towards the East of the site.

The long-term noise monitoring location is shown in Figure 3.



Figure 3: Noise monitoring locations

3.2 LONG-TERM NOISE MONITORING

Long-term noise monitoring was carried out from Tuesday 26th of July to Wednesday 3rd of August 2022 with a Rion NL-52 Class 1 Sound Level Meter (Serial Number 01254316). The noise logger recorded L_{A1} , L_{A10} , L_{Aeq} and L_{A90} noise parameters at 15-minute intervals during the measurement period. The calibration of the noise logger was checked before and after use and no deviations were recorded.

This location was secure and considered to be representative of the typical ambient and background noise levels. The microphone was mounted 1.5 meters above the ground and a windshield was used to protect the microphone.

The detailed results of the long-term noise monitoring are presented graphically in Appendix A. Weather conditions were monitored for the duration of the noise survey and were typically calm and dry. As stated in the NSW NPI, any data likely to be affected by rain, wind or other extraneous noise has been excluded from the calculations.

Rating Background Levels (RBLs) are shown in Table 2, together with the ambient noise levels (L_{Aeq}) measured for each period. The RBLs are determined in accordance with the methodology from the NSW NPI.

Location	Rating Background Level, dB(A)			L_{Aeq} Ambient Noise Levels, dB(A)		
	Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am	Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am
L1	42	40	34	54	46	48

Table 2: Background results of the long-term noise monitoring.

3.3 SHORT-TERM NOISE MONITORING

Short-term noise monitoring was carried out to obtain representative third-octave band noise levels of the site on Tuesday 26th of July and Wednesday 3rd of August 2022, during the day-time period. Short-term noise measurements were carried out with a NTi XL-2 hand-held Sound Level Meter (SLM) (Serial Number A2A-13742-E0). The calibration of the SLM was checked before and after each use and no deviations were recorded.

The SLM microphone was mounted 1.5 metres above the ground and a windshield was used to protect the microphone. Measurements were undertaken in the free-field – i.e., more than 3 metres away from any building façade or vertical reflective surface. Weather conditions were calm and dry during the attended noise monitoring.

A summary of the results of the short-term noise monitoring are shown in Table 3.

Location	Date and Time	Parameter	Sound Pressure Level, dB (re 20μPa)								
			Overall dB(A)	Octave Band Centre Frequency, Hz							
				63	125	250	500	1k	2k	4k	8k
M1	26/07/2022 1:42pm – 1:57pm	L _{90,15min}	52	55	52	49	47	47	43	35	25
		L _{eq,15min}	63	66	64	60	58	59	56	49	42
		L _{10,15min}	66	68	62	60	60	62	59	49	39
M1	03/08/2022 2:11pm – 2:26pm	L _{90,15min}	53	56	52	47	44	46	45	42	33
		L _{eq,15min}	61	66	64	59	55	57	54	50	41
		L _{10,15min}	64	68	65	60	58	60	56	51	42

Table 3: Results of short-term noise monitoring.

4 RELEVANT NOISE STANDARDS AND GUIDELINES

4.1 STANDARDS AND GUIDELINES

The following standards and guidelines are considered relevant to the project and have been referenced in developing the project noise level criteria.

- Regulatory Framework:
 - Protection of the Environment Operations (POEO) Act 1997.
 - Environmental Planning and Assessment (EP&A) Act 1979.
- Planning Framework:
 - Penrith Development Control Plan (P-DCP) 2014
 - Penrith Local Environment Plans (P-LEP) 2010.
 - State Environmental Planning Policy (Housing) 2021
- Operational Noise
 - NSW EPA Noise Policy for Industry (NPI) 2017.
 - Australian Standard 2107:2016 '*Acoustics - Recommended Design Sound Levels and Reverberation Times for Building Interiors*'
- Transport Noise:
 - NSW EPA Noise Policy for Industry (NPI) 2017.
- Demolition and Construction Noise and Vibration:
 - NSW DECCW Interim Construction Noise Guideline (ICNG) 2009.
 - NSW DEC Assessing Vibration: A Technical Guideline 2006.
 - Australian Standard AS 2436:2010 '*Acoustics – Guide to Noise Control on Construction, Maintenance & Demolition Sites*'.

4.2 REGULATORY FRAMEWORK

4.2.1 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT

The Environmental Planning and Assessment Act 1979 (EP&A Act) provides the regulatory framework for the protection of the environment in NSW. The EP&A Act is relevantly about planning matters and ensuring that “environmental impact” associated with the proposed development is properly considered and reasonable before granting development consent to develop.

The assessment of environmental impact relies upon the identification of acceptable noise criteria which may be defined in a Development Control Plan, or derived from principles using guidelines like NSW EPA Noise Policy for Industry (NPI 2017) or Noise Guide for Local Government (NGLG 2013).

4.2.2 PROTECTION OF THE ENVIRONMENTAL OPERATIONS ACT

The Protection of the Environment Operations (POEO) Act 1997 has the objective of protecting, restoring and enhancing the quality of NSW environment. Abatement of noise pollution is underpinned by the definition of “offensive noise” as follows:

“...

(a) that, by reason of its level, nature, character or quality, or the time at which it is made, or any other circumstances:

(i) is harmful to (or is likely to be harmful to) a person who is outside the premises from which it is emitted, or

(ii) interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted, or

(b) that is of a level, nature, character or quality prescribed by the regulations or that is made at a time, or in other circumstances, prescribed by the regulations.

..."

NGLG 2013 provides a checklist to determine an offensive noise".

4.3 PLANNING FRAMEWORK

4.3.1 PENRITH CITY COUNCIL LEGISLATION

The P-LEP 2010 is the environmental planning instrument that applies to the site. The site is zoned as medium-density residential (R3) and the surrounding areas are zoned as low-density residential (R2), medium-density residential (R3), public recreation (RE1) and local centre (B2). Figure 4 shows the land zoning map based on the NSW Planning Portal. The purple highlight represents the Uniting Edinglassie site.

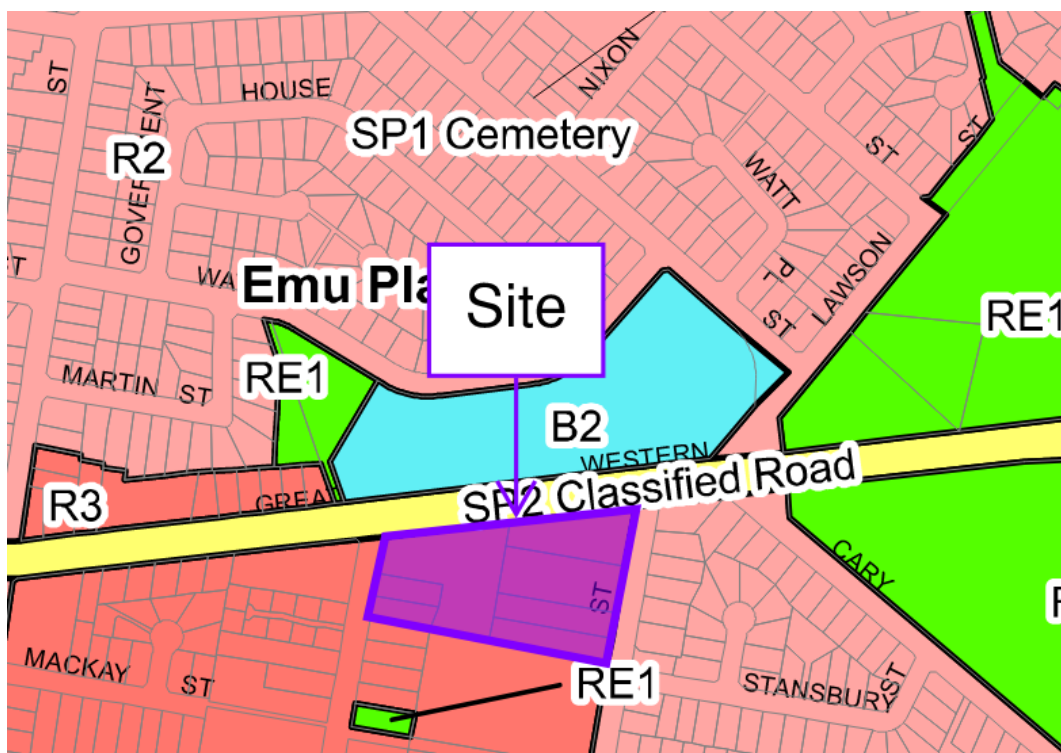


Figure 4: Land zoning of the site and surroundings.

4.3.2 STATE ENVIRONMENTAL PLANNING POLICY (HOUSING) 2021

The State Environmental Planning Policy (Housing) 2021 aims to ensure acceptable noise levels in bedrooms of new dwellings minimising traffic noise break-in. AS/NZS 2107:2016 will be used to establish the internal noise targets for the proposed development. These internal noise targets are for noise from external sources such as traffic. Refer to Table 4 for the recommended internal noise targets based on retirement homes/villages in suburban areas.

Type of occupancy / activity	Design sound level ($L_{Aeq,t}$) range, in dB(A)
Apartment common areas	45 – 50
Living areas	35 – 45
Sleeping areas (night-time)	35 – 40
Work areas	35 – 45

Table 4: Internal noise level ($L_{Aeq,t}$) range as per AS2107:2016.

4.4 OPERATIONAL NOISE

4.4.1 NSW EPA NOISE POLICY FOR INDUSTRY

The NSW NPI assesses noise from industrial noise sources - scheduled under the POEO. Mechanical noise from the development shall be addressed following the recommendations in the NSW NPI.

The assessment is carried out based on the existing ambient and background noise levels addressing the following:

Intrusiveness Criteria, to control intrusive noise into nearby sensitive receivers.

Amenity Criteria, to maintain the noise level amenity for particular land uses.

These criteria are established for each assessment period (day, evening and night) and the more stringent of the two criteria sets the Project Noise Trigger Level (PNTL).

4.4.1.1 Intrusiveness Criteria

The NSW NPI defines the intrusiveness criteria as follows:

"The intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (represented by the L_{Aeq} descriptor), measured over a 15 minute period, and does not exceed the background noise level by more than 5 dB when beyond a minimum threshold."

Based on the intrusiveness criteria definition and the background noise levels recorded, Table 5 shows the intrusiveness criteria for the noise sensitive residential receivers.

Indicative Noise Receiver	Period	Rating Background Level $L_{A90,period}$ dB(A)	Intrusiveness Criterion dB(A)
Residential Receivers	Day	42	47
	Evening	40	45
	Night	34	39

Table 5: Determination of the intrusiveness criterion.

4.4.1.2 Amenity Criteria

The NSW NPI states the following to define the amenity criteria:

"To limit continuing increases in noise levels from application of the intrusiveness level alone, the ambient noise level within an area from all industrial noise sources combined should remain below the recommended amenity noise levels specified in Table 2.2 where feasible and reasonable. The recommended amenity noise levels will protect against noise impacts such as speech interference, community annoyance and some sleep disturbance."

Based on the amenity criteria definition and the land zoning, Table 6 shows the amenity criteria for the noise sensitive receivers.

In accordance with the NPI methodology, no corrections have been made to the amenity noise levels as the area is not impacted by noise from industrial sources, and is not expected to be in the future. The NPI establishes amenity noise levels for 'School classrooms – (Internal)'. Therefore, to derive external noise level limits to the school, as a conservative estimate, the difference between the internal noise level and the external noise level, a 10dB correction has been used.

Indicative Noise Amenity Area	Period	Amenity Noise Level $L_{Aeq,period}$ dB(A)	Amenity Noise Level $L_{Aeq,15minutes}$ dB(A)
Suburban Residential (R2 - R3)	Day	55	53 (55-5+3)
	Evening	45	43 (45-5+3)
	Night	40	38 (40-5+3)
School classroom – (External)	Noisiest 1-hour period when in use	45	43 (45-5+3)
Commercial	When in use	65	63

Table 6: Determination of amenity criterion.

4.4.1.3 Project Noise Trigger Levels

The PNTL's are shown in Table 7 and have been obtained in accordance with the requirements of the NSW NPI. These shall be assessed to the most affected point on or within the noise sensitive receiver boundary. The more stringent of the intrusiveness and amenity is to be used in the assessment.

Indicative Noise Amenity Area	Period	Intrusiveness Criterion $L_{Aeq,15min}$ dB(A)	Amenity Criterion $L_{Aeq,15min}$ dB(A)
Suburban Residential (R2 - R3)	Day	47	53
	Evening	45	43
	Night	39	38
School classroom	Noisiest 1-hour period when in use	---	43
Commercial	When in use	---	63

Table 7: Determination of PNTL's (light grey highlight) for noise sensitive receivers.

4.4.2 MECHANICAL SERVICES NOISE

The internal noise levels will be a combination of the external noise and noise from the building services, particularly the air-conditioning systems. The internal noise criteria due to mechanical services noise will be designed in general accordance with the Australian Standard 2107:2016 'Acoustics - Recommended Design Sound Levels and Reverberation Times for Building Interiors'. The recommended Design Sound Levels are presented in Table 8. This criteria shall be addressed during design stages.

Occupancy	Design Sound Level ($L_{Aeq,T}$) range, dB(A)
Sleeping Areas (night-time)	35 to 40
Living areas	35 to 45
Lounges	< 50
Dining rooms	40 to 45
Kitchen, Laundry and Maintenance areas	< 55
Foyers and recreation areas	45 to 05

Table 8: AS 2107:2016 design sound levels for areas relevant to the development.

4.5 CONSTRUCTION NOISE AND VIBRATION

4.5.1 NOISE CRITERIA

The ICNG suggest construction noise management levels that may minimise the likelihood of annoyance being caused to noise sensitive residential receivers depending on the duration of works. The management levels for long-term duration works are as follows:

- Within recommended standard hours.

The $L_{Aeq,15min}$ level measured at the most exposed boundary of any affected residential receiver when the construction site is in operation must not exceed the background noise level by more than 10dB(A). This noise level represents the point above which there may be some community reaction to noise.

However, in the case of a highly noise affected area, the construction noise level ($L_{Aeq,15min}$) at the most exposed boundary of any affected residential receiver when the construction site is in operation should not exceed 75dB(A). This level represents the point above which there may be strong community reaction to noise.

- Outside recommended standard hours.

The $L_{Aeq,15min}$ level measured at the most exposed boundary of any affected residential receiver when the construction site is in operation must not exceed the background level by more than 5dB(A). It is noted that a strong justification is required for works outside the recommended standard hours.

Table 9 below summarises the airborne construction noise criteria for most the affected noise sensitive receivers surrounding the development site.

Sensitive Receiver	Airborne Construction Noise Criteria, L_{Aeq} dB(A)	
	Within Standard Hours	Outside Standard Hours
Low Density Residential (R2)	Noise affected / External	RBL + 10
	Highly noise affected / External	75
Classrooms at schools and other educational institutions	Noise affected / Internal	45
Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion)	Noise affected / External	65

Table 9: ICNG construction airborne noise criteria for noise sensitive receivers surrounding the site.

Where reference is made to an internal noise level, an external noise level 10dB above the internal noise levels are applied which should achieve the internal noise level where a window is adequately opened to provide natural ventilation.

The ICNG recommends internal ground-borne noise maximum levels at residences affected by nearby construction activities. Ground-borne noise is noise generated by vibration transmitted through the ground into a structure and can be more noticeable than airborne noise for some sensitive receivers. The ground-borne noise levels presented below from the ICNG are for residential receivers during evening and night-time periods only, as the objective is to protect the amenity and sleep of people when they are at home.

- Evening: $L_{Aeq,15min}$ 40dB(A) (internal)
- Night: $L_{Aeq,15min}$ 35dB(A) (internal)

The internal noise levels are assessed at the centre of the most affected habitable room.

4.5.2 VIBRATION CRITERIA

4.5.2.1 Structural Building Damage

Ground vibration from construction activities can damage surrounding buildings or structures. For occupied buildings, the vibration criteria given in previous section for Human Comfort shall generally form the limiting vibration criteria for the Project.

For unoccupied buildings, or during periods where the buildings are unoccupied, the vibration criteria for building damage suggested by German Standard DIN 4150.3:2016 'Vibration in Buildings – Effects on Structures' are to be adopted. Guideline values from DIN 4150.3:2016 are presented in Table 10.

Structural type	Vibration velocity, mm/s (Peak Particle Velocity - PPV)				
	Foundation			Plane of floor uppermost full storey in horizontal direction	Floor slabs, vertical direction
	1Hz to 10Hz	10Hz to 50Hz	50Hz to 100Hz	All frequencies	All frequencies
Type 1: Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40	20
Type 2: Residential buildings and buildings of similar design and/or occupancy	5	5 to 15	15 to 20	15	20
Type 3: Structures that because of their particular sensitivity to vibration, cannot be classified under Type 1 and 2 and are of great intrinsic value (e.g. heritage buildings)	3	3 to 8	8 to 10	8	20

Table 10: DIN 4150.3:2016 Guideline values of vibration velocity (PPV) for evaluating the effects of short-term vibration.

4.5.2.2 Human Comfort

The Department of Environment and Climate Change (DECC) developed the document 'Assessing Vibration: A Technical Guideline' in February 2006 to assist in preventing people from exposure to excessive vibration levels within buildings. It is based on the guidelines contained in BS 6472.1:2008 'Guide to evaluation of human exposure to vibration in buildings – Vibration sources other than blasting'.

The guideline does not address vibration induced damage to structures or structure-borne noise effects. Vibration and its associated effects are usually classified as continuous (with magnitudes varying or remaining constant with time), impulsive (such as shocks) or intermittent (with the magnitude of each event being either constant or varying with time). Vibration criteria for continuous and impulsive vibration are presented in Table 11 below, in terms of vibration velocity levels.

Place	Time	r.m.s. velocity, mm/s [dB ref 10 ⁻⁶ mm/s]			
		Continuous Vibration		Impulsive Vibration	
		Preferred	Maximum	Preferred	Maximum
Residences	Day-time	0.20 [106 dB]	0.40 [112 dB]	6.00 [136 dB]	12.00 [142 dB]
	Night-time	0.14 [103 dB]	0.28 [109 dB]	2.00 [126 dB]	4.00 [132 dB]
Offices, schools, educational and worship	When in use	0.40 [112 dB]	0.80 [118 dB]	13.00 [142 dB]	26.00 [148 dB]

Table 11: Continuous and impulsive vibration criteria applicable to the site.

When assessing intermittent vibration comprising a number of events, the Vibration Dose Value (VDV) it is recommended to be used. Table 12 shows the acceptable VDV values for intermittent vibration.

Place	Time	Vibration Dose Values, $m/s^{1.75}$	
		Preferred	Maximum
Residences	Day-time	0.20	0.40
	Night-time	0.13	0.26
Offices, schools, educational and worship	When in use	0.40	0.80

Table 12: Intermittent vibration criteria applicable to the site.

4.6 TRANSPORT NOISE

4.6.1 NSW ROAD NOISE POLICY

The NSW Road Noise Policy (RNP) establishes criteria for traffic noise from:

- Existing roads,
- New road projects,
- Road development projects,
- New traffic generated by developments.

For existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level should be limited up to 2.0dB above the existing noise levels. An increase of up to 2.0dB represents a minor impact that is considered barely perceptible to the average person.

5 NOISE INTRUSION ASSESSMENT

A noise intrusion assessment has been conducted based on the external noise sources impacting upon the façades of the proposed development. The assessment has been conducted in order to provide recommendations on the performance of the glazing in order to meet the internal noise levels as per the AS/NZS 2107:2016 and SEPP (Housing) 2021. The external noise sources which have been included in the assessment were based on the unattended noise monitor and attended noise measurement.

Refer to Table 13 for sound insulation requirements and Table 14 for typical glazing system with their sound insulation rating. The sound insulation requirements are to include both the glass and frame loss. Note that the glazing is for minimum required for acoustic purposes only, and other requirements need to be met.

<i>Building</i>	<i>Room Type</i>	<i>Façade</i>	<i>Weighted Sound Reduction Index (R_w)</i>
A, B	Bedroom / Living Room	North	R_w35
		East	R_w35
		West	R_w35
		South	R_w32
C, D, E	Bedroom / Living Room	North	R_w32
		East	R_w32
		West	R_w32
		South	R_w32

Table 13: Recommended glazing performance (including frame).

<i>Weighted Sound Reduction Index (R_w)</i>	<i>Fixed Single Glazing System</i>
R_w32	6.38mm laminated glass
R_w35	10.38mm laminated glass

Table 14: Typical glazing systems.

These glazing recommendations are high level and should be used as an estimate only, and need to be reassessed during detailed design when more information is known regarding the development and potential future noise impacts.

Rooftop celestial windows are to be at minimum 6mm thick glass or equivalent to achieve an R_w30 construction.

6 EXTERNAL NOISE IMPACT ASSESSMENTS

6.1 EXTERNAL MECHANICAL PLANT

Noise from mechanical plant from the proposed development should be controlled to ensure external noise emissions are not intrusive and do not impact the amenity of noise sensitive receivers. The noise emissions must meet the noise limits as set out in accordance with the NSW NPI.

Noise controls may need to be incorporated with the design of the mechanical plant to ensure that cumulative noise levels from plant to the nearest noise sensitive receivers meets the noise level criteria. Mechanical plant will operate continuously and therefore, night time operation (10pm to 7am) has been considered for the noise assessment of the external mechanical plant.

At this stage, final mechanical plant selections have not been made; therefore, it is not possible to undertake a detailed assessment of the mechanical plant noise emissions. However, a preliminary assessment has been carried out for the mechanical plant based on the following:

- External noise emissions impact on most affected noise sensitive residential receivers
- Night time operation (10pm to 7am) has been considered for the noise assessment of the external mechanical plant
- Condenser unit locations on the balconies
- Club house condenser unit on roof of 60dB(A) at 1m – This unit does not require any acoustic treatment based on proposed location
- Sound Pressure Level of balcony condenser unit for 2-3 bedrooms based on 54-53dB(A) at 1m. and for 1 bedroom 52-49dB(A).
- Sound Pressure Level of the Heat Pumps based on 69dB(A) at 3m (being the total SPL of heat pumps per building)

The preliminary acoustic treatment is as follows:

- Acoustic attenuation shall be implemented to the condenser units located on the terraces of CG09, CG08, C109, C108, C209, C208, D101, D102, D201 and D202. The acoustic attenuation can be in the form of acoustic screening or through other measures where feasible such as night modes, selection of quieter units, or a combination etc. An attenuation of approximately 7dB is required to achieve the external noise emission criteria. This required acoustic treatment will be implemented during detailed design to achieve the external noise emission requirements.
- Refer to Figure 5 for acoustic screening required to the rooftop for the heat pumps. The acoustic screen / barrier shall have a minimum surface mass of 12kg/m², or an acoustic louvre only if required equivalent to ACRAN 20. The screen's height shall be at least 2m high, and at least 200mm above the top of the tallest unit (heat pump) when installed. Heat pump will be installed within each hydraulic plant zone.
- Locate heat pumps at least 3m from any celestial window for acoustic purposes.

Usual design noise controls that may need to be implemented will typically include, but are not limited to:

- Strategic location and selection of plant to ensure the cumulative noise level at the receiver boundaries is met.
- Selection of appropriate quiet plant.
- Acoustic noise control measures to be put in place to minimise noise impacts such as:

- Acoustic assessment of the mechanical plant shall continue during the detailed design phase of the project in order to confirm any noise control measures.



6.2 TRAFFIC NOISE GENERATION

A traffic generation noise assessment has been undertaken in order to determine the potential noise impact of traffic generated by the proposed residential development. Based on the information provided by TTW, the traffic volumes are shared by Emerald Street and Troy Street. The predicted traffic generation by site is presented in Table 15 and Table 16.

	<i>Existing Traffic Volume</i>	<i>Predicted Traffic Volume</i>	<i>dB increase</i>
<i>AM Peak Traffic Flow (vehicles/hour)</i>	100	114	+0.5
<i>PM Peak Traffic Flow (vehicles/hour)</i>	45	60	+1.2

Table 15: Predicted traffic noise level increase on Emerald Street.

	<i>Existing Traffic Volume</i>	<i>Predicted Traffic Volume</i>	<i>dB increase</i>
<i>AM Peak Traffic Flow (vehicles/hour)</i>	204	231	+0.5
<i>PM Peak Traffic Flow (vehicles/hour)</i>	87	115	+1.2

Table 16: Predicted traffic noise level increase on Troy Street.

As noted in Section 4.6, when considering land use redevelopment and the impact on sensitive land uses (residential / schools / hospitals / recreational) the NSW Road Noise Policy (RNP) states that an increase up to 2.0dB in relation to existing noise levels is anticipated to be insignificant. As shown in Table 15 and Table 16, the increase of traffic noise levels due to construction of the development, is less than the maximum allowable increase of 2.1dB(A).

Therefore, the traffic increase due to the construction of the proposed development will not result in any noticeable change in traffic noise levels and is expected to meet the NSW Road Noise Policy recommendations.

7 SUMMARY AND CONCLUSION

A noise and vibration impact assessment has been carried out for the proposed Stage 2 redevelopment of the Uniting Edinglassie located at 1-3 Emerald St, Emu Plains NSW 2750. This report forms part of the documentation package submitted to Penrith City Council as part of the Development Application.

This report establishes relevant noise level criteria, details the acoustic assessment and provides comments and recommendations for the proposed development. Ambient and background noise surveys have been undertaken at the existing site to establish the appropriate noise criteria in accordance with the relevant guidelines.

The noise assessment has adopted methodology from relevant guidelines, standards and legislation to assess noise impact. The noise impacts have been predicted at the nearest noise sensitive receiver boundaries.

At this stage, final mechanical plant selections have not been made; therefore, it is not possible to undertake a detailed assessment of the mechanical plant noise emissions. However, a preliminary assessment has been carried out for the external mechanical plant. Acoustic treatment has been proposed in Section 6.1 of this report in order to meet the noise level criteria set out in Section 4.4.1.3. Acoustic assessment of the mechanical plant shall continue during the detailed design phase of the project in order to confirm any noise control measures.

Noise break-in from traffic noise has been assessed for the external glazing of the buildings and design recommendations have been provided in Section 5 of this report, in order to achieve the internal noise criteria.

The traffic increase due to the construction of the proposed development will not result in any noticeable change in traffic noise levels and is expected to meet the NSW Road Noise Policy recommendations.

The information presented in this report shall be reviewed if any modifications to the features of the development specified in this report occur, including and not restricted to selection of mechanical plant, modification to the building or the introduction of any additional noise sources.

Based on the information presented in this report, relevant objectives will be satisfied and therefore approval is recommended to be granted.

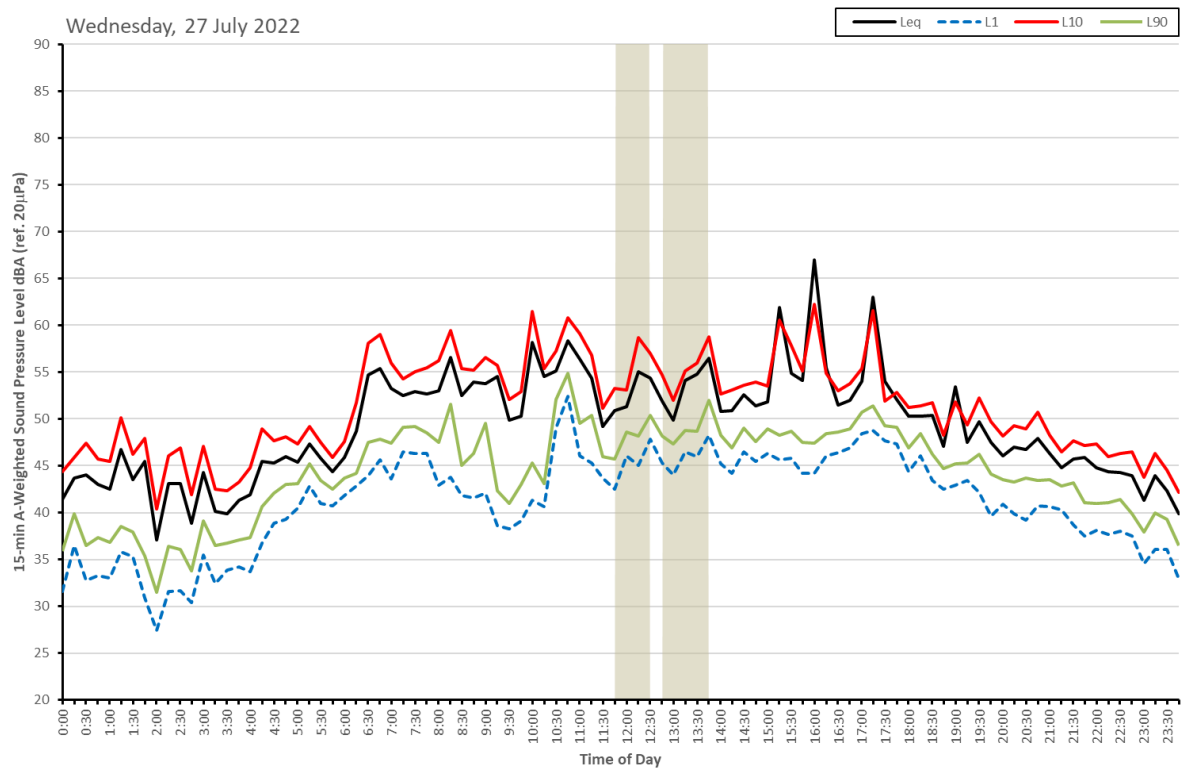
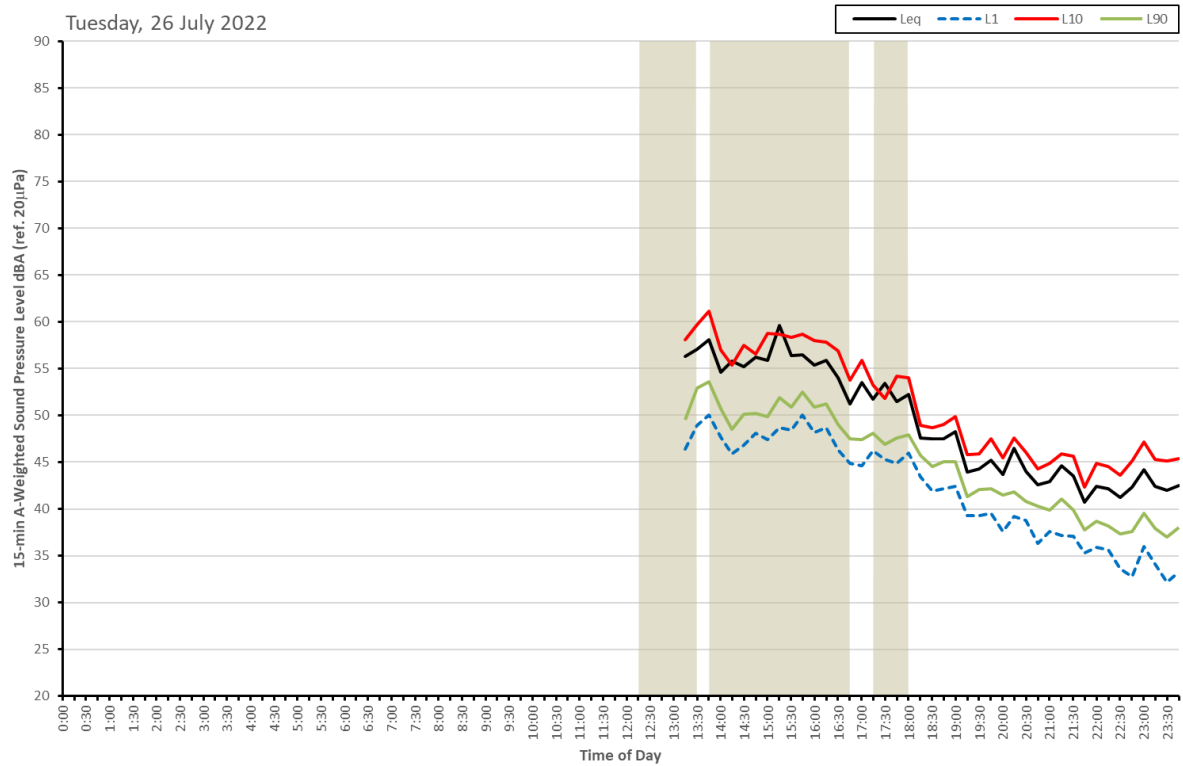
APPENDIX A: LONG-TERM NOISE MONITORING RESULTS

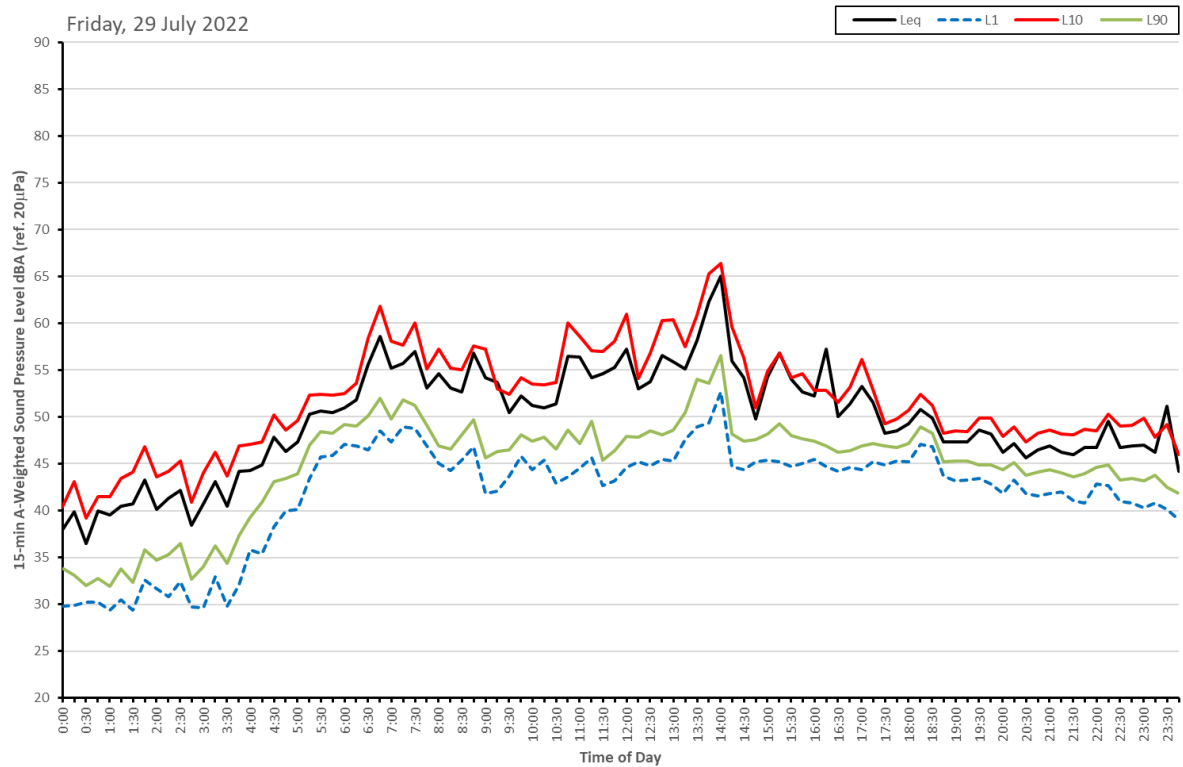
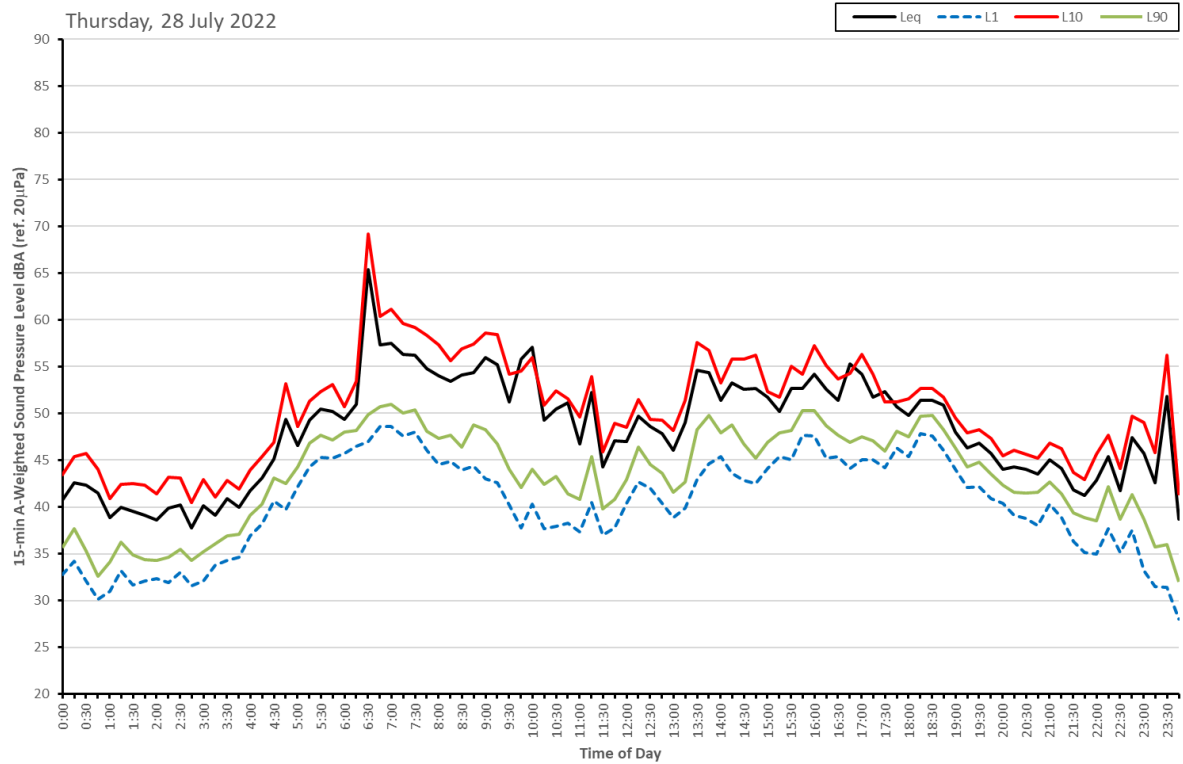
L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

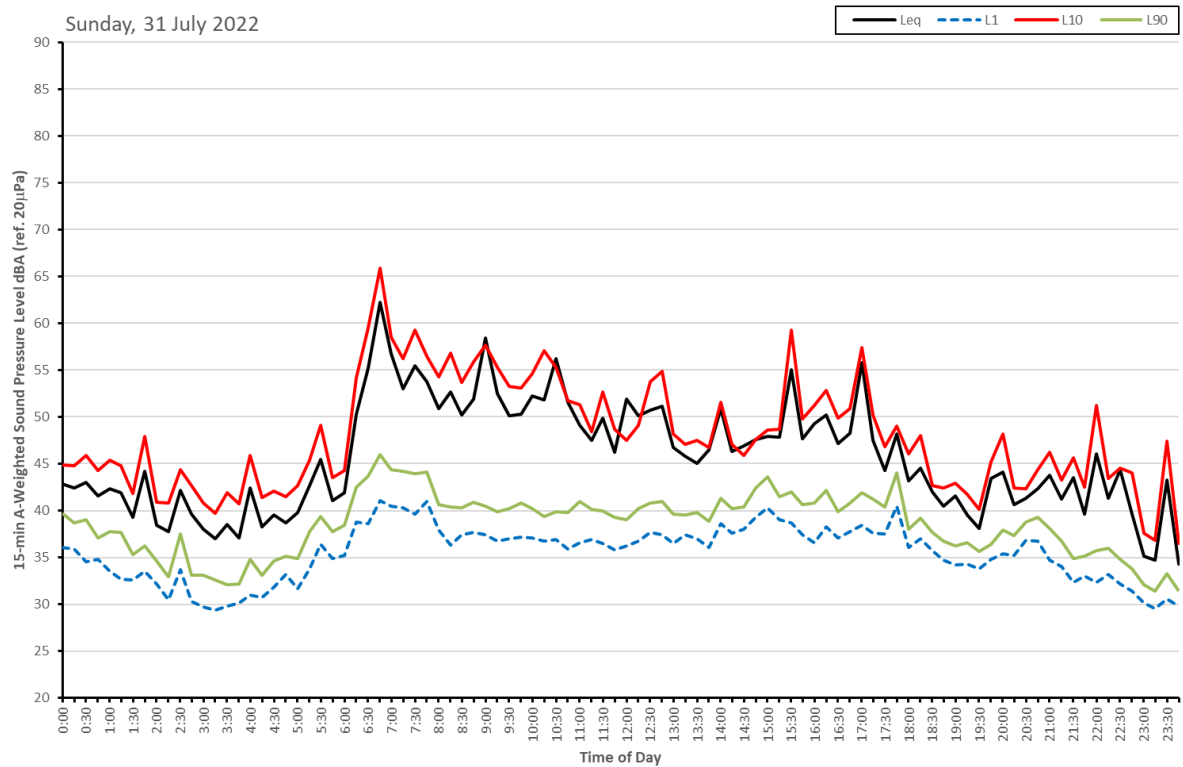
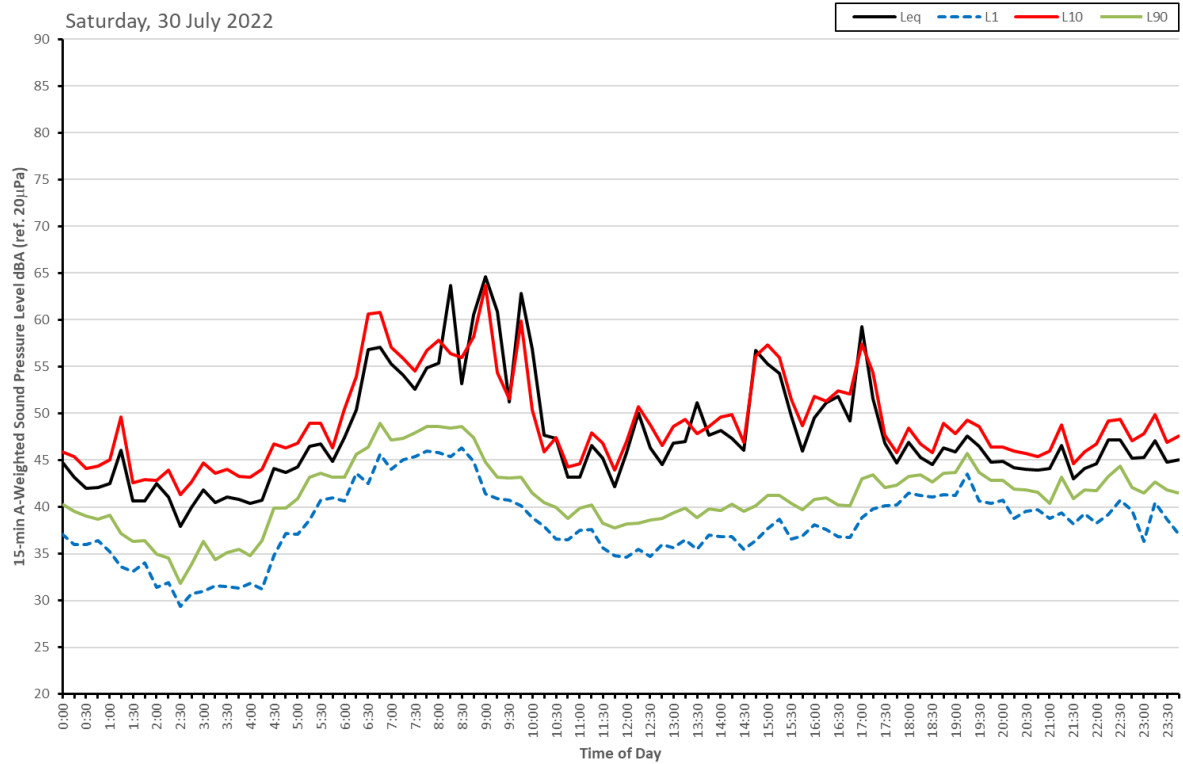
L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

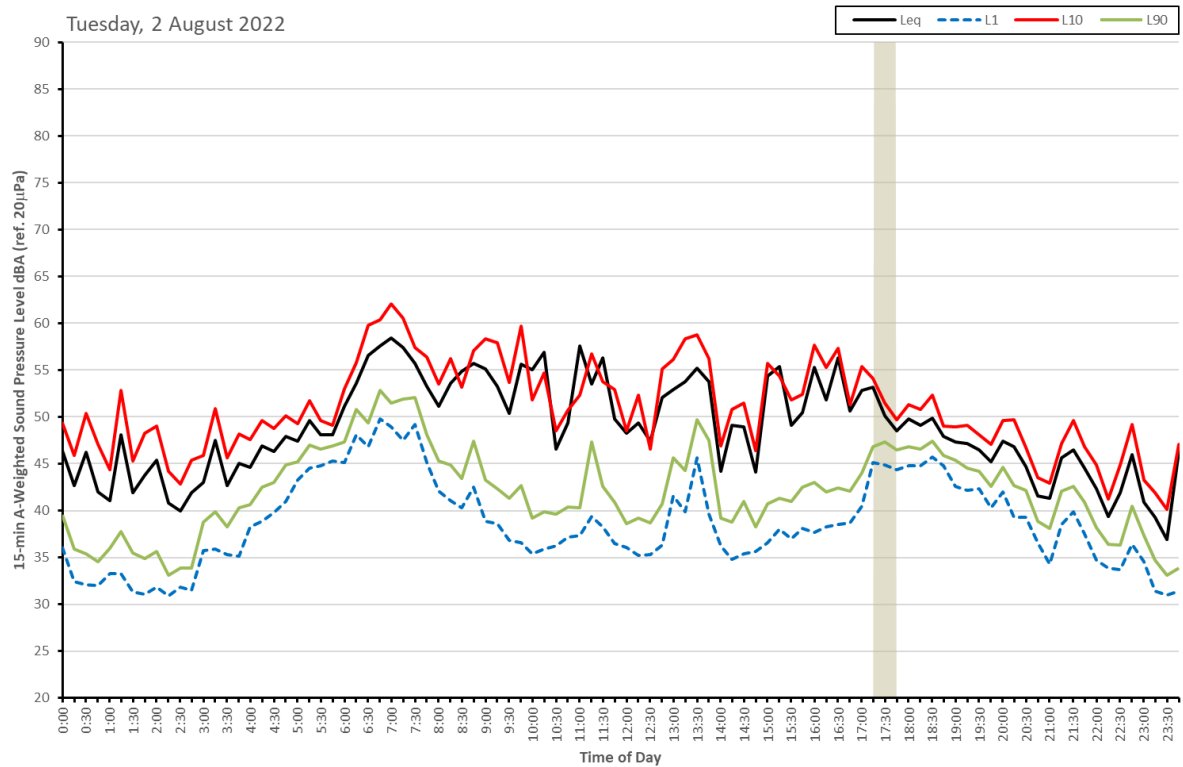
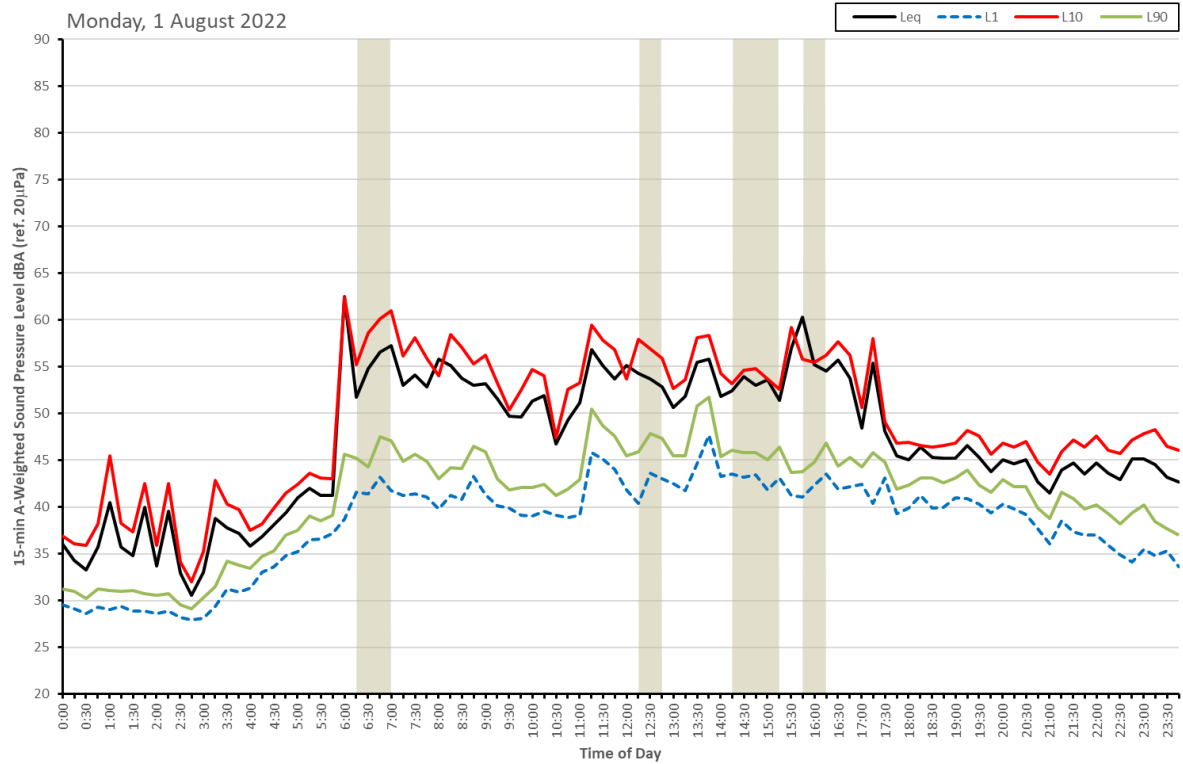
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

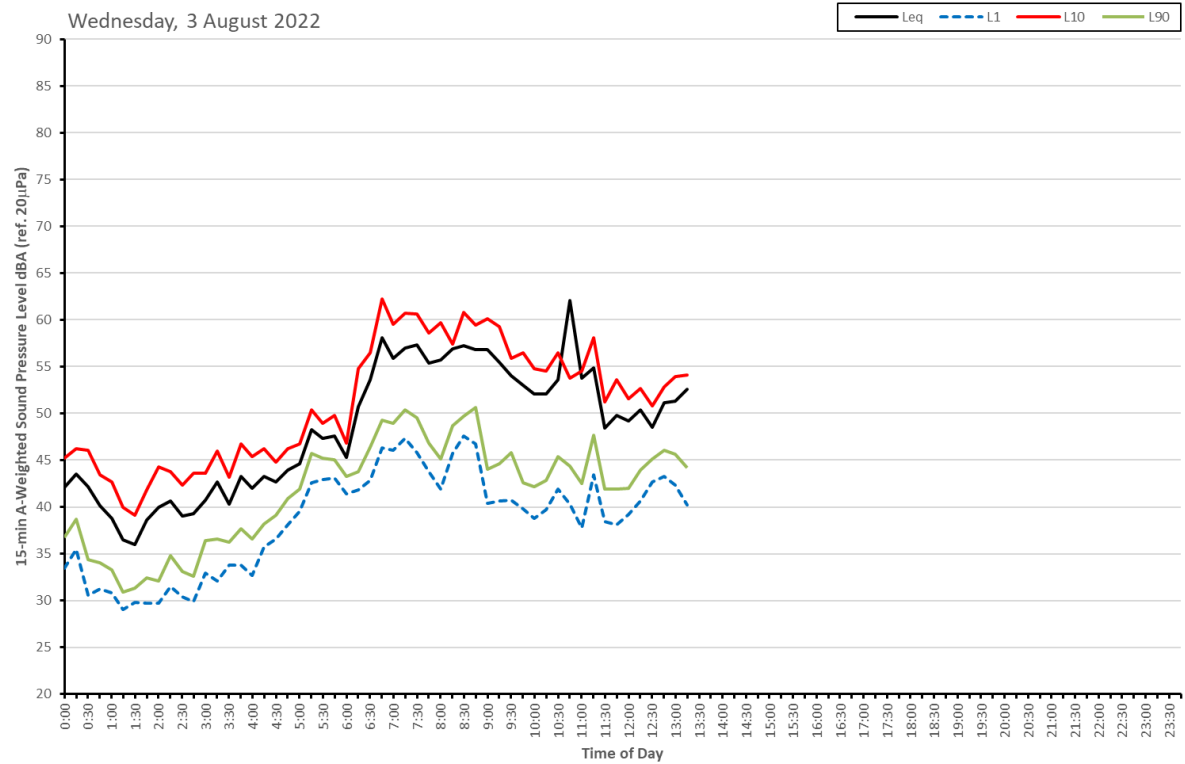
L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.











APPENDIX B: REPONSE TO COUNCIL

JHA prepared a DA Acoustic Report (220236-AC-DA [B] dated 17/11/2022) for the Uniting Edinglassie Stage 2 project in support of the Development Application. This letter provides JHA's response to the comments received from Penrith Council (RFI 170123 – 4 April 2023_PAN-290522) with respect to the content of the Acoustic Report.

Council Comments (in blue) and JHA responses are as follows:

JHA's Response:

Stage 1 has been considered as a sensitive receiver during design, with the Stage 2 mechanical plant on the rooftops acoustically treated as required to achieve compliance to Stage 1 noise emission criteria. Stage 2 is not considered a sensitive receiver to its own development for DA. During design, noise levels will be controlled within the spaces of Stage 2 to achieve internal noise levels from mechanical services from Stage 2 as per AS/NZS 2107:2016.

JHA's Response:

There are no criteria for operational noise from the use of the Clubhouse and rooftop to surrounding receivers or its own development (Stage 2). The clubhouse will be designed such that noise impacts will be minimised through its design and function to avoid the potential for acoustic amenity impacts. Mitigation measures will include minimum 6.38mm laminated acoustic glass, and management measures such as keeping doors and windows closed in the evening hours or that agreed with the client. The potential for noise impacts is expected to be low with the implementation of these measures. Partitions/floors separating ILUs from the clubhouse will be designed in accordance with the acoustic requirements of the NCC and where it is recommended to increase construction requirements this will be discussed with the design team. The glazing specifications to the Stage 2 development due to road traffic noise will also control other noise such as those generated by the club house to within the internal spaces.

JHA's Response:

Based on the acoustic glazing requirements to the ILUs due to external road traffic noise, any noise impacts from the on-grade carpark will be mitigated such that the internal noise criteria will be achieved. The basement carparking will pose no additional acoustic amenity impacts. Similarly, based on the acoustic glazing requirements, impacts from waste collection and deliveries and use of management measures such as hours of operation will reduce the potential for acoustic amenity impacts.

Yours sincerely,

Sean Matthews

Senior Acoustic Engineer