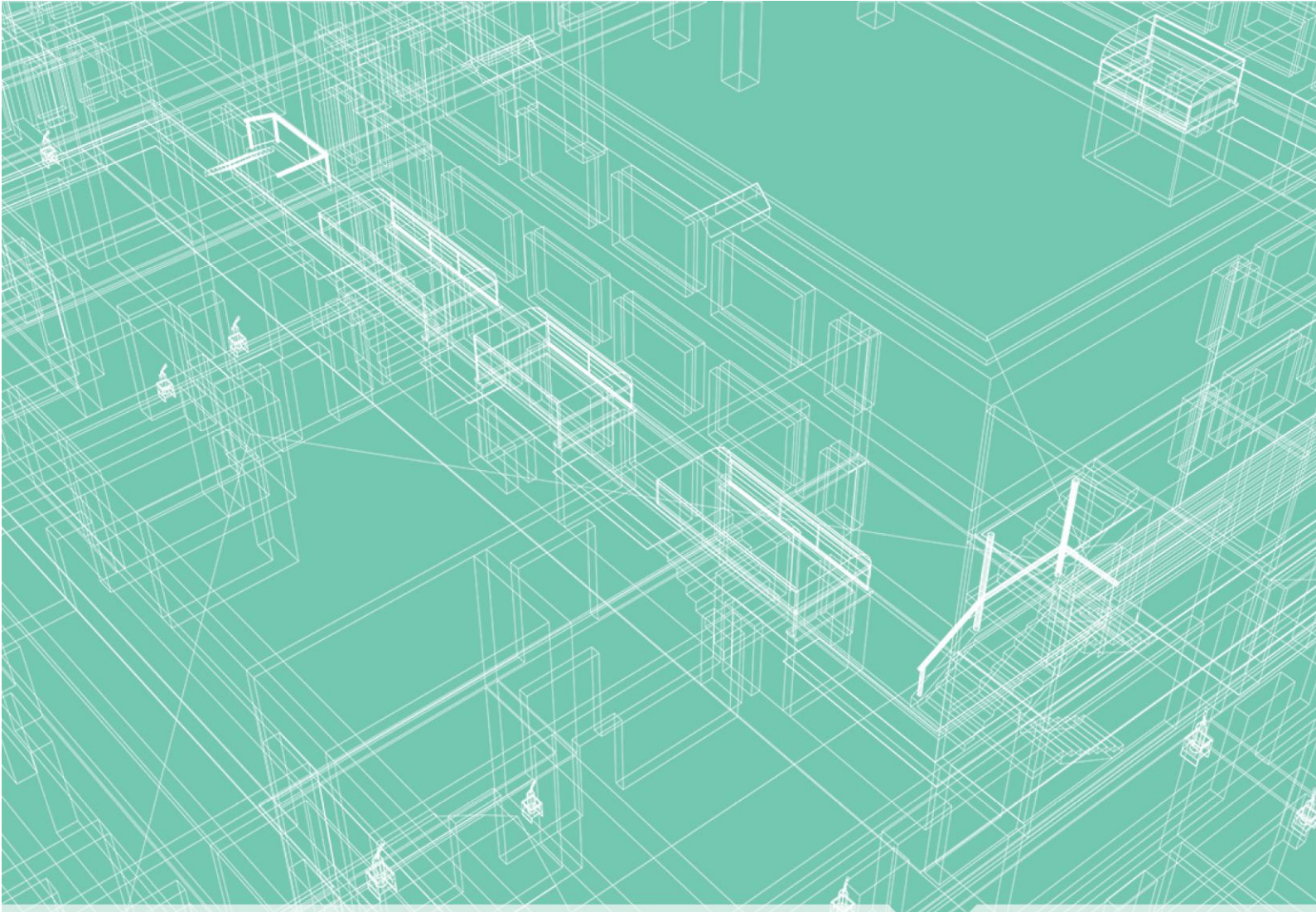

NOISE & VIBRATION IMPACT ASSESSMENT FOR REF

NEW PRIMARY SCHOOL AT WILTON JUNCTION

ACOUSTIC SERVICES

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DOCUMENT CONTROL SHEET

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CONTENTS

1 INTRODUCTION

This noise & vibration impact assessment has been prepared to support a Review of Environmental Factors (REF) for the NSW Department of Education (DoE) for the construction and operation of the new primary school at Wilton Junction (the activity).

The purpose of the REF is to assess the potential environmental impacts of the activity prescribed by *State Environmental Planning Policy (Transport and Infrastructure) 2021* (T&I SEPP) as "development permitted without consent" on land carried out by or on behalf of a public authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The activity is to be undertaken pursuant to Chapter 3, Part 3.4, Section 3.37A of the T&I SEPP.

This document has been prepared in accordance with the *Guidelines for Division 5.1 assessments* (the Guidelines) by the Department of Planning, Housing and Infrastructure (DPHI) as well as the *Addendum Division 5.1 guidelines for schools*.

The NSW Department of Education (DoE) is the proponent and determining authority pursuant to Section 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The purpose of this report is to:

- Identify noise sensitive receivers that will potentially be affected by the operation and construction of the proposed activity.
- Establish appropriate noise criteria based on the noise surveys, in accordance with the relevant standards, guidelines and legislation for the following noise emissions:
  - Mechanical plant from the school to the surrounding receivers.
  - Public Address and School Bell Systems.
  - Activities within the Hall during Out of School Hours Care.
  - Noise from Pre-school.
  - Noise from classroom activities.
  - Traffic noise intrusion.
  - Construction noise and vibration.
- Determine whether the relevant criteria can be achieved based on the proposed operations and construction methods. Where applicable, provide mitigation measures for any necessary acoustic control measures that will need to be incorporated into the new primary school or use in order to ensure with the assessment criteria.

This report shall be read in conjunction with the Architectural design drawings and other consultant design reports submitted as part of the application.
The following documentation has been used for the preparation of this report:

- Architectural drawings of the proposed activity.
- Noise data collected on site through the use of noise loggers and a handheld spectrum analyser.
- Draft Transport Impact Assessment, Wilton Junction PS, Stantec, 13/02/2025, ref: 300303822 rev A.

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 respectively.

2 DESCRIPTION OF THE PROPOSAL

2.1 LOCATION / SITE DESCRIPTION

The current street address is 200 Fairway Drive, Wilton, 2571, NSW. The site forms part of the northern portion of Lot 1063 in Deposited Plan 1289197) that was previously subdivided by Landcom. The site is approximately 3.4ha hectares in size and is located within Wilton Junction which is part of the North Wilton Precinct.

As a result of precinct wide rezonings, the surrounding locality is transitioning from a semi-rural residential area to a highly urbanised area with new low to medium density residential development with supporting services. North Wilton Precinct is approximately 85km south-west of the Sydney CBD, 30km north-west of Wollongong and 30km southwest of Campbelltown-Macarthur Strategic Centre. The precinct is located on the interchange with the Hume Highway, which connects the Southern Highlands with the Sydney metropolitan region to the northeast and Canberra to the south-west.

The proposed school site does not currently have road access, however Landcom is expected to deliver the road network and surrounding public domain network in accordance with DA/2022/1279/1. Proposed Road 14 located on the eastern boundary of the site will ultimately provide future access to the site. The site contains several patches of remnant native vegetation particularly within the northern portion of the site. The central part of the site has been predominantly cleared and consists of grassland. An aerial photograph of the site is provided at Figure 1.

Figure 1: Aerial Photograph of the Site. *Source: Urbis, 2024.*

2.2 PROPOSED ACTIVITIES

The proposed activity is for the construction and operation of a new primary school at Wilton Junction which will accommodate up to 552 students and 35 staff. Additionally, the proposal includes an integrated pre-school which will capacity for up to 60 students and 7 staff. In total, the new school will support up to 612 students and 42 staff.

The new school includes general and support learning spaces, a library, administrative areas and a staff hub. Core facilities include a standalone school hall and canteen, two carparks, and a sports court.

Specifically, this proposal includes the following:

- Construction of a 3-storey learning hub which includes:
  - 24x General Learning Spaces
  - 3 x Support Learning Spaces
  - Staff hub including administrative areas and library.
  - Integrated public pre-school.
- Standalone hall and COLA with outside of school hours care (OSHC).
- Associated landscaping including sports court and separate outdoor play space for the preschool.
- Associated site utilities and services including installation of new 1500 kVA padmount substation and a new main switchboard.
- Main car park to the south of the site with 33 car spaces (including one accessible space).
- Separate car park for pre-school located to the north of the school with 18 spaces (including one accessible space).
- Main school pedestrian entrance proposed off Road 14.
- Earthworks.

Figure 2 provides an extract of the proposed site plan.

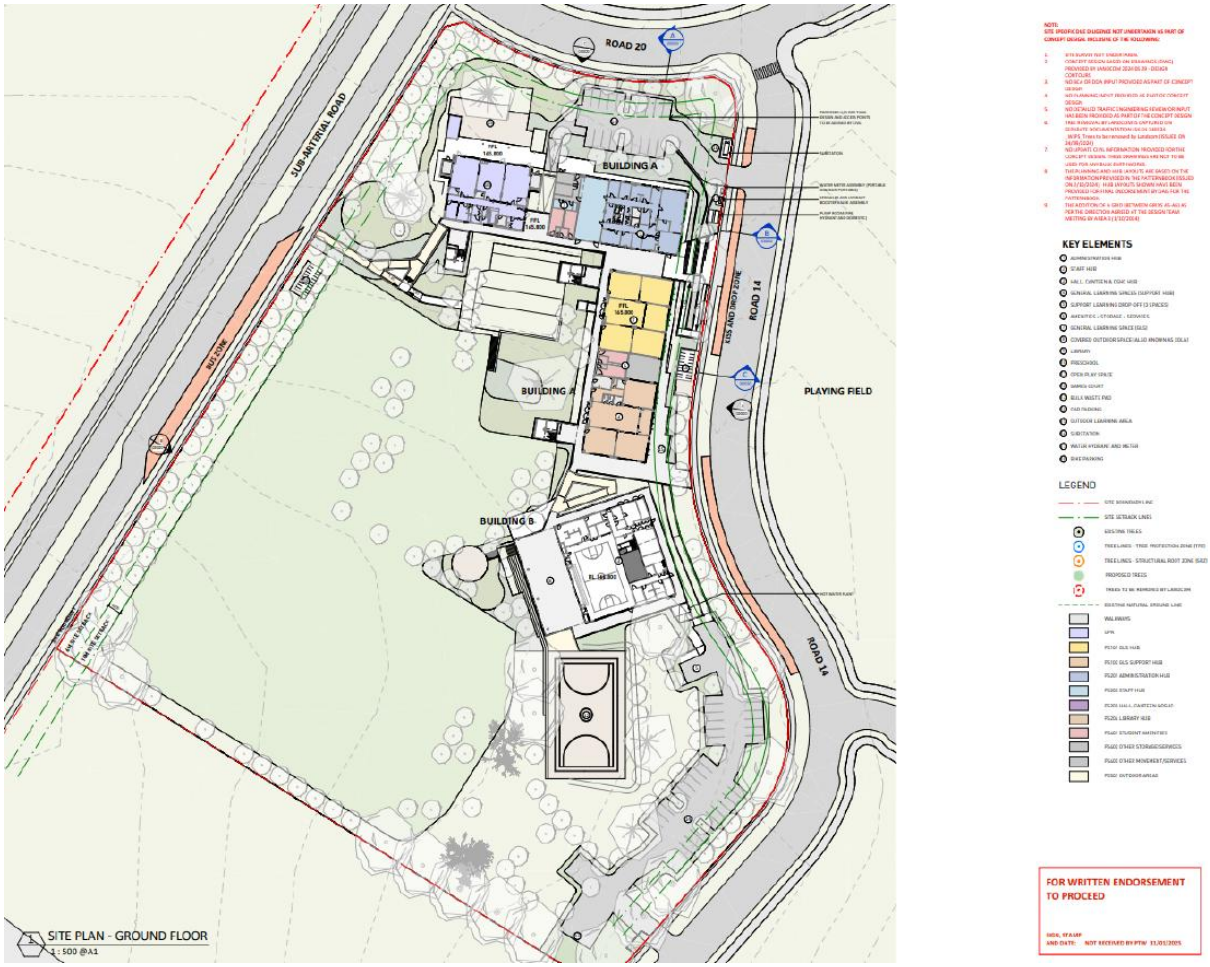


Figure 2 Proposed Site Plan – Staging. *Source: PTW, 2025*

2.3 SURROUNDING RECEIVERS

The land around the proposed school is under development – see Figure 3 below. However, large areas of housing are planned with infrastructure works currently in progress. Therefore, at the time of this report, the surrounding receivers cannot be properly identified. Nevertheless, residential receivers will be assumed for all surrounding receivers for the noise assessments in this report as this represents the worst case scenario with the most stringent noise emissions criteria.

Relevant Wollondilly Shire planning framework have been reviewed for any noise requirement or criteria. The land zoning of the area of the site and surrounding areas are shown in Figure 3 as per information extracted from the Wilton Growth Area Land Application Map. The site is categorised as Urban development.

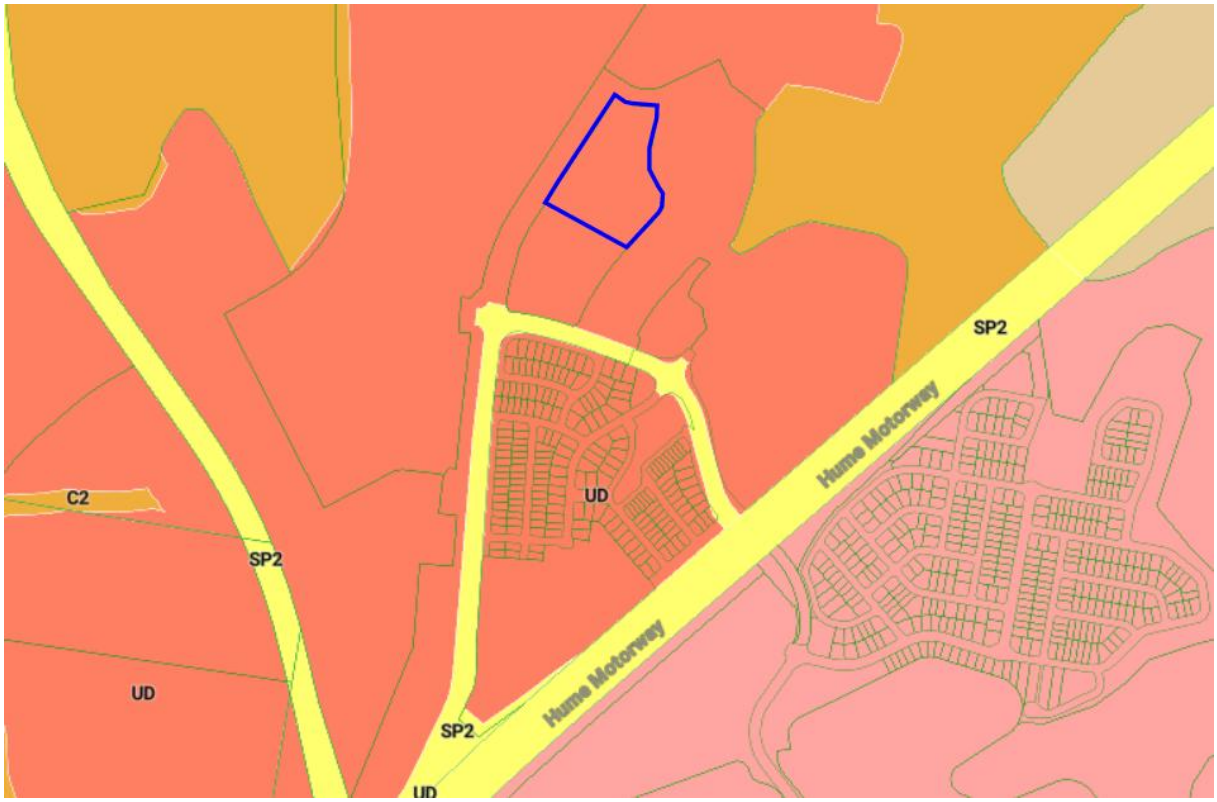


Figure 3: Land Zoning location of the site (blue line) and surroundings.

It is noted that if noise impacts associated with the proposed activity are controlled at the nearest noise sensitive receivers, then compliance with the recommended criteria at all noise sensitive receivers will be achieved.

A summary of the nearest assumed residential receivers surrounding the site location is shown in Table 1, including the approximate distances between closest lot boundaries.

Sensitive Receiver direction from site	*Receiver Type*	*Distance (m)*
North	Residential	20
East		20
South		0*
West		20

Table 1: Nearest assumed residential receivers surrounding the site location plus distances. *Note: The southern receiver is an undetermined lot with a shared boundary not separated by a road.

2.4 OPERATING HOURS

At this stage, it is understood that the new primary school will operate within typical school hours. The following operating hours have been assumed for the noise and vibration impact assessment purposes.

- School hours: 8am to 4pm Monday to Friday.
- Out of Hours: 7am to 8am & 4pm to 6pm Monday to Friday.

3 SITE MEASUREMENTS

3.1 GENERAL

A noise survey was conducted in the location shown in Figure 4 to establish the ambient and background noise levels of the site and surroundings. The noise survey has been carried out in accordance with the method described in the AS 1055:2018 *'Acoustics – Description and measurement of environmental noise'*. Figure 4, below shows the locations of the long term noise logging (L1) and short term noise measurements (S1 and S2).

The noise logger was initially planned to be located on the proposed activity site. However, at the time of the noise survey, infrastructure construction was in progress near the proposed activity site. The long-term noise logging location (L1) was selected to minimise the effect of construction noise on the noise logger while still being representative of the acoustic environment. Additionally, suitable noise logger locations were limited due to wildlife presence in the area that posed a risk of damage to the noise logger. Therefore, in JHA's opinion, the noise logger location was representative of the noise levels around the site and similar to those in the activity site – if the works would not be present.

From observations during the noise survey, it was noted that road noise from the Hume Highway was audible when near the proposed activity location.

Figure 4: Noise survey locations and boundary of the site.

3.2 LONG-TERM NOISE MONITORING

Long-term noise monitoring was carried out from Friday 4th to Tuesday 15th of October 2024 with a Rion NL-52 noise logger (Serial Numbers 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.

The noise logger was located to the north-west of the proposed activity site – location L1 as shown in Figure *4*. The location was secured and is considered to be representative of the typical ambient and background noise levels plus road noise levels.

The noise logger's microphone was mounted 1.5 metres above the ground and a windshield was used to protect the microphone. Weather conditions were monitored during the unattended noise monitoring period.

The detailed results of the long-term noise monitoring are presented graphically in Appendix A. 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 (shaded in the Appendix A graphs).

The Assessment Background Levels (ABLs) have been established in general accordance with the methodology described in the NSW NPI, i.e. 10th percentile background noise level (L_{A90}) for each period of each day of the ambient noise survey. The median of these levels is then presented as the RBLs (Rating Background Levels) for each assessment period.

These RBLs are shown in Table 2, together with the ambient noise levels (L_{Aeq}) measured for each time period.

Location	*Rating Background Levels, 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	37	38	36	52	45	46

Table 2: Results of unattended 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 Friday 4th October and Tuesday 15th October 2024, short-term noise measurements were carried out during day-time. Short-term noise measurements were carried out with an NTI XL-3 hand-held Sound Level Meter (SLM) (Serial Number A3A-00494-D1). 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
S1	04/10/2024 12:36pm – 12:51pm	$L_{90,15min}$	35	49	47	32	28	29	23	20	17
		$L_{eq,15min}$	41	57	54	41	32	32	30	30	31
		$L_{10,15min}$	43	59	57	43	33	34	33	31	28
S2	15/10/2024 12:27pm – 12:42pm	$L_{90,15min}$	60	66	61	52	59	56	51	42	31
		$L_{eq,15min}$	68	75	69	61	66	64	58	49	40
		$L_{10,15min}$	70	67	66	61	60	60	55	46	36

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:
  - Environmental Planning and Assessment (EP&A) Act 1979.
  - Protection of the Environmental Operations (POEO) Act 1997.
- Planning Framework:
  - Wollondilly Shire Development Control Plan 2016.
  - Wollondilly Local Environmental Plan 2011.
- Noise Emissions and Intrusions:
  - NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI) 2017.
  - AAAC Guideline for Child Care Centre v3.0 September 2020.
  - State Environmental Planning Policy, (Transport and Infrastructure) 2021.
  - NSW Department of Education (DoE) Design Checklist – 0001c, 2022.
- Transport Noise:
  - NSW DECCW, Road Noise Policy (RNP) 2011.
  - Australian Standard AS2021:2015 *'Acoustics – Aircraft Noise Intrusion – Building Sitting and Construction'*.
- Construction Noise and Vibration:
  - NSW DECCW, Interim Construction Noise Guideline (ICNG) 2009.
  - NSW DECC, Assessing Vibration: A Technical Guideline 2006.
  - NSW Road Maritime Service (RMS), Construction Noise and Vibration Guideline 2016.
  - Australian Standard AS 2436:2010 '*Acoustics – Guide to Noise Control on Construction, Maintenance & Demolition Sites*'.

4.2 REGULATORY FRAMEWORK

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 activity 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).

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.

..."

4.3 PLANNING FRAMEWORK – WOLLONDILLY COUNCIL

Wollondilly Development Control Plan (W-DCP 2016) has been reviewed for any relevant noise requirements or criteria for the proposed activity. There are no specific noise level criteria, but rather sections of the W-DCP 2016 provide general planning strategies.

4.4 OPERATIONAL NOISE

4.4.1 NSW EPA NOISE POLICY FOR INDUSTRY

The NSW EPA Noise Policy for Industry 2017 assesses noise from industrial noise sources – scheduled under the POEO. Mechanical noise from the proposed activity 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).

As discussed previously, the surrounding receivers on all sides of the activity site are assumed to be residential. This represents a worst-case scenario. Therefore, the following assessments are based on residential criteria.

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 5dB when beyond a minimum threshold."

Based on the intrusiveness criteria definition and the measured background noise levels on site, Table 4 shows the intrusiveness criteria for the noise sensitive receivers.

Indicative Noise Amenity Area	*Period*	*Rating Background Level dB(A)*	*Intrusiveness Criterion dB(A)*
General Residential (R2)	Day	37	42
	Evening	38	42*
	Night	36	41

Table 4: Determination of the intrusiveness criterion. *Note – evening noise level cannot be higher than the daytime noise level as per NSW NPI.

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 land zoning of the noise sensitive receivers plus amenity criteria definition, Table 5 shows the amenity criteria for the noise sensitive receivers.

Indicative Noise Amenity Area	*Period*	*Recommended Amenity Noise Level ($L_{Aeq,period}$) dB(A)*	*Amenity Criterion ($L_{Aeq15min}$) dB(A)*
General Residential (R2)*	Day	55	53 (55-5+3)
	Evening	45	43 (45-5+3)
	Night	40	38 (40-5+3)

Table 5: Determination of amenity criterion. ***Note:** R2 refers to the low density residential (suburban) as per the NSW NPI. This is based on the nearest established residential receiver category on the southern side of the Hume Highway.

4.4.1.3 Project Noise Trigger Levels

The PTNL's are shown in Table 6 and have been obtained in accordance with the requirements of the NSW NPI. These shall be assessed to the most affected point of within the noise sensitive receiver boundary.

Indicative Noise Amenity Area	*Period*	*Intrusiveness Criterion dB(A)*	*Amenity Criterion dB(A)*
General Residential (R2)	Day	42	53
	Evening	42	43
	Night	41	38

Table 6: PNTLs for noise sensitive receivers.

4.4.2 AAAC GUIDELINE FOR CHILD CARE CENTRE

There are no prescribed regulations or legislation that applies to outdoor playgrounds noise from schools. The AAAC guideline is addressed for assessment of childcare centres and its noise level criterion for outdoor spaces have been considered as adequate by NSW tribunal decisions. As children do not play outdoors continuously for long periods of time, and as the duration of time for children playing outside is reduced, the overall noise annoyance reduces. Therefore, it is reasonable to allow a higher level of noise impact for a shorter duration.

Whilst the AAAC guideline does not apply for schools, there are similarities in noise emissions from uses of outdoor playground areas for schools and child care centres. Therefore, we recommend that the following noise criteria shall be applied to noise impacts arising from the schools outdoor playgrounds.

Our noise assessment approach is based on:

- NSW tribunal decisions when assessing noise from the use of child care centres.
- 'Guideline for Childcare Centre Acoustic Assessment' prepared by the Association of Australasian Acoustical Consultants (AAAC).

Table 7 shows the noise level criteria proposed by the AAAC guideline for assessing noise from outdoor spaces. These are the noise levels at which it is considered that complaints are unlikely.

Use of outdoor area	*Noise Level Criteria*	*Criteria (day-time)*
Up to 4 hours (total) per day[1]	$L_{Aeq,15min}$ noise level from outdoor area not to exceed the existing background noise level ($L_{A90,15min}$) plus 10dB $L_{Aeq,15min} < L_{A90,15min} + 10dB(A)$	$L_{Aeq,15min} < 47dB(A)$
More than 4 hours (total) per day[1]	$L_{Aeq,15min}$ noise level from outdoor area not to exceed the existing background noise level ($L_{A90,15min}$) plus 5dB $L_{Aeq,15min} < L_{A90,15min} + 5dB(A)$	$L_{Aeq,15min} < 42dB(A)$

Table 7: Noise level criteria for the playground areas as per AAAC guideline.

4.4.3 STATE ENVIRONMENTAL PLANNING POLICY – TRANSPORT & INFRASTRUCTURE

The NSW State Environmental Planning Policy (SEPP) (Transport and Infrastructure) 2021 provides the noise criteria for the use of the school. The policy states:

"A new building or (if the development is an alteration or addition to an existing building for the purpose of changing its use) an existing building that is to be used for the purpose of a school or school-based child care must be designed so as not to emit noise exceeding an L_{Aeq} of 5dB(A) above background noise when measured at any lot boundary."

Based on the long-term unattended noise results of background noise levels, the following table shows the noise level criteria for operational noise.

[1] 4 hours are set in 2 hours in the morning and 2 hours in the afternoon.

Receiver	Time Period	Measured RBL dB(A)	Criteria dB(A)
General Residential (R2)	Day	37	42
	Evening	38	43
	Night	36	41

Table 8: Operational Noise Criteria.

4.4.4 SUMMARY OF OPERATIONAL NOISE LEVEL CRITERIA

Based on the criteria from the relevant noise standards and guidelines detailed in this section, Table 9 summarizes the noise level criteria for operational noise. For noise assessment purposes, the corresponding criteria is based on background noise level measured, the lowest value has been used.

Noise Emission	Receiver	Time Period	Noise Level Criteria $L_{Aeq,15min}$ dB(A)
External Mechanical Plant	General Residential (R2)	Day Time (7am – 6pm)	42
		Evening Time (6pm – 10pm)	42
		Nighttime (10pm – 7am)	38
Outdoor Playgrounds	General Residential (R2)	Up to 4 hours (7am – 6pm)	47
		More than 4 hours (7am – 6pm)	42
Operational Noise	General Residential (R2)	Day Time (7am – 6pm)	42
		Evening (6pm – 10pm)	43
		Night (10pm – 7am)	41

Table 9: Summary of the noise level criteria at the nearest noise sensitive receivers.

4.5 TRANSPORT NOISE

4.5.1 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 (i.e. less than 2.1dB)[2] 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.

[2] NSW Roads and Maritime Service. Noise Criteria Guideline 2015. Page 10.

The Draft Transport Impact Assessment[3] (TIA) for the new public school has been reviewed. The TIA does not provide specific existing and proposed traffic volume information (trips) for comparison. Therefore, an assessment of the impact of the proposed activity on traffic noise cannot be undertaken. It should also be noted that roads and infrastructure in the area is in progress and some roads are not trafficable.

Therefore, it can be stated proposed activity is expected to meet the NSW RNP recommendations.

4.5.2 AVIATION NOISE

Adjacent to the proposed activity site, there is the Wilton Airport, a small aerodrome used for skydiving. Skydiving activities usually occur with smaller propeller aircraft and very infrequently compared to a commercial airport. Additionally, as per the information retrieved, there is no ANEF map for this aerodrome. Therefore, no aircraft noise assessment for the school will be required as per AS2021:2015 requirements.

4.6 CONSTRUCTION NOISE AND VIBRATION

4.6.1 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 Management Level ($L_{Aeq,15min}$) 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 (RBL) 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 Management 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 Management Level ($L_{Aeq,15min}$) 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 (RBL) by more than 5dB(A). It is noted that a strong justification is required for works outside the recommended standard hours.

ICNG suggests construction noise management levels for other sensitive land uses surrounding construction sites. Table 10 below summarises the airborne construction noise criteria for receivers surrounding the site.

Sensitive Receiver		*Airborne Construction Noise Criteria, L_{Aeq} dB(A)*	
		Within Standard Hours	*Outside Standard Hours*
Residential Receivers	Noise affected / External	RBL+10	RBL+5
	Highly noise affected / External	75	N/A

[3] Wilton Junction Public School, Transport Impact Assessment, issued by Stantec, dated 13 February 2025.

Table 10: ICNG construction airborne noise criteria for noise sensitive receivers surrounding the site.

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.

4.6.2 VIBRATION CRITERIA

4.6.2.1 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]

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

Table 12: Intermittent vibration criteria applicable to the site.

4.6.2.2 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 13.

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

5 OPERATIONAL NOISE EMISSIONS ASSESSMENT

Noise break-out from the proposed activity has the potential to impact on existing noise sensitive receivers. For the purpose of this noise impact assessment, the noise sources are assumed as follows:

- Mechanical plant from the proposed activity to the surrounding receivers.
- Public address and school bell systems.
- Activities and events within the Hall and Out of Hours Community use.
- Noise from the Preschool.
- Noise from Classrooms.

Each of these noise sources has been considered in the noise impact assessment. The noise impact assessments have also considered the following:

- Noise levels have been considered as continuous over assessment time period to provide the worst-case scenario.
- Distance attenuation, building reflections and directivity.
- Lowest background levels measured.

5.1 EXTERNAL MECHANICAL PLANT

Noise from proposed activity mechanical plant rooms should be controlled to ensure external noise emissions are not intrusive and do not impact the amenity of noise sensitive receivers.

Mechanical plant will operate continuously during normal school hours. At this stage, a preliminary selection of the external mechanical plant has been provided and a noise assessment at the nearest noise sensitive receivers has been carried out based on the noise data from the manufacturers. The selected units and their noise levels are listed below grouped into the blocks they occupy:

Block A – North

- 1 x Condenser Unit Daikin REYQ26BYM – 64dB(A) @1m (as per Daikin product information sheet)
- 1 x Condenser Unit Daikin REYQ20BYM – 63dB(A) @1m (as per Daikin product information sheet)
- 1 x Condenser Unit Daikin REYQ28BYM – 64dB(A) @1m (as per Daikin product information sheet)
- 1 x Condenser Unit Daikin REYQ40BYM – 68dB(A) @1m (as per Daikin product information sheet)
- 2 x Condenser Unit Daikin RKM71WVMA – 54dB(A) each @1m (as per Daikin product information sheet)
- 1 x Condenser Unit Daikin RXYMQ3AV4A – 52dB(A) @1m (as per Daikin product information sheet)

The following assumptions have been made in the noise assessment:

- The location of the external plant is as per Figure 5.
- The nearest noise sensitive receivers are the future receivers across the adjacent 'Road 20' to the north.
- The large top-discharge condenser units have 1.7m of 50mm internally lined rigid ductwork attached to the top discharge
- Building reflections and directivity.

The noise assessment of the mechanical plant is summarised in Table 14.

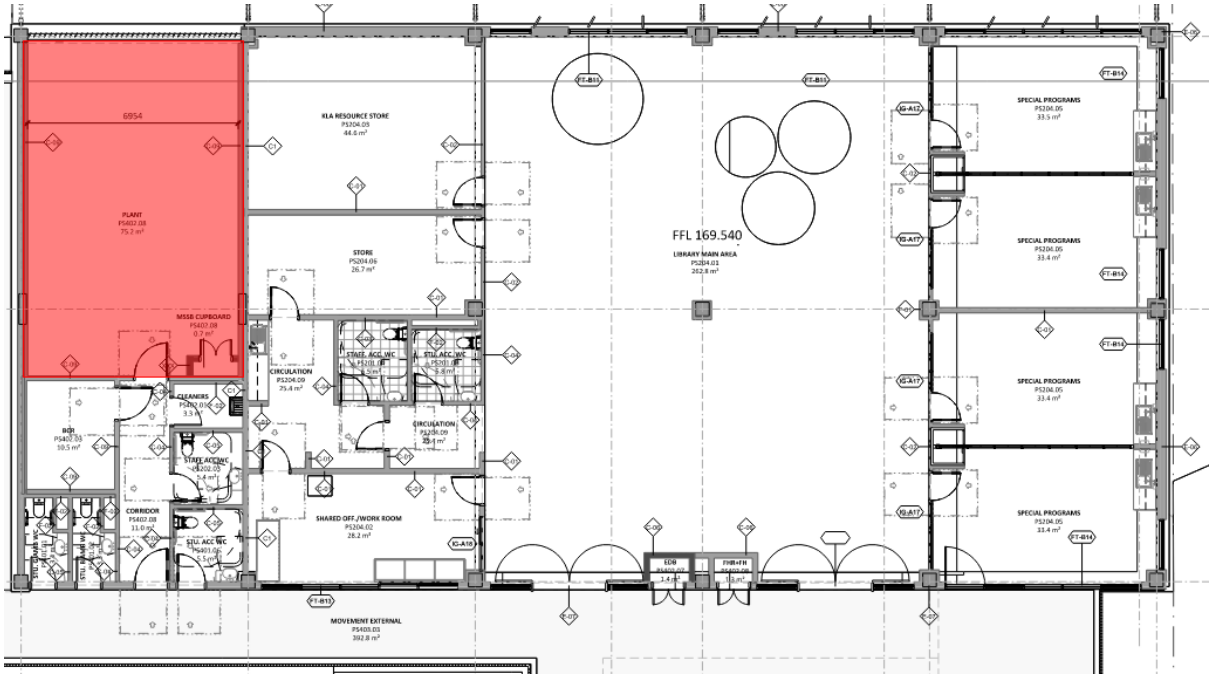


Figure 5. Preliminary proposed location of the Block A north external mechanical plant (red shading).

Calculation	*Overall A-weighted noise level, in dB(A)*
	Northern receiver
L_{Aeq} CUs @1m from louvre	64
Distance attenuation, dB	-34
$L_{Aeq,15min}$ resulting at residential receiver	30
Daytime criteria NPI / Complies?	42 / Yes

Table 14: Noise assessment of external mechanical plant to the nearest noise sensitive receivers.

Based on this assessment and the NSW NPI noise level criteria in Table 6, the external mechanical plant in Block A north will meet the noise level criteria at the nearest noise sensitive receivers.

Block A – East

- 2 x Condenser Unit Daikin REYQ38BYM – 67dB(A) each @1m (as per Daikin product information sheet)
- 1 x Condenser Unit Daikin REYQ36BYM – 67dB(A) @1m (as per Daikin product information sheet)
- 3 x Condenser Unit Daikin REYQ40BYM – 68dB(A) each @1m (as per Daikin product information sheet)
- 1 x Condenser Unit Daikin RXYMQ3AV4A – 52dB(A) @1m (as per Daikin product information sheet)

The following assumptions have been made in the noise assessment:

- The location of the external plant is as per Figure 6.
- The nearest noise sensitive receivers are the future receivers across the adjacent 'Road 14' to the east.
- The large top-discharge condenser units have 1.7m of 50mm internally lined rigid ductwork attached to the top discharge.
- Building reflections and directivity.

The noise assessment of the mechanical plant is summarised in Table 15.

Figure 6. Preliminary proposed location of the Block A east external mechanical plant (red shading).

Calculation	*Overall A-weighted noise level, in dB(A)*
	Eastern receiver
L_{Aeq} CUs @1m from mechanical plant	68
Distance attenuation, dB	-30
$L_{Aeq,15min}$ resulting at residential receiver	**39**
Daytime criteria NPI / Complies?	**42** / Yes

Table 15: Noise assessment of external mechanical plant to the nearest noise sensitive receivers.

Based on this assessment and the NSW NPI noise level criteria in Table 6, the external mechanical plant in Block A east will meet the noise level criteria at the nearest noise sensitive receivers.

Block B – Hall

- 1 x Condenser Unit Daikin REYQ12BYM – 59dB(A) @1m (as per Daikin product information sheet)
- 1 x Condenser Unit Daikin RKM71WVMA – 54dB(A) @1m (as per Daikin product information sheet)

The following assumptions have been made in the noise assessment:

- The location of the external plant is as per Figure 7.
- The nearest noise sensitive receivers are the future receivers across the adjacent 'Road 14' to the east.
- Building reflections and directivity.

The noise assessment of the mechanical plant is summarised in Table 16.

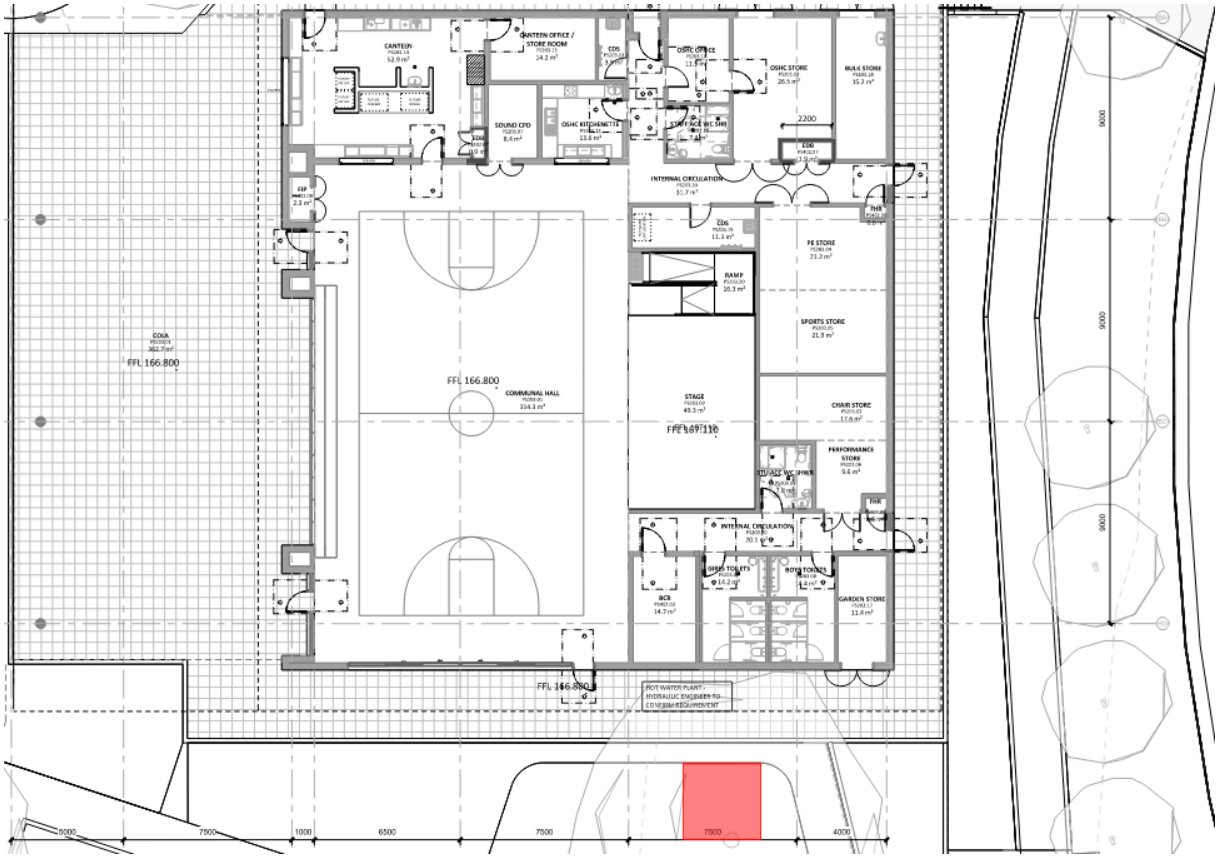


Figure 7. Preliminary proposed location of hall mechanical plant (red shading).

Calculation	*Overall A-weighted noise level, in dB(A)*
	Eastern receiver
L_{Aeq} CUs @1m from louvre	60
Distance attenuation, dB	-31
Reflections, dB	3
$L_{Aeq,15min}$ resulting at residential receiver	**32**
Daytime criteria NPI / Complies?	**42** / Yes

Table 16: Noise assessment of external mechanical plant to the nearest noise sensitive receivers.

Based on this assessment and the NSW NPI noise level criteria in Table 6, the external mechanical plant on the roof of the Hall will meet the noise level criteria at the nearest noise sensitive receivers.

If the external mechanical is relocated or reselected during design stages, a new assessment shall be carried out, and the usual design noise controls that may need to be implemented will typically include, but are not limited to:

- Strategic location and selection of mechanical plant to ensure the cumulative noise levels 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:
  - In-duct attenuation.

- Noise enclosures as required.
- Sound absorptive panels.
- Acoustic louvres as required.
- Noise barriers as required.

Acoustic assessment of all mechanical plant shall continue during the design phases of the project in order to confirm any noise control measures to achieve the relevant noise criteria at the nearest noise sensitive receivers. Acoustic design and certification of mechanical services is recommended to be provided prior to the Construction Certificate.

5.2 PUBLIC ADDRESS AND SCHOOL BELL SYSTEMS

Noise from proposed public address and school bell systems should be controlled to ensure external noise emissions are not intrusive and do not impact on the amenity of noise sensitive receivers.

At this stage, public address and school bell systems selections have been not made; therefore, it is not possible to undertake a detailed assessment of the public address and school bell noise emissions. However, general mitigation measures are provided below.

Acoustic assessment of public address and school bell systems shall continue during the design phases of the project once location, number and type of loudspeakers will be nominated.

The EPA notes numerous reports of community concern arising from inadequate design and installation as well as inappropriate use of school public address and bell systems. EPA considers that appropriate design, installation and use of those systems can both:

- Meet the proponent's objectives of proper administration of the school and ensuring safety of students, staff and visitors, and
- Avoid interfering unreasonably with the comfort and repose of occupants of nearby residences.

The public address and school bell systems shall be designed, installed and operated such that the systems do not interfere unreasonably with the comfort and repose of occupants of nearby residences. It is anticipated that the noise impact to the nearest sensitive receivers will be negligible if following mitigation measures are implemented:

- Low-powered horn-type speakers shall be located and orientated to provide a good coverage of the school areas whilst being directly away from residences and near sensitive receivers. System coverage shall be reviewed during the design phases.
- Speakers shall be mounted with a downward angle and as close to the floor as possible.
- The noise level of the systems shall be adjusted on site so they will be clearly audible on the school site without being excessive. The systems shall initially be set so that the noise at nearby residences and sensitive receivers do not exceed noise level criteria.
- Once the appropriate noise level has been determined on site, the systems shall be limited to these noise levels so that staff cannot increase the noise levels.
- The systems shall be set so that it only occurs on school hours – to not operate out of hours.

5.3 HALL AND OUT OF HOURS CARE

The proposed hall is expected to be used by students and teachers during the daytime as well as by after and before school care (assumed times are 7am – 9am and 3pm – 6pm). Halls are typically used for school assemblies, presentations, examinations and student concerts during school hours.

Out of hours school care is understood to be within the hall, therefore the noise will be confined. Noise break-out will be driven by the sound insulation performance of the building envelope. Typically, solid sections of the façade will provide a sound reduction index of R_W50.

Hence, noise from the use of the hall as an out of hours care facility is not expected to impact the acoustic amenity of the surrounding receivers.

5.4 PRESCHOOL OUTDOOR PLAYGROUND

Noise breakout from the preschool outdoor playground has the potential to impact on the nearest assumed residential receivers – to the north – across Road 20, and west – across the sub-arterial road. The key noise source will be children using the outdoor playground. Based on the architectural drawings, the preschool is located in the northern part of the site and the preschool outdoor playground is adjacent to the north.

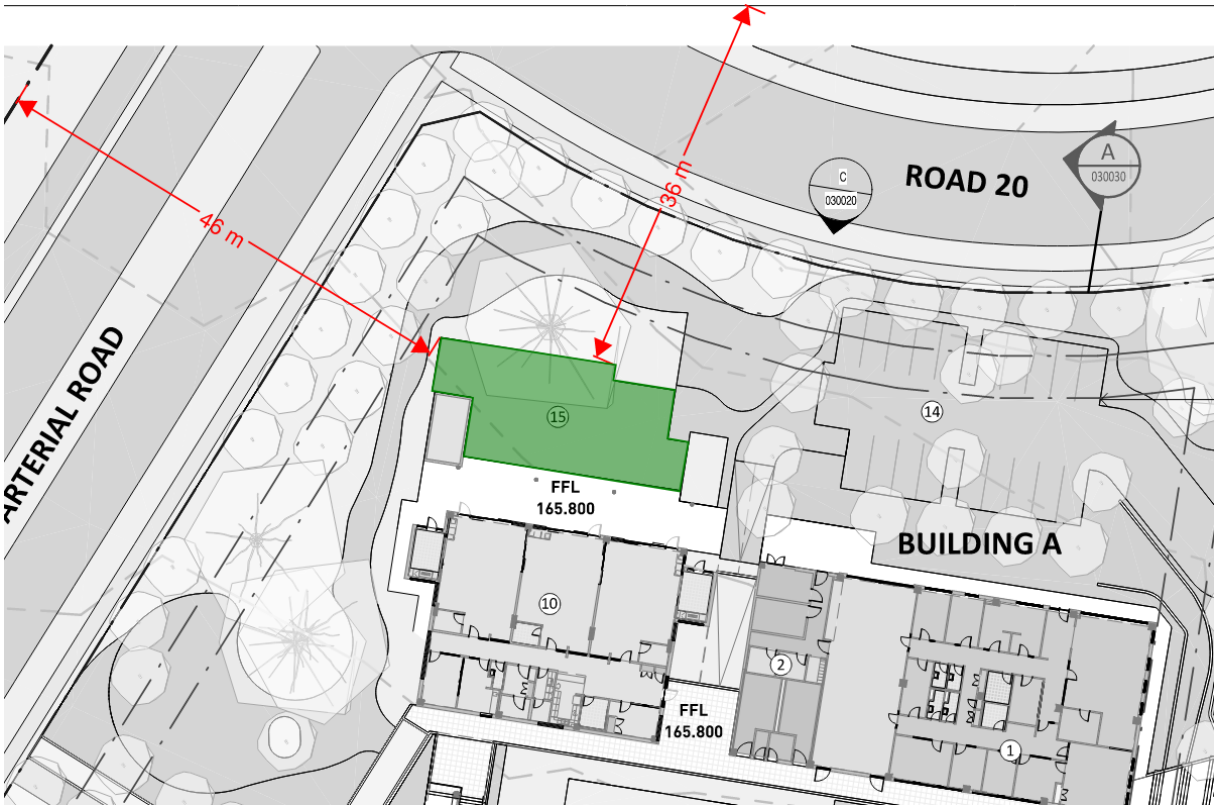


Figure 8: Location of preschool outdoor playground (green shadow) as per architectural drawings.

It has been assumed that the outdoor playgrounds will be likely to be at full capacity – 60 children. The noise assessment has assumed the following:

- Children aged between 3 to 5 years – 87dB(A) sound power level for groups of 10 children involved in active play, as per AAAC guideline. Assuming a maximum capacity of 60 children, the equivalent sound power level is 94dB(A).

- The preschool is proposed to be to the north of the site, therefore future residential receivers to the north are considered the most affected and this has been assessed as the worst-case scenario.
- A maximum number of 60 children will be using the playground at any time.
- The children will be evenly distributed across the outdoor playground.
- The outdoor playground area will be in use during school hours – i.e. daytime (8am to 4pm).
- There is a 1.8m high solid fence all around the outdoor playground.

The predicted noise levels at the nearest noise sensitive receivers and the AAAC guideline criteria are shown in Table 17.

Calculation	*Noise Level dB(A)*
L_{Aeq} of 60 children, dB(A) – Sound Pressure Level (@ 1metre)	86
Distance attenuation (36m), dB	-31
Barrier / Fence attenuation, dB	-15
Resulting level at residential receiver	40
Noise Level Criterion daytime (Up to 4 hours) / Complies?	47 / Yes
Noise Level Criterion daytime (More than 4 hours) / Complies?	42 / Yes

Table 17: Noise assessment at nearest residential noise sensitive receiver for the Preschool outdoor playground – with solid fence shielding.

As per the noise impact assessment results in the table above, the use of the preschool outdoor playground will meet the noise level criterion for more than 4 hours per day with 60 students at the nearest noise sensitive receivers with a fence / solid barrier around the playground area. The fence / solid barrier shall have no gaps and be a minimum surface mass of 12kg/m^2 and a minimum height of 1.8m.

5.5 CLASSROOM NOISE

There will not be significant noise emissions from the use of the classrooms as, generally, noise levels within teaching spaces in a primary school are expected to be low, plus the typical façade sound insulation performance minimise the noise impacts to the nearest noise sensitive receivers.

At this stage, architectural façade drawings have not been prepared; therefore, it is not possible to undertake a detailed assessment of the sound insulation performance of the façade.

In order to achieve a sufficient façade sound insulation performance, surface of ventilation openings shall be minimised and the surface and sound insulation performance of glazing shall not reduce the overall sound insulation performance of the building façade.

Acoustic design of the façade, other external building elements and ventilation openings of the school will need to be considered throughout the design stages in order to meet the noise level criteria in the nearest noise sensitive receivers.

6 NOISE INTRUSION ASSESSMENT

Traffic noise from the Hume Highway has the potential to impact upon the facades of the proposed activity. In order to meet the NSW DoE Design Checklist – 0001c internal noise levels criteria for primary school teaching spaces being 40dB(A), JHA has carried out a review of traffic and mechanical noise impacts and recommends the minimum glazing thickness for the proposed building.

The following assumptions have been considered for the traffic noise impacts:

- Traffic noise levels for the assessment are as per measured levels on site. Refer to Section 3.
- Internal noise levels are predicted based on noise levels incident at the façade of each space, which are based on the above measurements.
- External glazing is the weakest elements of the façade, and solid sections of the façade will provide a sound reduction index of R_W50.
- Calculations have been based on achieving the internal noise targets as per NSW DoE Design Checklist - 0001c.

To achieve compliance with the internal noise levels criteria as per NSW DoE Design Checklist - 0001c, based on the above assumptions, the following is required:

- External glazing facing the Hume highway (facing south or east) to provide a minimum sound reduction index of R_W32. A 6.38mm laminated fixed single glazing system achieves the nominated sound reduction index.

Notwithstanding with the glazing mitigation measures provided above, the acoustic performance of the glazing and building façade shall be reviewed during the detailed design of the project once glazing and façade areas will be defined.

7 CONSTRUCTION NOISE AND VIBRATION PLANNING

Currently a detailed construction program is not yet full defined. This section of the Construction Noise and Vibration Planning provides general preliminary mitigation measures only and provides applicable criteria together with feasible and reasonable noise and vibration control practices to be observed during the construction of the proposed activity.

This preliminary advice in relation to construction noise and vibration management shall form the basis for the Contractor's Construction Noise and Vibration Management Plan (CNVMP) which shall identify any noise criteria exceedance once construction methods and stages are known.

Any noise from demolition and construction activities to be carried out on site must not result in *'offensive noise'* to any noise sensitive receiver. To this end, the Contractor employed to undertake the demolition and/or construction works is responsible for ensuring that any site noise and, in particular, any complaints shall be monitored, investigated, managed and controlled.

7.1 RELEVANT STANDARDS FOR CONSTRUCTION NOISE AND VIBRATION CRITERIA

Section 4.6 of this report contains the relevant legislation, codes, and standards in addition to construction noise and vibration criteria for this project.

7.2 WORKING HOURS

The following construction hours are proposed as follows:

- Monday to Friday: 7am to 6pm.
- Saturday: 8am to 1pm.
- Sundays and Public Holidays: No excavation or construction works.

It is noted that the proposed construction hours are within the recommended EPA hours. Noise control measures are to be implemented during these hours following consultation and engagement with the community.

It is recommended that high noise level works – i.e. piling, excavation, etc – shall be scheduled to not occur during shoulder periods of the recommended standard hours – i.e 7am to 8am and 5pm to 6pm. A detailed Construction Noise & Vibration Management Plan (CNVMP) shall further assess the noise impact of construction works and shall include a protocol to minimise any potential noise impacts to identified sensitive receivers and ensure that appropriate noise control measures are defined and implemented to comply with all relevant noise guidelines.

7.3 PRELIMINARY CONSTRUCTION NOISE ASSESSMENT

A preliminary construction noise assessment has been carried out based on typical plant and machinery expected throughout the construction. The preliminary noise assessment has been considered at the nearest assumed residential receivers.

7.3.1 CONSTRUCTION WORKS AREA

Figure 9 shows the proposed site staging plan with site boundaries (red dashed line).

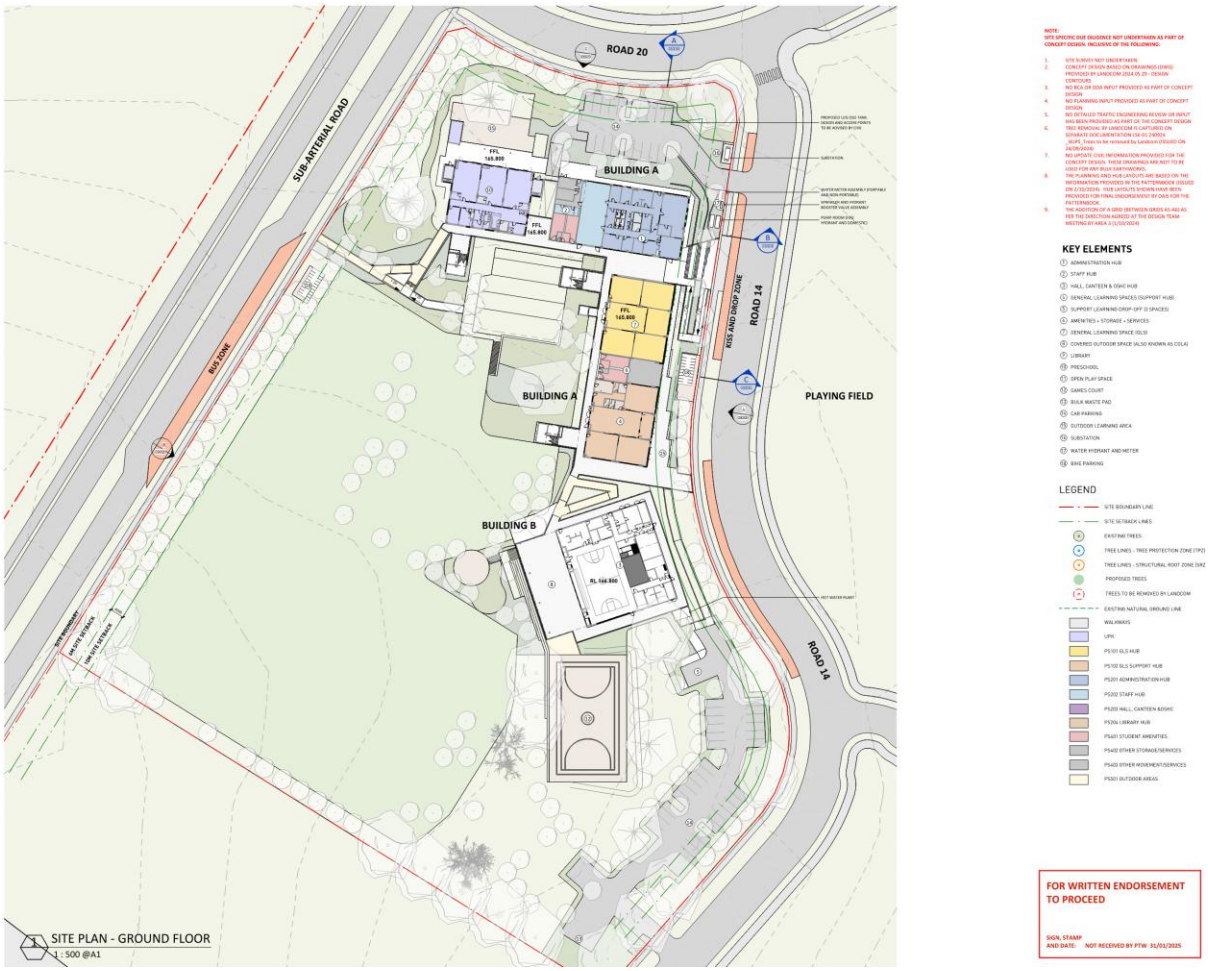


Figure 9: Proposed Site Plan – Staging. Source: PTW, 2025.

Based on the site staging plan as shown in Figure 9, it has been assumed that as a worst case, generally works will be no closer than the following distances from the receiver boundary:

- 5m – southern receiver,
- 20m – eastern receiver,
- 20m – northern receiver, and
- 30m – western receiver.

The distances above represent a worst-case scenario; when construction works will be conducted at the boundary of the site.

7.3.2 NOISE

A high-level noise assessment has been carried out to predict the worst-case noise level at the nearest noise sensitive receiver. We note that the predicted noise levels consider the worst-case scenario, i.e., construction activities being carried out at the boundary of the site as per Figure 9.

A Detailed CNVMP addressing impacts should be conducted during the construction stages when specific information around construction methodology is known, to provide acoustic mitigation measures and management measures based on specific construction works, equipment and locations.

The expected construction noise sources and the predicted noise levels at the nearest residential receivers plus existing school receivers are shown below in Table 18. The equipment noise levels are based on the database published by the UK Department for Environmental, Food and Rural Affairs (DEFRA) & Australian Standard AS2436:2010 *'Guide to Noise Control on Construction, Maintenance & Demolition Sites'* for a 15-minute period.

Item	*Typical Power Noise Level L_{A10} (dB ref 1pW)*	*Typical Noise Level $L_{A10,15m}$ at 7m (dB ref 20µPa)*	*Predicted Noise Level $L_{Aeq,15m}$ Nearest Assumed Residential*	*Complies with Highly Noise Affected Criteria*
Angle grinders	104	76	77 – 82	No
Truck (>20 tonne)	108	80	81 – 86	No
Circular saw	115	87	88 – 93	No
Piling rig	120	92	93 – 98	No
10-40tn Excavator	117	89	90 – 95	No
40-50tn Mobile crane	111	83	84 – 89	No
Concrete pump	114	86	87 – 92	No
Concrete truck	110	82	83 – 88	No
Drill	94	66	67 – 72	Yes

Table 18: Anticipated airborne noise levels for construction equipment / plant used during construction works.

Based on the results of the preliminary assessment as shown above, the noise associated with the construction works is expected to exceed the noise limits for highly noise affected receivers within standard hours. This assessment is based on typical noise levels associated with construction sites and machinery.

Nevertheless, compliance with the relevant construction noise criteria can be achieved through specific noise mitigation measures such as acoustic screening around the site. These noise mitigation measures are to be provided in a detailed Construction Noise & Vibration Management Plan and prepared by a qualified acoustic consultant prior to Construction Certificate.

7.3.3 VIBRATION

The NSW RMS '*Construction Noise and Vibration Guideline*' provides safe working distances for vibration intensive plant and are quoted for both 'cosmetic' damage (in accordance with BS 7385.2:1993) and human comfort (in accordance with DECC's '*Assessing Vibration: A Technical Guideline*'). The recommended safe working distances for typical construction plant are provided in Table 19.

Plant Item	*Description*	*Cosmetic Damage*	*Human Response*
Small Hydraulic Hammer	5-12 tonne	2m	7m
Medium Hydraulic Hammer	12-18 tonne	7m	23m
Large Hydraulic Hammer	18-34 tonne	22m	73m
Vibratory Pile Driver	Sheet piles	2-20m	20m
Pile Boring	<800mm	2m	N/A
Jackhammer	Handheld	1m	Avoid Contact with Structure

Table 19: Recommended minimum working distances for vibration intensive plant from sensitive receivers.

For any vibration intensive plant expected to be within proximity of the minimum distances described above, the contractor must engage a qualified engineer to carry out a vibration survey in order to assess any potential risks.

The vibration survey and assessment will determine whether the vibration levels might exceed the relevant criteria then vibration mitigation and management measures will need to be put in place to ensure vibration impacts are minimized as far as practicable.

7.4 MITIGATION MEASURES

In order to meet the noise and vibration requirements of the site, the Contractor will be required to engage a qualified acoustic consultant to assist in the compilation of a CNVMP and undertake noise and vibration monitoring for the duration of the project.

7.4.1 PROJECT SPECIFIC ACOUSTIC MEASURES

Acoustic amelioration measures will be required due to the expected exceedances of the noise level criteria. Temporary shielding such as solid hoarding/acoustic curtains may reduce the expected noise impacts and is proposed as a noise control measure during construction. The location and extent of the shielding are to be defined in the detailed Construction Noise and Vibration Management Plan (CNVMP).

7.4.2 GENERAL CONTROL ELEMENTS

As a general rule, minimising noise and vibration should be applied as universal work practice at any time of day, but especially for any construction works to be undertaken at critical times outside normal daytime/weekday periods.

It is noted that the reduction of noise and vibration at the source and the control of the transmission path between the construction site and the receiver(s) are the preferred options for noise minimisation. Providing treatments at the affected receivers should only be considered as a last resort. Construction noise and vibration shall be managed by implementing the strategies listed below:

- *Plant and equipment*. In terms of both cost and results, controlling noise and vibration at the sources is one of the most effective methods of minimising the impacts from any work site activities. Work practices that will reduce noise and vibration at the source include:
  - Employing quieter techniques for all high noise activities such as rock breaking, concrete sawing, and using power and pneumatic tools.

  - Use quieter plant and equipment based on the optimal power and size to most efficiently perform the required tasks.
  - Selecting plant and equipment with low vibration generation characteristics.
  - Operate plant in a quietest and most effective manner.
  - Where appropriate, limit the operating noise of equipment.
  - Regularly inspecting and maintain plant and equipment to minimise noise and vibration level increases, to ensure that all noise and vibration reduction devices are operating effectively.
- *On site noise management.* Practices that will reduce noise from the site include:
  - Maximising the distance between noise activities and noise sensitive receivers. Strategically locate equipment and plant.
  - Undertaking noisy fabrication work off-site where possible.
  - Avoid the use of reversing beeping alarms or provide for alternative systems, such as broadband reversing alarms
  - Maintaining any pre-existing barriers or walls on a demolition or excavation site as long as possible to provide optimum sound propagation control.
  - Constructing barriers that are part of the project design early in the project to afford mitigation against site noise.
  - Using temporary site building and material stockpiles as noise barriers. These can often be created using site earthworks and may be included as a part of final landscape design.
  - Installing purpose built noise barriers, acoustic sheds and enclosures.
- *Work scheduling.* Scheduling work during periods when people are least affected is an important way of reducing adverse impacts. The following scheduling aspects may reduce impacts:
  - Provide respite periods, including restricting very noisy activities to daytime, restricting the number of nights that after-hours work is conducted near residences, or by determining any specific requirements, particularly those needed for noise sensitive receivers.
  - Scheduling activities to minimise impacts by undertaking all possible work during hours that will least adversely affect sensitive receivers and by avoiding conflicts with other scheduled events.
  - Scheduling work to coincide with non-sensitive periods, to reduce impact on examinations.
  - Scheduling noisy activities to coincide with high levels of neighbourhood noise so that noise from the activities is partially masked and not as intrusive.
  - Planning deliveries and access to the site to occur quietly and efficiently and organising parking only within designated areas located away from sensitive receivers.
  - Optimising the number of deliveries to the site by amalgamating loads where possible and scheduling arrivals within designated hours.
  - Designating, designing and maintaining access routes to the site to minimise impacts.
  - Including contract conditions that include penalties for non-compliance with reasonable instructions by the principal to minimise noise or arrange suitable scheduling.
- *Consultation, notification and complaints handling.*
  - Provide information to neighbours before and during construction.
  - Maintain good communication between the community and Project staff.
  - Have a documented complaints process and keep register of any complaints.
  - Give complaints a fair hearing and provide for a quick response.
  - Implement all feasible and reasonable measures to address the source of complaint. Implementation of all reasonable and feasible mitigation measures for all works will ensure that

any adverse noise impacts to surrounding receivers are minimised when noise goals cannot be met due to safety or space constraints.

7.4.3 ADDITIONAL NOISE AND VIBRATION CONTROL MEASURES

If, during construction, an item of equipment exceeds either the noise criteria at any location or the equipment noise level limits, the following noise control measures, together with construction best practices, shall be considered to minimise the noise impacts on the neighbourhood.

- Schedule noisy activities to occur outside of the most sensitive times of the day for each nominated receiver.
- Consider implementing equipment-specific screening or other noise control measures recommended in Appendix C of AS 2436:2010.
- Limit the number of trucks on site at the commencement of site activities to the minimum required by the loading facilities on site.
- When loading trucks, adopt best practice noise management strategies to avoid materials being dropped from height into dump trucks.
- Avoid unnecessary idling of trucks and equipment.
- Ensure that any miscellaneous equipment (extraction fans, hand tools, etc) not specifically identified in this plan incorporates silencing/shielding equipment as required to meet the noise criteria.

Implementation of all reasonable and feasible mitigation measures for all internal and underground works will ensure that any adverse noise impacts to surrounding residential, commercial and recreational receivers are minimised when noise goals cannot be met due to safety or space constraints.

7.4.4 CONSTRUCTION TRAFFIC NOISE

Noise emissions due to construction vehicle traffic (particularly heavy vehicles) will need to be assessed and management to ensure the amenity of the surrounding receivers are not overtly affected.

Management of heavy vehicle to and from the site should be scheduled to occur outside the busiest traffic periods but also to avoid noise-sensitive times – i.e., exam periods within the school. Truck engine or heavy braking or accelerating should be avoided, as well as and excessive idling, particularly in residential streets.

Construction vehicle routes, parking and sub-contractor / driver behaviour should be observed and monitored to ensure considerate behaviour is maintained.

A Construction Traffic Management Plan will need to address the minimisation of construction traffic noise.

8 SUMMARY AND CONCLUSIONS

A noise and vibration impact assessment has been carried out for the construction and operation of the new primary school at Wilton Junction in North Wilton, NSW. This report forms part of the REF package submitted to the NSW Department of Education.

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

8.1 SUMMARY

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.

External Mechanical Plant: At this stage, preliminary mechanical plant selections have been made. Based on noise emission assessments, the external mechanical plant will meet the noise level criteria at the nearest noise sensitive receivers with insulated ductwork attached to the discharge of the top-discharge units – see Section 5.1. Mitigation measures have been provided to minimise the impact of external noise emissions associated with the mechanical plant of the proposed activity to the nearest sensitive receivers.

School Bell and PA system: Mitigation measures have been provided to minimise the impact of external noise emissions associated with the public address and school bell systems of the proposed activity to the nearest sensitive receivers.

Hall and Out of Hours Care: The predicted noise levels from the out of hours care in the hall are expected to meet the noise level criteria for school activities at the nearest residential receivers.

Preschool Outdoor Play Area: The noise impacts from the use of the preschool outdoor playground will meet the "more than 4 hours" noise level criteria – with 60 students – at the nearest noise residential receivers with a solid fence / barrier around the playground with a minimum heigh of 1.8m and a minimum surface mass of 12kg/m^2.

Classroom Operational Noise: The noise impact from the use of the classrooms will meet the established noise level criteria at the nearest noise sensitive receivers.

Noise intrusion: Noise break-in from traffic noise assessed for the external glazing facing the Hume Highway. A minimum sound insulation performance has been obtained to meet the internal noise level criteria as per NSW DoE Design Checklist - 0001c. Acoustic design of the external glazing shall continue during the detailed design of the project once glazing and façade areas will be defined.

Construction Noise and Vibration Planning: A preliminary construction noise assessment has been carried out. Based on the results of the preliminary assessment, noise associated with worst-case scenario construction works is expected to exceed the noise limits in accordance with the ICNG Guideline. Nevertheless, compliance with the relevant construction noise criteria can be achieved through specific noise mitigation measures. These noise mitigation measures are to be provided in a detailed Construction Noise & Vibration Management Plan prepared by a qualified acoustic consultant prior to Construction Certificate. The detailed CNVMP is to include noise impacts and mitigation measures for the surrounding noise sensitive receivers plus the existing school.

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, modifications to the building and introduction of any additional noise sources.

Subject to the adoption of the mitigation measures outlined in Section 8.2, the proposed activity will not result in significant noise and vibration impacts and potential impacts can be managed.

Even though no assessment can be considered as being thorough enough to preclude all potential environmental impacts, based on the information presented in this report, it can be stated that the impacts associated with the proposed activity can be managed. Additionally, subject to the adoption of the mitigation measures outlined in Section 8.2, the proposed activity will not result in significant noise and vibration impacts, and compliance with relevant criteria can be readily achieved.

8.2 MITIGATION MEASURES

Project Stage	*Mitigation Name*	*Mitigation Measures*	*Reason for Mitigation Measure*	*Section of Report*
D	Building Services Noise	The proposed mechanical layout includes insulated rigid ductwork on the discharge of the top discharge units. Acoustic assessment of all mechanical plant shall continue during the design phases of the project in order to confirm any noise control measures to achieve the relevant noise criteria at the nearest noise sensitive receivers. Refer to Section 5.1 for the detailed assessment of the mechanical services.	To comply with the established noise level criteria and to protect the acoustic amenity of the surrounding receivers.	Section 5.1
D / O	Public address and school bell systems Noise	The public address and school bell systems shall be designed, installed and operated such that the systems do not interfere unreasonably with the comfort and repose of occupants of nearby residences. Noise emissions from public address and school bell systems shall be restricted to the noise levels as per Section 4.4. Acoustic assessment of public address and school bell systems shall continue during the detailed design phase of the project in order to confirm any noise control measures required to achieve the relevant noise criteria at the nearest noise sensitive receivers.	To comply with the established noise level criteria and to minimise the negative impacts on the acoustic amenity of surrounding receivers.	Section 5.2

Project Stage	*Mitigation Name*	*Mitigation Measures*	*Reason for Mitigation Measure*	*Section of Report*
D / O	Preschool Outdoor Playground	A 1.8m high solid fence must be provided around the entire length of the outdoor playground of the Preschool. See Section 5.4 for more details.	To comply with the recommended noise level criterion and to protect the acoustic amenity of the surrounding receivers.	Section 5.4.
D	Traffic Noise Intrusion	To achieve the internal noise level criteria in accordance with NSW DoE Design Checklist - 0001c, all external glazing facing the Hume highway (facing south or east) to provide a minimum sound reduction index of R_W32. A 6.38mm laminated fixed single glazing system achieves the nominated sound reduction index.	To comply with the internal noise level criteria and ensure road noise break-in does not adversely affect students.	Section 6
C	Construction Noise	A detailed Construction Noise and Vibration Management (CNVMP) Plan must be prepared by the Contractor and implemented throughout the construction life of the project.	To comply with the NSW and Department of Environment and Climate Change (DECC) ICNG noise criteria and to protect amenity of the surrounding receivers.	Section 7

*Note: Project stages include:

- (D) Design
- (C) Construction
- (O) Operation

8.3 EVALUATION OF ENVIRONMENTAL IMPACTS

An assessment of the environmental impacts of the new primary school at Wilton Junction has been conducted. Based on the information presented in this report, the extent and nature of potential impacts are low and will not have a significant impact on the locality, community and/or the environment. Potential impact can be appropriately mitigated or managed to ensure that there is minimal impact on the locality, community and/or the environment.

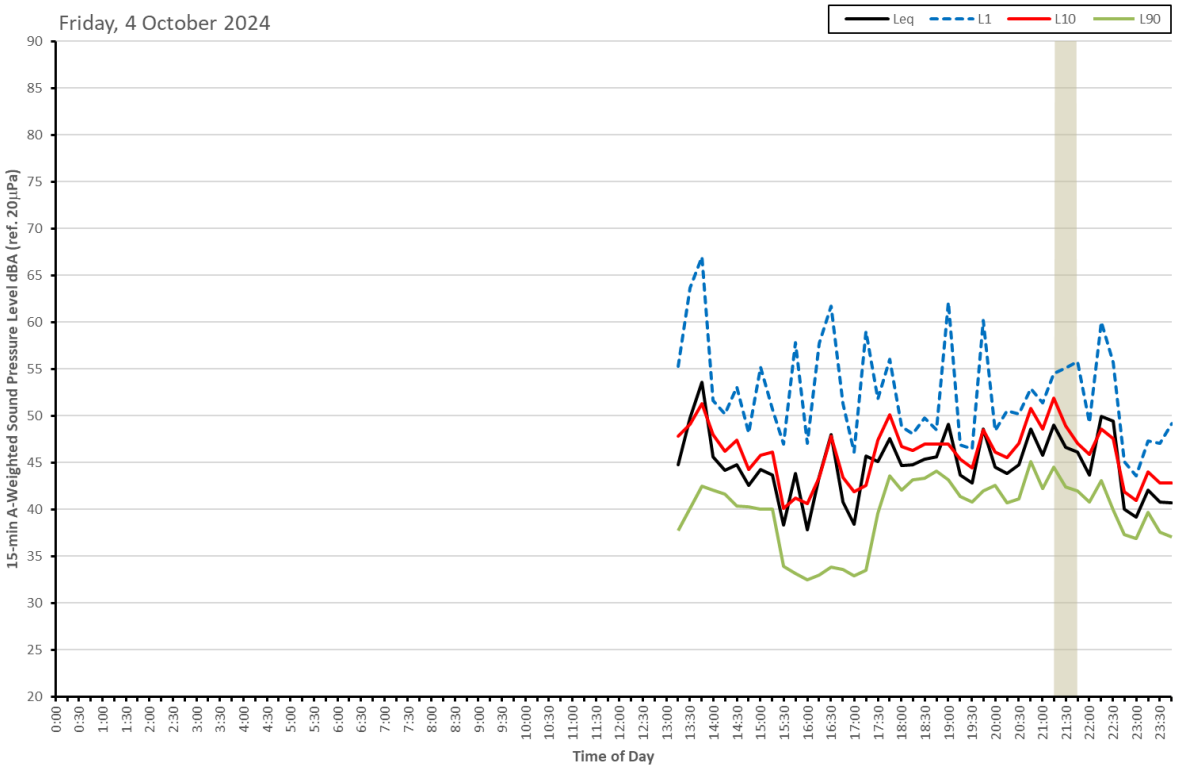
APPENDIX A: LONG-TERM NOISE MONITORING

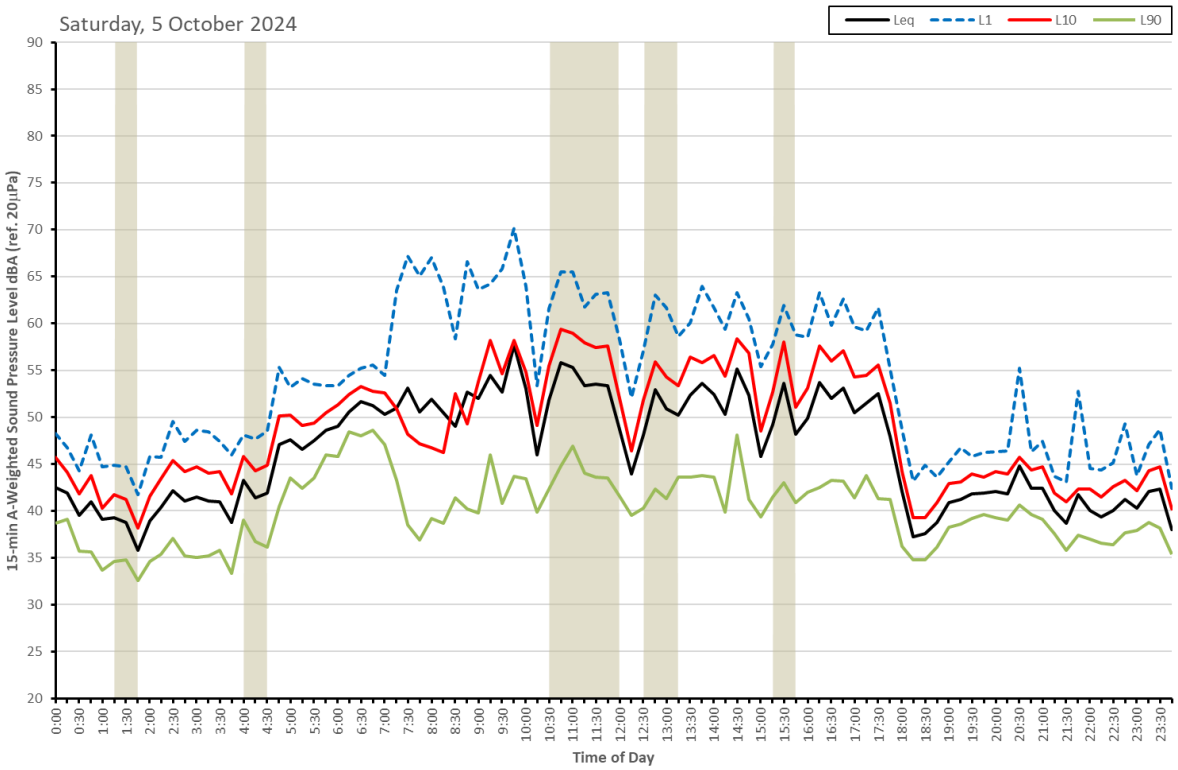
L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

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.


Friday, 4 October 2024
Leq
L1
L10
L90
15-min A-Weighted Sound Pressure Level dBA (ref. 20µPa)
Time of Day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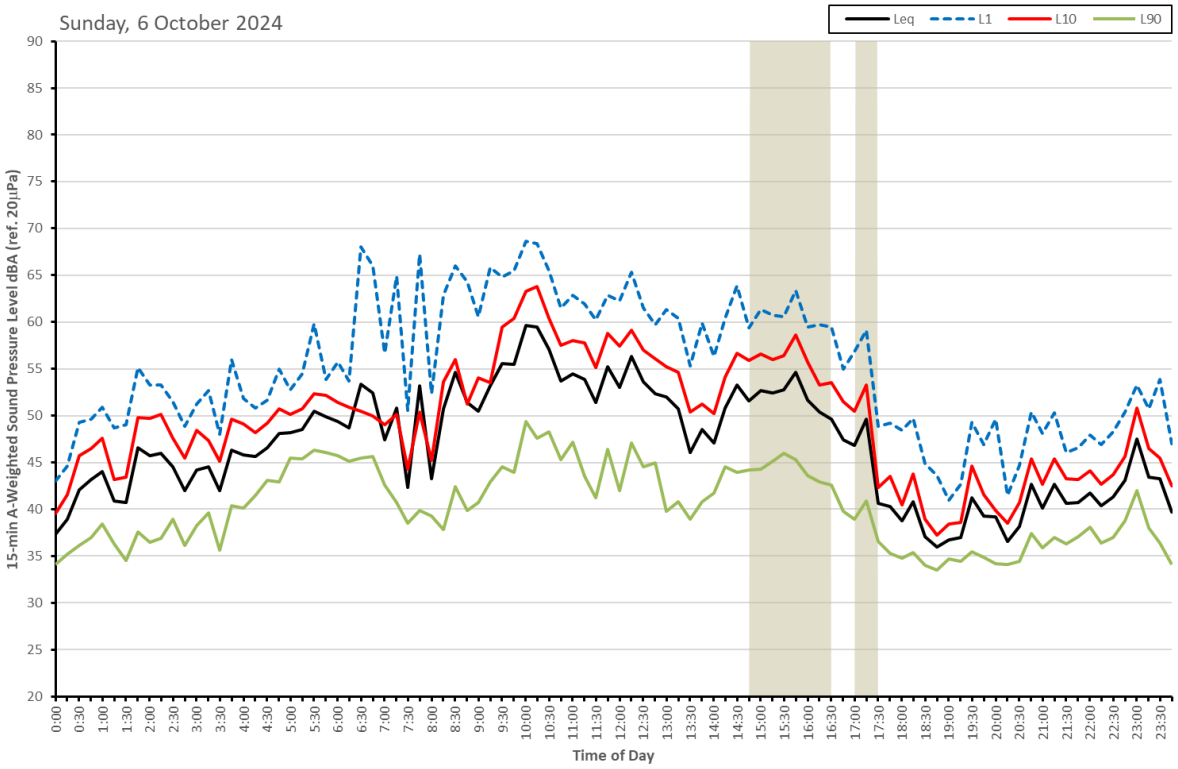
Leq
L1
L10
L90
15-min A-Weighted Sound Pressure Level dBA (ref. 20µPa)
Time of Day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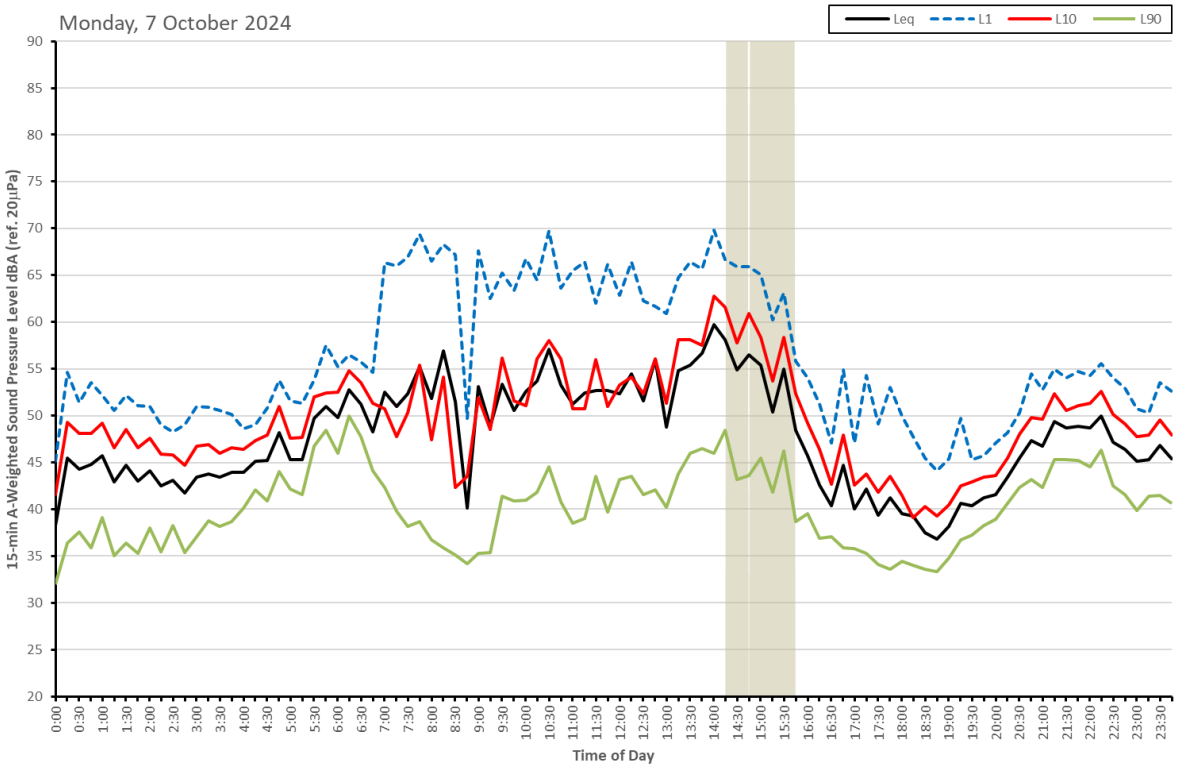
Leq
L1
L10
L90
15-min A-Weighted Sound Pressure Level dBA (ref. 20µPa)
Time of Day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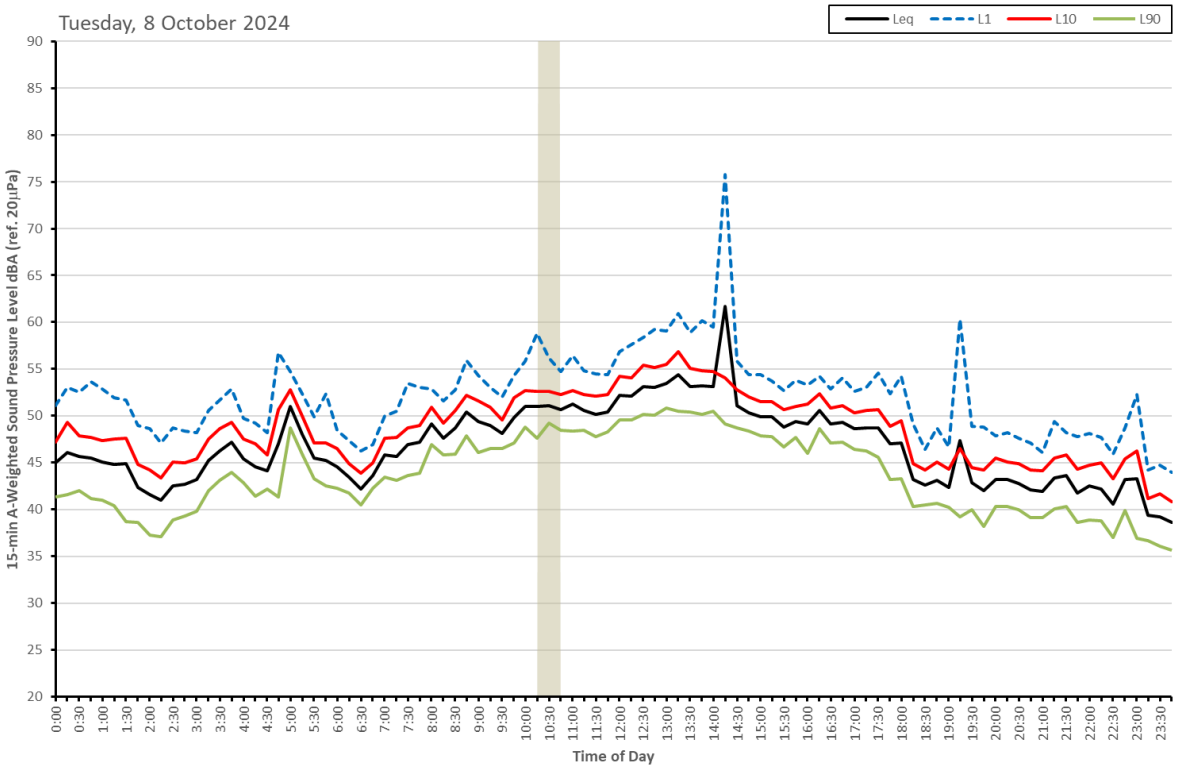
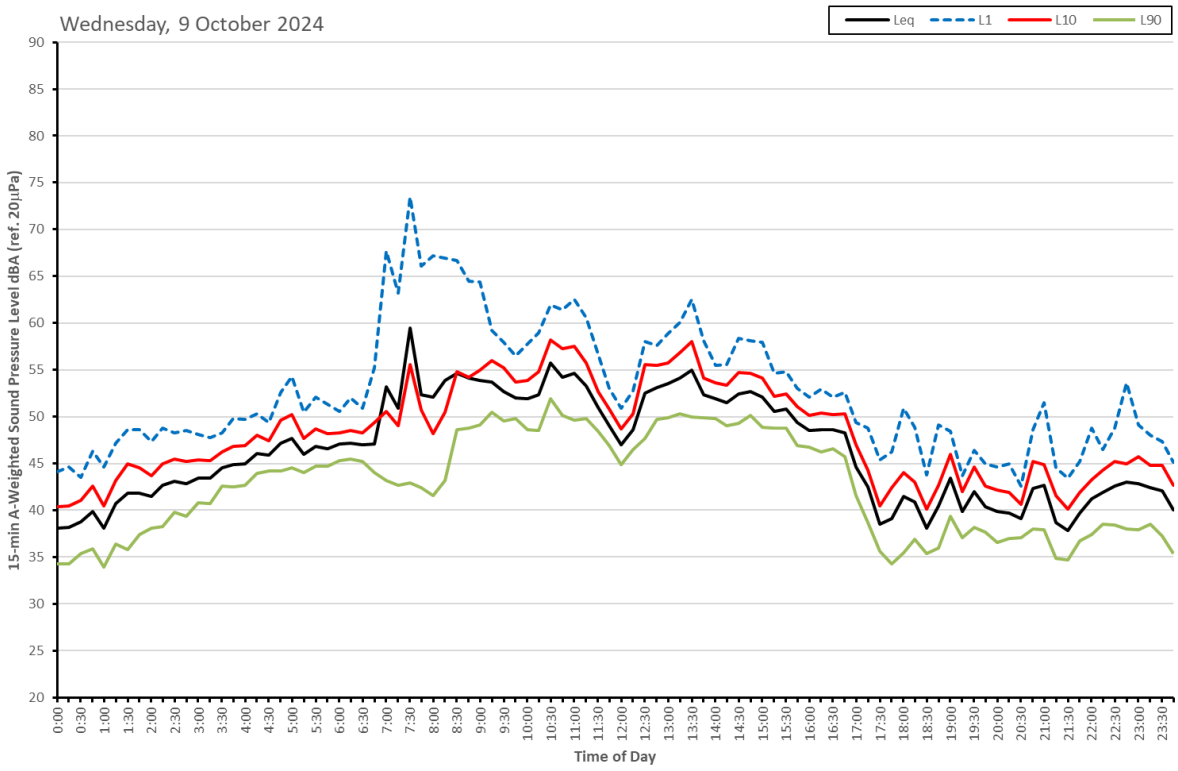
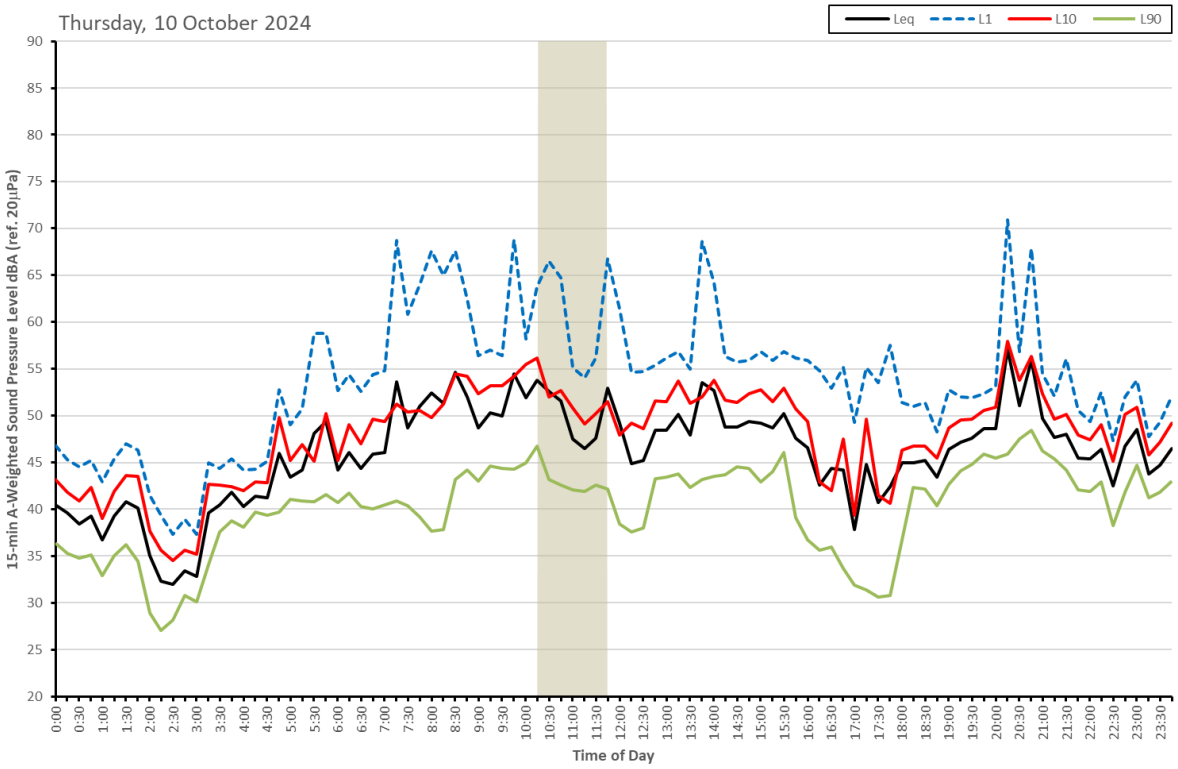
Leq
L1
L10
L90
15-min A-Weighted Sound Pressure Level dBA (ref. 20µPa)
Time of Day


Tuesday, 8 October 2024
Leq
L1
L10
L90
15-min A-Weighted Sound Pressure Level dBA (ref. 20µPa)
Time of Day


Wednesday, 9 October 2024
Leq
L1
L10
L90
15-min A-Weighted Sound Pressure Level dBA (ref. 20µPa)
Time of Day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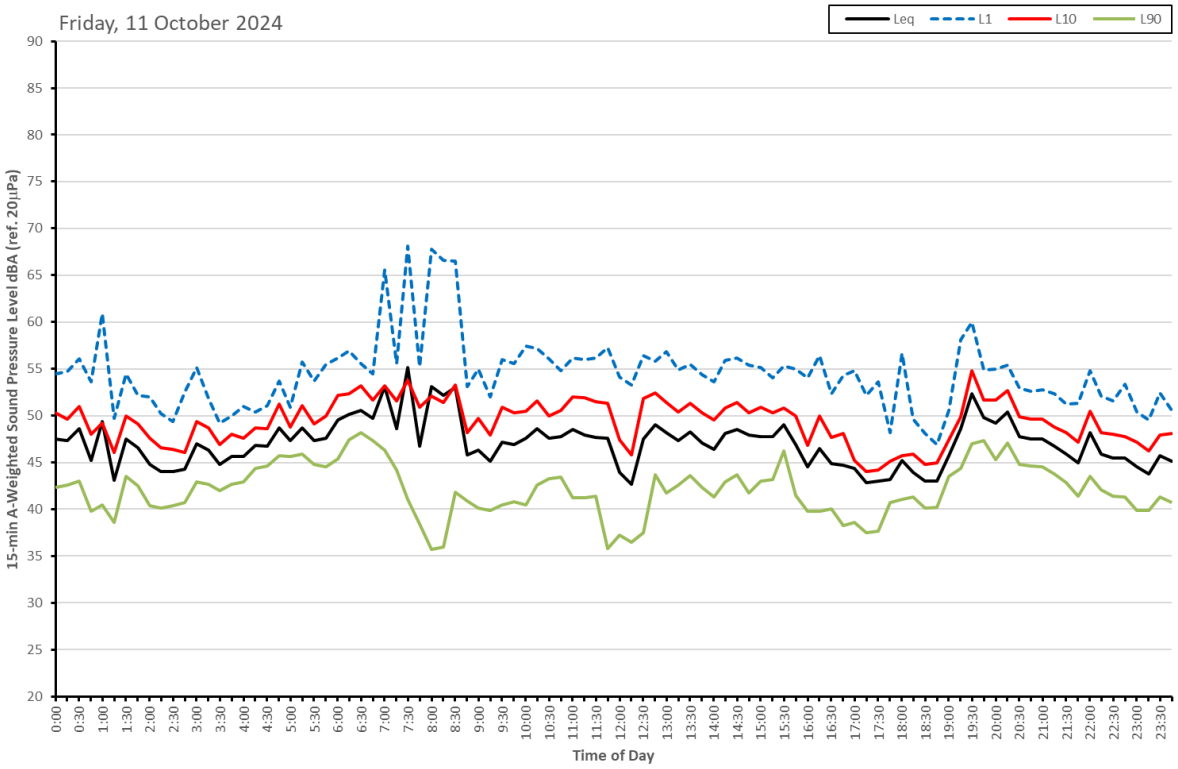
Leq
L1
L10
L90
15-min A-Weighted Sound Pressure Level dBA (ref. 20µPa)
Time of Day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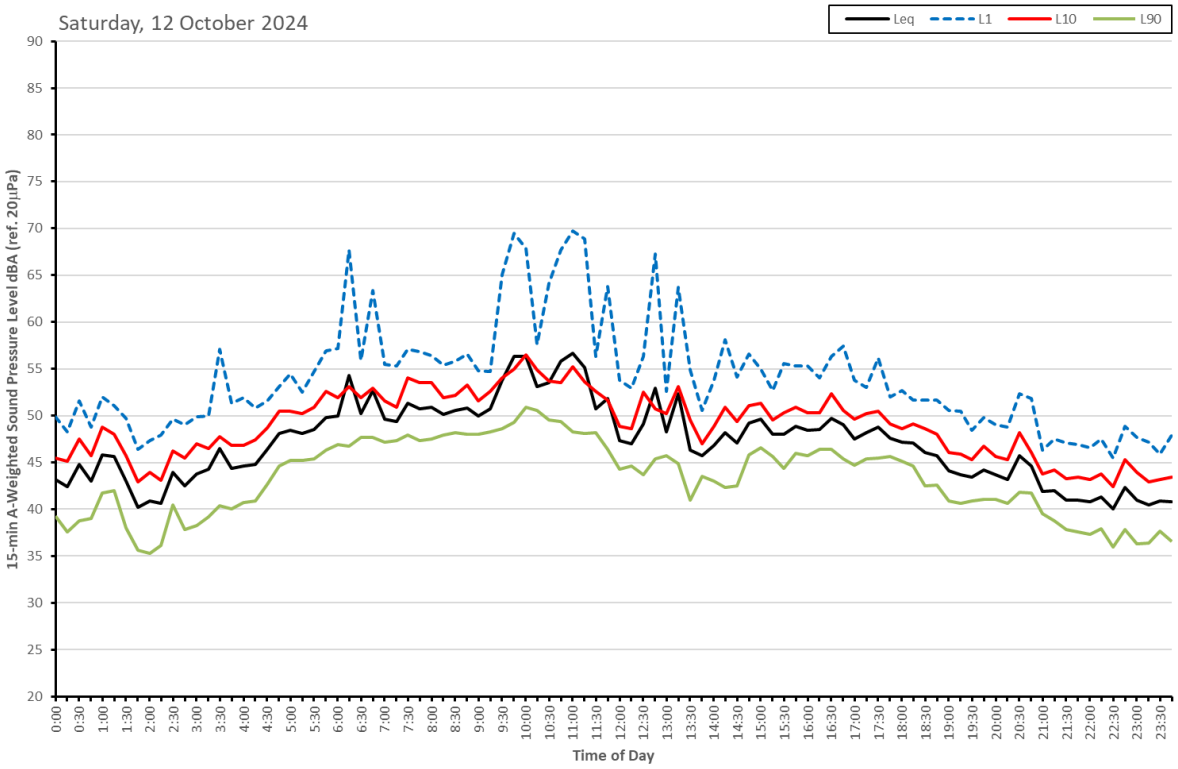
Leq
L1
L10
L90
15-min A-Weighted Sound Pressure Level dBA (ref. 20µPa)
Time of Day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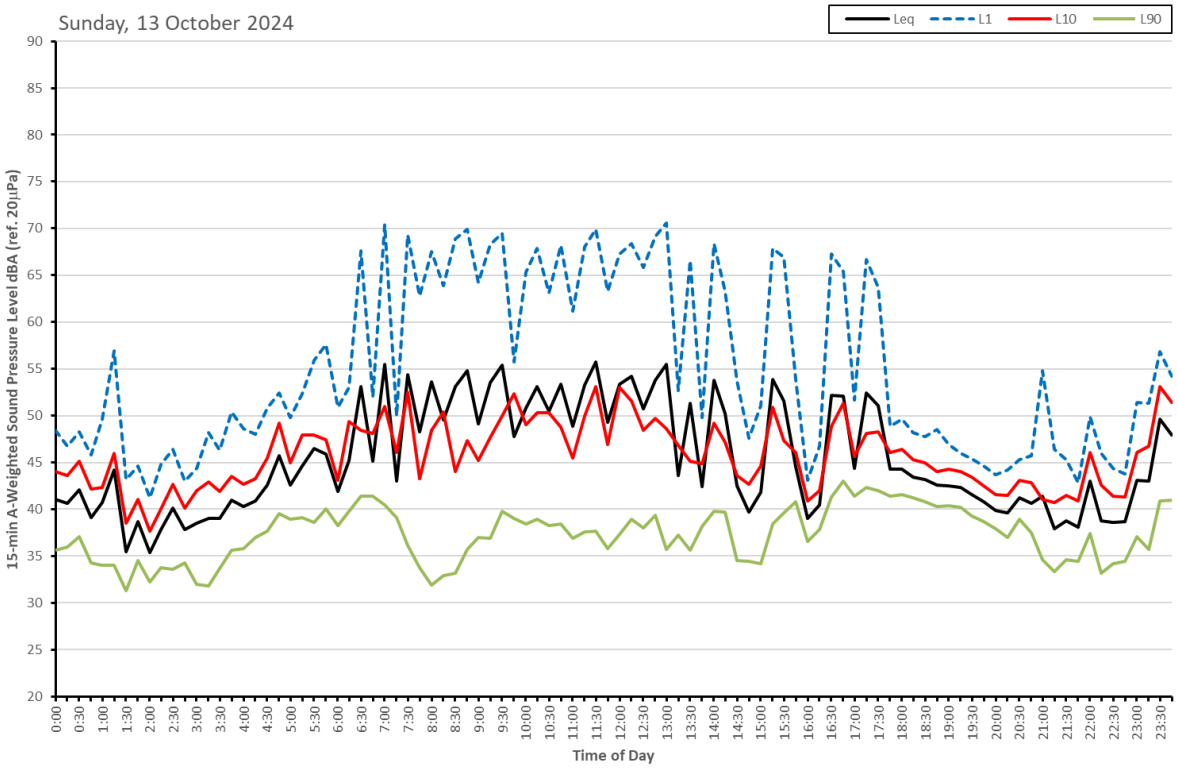
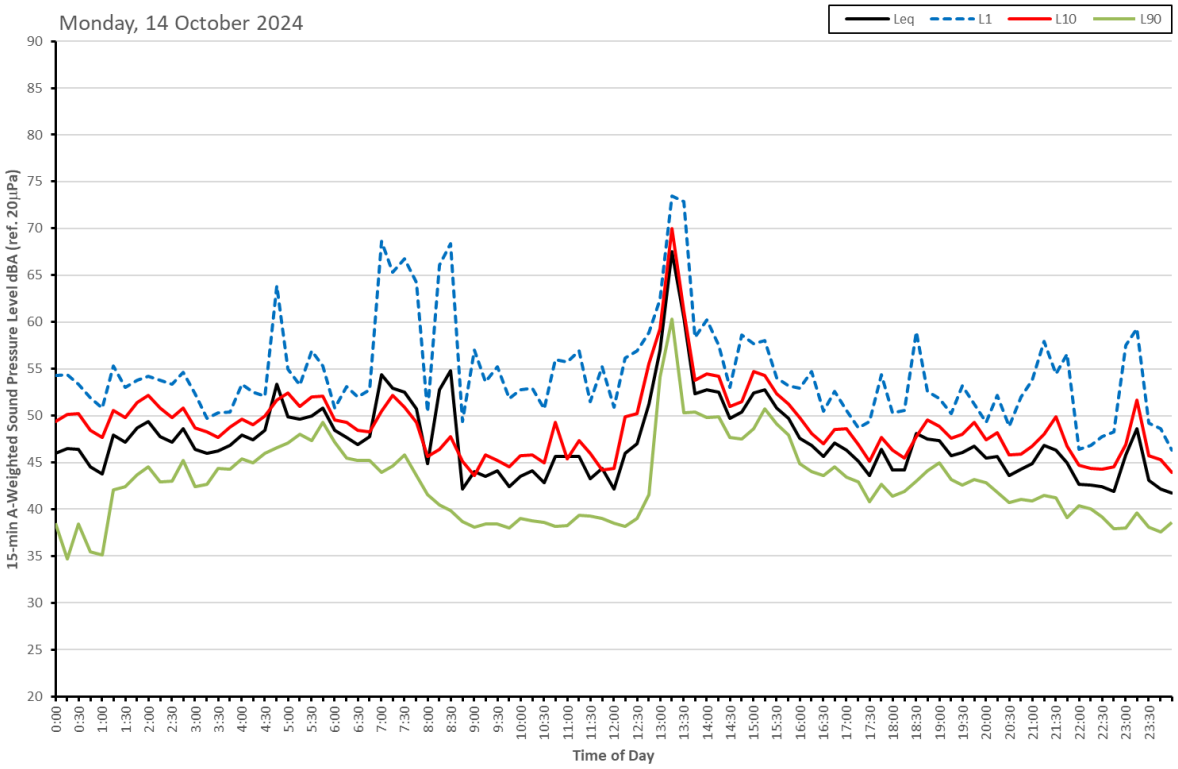
Leq
L1
L10
L90
15-min A-Weighted Sound Pressure Level dBA (ref. 20µPa)
Time of Day


Sunday, 13 October 2024
Leq
L1
L10
L90
15-min A-Weighted Sound Pressure Level dBA (ref. 20µPa)
Time of Day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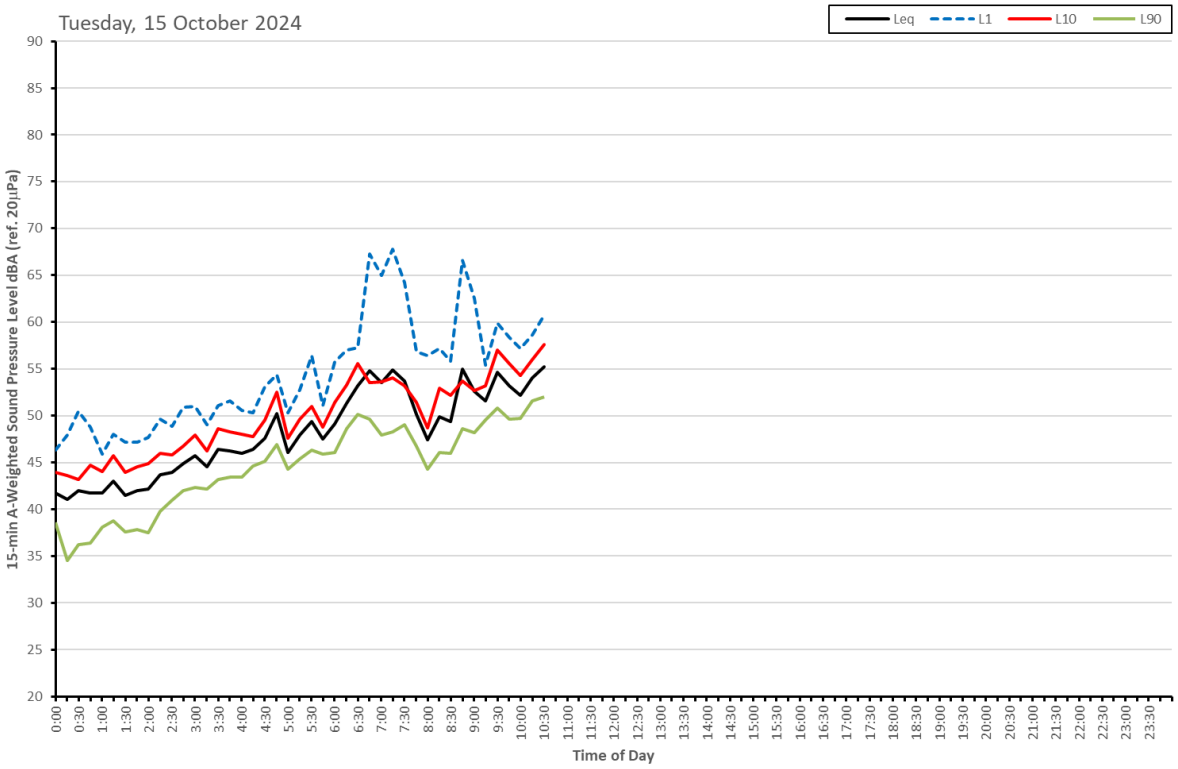
Leq
L1
L10
L90
15-min A-Weighted Sound Pressure Level dBA (ref. 20µPa)
Time of Day


Tuesday, 15 October 2024
Leq
L1
L10
L90
15-min A-Weighted Sound Pressure Level dBA (ref. 20µPa)
Time of Day