

HERSTON QUARTER CHILDCARE CENTRE DEVELOPMENT

Noise Impact Assessment

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL



Approval no: DEV2021/1171/7
Date: 22 December 2023

Prepared for:

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Australian Unity (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
620.30717.00000-R01-v4.0	29 August 2023	Daniel Lee	Timothy Trewin	Timothy Trewin
620.30717.00000-R01-v3.0	22 March 2023	Daniel Lee	Timothy Trewin	Timothy Trewin
620.30717.00000-R01-v2.0	17 March 2023	Daniel Lee	Timothy Trewin	Timothy Trewin
620.30717.00000-R01-v1.0	25 March 2022	Daniel Lee	Timothy Trewin	Timothy Trewin

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1 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been commissioned by Australian Unity to prepare a noise impact assessment for the proposed Herston Quarter Childcare Centre, located within a Priority Development Area (PDA) in the northeast section of 86 Bramston Terrace, Herston (Lot 1545 on SP316602). The purpose of SLR's assessment was to determine the suitability of the proposed development with regards to relevant Queensland noise legislation and support the development application to Economic Development Queensland (EDQ). On this basis, this acoustic assessment has assessed the site plans which are subject to the development application.

This report has considered the following sources of noise:

1. Noise from mechanical plant
2. Noise from traffic movements and carparking on the development site
3. Noise emission from childcare use
4. Noise emission from the designated childcare outdoor play area.

To support the application to EDQ, noise from the above listed sources has been considered against various industry standards and guidelines to inform compliance. The referenced standards and guidelines are listed below:

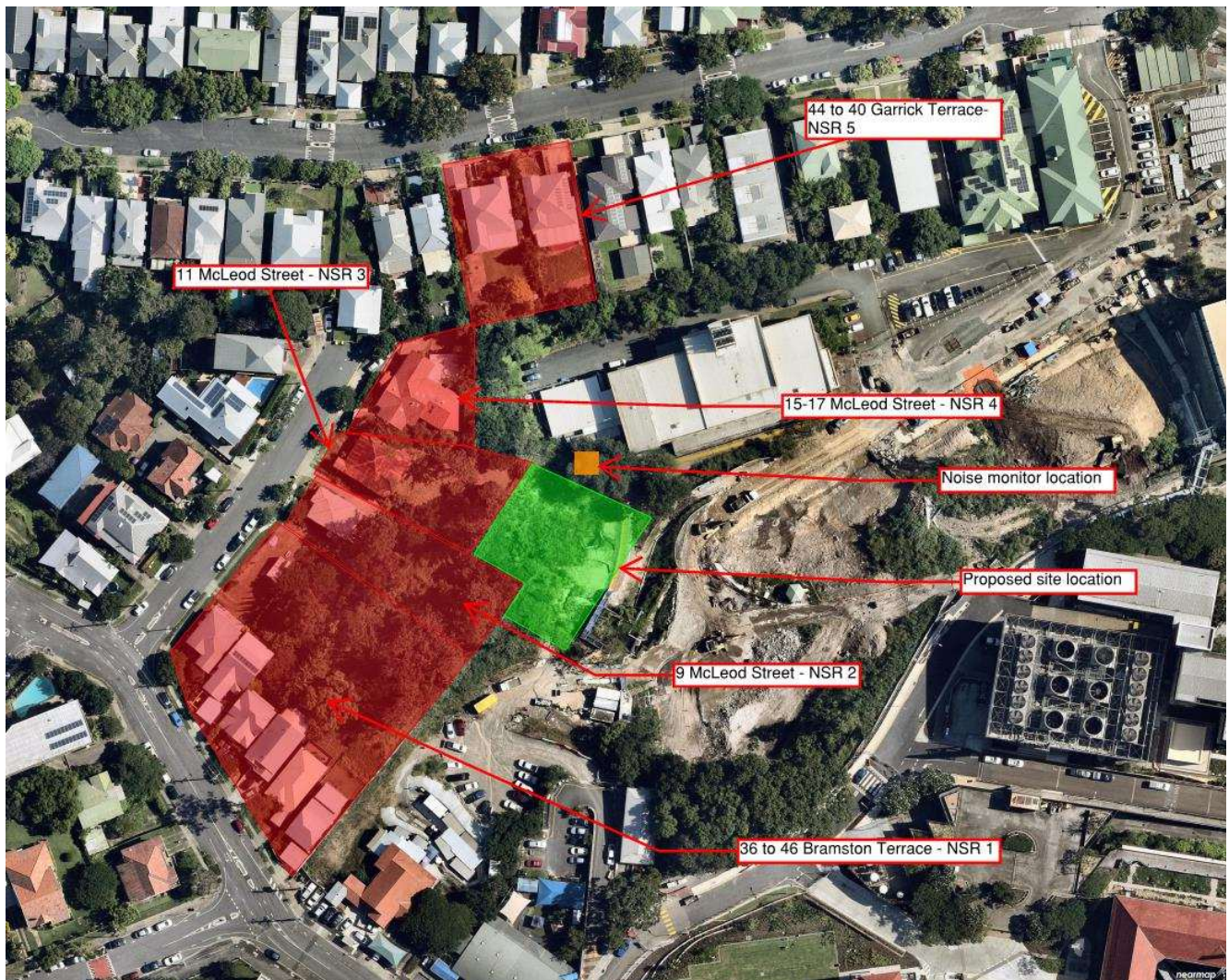
- Queensland Environment Protection (Noise) Policy 2019
- Queensland Environmental Protection Act 1994
- Brisbane City Council Plan (2014)
- AAAC Guideline for childcare centres
- World Health Organisation Guideline

2 Project overview

2.1 Site and surrounding uses

The development site forms a part of Lot 1545 on SP316602, 86 Bramston Terrace, Herston. **Figure 1** shows the site location in the context of surrounding off-site noise sensitive receptors (NSRs), and the noise monitoring location.

Figure 1 Site layout and identified receptors and noise monitoring location (Source: Nearmaps, 2022)



The subject site is in proximity of residential dwellings mainly to the west, with representative NSRs considered in this assessment listed in **Table 1**. It should be noted that SLR has considered noise impacts to the approved house extensions at NSR3 (11 McLeod Street) as shown in Caldicott designs drawings, *2021-1 Dwg No. SD01* to *No. SD06*

Table 1 Location of identified NSRs surrounding the project site

Receptor ID	Address	Approximate distance of dwelling from boundary of Development Site
NSR1	36 to 46 Bramston Terrace	55 m
NSR2	9 McLeod Street	35 m
NSR3	11 McLeod Street	9 m
NSR4	15 to 17 McLeod Street	25 m
NSR 5	44 to 40 Garrick Terrace	50 m

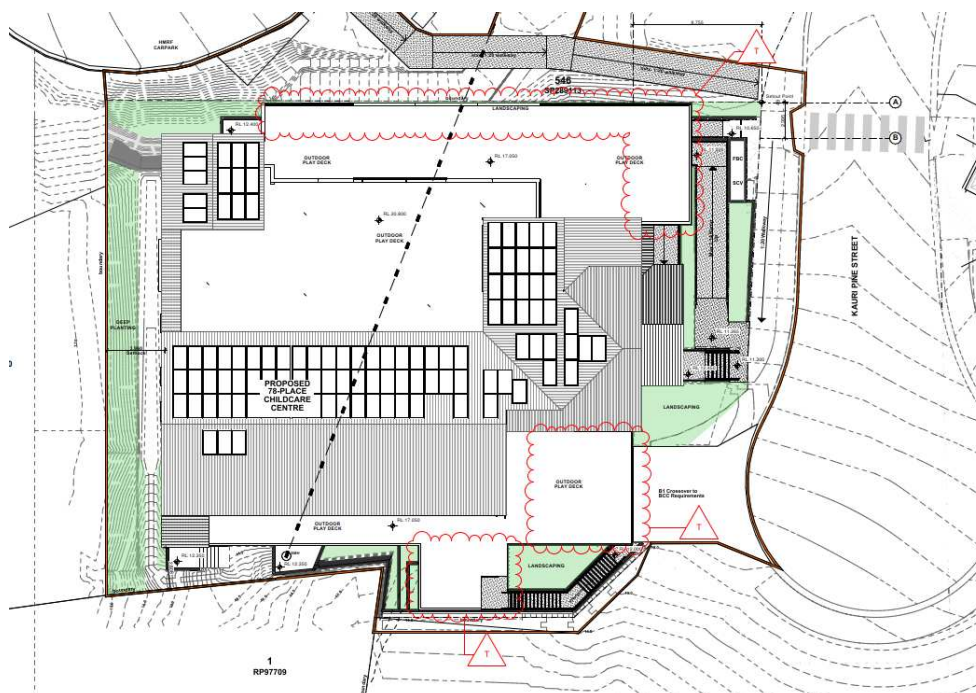
2.2 Proposed development

Table 2 lists the individual components of the proposed development, proposed use and intended operating hours.

Table 2 Development component and operating hours

Development component	Floor level	Proposed use	Proposed operating hours Monday - Sunday
Child Care Centre (Indoor Area)	1 & 2	Indoor use	6 am to 7 pm
Child Care Centre (Outdoor Area)	1 & 2	Outdoor use	6 am to 7 pm
Child Care Centre Carpark	GF	Indoor use	6 am to 7 pm

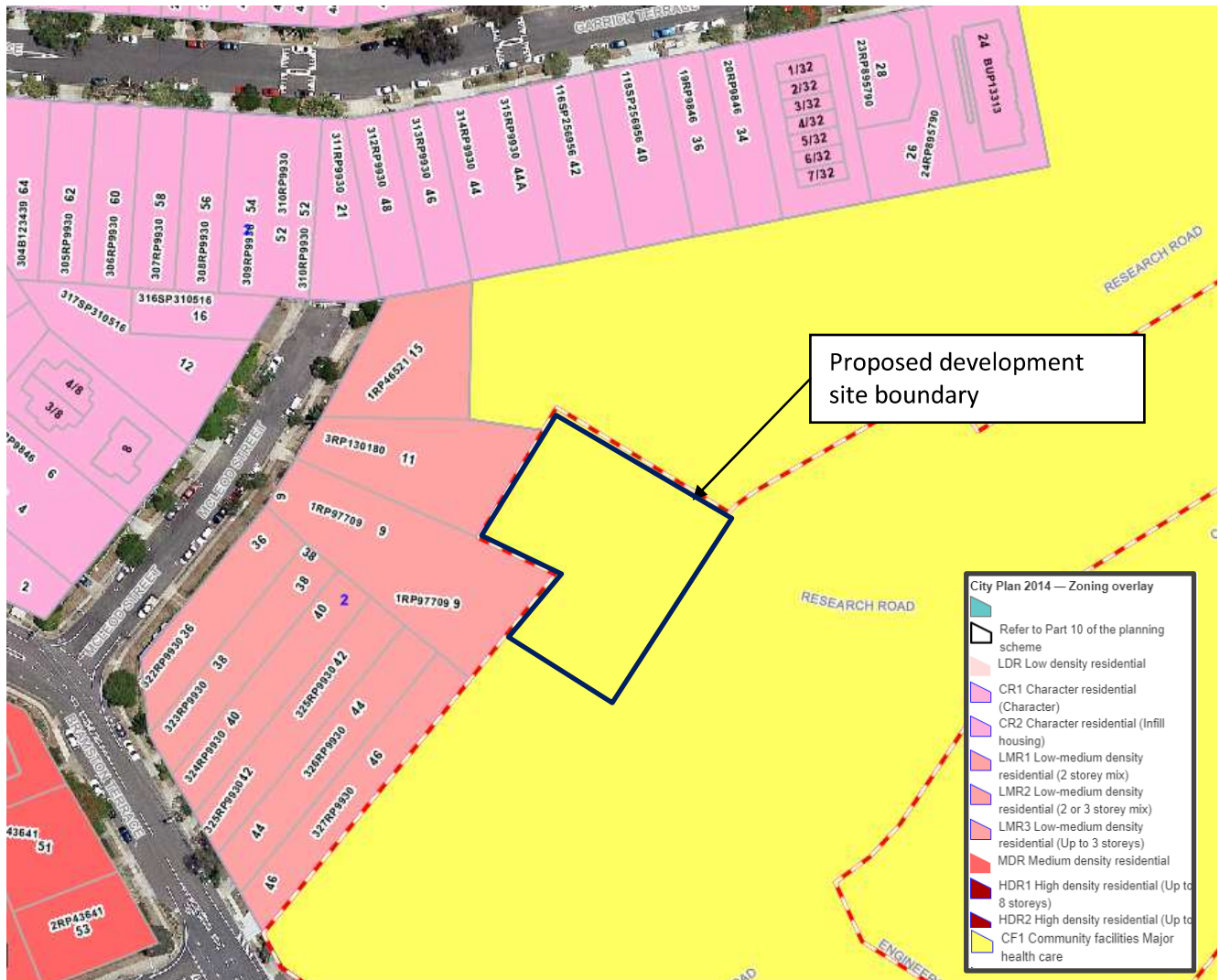
Figure 2 Proposed development site plan



2.3 Land use zoning – Brisbane City Council (BCC) City Plan

The BCC city plan was used as guidance material to identify sensitive receptors in the surrounding environment. The development site is currently located within a ‘Community facilities Major health care zone, as shown in Figure 3.

Figure 3 BCC City Plan– land zoning map



Neighbouring lots towards south-west, west, and north-west are zoned as ‘Low-medium density residential’ and are currently used for residential purposes. Lots towards the north are zoned as ‘Character (infill housing)’. Noise emissions from the childcare centre and associated carpark will need to be controlled at the identified noise sensitive receptors. Buildings to the north, east and south on the health campus have sealed facades are not considered to be noise sensitive.

3 Existing ambient environment

Noise measurements were conducted by SLR to identify and quantify the existing noise environment at the subject site. Continuous unattended noise logging was conducted at the location shown in **Figure 1** commencing on Monday 3rd January 2022 and concluding on Tuesday 4th January 2022. The monitoring dates were chosen during the public holiday period to avoid contamination from surrounding construction activities and allow for more conservative background noise levels. The objective of the unattended noise monitoring was to quantify the existing ambient and background noise levels in the area, and to assist in determining appropriate noise criteria for the proposed development.

The unattended noise monitoring was carried out using an Acoustic Research Laboratories (ARL) Ngara noise logger (serial no. 8781BE). The Ngara was configured to record a range of A-weighted Fast-response statistical noise levels over consecutive 15-minute intervals. The noise logger was located in the free field with a microphone height of 1.5 m above the existing ground level.

All items of acoustic instrumentation employed during the noise monitoring were set to A-weighted and Fast response with the microphones fixed at 1.5 m above ground level. The noise logger and sound level meter were checked for calibration using a G.R.A.S Sound Level Calibrator (serial no. 270304) before and after the survey. The instrument exhibited a drift less than ± 1.0 dB during the course of monitoring; therefore, measurements are considered valid according to AS 1055:2018 - *Acoustics - Description and measurement of environmental noise*.

The unattended noise measurement results from the monitoring location were used to determine the 'Rating Background Level' (RBL) for daytime (7:00 am to 6:00 pm), evening (6:00 pm to 10:00 pm) and night-time (10:00 pm to 7:00 am) periods at the monitoring location. The RBL is the median of the 90th percentile of the daily background (LA₉₀) noise levels in each assessment period (day, evening and night) over the duration of the monitoring, and is widely adopted as the method for defining 'background' noise levels for noise assessments conducted in the State of Queensland¹. The complete measurement results of the unattended noise surveys are presented graphically in **Attachment A**. **Table 3** contains the RBL derived for the measurement location.

The ambient noise levels are the average monitored (L_{Aeq}) noise levels for each period, which account for all sources of noise within the local environment, and are also shown in **Table 3**.

Table 3 Monitored noise levels – existing noise environment

Monitoring Location	Rating Background Level, dBA			Ambient L _{Aeq} Noise Levels, dBA		
	Day	Evening	Night	Day	Evening	Night
Behind the Herston Medical Research Facility, North-western corner of Lot 1545 on SP316602	44	43	42	53	52	47

Note: The daytime is 7:00 am to 6:00 pm, the evening is 6:00 pm to 10:00 pm and the night-time is 10:00 pm to 7:00 am.

¹ With reference to DES' *Planning for Noise Control* Guideline 2004

4 Noise Criteria

Noise emissions from the proposed development will be considered against State criteria to inform compliance to EDQ. In addition, this assessment considers local Council policy and the AAAC guideline as guidance material.

4.1 Queensland Environmental Protection (Noise) Policy (EPP)

Noise from the proposed development has been assessed with regard to noise criteria primarily described in the Queensland *Environmental Protection (Noise) Policy 2019* (EPP(Noise)). The EPP(Noise) is subordinate legislation under the *Environmental Protection Act 1994* and the environmental values to be enhanced or protected under the EPP(Noise) are:

- The qualities of the acoustic environment that are conducive to protecting the health and biodiversity of ecosystems.
- The qualities of the acoustic environment that are conducive to human health and wellbeing, including by ensuring a suitable acoustic environment for individuals to do any of the following: sleep, study or learn or be involved in recreation, including relaxation and conversation.
- The qualities of the acoustic environment which are conducive to protecting the amenity of the community.

The EPP(Noise) contains Acoustic Quality Objectives (AQO) for receptors potentially sensitive to noise. Where the overall level of noise at the receptors from the proposed development are within the AQO, the environmental values are considered to be achieved.

The AQO for the noise sensitive receptors and land use adjacent to the Project are presented in **Table 4**. The 1-hour L_{Aeq} has been selected as the most appropriate descriptor for the assessment of time varying or intermittent noise sources associated with the subject development.

Table 4 EPP(Noise) Acoustic Quality Objectives

Sensitive receptor	Time of day	Acoustic quality objectives (measured at the receptor) dB(A)			Environmental value
		$L_{Aeq,adj,(1hour)}$	$L_{A10,adj,(1hour)}$	$L_{A1,adj,(1hour)}$	
Dwelling (for outdoors)	daytime and evening	50	55	65	health and wellbeing
Dwelling (for indoors)	daytime and evening	35	40	45	health and wellbeing
	night-time	30	35	40	health and wellbeing, in relation to the ability to sleep

The AQO are not mandatory but rather objectives that should be aimed to be achieved over time.

To assess noise levels to the internal (indoor) AQO at residential dwellings during the night time period, the external noise levels predicted via noise modelling have to be adjusted by a façade correction that accounts for the reduction of noise achieved by the building. As seen in **Table 4**, the difference in the nominated indoor and outdoor objectives is 15dB. Therefore to derive a night time external limit for the purposes of assessment 15dBA is added to the listed indoor objectives.

4.2 Environmental Protection Act 1994 - Mechanical plant emissions

As per the Environmental Protection Act 1994, Section 440U *Air-conditioning equipment*, in occupier of the premises must not use, or permit the use of, the equipment on any day—

- (a) before 7a.m, if it makes a noise of more than 3 dBA above the background level; or
- (b) from 7a.m. to 10p.m, if it makes a noise of more than 5 dBA above the background level; or
- (c) after 10p.m, if it makes a noise of more than 3 dBA above the background level.

The above are interpreted as “measured” limits and thus the design should account for an element of local background noise. For design purposes mechanical plant limits will be established as:

- Day/evening (7am to 10pm); B/G +3 dB, and
- Night (10pm to 7am); B/G + 0 dB.

According to the EPA Act 94:

- Background level means the background A-weighted sound pressure level under the prescribed standard measured as $L_{A90,T}$.
- $L_{A90,T}$ means the A-weighted sound pressure level obtained using time weighting ‘F’ that is exceeded for 90% of the measuring period (T).

According to the Environmental Protection Regulation 2019, source noise for noise standard 440U of the Act may be measured as $L_{A90,T}$. However for the sake of this assessment the RBL has been used which is a conservative approach.

4.3 World Health Organisation (WHO) sleep disturbance

Sleep awakening criteria may be used to assess the impact of noise sources operating during the night period (10pm – 7am) that are neither steady nor quasi-steady, such as time varying events (e.g. door closure, engine start, vehicle movement). The WHO guideline recommends a L_{Amax} 45 dBA for non-continuous noise (based on 10-15 events per night). Using a 7 dBA outside to inside sound correction for open windows, this translates to an external (free field) limit of L_{Amax} 52 dBA, assessable at residential dwellings.

Table 5 Sleep disturbance noise limits at residential receivers

Period	Time	Noise Limits at a Noise Sensitive Place Measured as the Adjusted Maximum Sound Pressure Level, dBA
Night time	10pm to 7am	52

4.4 Brisbane City Council City Plan

The BBC City Plan 2014 “Childcare centre code” provides planning requirements with respect to managing noise at noise sensitive land uses and at adjoining noise sensitive use or land identified for future noise sensitive uses.

Figure 4 Brisbane City Plan 2014 Childcare centre code

PO10 Development is of a nature and scale which does not result in noise emissions that exceed the following criteria: a. $L_{Aeq,adj,T}$ emitted from the development is not greater than the rating background level plus 3 at the <u>sensitive use</u>. Where T is: a. Day (7am to 6pm): 11 hr; b. Evening (6pm to 10pm): 4 hr; c. Night (10pm to 7am): 9hr. Where $L_{Aeq,adj,T}$ is the A-weighted equivalent continuous sound pressure level during measurement time T, adjusted for tonal and impulsive noise characteristics, determined in accordance with the methodology described in the <u>Noise impact assessment planning scheme policy</u>. Note—Rating background level is to be determined in accordance with the methodology described in the <u>Noise impact assessment planning scheme policy</u>. Note—A noise impact assessment report prepared in accordance with the methodology described in the <u>Noise impact assessment planning scheme policy</u> can assist in demonstrating achievement of this performance outcome.	AO10.1 Development provides a 2m high <u>acoustic fence</u> and a minimum 2m wide landscaped buffer along any boundary adjoining land in a zone in the Residential zones category.
	AO10.2 Development ensures mechanical plant or equipment is <u>acoustically screened</u> from adjoining <u>sensitive uses</u>. Note—Mechanical plant includes generators, motors, compressors and pumps, for example air-conditioning, refrigeration or coldroom motors.
	AO10.3 Development does not operate before 7am or after 7pm.

4.5 AAAC Guideline for child care centres

The assessment has also referenced the guideline noise levels from the Association of Australian Acoustical Consultants Guideline for Child Care Centre Acoustic Assessment version 3, 2020 (AAAC Guideline). The guidelines in **Table 6** are recommended to be achieved at nearby residential land use to control the potential noise impacts from the child care centre play areas.

Table 6 AAAC Guideline for child care centres

Association of Australian Acoustical Consultants Guideline for Child Care Centre Acoustic Assessment (2020)		Project specific noise criteria
Noise from outdoor play area to offsite noise sensitive receptors	Based criterion of LAeq,15min 45 dBA; or Existing LA90 + 5 dBA (for more than 4 hours play per day); or LAeq,15min shall not exceed: Existing LA90 + 10 dBA (for up to 4 hours play per day)	Day time Presuming unlimited play hours between 7am and 6pm, (RBL _{day} 44 dBA + 5dBA) = LAeq,15min(7am-6pm) 49 dBA Evening (RBL _{evening} 43 dBA + 5dBA) = LAeq,15min(7am-6pm) 48 dBA

4.6 Summary of project noise criteria

Based on the above criteria examination and the relevant acoustic consideration for the development, the noise emission criteria applicable to the Project are shown in **Table 7**. The values represent the lower of the various EPP(Noise), EP Act, BCC, AAAC childcare and WHO criteria as applicable at offsite noise sensitive receptors.

Table 7 Noise emission criteria for the project at offsite NSR's

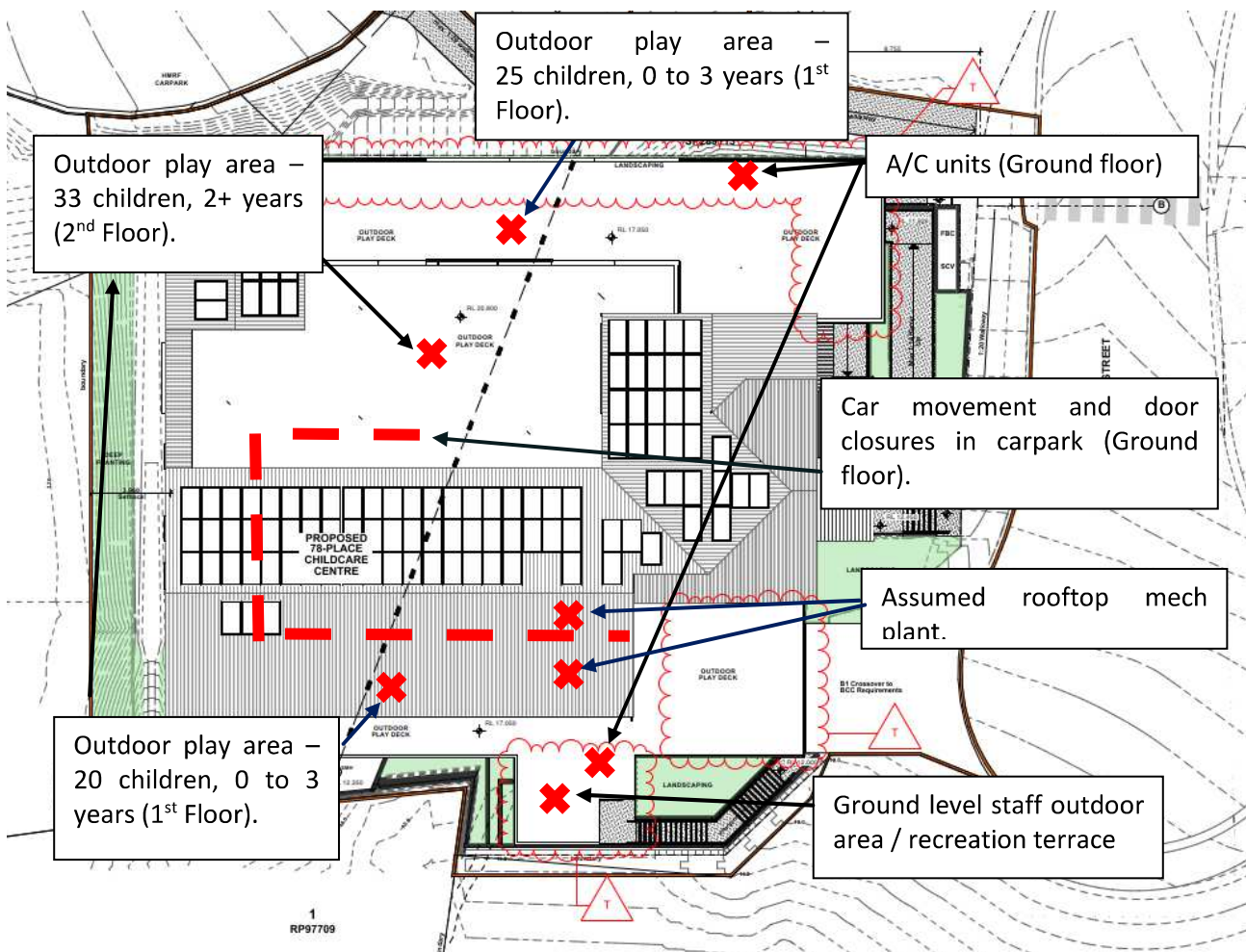
Noise Source	Noise source characteristic	Overriding criteria	Noise Criteria, dBA			
			Day (7:00 am – 6:00 pm)	Evening (6:00 pm – 10:00 pm)	Night (10:00 pm – 7:00 am)	Sleep disturbance (10:00 pm – 7:00 am)
Mechanical Plant	Continuous	EP Act	47dBA LA90	46dBA LA90	42dBA LA90	n/a
Childcare outdoor play	Intermittent/time varying	BCC	47dBA LAeq	46dBA LAeq	n/a	n/a
Childcare carpark activities	Intermittent/time varying + continuous	BCC	47dBA LAeq	46dBA LAeq	45dBA LAeq	n/a
Childcare carpark activities	Intermittent/time varying	WHO sleep disturbance	n/a	n/a	n/a	52dBA LAmax

5 Noise source summary

5.1 Location

To assist the assessment of the noise emissions from the proposed childcare operation, continuous and variable noise levels were used from SLR's extensive noise source database library and the AAAC guideline. Noise sources considered and the approximate location shown in **Figure 5**.

Figure 5 Noise sources considered.



The sources presented in **Figure 5** are all external to the building envelope. With regards to the staff outdoor area/recreation terrace, this is for staff usage only and the potential noise source is staff face to face conversations at a moderate noise level of 60 dBA at 1m (ie sound power level 68 dBA). This sound level is considered insignificant compared to the other identified time varying childcare noise sources listed in **Table 8**. Environmental noise compliance is therefore expected to be easily achieved and as such the modelling of staff terrace noise emissions is not considered to be necessary as part of this assessment.

Internal noise sources within the childcare such as children playing, talking, etc are expected to be well attenuated by the building façades due to external noise intrusion requirements; therefore, do not require further assessment. The number of sources and assigned noise emission (sound power levels) are described in the following sections.

5.2 Noise emission from time varying sources

5.2.1 General overview

Short-term time varying noise events from car park activities, and outdoor play can potentially affect nearby noise sensitive receivers. The time varying noise sources are assumed to be the customer vehicles entering site parking, car parking events associated with the proposed development, and children playing in the outdoor play area of the childcare centre.

The assumed time varying noise levels are summarised in **Table 8** and have been applied as source noise emission levels in the assessment of noise from the proposed development future operation. The number of, duration and expected sound power levels (SWL) for these events are listed in further detail in the following sub-sections where applicable. Noise data was either obtained from the SLR in-house source noise measurement database.

Table 8 Time varying noise source sound power levels and model input assumption

Noise event	Source height, metres	Source Leq SWL, dBA	Assigned acoustic penalty	Duration	Single event L _{Amax} SWL dBA
Childcare outdoor play area 1 (0 to 3 years) ¹	0.5	80 Leq ^{Note 1}	nil	x 3 one-hour events of continuous play during the day x 1 one hour event of continuous play during the evening	n/a
Childcare outdoor play area 2 (0 to 3 years) ¹	1	80, 80 Leq ^{Note 1}	nil	X 3 one-hour events of continuous play during the day X 1 one hour event of continuous play during the evening	n/a
Childcare outdoor play area 3 (2+ years) ¹	1	87, 87 Leq ^{Note 1}	nil	x 3 one-hour events of continuous play during the day x 1 one hour event of continuous play during the evening	n/a

Noise event	Source height, metres	Source Leq SWL, dBA	Assigned acoustic penalty	Duration	Single event LAmax SWL dBA
Slow moving car + car start and door closure	0.5	76 Leq per car event	nil	70 car events during the day 5 events during the evening, 5 events during night, Travelling @10km/h. Each car event assumed to be 30 seconds long.	90 Lmax per door closure

Note 1: Clusters of 15 children each assumed simultaneously involved in active play in outdoor play area designated. Refer **Section 5.2.2** for further information. Noise predictions to offsite receptors are presented in **Section 6**.

5.2.2 Noise emission from childcare centre

The AAAC guideline for childcare centres identifies a typical range of sound power levels for groups of 10 children in continuous active play, which has been scaled up for 15 and reproduced below in **Table 9**.

Table 9 Effective sound power levels for groups of 15 children involved in active play

Association of Australian Acoustical Consultants Guideline for Child Care Centre Acoustic Assessment Version 3 (2020)	
Age Group	Sound Power Level, dBA
15 Children 0 to 2 years	77 to 80
15 Children 2 to 3 years	83 to 87
15 Children 3 to 6 years	84 to 89

Source: Association of Australian Acoustical Consultants Guideline for *Child Care Centre Acoustic Assessment*, version 3 (2020).

The assessment of noise from the outdoor play areas applied the following assumptions:

- A source sound power level of 80 and 87 dBA L_w has been referenced per each cluster of 15 children based on children age. In total, this assessment has assumed that 75 children in total may simultaneously be involved in active play in the designated outdoor play areas.
- When assessing noise to the 15-minute intrusive noise criterion, it was assumed that the children could generate noise for the full assessment period, accordingly a time correction was not applied to the noise predictions. Whilst this is a conservative assessment, as the children will have times of indoor play and sleep, it provides a worst-case assessment scenario for noise.

It is noted that the childcare centre will likely operate during the 6:00 am to 7:00 pm period and the assessment has therefore been based on demonstrating compliance with the daytime, evening and night-time period noise criteria. With regard to the period between 6:00 am to 7:00 am, which by definition is part of the night-time period for noise; it is assumed there will be a relatively low number of children at the centre at this time and no outdoor play will occur. The period 6:00 pm to 7.00 pm is part of the evening period.

5.3 Noise emission from continuous sources

At this stage, exact detailed of the proposed mechanical plant are not known, as the final specification of this equipment will take place during the detailed design stage. Potential sources of noise from mechanical plant at the development and their assumed continuous noise levels are summarised in **Table 10**. The identified mechanical plant have been assessed as a noise emission from development for future operation. Noise data was either obtained from the SLR in-house source noise measurement database or from manufacturer's data obtained for similar projects and presumes modern low noise equipment will be provided.

Table 10 Continuous mechanical plant and sound power levels

Plant	Modelled location	Number of plant items	Assumed sum sound power level SWL for modelling purposes, dBA ¹
Air conditioning condenser units	Ground floor	9	64
Kitchen Exhaust Fan (KEF)	Rooftop	1	76
Toilet Exhaust Fan (TEF)	Rooftop	1	76
Combined SWL	-	-	80

Noise predictions to offsite receptors are presented in **Section 6**.

5.4 Noise barriers and acoustic balustrades

As revealed in the following report sections noise barriers are required the purposes of providing attenuation to the surrounding noise sensitive receptors (neighbouring dwellings).

For control of on-site noise emissions from the outdoor play area to sensitive receptors, the following noise mitigations are required:

- 1.8 m high acoustic balustrade along the north-eastern and south-western boundaries of the outdoor play areas. The balustrade height is to be measured from the finished grade of the play area.
- Full height acoustic walls along the north-western boundaries of the level 1 outdoor play areas.
- Full height acoustic walls and roof along the north-western boundaries of the level 2 outdoor play area.

The above acoustic treatments required are marked on site layout/plans, refer **Figure 6** and **Figure 7**.

These acoustic treatments have been assumed as part of a 'base case' mitigation design, with the predictions provided in **Section 6** incorporating these barriers.

It is required that the acoustic barrier and balustrades be impervious from the ground to the recommended height and contain no gaps that would allow the passage of sound. Minimum surface density is 12.5 kg/m² with minimal gaps allowance at the bottom to allow for drainage, if required and subject to approval of acoustic engineer. Suitable materials (including a combination of) are expected to include, but are not limited to, 6mm thick glass, 12mm thick perspex, 25mm lapped and capped pine palings, 9mm fibrous cement sheeting, 75mm thick Hebel, or masonry blocks.

Figure 6 Acoustic treatment locations Level 1

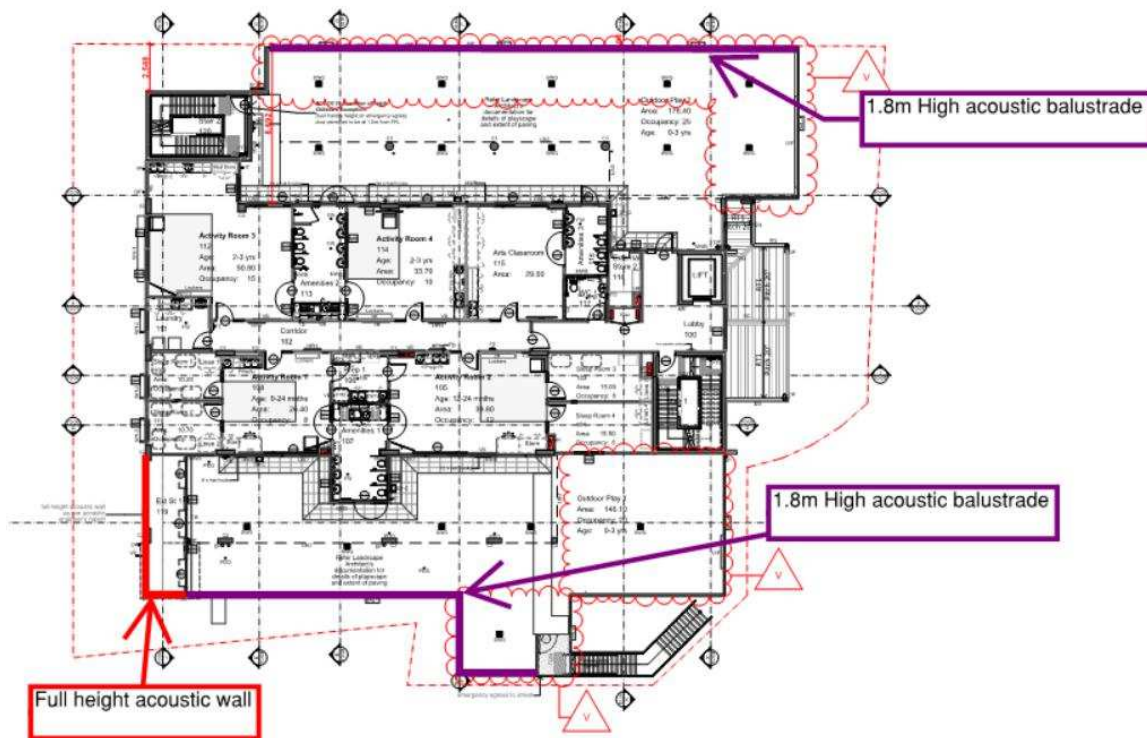
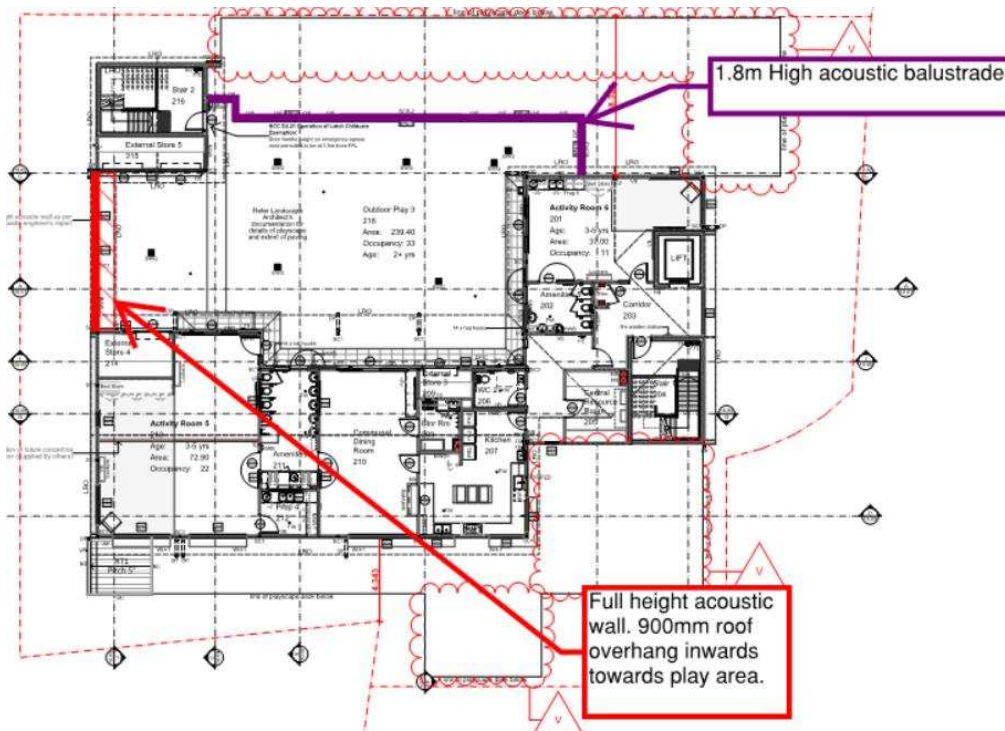


Figure 7 Acoustic treatment locations Level 2



6 Noise modelling results and recommendations

A 3D model of the proposed development and surrounding sensitive receptors was created in SoundPLAN V8.0 in order to understand the predicted noise impacts due to the sources presented in **Section 5**. The SoundPLAN noise model considers the geographical placement of the proposed building and fences in addition to the local terrain and design (where applicable) of suitable noise attenuation measures in calculating the noise propagation from the project sources. **Table 11** identifies the assessed time period for each source type.

Table 11 Noise sources modelled

Tenancy	Source type	Noise source	Noise source modelled during period?		
			Day (7:00 am – 06:00 pm)	Evening (6:00 pm – 10:00 pm)	Night (10:00 pm – 07:00 am)
Child Care Centre	Time varying/ intermittent	Childcare outdoor active play	☒	☒	☐
	Continuous	Mechanical plant	☒	☒	☒
	Time varying/ intermittent	Slow moving car (including car door close and car start)	☒	☒	☒

The assessment of noise emissions and noise intrusions are contained in the report sub-sections following.

6.1 Scenario 1 – Noise emission from childcare centre operation

Based on the time varying sound source items and operational assumptions described in **Section 5.2**, the following lists calculated noise levels at the predicted worst affected noise sensitive receptor NSR2.

Table 12 provides a summary of childcare play areas emissions against the project specific BCC and WHO criteria nominated in **Table 7**.

Table 12 Scenario 1 – Noise emission predictions including all noise sources – with barriers (against BCC and WHO criteria)

Noise source	Assessment parameter, time period and predicted noise level (dBA)			
	Day (7:00 am – 6:00 pm) LAeq	Evening (6:00pm-10pm) LAeq	Night (10:00 pm – 7:00 am) LAeq	Night-time Noise Criteria (10:00 pm – 7:00 am) L _{Amax}
Worst affected receptor for period	NSR3	NSR3	NSR3	NSR3
75 Children simultaneously involved in active play	42	43	n/a ^{Note 1}	n/a ^{Note 1}

Noise source	Assessment parameter, time period and predicted noise level (dBA)			
	Day (7:00 am – 6:00 pm) L _{Aeq}	Evening (6:00pm-10pm) L _{Aeq}	Night (10:00 pm – 7:00 am) L _{Aeq}	Night-time Noise Criteria (10:00 pm – 7:00 am) L _{Amax}
Ground level carpark noise (car movements, car door closure)	42	35	30	51
External mechanical plant noise (Roof top, ground level)	40	40	40	_ Note 2
OVERALL (Cumulative)	46	45	40	51 Note 2
Project criterion (BCC City Plan and WHO Sleep Disturbance)	47	46	45	51
Compliant?	Yes, compliant	Yes, compliant	Yes, compliant	Yes, compliant

Note 1: Not operating during this period.

Note 2: L_{Amax} events non-cumulative.

From the above predictions, noise compliance could be expected during the daytime, evening and night-time periods for both the nominated L_{Aeq} and L_{Amax} criteria with provision of the following recommendations:

- Acoustic treatments marked on site layout/plans are implemented, refer **Figure 6**. The nominated acoustic balustrades and full height walls are to be constructed of a material achieving a minimum surface density of 12.5 kg/m².
- Childcare outdoor group play be limited to hours 7 am to 7 pm only.
- The carpark surface is of a 'low-squeal' compound (in relating to tyre noise). Asphalt or plain concrete surfaces are expected to satisfy this requirement.
- Metal grates and man-hole covers be well fixed to avoid rattling, where applicable.
- Noise from internal noise generating activities be limited to no more than 75 dBA L_{eq,adj,15min}. Where noise events exhibit any tonal, impulsive or low frequency characteristic then the noise limit is to be adjusted downwards using methods described in the Queensland Noise Measurement Manual. Alternatively building façade acoustic upgrades applied.
- Should the sound power of mechanical plan units exceed the values listed in **Table 10**, acoustic screens may be required to control noise emissions to offsite noise sensitive receptors. Any acoustic screen should extend no less than 600 mm above the highest plant to provide effective acoustic attenuation and be constructed of a solid material with a minimum surface density of 12.5 kg/m². Examples of such conforming material are metal cladding outside of 6mm fibrous cement sheeting, or 9mm compressed fibrous cement sheeting (both being supported by steel framing). To minimise acoustic reflections back from the screen, it is required that the inside face of the screen be fitted with an internal layer of 75mm thick glasswool/rockwool insulation protected by a perforated steel sheet.

6.2 Scenario 2 – Continuous noise predictions only – mechanical plant

Based on the source items and operational assumptions described in **Section 5.3**, a scenario has been modelled comprised of continuous noise sources only. For the purposes of this assessment, it was assumed that all plant may operate continuously throughout the day, evening and night time period.

Table 13 lists predicted noise levels at the two worst affected NSRs being NSR3 (9 Mcleod Street) and NSR4 (15-17 Mcleod Street) against the project criteria.

Table 13 Scenario 2 – Continuous noise predictions only – mechanical plant (against EP Act)

Noise source	Predicted noise level, dBA LAeq	
	Receptor NSR3	Receptor NSR4
A/C condenser units	<20	<20
Additional rooftop plant	40	36
OVERALL	40	36
Project criterion	42	42
Complies with 45 dBA project night time criterion?	Yes, compliant	Yes, compliant

From the above predictions, noise compliance could be expected for mechanical plant emissions with provision of the following acoustic treatment:

- Rooftop mounted units are to be designed to achieve a sound power level of no greater than 79 dBA LAeq plant (combined).
- Should the sound power of roof top mechanical plant units exceed the values listed in **Table 10**, acoustic screens may be required to control noise emissions to offsite noise sensitive receptors. Any acoustic screen should extend no less than 600 mm above the highest plant to provide effective acoustic attenuation and be constructed of a solid material with a minimum surface density of 12.5 kg/m². Examples of such conforming material are metal cladding outside of 6mm fibrous cement sheeting, or 9mm compressed fibrous cement sheeting (both being supported by steel framing). To minimise acoustic reflections back from the screen, it is required that the inside face of the screen be fitted with an internal layer of 75mm thick glasswool/rockwool insulation protected by a perforated steel sheet.
- Any other individual non-rooftop HVAC (such as wall mounted A/C condenser) units within the development are not to exceed 66 dBA at 1 m.
- Where any of the above equipment is deemed to be tonal, a 5 dBA penalty would apply, and additional treatment may be required.
- Mechanical plant extraction systems are to be constructed such that the outlet is either shielded from the noise sensitive premises and/or is pointing in a direction at least 90 degrees away from the nearest residences.

- Acoustic design input will be required during the later detailed design phase such that mechanical plant noise is able to be controlled to acceptable levels at both on and off-site noise sensitive receptors. Upon commissioning of the building, it will be the mechanical contractor's responsibility to submit confirmation that noise emissions from the installed plant comply with the noise criteria listed in **Table 7** of this report.

7 Discussion

A noise prediction model for the proposed childcare centre was developed with the SoundPLAN noise prediction software. The noise model adopted the concept designs for the development, the surrounding community and the source noise emissions and assumptions detailed in **Section 5**.

Noise levels were predicted for the following three (3) scenarios with the predicted noise external levels detailed in **Table 12** and **Table 13** for the local receptors and environment:

- Scenario 1: Noise emission predictions including all noise sources – with barriers, refer **Table 12**.
- Scenario 2: Continuous noise predictions only – Mechanical plant with barriers, refer **Table 13**.

Noise control recommendations can be found throughout **Section 6** of this report.

8 Conclusion

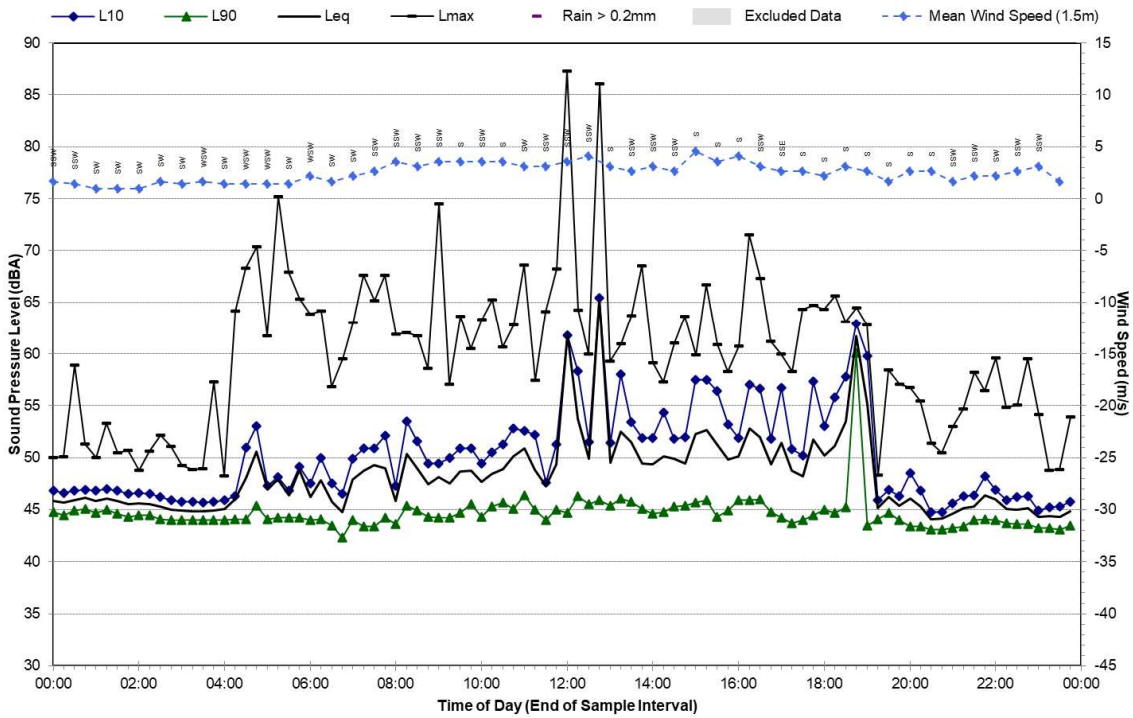
SLR was commissioned by Australian Unity to prepare a noise impact assessment for the operation of a proposed childcare centre at of 86 Bramston Terrace, Herston (Lot 1545 on SP316602). Potential noise sources were identified, and hence future potential noise emissions assessed. The assessment has considered the requirements of the Queensland EPP Noise, EP Act plus BCC City Plan, AAAC Guideline and WHO Guideline criteria with regard to the applicable ambient noise level. Based on the listed operating hours, the predictions show that the proposed development, with inclusion of the recommendations contained in this report is capable of complying with the relevant criteria at the most exposed noise sensitive receptors.

APPENDIX A

Ambient Noise Level Charts – Unattended Noise Monitoring Onsite

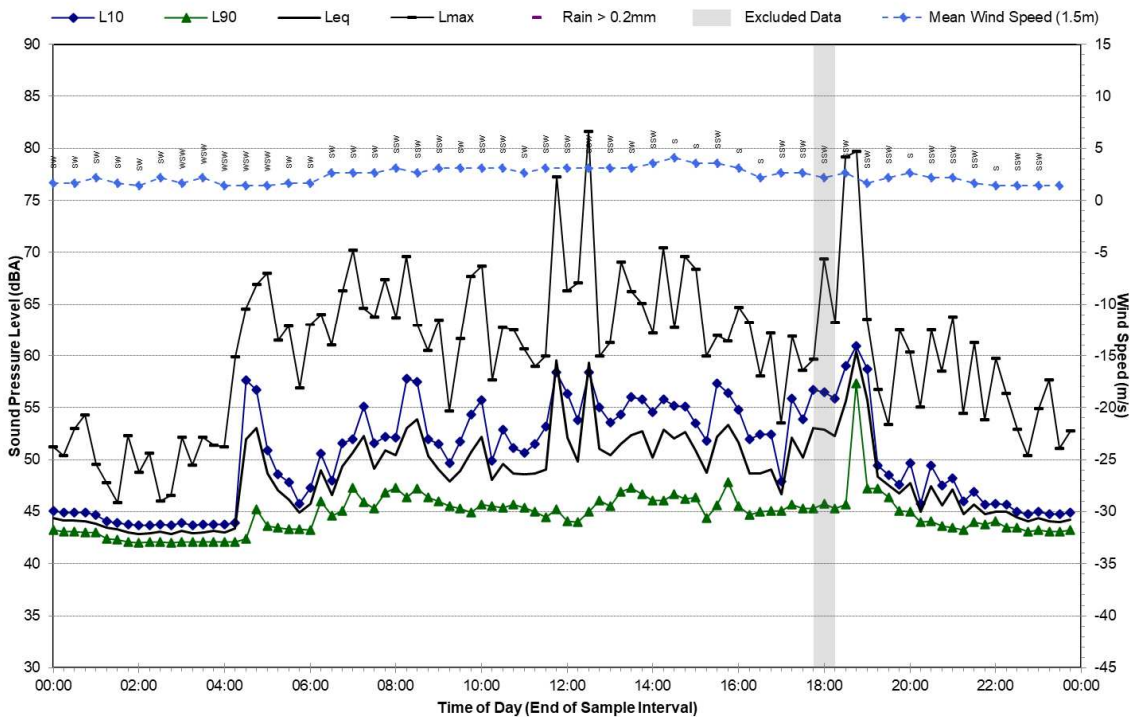
Statistical Ambient Noise Levels

Noise Monitor: HMRF - Monday, 3 January 2022



Statistical Ambient Noise Levels

Noise Monitor: HMRF - Tuesday, 4 January 2022



APPENDIX B

Grid Noise Maps

Figure B1 Childcare noise emission map (day)

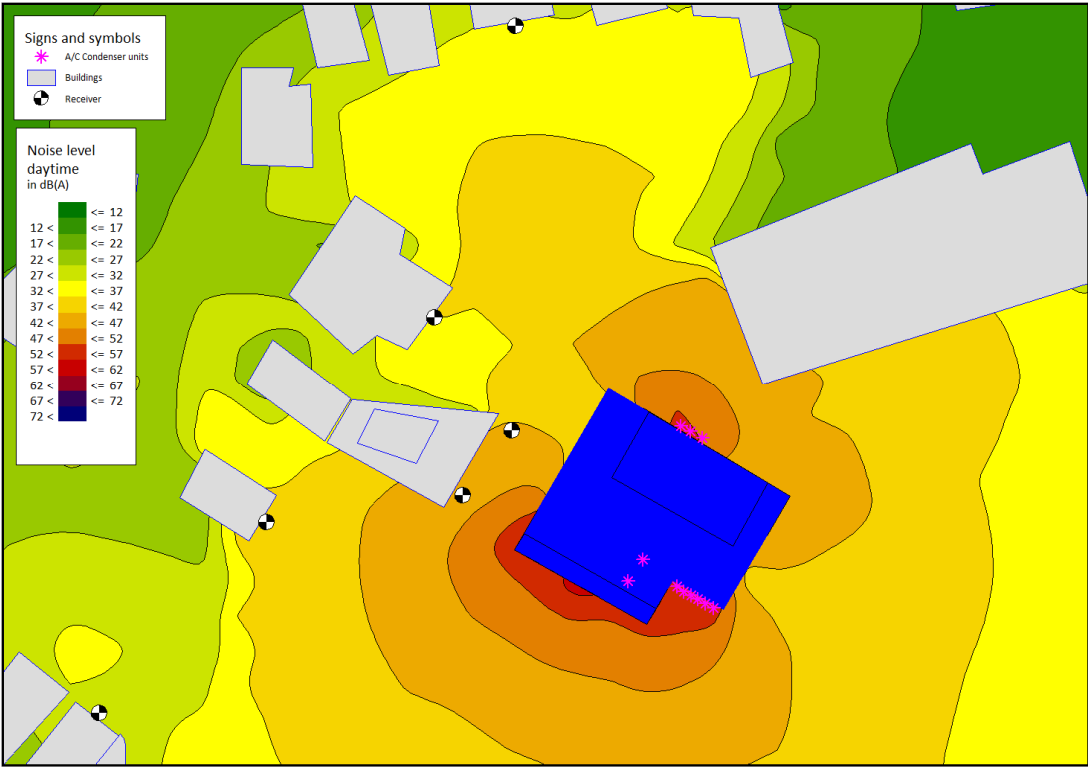


Figure B2 Childcare noise emission map (evening)

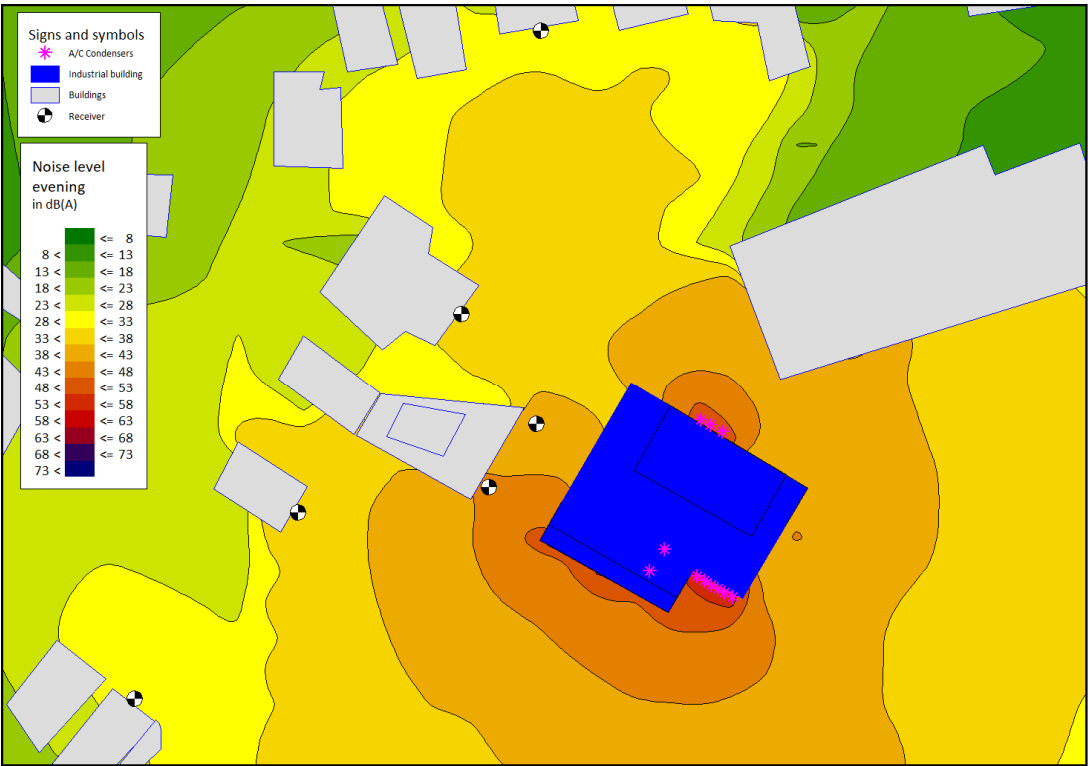
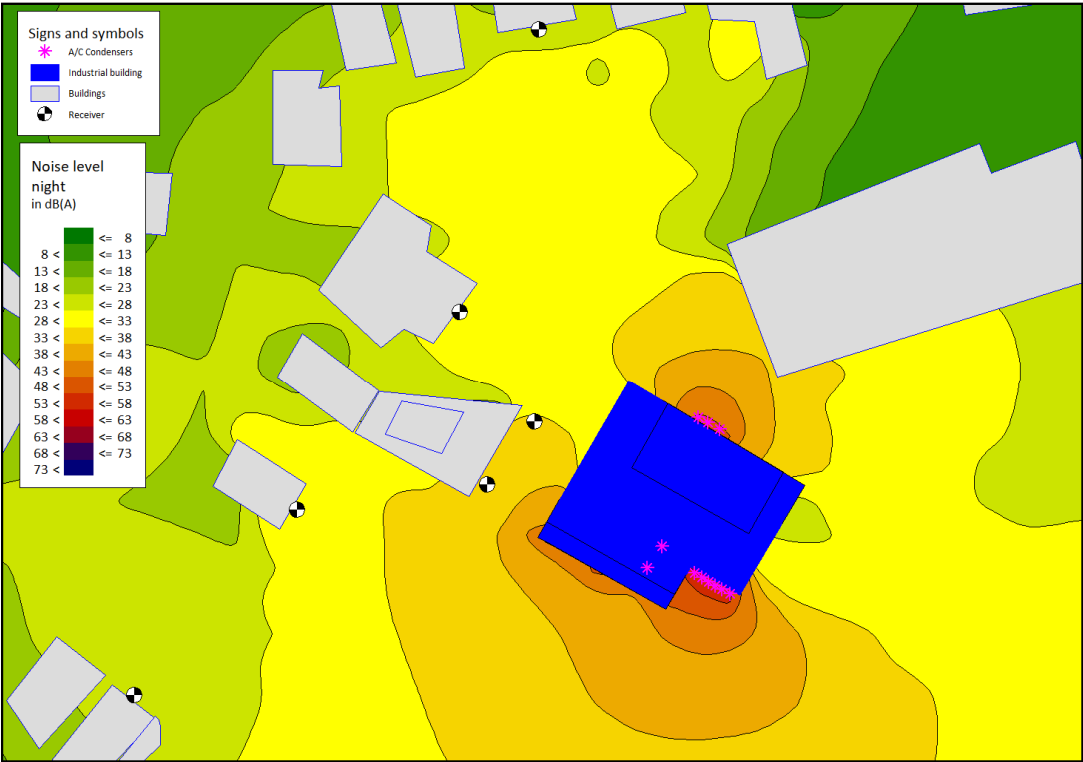


Figure B3 Childcare noise emission map (night)



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