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Environmental Noise Assessment
Proposed Child Care Centre

At: -

32 Halloran Street,

Turvey Park, NSW 2527

Prepared for: -

Mr Nicholas Karpathios and Mr Darren White
C/- Archidrome Pty Ltd
206, 8 Help Street,
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Reference: 2204003E-R

Prepared by: -

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Archidrome Pty Ltd on behalf of Mr White and Mr Karpathios commissioned Harwood Acoustics Pty Ltd to carry out an Environmental Noise Assessment for a childcare centre proposed to be constructed at 32 Halloran Street, Turvey Park, NSW.

Accordingly, Harwood Acoustics Pty Ltd has prepared this report for the exclusive use of the Client identified on the title page. The report is prepared in accordance with the brief and scope of works agreed between the Client and Harwood Acoustics Pty Ltd and may not be suitable for use beyond that scope.

Harwood Acoustics Pty Ltd undertakes no duty nor accepts any responsibility to any third party who may rely upon this report.

Advice and recommendations provided in this report are in relation to acoustical issues only. No claims of expertise are made, and no liability is accepted, in relation to issues falling outside the field of acoustical consulting. These may include, but are not limited to, structural and waterproofing considerations, fire rating or thermal rating. Relevant authorities and / or experts should be consulted regarding areas other than acoustics.

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1. INTRODUCTION AND SUMMARY

Mr Karpathios and Mr White propose to construct a child care centre at 32 Halloran Street, Turvey Park, NSW (the Site).

The Site is located on the western side of Halloran Street and is bound to the west, north and south by residential premises. Opposite Halloran Street to the east is the Turvey Park Public School and further to the south is Gissing Oval. A location plan is shown in Figure 1.

It is proposed to construct a two-storey child care centre on the Site. The child care centre will have capacity for up to 46 children in the following age groups:-

- 0 to 2-year olds (babies) – 8 children,
- 2 to 3-year olds (toddlers) – 13 children, and
- 3 to 5-year olds (pre-schoolers) – 25 children (17 on the ground floor and 8 on the first floor).

The centre will comprise four (4) indoor play rooms for each age group of children on the ground floor and an additional play room for the 3 to 5 years olds on the first floor. In addition, there will be a kitchen, nappy change, bottle prep, staff room, office, laundry and amenities. Outdoor play areas will be located on the western and southern sides of the ground floor level and there will be an outdoor deck on the first floor levels. The Site will be accessed via Halloran Street and there is provision for on-site staff and customer parking.

Proposed floor plans are shown in Figures 2 and 3 and full details can be seen in Archidrome Pty Ltd's architectural drawings dated 23/02/2022.

It is a requirement of Wagga Wagga City Council that an Environmental Noise Assessment be prepared to consider the potential for noise emission arising from the use of the centre to impact existing residential receptors in proximity of the Site.

In undertaking this assessment consideration has been given to the NSW Department of Planning, Industry and Environment's *Child Care Planning Guideline* (2017); the NSW Environment Protection Authority's (EPA) *Noise Guide for Local Government* (2013); NSW EPA's *Road Noise Policy* 2011 and the Association of Australasian Acoustical Consultants *Guideline for Child Care Centre Acoustic Assessment* (2013) (the *AAAC Guideline*).

Project specific noise goals for noise emission arising from the use of the proposed centre are derived from the EPA's *Noise Guide for Local Government* and the *AAAC Guideline* and are based on background noise levels measured in proximity to the existing residential receptors bounding the Site. The noise goal is **42 dBA** $L_{eq,\ 15\ minute}$ during the day time period for mechanical plant, on-site motor vehicle movements and children at play inside the centre. The noise goal is **47 dBA** ($L_{eq,\ 15\ minute}$) for children at play outdoors providing that the outdoor play time is restricted to a maximum 2 hours per day as detailed in Section 7 of this Report.

Noise sources associated with the operation of the child care centre include children at play outdoors, children at play indoors, any mechanical plant servicing the centre and vehicle movements on the Site.

Recommendations are made in Section 7 of this report to reduce the level of noise emission from the child care centre to within the design noise goals at all receptor locations.

Recommendations include erecting sound barrier screens around the outdoor play areas and restricting the hours of outdoor play to a maximum combined total of 2 hours per day, or alternatively restricting the number of children permitted outside to play at any given time. A final assessment of mechanical plant noise emission will be undertaken prior to the issue of a construction certificate.

Providing these recommendations are implemented and continue to be adhered to, the noise design goals derived from the EPA's *Noise Guide for Local* Government and Association of Australasian Acoustical Consultants *Guideline for Child Care Centre Acoustic Assessment* 2013 will be met for this development.

The level of noise emission from on road traffic will meet the EPA's *Road Noise Policy* (2011) day time noise limits for parents and carers dropping children off at the centre.

2. SITE AND DEVELOPMENT DESCRIPTION

2.1 Site Description

The Site is located on the western side of Halloran Street and is bound to the west, north and south by residential premises. Opposite Halloran Street to the east is the Turvey Park Public School and further to the south is Gissing Oval.

The nearest residential receptors to the Site are shown in Figure 1 and the addresses are as follows.

R1 – 32 Halloran Street

R2 – 27 Dalton Street

R3 – 30 Halloran Street

R4 – 55 Blamey Street

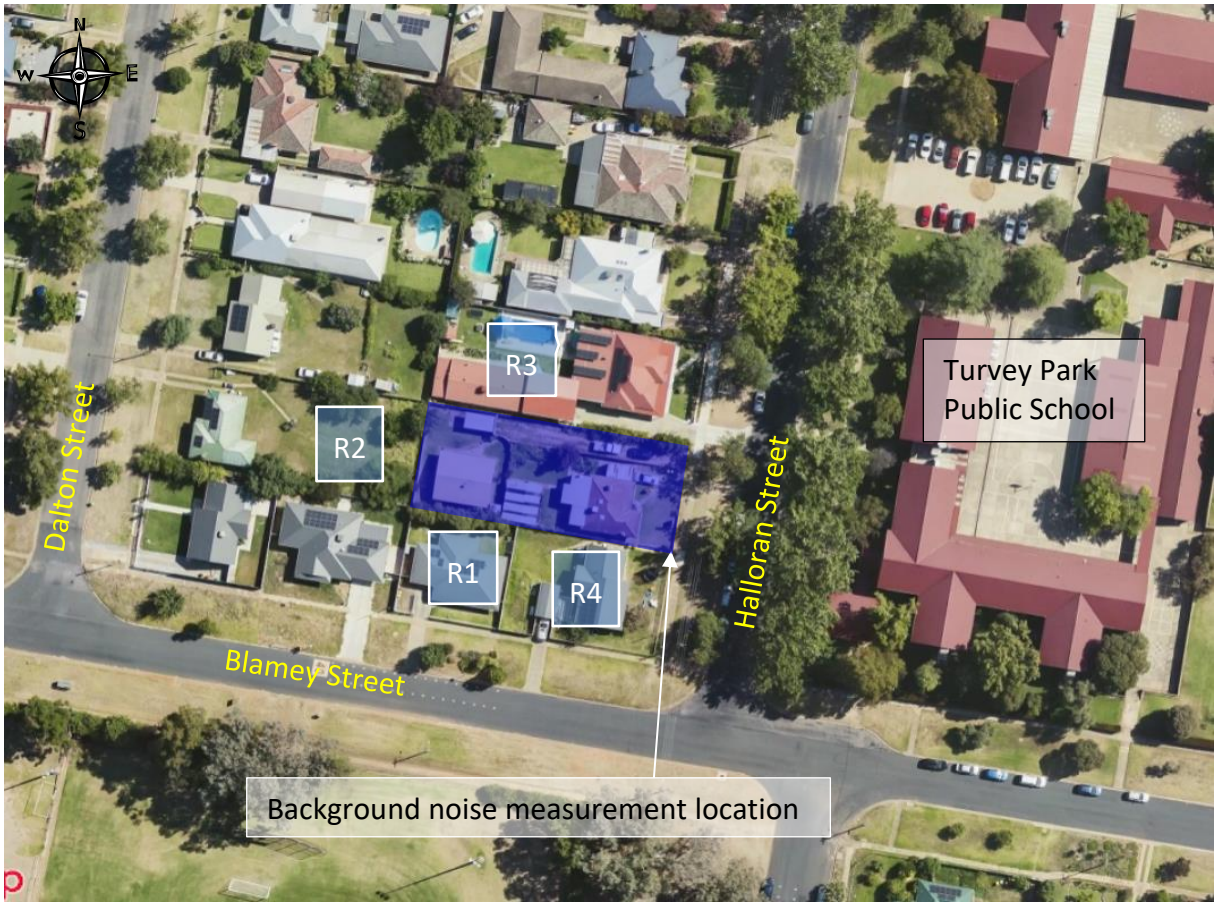

Figure 1. Location Plan – 32 Halloran Street, Turvey Park, NSW

(source: www.metromap.com.au ©)

2.2 Description of Proposal

It is proposed to construct a two-storey child care centre on the Site. The child care centre will have capacity for up to 46 children in the following age groups:-

- 0 to 2-year olds (babies) – 8 children,
- 2 to 3-year olds (toddlers) – 13 children, and
- 3 to 5-year olds (pre-schoolers) – 25 children (17 on the ground floor and 8 on the first floor).

The centre will comprise four (4) indoor play rooms for each age group of children on the ground floor and an additional play room for the 3 to 5 years olds on the first floor. In addition, there will be a kitchen, nappy change, bottle prep, staff room, office, laundry and amenities. Outdoor play areas will be located on the western and southern sides of the ground floor level and there will be an outdoor deck on the first floor levels. The Site will be accessed via Halloran Street and there is provision for on-site staff and customer parking.

Proposed floor plans are shown in Figures 2 and 3 and full details can be seen in Archidrome Pty Ltd's architectural drawings dated 23/02/2022.

The centre will operate between the hours of 7 am and approximately 6 pm Monday to Friday.

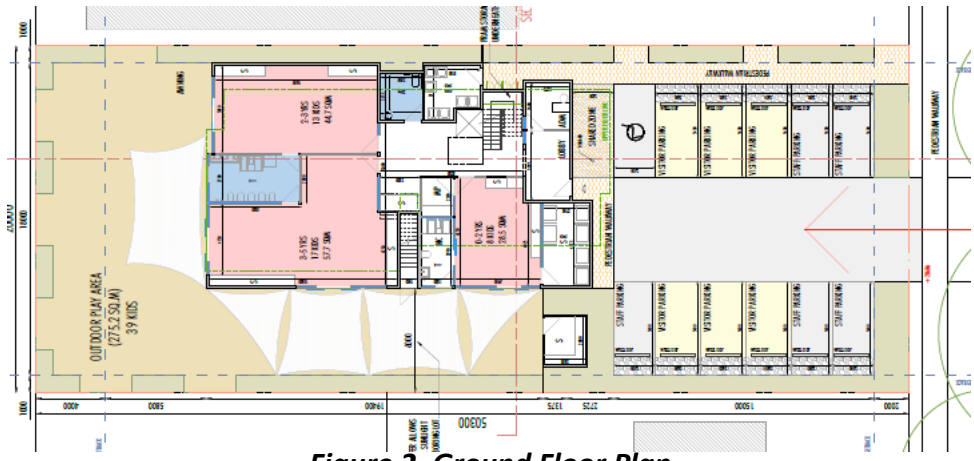

Figure 2. Ground Floor Plan

(source: Archidrome Pty Ltd's architectural drawing A01 dated 23/02/2022.)

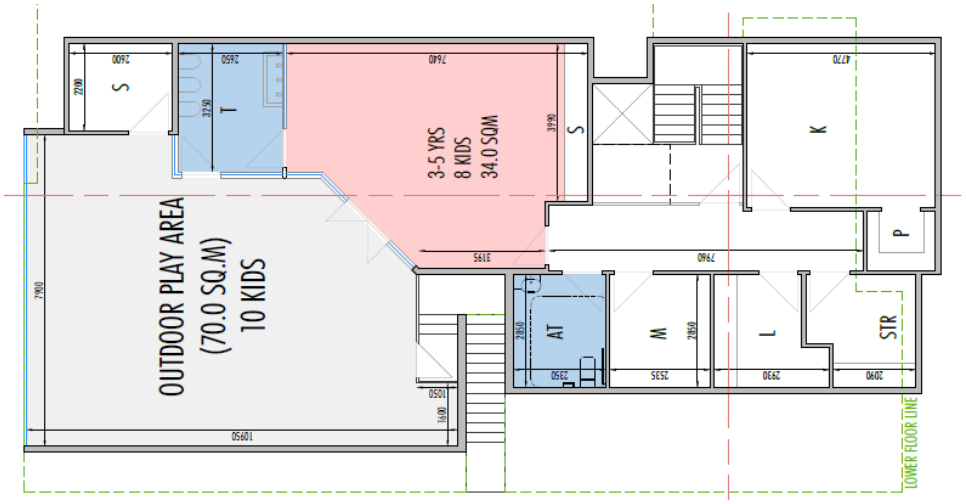

Figure 3. First Floor Plan

(source: Archidrome Pty Ltd's architectural drawing A04 dated 23/02/2022.)

3. NOISE CRITERIA

This section outlines the noise guidelines applicable to this proposal and establishes the project specific noise goals. Consideration is given to noise emission generated by the development and the potential noise impacts on existing residential receptors. In addition, consideration is given to noise intrusion into the proposed centre from road traffic and general commercial activity.

3.1 Child Care Planning Guideline 2017

The NSW Department of Planning and Environment published the *Child Care Planning Guideline* in 2017. The Guideline provides, among other things, provisions and recommendations to minimise the impact of child care facilities on the acoustic privacy of neighbouring residential developments.

Section C24 of the Guideline states: -

> *"A suitably qualified acoustic professional should prepare an acoustic report which will cover the following matters:*
>
> - *identify an appropriate noise level for a child care facility located in residential and other zones*
> - *determine an appropriate background noise level for outdoor play areas during times they are proposed to be in use*
> - *determine the appropriate height of any acoustic fence to enable the noise criteria to be met."*

In addition, the Guideline considers the potential for noise intrusion into the child care centre from, for example, busy roads.

Section C26 of the Guideline states: -

> *"An acoustic report should identify appropriate noise levels for sleeping areas and other non play areas and examine impacts and noise attenuation measures where a child care facility is proposed in any of the following locations:*
>
> - *on industrial zoned land*
> - *where the ANEF contour is between 20 and 25, consistent with AS 2021 - 2000*
> - *along a railway or mass transit corridor, as defined by State Environmental Planning Policy (Infrastructure) 2007*
> - *on a major or busy road*
> - *other land that is impacted by substantial external noise."*

The following guidelines and standards are used to establish noise design goals to address the requirements of the Child Care Planning Guideline (2017).

3.2 NSW EPA's Noise Guide for Local Government

The Environment Protection Authority (EPA) published the *Noise Guide for Local Government* in June 2013. The policy is specifically aimed at assessing noise from light industry, shops, entertainment, public buildings, air conditioners, pool pumps and other noise sources in residential areas.

The EPA in Section 2.2.1 of the Noise Guide for Local Government states that a noise source is generally considered to be intrusive if the noise from the source, when measured over a 15-minute period ($L_{eq,\ 15\ minute}$), exceeds the background noise ($L_{90,\ 15\ minute}$) by more than 5 dB.

This criterion is in keeping with the EPA's *Noise Policy for Industry* (2017) Intrusiveness Criteria and Council's standard noise conditions.

The noise from the source is measured or assessed at the most affected point within the residential property boundary, or of that is more than 30 metres from the residence, at the most affected point within 30 metres of the residence. For upper floors the noise is assessed outside the nearest upstairs window. In this instance existing and future residences are assumed to be single storey.

3.3 Association of Australasian Acoustical Consultants Guideline for Child Care Centres

In May 2008, the Association of Australasian (formerly Australian) Acoustical Consultants (AAAC) published the Its first *Guideline for Child Care Centre Acoustic Assessment*. The guideline was updated in 2010 and again in 2013 to assist both AAAC members and local Councils to assess the noise impact from proposed childcare centres both accurately and fairly (see www.aaac.org.au).

3.3.1 Children at Play Outdoors

It is common practice for councils to follow the recommendations of the EPA and require a noise criterion of background +5 dB at residential receptor locations for noise impact from sources such as mechanical plant, which may operate over a prolonged period of time.

However, children do not always play outdoors for long periods of time, and as the duration of time for children playing outside is reduced, the overall noise annoyance also reduces.

The Guideline therefore provides two noise goal levels depending on the duration of total outdoor play time, as follows: -

Up to 2 hours (total) per day – The $L_{eq,\ 15min}$ noise level emitted from the outdoor play area shall not exceed the area background noise level assessment location by more than **10 dB**.

More than 2 hours (total) per day – The $L_{eq,\ 15min}$ noise level emitted from the outdoor play area shall not exceed the area background noise level assessment location by more than **5 dB**.

In this instance, the total outdoor play time at the centre will, at least on some occasions, exceed 2 hours.

3.3.2 Children at Play Indoors

The Guideline requires that noise emission arising from children at play indoors is to be assessed against a noise goal derived from the background noise level plus 5 dB in line with the INP Intrusiveness criterion at any affected residential receptors.

3.3.3 External Impact on Children

The Guidelines recommends the following noise design goals for childcare centres potentially affected by road traffic on busy roads: -

- **55 dBA** ($L_{eq,\ 1\ hour}$) for <u>outdoor</u> play areas, and
- **40 dBA** ($L_{eq,\ 1\ hour}$) <u>indoor</u> play areas.

3.4 Existing Background Noise Levels

In order to establish the Intrusiveness Criteria, it is necessary to determine the background noise levels in the vicinity of all potentially affected residential receptors.

The background noise level is defined by the EPA as 'the underlying level of noise present in ambient noise when all unusual extraneous noise is removed' and is considered to be represented by the $L_{A90,\ 15\ minute}$ descriptor. This is a statistical measure of the sound pressure level that is exceeded for 90 % of the time.

The Rating Background Level is the single-figure background noise level derived from monitoring $L_{A90,\ 15\ minutes}$ over a representative period of time. The Rating Background Level is established for the day, evening and night time periods and is used for assessment purposes.

When measuring background noise levels, it is important to undertake sufficient monitoring of background noise to allow intrusive noise to be assessed adequately.

The criteria and methodology provided in the guideline is derived from the NSW EPA's *Noise Policy for Industry* 2017. The policy provides minimum rating background noise levels (RBLS) for each period of the day, evening and night.

The minimum assumed RBLs result in minimum intrusiveness noise levels. These are shown in Table 2.1 in the Policy and are replicated in Table 1 below.

Table 1 Minimum assumed RBLs and project intrusiveness noise levels (Derived from EPA Table 2.1)

Time of Day	Minimum Assumed Rating Background Level dBA	Minimum Project Intrusive Noise Level ($L_{eq,\ 15\ minute}$, dBA)
Day (7 am to 6 pm)	**35**	**40**
Evening (6 pm to 10 pm)	**30**	**35**
Night (10 pm to 7 am)	**30**	**35**

In this instance a noise logger was at the Site Wednesday 18 to Tuesday 24 May 2022 to measure current background noise levels.

The results of the survey are summarised in Table 2 below and shown in graphical format in Appendix B. Instrumentation used during the noise survey is shown in Appendix A.

Table 2 Rating Background Noise Levels – Halloran Street, Turvey Park

Time of Day	Rating Background Level dBA
Day (7 am to 6 pm)	**37**
Evening (6 pm to 10 pm)	**33**
Night (10 pm to 7 am)	**30***

* The actual measured rating background noise level at night was 26 dBA and would typically be set to 30 dBA as a minimum in accordance with the EPA's *Noise Guide for Local Government* 2013, however in this case there is no night time activity.

3.5 On Road Traffic Noise Criteria – Road Noise Policy

The NSW EPA published the NSW '*Road Noise Policy*' in March 2011.

The Policy contains strategies to address the issue of road traffic noise from, among other things, traffic generating developments.

3.5.1 Noise Assessment Criteria – Residential Land Uses

Section 2.3.1 of the Policy *'Noise assessment criteria – residential land uses'* sets out the assessment criteria for residences to be applied to particular types of project, road category and land use.

The relevant parts of Table 3 are replicated in Table 3 below.

Table 3 Road Traffic Noise Assessment Criteria

Road Category	Type of Project / Land Use	Assessment Criteria, dBA	
		Day (7 am – 10 pm)	**Night (10 pm – 7 am)**
Local Roads	6. Existing residences affected by **additional traffic** on existing local roads generated by land use developments	$L_{Aeq\ (1\ hour)}$ 55 (external)	$L_{Aeq\ (1\ hour)}$ 50 (external)

3.6 Project Specific Noise Goals

When all the above factors are considered, the most relevant project specific noise goals are as follows: -

Child Care Centre Operational Noise – At all residential receptor locations

- (37 + 5 =) **42 dBA** $L_{eq,\ 15\ minute}$ during the day time period for children at play outdoors for **more than two hours** in total
- (37 + 10 =) **47 dBA** $L_{eq,\ 15\ minute}$ during the day for children at play outdoors for **less than two hours** in total
- (37 + 5 =) **42 dBA** $L_{eq,\ 15\ minute}$ for children at play indoors and all mechanical plant and motor vehicle movements.

On-road traffic noise

- **55 dBA** $L_{eq,\ 1\ hour}$ for on road traffic noise during the day.

External noise intrusion

There are no significant external noise producing transport corridors affecting the Site. Therefore, no further consideration is given to external noise intrusion in this assessment.

4. CHILD CARE CENTRE SOURCE NOISE LEVELS

The main source of noise from the development will be children playing indoors and outdoors as well as mechanical plant servicing the centre and consideration is also given to noise emission from motor vehicles arriving at or leaving the Site.

4.1 Children at Play Noise Levels

A noise model has been developed to establish the noise level of children at play. This model is based on measurements taken of children at play in groups undertaken during previous assessments of childcare centres by the author and sound pressure level data for children given in Kryter[1].

The data has been used to establish the sound power level for individual children shown in Table 4 below. These levels are in line with the sound power levels provided in the AAAC '*Guideline for Child Care Centre Acoustic Assessment*'.

Table 4 Children at Play - L_{eq} Sound Power Levels

Description	L_{eq} Sound Power Levels (dBA)
1 child 0 to 2 years	69
1 child 2 to 3 years	75
1 child 3 to 5 years	77
8 children 0 to 2 years	78
10 children 2 to 3 years	85
17 children 3 to 5 years	89
8 children 3 to 5 years	86

4.2 Mechanical Plant Noise Levels

It is not known at the time of writing this report what specific mechanical plant will be associated with the proposed development.

Mechanical plant is likely to include: -

- Air conditioning plant,
- Ventilation fans (toilet and / or kitchen)

Recommendations are made in Section 5 in relation to mechanical plant noise.

4.3 On-Site Motor Vehicle Noise

This section considers the noise emission from the manoeuvring of cars on the Site. The car park will be used for parents or carers to drop off and collect children and the car park is accessed via Halloran Street.

The L_{eq} sound power level of on-site car movement is shown in Table 5 below.

[1] *'The Effects of Noise on Man'* by Karl Kryter, Academic Press (1985)

Table 5 L_{eq} Power Levels of Motor Vehicle Movements

Description	Sound Power Level dBA
$L_{eq,\ 15\ minute}$ one car passing	**69**

5. NOISE LEVEL PREDICTIONS

5.1 Modelling Equations

Outdoor noise sources, such as children at play, mechanical plant and motor vehicles in the car park have been modelled using the formula: -

$$L_{eq} = L_w + Dc - A$$

Where:

- L_w is the sound power level of the noise source;
- Dc is directivity correction; and
- A is the attenuation that occurs during the propagation from source to receiver.

The term A in the equation includes attenuation from geometric divergence (distance loss), atmospheric absorption, ground absorption, barrier effects and miscellaneous other effects.

This model derives from the International Standard ISO 9613-2 (1996(E)) *'Acoustic – Attenuation of sound during propagation outdoors Part 2 General method of calculation'*. The method described in the Standard is general in the sense that it may be applied to a wide variety of noise sources, and covers the major mechanism of sound attenuation. The method allows for propagation conditions with the wind blowing from the source to the receiver.

For children playing within the childcare centre, the external noise level at each receptor has been calculated from the formula: -

$$Lp_2 = Lp_1 - R_w + 10\ Log_{10}\ S - 20\ Log_{10}\ r - 14 + DI\ dBA$$

Where:

- Lp_2 is the predicted noise level at the receiver,
- Lp_1 is the internal noise level of children at play,
- R_w is the weighted sound reduction index of the building element (wall, roof, window, etc),
- S is the area of the building element (m^2),
- r is the distance between the receiver and the building element,
- DI is the directivity index of the façade.

5.2 Predicted Noise Levels – Children at Play Outdoors

The predicted noise levels at each receptor for children at play outdoors are shown in Table 6 below.

Table 6 Predicted L_{eq} Noise Levels – Children at Play Outdoors < 2 hours

Description	Predicted Noise Level $L_{eq, 15\ minute}$ (dBA) at Receptor Locations			
	R1	R2	R3	R4
Design Noise Goal 7 am to 6 pm (< 2 hours)	**47**	**47**	**47**	**47**
Children at play (0 to 2)	31	30	18	30
Children at play (2 to 3)	39	39	35	28
Children at play (3 to 5) ground floor	45	41	36	38
Children at play (3 to 5) first floor	38	36	29	28
Combined	**47**	**44**	**39**	**39**
Complies	Yes	Yes	Yes	Yes

The predictions in Table 6 consider the following: -

- All children at play for a total that does not exceed more than two hours.
- Distance loss to each receptor,
- Recommendations including acoustical screening made in Section 7 of this Report have been implemented and continue to be adhered to.

It is worth noting that the predicted noise levels are considered to be a worst-case scenario as it assumes that all children are outdoors playing simultaneously, which is unlikely to often be the case.

5.3 Predicted Noise Levels – Children at Play Indoors

The predicted noise levels at each receptor for children at play within the centre are shown in Table 7 below.

Table 7 Predicted L_{eq} Noise Levels – Children at Play Indoors

Description	Predicted Noise Level $L_{eq, 15\ minute}$ (dBA) at Receptor Locations			
	R1	R2	R3	R4
Design Noise Goal 7 am to 6 pm	**42**	**42**	**42**	**42**
Children at play (0 to 2)	34	22	19	33
Children at play (2 to 3)	34	33	30	24
Children at play (3 to 5) ground floor	41	41	37	38
Children at play (3 to 5) first floor	37	37	30	27
Combined	**43**	**43**	**38**	**39**
Complies	Yes	Yes	Yes	Yes

The predictions in Table 7 consider the following: -

- Distance loss to each receptor,
- Recommendations relating to acoustical screening and building construction made in Section 7 of this Report have been implemented.

5.4 Predicted Noise Levels – Car park

For the purpose of assessing the level of noise emission from motor vehicles accessing the Site to drop off or pick up children, the following vehicle movements are considered:-

- 12 vehicle movements in the busiest 15-minute period during the day,
    - 6 on each side of the car park (refer Figure 2)
- 40 vehicle movements in the busiest one (1) hour period (for assessment against on road traffic criteria).

The predicted levels for car park activity are shown in Table 8 below.

Table 8 Predicted L_{eq} Noise Levels – Car Park / Driveway Activity

Description	Predicted Noise Level $L_{eq,\ 15\ minute}$ (dBA) at Receptor Locations			
	R1	R2	R3	R4
Design Noise Goal 7 am to 6 pm	**42**	**42**	**42**	**42**
12 car movements in 15 minutes	<30	<25	42	42
Complies	Yes	Yes	Yes	Yes

The predictions in Table 8 consider the following: -

- Distance loss to each receptor,
- Recommendations relating to acoustical screening made in Section 7 of this Report have been implemented.

5.5 Mechanical Plant Assessment and Recommendations

Details of mechanical plant servicing the development are not finalised at this stage and are likely to potentially include:-

- air conditioning condensers,
- ventilation fans.

The level of noise emission from the operation of mechanical plant should not exceed an energy average sound pressure level (L_{eq}) of **32 dBA** when measured over a period of 15 minutes during the day time or evening periods at any residential receptor.

This is to ensure that the overall level of noise emission from the Site does not exceed the noise deign goal at any receptor.

A final assessment of mechanical plant can be carried out prior to the issue of a Construction Certificate once the selections of all mechanical plant have been finalised.

6. ON-ROAD TRAFFIC NOISE

6.1 Predicted Road Traffic Noise Level

Consideration is given to on-road traffic noise for cars driving along the local roads to either drop off or pick up children.

A peak hour prediction of 40 vehicle movements in the busiest one-hour period is used as a typical worst-case scenario in predicting on-road traffic noise levels. This is considered a conservatively high estimate and actual vehicle movements are likely to be less.

The closest dwellings along Halloran Street to the road are approximately 18 metres from the nearest road edge.

Formulae are given in the Calculation of Road Traffic Noise (CoRTN) from the UK Department of Transport and Welsh Office (1988) for the calculation of on-road vehicle noise. However, the calculation procedure given in CoRTN is untested for small traffic flows (under 200) and typically yields lower noise levels than actually occur in practice.

Therefore, a calculation based on the sound exposure level for various vehicles has been carried out. The sound exposure level (L_{Ae}) is a summation of the sound energy produced during a single event (i.e. a motor vehicle pass-by, a train pass-by, etc.).

The author has measured the level of noise emission from numerous vehicle types including cars and four-wheel drives.

The average maximum measured sound exposure levels of a range of vehicles, normalised to a distance of 10 metres is as follows: -

- Car – 69 dBA, and
- 4WD – 72 dBA.

Once established, a sound exposure level (L_{Ae}) can be used to calculate an energy average, sound pressure level ($L_{eq, time}$) using the following formula: -

$$L_{eq,\ 1\ hour} = L_{ae} - 10\ log_{10}\ (T) + 10\ log_{10}\ (N)$$

Where T is the time in seconds (1 hour in this instance – in accordance with the assessment criteria, see Table 2) and N is the number of vehicle trips.

The predicted noise level from on-road vehicle movements during the peak hour is shown in Table 9 below.

A movement is a single pass-by the same dwelling and given the access into the estate, it is assumed that all 40 movements will pass the same dwelling (worst-case).

Table 9 Predicted $L_{eq,\ 1\ hour}$ Noise Levels – Motor Vehicles (On-Road Traffic)

Description	Predicted Noise Level $L_{eq,\ 1\ hour}$ (dBA) at Receptor Locations
	Nearest House to Halloran Street
Acceptable Noise Level (day time)	**55**
Vehicle movements peak hour (40 cars)*	49 to 50
Complies	Yes

* This assumes that 40 cars pass the same house on the way in and out of the centre in the busiest one hour period (i.e. 80 movements past the same dwelling).

7. NOISE CONTROL RECOMMENDATIONS

7.1 Sound Barrier Screening

Sound barrier screens are required to reduce the level of noise emission from children at play outdoors and the car park to within the noise limits at the neighbouring receptors.

- Erect a sound barrier screen along the entire southern and western boundary of the outdoor play areas on the ground floor to a minimum of **2.4 metres** above the finished ground level of the play space,
- The southern boundary fence should extend past the car parking area at a minimum height of 2.1 metres,
- The northern boundary screen should extend past the car park at a minimum height of 1.8 metres,
- Refer Figure 4 below,
- Erect a balustrade around the upper level deck to a minimum height of 1.8 metres above the finished floor level of the deck (refer Figure 5).

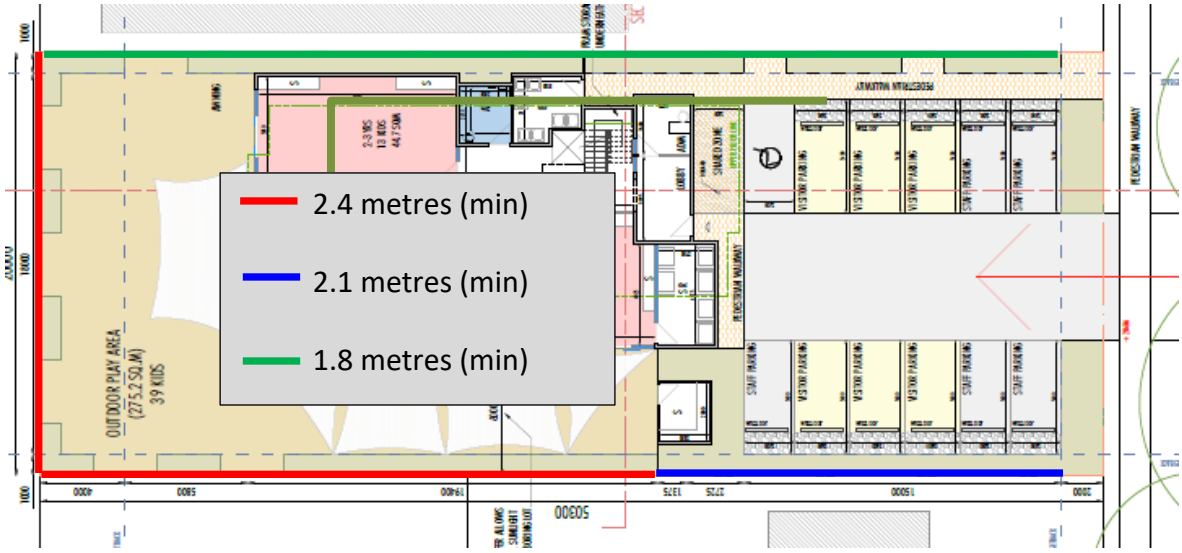

Figure 4. Recommended Sound Barrier Screens – Ground Floor

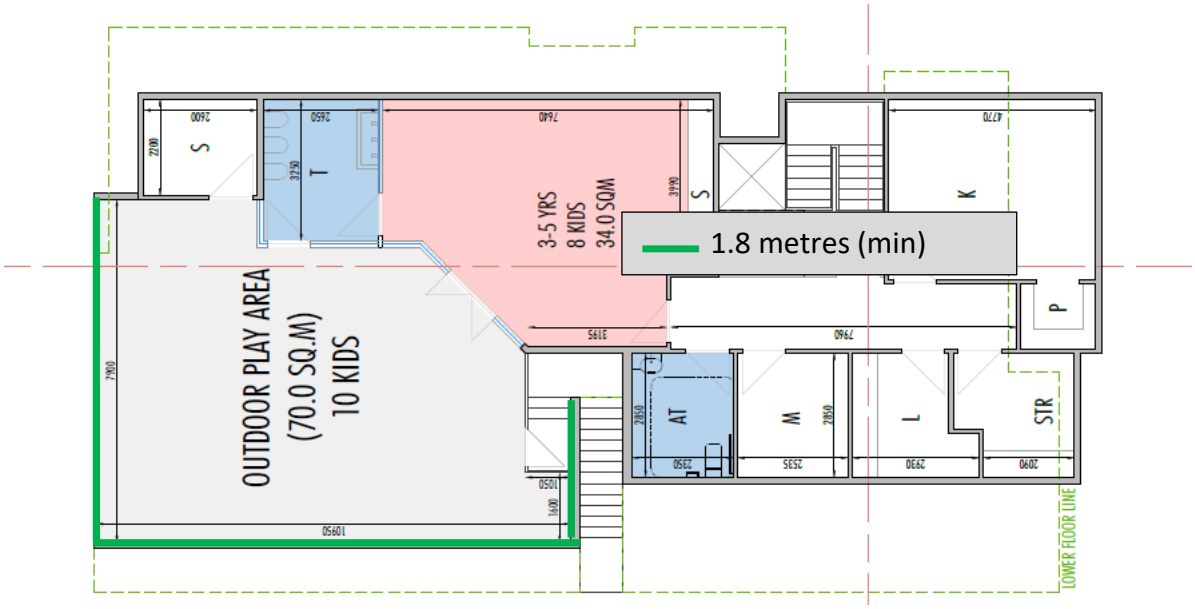

Figure 5. Recommended Sound Barrier Screen – Upper Level Deck

Screen construction

- Screens may be constructed from any impervious material such as; corrugated sheet steel (*Colorbond*), lapped and capped timber, masonry, minimum 4 mm thick float glass, 10 mm thick polycarbonate, earth mounding or a combination, without holes or gaps other than 20 mm at the base if required,
- **NB** There should be no elevated play equipment in the outdoor play areas of a significant height above the sound barrier screens.

7.2 Outdoor Play Times or Maximum Number of Children

The above screening recommendations are based on either of the following options being implemented and adhered to:-

Option 1 – maximum outdoor play time

- Outdoor play time should not exceed a total of 2 hours for all children combined on any given day. There is acoustically no restriction required on the number of children outdoors during this 2 hour period.

Option 2 – maximum number of children outside

There are in essence four delineated outdoor play areas with three age group areas demarcated on the ground level and one 3 to 5 year old play space on the first floor deck.

In order to ensure that the noise limits are met without a restriction to the overall total hours of outdoor play time, groups of children outdoors should be staggered such that the 2 to 3 year olds and 3 to 5 years olds are not outdoors in the ground level play are at the same time.

Allowable outdoor play group combinations are therefor as follows:-

- Nine (9) 3 to 5 year olds on the ground level plus eight (8) 3 to 5 year olds on the first floor deck plus the 0 to 2 year olds at any one time, OR
- Ten (10) 3 to 5 year olds on the first floor deck plus thirteen (13) 2 to 3 year olds at ground level and the 0 to 2 year olds at any one time, OR
- Thirteen (13) 2 to 3 year olds at ground level plus the 0 to 2 year olds.

Providing these recommendations can be adhered to, there is no requirement for a restriction on the number of hours during which children can play outdoors.

7.3 Indoor Playroom Use

General:- Playrooms should be carpeted which will provide a reduction in the reverberant build-up of sound. Alternatively acoustic ceilings or acoustical absorbent material may be installed within the rooms and details may be finalised prior to the issue of a Construction Certificate.

If option 2 above is selected:-

- Openings in the playrooms, whilst children are inside and that group is restricted from outdoor play, should not exceed the following
    - 3 to 5 year old play room (north facing sliding doors only)
    - 2 to 3 year old play room (no restriction),
    - 0 to 2 year old play room (no restriction).

7.4 Mechanical Plant

A final assessment of mechanical plant will be undertaken prior to the issue of a construction certificate as detailed in Section 5.5. The noise design goals can easily be achieved at this Site for noise emission arising from the operation of any mechanical plant.

8. CONCLUSION

An assessment of the potential noise impact arising from a child care centre proposed to be constructed at 32 Halloran Street, Turvey Park, NSW has been undertaken.

Noise emission from the child care centre will meet the NSW EPA's, Association of Australian Acoustical Consultant's Guideline and Wagga Wagga City Council's general noise requirements at the nearest residential receptors to the Site.

This is providing that recommendations made in Section 7 of this report are implemented and continue to be adhered to.

Matthew Harwood, MAAS

Director & Principal Consultant

Attachments: -
Important Note
Appendix A – Noise Survey Instrumentation
Appendix B – Noise Survey Results

Important Note

All products and materials suggested by Harwood Acoustics Pty Ltd are selected for their acoustical properties only. Recommendations made in this report are intended to resolve acoustical problems only, therefore all other properties such as aesthetics, air flows, chemical, corrosion, combustion, construction details, decomposition, expansion, fire rating, fumes, grout or tile cracking, loading, shrinkage, smoke, ventilation etc. are outside Harwood Acoustic's field of expertise and ***must*** *be checked with the supplier or suitably qualified specialist before purchase.*

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Opinions and judgements expressed herein, which are based on our understanding and interpretation of current regulatory standards, should not be construed as legal opinions.

Noise Survey Instrumentation	Appendix A

The instrumentation used during the noise survey consisted of the following: -

Description	Model No.	Serial No.
SVANTEK Sound Level Meter	SVAN 971	74362
Brüel & Kjaer Acoustical Calibrator	4321	3003242

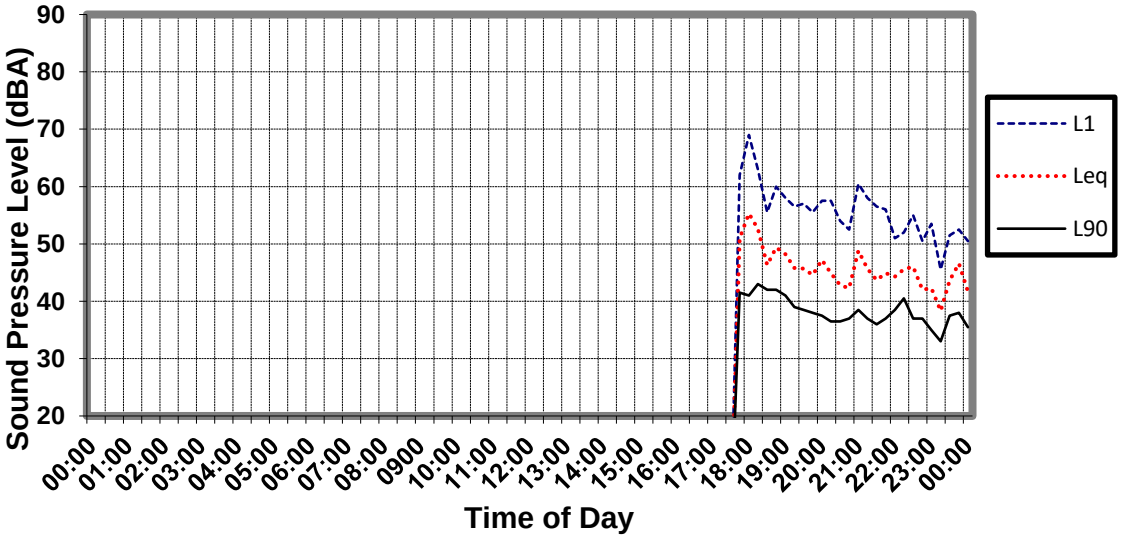
The SVANTEK Model SVAN 971 sound level meter conforms to Australian Standard AS IEC 61672.1-2004: 'Electroacoustics - Sound Level Meters – Specifications' as a Class 1 precision sound level meter and has an accuracy suitable for both field and laboratory use.

The calibration of the sound level meter was checked before and after the measurement periods. No significant system drift occurred over the measurement period.

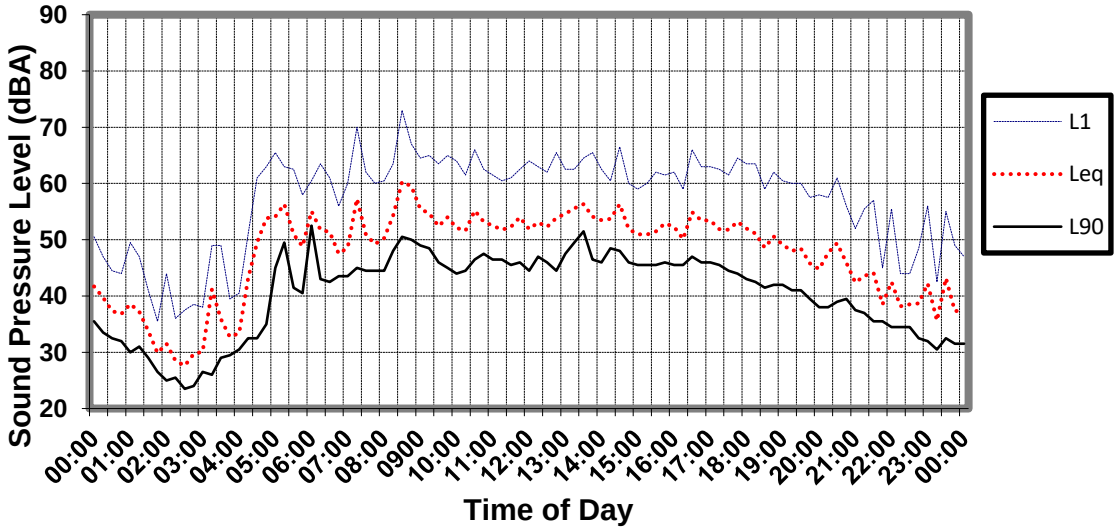
The sound level meter and calibrator have been checked, adjusted and aligned to conform to the factory specifications and issued with conformance certificates as required by the regulations.

Background Noise Survey Results	Appendix B

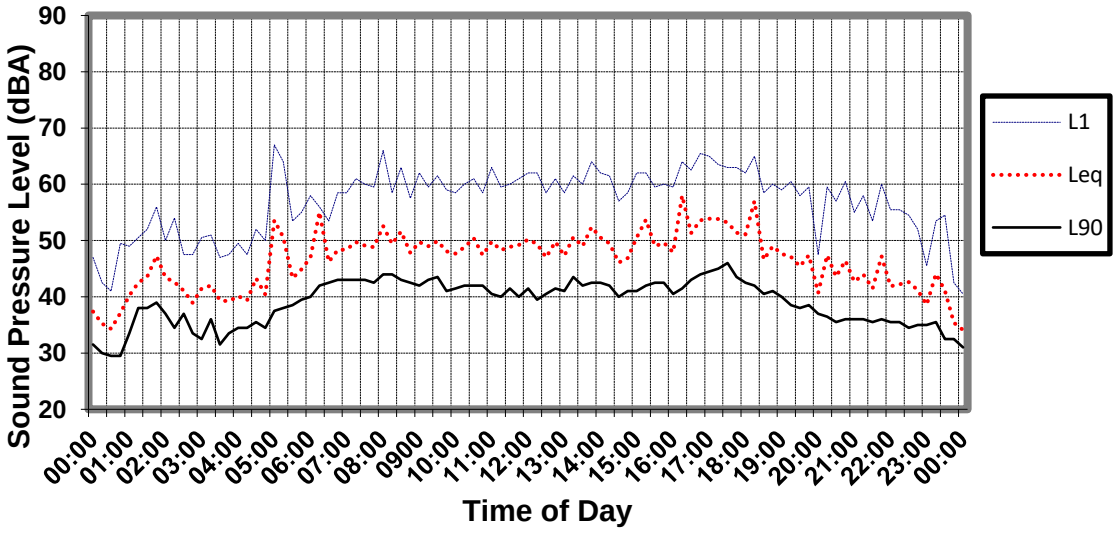
Wednesday May 18th 2022



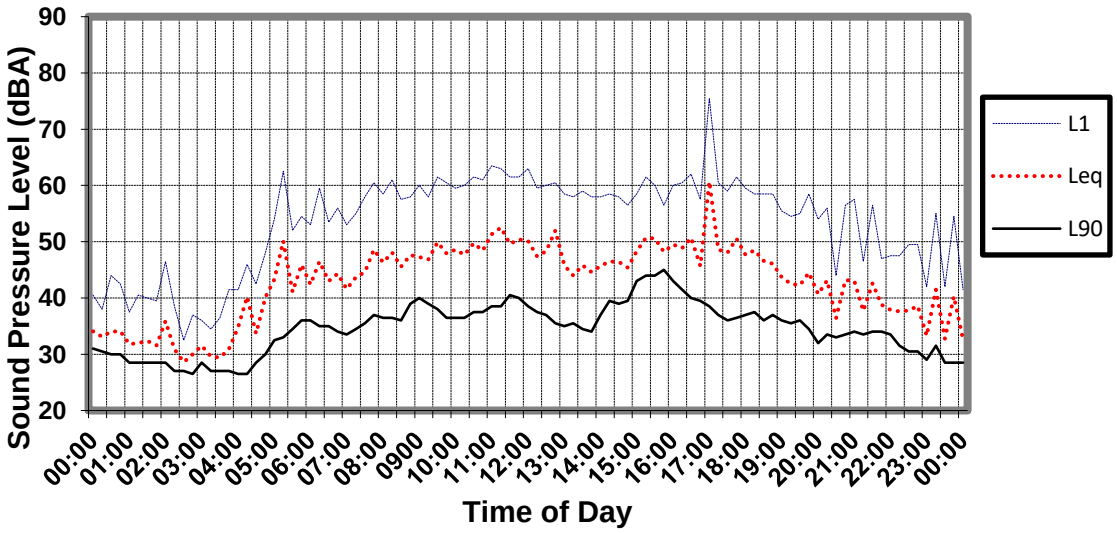
Thursday May 19th 2022



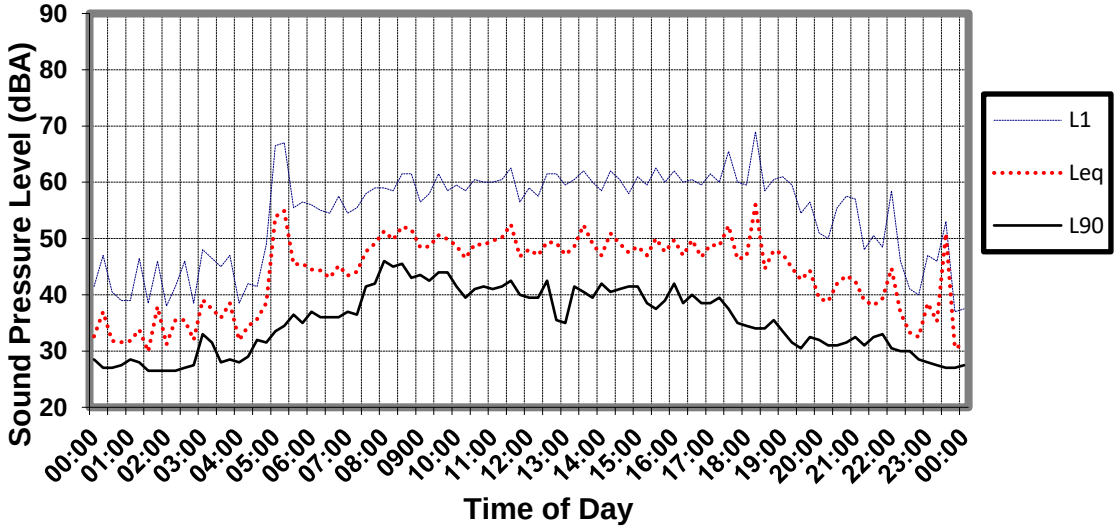
Friday May 20th 2022



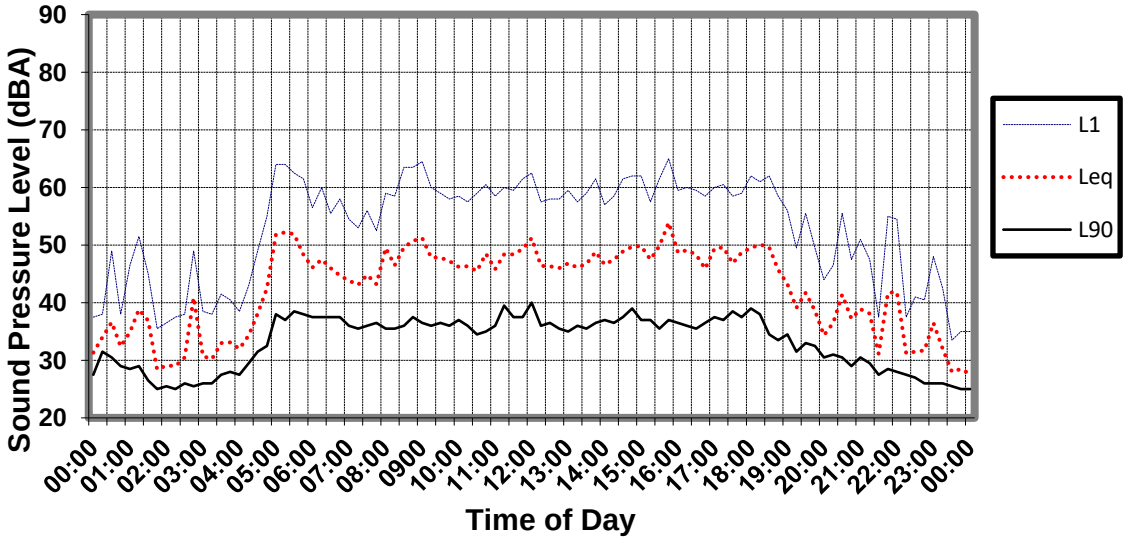
Saturday May 21st 2022



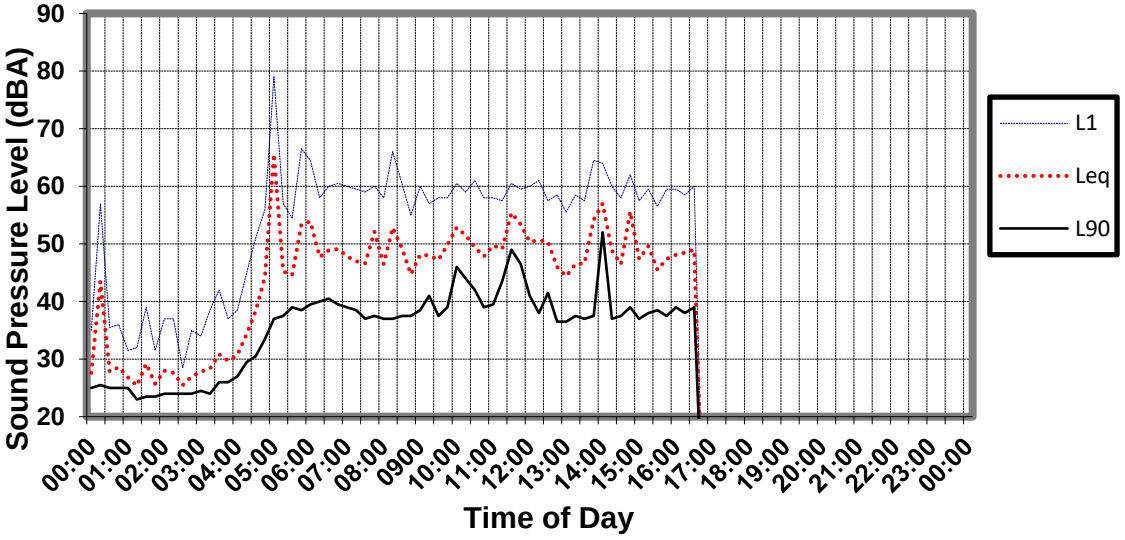
Sunday May 22nd 2022



Monday May 23rd 2022



Tuesday May 24th 2022



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Mr Nicholas Karpathios and Mr Darren White
C/- Archidrome Pty Ltd
206, 8 Help Street
Chatswood NSW 2067

Reference: 2204003e-l.docx

Attention: Ms Sahar Ziaee
Email: sahar@archidrome.com.au

11 November, 2022

Dear Sahar,

ACOUSTICAL ADVICE – PROPOSED CHILD CARE CENTRE

32 HALLORAN STREET, TURVEY PARK, NSW

Archidrome Pty Ltd has recently submitted development application documentation to Wagga Wagga City Council on behalf of Mr Nicholas Karpathios and Mr Darren White for the construction of a child care centre at 32 Halloran Street, Wagga Wagga, NSW (the Site).

At the time of the preparation of the application Harwood Acoustics Pty Ltd prepared an Environmental Noise Assessment, reference 2204003E-R, dated 15 July 2022 (the ENA).

The ENA addressed the potential for noise emission arising from the operation of the centre to impact neighbouring residential receptors.

I understand that following submission of the application Council has received a number of objections and submissions in relation to the centre from the community, some of which raise concerns in relation to noise generation from the centre.

Following a detailed review of the submissions it seems that the acoustical concerns raised by the surrounding community might be broken down in to the following categories:-

- Operational noise of the centre (i.e. children at play),
- Noise generated by cleaning at the centre,
- Construction noise emission during the demolition of existing structures and construction of the centre,
- Noise generation of waste storage and collection.

To assist Council, I am pleased to offer the following comments and summary of the noise assessments and the likely noise impacts.

Operational Noise / Children at Play

The ENA addresses operational noise which includes noise generated by children at play both indoors and outdoors as well as any mechanical plant servicing the building and the noise emission arising from motor vehicles attendant to the centre.

The ENA provides noise predictions from children at play at each of the neighbouring receptors and compares these predicted noise levels to noise criteria derived from the NSW Department of Planning, Industry and Environment's *Child Care Planning Guideline* 2017; the NSW Environment Protection Authority's (EPA) *Noise Guide for Local Government* 2013; NSW EPA's *Road Noise Policy* 2011 and the Association of Australasian Acoustical Consultants *Guideline for Child Care Centre Acoustic Assessment* 2013 (the *AAAC Guideline*).

The ENA then provides recommendations to ensure that the noise goals (criterion) are met at each receptor and these include, but are not necessarily limited to:-

- Construction of sound barrier (boundary) fences around the outdoor play areas,
- Restriction on the number of children permitted outdoors at any one time,
- Restriction on the allowable openings in the play rooms whilst children are indoors,
- Advice on the construction of the play rooms to reduce reverberant sound ("Echo" build up)

These recommendations are common and typical for most child care centres in NSW and are designed to ensure that acceptable noise limits are met, providing of course that the administrative recommendations such as the restriction on the number of children allowed to be outside are implemented and continue to be adhered to. Again, these are not uncommon management procedures, particularly for larger centres.

Cleaning Activity at the Centre

The level of noise emission that could be generated by either contract or in house cleaners at the facility is considerably lower than that which would be generated by the children during normal operational activity.

Notwithstanding this, a management plan could be prepared which instructs cleaners to minimise the level of noise emission at neighbouring receptors, by for example:-

- Ensuring that cleaning is not carried out after 10 pm or before 7 am on any day to avoid sleep disturbance potential,
- Stipulating that vacuum cleaners are only to be used when windows and doors are closed,

Consideration could be given noise when awarding the contract to a commercial operator.
A similar approach to restrictions on grounds maintenance as well. For example, a restriction on hours, a restriction on the use of leaf blowers, etc.

Construction Noise Emission

It is common practice for Councils to include conditions within a typical development consent relating to construction noise management. These conditions might take the form of specifying allowable construction hours and / or requesting the preparation of a Construction Noise and Vibration Management Plan (CNVMP). A CNVMP would be prepared in accordance with the NSW EPAs *Interim Construction Noise Guideline* 2009 and Australian Standard AS2436:2010. The CNVMP will advise on best practices to minimise noise impacts and if required noise and vibration testing could be carried out at critical times during the construction phase.

Again, this is common practice and would typically to any residential or commercial developments across NSW.

Waste Management Noise

It is understood that a revised management plan has been prepared which removes the intent to crush materials on site. All materials collected during the demolition phase will be disposed of. These processes would also be considered and addressed in the preparation of the CNVMP at the Construction Certificate stage to ensure that best, low noise practices were adopted and adhered to.

With respect to noise generation of waste storage and collection during the normal operation of the child care centre, it is proposed to construct a waste bin enclosure on the northern side of the centre.

It is likely that waste collection will be arranged by private contractor however the bins will be standard 240 litre bins that are generally used in residences. It could be stipulated that waste collection should not occur prior to 7 am on any day, again to avoid sleep disturbance.

In my view, there is no reason acoustically that the centre could not be approved and managed to ensure that the standard noise goals applicable to all child centres in NSW could not be achieved.

Please do not hesitate to contact the undersigned should you require any further information or clarification.

Yours faithfully

Matthew Harwood, MAAS
Director and Principal Consultant
Harwood Acoustics Pty. Ltd.