

Association of Australian Acoustical Consultants Guideline for Child Care Centre Acoustic Assessment

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1.0 INTRODUCTION

This guideline sets out a recommended assessment method for the submission of a Noise Impact Assessment to accompany a Development Application for Child Care Centres, and provides typical recommendations for the control of noise from such Centres.

The high density usage of small spaces combined with insufficient variety, diversity and play opportunities are a known cause of a breakdown in children's behaviour with an ensuing increase in noise. In addition, the necessity of locating accessible Child Care Centres in residential neighbourhoods, providing generous and unencumbered outdoor spaces for children to enjoy their activities and the right of neighbours to a reasonable level of noise amenity are potentially at conflict and require a considered approach to planning a Child Care Centre.

A Child Care Centre is considered to be a building or place which is used to provide a Children's Service but excludes Home-Based Children's Services, Mobile Children's Services or Family Day-Care Children's Services.



2.0 BACKGROUND TO THE GUIDELINE

This guideline has been prepared by members of the Association of Australian Acoustical Consultants (AAAC) to assist local councils and AAAC members to assess the potential noise impact from proposed Child Care Centres accurately and fairly.

The assessment procedure may vary slightly from state to state, however the general principles remain the same. References have been made to specific State policies, in order to simplify the technical content in this document. (AAAC members in each State or Territory may modify the guidelines in order to meet specific State requirements).

The recommendations are based on the common practice of AAAC members and the results of the NSW Division of the Australian Acoustical Society (AAS) Technical Meeting in September 2007 on Child Care Noise.

Some local councils may have specific acoustical criteria which should be considered when carrying out an assessment. If the requirements are non specific, this guideline will assist in determining a suitable assessment procedure.

This guideline refers to the potential noise impact of Child Care Centres with 10 or more children. It does not limit the number of children at any one centre, however council may have an upper limit that should be adhered to subject to noise and other impacts.

Child Care Centres typically operate from 7 am to 6 pm, Monday to Friday for up to 52 weeks per year.

3.0 OBJECTIVE

The objectives of this guideline are:

- To protect the reasonable acoustic privacy of nearby residents in their dwellings and private open spaces;
- To provide noise goals and noise control recommendations to ensure that a Child Care Centre in a residential area does not generate unacceptable noise levels such as to adversely impact upon the amenity of adjoining properties and other properties close to the site;
- To recommend minimum requirements for adequate space, variety, diversity and play opportunities for children to help reduce the noise levels experienced by adjoining properties and other properties close to the site;
- To protect children from excessive noise which may be experienced due to the close proximity to roads, industrial premises, aircraft or rail operations.



4.0 DEFINITIONS

Adverse Weather means the occurrence of rain or a wind speed greater than 5 metres per second.

Background Noise Level is the 'A' frequency weighted sound pressure level, obtained by using time-weighting 'Fast' that is equal to or exceeded for 90% of the time interval considered in the absence of the noise under investigation, descriptor is $L_{AF90,T}$ (normally measured in 15 minute time increments (T)).

Care and Protection Act means the Children (Care and Protection) Act 1987 No. 54.

Child Care Centre means a building or place which is used to provide a Children's' Service but does not include a building or place used to provide:

- Home-Based Children's' Services;
- Family Day-Care Children's' Services;
- Mobile Children's' Services.

Children's' Service has the same meaning as in the Care and Protection Act.

dB(A) means A-weighted sound pressure level in decibels.

Family Day-Care Children's' Services has the same meaning as in the Care and Protection Act.

Home-Based Children's' Services has the same meaning as in the Care and Protection Act.

L_{Aeq} means 'A' frequency weighted energy equivalent sound pressure level.

L_{AF90} means the sound pressure level exceeded for 90% of the measurement period (see Background Noise Level above).

$L_{AS,max,T}$ means 'A' frequency weighted, slow time weighted, maximum RMS sound pressure level measured in the time period 'T'.

Mobile Children's' Services has the same meaning as in the Care and Protection Act.

Sound Power Level (L_w) of a noise source is an absolute that does not vary with distance or differing acoustic environments. It is 10 times the common logarithm of the ratio sound power and a reference power (usually 1 pW).

Sound Pressure Level (L_p) is the level of sound measured on a sound level meter and expressed in decibels (dB or dBA). It is ten times the common logarithm of the ratio acoustic pressure (Pa) squared and a reference pressure (usually 20 μ Pa).

5.0 NOISE CRITERIA

Criteria for Child Care Centres are based around an emergence above the background noise level.

Background Noise Level

The background noise level should be measured using a continuous noise logger for a period of at least five consecutive weekdays. If the Child Care Centre is proposed to operate on Saturday and/or Sunday, these days should also be included. At least three of those days must not be affected by adverse weather. Meteorological data may be measured on site or accessed from the nearest Bureau of Meteorology weather station, within 30 km.

Logger Location

The noise logger should be located to measure the background noise level at the most affected residential receiver locations. If this location is not possible, the acoustical consultant shall select another suitable and equivalent location.

Instrumentation

The existing background noise level shall be measured using acoustical instrumentation which conforms to Australian Standard AS IEC 61672.1-2004 'Electroacoustics – Sound Level Meters – Specifications' as a class 1 or class 2. Acoustical instrumentation that conforms to AS 1259.2-1990 'Acoustics - Sound Level Meters – Integrating – Averaging', Type 1 or 2 may also be used.

Residential Receptors

Outdoor Play Area

For most centres as the duration of time that children are allowed to play outside is reduced then the overall noise impact reduces. Therefore, it is reasonable to allow a higher level of noise impact for a shorter duration of outdoor play. AAAC members regard that a total time limit of approximately 2 hours outdoor play per day (eg 1 hour in the morning and 1 hour in the afternoon) should allow an additional emergence above the background of 5 dB.

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

More than 2 hours per day - The $L_{eq,15 \text{ minute}}$ noise level emitted from the outdoor play area shall not exceed the background noise level by more than 5 dB at the assessment location.

The assessment location is defined as the most affected point on or within any residential receiver property boundary. Examples of this location may be:

- 1.5 m above ground level;
- On a balcony at 1.5 m above floor level;
- Outside a window on the ground or higher floors.

Indoor Play Area, Mechanical Plant, Pick up and Drop off

The $L_{eq,15 \text{ minute}}$ noise level emitted from the cumulative noise impact of children playing indoors, mechanical plant and traffic on the site shall not exceed the background noise level by more than 5 dB at the assessment location.

Commercial Receptors

The $L_{eq,15 \text{ minute}}$ noise level emitted from the Child Care Centre shall not exceed 65 dB(A) when assessed at the most affected point at or within any commercial property boundary

Traffic Noise

Traffic noise on local roads generated by vehicles associated with the child care centre arriving and leaving the site (for example vehicles travelling on public roads) shall comply with $L_{eq,1 \text{ hour}}$ 50 dB(A) at the assessment location.

6.0 SOUND POWER LEVELS

The effective sound power level (L_w) of various noise sources should be assumed for a proposed Child Care Centre. The L_w of children playing varies widely depending on the age of the children and the activity that the children are engaged with.

The L_w of mechanical plant and traffic can normally be predicted with accuracy depending on the type of plant, location and/or number and type of vehicles.

Children

The noise level of boys and girls are assumed to be very similar and therefore are not differentiated in this guideline. A typical range of effective sound power levels for groups of 10 children playing is given below in Table 1 for guidance.

Table 1 – Effective Sound Power Levels for groups of 10 children playing

10 Children aged 0 to 2 years	77 to 80 dB(A)
10 Children aged 2 to 3 years	83 to 87 dB(A)
10 Children aged 3 to 6 years	84 to 90 dB(A)

To calculate the effective sound power level for a specific number of children, the following formula shall be used:

$$\begin{array}{l} \text{Effective Sound Power Level} \\ \text{for 'n' children} \end{array} = \begin{array}{l} \text{Effective Sound Power Level for} \\ 10 \text{ children} + 10 \log (n/10) \end{array}$$

Mechanical Plant

Ideally the proposed mechanical plant should be designed and selected specifically for the project, however it is not uncommon for the mechanical plant not to be selected prior to submitting a development application. Mechanical plant may consist of an air conditioning system and exhaust fans. A typical range of sound power levels for mechanical plant is given below in Table 2.

Table 2 – Sound Power Levels for Mechanical Plant

Small (single fan) condenser (outdoor unit)	65 dB(A)
Medium (double fan) condenser	70 dB(A)
Large (double fan) condenser	80 dB(A)
Small exhaust fan (toilet, garbage room)	60 to 65 dB(A)
Small kitchen exhaust fan	65 to 75 dB(A)

Traffic

The noise from cars and small delivery vans arriving at the centre may be a significant source of noise and should be considered. A typical range of sound power levels for traffic is given below in Table 3.

Table 3 – Sound Power Levels for Traffic (30 second L_{eq})

Car	85 to 90 dB(A)
Delivery Van	85 to 95 dB(A)

7.0 EXTERNAL NOISE IMPACT ON CHILDREN

For proposals that are located within 60 metres of an arterial road or railway line a noise assessment should be submitted with the development application.

Road, Rail Traffic and Industry

The noise level $L_{Aeq,1 \text{ hour}}$ from road, rail traffic or industry at any location within the outdoor play or activity area during the hours when the Centre is operating shall not exceed 55 dB(A).

The noise level $L_{Aeq,1 \text{ hour}}$ from road, rail traffic or industry at any location within the indoor play or sleeping areas of the Centre during the hours when the centre is operating shall not exceed 40 dB(A).

Aircraft

The $L_{A_{\text{Smax}}}$ noise level from aircraft at any location within the indoor play or sleeping areas of the centre during the hours when the Centre is operating shall not exceed 50 dB(A) in accordance with Australian Standard S2021.

8.0 NOISE CONTROL RECOMMENDATIONS

Where the predicted level of noise exceeds the criteria at the noise assessment location, noise control measures shall be implemented to ensure compliance.

The following indicative noise controls may be used to achieve compliance with the noise criteria. Site specific controls should be recommended in the Child Care Centre noise assessment.

Building Design

The design of the childcare centre should aim to locate sleep rooms and outdoor play areas away from external noise sources.

Where feasible, building designs should be based on a "U" shaped or "L" shaped layout, with outdoor play areas positioned such that the building structures act as a noise barrier.

Maximise the separation between the active outdoor play area (as opposed to passive activities such as painting, drawing etc) and the façade of any neighbouring residential premises.

Ensuring operable windows of the child care centre and external play areas do not have a direct line of sight to neighbouring noise sensitive areas.

Locate access ramps away from neighbouring sensitive premises where possible.

Include low noise features such as self closing gates with soft closure hinges, selection of low noise air conditioning condensers, minimize the use of speed humps and ensure car park surfaces and access ways are smooth.

Outdoor Play Areas

Outdoor play areas should be located to minimise the noise impact on adjoining neighbours.

For 'green field' sites consideration should be given to surrounding the outdoor play area with the Child Care Centre building either totally or partially where practical.

Consideration should be given to noise minimisation related to hard-paved areas and pathways within the children's play area to reduce the reverberant noise levels.

Buildings and Other Structures

Buildings and other structures such as storage sheds or covered shade areas may be incorporated into the outdoor play area to provide acoustic shielding.

Boundary Fences

The standard height for a boundary fence is 1.8 metres. Higher fences that are solid and free from visible gaps will reduce the noise impact for ground floor receptors. The local council should provide guidance on the allowable height of fences.

In some cases where higher fences are required, the fence may consist of a combination of a 'standard height fence' plus a transparent 'top' to allow sunlight to pass through.

Alternatively a standard height fence plus an angled cantilevered top to the total required height may be constructed to reduce the noise impact and overall boundary height.

All external pedestrian gates should be fitted with appropriate door closers to provide a slow and regulated closing of the gate to prevent the generation of impact sound.

Limiting the Number of Children Outside

The number of children within the Centre or playing in the outdoor play area at any one time may be limited to reduce the noise impact. A reduction in the number of children by half will reduce the noise impact by approximately 3 dB.

Noise Management Plan

One of the most effective measures that should be implemented in conjunction with the physical noise controls is a noise management plan (NMP). The NMP should be incorporated within the Centre's overall management plan.

The following are examples of management measures that may be incorporated into a Noise Management Plan.

- A separate daily program for both the warmer and cooler months should be established in order to regulate the total time spent outdoors and indoors;
- The program should be made publicly available to parents and neighbours;
- A contact phone number for the Centre's director should be made available to neighbours to facilitate communication and to resolve any neighbourhood issues that may arise due to operation of the Centre;
- The number of children playing outside at any one time may need to be limited to meet the noise criteria;
- The total time spent outside in the play area may need to be limited to less than 2 hours per day to meet the noise criteria;
- Crying children should be taken inside the Centre and comforted;
- The behaviour of children should be monitored and modified as required by adequately trained child care workers;
- Parents and guardians should be informed of the importance of noise minimisation when entering the site, dropping off or picking up children;
- Carers should be educated to control the level of their voice while outside;
- Amplified music may need to be avoided to meet the noise criteria.

Drop off and Pick up

Noise control measures should be implemented to minimise adverse impacts to neighbours caused by car doors slamming and the sound of parents and children arriving or departing the Centre.

Such measures could include the judicious positioning of arrival and departure access points away from residential property boundaries, the appropriate placement of buildings constructed on site to shield the noise or the provision of acoustic fencing or landscaping.

Supervision

The Centre should always be properly supervised in order to limit the noise emission.

Other Published AAAC Guidelines:

AAAC Guideline for Apartment and Townhouse Acoustic Rating

AAAC Guideline for Commercial Building Acoustics

AAAC Guideline for Educational Facilities Acoustics

AAAC Guideline for Report Writing

AAAC Guideline for Selection of an Acoustical Consultant

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For more information, please visit www.aaac.org.au