



Doc. No: 212116-9345

Noise Assessment – Proposed centre-based child care facility Hereford Hill, Lochinvar, NSW

Prepared for:

Lochinvar Child Care Pty Ltd AFT Lochinvar Child Care Unit Trust
c/- HPC Planning
Level 12, 126 Margaret Street
Brisbane QLD 4000

Author:

A handwritten signature in black ink, appearing to be 'Neil Pennington', written over a light grey circular stamp or watermark.

Neil Pennington
B.Sc., B. Math.(Hons) MAIP, MAAS, MASA
Principal / Director

December 2021

CONTENTS

| | | |
|-----|------------------------------------|----|
| 1.0 | INTRODUCTION..... | 1 |
| 3.1 | Proposal description..... | 1 |
| 2.0 | TERMS AND DEFINITIONS..... | 2 |
| 3.0 | NOISE CRITERIA..... | 2 |
| 3.1 | Noise assessment requirements..... | 2 |
| 3.1 | Background noise levels..... | 3 |
| 3.2 | Sleep disturbance..... | 5 |
| 3.3 | Traffic Noise..... | 5 |
| 4.0 | NOISE ASSESSMENT..... | 6 |
| 4.1 | External Play Areas..... | 6 |
| 4.2 | Internal Activity Areas..... | 9 |
| 4.3 | Mechanical Plant..... | 10 |
| 4.4 | Car Park..... | 10 |
| 4.5 | Construction..... | 11 |
| 4.6 | Traffic..... | 11 |
| 5.0 | CONCLUSION..... | 12 |

Appendix I

NOISE LOGGER CHART

1.0 INTRODUCTION

This report presents the results, findings and recommendations arising from an acoustic assessment of a proposed Child Care Facility at 853 and 857 New England Highway, Lochinvar, NSW.

The investigation was requested by HPC Planning on behalf of the proponent Lochinvar Child Care Pty Ltd ATF Lochinvar Child Care Unit Trust to support a Development Application to Maitland City Council (Council) to address their typical requirements for such a redevelopment.

Additional feedback from Council dated 3 November 2021 has also been reviewed and addressed in this revised assessment.

3.1 Proposal description

Under the proposal the centre will cater for 82 children aged 0-5 years with normal operating hours being Monday to Friday between 6:15 am and 6:15 pm for 52 weeks per year. There will be 13 child care staff.

Modern child care centres function as early learning facilities rather than simply for child minding. As such, there is emphasis on the guided development of children with organised activities and set objectives. Typically, children will be distributed throughout play areas in supervised groups. From an acoustic point of view this means there is no unrestricted play time during which children could create excessive noise. Activities are supervised at all times by qualified and trained staff members.

The Department of Family and Community Services (FACS) ensures that child care centres comply with the Children and Young Persons (Care and protection) Regulation 2012. Under this regulation services must comply with the NSW Cancer Council guidelines which state “Care should be taken to minimise the time spent outdoors between 11 am and 3 pm daylight saving time (10 am and 2 pm Eastern Standard Time), when daily UVR levels are generally at their peak”.

As a result of these guidelines children are not typically outside during the hours outlined or if they are then usually for relatively short periods. The time spent outdoors is also subject to weather conditions.

The indoor areas of the building will be mechanically ventilated. Doors and windows would usually remain closed whilst the children are indoors but it is considered that they would be open at times of appropriate weather because Council’s DCP requires “Natural ventilation should be available throughout the centre – opening windows for cross ventilation”.

2.0 TERMS AND DEFINITIONS

Table 1 contains the definitions of commonly used acoustical terms and is presented as an aid to understanding this report.

| TABLE 1 DEFINITION OF ACOUSTICAL TERMS | |
|---|---|
| Term | Definition |
| dB(A) | The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB). |
| SPL | Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard. |
| STL | Sound Transmission Loss. The ability of a partition to attenuate sound, in dB. |
| Lw | Sound Power Level radiated by a noise source per unit time re 1pW. |
| Leq | Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period. |
| L1 | Average Peak Noise Level - the level exceeded for 1% of the monitoring period. |
| L10 | Average Maximum Noise Level - the level exceeded for 10% of the monitoring period. |
| L90 | Average Minimum Noise Level - the level exceeded for 90% of the monitoring period and recognised as the Background Noise Level. In this instance, the L90 percentile level is representative of the noise level generated by the surrounds of the residential area. |

3.0 NOISE CRITERIA

3.1 Noise assessment requirements

Council requires assessment of the proposal against the Maitland Development Control Plan 2011: C2 Child Care Centres. The facility will operate as a commercial enterprise and, as such, guidance for the assessment of noise impacts has been taken from the NSW Noise Policy for Industry (NPI), NSW Land and Environment Court precedents and the Association of Australian Acoustical Consultants (AAAC) Childcare Centre noise Assessment Guideline (v3.0, 2020).

The DCP advises that noise emissions from child care centres should ideally not exceed the ambient background noise levels by more than 5 dB at residential receivers. This requirement was derived from the NSW Industrial Noise Policy (INP, EPA 2000) for industrial noise emissions up to continuous 24 hour operation.

The issue of noise emissions from child care centres was included in a discussion paper prepared by the Southern Sydney Regional Organisation of Councils (SSROC) in 2005. As stated in the discussion paper, an assessment of 13 Land and Environment Court cases relating to child care centres revealed the following quotation from a Court judgement:

Council may require that a suitably qualified acoustic consultant undertake an acoustic assessment, which includes recommended noise attenuation measures.

Noise readings (measured at any point on the boundary of the site between the proposed Child Care Centre and adjoining property), should not exceed 10 dB(A) above the background noise levels during the hours of operation of the Centre. The noise measurements are to be measured over a 15-minute period and are to be undertaken in accordance with the requirements of the NSW Department of Environment and Conservation (now OEH).

The SSROC discussion paper also noted that:

Noise from children playing was a common issue before the court. The court generally imposed a condition that noise not exceed background noise + 10dB.

In order to achieve this standard, several acoustic reports submitted to the court recommended that the time spent by children in the outdoor play areas be limited. Some consents limited outdoor play to 2 hours per half day.

A criterion of 'background + 10dB' for a total of four hours outdoor play time per day is recommended in Section 3.2.1 of the AAAC Guideline. The standard DCP/INP criterion of 'background + 5dB' will apply for other noise sources on the site or use of the outdoor play area with no time restriction.

3.1 Background noise levels

Spectrum Acoustics conducted background noise monitoring for the original subdivision application in 2017 at locations indicated in **Figure 1**. Rion NL-42 noise loggers programmed to continuously register environmental noise levels over 15 minute intervals.

Logger Location 2 was alongside the tennis court at the (then) existing residence on the site, from 2 to 6 May 2017 at approximately 85m from the centre of traffic on the New England Highway. This logger location is representative of the setback of the subject site from the New England Highway.



Figure 1. Noise logger location.

The proponent has indicated that the facility will only operate from Monday to Friday, during the day period¹. **Table 2** below shows a summary of the measured LA90 (background) and LAeq noise levels for the day, evening and morning shoulder periods. The data is shown graphically in **Appendix I**.

| TABLE 2 MEASURED NOISE LEVELS | | | | |
|----------------------------------|--------------------------|----------------------------|---------|----------|
| Location | Percentile | Ambient Noise Levels dB(A) | | |
| | | Day | Evening | 6:15-7am |
| N2 | L ₉₀ | 41 | 38 | 41 |
| | L _{eq} (period) | 48 | 48 | 47 |

In relation to determining noise goals for the operation of mechanical plant at the site the NPI sets out two separate sets of criteria designed to ensure developments meet environmental noise objectives. The first criteria account for intrusive noise and the others apply to the protection of amenity of particular land uses. A new development is assessed by applying both criteria to the situation and adopting the more stringent of the two.

Amenity criteria are dependent upon the nature of the receiver area and the existing level of industrial noise. The area is best described as “suburban” and, as current industrial noise is insignificant, the adopted criterion is equal to the recommended amenity limit for a suburban area.

Table 3 below specifies the applicable base noise objectives for the operation of mechanical plant at the child care centre being assessed based on the lowest recorded background noise level, being 41 dB(A),L90.

¹ There would be children dropped off and picked up during the morning shoulder period 6:15 am – 7:00 am. Ambient levels during this period have been calculated and included in Table 2.

| TABLE 3 BASE NOISE LEVEL OBJECTIVES | | |
|--|--|---|
| Period | Intrusiveness trigger level* Leq (15 min) dB(A) | Amenity trigger level** Leq (Period) dB(A) |
| Day | 46 | 53 |
| Morning shoulder | 46 | 43 |

* Rating Background Level (RBL) + 5dB. RBL is the median value of each ABL (Assessment Background Level) over the entire monitoring period. The ABL is a single figure representing the “L₉₀ of the L₉₀’s” for each separate day of the monitoring period.

** Recommended level for Urban zone Table 2.1 of NPI minus 5 dB. Correction of +3dB to convert to LAeq(15min).

The project specific noise trigger levels are therefore,

| | |
|------------------|------------------------------|
| Morning shoulder | 43 dB(A) Leq (15 min) |
| Day | 46 dB(A) Leq (15 min) |

The daytime criterion will be conservatively adopted for the morning shoulder period, although due to the morning traffic peak, ambient levels are higher at this time. As per the discussion detailed above the noise from children in the outdoor play areas will be assessed against the shorter duration criterion of “daytime background + 10” or;

| | |
|-----|------------------------------|
| Day | 51 dB(A) Leq (15 min) |
|-----|------------------------------|

3.2 Sleep disturbance

Section 2.5 of the NPI states that where the subject development/premises night-time noise levels at a residential location exceed:

- LAeq,15min 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- LAFmax 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,

a detailed maximum noise level event assessment should be undertaken.

The background noise level of 41 dB(A) for the period 6:15am – 7am implies sleep a disturbance trigger levels of 52 dB(A), Lmax.

3.3 Traffic Noise

Noise impacts from road traffic are assessed separately to site noise using the EPA Road Noise Policy (RNP).

The RNP, as adopted by Roads and Maritime Services (RMS) NSW, defers to the SEPP (Infrastructure) 2007 regarding traffic noise impacts on new developments. Provisions relevant to child care centres are included in Appendix C10 of the SEPP as follows:

For new sensitive land use developments around existing busy roads in NSW, such as educational institutions, child care facilities, places of worship and hospitals, both suggested internal acoustic performance requirements and design principles are provided in Section 3.6.1 of the interim guideline.

The acoustic design advice in the guideline may be considered when designing such a development near any type of road.

In certain circumstances, the Infrastructure SEPP imposes a requirement on councils to consider these guidelines before determining development applications for noise sensitive developments.

The DP&E “Development near rail corridors and busy roads – Interim guideline” supports the SEPP (2007) and provides internal noise criteria applicable to sensitive developments.

Table 3.1 of the Interim guideline is reproduced below.

| Table 3.1: Noise criteria | | |
|---|-------------------------------|------------------------|
| Residential Buildings | | |
| Type of occupancy | Noise Level dBA | Applicable time period |
| Sleeping areas (bedroom) | 35 | Night 10 pm to 7 am |
| Other habitable rooms (excl. garages, kitchens, bathrooms & hallways) | 40 | At any time |
| Non-Residential Buildings | | |
| Type of occupancy | Recommended Max Level dBA | |
| Educational Institutions including child care centres | 40 | |
| Places of Worship | 40 | |
| Hospitals | - Wards | 35 |
| | - Other noise sensitive areas | 45 |

Note: airborne noise is calculated as $L_{eq}(9h)$ (night) and $L_{eq}(15h)$ (day). Groundborne noise is calculated as L_{max} (slow) for 95% of rail pass-by events.

The AAAC Guideline recommends a maximum traffic noise impact of **55 dB(A), $L_{eq}(1 \text{ hour})$** in outdoor play areas of child care centres, **40 dB(A)** in internal activity areas and **35 dB(A)** within sleeping areas.

4.0 NOISE ASSESSMENT

4.1 External Play Areas

To assess potential noise impacts from the proposed child care centre, noise levels were taken from the Spectrum Acoustics technical database. This contains measurements made at existing child care facilities that are similar in acoustic nature to the proposed child care centre.

The database contains noise measurements made in outdoor play areas as well as indoor areas. All sound levels have been measured with a Bruel & Kjaer Type 2250 Precision Sound Level Analyser with calibration performed before and after the survey.

One set of outdoor measurements was made over a 15 minute interval during a morning activity session whilst 15 children aged up to 3 years old were in an outdoor playground. The measurements were made from the veranda of the facility at the end of the playground. The noise source (i.e. the children) was in motion about the area with an average distance of approximately 15m from the sound level meter.

Similar measurements were made over 15 minute intervals during a morning activity session whilst 15 children aged between about 2 and 6 years old were in an outdoor playground. Measurements were made near the ends of the playground, which had dimensions of approximately 5 x 15 m. The noise source (i.e. the children) was in motion about the area with an average distance of approximately 8m from the sound level meter.

Calculated Leq sound power levels based on the measured noise levels are very similar to the values given in Table 1 of the AAAC Guideline, which will be adopted for this assessment, as shown in **Table 4**.

| TABLE 4 CALCULATED SOUND POWER LEVELS dB(A) Leq (15 min) | | | | | | | | | |
|---|-------|-----------------------------------|-----|-----|-----|----|----|----|----|
| Source | dB(A) | Octave Band Centre Frequency (Hz) | | | | | | | |
| | | 63 | 125 | 250 | 500 | 1K | 2K | 4K | 8K |
| 10 x < 3 y.o. | 85 | 61 | 67 | 73 | 79 | 81 | 78 | 74 | 70 |
| 10 x 3 to 5 y.o. | 87 | 64 | 70 | 75 | 81 | 83 | 80 | 76 | 72 |

The proposal incorporates both indoor and outdoor play areas. Potential noise issues arise primarily when children are engaged in outdoor play activities.

The proponent has advised that of the total facility capacity of 82 children aged 0-5 year old, there would typically be some enrolment shortfall, ten absent on any given day and ten at OOSH, leaving at most 66 children (80% capacity) in attendance.

Based on the proposed layout of the outdoor space, and the discussion above, it was assumed there would be four groups of 10 children aged 0-5 distributed in **Figure 2**. Only the western half of the playground, represented by sources S1 and S2, would potentially impact on the adjoining residence R1. Children would access the play areas directly from the building. **Figure 3** shows the proposed western boundary fence and partial roof for noise control purposes. Carpark source CP1 would potentially impact on adjoining residence R2.



Figure 2. Proposed Site Layout, noise sources and nearest residence



Figure 3. Proposed western boundary acoustic screen. (Matt Perspex panels).

The noise sources were propagated to the receiver points, taking into account loss for distance and barrier effects of proposed barriers as indicated in Figures 2 and 3.

Barrier insertion loss is calculated using the Maekawa edge diffraction model as used in many available computer models of outdoor sound propagation and accounts for the natural elevation differences between the sources and receivers, as well as the barrier dimensions.

For the calculations, a source height of 1 m was used to approximate the height of a child’s mouth. The predicted received noise levels are then compared to the adopted noise goals to determine noise impacts.

Table 5 shows the predicted noise levels at the nearest residence to the play areas.

| TABLE 5 RECEIVED NOISE LEVEL AT R1 | | | | | | | | | |
|---------------------------------------|-----------|----------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Propagation Elements | dB(A) | Octave Band Centre Frequency, Hz | | | | | | | |
| | | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k |
| Source Lw Leq (15 min) | 87 | 64 | 70 | 75 | 81 | 83 | 80 | 76 | 72 |
| S1 Distance loss (10 m) | -28 | -28 | -28 | -28 | -28 | -28 | -28 | -28 | -28 |
| S2 Distance loss (20 m) | -34 | -34 | -34 | -34 | -34 | -34 | -34 | -34 | -34 |
| S1 Barrier Loss (3 m) | | -10 | -13 | -16 | -19 | -22 | -24 | -24 | -24 |
| S2 Barrier Loss (3 m) | | -7 | -8 | -10 | -13 | -15 | -18 | -21 | -24 |
| S1 SPL at receiver R1 | 39 | 26 | 29 | 31 | 34 | 33 | 28 | 21 | 20 |
| S2 SPL at receiver R1 | 39 | 23 | 28 | 31 | 34 | 34 | 28 | 21 | 14 |
| TOTAL at R1 | 42 | 28 | 32 | 34 | 37 | 37 | 31 | 26 | 21 |
| Criterion (no time limit*) | 46 | | | | | | | | |
| Criterion (2 hour / day) | 51 | | | | | | | | |

* From 7am-6pm.

The predicted level in Table 5 is below the “background + 5 dB” criterion so children’s activities in the outdoor play area will not require any time restrictions within normal daytime hours.

This assessment has considered use of the outdoor play area during normal operating hours based on a maximum number of children aged 3-5 likely to be in the play area during a worst-case 15-minute period. Further detailed analysis based on usage by younger groups of children and times of use for the various age groups is unnecessary as the noise emissions are covered by the worst-case assessment above.

4.2 Internal Activity Areas

The proposed Activity Room 5 is shown in Figure 2. This room would accommodate 20 children over 36 months of age and two staff and has two windows facing residences to the west. Section 4.1 of the AAAC Guidelines allows for a -6 dB correction for outdoor passive play areas relative to the levels in Table 4. Internal activities are typically not only

passive but also directed and task-based. It is reasonable to allow a -10 dB correction for internal, directed and passive activities relative to noise levels from free play in the outdoor area.

Based on an internal sound power level of 77 dB(A), calculated internal loss of 10 dB in a semi-reverberant space, the standard 10 dB loss through open windows and nominally 3m distance to a point within the yard of the neighbouring residential property, the resultant noise impact at receiver R1 is 39 dB(A), Leq. In the worst case that this internal noise and the external noise considered above occurred simultaneously, the cumulative level of 45 dB(A) is marginally below the 46 dB(A) criterion.

4.3 Mechanical Plant

Air conditioning will typically be provided by split system units. The requirement for any additional external condenser units is yet to be determined although, if required, would logically be contained within or immediately adjacent to the building footprint.

Condenser units for similar applications, typically, have sound power levels in the range 65 to 70 dB(A) when they are operating at full capacity. The plant will be contained within the building footprint, either at ground level or on the roof, and should be located away from the western boundary. Final selection of A/C plant should be reviewed at the CC stage to confirm compliance with the noise trigger levels established in this report.

The proposed kitchen and laundry would be located in the south-eastern corner of the facility at a distance of at least 25m from any surrounding residence. Table 2 of the AAAC Guideline provides a sound power level of 70 dB(A) for a small kitchen exhaust fan, which would be roof-mounted. Allowing for distance loss, the predicted level of 34 dB(A) is well below the 46 dB(A) criterion and will not contribute cumulatively to increase the levels predicted above for the children's activities and carpark in the following section.

As with the A/C plant, all proposed external mechanical plant must be reviewed for compliance with the noise criteria in this report at the final design stage.

There is no public address system proposed for this development. It is possible that an intercom may be installed, but there are generally no louder than normal speech and do not require speakers.

4.4 Car Park

The car park would be located at the southern side of the centre as shown in Figure 2. Noise compliance measurements taken by Spectrum Acoustics at a similarly sized child care centre at Wamberal on the Central Coast recorded a level of 40 dB(A),Leq(15min) at a distance of

15m from the nearest point of the carpark during afternoon pick-up time. This equates to 53 dB(A), $L_{eq}(15min)$ at a nominal distance of 5m to receiver R2. This is 10 dB above morning shoulder intrusive noise trigger level of 43 dB(A).

Maximum noise levels of up to 85 dB(A) from doors closing etc would reduce to 63 dB(A) over this distance. This is 11 dB above the project sleep disturbance trigger level of 52 dB(A), L_{max} for the period 6:15-7:00 am. Attenuation of the predicted exceedances will be achieved by a minimum 1.5m acoustic fence along the boundary of the proposed carpark as indicated in Figure 2. It is recommended that a standard height 1.8m fence be constructed to further ensure minimal adverse noise impacts from the carpark. An acoustic fence is an impervious material of minimum mass 15 kg/m².

The calculation above and the recommended acoustic boundary fence address the peak periods of dropping off and picking up children. Any other incidental use of the facility involving parent meetings, cleaning or maintenance will be adequately covered by these provisions. No details of potential staff meetings etc outside normal business hours have been provided for assessment. Such meetings would not introduce any significant potential noise source beyond what has been considered herein.

4.5 Construction

Construction of the facility would occur in a manner and timing similar to construction works that would be generally occurring throughout the growing subdivision. A Construction Noise Management Plan is usually required for construction projects longer than 26 weeks in duration. For projects of shorter duration, as would be expected for this project and the surrounding residential construction, standard construction hours from the EPA's Interim Construction Noise Guidelines (ICNG, 2009) are usually imposed by Councils as follows:

Monday to Friday 7am – 6pm;
Saturday 8am – 1pm;
No work on Sundays or public holidays.

4.6 Traffic

The measured traffic noise level at N2 in Figure 1 was 48 dB(A), which is well below the limit of 55 dB(A). There would be a row of buildings constructed between the site and the New England Highway, reducing traffic noise level by at least 10 dB. Any open windows exposed to traffic noise would experience the accepted 10 dB reduction from outside to inside, resulting in levels below 30 dB(A) and compliance with the internal noise criteria and no further assessment of traffic noise impacts is required.

5.0 CONCLUSION

An acoustical assessment of theoretical noise emissions has been carried out for a proposed Centre-Based Child Care Facility at 853 and 857 New England Highway, Lochinvar, NSW.

The noise impacts at the nearest residential boundaries have been assessed, due to the operation of the child care centre, car park noise and mechanical plant.

Calculation results showed that noise barriers would be required for proposed outdoor play areas and the carpark to achieve the noise criteria at nearby future residential receivers. No exceedances of noise limits on mechanical plant emissions and road traffic generated by the proposal are expected, provided the plant is assessed for compliance with the noise trigger levels established in this report at the CC stage.

Based on these findings, we conclude that the proposed Centre-Based Child Care Centre can operate within noise limits as may be imposed by Council in a Development Approval.

APPENDIX I

NOISE LOGGER CHART

