

Environmental Noise Impact Assessment
Proposed Child Care Centre
8 Robertson Road, Chester Hill

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CONTENTS

SECTION 1	INTRODUCTION	4
SECTION 2	AMBIENT NOISE MEASUREMENTS	5
2.1	Measured background noise levels	5
2.2	Measured road traffic noise level	7
2.3	Measurement equipment.....	7
2.4	Noise level descriptors	7
SECTION 3	NOISE CRITERIA.....	8
3.1	Council requirements	8
3.2	Association of Australian Acoustical Consultants Guideline	9
3.3	State Environment Planning Policy (Transport and Infrastructure) 2021.....	10
3.4	Child Care Planning Guideline.....	11
3.5	Required external noise reduction	11
3.6	EPA project noise trigger levels	11
3.7	Noise criteria.....	12
SECTION 4	NOISE EMISSION	14
4.1	Description of the proposed development.....	14
4.2	Children playing – sound power levels.....	16
4.3	Children playing – outdoor play areas.....	16
4.4	Children playing – indoor activity/playrooms	17
4.5	Carpark.....	17
4.6	Mechanical plant	18
4.7	Waste collection.....	19
4.8	Predicted cumulative noise levels.....	19
SECTION 5	NOISE CONTROL RECOMMENDATIONS	21
5.1	Noise management controls	21
5.2	Sound barrier walls	21
5.3	Building construction	22
5.4	Mechanical ventilation	22
5.5	Mechanical plant	22
5.6	Waste collection.....	22
5.7	Managing a noise complaint.....	22
SECTION 6	CONCLUSION.....	23
APPENDIX		

SECTION 1 INTRODUCTION

A new childcare centre is proposed to be built at 8 Robertson Road, Chester Hill, refer to Figure 1 below and the architectural floor plans in Appendix B.

The centre will comprise four indoor playrooms, one cot room, three outdoor play areas and car parking in the basement. The centre will cater for up to 70 children aged 0 to 5 years. The proposed operating hours of the centre are between 7 am and 6 pm, Monday to Friday.

The ambient noise at the development site is affected by road traffic on nearby roads and activities associated with the nearby residential premises.

Noise control recommendations to reduce the noise emission from the proposed childcare centre to acceptable noise levels to comply with Council requirements are given in Section 5 of this report.

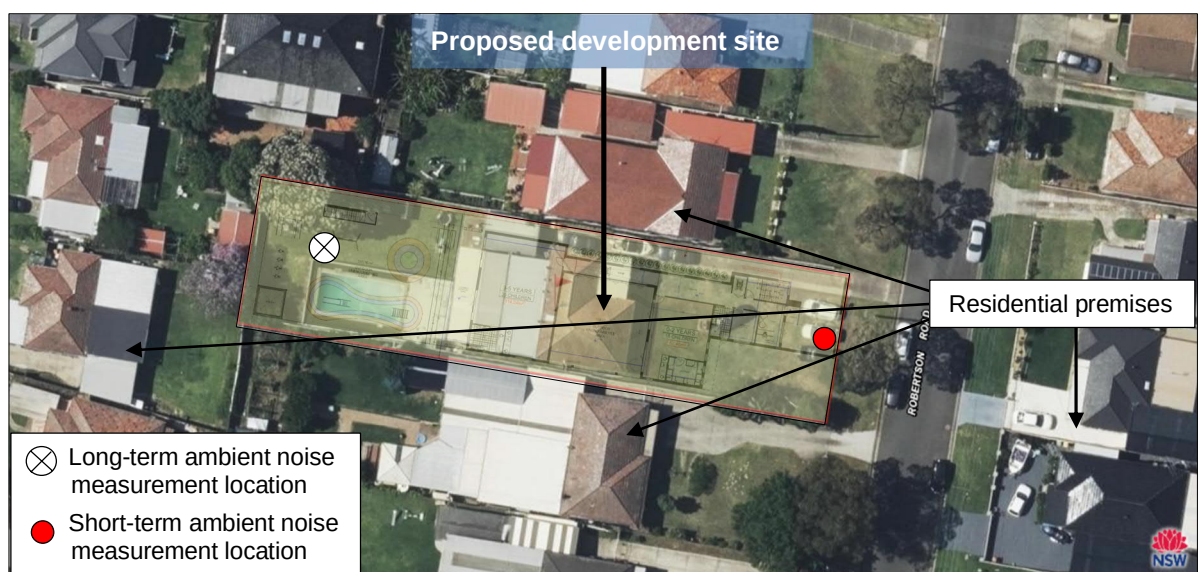


FIGURE 1 – Site location

SECTION 2 AMBIENT NOISE MEASUREMENTS

2.1 Measured background noise levels

The proposed development will be located at 8 Robertson Road, Chester Hill. The ambient noise at the development site is affected by road traffic on nearby roads and activities associated with the nearby residential premises with a regular daily pattern of noise.

The ambient noise measurements were carried out at the development site at the following locations, refer to the Site Location in Figure 1 above and the photos showing the background noise measurement locations in Figure 2 below:

- Location 1: long-term noise monitoring location at the back of the existing dwelling at the height of 1.5 metres above the existing ground level, approximately 5 metres from the western boundary.
- Location 2: short-term noise monitoring location at the front of the existing dwelling at the height of 1.5 metres above the ground level.

The EPA uses the Rating Background Level (RBL) to determine the background noise level, to account for the temporal variation of background noise levels. The results of the noise survey are presented in Appendix A and summarised in TABLE 1 below. The measured noise levels exclude a façade reflection.

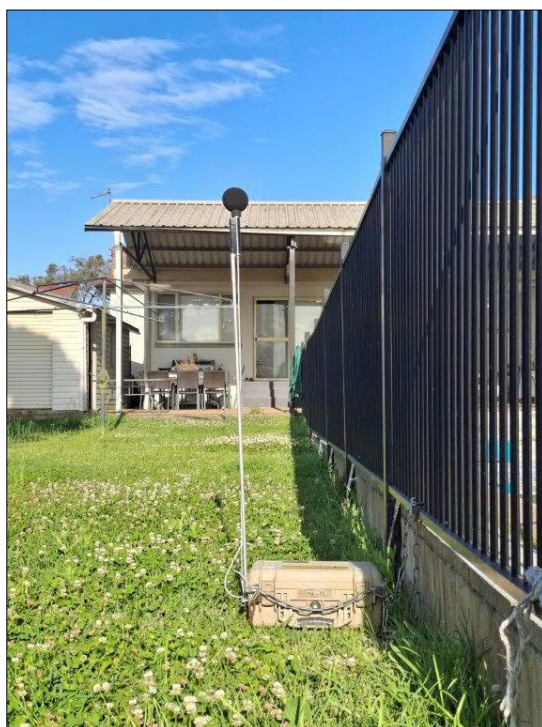
The background noise levels in TABLE 1 above are representative of the background noise levels in the absence of noise from the proposed development, as required by the EPA in Section B2.1 of the Noise Policy for Industry.

Meteorological conditions during the measurements consisted of clear and cloudy skies and short periods of high wind and rain as shown in Appendix A. Recorded data during the periods of high wind/rain was excluded from the background noise levels. Atmospheric conditions at all other times were acceptable for noise monitoring.

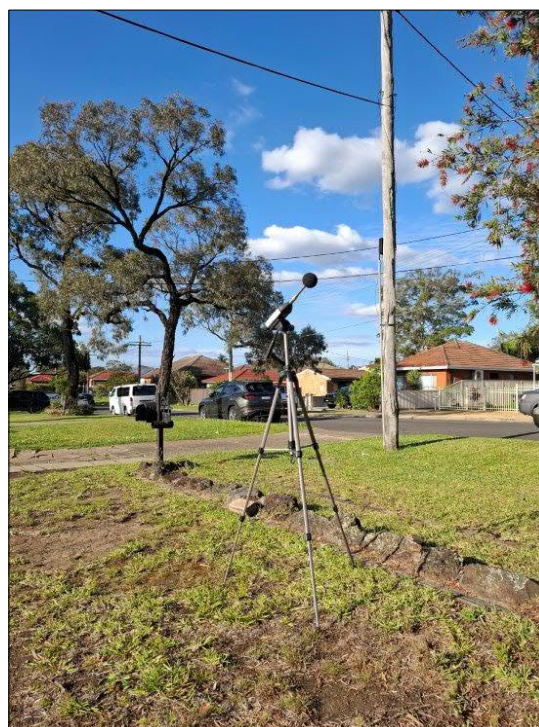
TABLE 1 – Measured rating background noise levels

Location: 8 Robertson Road, Chester Hill		
Period	Rating background level (RBL)	
	Day, dB(A) (7 am – 6 pm)	Evening, dB(A) (6 pm – 7 pm)
Wednesday (16/10/24)	35	37
Thursday (17/10/24)	35	41
Friday (18/10/24)	40	38
Saturday (19/10/24)	37	39
Sunday (20/10/24)	38	42
Monday (21/10/24)	43	36
Tuesday (22/10/24)	34	37
Wednesday (23/10/24)	34	-
Median	35*	37*

* The median levels on weekdays, excluding Saturday and Sunday.



Location 1: long-term
noise monitoring location



Location 2: short-term
noise monitoring location

FIGURE 2 – Locations of the noise measurements

2.2 Measured road traffic noise level

Short-term ambient noise measurements, at the front of the premises, are shown in TABLE 2 below. The noise level was measured 1.5 metres above the ground and excluded a façade reflection.

The measured noise level complies with the AAAC rail and road traffic noise criterion of 55 dB(A) for an outdoor play area, in Section 3.2 of this report, and the EPA amenity noise level of 53 dB(A) for an active recreation area, in Section 3.6, and is therefore acceptable.

TABLE 2 – Measured ambient noise levels at the front of the premises

Location, Date & Time	Noise level descriptor	Sound pressure levels (dB) at octave band centre frequencies (Hz)								
		63	125	250	500	1k	2k	4k	8k	dB(A)
Front of the premises, (5:37 – 5:52 pm, Wednesday 16/10/2024)	Leq	56	53	49	46	46	41	35	28	50
	L ₉₀	44	41	35	34	35	29	23	16	39

2.3 Measurement equipment

The noise level measurements were made with the following equipment meeting all applicable requirements of Australian Standard AS1259 for an integrating-averaging sound level meter, set to Fast Response:

- Svantek 977C Sound Analyser, Type 1 precision environmental sound and vibration analyser, calibrated on 13/03/2023.
- Infobyte Noise Monitor iM4-102, Type 2 precision environmental noise monitor, calibrated on 6/08/2024.

The measurement system was field calibrated with a Svantek SV-33B acoustic calibrator before the noise survey. A calibration check was performed at the start and end of the noise survey, and the calibration drift was found to be less than 1 dB and was therefore acceptable [AS1055:2018, Section 5.6 “Field checks of calibration”]. The SV-33B was calibrated on 10/03/2023.

2.4 Noise level descriptors

L_{Aeq} noise level descriptor is defined as “the value of the A-weighted sound pressure level of a continuous steady sound that, within the measurement time interval, has the same sound pressure as a sound under consideration whose level varies with time” [AS2107-2000].

The **L_{Aeq}** is determined by integrating the sound level over time and studies have shown that human reaction to time-varying noise is quite accurately represented by the **L_{Aeq}** level [Marshall Long, “Architectural Acoustics”, 2006].

L_{Aeq} (15-minute) noise level descriptor refers to the **L_{Aeq}** noise level evaluated over 15 minutes.

L_{eq}, (11-hour) noise level is the overall daytime **L_{Aeq}** noise level between 7 am and 6 pm.

L_{eq}, (1-hour) noise level is the highest 10 percentile of the measured **L_{Aeq}** noise levels evaluated over each hour between 7 am and 6 pm.

L_{A90} noise level descriptor is defined as the exceeded A-weighted sound pressure level that occurred for 90% of the time in a measurement period (the lowest 10 percentile of the measured noise levels). The **L₉₀** noise level is considered the background noise level.

SECTION 3 NOISE CRITERIA

3.1 Council requirements

Canterbury Bankstown Council requires the following in Chapter 10.1 “Centre-Based Child Care Facilities”, Section 5 of the DCP 2023 in relation to the noise emission from a childcare centre:

Acoustic privacy

Explanation

It is important to balance the operation of child care facilities with community expectations. To achieve this outcome, Council considers it necessary to limit the capacity of child care facilities if its activities, such as children playing outdoors, are to harmoniously co-exist with the surrounding residential amenity. This is the preferred outcome rather than resorting to noise attenuation walls.

Objectives

O1 To ensure child care facilities do not adversely impact on the residential amenity of adjoining dwellings and the surrounding area.

O2 To install appropriate acoustic privacy measures which are compatible with the prevailing character of residential areas.

Development controls

5.1 Air conditioning, mechanical ventilation or any other continuous noise source must not exceed the ambient level at any specified boundary by more than 5dB(A).

5.2 The location and design of child care facilities must consider the projection of noise from various activities to avoid any adverse impacts on the residential amenity of adjoining land.

For the purpose of this clause, Council requires applications to submit an Acoustic Report prepared by a suitably qualified acoustic consultant to determine:

- (a) existing noise levels at the identified sensitive receiver locations;*
- (b) likely noise levels to emanate from the child care facility at the identified sensitive receiver locations;*
- (c) whether the development must apply measures to ensure the noise of children playing in outdoor areas does not exceed 10dB(A) above the background noise level;*
- (d) whether the location and setbacks of the development are sufficient to protect the acoustic privacy of adjacent dwellings;*
- (e) whether the location of outdoor areas should avoid living areas and bedrooms of adjacent dwellings; and*
- (f) whether the development must install certain noise attenuation measures to protect the acoustic privacy of adjacent dwellings.*

The Acoustic Report must measure the noise readings over a 15 minute period and must provide details of all modelling assumptions including source noise data, noise monitoring positions, receiver heights and locations, prevailing meteorological conditions during the monitoring, confirmation of the methodology adopted along with a copy of the model input and output data.

5.3 The maximum height for noise attenuation walls and fences along the boundary of the site is 2m.

3.2 Association of Australian Acoustical Consultants Guideline

The "Childcare Centre Noise Assessment Technical Guideline" published by the Association of Australian Acoustical Consultants (AAAC), revised in October 2013, recommends the following for assessing the level of noise at 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 $L_{eq,15\text{ min}}$ 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 $L_{eq,15\text{ min}}$ 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, or
- on a balcony at 1.5 m above floor level, or
- 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.

Traffic Noise

Traffic noise on local roads generated by vehicles associated with the Childcare 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.

For proposals that are located within 60 metres of an arterial road or railway line, the AAAC Guideline recommends the following noise criteria:

Road, Rail Traffic and Industry

The noise level $L_{eq,1\text{ hour}}$ 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 $L_{eq,1\text{ hour}}$ 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).

3.3 State Environment Planning Policy (Transport and Infrastructure) 2021

The State Environment Planning Policy (Transport and Infrastructure) 2021 requires the following in relation to noise emission and noise intrusion into a childcare centre:

2.119 Impact of road noise or vibration on non-road development

(1) This clause applies to development for any of the following purposes that is on land in or adjacent to the road corridor for a freeway, a tollway or a transitway or any other road with an annual average daily traffic volume of more than 20,000 vehicles (based on the traffic volume data published on the website of TfNSW) and that the consent authority considers is likely to be adversely affected by road noise or vibration—

- (a) residential accommodation,*
- (b) a place of public worship,*
- (c) a hospital,*
- (d) an educational establishment or centre-based child care facility.*

(2) Before determining a development application for development to which this section applies, the consent authority must take into consideration any guidelines that are issued by the Secretary for the purposes of this section and published in the Gazette.

(3) If the development is for the purposes of residential accommodation, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded—

- (a) in any bedroom in the residential accommodation—35 dB(A) at any time between 10 pm and 7 am,*
- (b) anywhere else in the residential accommodation (other than a garage, kitchen, bathroom or hallway)—40 dB(A) at any time.*

(4) In this section, freeway, tollway and transitway have the same meanings as they have in the Roads Act 1993.

The State Environment Planning Policy (Transport and Infrastructure) 2021 requires the following in relation to noise emission from a child care centre (previously provided in the “State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017”):

Schedule 1 Exempt development—general

Air conditioning units

Noise level must not exceed 5dB above the rating background noise level when measured at the boundary of the most affected residential premises (or potentially most affected residential premises), determined in accordance with the Noise Policy.

Source noise must not exhibit tonal noise, as defined in the Noise Policy (being noise containing a prominent frequency and characterised by a definite pitch).

In these standards, the Noise Policy means the document entitled NSW Industrial Noise Policy (ISBN 0 7313 2715 2) published in January 2000 by the Environment Protection Authority.

Schedule 6 Complying development in schools—Chapter 3

6 Noise

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

3.4 Child Care Planning Guideline

The Child Care Planning Guideline was published by the NSW Government in August 2017. The Guideline provides considerations for visual privacy, to reduce noise intrusion into childcare centres and to minimise noise impact on neighbouring residential properties.

3.5 Required external noise reduction

Based on the noise criteria in Section 3.2 above, the required external noise reduction from outside to inside with the windows/doors closed is summarised in TABLE 3 below.

TABLE 3 – Required rail noise reduction

Location	External noise level	Indoor design sound level	Required noise reduction
Playrooms and sleeping areas	50 dB(A) L _{eq} , 1 hour Day (7 am – 6 pm)	40 dB(A) L _{eq} , 1 hour Day (7 am – 6 pm)	10 dB(A)

3.6 EPA project noise trigger levels

The NSW Environmental Protection Authority (EPA) published the Noise Guide for Local Government in 2013 and the Noise Policy for Industry (NPI) in 2017 to provide guidelines to assess the potential impact of noise from new and existing developments and includes a framework for considering feasible and reasonable noise mitigation measures.

The Guide refers to the NSW Industrial Noise Policy (EPA 2000), which has now been superseded by the NPI, for a definition of intrusive noise [Section 2.2.1 “Intrusive noise”, Noise Guide for Local Government].

The NPI specifically applies to industrial noise sources from activities listed in Schedule 1 of the POEO Act and regulated by the EPA. In the absence of Council noise criteria, the NPI is used in this report as a guide to assess the potential noise impact from the subject premises.

The NPI sets out a procedure to determine ‘project noise trigger levels’ relevant to a particular development. The project noise trigger level is a level that, if exceeded, would indicate a potential noise impact on the community. The project noise trigger level provides a benchmark or objective for assessing a proposal or site and is not intended for use as a mandatory requirement [Section 2.1 of the NPI].

The project noise trigger level is the lower (that is, the more stringent) value of the project *intrusiveness noise level* and project *amenity noise level* determined in this report.

The intrusiveness of a noise source may generally be considered acceptable if the level of noise from the source (represented by the L_{Aeq} descriptor), measured over a 15-minute period, does not exceed the background noise level by more than 5 dB when beyond a minimum threshold.

The noise levels are assessed at the reasonably most-affected point on or within the residential property boundary or, if that is more than 30 metres from the residence, at the reasonably most-affected point within 30 metres of the residence, but not closer than 3 metres to a reflective surface and at a height of between 1.2–1.5 metres above ground level [Section 2.6 of the NPI].

The measured rating background levels are given in Section 2 of this report. Table 2.2 “Amenity noise levels” of the Policy provides recommended amenity noise levels to protect residential premises in a suburban noise amenity area. The project noise trigger levels are summarised in TABLE 4 below.

TABLE 4 – EPA project noise trigger levels

Location	Period	Project amenity noise level L_{eq} (15 MINUTE)	Minimum project intrusiveness noise level L_{eq} (15 MINUTE)	Project noise trigger level L_{eq} (15 MINUTE)
Outside the nearby residences	Day (7 am – 6 pm)	53 dB(A) (= 55 – 5 + 3)	40 dB(A) (= 35 + 5)	40 dB(A)
Active recreation area (e.g. school playground)	When in use	53 dB(A) (= 55 – 5 + 3)	-	53 dB(A)

The Project Intrusiveness Noise Level also meets the recommendations in the ‘Noise Guide for Local Government’.

The NPI states that “where a noise source contains certain characteristics, such as tonality, intermittency, irregularity or dominant low-frequency content, there is evidence to suggest that it can cause greater annoyance than other noise at the same noise level” [Section C.1 of the NPI].

Correction factors are to be added to the measured or predicted noise levels at the receiver before comparison with the noise trigger levels. The level of noise from the activities at the proposed centre is likely to be without the above characteristics, and modifying factors are therefore not applicable.

3.7 Noise criteria

Based on the rating background noise levels in Section 2.1 of this report, the noise criteria for the noise emitted at the nearby residences are summarised in TABLE 5 below.

The cumulative noise impact of children playing indoors, carpark and the mechanical plant should comply with the noise trigger levels. The noise emission from children playing outdoors normally occurs at a different time and is assessed separately as recommended by the Childcare Centre Noise Assessment Technical Guideline published by the AAAC in Section 3.1 of this report.

TABLE 5 – Noise criteria for noise emission (7 am – 6 pm)

Receptor location	Activity	Noise criteria L_{eq} (15 Minute)
Outside nearby residences	- Children playing indoors - Cars entering/leaving - Mechanical plant	40 dB(A)
	Children playing outdoors	45 dB(A)

Provided the noise emission from the development complies with the above noise criteria, the noise emission will also comply with Council requirements.

The noise criteria for the noise intrusion into the playrooms and sleeping areas within the childcare centre, based on the AAAC requirements in Section 3.2 of this report, are summarised in TABLE 6 below.

TABLE 6 – Noise criteria for noise intrusion into the proposed childcare centre

Receptor location	Noise criteria L _{eq} (15 Minute)
Inside play and sleeping areas	40 dB(A)

Provided the noise emission from the development and the noise intrusion into the childcare centre complies with the noise criteria in TABLES 5 and 6 above, the noise emission and intrusion will meet the Council requirements.

SECTION 4 NOISE EMISSION

The noise measurements and assessment in this report were carried out in accordance with the Australian Standard AS1055:2018 "Acoustics - Description and measurement of environmental noise".

The sound pressure level at the receiver location is calculated using the following formula, based on International Standard ISO 9613-2:1996 "Acoustics – Attenuation of sound during propagation outdoor – Part 2: General method of calculation":

$$L_p = L_w - 20 \times \log_{10}(D) - 8 - A_{\text{barrier}}$$

where: L_p is the sound pressure level at the receiver location (dB);
 L_w is the sound power level of the noise source (dB);
 D is the distance between the noise source and the receiver location (m);
 A_{barrier} is the attenuation due to sound barrier between the noise source and the receiver.

The overall sound pressure level inside the rooms of the childcare centre was calculated using a room correction with an average sound absorption coefficient of 0.1.

The noise assessment was based on the architectural drawings by Campbell Hill Group PTY LTD, dated 11/10/2024, refer to the floor plans in Appendix B.

Sample calculations of the noise emission from the childcare centre, modelled using iNoise software¹, are shown in Appendix C.

4.1 Description of the proposed development

A new childcare centre is proposed to be built at 8 Robertson Road, Chester Hill. The centre will comprise four indoor playrooms, one cot room, three outdoor play areas and car parking in the basement. The centre will cater for up to 70 children aged 0 to 5 years.

The proposed operating hours of the centre are between 7 am and 6 pm, Monday to Friday.

The following noise sources have been identified as part of this development that may potentially affect the neighbouring properties:

- Children playing inside the playrooms
- Children playing outside in the outdoor areas
- Cars entering and leaving the carpark
- Air-conditioning plant

Service vehicles will include waste collection and is considered in Section 4.7 of this report. There will not be other regular service vehicles as part of this development.

¹ iNoise V2024.2 using ISO 9613.1/2. The outdoor play areas were modelled as an "Area Source" and the driveway as a "Line Source". A maximum distance of 1 metre between the point sources and a height of 1 and 1.2 metres were used in the Area and Line source calculations.

The noise emission is assessed at the following nearest potentially affected receptor locations, shown in Figure 3 below:

- Receptor locations 1a – 1c: outside the adjoining single-storey residence located along the southern boundary of the development site.
- Receptor location 2: outside the adjoining residence located along the western boundary of the development site.
- Receptor location 3: outside the window on the second floor of the residence located to the north of the development site.
- Receptor locations 4a – 4c: outside the adjoining single-storey residence located along the northern boundary of the development site.
- Receptor locations 5a and 5b: outside the residences located across Robertson Road to the east of the development site.

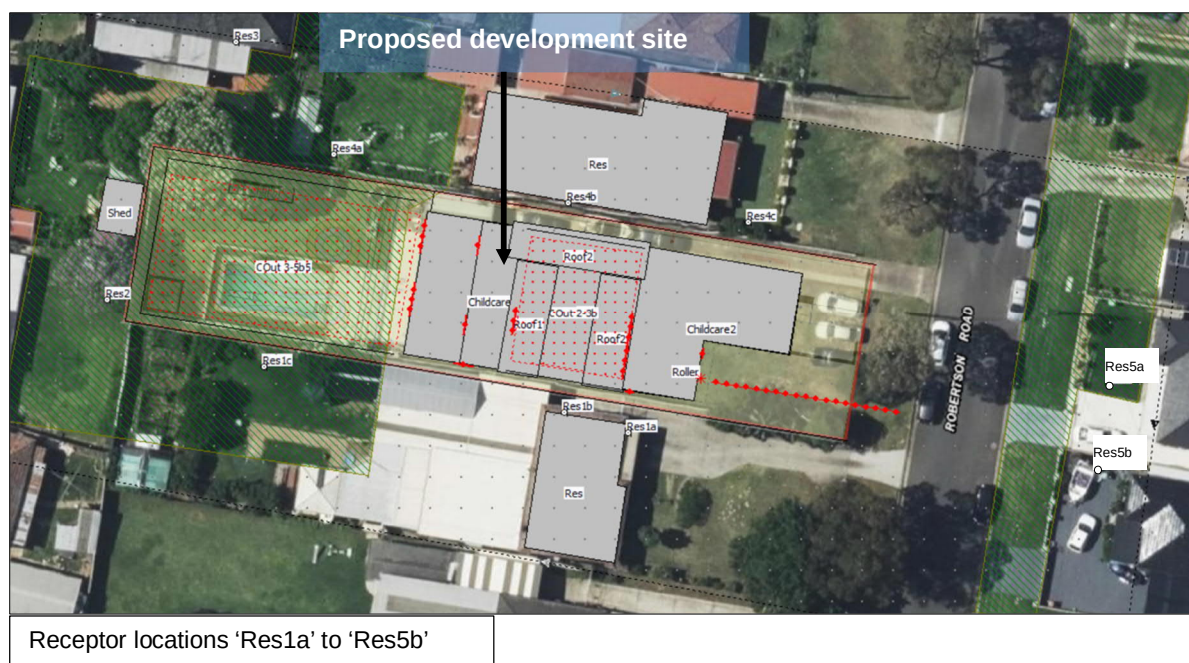


FIGURE 3 – Receptor locations

Provided the noise emission from the development complies with the noise criteria at the above receptor locations, the noise emission will also be acceptable at all other nearby properties.

4.2 Children playing – sound power levels

The centre will cater for up to 70 children as follows:

- 15 children aged 0 to 2 years
- 20 children aged 2 to 3 years
- 35 children aged 3 to 5 years

The children will be allowed to play inside the building and in the outdoor play areas. It is assumed that the internal space of the centre will be air-conditioned.

For assessing the typical worst possible noise emission from the childcare centre, 70 children were assumed to be playing inside the building or in the outdoor play areas at the same time. It is assumed that children will be allowed to play in the outdoor areas during the day only between 7 am and 6 pm.

Based on previous noise measurements at various childcare centres in Sydney and the sound levels provided by AAAC², the sound power levels for children playing are shown in TABLE 7 below.

The noise emission was modelled by equally distributing the children over the proposed outdoor area. On any single day, children are likely to be positioned in small groups at various locations in the outdoor play areas, however, when the scenarios are averaged over a longer period, the noise emission is likely to be equal to the noise emitted from children equally distributed over the outdoor areas.

TABLE 7 – Sound power levels of children playing

Description	Sound power levels, L_{eq} (15 MINUTE) dB at octave band centre frequencies (Hz)								
	63	125	250	500	1k	2k	4k	8k	dB(A)
15 children playing (0 – 2 years)	57	63	69	75	77	74	70	66	80
20 children playing (2 – 3 years)	64	70	76	82	84	81	77	63	88
35 children playing (3 – 5 years)	78	82	87	84	87	87	81	70	92

4.3 Children playing – outdoor play areas

The predicted L_{Aeq} levels of noise at the nearby residences, from children playing in the outdoor areas, are shown in TABLE 8 below.

TABLE 8 shows the noise levels with and without solid fences built along the boundaries of the outdoor play areas recommended in Section 5 of this report. The noise levels are calculated based on the sound power levels in TABLE 7 above.

The noise emission from children playing outdoors normally occurs at a different time than other activities at the Centre and is assessed separately in this Section, as recommended by the Childcare Centre Noise Assessment Technical Guideline in Section 3.2 of this report.

² Page 7 of the “Technical Guideline – Childcare Centre Noise Assessment” published by the Association of Australian Acoustical Consultants (AAAC). The overall sound power levels used in the noise assessment are equal to the median sound power levels provided in the AAAC Guideline.

Details of the calculated levels are shown in Appendix D.1. The receptor locations are described in Section 4.1 of this report.

A sample calculation of the noise emission from the outdoor play areas, modelled using iNoise software, is shown in Appendix C.1.

TABLE 8 – Predicted cumulative noise levels from the outdoor play areas

Receptor location	Calculated noise level, L_{eq} (15 Minute) dB(A) without noise controls	Calculated noise level, L_{eq} (15 Minute) dB(A) with noise controls	Noise criteria, dB(A)	Complies (Yes/No) with noise controls
Res1a	42	42	45	Yes
Res1b	46	46	45	Yes*
Res1c	52	47	45	Yes*
Res2	50	45	45	Yes
Res3	52	47	45	Yes*
Res4a	49	44	45	Yes
Res4b	44	43	45	Yes
Res4c	41	40	45	Yes
Res5a	28	25	45	Yes
Res5b	32	29	45	Yes

* An exceedance of up to 2 dB is not significant and is considered 'negligible' in the Noise Policy for Industry published by the NSW Environmental Protection Authority (EPA) [Section 4.2 of the NPI].

4.4 Children playing – indoor activity/playrooms

The predicted L_{eq} levels of noise from 70 children playing inside the playrooms, with the windows and external doors open, are shown in Section 4.8 below.

The noise levels are calculated based on the sound power levels in TABLE 7 above.

4.5 Carpark

A carpark will be located in the basement of the proposed centre. The cars will enter and leave the carpark via Robertson Road.

The NSW Roads and Maritime Services in their "Guide to Traffic Generating Developments" estimates a traffic generation rate for childcare centres of 0.23 vehicle trips per child at any one time. Based on 70 children in the proposed centre, an estimated 16 car trips per hour will occur between 7 am and 6 pm (equal to 4 car trips in 15 minutes).

Based on previous noise measurements of various carparks in Sydney, the sound power levels of the carpark are shown in TABLE 9 below³.

The noise levels are calculated based on the sound power levels in TABLE 9 below and with a 1.8-metre high solid fence along the southern boundary nearest to the carpark driveway.

It is assumed the roller door will open and close for each car entering and leaving the carpark.

The predicted $L_{eq, 15\text{-minutes}}$ noise levels from cars entering and leaving the premises and the carpark roller door are shown in Section 4.8 below.

TABLE 9 – $L_{Aeq, 15\text{ Minute}}$ sound power levels of driveway and roller door

Description	$L_{eq, 15\text{ Minute}}$ Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	63	125	250	500	1k	2k	4k	8k	dB(A)
Driveway (4 car trips in 15 minutes entering/ leaving the carpark)	86	82	79	75	76	72	68	60	80
Carpark roller door	61	56	59	59	67	62	61	56	70

4.6 Mechanical plant

The mechanical plant, including the air-conditioning plant, has not yet been selected for this development. Two air-conditioning outdoor condensing units are assumed to be located above the entrance to the carpark. The typical sound power levels of air-conditioning condensing units are shown in TABEL 10 below.

TABLE 10 – Sound power levels of condensing unit

Description	L_{eq} Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	63	125	250	500	1k	2k	4k	8k	dB(A)
Typical air-conditioning condensing unit	69	78	75	74	70	64	56	46	75

For two typical outdoor units, the predicted (calculated) cumulative L_{Aeq} noise levels are shown in Section 4.8 below.

³ The $L_{eq, 15\text{ minute}}$ sound power levels of cars travelling along the driveway is based on an overall sound power level of 85 dB(A) for one car which is estimated based on the average of mean energy emission levels taken in various locations in the U.S. and Europe, consisting of over 6000 pass-by events [Handbook of Noise and Vibration Control, Malcolm J. Crocker, John Wiley & Sons Inc., New Jersey, 2007, p.1429].

4.7 Waste collection

The Noise Guide for Local Government, published by the EPA, provides guidelines to reduce the potential impact of noise from waste collection and includes feasible and reasonable noise mitigation measures.

The following options to reduce the noise impact from waste collection are extracted from the Noise Guide [Case study 3: “Noise from garbage collection”, Section 3.6 of the Noise Guide for Local Government]:

- Negotiating a suitable time for waste collection that will minimise noise impact at the nearby residences.
- Discussing options for better management of the rubbish collection services with the rubbish contractor. Improved management practices could include:
 - relocating where the collection occurs
 - building noise barriers for the collection area
 - using up-to-date equipment that uses ‘quieter’ technology such as low-noise bin lifters
 - maintaining rubbish trucks and braking materials to minimise or eliminate noise such as squeaky brakes
 - educating drivers and collectors to be careful and to implement quiet work practices
- Taking such practicable means as may be necessary to prevent, control or minimise the emission of noise.

4.8 Predicted cumulative noise levels

The predicted cumulative L_{Aeq} levels of noise at the nearest receptor locations from the proposed childcare centre, with the recommended noise controls in Section 5 of this report, are summarised in TABLE 11 below.

Details of the calculated levels are shown in Appendix D.2. The receptor locations are described in Section 4.1 of this report.

The predicted noise levels comply with the noise criteria in Section 3 of this report at the nearest receptor locations.

A sample calculation of the noise emission from the proposed childcare centre, including the playrooms, carpark, driveway and air-conditioning units, modelled using iNoise software, is shown in Appendix C.2.

The noise emission from children playing outdoors normally occurs at a different time and is assessed separately in Section 4.3 of this report, as recommended by the Childcare Centre Noise Assessment Technical Guideline in Section 3.2.

TABLE 11 – Predicted cumulative noise levels from the childcare centre

Receptor Location	Calculated noise level, L _{eq} (15 Minute) dB(A) with open windows and doors	Calculated noise level, L _{eq} (15 Minute) dB(A) with closed windows and doors	Noise Criteria, dB(A)	Complies (Yes/No) with closed windows and doors
Res1a	46	39	40	Yes
Res1b	47	34	40	Yes
Res1c	48	28	40	Yes
Res2	41	20	40	Yes
Res3	47	26	40	Yes
Res4a	47	28	40	Yes
Res4b	41	24	40	Yes
Res4c	38	27	40	Yes
Res5a	38	38	40	Yes
Res5b	41	41	40	Yes*

* An exceedance of up to 2 dB is not significant and is considered 'negligible' in the Noise Policy for Industry published by the NSW Environmental Protection Authority (EPA) [Section 4.2 of the NPI].

SECTION 5 NOISE CONTROL RECOMMENDATIONS

It is recommended that the following noise controls be implemented to reduce the noise from the railway line and to reduce the noise emission from the proposed childcare centre to comply with the noise criteria in Section 3 of this report.

5.1 Noise management controls

The following noise management controls are recommended to reduce the noise emission from the outdoor play areas:

- The outdoor play areas may be used during the day only, between 7 am and 6 pm.
- The outdoor play area next to the 0 – 2 playroom may be used by up to 15 children aged 0 to 2 years.
- The outdoor play area on the first floor, next to the 2 – 3 playrooms, may be used by up to 20 children aged 2 to 5 years.
- The main outdoor play area next to the 3 – 5 playroom may be used by up to **10 children aged 2 to 5 years at any one time**. This will minimise the noise emission from children playing in the main outdoor area outside the nearby residences.
- Crying children should be taken inside the centre.
- Amplified sound and music should not be played in the outdoor play areas.
- It is recommended that the windows and external doors of the playrooms be closed while children are playing inside and during activities with high levels of noise, such as a TV or amplified music playing inside, to reduce the noise emission at the adjoining residences.

5.2 Sound barrier walls

It is recommended that a **2-metre high sound barrier wall** be constructed along the boundaries of the outdoor play areas as shown in Appendix B.

It is recommended that an additional **2.4-metre high sound barrier wall** be constructed within the premises near the northern boundary of the main outdoor play area as shown in Appendix B. This barrier wall may not be built along the boundary since Council allows a maximum 2 metre high wall along the boundaries. The existing or 1.8 metre solid fence is acceptable along the northern boundary.

It is recommended that a 1.8-metre high sound barrier wall be constructed along the southern boundary next to the driveway as shown in Appendix B.

The sound barrier walls should be constructed from Colorbond, lapped and capped timber fence, masonry, minimum 10 mm thick plexiglass or 6.4 mm thick laminated glass.

The height of the sound barrier walls, recommended above, is from the existing ground level. The sound barrier wall should be increased if the site is excavated, and the sound barrier wall is installed at a lower ground level.

The 2.4 metre high sound barrier wall may comprise a 2.4 metre vertical wall or a sloping section built on top of a 1.8 or 2.1 metre vertical wall, as shown in Figure 4 below.

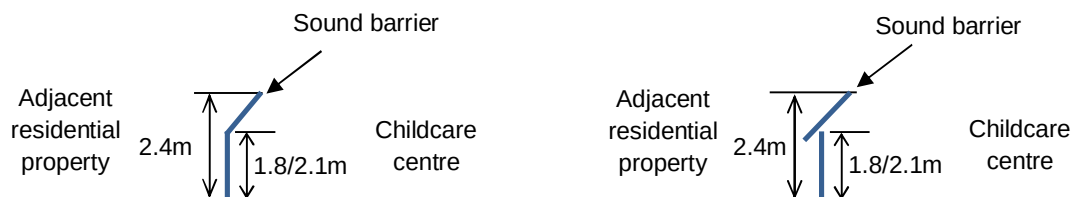


FIGURE 4 – Sound barrier wall options

5.3 Building construction

Standard building constructions, including standard windows and external doors, will be acoustically acceptable.

5.4 Mechanical ventilation

The windows and external doors of the playrooms fronting the road will need to be closed to reduce the external road traffic noise inside the centre. These rooms will therefore be required to be mechanically ventilated to comply with the Building Code of Australia.

5.5 Mechanical plant

The mechanical plant, including the air conditioning plant, has not yet been selected for this development. It is recommended that the noise emission from the mechanical plant be assessed at the Construction Certificate stage and/or once the plant selection is finalised.

For typical outdoor condensing units with a sound power level of up to 75 dB(A), installed in the basement or along the eastern side of the building and at least 5 metres away from the residential boundary, the noise emission will comply with the noise criteria in Section 3 of this report and additional noise controls will not be required.

It is feasible to reduce the noise emission from the mechanical plant, such as the carpark ventilation plant, using internally lined ductwork and/or silencers.

Notwithstanding this, the noise emission from any air conditioning unit(s) and the mechanical plant should be acoustically treated to reduce the noise emission level at the neighbouring properties to levels complying with the noise criteria in Section 3 of this report.

5.6 Waste collection

It is recommended that waste collection be carried out during the daytime or evening between 7 am and 8 pm.

The collectors should be instructed to implement quiet work practices since the centre is located adjacent to residential premises.

5.7 Managing a noise complaint

It is recommended that attended noise monitoring be carried out should there be a noise complaint and appropriate measures be taken to reduce the noise to comply with the noise criteria.

Contact phone number should be displayed at the front of the premises and the management should nominate a representative to manage noise complaints. Complainants should be informed that their complaints are being addressed and that action is being taken to reduce the noise emission.

SECTION 6 CONCLUSION

An acoustical investigation of the noise emission from the proposed childcare centre at 8 Robertson Road, Chester Hill has been carried out to assess the impact on the nearby residential premises.

Provided the noise control recommendations in Section 5 of this report are implemented, the level of noise emitted by the proposal will comply with the noise limits required by Council, detailed in Section 3 of this report.

Standard building construction will be acoustically acceptable to reduce the noise emission from the playrooms and to reduce the external noise intrusion within the playrooms to meet the noise criteria in Section 3.

Report prepared by
DK Acoustics Pty Ltd



Danny Kastak, BE, MEngSc., MIEAust., MAAS
Senior Acoustical Engineer

MEMBERSHIPS

Member of the Australian Acoustical Society and the Institute of Engineers, Australia and a consulting acoustical engineer since 1997. The work in this report has been performed in accordance with the terms of these memberships.

QUALIFICATIONS

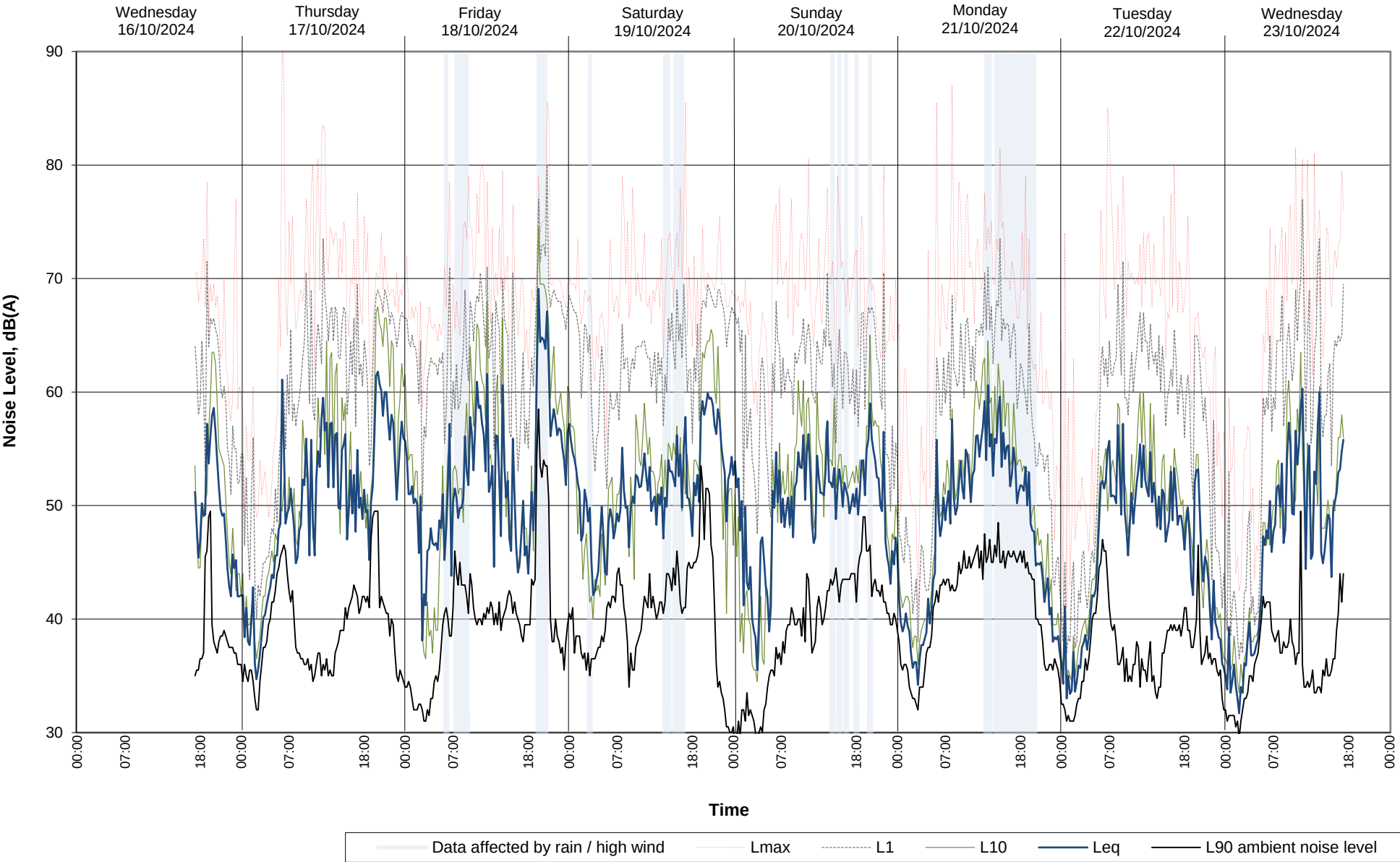
Bachelor of Engineering, The University of New South Wales, 1993.
Master of Engineering Science, The University of New South Wales, 1996.

Attachments:

Appendix A – Ambient noise survey
Appendix B – Architectural floor plans
Appendix C – Sample calculations of the predicted noise levels
Appendix D – Predicted cumulative noise levels

AMBIENT NOISE SURVEY

Noise monitor location: 8 Robertson Road, Chester Hill





S	SINK
↓	REDUCED LEVEL
S/O	STOVE/OVEN COOKTOP
(SA)	SMOKE ALARM
W	WASHING MACHINE
D	DRYER
F	FRIDGE
DW	DISHWASHER
(DP)	DOWNPIPE
T.O.R	TOP OF ROOF
T.O.P	TOP OF PARAPET
B.I.R	BUILD IN ROBE
W.I.R	WALK IN ROBE
→	WATER FLOW DIRECTION
X°	ROOF PITCH
(FW)	FLOOR WASTE
L/C	LINEN CUPBOARD
P.O.S	PRIVATE OPEN SPACE
LP	LIGHT POLE

GENERAL NOTES

- THE BUILDER SHALL CHECK AND VERIFY ALL DIMENSIONS AND VERIFY ALL ERRORS AND OMISSIONS TO THE ARCHITECT. DO NOT SCALE THE DRAWINGS. DRAWINGS SHALL NOT BE USED FOR CONSTRUCTION PURPOSES UNTIL ISSUED BY THE ARCHITECT FOR CONSTRUCTION.
- CHECK ALL DIMENSIONS ON THE JOB PRIOR TO COMMENCEMENT OF KITCHEN DRAWINGS OR FABRICATION. ANY DISCREPANCIES TO BE REFERRED TO THE ARCHITECT/ENGINEER/DESIGNER PRIOR TO COMMENCEMENT OF WORK.
- ALL WORK TO BE IN ACCORDANCE WITH THE BUILDING CODE OF AUSTRALIA, WINDOW DESIGN STANDARDS, THE LOCAL COUNCIL AND AUSTRALIAN STANDARDS.
- ALL DRAWINGS SHOULD BE READ IN CONJUNCTION WITH ARCHITECTURAL SPECIFICATION AND SCHEDULES, CONSULTANTS DOCUMENTATION.
- DRAWINGS ARE NOT TO BE SCALED FOR DIMENSIONING PURPOSES, FIGURED DIMENSIONS SHALL PREVAIL.
- FOOTINGS AND BEAMS TO ENGINEERS DRAWING AND DETAIL.
- TIMBER USED SHALL BE IN ACCORDANCE WITH AS 1684 OF TIMBER FRAMING CODE.
- PROVIDE 50mm SETDOWN TO SLAB TO WET AREA (GROUND FLOOR).
- WET AREAS TO BE IN ACCORDANCE WITH AS3740 WATERPROOFING OF WET AREAS WITHIN RESIDENTIAL BUILDINGS.
- SMOKE ALARMS ARE TO BE INSTALLED IN ACCORDANCE WITH AS3786. ALARMS TO BE POSITIONED ON THE CEILING AND SET BACK A MINIMUM DISTANCE 300mm FROM ANY WALL.
- ALL GROUND LINES ARE APPROXIMATE ONLY AND ARE TO BE VERIFIED ON SITE.
- ALL WINDOW SIZES ARE APPROXIMATE ONLY AND FINAL SIZES MUST BE DETERMINED BY THE BUILDER.
- CONCEALED METAL FASTENED SHEET TO BE USED FOR ALL SKILLION ROOF COVERING.

REVISION	NAME	DATE
REVISION A - CONCEPT	M.N	00/00/00
REVISION A - CONCEPT	M.N	00/00/00
REVISION B - PRINCIPLE PLANS	K.N	24/09/24
REVISION D - 3A ISSUE	M.M	11/10/24

CAMPBELL HILL
GROUP PTY LTD.
Contact: 0433 375 386
Email: campbellhillgroup@hotmail.com

bdac
BUILDING DESIGNERS
ASSOCIATION OF AUSTRALIA

Client
NAME

Project Name
CHILDCARE

At
8 ROBERSTON RD, CHESTER HILL

Drawing Title:
- Internal Play Area Plan
Ground Floor, First Floor

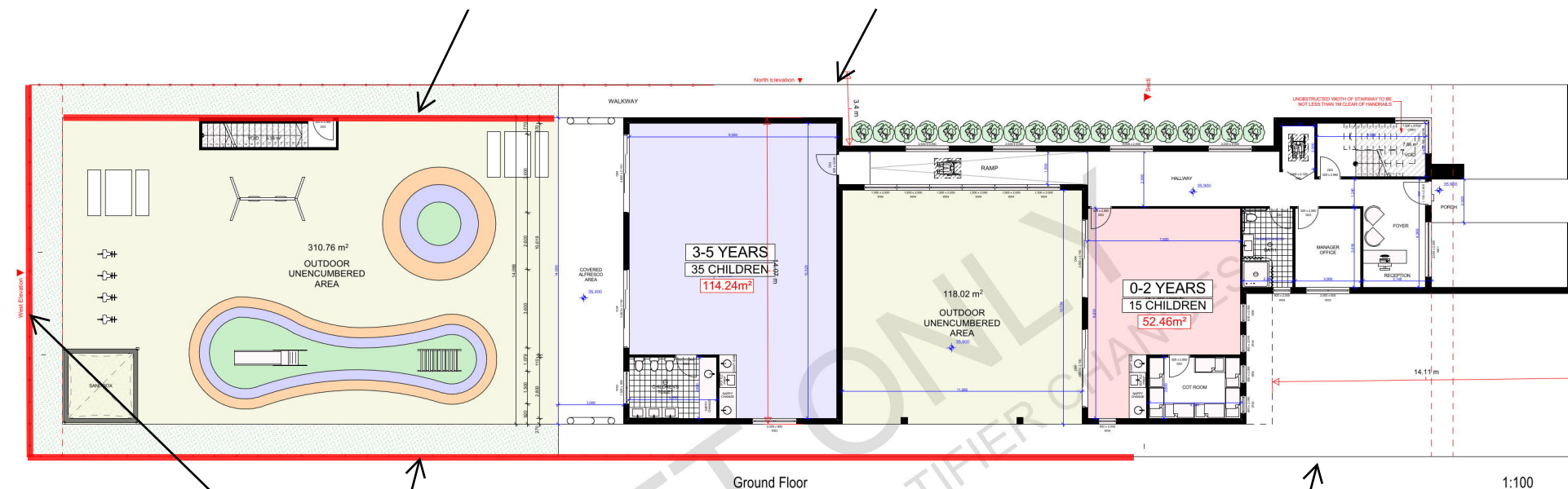
BOAA ACCREDITATION NO: 6455 Scale: As Noted A1
Designed By: M.N

Project No: # Drawing No: 17

Date: 11/10/2024

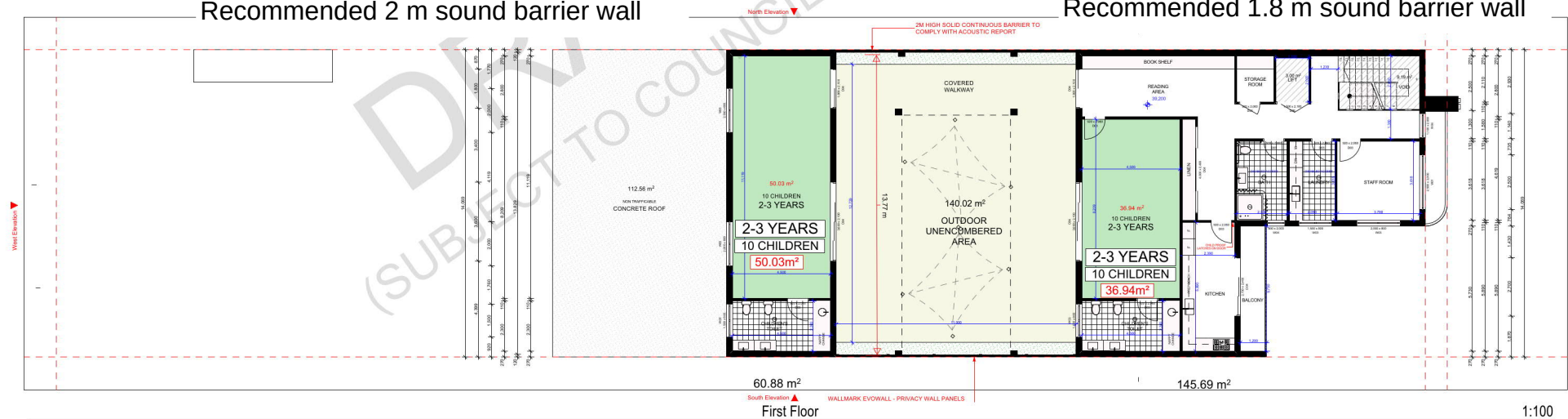
Recommended 2.4 m sound barrier wall

Existing or 1.8 m sound barrier wall
(northern boundary)



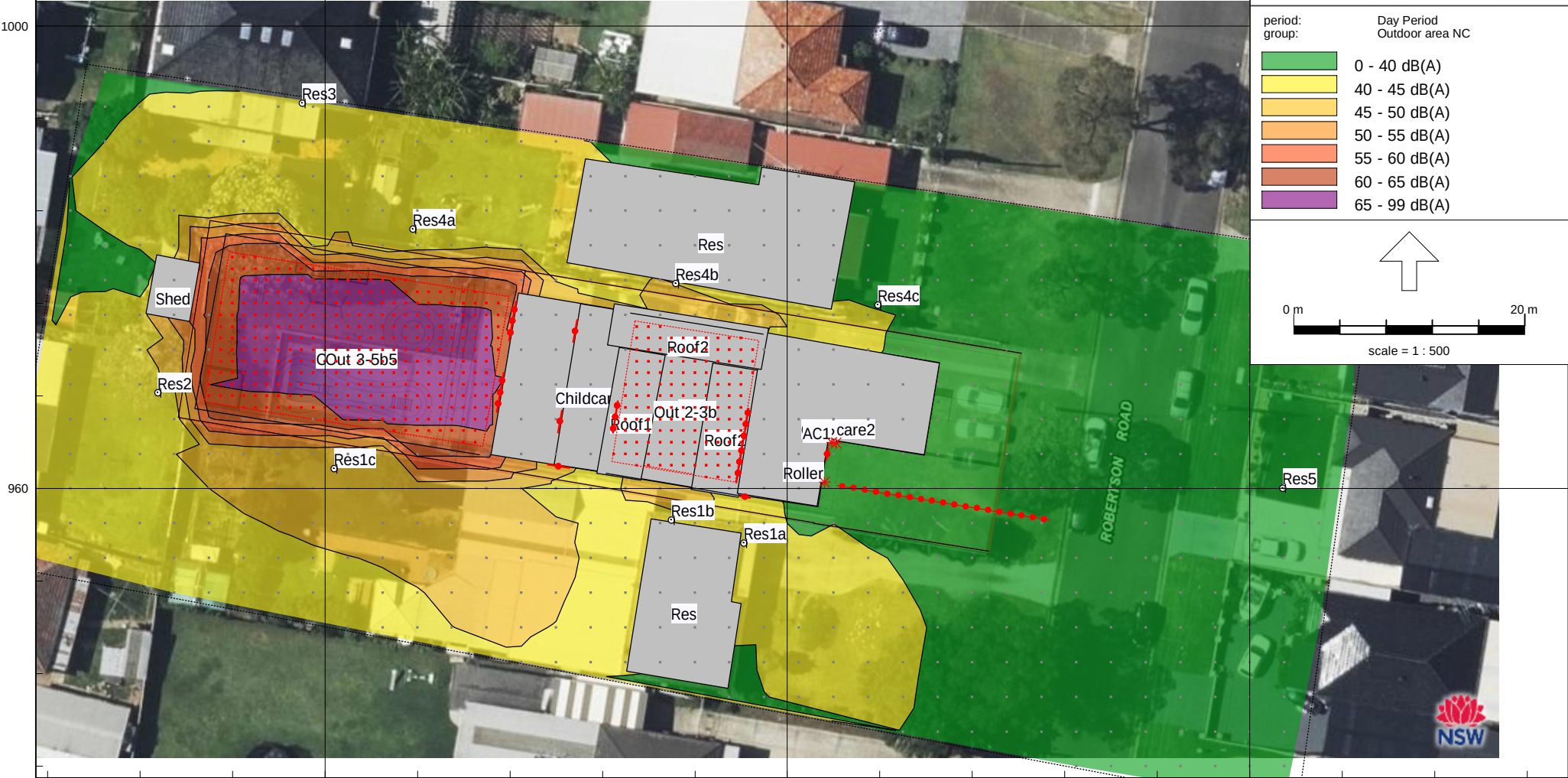
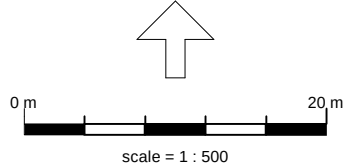
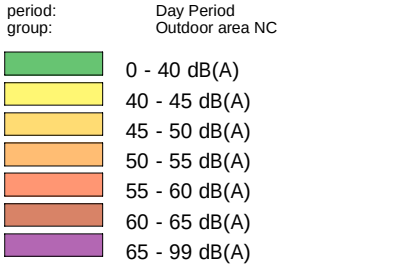
Recommended 2 m sound barrier wall

Recommended 1.8 m sound barrier wall



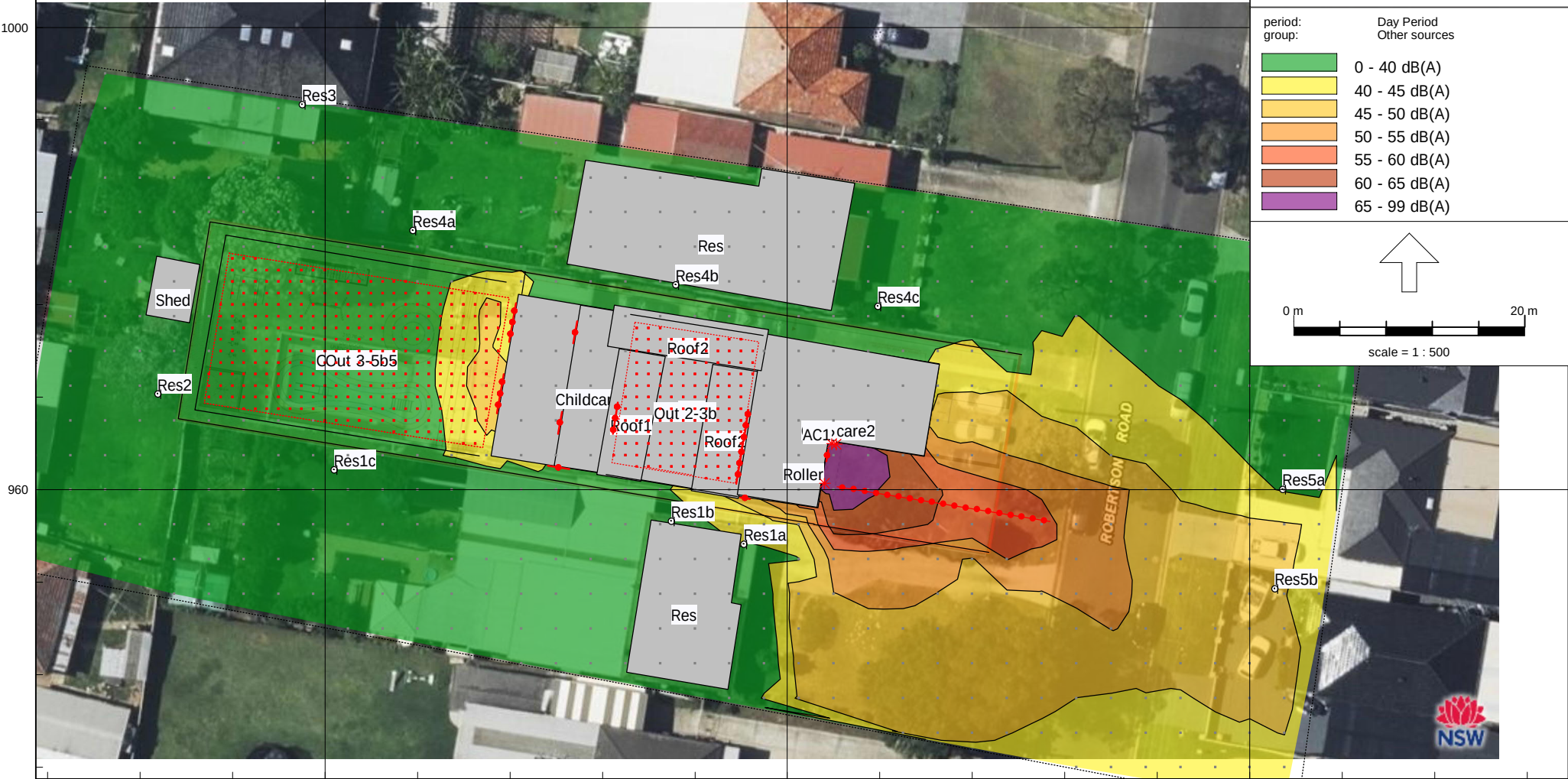
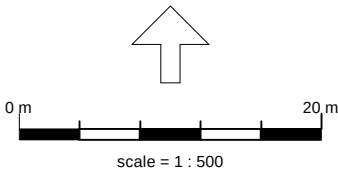
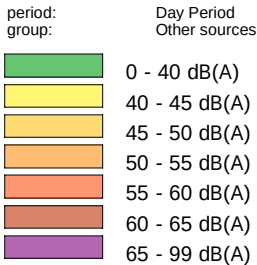
Calculated noise emission levels from the proposed outdoor play areas, 1.5 metres above the ground.

- Area sources
- Area source points
- Detail point sources
- Emitting facades
- Line sources
- Point sources
- Grids
- Grid points
- Barriers
- Buildings



Calculated noise emission levels from the proposed childcare centre, driveway, carpark roller door, indoor play areas, and air-conditioning units, 1.5 metres above the ground.

- Area sources
- Area source points
- Detail point sources
- Emitting facades
- Line sources
- Point sources
- Grids
- Grid points
- Barriers
- Buildings



Predicted cumulative noise levels from the outdoor play areas

	Calculated L_{eq} (15 Minute) Noise Level, dB(A), at Receptor Locations 1 to 14 ⁽¹⁾									
Activity	Res1a	Res1b	Res1c	Res2	Res3	Res4a	Res4b	Res4c	Res5a	Res5b
Outdoor play area with 15 children, 0 – 2 years old, on the ground floor	35	43	22	14	15	19	27	23	13	14
Outdoor play area with 20 children, 2 – 5 years old, on the first floor	41	42	34	23	33	29	42	40	23	27
Outdoor play area with 10 children, 3 – 5 years old, main outdoor play area	24	35	47	45	47	44	35	23	20	25
TOTAL	42	46	47	45	47	44	43	40	25	29
Noise Criteria (7 am – 6 pm)	45	45	45	45	45	45	45	45	45	45
Complies (Yes/No)	Yes	Yes ⁽²⁾	Yes ⁽²⁾	Yes	Yes ⁽²⁾	Yes	Yes	Yes	Yes	Yes

⁽¹⁾ Refer to the description of the receptor locations in Section 4.1 of this report.

⁽²⁾ An exceedance of up to 2 dB is not significant and is considered 'negligible' in the Noise Policy for Industry published by the NSW Environmental Protection Authority (EPA) [Section 4.2 of the NPI].

The noise levels are calculated using the iNoise software.

Predicted cumulative noise levels from the childcare centre

	Calculated noise level, L_{eq} (15 Minute) dB(A), at receptor locations*									
Activity	Res1a	Res1b	Res1c	Res2	Res3	Res4a	Res4b	Res4c	Res5a	Res5b
Air-conditioning units (2 x 75 dB(A) SWL)	33	28	16	10	11	13	21	25	32	40
Children playing inside the indoor play areas, noise transmitted through open sliding doors	34	30	27	19	26	28	20	15	20	23
Cars entering/leaving the carpark	35	30	17	7	7	8	13	19	35	35
Carpark roller door	24	18	7	1	3	6	11	16	31	31
TOTAL	39	34	28	20	26	28	24	27	38	41
Noise Criteria (7 am – 6 pm)	40	40	40	40	40	40	40	40	40	40
Complies (Yes/No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

* Refer to the description of the receptor locations in Section 4.1 of this report.

The noise levels are calculated using the iNoise software.