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Proposed Childcare Facility

141 & 143 Vines Road, Hamlyn Heights

Acoustic Report

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MEMBER FIRM OF THE ASSOCIATION OF AUSTRALASIAN ACOUSTICAL CONSULTANTS

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The findings of any assessment and/or recommendations provided within this document are based on noise and vibration factors only.

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This may include but is not limited to structural engineers, mechanical services engineers etc.

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1. Introduction

The proposal includes the construction and operation of a childcare centre at the site described as 141 and 143 Vines Road, Hamlyn Heights. The facility includes internal and external areas where children will occupy and play, as well as an external car park and driveway abutting Waiora Avenue to the south.

The proposed facility will accommodate 109 children in the age range of 0-5 years with operating hours of 6:30am to 6:30pm Monday to Friday.

The subject site is in proximity to existing residential use and therefore has the potential to generate noise emissions which may impact on the acoustic amenity of the surrounding uses.

In consideration of the above, Watson Moss Growcott Acoustics (WMG) has been engaged to review the proposal and provide commentary regarding potential noise emissions and intrusion at the subject site.

This report presents a summary of the assessment and includes practical noise mitigation strategies within Section 10 to minimise noise emissions from the site where appropriate.

2. Noise Assessment Terminology

Noise assessment terminology used within this report is defined within Table 1 below.

Table 1: Noise Assessment Terminology

Terminology	Definition
dB(A)	Decibels recorded on a sound level meter, which has had its frequency response modified electronically to an international standard, to quantify the average human loudness response to sounds of different character
L_{eq}	The equivalent continuous level that would have the same total acoustic energy over the measurement period as the actual varying noise level under consideration. It is the noise measure defined by the EPA as the measure of the noise to use in assessing compliance with noise limits.
L_{90}	The level exceeded for 90% of the measurement period, which is representative of the typical lower levels in a varying noise environment. It is the noise measure defined by the EPA as the measure of the background noise level to use in determining noise limits.
L_{10}	Commonly described as the average of the higher levels of a range of noise levels. It is the value of a range of values exceeded for 10% of the observation period, i.e. the level exceeded for 6 minutes for every 60 minutes of observation.
L_{max}	The highest instantaneous maximum 'A weighted' noise level.
Sound Power Level (Lw)	The sound power level of a source is a measure of the amount of energy in the form of sound emitted from the source. The sound power level of a source is an inherent characteristic of that source and does not vary with distance from the source or with a different acoustic environment. The sound power level equals the sound pressure level at a distance from the source plus 10 times the logarithm (to base 10) of the measurement surface area (m^2), and is relative to a reference sound power of 1pW, (10-12 Watts).
Sound Pressure Level (Lp)	Sound that we can hear with our ears or measure with a sound level meter is actually small variations in the pressure of the air around us. The magnitude of the pressure fluctuations vary over a very wide range from the very lowest levels we can just hear to the very high levels we need to be protected from, and for that reason sound is measured on a logarithmic scale. The sound pressure level equals 10 times the logarithm (to base 10) of the sound pressure divided by a reference pressure, which is 20 µPa. The sound pressure level reduces with increasing distance from a source and is influenced by the surroundings.

3. Measurement Equipment

As part of the assessment works, WMG used the equipment described in Table 2 below.

Table 2: Measurement Equipment List

Equipment Designation	Use of Equipment
Rion NA27 Precision Sound Level Meter	Handheld Noise Measurements
Ngara Real Time Sound Acquisition System	Fixed Position Unattended Noise Monitoring

Field calibration of the measurement equipment was checked with a Bruel & Kjaer Type 4230 Sound Level Calibrator at the commencement and completion of the measurements and found to be within the correct calibration range.

4. Site and Surrounding Environment

The site is located at 141 and 143 Vines Road and abuts existing residential dwellings to the north and east, Waiora Avenue to the south, and Vines Road to the west.

Due to their proximity to the subject site, the critical residential receptors have been identified as follows:

- **R1**: Single level dwelling – 145 Vines Rd.
- **R2**: Single level dwelling – 24 Waiora Ave.
- **R3**: Single level dwelling – 33 Waiora Ave.
- **R4**: Single level dwelling – 139 Vines Rd.
- **R5**: Single level dwelling – 122 Vines Rd.

The aerial photo shown below in Figure 1 identifies the subject site and the nearby sensitive receptors of relevance.

Figure 1: Aerial photo of subject site and surrounding environment

5. Proposed Site Layout and Operations

As part of the proposal, WMG has reviewed the architectural drawings prepared by 'On Architecture'.

These drawings and attached in Appendix 1.

The drawings indicate that the proposal includes a two-level building incorporating six activity rooms, combined with a planning room, parents room, offices, laundry, kitchen, staff room as well as a reception area.

The use will also include an outdoor play area along the southwestern, western, northern and northwestern boundary as well as towards the eastern side of the proposed building at the first level.

The site car park will be located adjacent to the eastern site boundary and will be accessed via Waiora Avenue to the south. It is understood that the car park will be used for pick-up/drop-off, staff parking and waste collection.

The current design includes the construction of fencing at the perimeter of the outdoor play areas including at ground level and first floor level.

Based on the documentation provided, the facility will accommodate up to 109 children in the age range of 0-5 years and includes proposed operating hours of 6:30am to 6:30pm Monday to Friday.

6. Outdoor Play Noise Assessment Guideline Discussion

Many previous VCAT determinations for childcare centres have repeatedly reinforced the principle that centres can and should be a compatible use within residential areas.

In support of the above, WMG has previously provided recommendations for practical noise control screening for outdoor play areas to minimise the potential for adverse noise changes when assessed at existing residences.

In the absence of quantitative noise assessment procedures within the legislative framework, several members of the Association of Australasian Acoustical Consultants (AAAC) in NSW developed a qualitative assessment procedure.

This procedure was adopted as a AAAC guideline published document and has included updates during October 2013 and in September 2020.

The guidance in the AAAC document indicates that noise associated with children playing in outdoor areas should not exceed ambient background noise levels by more than 5-10 dB(A) depending on the usage of the outdoor play area.

Previous iterations of the Guideline have nominated more restrictive assessment criteria for centres where children play outside for greater than 2 hours per day. The practical experience of this firm and others adopting the assessment procedures often resulted in a perceived need for excessively tall noise barriers due to typical usage of outdoor areas including greater than 2 hours per day.

The latest iteration of the Guideline has now set a threshold of 4 total hours including 2 hours of play in the morning and 2 hours of play in the afternoon.

Where children play outdoors for less than 4 hours during the day (2 in the morning, 2 in the afternoon), the Guideline nominates that noise emissions should not exceed the background noise level by more than 10 dB. For greater than 4 hours, the nominated criteria is reduced to 5 dB above the background noise level.

For the proposed childcare use and many others, there may be instances where the intent will be for children to play outdoors for greater than 4 hours, and hence the guideline assessment procedures would apply the more restrictive criterion of background noise + 5dB.

Whilst acknowledging that the AAAC Guideline is of assistance for understanding potential noise emissions, previous VCAT determinations, including Tamoe Investments Pty Ltd v Glen Eira CC [2015] VCAT 719, have identified that the document is not a reference document in the Scheme nor is it an adopted Policy of Council.

In addition to the above, there are various determinations and approvals from Council and VCAT including Rosenberg v Glen Eira [2016] VCAT 1433 which have considered the background noise + 5 dB criteria as conservative given that childcare centre use is typically limited to the weekday daytime periods only, and occupation of outdoor areas is often intermittent rather than continuous.

Residual noise levels at sensitive receptors equivalent to the background + 10dB guideline value have commonly been considered as appropriate by relevant Authorities including Council and VCAT.

For this project, WMG has reverted to the general principle of including practical height noise barriers around outdoor play areas which will be occupied by children and has then considered the outcomes at sensitive receptors relative to the guidance provided within the AAAC documentation.

7. Site Investigations and Existing Acoustic Environment

As part of investigations for the proposal, WMG has attended the site and has undertaken attended and unattended noise monitoring within the boundaries of the site land and within the surrounding area.

The noise monitoring was undertaken during the period Monday 31st March to Monday 7th April 2025 and included continuous measurement of noise levels and recording of audio files.

The noise level data obtained as part of the unattended monitoring is included within Appendix 2.

The unattended noise monitoring location was selected to be generally representative of the acoustic environment at the closest sensitive receptor locations adjacent to the eastern site boundary.

Supplementary attended noise measurements were also carried out to the southwest and southeast of the subject site in order to consider variations in the acoustic environment at all relevant nearby sensitive receptor locations.

Figure 2 provides an aerial photo of the site including the attended and unattended monitoring locations. The results of the ambient noise monitoring are included in Table 3 within section 8.2.

Figure 2: Aerial photograph including monitoring locations

8. Noise Emission Assessment

8.1. Noise Prediction Methodology

Modelling of operational noise emissions from the site has been conducted using DataKustik CadnaA environmental noise modelling software. Relevant information regarding site land elevations and site buildings, and the surrounding environment has been sourced from online databases including Nearmaps, VicMaps and topography from the ANZLIC Committee on Surveying and Mapping.

It is noted that the existing site land and surrounds included varying land heights. The model has adopted the natural land height obtained from online sources.

For this assessment, the modelling software has implemented the calculation procedures defined within International Standard ISO 9613-2. This Standard has been considered and approved as part of many previous projects requiring noise emission assessment works.

Through implementation of the standard, the noise model considers the following attenuation:

- Geometrical spreading.
- Atmospheric absorption.
- Ground attenuation.
- Meteorological effects.
- Source/receiver height effects.
- Attenuation due to the surrounding environment including existing buildings/structures.

The modelling input parameters also incorporate assessment methodology requirements of EPA Victoria including:

- Residual noise levels at noise sensitive receptor locations have been considered when weather conditions assist with propagation of emissions in the direction of the relevant receptor.
- Predicted values have been considered within 10 metres of the noise sensitive external facades.

After site investigations, it was apparent that all nearby relevant residential receptors are of single-level construction.

In consideration of the above, and for the purposes of this assessment, WMG has adopted an assessment height of 1.50m above ground level for single level dwellings.

The above approach has been considered and approved as part of assessments of a similar nature where information regarding the height of sensitive windows at receptor buildings is unknown.

8.2. Assessment of Noise Emissions due to Children Playing in Outdoor Area

8.2.1. AAAC Assessment Guidelines

In accordance with AAAC guideline documentation, the ambient background noise levels during assessment periods outlined in the Regulation/Guideline for each State or Territory are considered appropriate for setting noise emission criteria for children playing in outdoor areas at the centre.

EPA Regulations nominate the 'day' period as 7:00am to 6:00pm Monday to Saturday which generally aligns with the operating hours of the centre which operates Monday to Friday.

It is noted that proposed facility operating hours commence at 6:30am, however, it is understood that children will not be within outdoor areas at these times. In consideration of the above, the period 7:00am to 6:00pm, Monday to Friday, has been adopted as the basis for the assessment.

A summary of the ambient background noise levels measured by the unattended monitoring device during the 'day' period is included within Table 3 below.

Table 3: Summary of measured ambient background noise levels – Unattended Noise Monitoring

Day / Date	Measured Ambient Background Noise Level (7:00am to 6:00pm)	Weather Conditions / Comments
Monday 31st March 2025	Full day not captured	N / A
Tuesday 1st April 2025	44 dB(A) L_{90}	Moderate – High breeze, no rain. Contributions from nearby trees rustling under high breeze conditions.
Wednesday 2nd April 2025	41 dB(A) L_{90}	Light – Moderate breeze, no rain.
Thursday 3rd April 2025	43 dB(A) L_{90}	Moderate – High breeze, no rain. Contributions from nearby trees rustling under high breeze conditions.
Friday 4th April 2025	41 dB(A) L_{90}	Light – Moderate breeze, no rain.
Saturday 5th April 2025	43 dB(A) L_{90}	Moderate – High breeze, no rain. Contributions from nearby trees rustling under high breeze conditions.
Sunday 6th April 2025	45 dB(A) L_{90}	Moderate – High breeze, light rain. Contributions from nearby trees rustling under high breeze conditions.
Monday 7th April 2025	Full day not captured	N / A

Through analysis of audio files recorded as part of the continuous monitoring, WMG has concluded that the acoustic environment at the subject site is generally dominated by traffic movements along Vines Road and Ballarat Road.

On occasion, extraneous noise associated with trees rustling under higher breeze conditions contributed to the overall acoustic environment when measured at the unattended noise monitoring location.

In consideration of the above, WMG focused on the unattended noise monitoring data obtained during periods when weather did not adversely impact the measured noise levels, as well as the data collected as part of the supplementary attended measurements undertaken on Monday 7th April during retrieval of the monitoring equipment.

The supplementary attended measurements were undertaken at locations which were considered representative of the acoustic environment at nearby sensitive receptors and have been summarised in Table 4 below.

Table 4: Summary of measured ambient background noise levels – Attended Noise Monitoring Monday 7th April

Time of Measurement	Representative Location	Measured Noise Level	Comments
11:09am	**Rear of R1 – R2** (Attended Location 1)	42 dB(A) L_{90}	Noise associated with traffic movements along Vines Rd & Ballarat Rd dominant.
11:19am	**Front of R3 – R4** (Attended Location 2)	45 dB(A) L_{90}	Noise associated with traffic movements along Vines Rd & Ballarat Rd dominant.
11:29am	**Front of R5** (Attended Location 3)	50 dB(A) L_{90}	Noise associated with traffic movements along Vines Rd & Ballarat Rd dominant.

The observed weather conditions during the attended assessment consisted of a just-detectable westerly breeze, with the acoustic environment generally dominated by noise due to traffic movements along Vines Rd and Ballarat Rd.

Minor contributions associated with nearby birds and insects were observed for all attended measurement locations.

The measured ambient background noise levels at each location indicated a variation in the order of 6 dB(A) between the noise level at the rear of the subject site, and at the exposed location abutting Vines Rd. Values along the northern boundary adjacent to the southern façade of R1 are expected to be between the values recorded at the front and rear of the subject site.

For the purposes of the assessment, WMG has adopted the following:

- Rear of R1 and R4, as well as R2 and R3:
  - Adopted ambient background noise level of 41 dB(A) L_{90}.
  - By adopting the 'background level plus' methodology, this would allow for AAAC guideline values of 46 dB(A) L_{eq} for greater than four hours of outdoor play, and 51 dB(A) L_{eq} for less than four hours of outdoor play.
- Front of R1, R4 and R5:
  - Adopted ambient background noise level of 47 dB(A) L_{90}.
  - By adopting the 'background level plus' methodology, this would allow for AAAC guideline values of 52 dB(A) L_{eq} for greater than four hours of outdoor play, and 57 dB(A) L_{eq} for less than four hours of outdoor play.
- R1 southern façade and R4 northern façade:
  - Adopted ambient background noise level of 43 dB(A) L_{90}.
  - By adopting the 'background level plus' methodology, this would allow for AAAC guideline values of 48 dB(A) L_{eq} for greater than four hours of outdoor play, and 53 dB(A) L_{eq} for less than four hours of outdoor play.

8.2.2. Source Noise Levels

As part of previous investigations at childcare centres, WMG has observed and carried out noise measurements associated with children playing in outdoor areas. The number of children and the noise that they generate in play areas varies from time to time and for different facilities.

Children tend to distribute themselves in groups throughout the available play area and slightly towards the central parts of the play area where items of play equipment will often be located.

For this assessment, WMG has considered the source sound power levels provided within the AAAC Guidelines which are summarised within Table 5 and relate to groups of 10 children playing.

Table 5: AAAC Guideline Values: Effective Sound Power Levels for groups of 10 Children Playing

Number of Age of Children	dB(A)	Sound Power Levels [dB] at Octave Band Centre Frequencies [Hz]							
		63	125	250	500	1000	2000	4000	8000
10 children 0-2 years	78	54	60	66	72	74	71	67	64
10 children 2-3 years	85	61	67	73	79	81	78	74	70
10 children 3-5 years	87	64	70	75	81	83	80	76	72

For effective sound power levels of a specific number of children, the guideline provides the following formula:

Effective Sound Power Level for 'n' children = Effective Sound Power Level for 10 children + 10log (n/10)

The sound power level of a noise source will be independent of environment and is a common method for quantifying the acoustic power of a noise source. The sound pressure level will be the noise level produced at a distance and will be influenced by the surrounding environment by a source of a particular sound power level.

This is much the same concept as a light bulb having a certain rated power wattage and producing a different level of light at different distances and in differing surrounding environments.

Noise measurements recorded by WMG as part of previous investigations produced average measured noise levels in the order of 58 dB(A) L_{eq} when measuring a group of 28 pre-school children at 10 metres from a dedicated outdoor play area boundary, and 18 metres from children playing within the outdoor area in the absence of any noise barrier shielding. In consideration of the above, the values measured by WMG correlate well with the AAAC guideline range of values given for the 2-3 year old children and 3-5 year old children.

8.2.3. Noise Modelling Input Parameters

Noise predictions due to children playing within outdoor play areas have been based on information provided by the client which includes the number of children, the age of the children, and the rooms where children will be located.

It is understood that the children's activity rooms and designated outdoor play areas are as follows:

- Activity 1-4 – Outdoor Play Area 1 (ground level).
- Activity 5-6 – Outdoor Play Area 2 (first level).

A summary of the information provided to WMG, and the corresponding sound power levels adopted to consider the noise emissions from children playing in the outdoor areas is included within Table 6.

Table 6: Summary of adopted noise model input parameters

Room Designation	Number of Children	Age Group	Adopted Sound Power Level per 10 Children
Activity 01	12	0 – 2 years old	78 dB(A) L_{eq}
Activity 02	12	0 – 2 years old	78 dB(A) L_{eq}
Activity 03	15	2 – 3 years old	85 dB(A) L_{eq}
Activity 04	15	2 - 3 years old	85 dB(A) L_{eq}
Activity 05	22	3 – 5 years old	87 dB(A) L_{eq}
Activity 06	33	3 – 5 years old	87 dB(A) L_{eq}

In determining the residual noise levels at noise sensitive receptors, WMG has modelled simultaneous occupation of the outdoor area by all children at the facility.

Therefore, using the source data from the AAAC Guideline as a basis, the predicted noise emissions will represent the higher levels of noise which may occur at sensitive receptors.

During other times when fewer children are located within the external area, lower noise levels would be expected at each of the receptors.

In addition to the above, WMG has utilised the following input parameters for the noise model:

- Proposed barriers to be constructed at the subject site are as described in section 10.7 of this report.
- Outdoor areas will include soft floor coverings eg: grass (not concrete).
- Children play in the external areas as recommended within this report.
- Sound power levels have been distributed uniformly around the available outdoor play areas in proximity to the activity rooms where those children will be located.

8.2.4. Noise Prediction Results

Noise emissions due to children playing within the outdoor play areas will be reduced by distance separation between the outdoor areas and the sensitive receptors, as well as noise shielding provided by the proposed acoustic barrier/s and/or other operational measures.

When addressing noise emissions from the proposal, residual noise levels have been predicted at sensitive residential facades including openable window/door sections.

In addition, predicted values include consideration of external occupiable areas located within 10m of the dwelling external facades which aligns with the assessment methodologies contained within the Environment Protection Act 2017 reference documentation. External car parking areas and/or driveways have generally not been considered as noise sensitive as part of the assessment.

Based on the incorporation of the proposed practical height barrier/s, the predicted noise levels at each of the critical receptors during the different operating conditions are summarised below in Table 7.

Table 7: Predicted Noise Levels at Critical Receptors Surrounding Subject Site

Receptor	Address	Predicted Noise Level
R1	145 Vines Rd – southern facade	52 dB(A) L_{eq}
	145 Vines Rd – rear yard	51 dB(A) L_{eq}
R2	24 Waiora Ave.	51 dB(A) L_{eq}
R3	33 Waiora Ave.	49 dB(A) L_{eq}
R4	139 Vines Rd.	49 dB(A) L_{eq}
R5	122 Vines Rd.	47 dB(A) L_{eq}

The results of the noise model indicate that predicted values at the most critical sensitive receptors surrounding the subject site will be in the order of 0-10 dB(A) above the ambient background noise levels which have been adopted as the basis for the assessment.

When considered relative to the AAAC guideline values, the predicted noise levels align with 'background plus 10 dB' values which are commonly considered as appropriate by relevant Authorities.

8.3. Assessment of Services Equipment and Waste Collection Noise

8.3.1. Assessment Criteria

8.3.1.1. General Methodologies

The subject site and sensitive receptors are located in the 'major urban area' associated of Melbourne.

In accordance with the Noise Protocol, noise limits for site operations will be determined in accordance with Part I, A1 of the Noise Protocol document referenced as the 'urban area method'.

Using the 'urban area method', the relevant 'zoning levels' are calculated using the area of differing land zoning types surrounding residential receptors as described in Clause 7-15 of the Noise Protocol.

The calculated 'zoning levels' vary depending on the time of the day, evening, or night with the highest permitted values occurring during day periods and the lowest during night periods.

The relevant day, evening, and night assessment periods are shown in Table 8.

Table 8: Details of EPA Assessment Periods

EPA Assessment Period	Relevant Days	Relevant Time Periods
Day	Monday to Saturday	7:00am to 6:00pm
Evening	All Days	6:00pm to 10:00pm
	Sunday, Public Holidays	7:00am to 6:00pm
Night	All Days	10:00pm to 7:00am

Further derivation of the 'noise limits' applicable for the site operations are based on measurement of the existing ambient background noise level at nearby sensitive receptors in accordance with Clause 39-51 of the Noise Protocol.

Where ambient background noise levels at sensitive receptors fall within the range considered 'neutral' in accordance with the Noise Protocol methodologies, the calculated 'zoning levels' will apply as noise limits for the site operations.

The 'neutral' range represents an ambient background noise level which is considered 'typical' for the relevant land zoning types surrounding the receptor location.

Where ambient background noise levels are measured to be higher or lower than the 'neutral range', background level adjusted noise limits will apply for the site operations.

8.3.1.2. Noise Protocol Noise Limits

Based on the results of the noise monitoring, the calculated Noise Protocol noise limits at the sensitive receptors in proximity of the subject site are as shown below in Table 9.

For the purposes of this assessment, WMG has focused on areas of the residential dwellings where the lower ambient background noise levels, and hence, lower Noise Protocol limits will apply.

Table 9: Calculated Noise Protocol Noise Limits

Assessment Period	Relevant Days	Relevant Time Periods	Noise Protocol Limits	
			R1-R4	R5
Day	Monday - Friday	7:00am to 6:00pm	52 dB(A) L_{eq}	53 dB(A) L_{eq}
Evening	Monday - Friday	6:00pm to 7:00pm	45 dB(A) L_{eq}	50 dB(A) L_{eq}
Night	Monday - Friday	6:00am to 7:00am	40 dB(A) L_{eq}	45 dB(A) L_{eq}

The noise limits must be met within a 'noise sensitive area', which for this site will be within the boundary of any of the sensitive receptors, and within 10 metres of the outside of the external walls of the dwelling.

The relevant assessment period will be 30 minutes.

8.3.2. Services Equipment Noise Emissions

8.3.2.1. Source Noise Levels and Assessment

The mechanical services design for the proposal has not been completed at this stage, however it is anticipated that relevant equipment associated with the proposal will include:

- Exhaust fans associated with toilets, kitchen, laundry etc.
- Outdoor air conditioning equipment.

The current plans identify an area where 'plant' may be located, however, it would be expected that ventilation fans may also be located above the roof of the base building at various locations.

Furthermore, it is expected that equipment will only operate during the proposed operating hours.

When addressing noise emissions associated with services equipment, the AAAC guideline provides indicative sound power levels to assist with site configuration during the planning phase of a proposal.

The sound power levels are included below.

Table 10: AAAC Guideline Services Equipment Sound Power Levels

Noise Source	Sound Power Level
Small (single fan) condenser (outdoor unit)	65 dB(A)
Medium (double fan) condenser (outdoor unit)	70 dB(A)
Large (double fan) condenser (outdoor unit)	80 dB(A)
Small exhaust fan (toilet, garbage room)	60 dB(A)
Small kitchen exhaust fan	70 dB(A)

Using the above sound power data to provide some basis for calculating noise emissions from the site, it would be recommended that unshielded services equipment be located at least 15.0m residential boundaries. Should a 'large (double fan) condenser (outdoor unit)' form part of the proposal, it is likely that this distance would need to increase to 20.0m and may require shielding from residential receptors.

The recommendation will be that once a mechanical services design has been completed, the design is reviewed by an acoustic consultant to ensure compliance with relevant noise criteria.

8.3.3. Waste Collection Noise Emissions

8.3.3.1. Event Description and Source Noise Levels

Based on review of the waste management plan (WMP) prepared by Ratio Consultants for the planning application (ref. 22039W-R01F01), it is understood that waste collection at the property will include the following:

- A private collection service to collect all waste streams from within the property.
- The vehicle will enter site from Waiora Avenue drive to the northern end of the carpark to undertake a U-turn.
- The vehicle will then stop within the carpark adjacent to the bin area.
- The building manager will be responsible for ensuring that the waste collection contractor has access to the bin store at the facility. The waste collection contractor will be responsible for the transfer of bins from the collection point to the rear of the vehicle and returning the bins to the collection point immediately after collection.
- Once complete, the vehicle will depart the site via the crossover onto Waiora Avenue.
- Waste collection will be restricted to the hours 7:00am to 6:00pm Monday to Saturday.

When addressing noise emissions associated with waste collection, typical noise sources requiring consideration will include truck movement noise, reversing safety alarm beepers, idling of the vehicle, and the waste collection event.

WMG has previously undertaken noise measurements of various heavy vehicle types travelling within private land where speeds have been generally limited to under 20km/h consistent with the proposal.

Measurements have shown variation in truck noise levels based on the vehicle type, vehicle speed and the manner in which the driver is operating their vehicle. Measured values equating to a sound power level of 84 dB(A) to 110 dB(A) have been obtained as part of these previous investigations.

The truck type nominated within the report is a mini rear loading light rigid vehicle.

From discussions with several waste collection operators, rear compactors associated with a ‘mini’ type vehicle are often sourced from Garwood International and could be either a ‘Miner’ unit or a ‘Bantam’ unit each of which use a light rigid vehicle consistent with a Hino 300 or equivalent.

WMG has measured a Bantam unit previously as part of an independent investigation.

Due to the size of the private carpark, it would be expected that waste vehicles will be travelling at very slow speeds of up to 5-10 km/h whilst on site and will likely be rolling into position with engine revs close to idle.

Based on previous measurements, it is expected that if drivers maintain their general environment duty to operate their vehicles ‘reasonably’, sound power levels in the order of 90-92 dB(A) will be achievable during slow speed forward movement.

For the waste collection event, the noise level varies based on the truck type, operator of the vehicle, the contents of the bin, the contents of the truck, and whether the bin includes any additional elements which may generate impact noise when the bin is raised and tipped.

From previous experience including a Bantam rear loading vehicle, the waste collection event including the emptying of a single bin occurred for in the order of 60 seconds equates to a sound power level in the order of 92 dB(A).

The above values have been considered as the basis for the assessment.

Despite including an impulse type of noise character, an impulsive adjustment has not been applied as the event is considered ‘sporadic’ in accordance with EPA assessment methodology.

8.3.3.2. Noise Predictions

Based on calculations implementing noise prediction methodology described within ISO 9613, predicted noise levels at each of the described receptors will be as shown below in Table 11. The results have been colour coded whereby green indicates compliance with the noise limits, and red indicates non-compliance.

The relevant receptor locations which are most exposed to the waste delivery events due to distance separation and localised shielding will include receptors R2-R4.

Compliance with relevant criteria at these receptors is expected to result in compliance at all other receptors.

Due to the tonal nature of the reverse beepers which will likely be attributable to the waste collection vehicle, it could be deemed reasonable to apply a +2 dB tonal adjustment to the predicted noise levels in accordance with the Noise Protocol. This has therefore been included in the assessment.

Table 11: Predicted Noise Levels including consideration relative to Noise Protocol Noise Limits

Receptor	Predicted Noise Level	Tonal Adjustment	Effective Noise Level	Noise Protocol Noise Limits dB(A) L_{eq} (30 minute)		
				Late Night 6:30am–7:00am	Day 7:00am–6:00pm	Early Evening 6:00pm–6:30pm
R2	47 dB(A) L_{eq}	+2 dB(A)	49 dB(A)	40 dB(A)	52 dB(A)	45 dB(A)
R3	40 dB(A) L_{eq}	+2 dB(A)	42 dB(A)	40 dB(A)	52 dB(A)	45 dB(A)
R4	40 dB(A) L_{eq}	+2 dB(A)	42 dB(A)	40 dB(A)	52 dB(A)	45 dB(A)

Based on the results of the noise model, there is potential for noise emissions associated with waste collection events to exceed Noise Protocol noise limits at off-site sensitive receptors during the early morning and early evening period.

In consideration of the above, and despite being infrequent, the modelling results indicate that collections should be limited to the EPA defined day period between 7:00am and 6:00pm Monday to Saturday. This is consistent with the wording included in the WMP.

9. Consideration of Noise Associated with Vehicles Using Carpark

The proposal includes an external car park area which is located adjacent to the eastern boundary of the subject site and will be accessed from Waiora Avenue to the south.

Where commercial operations are proposed to commence prior to 7:00am, WMG commonly considers the potential for sleep disturbance to occur at noise sensitive receptor locations due to vehicles using the car park.

The approach taken by this firm and others in relation to the potential for sleep disturbance is based on a review of numerous sleep disturbance studies set out in the *NSW Road Noise Policy* (March 2011), issued by the Department of Environment, Climate Change and Water NSW.

From the research on sleep disturbance to date, the document concludes the following:

- maximum internal noise levels below 50-55 dB(A) are unlikely to awaken people from sleep.
- one or two noise events per night, with maximum internal noise levels of 65–70 dB(A), are not likely to affect health and wellbeing significantly.

The noise levels referred to are the noise levels within rooms used for sleeping.

Based on the outcomes described above, Table 12 below presents a summary of the equivalent outdoor and indoor noise levels which have the potential to cause sleep awakening and/or affect health and wellbeing.

Table 12: Summary of Sleep Disturbance Assessment Criteria Values

Reaction	Noise Level Inside Habitable Room	Equivalent Noise Levels Outside Habitable Room	
		Windows closed	Windows open
Unlikely to cause sleep awakening	50 – 55 dB(A)	73 – 78 dB(A)	60 – 65 dB(A)
1 –2 events per night not likely to affect health and wellbeing	65 – 70 dB(A)	88 – 93 dB(A)	75 – 80 dB(A)

The values are based on the generally accepted 10 dB(A) noise reduction from outside to inside provided by an open window and will be applicable outside windows of spaces used for sleep.

From the previous experience of the writer's firm, noise caused by patrons and vehicles will generally be associated with conversational noise, the closing of vehicle doors and starting vehicle engines in a reasonable or unreasonable manner. Commonly, consultants will adopt a sound power level in the order of 95 dB(A) for 'reasonable' behaviour, with 'unreasonable' behaviour resulting in noise levels in the order of 8 dB(A) higher.

These values are generally applicable where parking spaces form part of a commercial premises as instantaneous noise emissions associated with vehicles travelling at slow speeds within the site boundaries are typically much lower and of a more constant nature.

Generally, WMG will consider the sound power levels associated with 'reasonable' behaviour relative to the NSW Road Noise Policy (2011) values 'unlikely to cause sleep disturbance', and the more infrequent, 'unreasonable' behaviour noise level impacts relative to the values where '1-2 events per night not likely to affect health and wellbeing'.

Unreasonable behaviour is commonly considered for commercial facilities including service stations and convenience restaurants which may have extended operating hours during the night period or perhaps 24-hour operations. With suitable provisions from management, it would be expected that unreasonable behaviour at a facility consistent with the proposal could be avoided.

The facility car park will be located adjacent to the eastern site boundary and hence will be immediately adjacent to the western façade of the 24 Waiora Avenue (R2) receptor. Due to the proximity to the car park, this receptor will be the most exposed to car park activity noise.

The proposal includes a 2.0m high fence along eastern boundary of the site adjacent to the car park which will provide noise shielding to the R2 receptor under consideration.

Based on predictions, the resultant noise levels at the R2 receptor will be in the order of 66 dB(A)L_{max}, and hence will be marginally higher than the values 'unlikely to cause sleep awakening' when windows are open. The predicted levels will continue to be well below the values where '1-2 events per night not likely to affect health and wellbeing'.

During times when the residents close their windows, the resultant internal noise levels will be well below the values 'unlikely to cause sleep awakening', and hence this could be a strategy to minimise the impact of noise associated with the use of the car park at the R2 receptor.

The alternative strategy would be for the operator to avoid usage of the car parking spaces adjacent to the R2 dwelling during the early morning period between 6:30am to 7:00am.

Having reviewed online photos of the 24 Waiora Avenue (R2) receptor, it is understood that there are two windows which face west toward the subject site. Generally, sleep disturbance is considered within rooms used for sleep, and hence, the southern of the two windows, which appears to be associated with a kitchen, would not be relevant.

The northern window appears to be associated with a small bedroom and hence is relevant.

Based on calculations, vehicles can utilise all but one of the car parking spaces whilst resulting in predicted values of ≤65 dB(A)L_{max} aligning with an 'unlikely to cause sleep awakening' outcome.

The car parking space where predicted values are 66 dB(A)L_{max} is shown below.

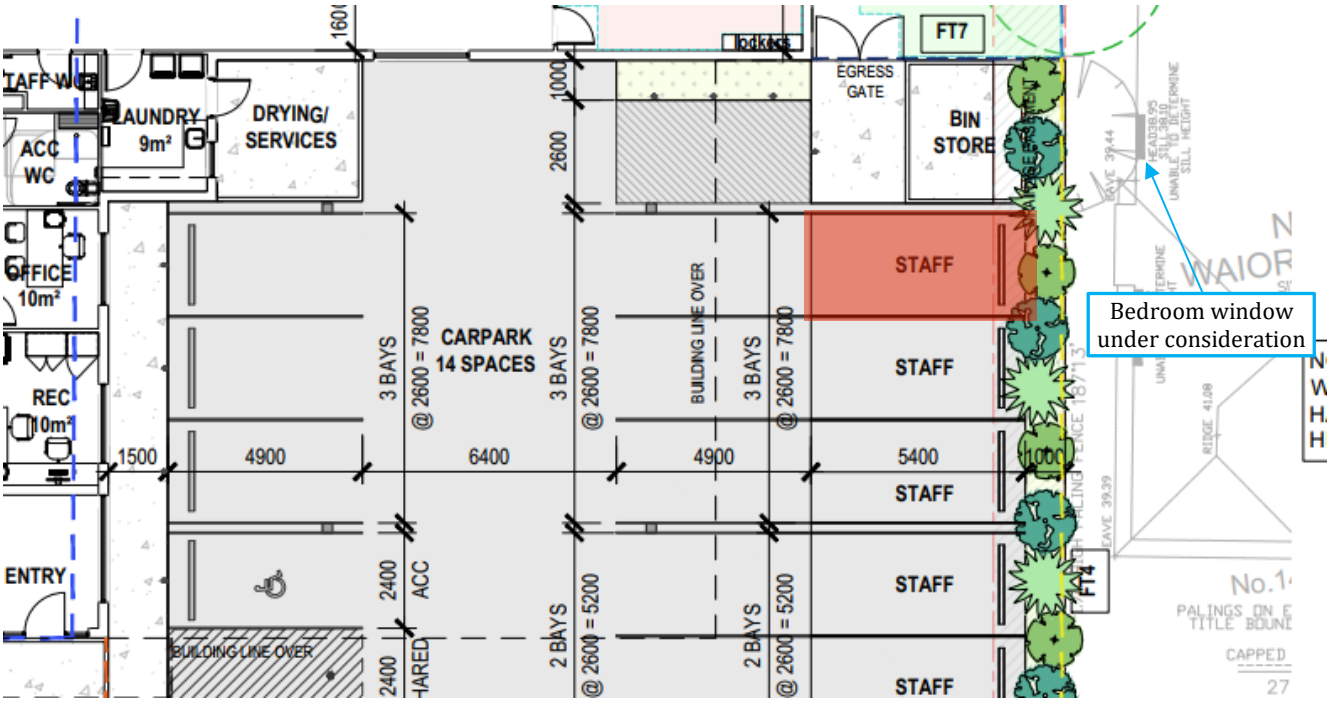


Figure 3: Carpark plan identifying lots resulting in values greater than 65 dB(A) L_{max} at R2

In consideration of the above, WMG would recommend that this parking space be avoided during the early morning period between 6:30am and 7:00am to minimise the potential for sleep disturbance at the adjoining receptor.

Further to the above, and in accordance with the general environmental duty of the client, it is considered appropriate that practical noise control strategies are adopted where possible to minimise the potential for significant adverse change in the acoustic amenity at surrounding sensitive receptors.

Specific details regarding what will likely be considered practical noise control strategies are discussed in Section 10.

10. Noise Mitigation Strategies

Suitable strategies for reducing noise emissions associated with the proposed use are included below.

The strategies described within this report are tentative in nature. Should other initiatives be incorporated within the development which ensure that the outcomes of the assessment remain unchanged, the strategies nominated in the report may be amended by a suitably experienced acoustic consultant.

10.1. General Environmental Duty Requirements

In accordance with the Act, the client would be deemed to be in breach of the GED if the client fails to do any of the following in the course of conducting the business or the undertaking so far as reasonably practicable:

- use and maintain plant, equipment, processes and systems in a manner that minimises risks of harm to human health and the environment from pollution and waste;
- use and maintain systems for identification, assessment and control of risks of harm to human health and the environment from pollution and waste that may arise in connection with the activity, and for the evaluation of the effectiveness of controls;
- use and maintain adequate systems to ensure that if a risk of harm to human health or the environment from pollution or waste were to eventuate, its harmful effects would be minimised;
- ensure that all substances are handled, stored, used or transported in a manner that minimises risks of harm to human health and the environment from pollution and waste;
- provide information, instruction, supervision and training to any person engaging in the activity to enable those persons to comply with the general environmental duty.

The described items will likely be internal processes involving training and documentation to address any potential emissions from the site in the event that they occur.

10.2. Mechanical Services Equipment

Given the early stages of the project, definitive strategies cannot be provided regarding noise control and equipment operating parameters. Based on the site configuration, it is expected that noise emissions can be adequately controlled through the selection of low noise equipment setback from residential boundaries by in the order of 15m.

Additional noise mitigation including the construction of barriers and fan speed control could likely be accommodated if the nominated distance is not achievable within the site design. The primary recommendation will be that the client engage the services of an acoustic consultant to review the design and ensure that noise emissions comply with relevant noise protocol noise limits at residential receptors.

10.3. Carparking Area Guidelines

In order to minimise the potential for unreasonable noise emission to the surrounding noise sensitive receptors, WMG provide the following construction guidelines for the proposed car parking area:

- Road surfaces must not include surface coverings which promote tyre squeal.
- Speed humps should be avoided, however, if required must include smooth transitions with minimal gradient.
- If a spoon grate is installed, it must be bolted into position rather than rely on gravity to be held in place.
- Driver's angle of view from the car parking area to be sufficient to ensure that horns are not required to alert pedestrians when exiting the site. Angled mirrors may also assist with minimising the need for car horn use.
- Ensure that pedestrian gates are fitted with rubber stops or slow closing mechanisms to minimise the potential for impact generated noise.

The current proposal does not include any access gate providing access to the carpark area. If this is to be introduced, then the operating mechanism/motor would need to be reviewed by an acoustic consultant.

10.4. General Noise Management Recommendations

Part of controlling noise emissions associated with the proposal will rely on facility management being active and aware of potential noise issues. It may be suitable for the facility to prepare a noise management plan which identifies potential issues and includes set processes to minimise noise emissions where practicable.

Guideline recommendations for minimising site noise emissions which could form part of the noise management plan include the following:

- Implementing management plans for non-typical events (eg. crying) within outdoor areas to ensure that the events are relocated to indoor areas and resolved promptly.
- Communication with parents / guardians relating to expectations during arrival and departure from the subject site. This will include minimising loud communication, and operating vehicles in 'reasonable' manner.
- Clear signage within car parking areas which notifies parents / guardians to be aware of their surroundings and to conduct themselves in a 'reasonable' manner.
- Provision of facility contact details for parents and neighbours to facilitate communication and to resolve any neighbourhood issues that may arise due to operation of the Centre.
- Staff to be educated to control their volume of voice when located outdoors.

10.5. Operating Limitations

In order to minimise noise emissions associated with the proposed use, WMG recommend that the following operating limitations are suitable for inclusion in noise management of the proposed use.

- Operating hours are limited to 6:30am to 6:30pm Monday to Friday.
- It is understood that a maximum of 109 children will occupy the facility, and that children will be up to 5 years of age, as specified in Table 6.
- During maximum capacity, external areas will be occupied by up to 109 children (but not before 7:00am or after 6:00pm). The assessment has been based on the children being distributed relatively uniformly within the outdoor play area and not gathered as a single large group immediately adjacent to sensitive receptors.

Variations to the input parameters adopted as the basis for this assessment may result in increased noise emissions associated with the facility and will require further review.

10.6. Waste Collection

Waste collection services should be undertaken in accordance with the guidance provided in EPA Publication 1254.2 (Noise Control Guidelines) as shown below:

- *Annoyance created by industrial waste collection tends to intensify in the early-morning period. To this end, early-morning collections should be restricted to non-residential areas to minimise early morning disturbances. Where a residential area is impacted by noise from the collection of refuse, then collections should be restricted to the times contained within the schedule.*
- *Refuse bins should be located at sites that provide minimal annoyance to residential premises.*
- *Compaction should be carried out while the vehicle is moving.*
- *Bottles should not be broken up at collection site.*
- *Routes which service predominantly residential areas should be altered regularly to reduce early morning disturbances.*
- *Noisy verbal communication between operators should be avoided where possible.*

Further to the above, and in consideration of the predicted noise levels relative to Noise Protocol noise limits, as well as the recommendations provided within Publication 1254.2, the outcomes of the assessment indicate that the waste collection events should be limited to the EPA defined day period between 7:00am and 6:00pm Monday to Saturday.

10.7. Acoustic Barrier Requirements

The proposal incorporates acoustic barriers at the perimeter of the outdoor play areas to maximise noise shielding in the direction of the off-site sensitive receptors. In order to provide the necessary noise reduction qualities the barriers must be constructed as follows:

- Manufactured from materials weighing at least 10 kg/m^2.
- Suitable materials include 25mm thick timber, 6mm thick glass, 15mm thick polycarbonate, 9mm thick cement sheet, or three layers of 0.48mm thick Colorbond steel sheeting. Masonry options including brickwork and precast concrete will also be acceptable. Other materials must be reviewed prior to approval.
- If constructed of timber or plywood, be stable so that the materials do not crack or warp (thus potentially creating gaps between panels) during the life of the fence.
- Installed in a manner that does not allow for gaps between panels, and between the fence panels and the ground below. This will typically require the installation of a barge board partially buried in the ground. For timber fences, gaps should be overlapped with timber cover pieces, glued, and screwed. For glass elements, gaps should be sealed using resilient mastic eg: Sikaflex Pro.
- A common acoustic paling fence will be constructed from a minimum of 25 mm thick 150 mm wide treated vertical timber boards, butted together and with 50mm cover strips. The fencing will include a barge board partially buried in the ground.
- If access doors are to form part of acoustic barrier fences, then the doors must be constructed as per the fence and include an overlapping section to minimise the gaps around the perimeter of the openable section. Rubber seals must also be included to eliminate gaps between the openable section and the ground as well as adjoining panels.
- The location of the barriers must align with the highest ground elevation to maximise the noise reduction provided by the barrier.

The proposed acoustic barriers are included below within Figures 4 and 5.

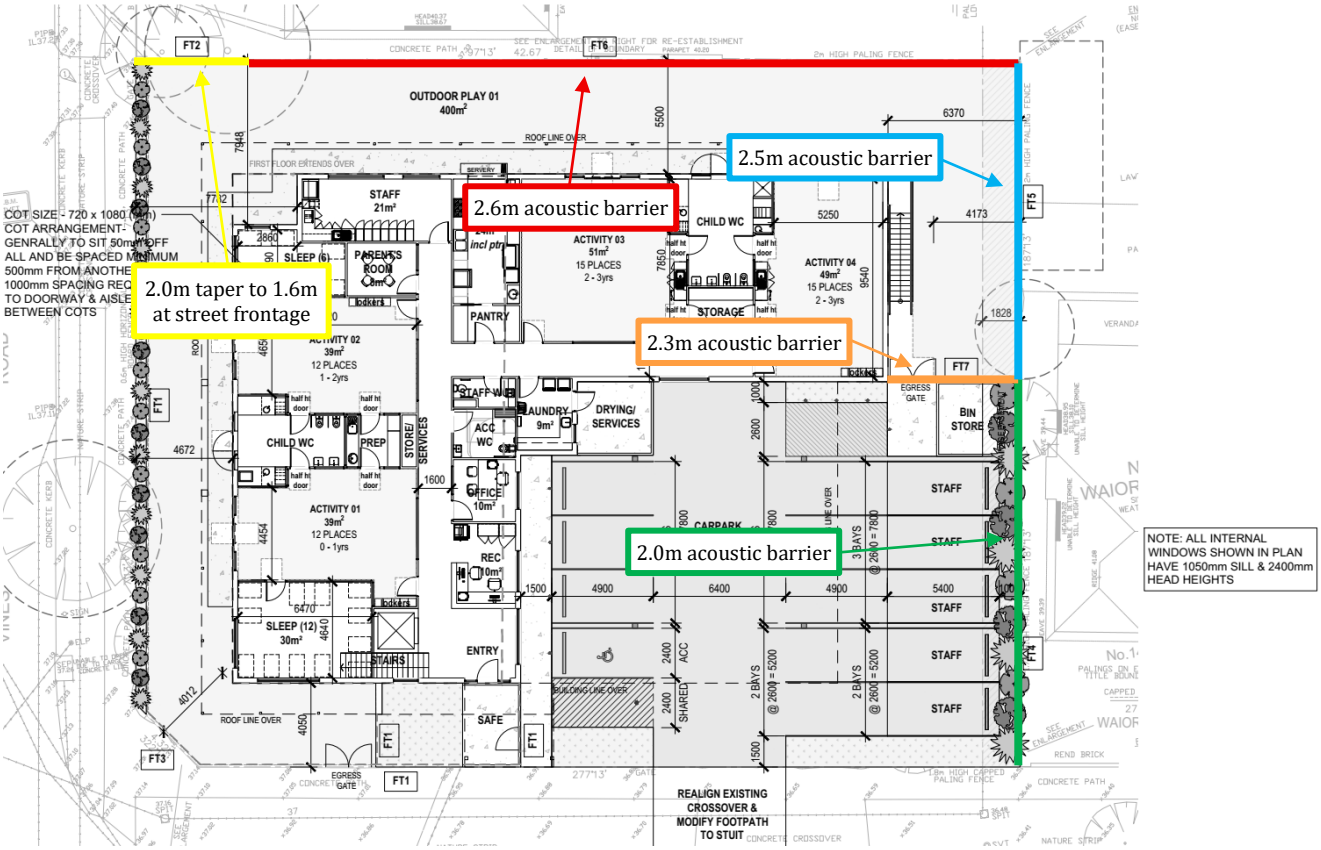


Figure 4: Acoustic barrier markup – Ground Level

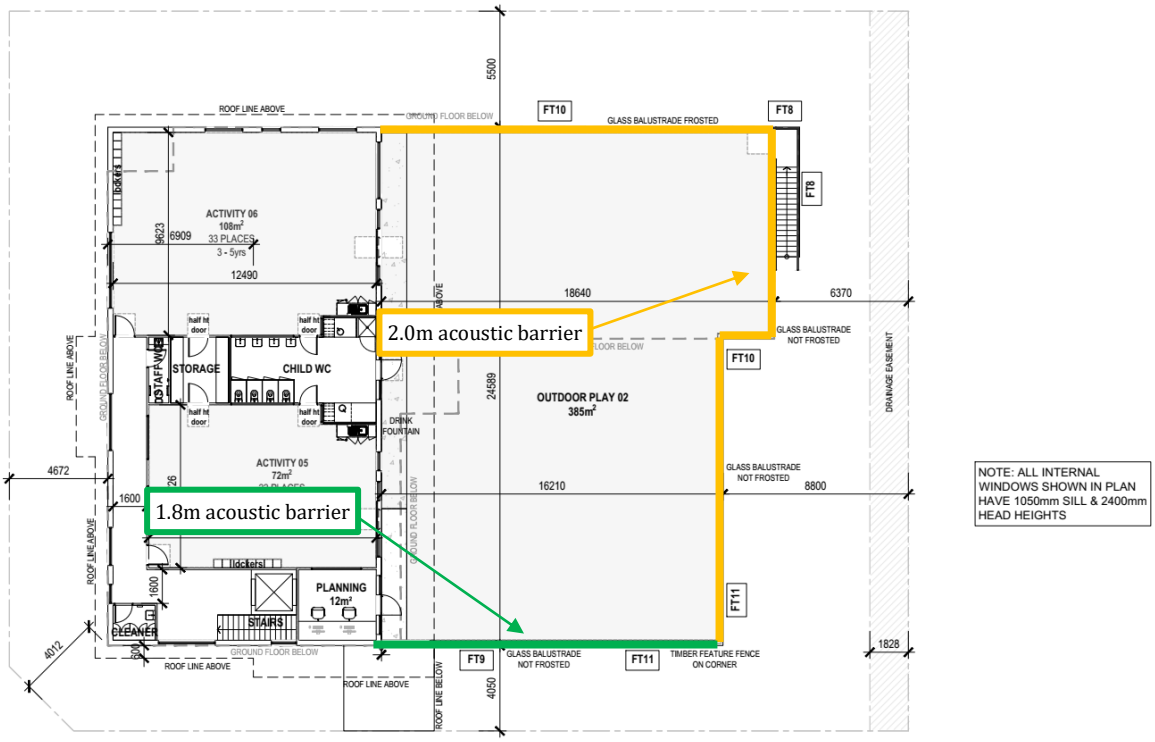


Figure 5: Acoustic barrier markup – First Level

The results of the noise model indicate that with the proposed acoustic barriers, the predicted values at the sensitive receptors will be in the order of 0-10dB(A) above the ambient background noise levels which have been adopted as the basis for the assessment.

The model indicates that acoustic reflections along the northern facade of the base building may increase the potential noise levels within the rear yard of R01.

A strategy to reduce the magnitude of these reflections would be to introduce sound absorption to the underside of the soffit which overhangs a portion of the northern outdoor area adjacent to the northern building facade.

It is envisaged that this would be evaluated during detailed design if necessary.

11. Conclusion

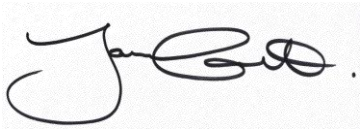
WMG has undertaken an assessment to address noise emissions from the proposed construction and operation of a new childcare centre at the site described as 141 and 143 Vines Road, Hamlyn Heights.

The assessment works have included noise modelling to calculate noise emissions associated with the proposed use including due to services equipment, waste collection, and noise due to children occupying outdoor areas associated with the proposal.

The findings of the assessment conclude:

- Practical barriers have been incorporated in the proposed design, which on this occasion result in residual noise levels consistent with the AAAC guideline values and values which have been commonly considered appropriate by Victorian Responsible Authorities and in VCAT determinations.
- With suitable equipment selections and setbacks from residential boundaries, noise due to services equipment at the site can be adequately attenuated to comply with Noise Protocol noise limits at sensitive residential receptors.

When addressing waste collection noise from the site, it would be recommended that collection events are limited to between 7:00am and 6:00pm Monday to Saturday to align with both the Noise Protocol noise limit requirements, and the intent of EPA Publication 1254.2.



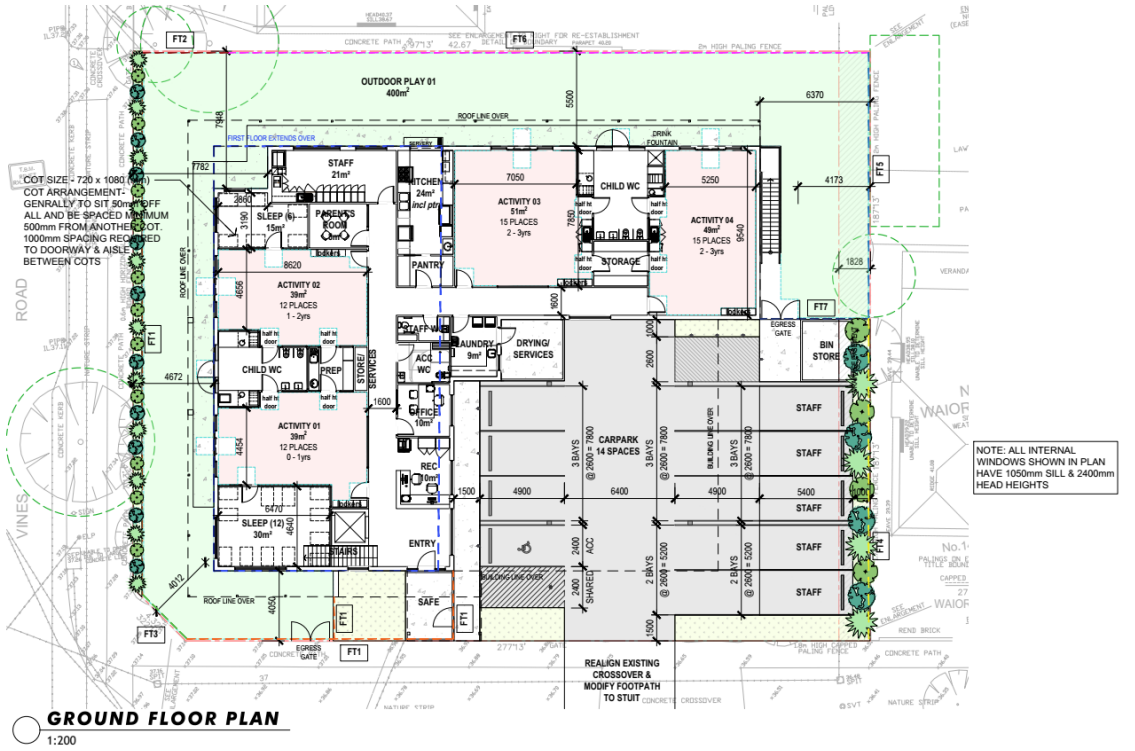
JORDAN GROWCOTT
WATSON MOSS GROWCOTT
ACOUSTICS PTY LTD

Appendix 1 – Project Drawings

ACTIVITY AREA SCHEDULE							
ROOM	PLACES	AGE	STAFF RATIO	STAFF No.	AREA REQ	UNENCUMBERED AREA	ENCUMBERED AREA	TOTAL AREA PROVIDED
ROOM 1	12	0-2	1:4	3	39	39sqm	7sqm	46sqm
ROOM 2	12	0-2	1:4	3	39	39sqm	7sqm	46sqm
ROOM 3	15	2-3	1:4	4	48.75	49sqm	8sqm	57sqm
ROOM 4	15	2-3	1:4	4	48.75	49sqm	8sqm	57sqm
ROOM 5	22	4-5	1:11	2	71.5	72sqm	8sqm	80sqm
ROOM 6	33	4-5	1:11	3	107.25	108sqm	8sqm	116sqm
TOTALS	109			22	354.25	356sqm	46sqm	402sqm

OUTDOOR PLAY AREA SCHEDULE					
ROOMS	PLACES	AREA REQ	UNENCUMBERED AREA	ENCUMBERED AREA	TOTAL AREA PROVIDED
ROOM 1 ROOM 2 ROOM 3 ROOM 4	12 12 15 15	378	400sqm	12sqm	412sqm
ROOM 5 ROOM 6	22 33	385	385sqm	5sqm - Doors 6sqm - Circulation 4sqm - Shed	400sqm
TOTALS	109	763	785sqm	27sqm	812sqm

SITE DATA	
SITE AREA	1452sqm
BUILDING AREAS (GFA) • Ground • First TOTAL	 522sqm 320sqm 842sqm
PROPOSED CHILD CARE PLACES	109
PROPOSED CARPARKING	14 Carparks



GROUND FLOOR PLAN
1:200

NOTE: ALL INTERNAL WINDOWS SHOWN IN PLAN HAVE 1050mm SILL & 2400mm HEAD HEIGHTS

PLANNING

Rev	Amendment	Date
-	-	-

FENCE TYPE LEGEND

FT.01
1800mm OPEN RAILING FENCE WITH TOP BAR

FT.02
1800mm - 2000mm TAPERED ACOUSTIC PAINTED TIMBER PALING BOUNDARY FENCE, REFER ELEVATIONS

FT.03
2000mm WHITE BRICK FEATURE FENCE

FT.04
2000mm ACOUSTIC PAINTED TIMBER PALING BOUNDARY FENCE

FT.05
2500mm ACOUSTIC PAINTED TIMBER PALING BOUNDARY FENCE

FT.06
2600mm ACOUSTIC PAINTED TIMBER PALING BOUNDARY FENCE

FT.07
2300mm OPEN RAILING FENCE WITH TOP BAR

FT.08
1800mm ALUMINUM BATT FENCE PAINTED WHITE

FT.09
1800mm WHITE ALUMINIUM FRAME, GLASS INFILL BALUSTRADE

FT.10
2000mm WHITE ALUMINIUM FRAME, GLASS INFILL BALUSTRADE

FT.11
2200mm TIMBER FEATURE FENCE

NOTES:
IMPACT RATED FENCING TO ALL STREET FACING FENCES

ALL NOISE BARRIERS MUST BE DESIGNED & CONSTRUCTED IN COMPLIANCE WITH ACOUSTIC REPORT. NOISE BARRIERS MUST ACHIEVE THE HEIGHT SPECIFIED ABOVE OUTDOOR PLAY FFL.

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Project
109 PLACE CHILD CARE
143 VINES ROAD, HAMLYN HEIGHTS, VIC

DRAWING
GROUND FLOOR PLAN

Scale As indicated Drawn LO
Client
Date 22/04/2026
Job No. 20250052
Dwg No. **DA03** Rev. - A3 SHEET

ACTIVITY AREA SCHEDULE								
ROOM	PLACES	AGE	STAFF RATIO	STAFF No.	AREA REQ	UNENCUMBERED AREA	ENCUMBERED AREA	TOTAL AREA PROVIDED
ROOM 1	12	0-2	1:4	3	39	39sqm	7sqm	46sqm
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TOTALS	109			22	354.25	356sqm	46sqm	402sqm

OUTDOOR PLAY AREA SCHEDULE					
ROOMS	PLACES	AREA REQ	UNENCUMBERED AREA	ENCUMBERED AREA	TOTAL AREA PROVIDED
ROOM 1 ROOM 2 ROOM 3 ROOM 4	12 12 15 15	378	400sqm	12sqm	412sqm
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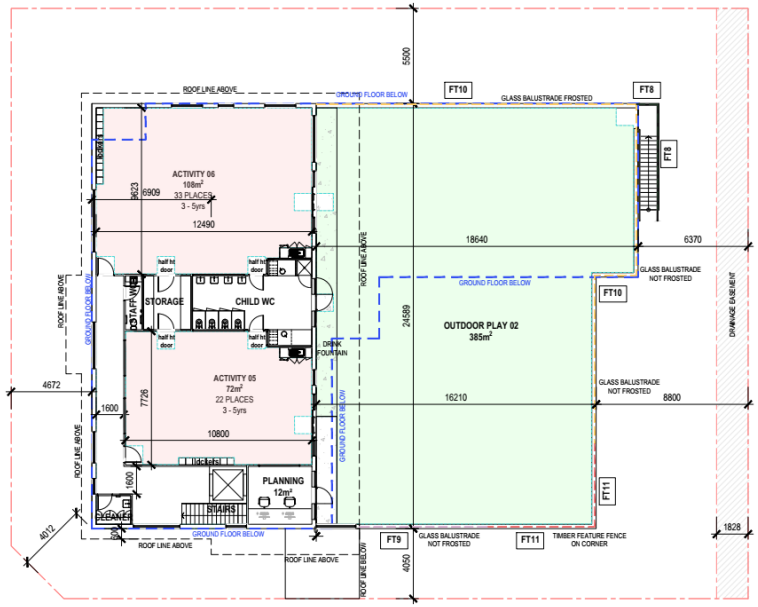

NOTE: ALL INTERNAL WINDOWS SHOWN IN PLAN HAVE 1050mm SILL & 2400mm HEAD HEIGHTS

FIRST FLOOR PLAN
1:200

PLANNING

Rev	Amendment	Date
-	-	-

FENCE TYPE LEGEND

FT.01
1800mm OPEN RAILING FENCE WITH TOP BAR

FT.02
1800mm - 2000mm TAPERED ACOUSTIC PAINTED TIMBER PALING BOUNDARY FENCE, REFER ELEVATIONS

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Project
109 PLACE CHILD CARE
143 VINES ROAD, HAMLYN HEIGHTS, VIC

DRAWING
FIRST FLOOR PLAN

Scale As indicated Drawn LO
Client
Date 23/04/2026
Job No. 202500052
Dwg No. **DA04** Rev. - A3 SHEET

Appendix 2 – Unattended Noise Monitoring Results