



**PROPOSED CHILD CARE CENTRE
HOCKING SHOPPING CENTRE**

ENVIRONMENTAL ACOUSTIC ASSESSMENT

APRIL 2019

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ENVIRONMENTAL ACOUSTIC ASSESSMENT
CHILD CARE CENTRE – HOCKING SHOPPING CENTRE

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FOR

CRI PROPERTY SOLUTIONS

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1. INTRODUCTION

Herring Storer Acoustics were commissioned by CRI Property Solutions to undertake an acoustic assessment of noise emissions associated with the proposed development of a child care centre, located within the Hocking local Shopping Centre at Lot 179 East Road, Hocking.

The report considers noise received at the neighbouring premises from the proposed development for compliance with the requirements of the *Environmental Protection (Noise) Regulations 1997*. This report considers noise emissions from :

- Children playing within the outside play areas of the child care centre; and
- Mechanical services.

For reference, plans of the proposed development is attached in Appendix A.

2. SUMMARY

We understand that it is proposed that the child care centre would only operate between 6:00am and 7:00pm, Monday to Friday (excluding public holidays) and would cater for up to 72 children.

With the existing boundary fences, noise received at the neighbouring premises from children playing in the outdoor areas would comply with the requirements of the *Environmental Protection (Noise) Regulations 1997* during the day period. It is understood that although the child care centre would open before 7am, the outdoor play area would not to be utilised until after 7am. Hence, compliance with the requirements of the *Environmental Protection (Noise) Regulations 1997* would be achieved.

Noise from the mechanical services has been assessed to also comply with the relevant assigned noise levels at all times. However, the air conditioning condensing units should be located on the south eastern portion of the roof over the proposed child care centre.

With the restriction of usage to the outdoor play area to the day period and the location of air conditioning condensing units on the south eastern portion of the roof to the child care centre, noise emissions from the proposed child care centre, would be deemed to comply with the requirements of the *Environmental Protection (Noise) Regulations 1997* at all times.

3. CRITERIA

The allowable noise level at the surrounding locales is prescribed by the *Environmental Protection (Noise) Regulations 1997*. Regulations 7 & 8 stipulate maximum allowable external noise levels. For noise sensitive premises this is determined by the calculation of an influencing factor, which is then added to the base levels shown below in Table 3.1. The influencing factor is calculated for the usage of land within two circles, having radii of 100m and 450m from the premises of concern. For commercial premises, the assigned noise levels are fixed throughout the day, as listed in Table 3.1.

TABLE 3.1 - BASELINE ASSIGNED OUTDOOR NOISE LEVEL

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
Noise sensitive premises: highly sensitive area	0700 - 1900 hours Monday to Saturday (Day)	45 + IF	55 + IF	65 + IF
	0900 - 1900 hours Sunday and Public Holidays (Sunday / Public Holiday Day)	40 + IF	50 + IF	65 + IF
	1900 - 2200 hours all days (Evening)	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	35 + IF	45 + IF	55 + IF

Note: L_{A10} is the noise level exceeded for 10% of the time.
 L_{A1} is the noise level exceeded for 1% of the time.
 L_{Amax} is the maximum noise level.
 IF is the influencing factor.

It is a requirement that received noise be free of annoying characteristics (tonality, modulation and impulsiveness), defined below as per Regulation 9.

“impulsiveness” means a variation in the emission of a noise where the difference between L_{Apeak} and L_{Amax(Slow)} is more than 15 dB when determined for a single representative event;

“modulation” means a variation in the emission of noise that –

- (a) is more than 3 dB L_{Afast} or is more than 3 dB L_{Afast} in any one-third octave band;
- (b) is present for more at least 10% of the representative assessment period; and
- (c) is regular, cyclic and audible;

“tonality” means the presence in the noise emission of tonal characteristics where the difference between –

- (a) the A-weighted sound pressure level in any one-third octave band; and
- (b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3 dB when the sound pressure levels are determined as L_{Aeq,T} levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as L_{ASlow} levels.

Where the noise emission is not music, if the above characteristics exist and cannot be practicably removed, then any measured level is adjusted according to Table 3.2 below.

TABLE 3.2 - ADJUSTMENTS TO MEASURED LEVELS

Where tonality is present	Where modulation is present	Where impulsiveness is present
+5 dB(A)	+5 dB(A)	+10 dB(A)

Note: These adjustments are cumulative to a maximum of 15 dB.

For this development, the closest neighbouring residences are as shown on Figure 01.

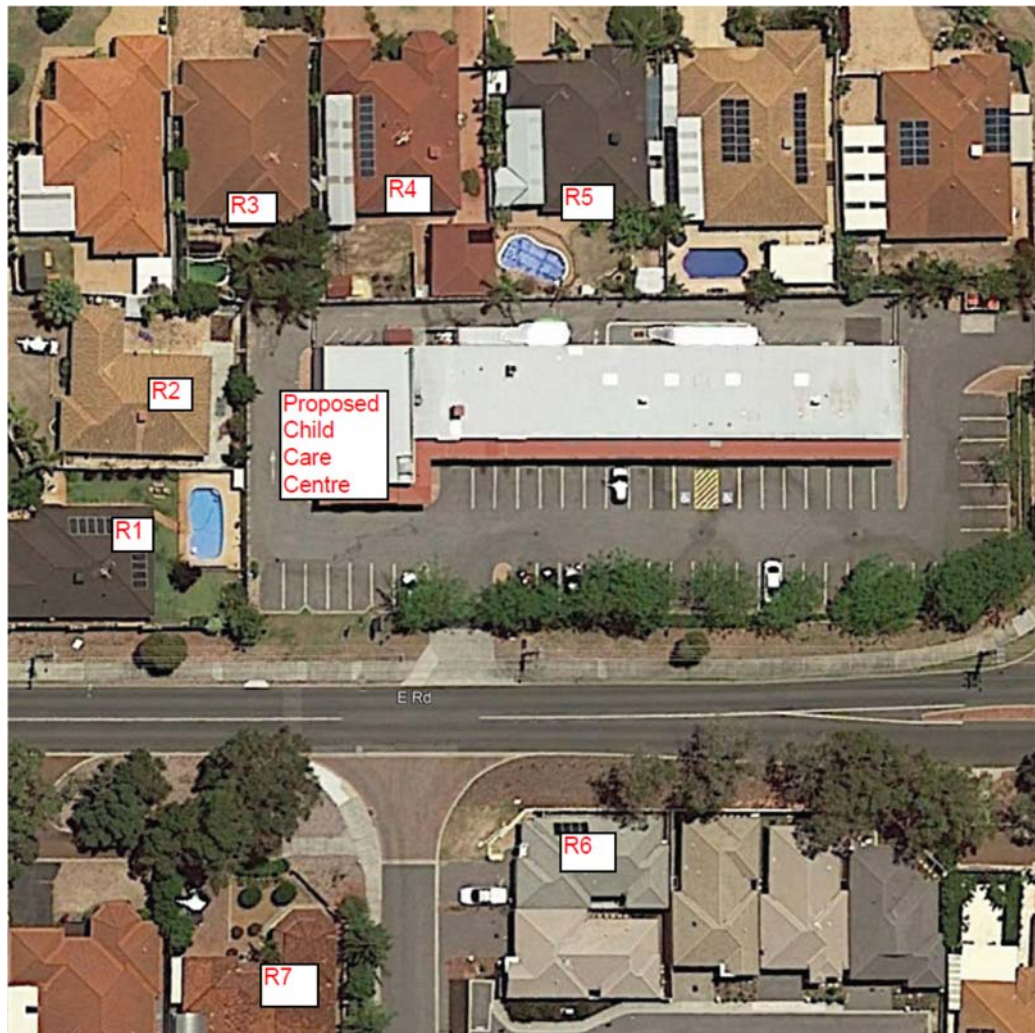


FIGURE 01 – NEIGHBOURING RESIDENCES

For residences R1 and R2, the Influencing Factor would be +7 dB(A), due to the proximity of Wanneroo Road. Thus, the traffic influencing factor would be +6 dB, with the influencing factor for the commercial usage being +1 dB.

For the other residences (R3 to R7) the Influencing Factor would be +3 dB, as Wanneroo Road, being a major road is within 450 metres of these residences. Again, the influencing factors for commercial premises (ie shopping centre) would be +1 dB.

Based on the above influencing factor, the assigned outdoor noise levels for the neighbouring residential locations are listed in Tables 3.3 and 3.4.

TABLE 3.3 - ASSIGNED OUTDOOR NOISE LEVEL FOR R1 AND R2

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L _{A 10}	L _{A 1}	L _{A max}
Noise sensitive premises	0700 - 1900 hours Monday to Saturday	51	61	71
	0900 - 1900 hours Sunday and Public Holidays	47	57	71
	1900 - 2200 hours all days	47	57	61
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	41	51	61

Note: L_{A10} is the noise level exceeded for 10% of the time.
 L_{A1} is the noise level exceeded for 1% of the time.
 L_{Amax} is the maximum noise level.

TABLE 3.4 - ASSIGNED OUTDOOR NOISE LEVEL FOR R3 TO R7

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L _{A 10}	L _{A 1}	L _{A max}
Noise sensitive premises	0700 - 1900 hours Monday to Saturday	48	58	68
	0900 - 1900 hours Sunday and Public Holidays	41	51	68
	1900 - 2200 hours all days	41	51	58
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	38	48	58

Note: L_{A10} is the noise level exceeded for 10% of the time.
L_{A1} is the noise level exceeded for 1% of the time.
L_{Amax} is the maximum noise level.

4. PROPOSAL

From information supplied, we understand that the child care centre normal hours of operations would be between 6:00am and 7:00pm, Monday to Friday (closed on public holidays). It is understood that the proposed childcare centre will cater for a maximum of 72 children.

Although, the child care centre would be open before 7am, it is understood that the outdoor play area would not be in use until after 7am. Therefore, noise received at the neighbouring premises from children within the outdoor area of the child care centre needs to comply with the assigned noise levels for the day period. However, noise received at the neighbouring residences from the mechanical services would need to comply with the assigned noise levels for the night period.

With regards to the air conditioning, we understand that the air conditioning has not been designed at this stage of the development. However, we suggest that the condensing units be located on the eastern section of the roof over the child care centre.

5. MODELLING

To assess the noise received at the neighbouring premises from the proposed development, noise modelling was undertaken using the noise modelling program SoundPlan.

Calculations were carried out using the DWER weather conditions as stated in the Department of Environment Regulation “*Draft Guidance on Environmental Noise for Prescribed Premises*”, relating to worst case noise propagation.

Calculations were based on the sound power levels used in the calculations are listed in Table 5.1.

TABLE 5.1 – SOUND POWER LEVELS

Item	Sound Power Level, dB(A)
Children Playing	83 (per 10 children)
Air conditioning condensing Units	4 @ 70

Note :

- Noise modelling was undertaken to a number of different receiver locations for each of the neighbouring residence, as shown in Figure 01. However, to simplify the assessment, only the noise level in the worst case location for each residence have been listed.

6. ASSESSMENT

Given the size of the outdoor play area, acoustic modelling has been based on 50 children playing outside within the outdoor play areas at the one time, utilising 5 groups of 10 children with sound power levels distributed as plane sources. The resultant noise levels at the neighbouring residence from children playing outdoors are tabulated in Table 6.1.

The resultant noise levels from the air conditioning at the neighbouring residences are also listed in Table 6.1.

Note : The noise modelling for the mechanical services does not include any diversity of operation. Thus, the assessment of the mechanical services would be considered conservative.

From previous measurements, noise emissions from children playing is a broadband noise and does not contain any annoying characteristics. Noise emissions from the mechanical services would be tonal and a +5 dB(A) penalty would be applied, as shown in Table 6.1.

**TABLE 6.1 - ACOUSTIC MODELLING RESULTS FOR L_{A10} CRITERIA
OUTDOOR PLAY AREAS AND MECHANICAL PLANT**

Neighbouring Premises	Calculated Noise Level (dB(A))	
	Children Playing	Air Conditioning
R1	49	30 (35)
R2	49	31 (36)
R3	48	26 (31)
R4	47	27 (32)
R5	45	25 (30)
R6	46	25 (30)
R7	47	24 (29)

() Includes +5 dB(A) penalty for tonality

Note : The noise contour plots are attached in Appendix B.

Tables 6.2 and 6.3 summarise the applicable Assigned Noise Levels, and assessable noise level emissions for each identified noise.

**TABLE 6.2 – ASSESSMENT OF L_{A10} NOISE LEVEL EMISSIONS
OUTDOOR PLAY (DAY PERIOD)**

Neighbouring Premises	Assessable Noise Level, dB(A)	Applicable Assigned Noise Level (dB(A))	Exceedance to Assigned Noise Level
R1	49	51	Complies
R2	49	51	Complies
R3	48	48	Complies
R4	47	48	Complies
R5	45	48	Complies
R6	46	48	Complies
R7	47	48	Complies

**TABLE 6.3 – ASSESSMENT OF L_{A10} DAY PERIOD NOISE LEVEL EMISSIONS
 ALL AIR CONDITIONING**

Neighbouring Premises	Assessable Noise Level, dB(A)	Applicable Assigned Noise Level (dB(A))	Exceedance to Assigned Noise Level
R1	35	41	Complies
R2	36	41	Complies
R3	31	38	Complies
R4	32	38	Complies
R5	23	38	Complies
R6	30	38	Complies
R7	29	38	Complies

7. CONCLUSION

It is proposed that the child care centre would only operate between 6:00am and 7:00pm, Monday to Friday (excluding Public Holidays) and would cater for up to 72 children.

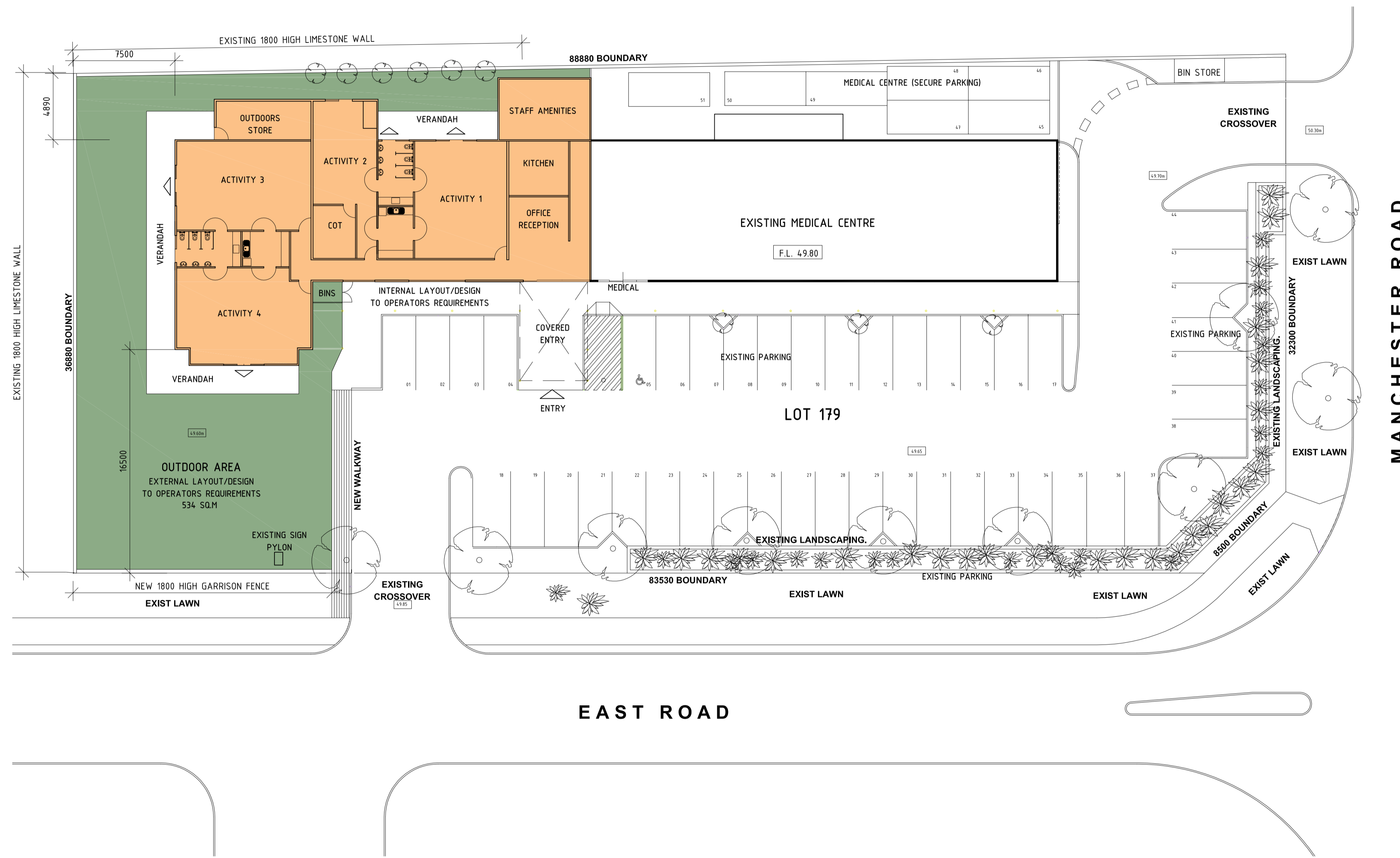
Noise received at the neighbouring premises from children playing in the outdoor areas shows that compliance with the *Environmental Protection (Noise) Regulations 1997* during the day period only. Although the child care centre would open before 7am, it is understood that the outdoor play area is not to be utilised until after 7am. Thus, achieving compliance with the requirements of the *Environmental Protection (Noise) Regulations 1997*.

Noise from the mechanical services has been assessed to also comply with the relevant assigned noise levels at all times. However, the air conditioning condensing units should be located on the south eastern portion of the roof over the proposed child care centre.

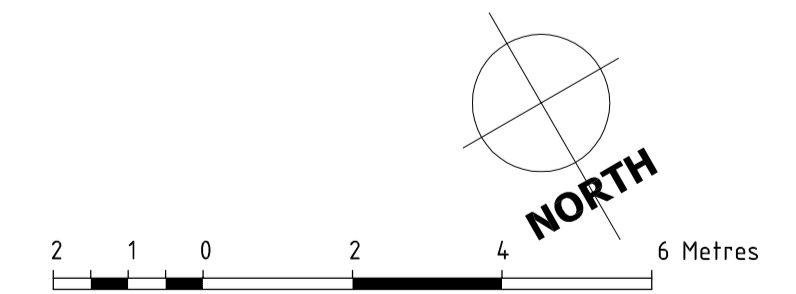
With the restriction of usage to the outdoor play area to the day period and the location of air conditioning condensing units on the south eastern portion of the roof to the child care centre, noise emissions from the proposed child care centre, would be deemed to comply with the requirements of the *Environmental Protection (Noise) Regulations 1997* at all times.

APPENDIX A

PLAN



TOTAL PARKING BAYS PROVIDED = 51



PRELIMINARY

FLOOR/SITE PLAN

NEW CHILD CARE FACILITY
AT LOT 179
EAST ROAD HOCKING

DRAWN	JF		
CHECKED			
APPROVED			
SCALE	1 : 200	A1	DATE MAY 19
JOB No.		FILE No.	
			SK-01 B

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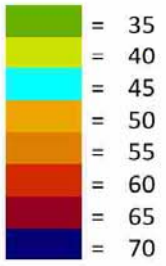


REV	DATE	
A	3.6.19	PRELIMINARY ISSUE
B	7.8.19	EXISTING LANDSCAPING ADDED - PEDESTRIAN WALKWAY FROM STREET ADDED. BIN ENCLOSURE ADDED.

APPENDIX B

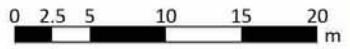
NOISE CONTOUR PLOTS

Noise level
LA10
in dB(A)



E Rd

Scale 1:500

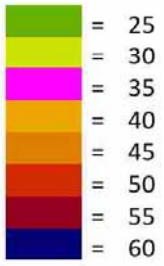


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Date : 16 September 2019

NOISE CONTOUR PLOT
OUTDOOR PLAY

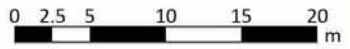
Figure B1
Appendix B

Noise level
LA10
in dB(A)



E Rd

Scale 1:500



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NOISE CONTOUR PLOT
MECHANICAL SERVICES

Figure B2
Appendix B