# PROPOSED CHILD CARE CENTRE
# VIRIDIAN BOULEVARD, AMBERTON BEACH

ENVIRONMENTAL ACOUSTIC ASSESSMENT

NOVEMBER 2019

OUR REFERENCE: 25091-2-19292

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# ENVIRONMENTAL ACOUSTIC ASSESSMENT

CHILD CARE CENTRE – AMBERTON BEACH

Job No: 19292

Document Reference : 25091-2-19292

FOR

# STOCKLAND

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# 1. INTRODUCTION

Herring Storer Acoustics were commissioned by Stockland to undertake an acoustic assessment of noise emissions associated with the proposed development of a child care centre, located at Lot 154 Corner of Viridian Boulevard and Heath Avenue, Amberton.

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.

We note that from information received from DWER, the bitumised area would be considered as a road, thus noise relating to the "propulsion and braking of motor vehicles" is exempt from the *Environmental Protection (Noise) Regulations 1997*. We note that these noise sources are rarely critical in the determination of compliance. However, for completeness, they have been included in the assessment, for information purposes only.

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 operate between 6:30am and 7:00pm, Monday to Friday (excluding public holidays) and would cater for up to 104 children.

Noise received at the neighbouring premises from children playing in the outdoor areas are calculated to comply with the *Environmental Protection (Noise) Regulations 1997* during the day period. 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, compliance with the requirements of the *Environmental Protection (Noise) Regulations 1997* is achieved at the neighbouring premises.

Noise from the mechanical services has been assessed to also comply with the relevant assigned noise levels at all times.

Based on the above assessment, 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 the future residences to the north west, the Influencing Factor would be +1 dB(A). For the existing residences to the south east and future residences to the south west, the Influencing Factor would be 0 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 FUTRUE RESIDENCES TO NORTH WEST**

| 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 | 46 | 56 | 66 |
| | 0900 - 1900 hours Sunday and Public Holidays | 41 | 51 | 66 |
| | 1900 - 2200 hours all days | 41 | 51 | 56 |
| | 2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays | 36 | 46 | 56 |

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 RESIDENCES TO SOUTH EAST AND FUTURE RESIDENCES TO SOUTH WEST**

| 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 | 45 | 55 | 65 |
| | 0900 - 1900 hours Sunday and Public Holidays | 40 | 50 | 65 |
| | 1900 - 2200 hours all days | 40 | 50 | 55 |
| | 2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays | 35 | 45 | 55 |

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 6:30am and 7:00pm, Monday to Friday (closed on public holidays). It is understood that the proposed childcare centre will cater for a maximum of 104 children. The breakdown of children would be :

| | |
|---|---|
| Babies (0 – 1 years) | 12 |
| 1 – 2 years | 12 |
| 2 – 3 years | 40 |
| 3+ years | 40 |

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 understand that the condensing units are to be located on the north west corner of the child care centre, adjacent to the bin store.

## 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 of Equipment | Sound Power Level, (dB(A)) |
|---|---|
| Children Playing | 83 (per 10 children) |
| Air Conditioning Condensing Units | 5 @ 72 |
| Cars moving | 79 |
| Car Start | 85 |
| Car Door | 87 |

The above noise sources need to comply with the following assigned noise levels :

$L_{A10}$ - Outdoor play and mechanical services.
$L_{A1}$ - Car movements.
$L_{AMax}$ - Car starts and doors closing.

With regards to noise emissions, the following are noted:

1 Noise associated with the mechanical services does not take into account any diversity of operation. Thus, this is a conservative assessment.

2 It has been assumed that the condensing units would be located on the north west corner of the development, in the alcove adjacent to the bin store.

3 Given the size of the outdoor play area, acoustic modelling of outdoor play noise was made, based on 80 children playing outside within the outdoor play areas at the one time, utilising 8 groups of 10 children with sound power levels distributed as plane sources.

## 6. RESULTS

The results of the noise modelling are listed in Tables 6.1 and 6.2.

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 could be tonal and a +5 dB(A) penalty, as shown in Table 6.1, has been applied to noise received at the neighbouring residences from the mechanical services.

Based on the definitions of tonality, noise emissions from car movements and cars starting, being an $L_{A1}$ and an $L_{AMax}$ respectively and present for less than 10% of the time, would not be considered tonal. However, the closing of a car door could be impulsive, thus a +10 dB(A) penalty, as shown in Table 6.2, has been applied to noise received at the neighbouring residences from the car doors.

**TABLE 6.1 – CALCULATED NOISE LEVELS FOR LA10 NOISE SOURCES**

| Location | Noise Source / Calculated Noise Levels (dB(A)) | |
|---|---|---|
| | Outdoor Play | Mechanical Services |
| North West | 46 | 31 (36) |
| South East | 45 | 13 (18) |
| South West | 37 | 25 (30) |

( ) Includes +5 dB(A) penalty of a tonal characteristic

Note : The noise modelling includes the barrier, as shown on Figure 5.1.

**TABLE 6.2 – CALCULATED NOISE LEVELS FOR LA1 AND LAMAX NOISE SOURCES**

| Location | Noise Source / Calculated Noise Levels (dB(A)) | | |
|---|---|---|---|
| | Car Movement | Car Start | Car Door |
| North West | 40 | 43 | 46 [56] |
| South East | 26 | 28 | 30 [40] |
| South West | 32 | 34 | 36 [46] |

( ) Includes +5 dB(A) penalty of a tonal characteristic
[ ] Includes +10 dB(A) penalty for impulsiveness

For information, noise contour plots are attached in Appendix B.

# 7. ASSESSMENT

## 7.1 $L_{A10}$ NOISE EMISSIONS

Tables 7.1 and 7.2 summarise the applicable Assigned Noise Levels, and assessable noise level emissions associated for the sources needing to comply with the $L_{A10}$ criteria.

**TABLE 7.1 – ASSESSMENT OF $L_{A10}$ NOISE LEVEL FOR OUTDOOR PLAY**

| Location | Assessable Noise Level, dB(A) | Applicable Times of Day | Applicable Assigned $L_{A10}$ Noise Level (dB) | Exceedance to Assigned Noise Level (dB) |
|---|---|---|---|---|
| North West | 46 | Day Period | 46 | Complies |
| South East | 45 | Day Period | 45 | Complies |
| South West | 37 | Night Period | 45 | Complies |

**TABLE 7.2 – ASSESSMENT OF $L_{A10}$ NOISE LEVEL FOR MECHANCIAL SERVICES**

| Location | Assessable Noise | Applicable Times | Applicable Assigned | Exceedance to |
|---|---|---|---|---|
| North West | 36 | Night Period | 36 | Complies |
| South East | 18 | Night Period | 35 | Complies |
| South West | 30 | Night Period | 35 | Complies |

## 7.2 $L_{A1}$ NOISE EMISSIONS

Table 7.3 summarises the applicable Assigned Noise Levels, and assessable noise level emissions for deliveries and car movements.

**TABLE 7.3 – ASSESSMENT OF $L_{A1}$ NOISE LEVEL EMISSIONS FOR CAR MOVEMENTS**

| Source | Assessable Noise Level, dB(A) | Applicable Times of Day | Applicable Assigned $L_{A1}$ Noise Level (dB) | Exceedance to Assigned Noise Level (dB) |
|---|---|---|---|---|
| North West | 40 | Night Period | 46 | Complies |
| South East | 26 | Night Period | 45 | Complies |
| South West | 32 | Night Period | 45 | Complies |

## 7.3 $L_{AMAX}$ NOISE EMISSIONS

Tables 7.4 and 7.5 summarises the applicable Assigned Noise Levels, and assessable noise level emissions for car starts and car doors closing.

**TABLE 7.4 – ASSESSMENT OF $L_{AMAX}$ NOISE LEVEL EMISSIONS FOR CAR START**

| Source | Assessable Noise Level, dB(A) | Applicable Times of Day | Applicable Assigned $L_{AMax}$ Noise Level (dB) | Exceedance to Assigned Noise Level (dB) |
|---|---|---|---|---|
| North West | 43 | Night Period | 56 | Complies |
| South East | 28 | Night Period | 55 | Complies |
| South West | 34 | Night Period | 55 | Complies |

**TABLE 7.5 – ASSESSMENT OF $L_{AMAX}$ NOISE LEVEL EMISSIONS FOR CAR DOOR**

| Source | Assessable Noise Level, dB(A) | Applicable Times of Day | Applicable Assigned $L_{AMax}$ Noise Level (dB) | Exceedance to Assigned Noise Level (dB) |
|---|---|---|---|---|
| North West | 56 | Night Period | 56 | Complies |
| South East | 40 | Night Period | 55 | Complies |
| South West | 46 | Night Period | 55 | Complies |

# 8. CONCLUSION

It is proposed that the child care centre would operate between 6:30am and 7:00pm, Monday to Friday (excluding Public Holidays) and would cater for up to 104 children.

Noise received at the neighbouring premises from children playing in the outdoor areas are calculated to comply with the *Environmental Protection (Noise) Regulations 1997* during the day period. 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, compliance with the requirements of the *Environmental Protection (Noise) Regulations 1997* is achieved at the neighbouring premises.

Noise from the mechanical services has been assessed to also comply with the relevant assigned noise levels at all times.

Based on the above assessment, 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

HEATH AVEN□E

O□d□□r P□□Ar□□ 2 □ 580 m²

□ □□□r□d A□r□□□□ D□□□□

V□r□□d□□ □□□r

P□□□S□□□□ 6
20 N° +3 yrs
73m²

P□□□S□□□□ □
20 N° +3 yrs
73 m²

P□□□S□□□□ □
20 N° 2-3 yrs
73 m²

P□□□S□□□□ □
20 N° 2-3 yrs
73 m²

P□□□S□□□□ 2
12 N° 1-2 yrs
49m²

P□□□S□□□□ □
12 N° 0-1 yrs
49 m²

O□d□□r P□□Ar□□ □
170.5 m²

V□r□d□□ □□□r

P□□□□

P□□□□□

P□□□□□□

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S□□r□d □□□□□

V□□□r □□□□r□□□

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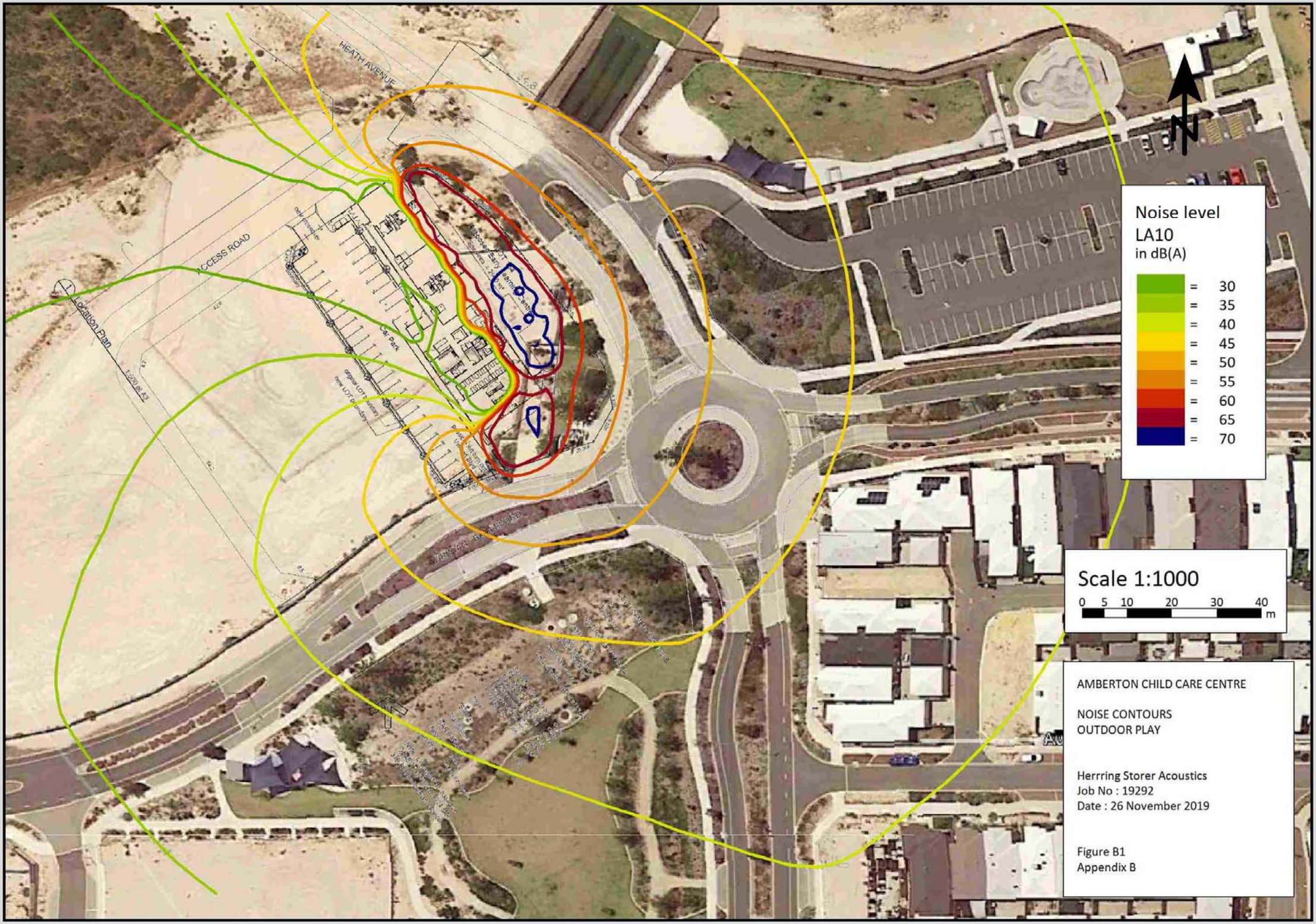
# APPENDIX B

NOISE CONTOUR PLOTS


HEATH AVENUE
ACCESS ROAD
Car Park
Location Plan
1:200 @ A3
Noise level
LA10
in dB(A)
= 30
= 35
= 40
= 45
= 50
= 55
= 60
= 65
= 70
Scale 1:1000
0 5 10 20 30 40
m
AMBERTON CHILD CARE CENTRE
NOISE CONTOURS
OUTDOOR PLAY
Herrring Storer Acoustics
Job No : 19292
Date : 26 November 2019
Figure B1
Appendix B


HEATH AVENUE
ACCESS ROAD
Location Plan
Noise level
LA10
in dB(A)
= 30
= 35
= 40
= 45
= 50
= 55
= 60
= 65
= 70
Scale 1:1000
0 5 10 20 30 40
m
AMBERTON CHILD CARE CENTRE
NOISE CONTOURS
MECHANICAL SERVICES
Herrring Storer Acoustics
Job No : 19292
Date : 21 November 2019
Figure B2
Appendix B


HEATH AVENUE
ACCESS ROAD
Location Plan
1:500 @ A3
Noise level
LA1
in dB(A)
= 30
= 35
= 40
= 45
= 50
= 55
= 60
= 65
= 70
Scale 1:1000
0 5 10 20 30 40
m
AMBERTON CHILD CARE CENTRE
NOISE CONTOURS
CAR MOVEMENTS WITHIN CAR PARK
Herrring Storer Acoustics
Job No : 19292
Date : 21 November 2019
Figure B3
Appendix B


HEATH AVENUE
ACCESS ROAD
Location Plan
1:200 @ A3
Noise level
LAMax
in dB(A)
= 30
= 35
= 40
= 45
= 50
= 55
= 60
= 65
= 70
Scale 1:1000
0 5 10 20 30 40
m
AMBERTON CHILD CARE CENTRE
NOISE CONTOURS
CARS STARTING
Herrring Storer Acoustics
Job No : 19292
Date : 21 November 2019
Figure B4
Appendix B


HEATH AVENUE
ACCESS ROAD
Location Plan
Car Park
Noise level
LAMax
in dB(A)
= 30
= 35
= 40
= 45
= 50
= 55
= 60
= 65
= 70
Scale 1:1000
0 5 10 20 30 40
m
AMBERTON CHILD CARE CENTRE
NOISE CONTOURS
CAR DOORS CLOSING
Herrring Storer Acoustics
Job No : 19292
Date : 21 November 2019
Figure B5
Appendix B