HERRING STORER ACOUSTICS

PROPOSED SERVICE STATION

MYCAR SERVICE CENTRE
HARRISDALE

ENVIRONMENTAL ACOUSTIC ASSESSMENT

DECEMBER 2020

OUR REFERENCE: 27000-3-20351

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ENVIRONMENTAL ACOUSTIC ASSESSMENT

PROPOSED DEVELOPMENT; HARRISDALE

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FOR

Stockland WA Development Pty Ltd

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1. INTRODUCTION

Herring Storer Acoustics were commissioned by NSPM on behalf of Stockland WA Development Pty Ltd to undertake an acoustic assessment of noise emissions associated with the proposed MyCar service centre to be located within 120 Yellowwood Avenue, Harrisdale.

This report assesses noise emissions from the premises with regards to compliance with the requirements of the *Environmental Protection (Noise) Regulations 1997*. This report considers noise emissions from :

- Mechanical Services;
- Workshop noise;
- Car door closing.

We note that from recent information received from the 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, we have also provided an assessment of the noise emissions from the following:

- Car movements on site; and
- Car starts.

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

2. SUMMARY

The closest neighbouring residences to this development are located to the west of the development, across Nicholson Road. As the service centre only operates during the day period, noise received at the neighbouring noise sensitive premises from these noise sources needs to comply with the appropriate assigned noise levels for the day period.

Noise from the mechanical services, and the general service centre noise would occur for more than 10% of the time, hence noise received at the neighbouring premises needs to comply with the assigned L_{A10} noise levels. Where as, car movements and the impact wrench would occur for less than 10% of the time and need to be assessed against the assigned L_{A1} noise levels.

Other sources, being car starting and car doors closing, would occur for less than 1% of the time. Thus, these noise sources need to be assessed against the assigned L_{AMax} assigned noise level.

From the analysis undertaken, noise emissions from the proposed development has been assessed to comply with the requirements of the *Environmental Protection (Noise) Regulations 1997* and no noise mitigation is required.

3. CRITERIA

The allowable noise level for noise sensitive premises in the vicinity of the proposed Facility site is prescribed by the *Environmental Protection (Noise) Regulations 1997*. Regulations 7 and 8 stipulate maximum allowable external noise levels or assigned noise levels that can be received at a premise from another premises. For residential premises, this noise level is determined by the calculation of an influencing factor, which is then added to the base levels shown below. The influencing factor is calculated for the usage of land within two circles, having radii of 100m and 450m from the premises of concern. The base noise levels for residential premises and the assigned noise levels for industrial premises are 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 residential premises of concern are located to the west of Nicholson Road, as shown on Figure 3.1 below.

FIGURE 3.1 – AREA AROUND PROPOSED DEVELOPMENT

The influencing factor at the nearest residential locations to the west of Nicholson Road have been determined to be +4 dB. Thus, the assigned noise levels at the neighbouring residences would be as listed in Table 3.3.

TABLE 3.3 - ASSIGNED OUTDOOR NOISE LEVEL

Premises Receiving Noise	**Time of Day**	**Assigned Level (dB)**		
		$L_{A\ 10}$	**$L_{A\ 1}$**	**$L_{A\ max}$**
Noise sensitive premises : Highly sensitive area	0700 - 1900 hours Monday to Saturday	49	59	69
	0900 - 1900 hours Sunday and Public Holidays	44	54	69
	1900 - 2200 hours all days	44	54	59
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	39	49	59

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. MODELLING

Modelling of the noise propagation from the proposed development was carried out using an environmental noise modelling computer program, "SoundPlan". Calculations were carried out using the EPA weather conditions as stated in the Environmental Protection Authority's *"Draft Guidance for Assessment of Environmental Factors No.8 - Environmental Noise"*.

For a car service centre, the noise emissions from the development, include:

- Mechanical Services;
- Service centre;
- Car Movements;
- Cars Starting; and
- Car doors closing.

The calculations were based in the sound power levels listed in Tables 4.1 to 4.4.

TABLE 4.1 – GENERAL SOUND POWER LEVELS

Item of Equipment	Sound Power Level, (dB(A))
Cars moving	81
Car Start	85
Car Door	87

TABLE 4.2 – MECHANICAL SERVICES NOISE LEVELS

Plant Item	Sound Power Level dB(A)
Air Conditioning Condensing Units	2 at 72
Exhaust Systems	1 at 81 1 at 67

TABLE 4.3 –SERVICE CENTRE

Item	Sound Power Level dB(A)
Service Centre (Impact wrench)	102
General service Centre Noise	78

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

L_{A10} - Mechanical services and general noise from service centre,.
L_{A1} - Car movement and service centre (Impact Wrench).
L_{AMax} - Car start 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. Such diversity would occur during the night period. Thus, this is a conservative assessment. At this stage of the project, the mechanical service has not been design. Therefore, the noise sources have been based on designs used for the same or similar tenancies.

2 It has been assumed that the mechanical services would be located on the roof.

5. RESULTS

Calculations were undertaken to the residences located across Nicholson Road. However, to simplify the assessment, only the worst case noise level for each source has been listed. The resultant noise levels are listed in Table 5.1.

TABLE 5.1 – WORST CASE CALCULATED NOISE LEVELS

Item	Calculated Noise Levels (dB(A))
Mechanical services	30
Service Centre (General Noise)	26
Service Centre (Impact Wrench)	51
Car Movement	36
Car Start	42
Car Door	43

6. ASSESSMENT

The following provided the acoustic assessment for the noise sources requiring compliance, as listed in Table 5.1.

For those sources that are exempt from the Regulations, the assessments are attached in Appendix B.

6.1 L_{A10} NOISE EMISSIONS – MECHANICAL SERVICES

Noise emissions from the mechanical services would be steady state and would operate for the majority of time. Hence noise received from the mechanical services needs to comply with the assigned L_{A10} noise level.

Given the resultant noise level at the residences and likely background noise level associated noise from vehicles travelling along Nicholson Road, we believe that it is unlikely that noise received at the neighbouring residences would be tonal. However, again to be conservative, a +5 dB(A) penalty has been applied to the calculated noise level associated with the mechanical services. Table 6.1 lists the characteristics that should be included in the assessable noise level.

TABLE 6.1 – APPLICABLE ADJUSTMENTS AND ASSESSABLE L_{A10} NOISE LEVELS, dB(A)
MECHANICAL SERVICES

Calculated Noise Level, dB(A)	Applicable Adjustments to Measured Noise Levels, dB(A)			Assessable Noise Level, dB(A)
	Where Noise Emission is NOT music			
	Tonality	Modulation	Impulsiveness	
30	+5	-	-	35

Table 6.2 shows the applicable Assigned Noise Levels, and assessable noise level emissions associated for the scenarios associated with the mechanical services.

TABLE 6.2 – ASSESSMENT OF L_{A10} NOISE LEVEL EMISSIONS
MECHANICAL SERVICES

Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable Assigned L_{A10} Noise Level (dB)	Exceedance to Assigned Noise Level (dB)
35	Day Period	49	Complies

6.2 L_{A10} NOISE EMISSIONS – SERVICE CENTRE

Noise emissions from the Service Centre would operate for more than 10% of the time. Hence noise received from the Service Centre needs to comply with the assigned L_{A10} noise level.

We believe that the service centre would not operate during the night period, however, it could be open on a Sunday or Public Holiday. Thus, noise from this activity needs to comply with the assigned noise levels for the Sunday / Public Holiday day period.

Again, given the resultant noise level at the residences and likely background noise level associated noise from vehicles travelling along Nicholson Road, we believe that it is unlikely that noise received at the neighbouring residences would be tonal. However, again to be conservative, a +5 dB(A) penalty has been applied to the calculated noise level associated with the service centre. Table 6.3 lists the characteristics that should be included in the assessable noise level.

TABLE 6.3 – APPLICABLE ADJUSTMENTS AND ASSESSABLE L_{A10} NOISE LEVELS, dB(A)
SERVICE CENTRE

Calculated Noise Level, dB(A)	Applicable Adjustments to Measured Noise Levels, dB(A)			Assessable Noise Level, dB(A)
	Where Noise Emission is NOT music			
	Tonality	Modulation	Impulsiveness	
26	+5	-	-	31

Table 6.4 shows the applicable Assigned Noise Levels, and assessable noise level emissions associated for the scenarios associated with the service centre.

TABLE 6.4 – ASSESSMENT OF L_{A10} NOISE LEVEL EMISSIONS
SERVICE CENTRE

Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable Assigned L_{A10} Noise Level (dB)	Exceedance to Assigned Noise Level (dB)
31	Sunday Day Period	44	Complies

6.3 L_{A1} NOISE EMISSIONS – IMPACT WRENCH

Noise emissions from the Impact Wrench would be assessed under the L_{A1} criteria.

Based on the definitions of tonality, noise emissions from Impact Wrench, being an L_{A1} and present for less than 10% of the time, would not be considered tonal. Thus, the assessable noise levels are as listed in Table 5.1. Table 6.5 shows the applicable Assigned Noise Levels, and assessable noise level emissions associated for the scenarios associated with the Impact Wrench.

TABLE 6.5 – ASSESSMENT OF L_{A1} NOISE LEVEL EMISSIONS IMPACT WRENCH

Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable Assigned L_{A1} Noise Level (dB)	Exceedance to Assigned Noise Level (dB)
51	Day Period	59	Complies

6.4 L_{A1} NOISE EMISSIONS – CAR MOVEMENT

Noise emissions from the car movements would be assessed under the L_{A1} criteria.

Based on the definitions of tonality, noise emissions from car movements, being an L_{A1} and present for less than 10% of the time, would not be considered tonal. Thus, the assessable noise levels are as listed in Table 5.1. Table 6.6 shows the applicable Assigned Noise Levels, and assessable noise level emissions associated for the scenarios associated with car movements.

TABLE 6.6 – ASSESSMENT OF L_{A1} NOISE LEVEL EMISSIONS CAR MOVEMENT

Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable Assigned L_{A1} Noise Level (dB)	Exceedance to Assigned Noise Level (dB)
36	Day Period	59	Complies

6.5 L_{AMAX} NOISE EMISSION – CAR START

If assessed under the Regulations, noise emissions from car starts needs to comply with the assigned L_{AMax} noise level.

Based on the definitions of tonality, noise emissions from car movements, being an L_{A1} and present for less than 10% of the time, would not be considered tonal. Thus, the assessable noise levels are as listed in Table 5.1. Table 6.7 shows the applicable Assigned Noise Levels, and assessable noise level emissions associated for the scenarios associated with car starts.

**TABLE 6.7 – ASSESSMENT OF L_{AMAX} NOISE LEVEL EMISSIONS
CAR START**

Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable Assigned L_{AMax} Noise Level (dB)	Exceedance to Assigned Noise Level (dB)
42	Day Period	69	Complies

6.6 L_{AMAX} NOISE EMISSION – CAR DOOR

Noise emissions from a car door closing on site need to comply with the assigned L_{AMax} noise level. As the critical period for compliance for this source is the night period, this scenario includes noise emissions from the sources associated with L_{AMax} noise levels. However, under the Regulations, each of these sources needs to be considered individually, it is the highest calculated noise levels used for assessment, rather than the cumulative overall noise levels.

Noise associated with the closing of a car door could be impulsive and to be conservative, a +10 dB(A) penalty for impulsiveness would be applied.

Table 6.8 list the characteristics that should be included and the assessable noise levels and the assessable noise level for car doors closing.

**TABLE 6.8 – APPLICABLE ADJUSTMENTS AND ASSESSABLE L_{AMAX} NOISE LEVELS, dB(A)
CAR DOOR**

Calculated Noise Level, dB(A)	Applicable Adjustments to Measured Noise Levels, dB(A)			Assessable Noise Level, dB(A)
	Where Noise Emission is NOT music			
	Tonality	Modulation	Impulsiveness	
43	-	-	+10	53

Table 6.9 shows the applicable Assigned Noise Levels, and assessable noise level emissions associated for the scenarios associated with the car doors closing.

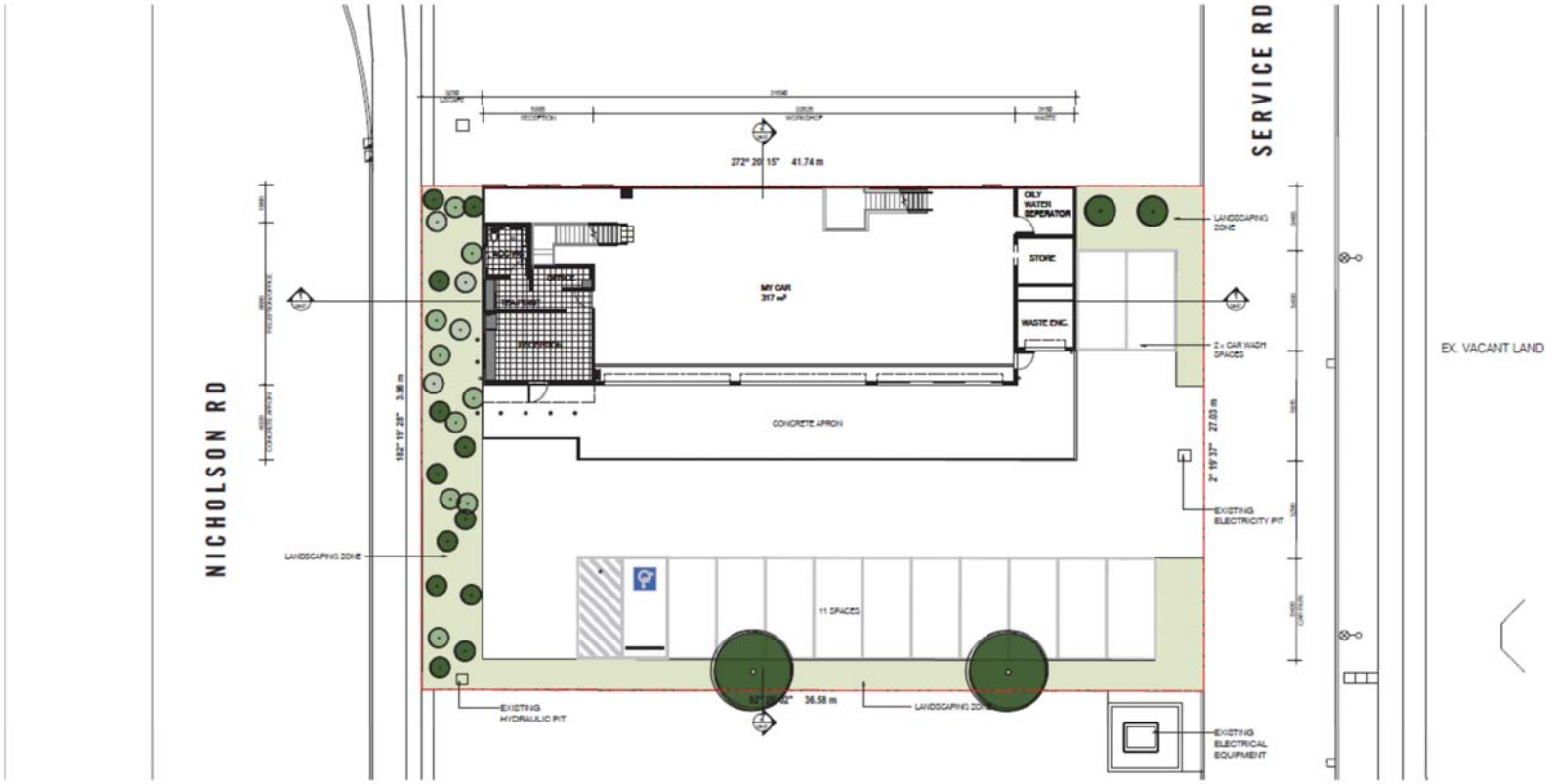
**TABLE 6.9 – ASSESSMENT OF L_{AMAX} NOISE LEVEL EMISSIONS
CAR DOOR**

Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable Assigned L_{AMax} Noise Level (dB)	Exceedance to Assigned Noise Level (dB)
53	Day Period	69	Complies

From the above assessments, it can be seen that noise received at the neighbouring residences, even using a conservative analysis, complies with the requirements of the *Environmental Protection (Noise) Regulations 1997* at all times. However, as the mechanical services design would only be confirmed as part of the next design phase, it is recommended that an acoustic review of the mechanical services be undertaken once the design has been finalised, to ensure compliance is achieved.

APPENDIX A

PLAN


NICHOLSON RD
SERVICE RD
EX. VACANT LAND
OILY WATER SEPERATOR
STORE
WASTE ENC.
MY CAR
317 m²
CONCRETE APRON
LANDSCAPING ZONE
2 x CAR WASH SPACES
EXISTING ELECTRICITY PIT
11 SPACES
EXISTING HYDRAULIC PIT
EXISTING ELECTRICAL EQUIPMENT
272° 20' 15" 41.74 m
182° 19' 28" 3.98 m
2° 19' 37" 27.03 m
36.58 m