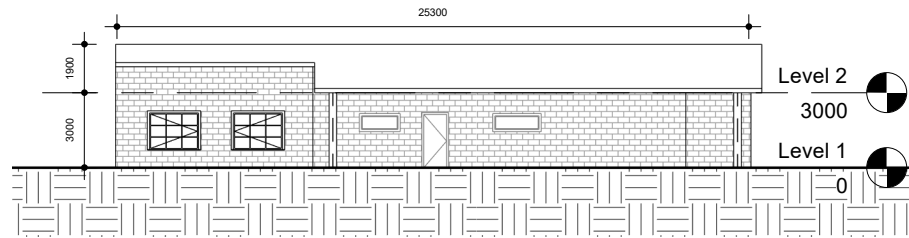
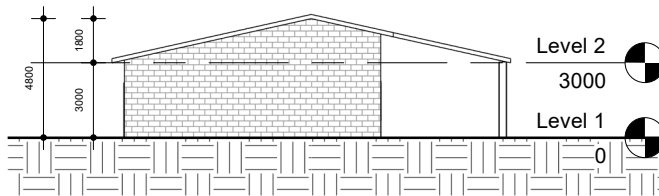


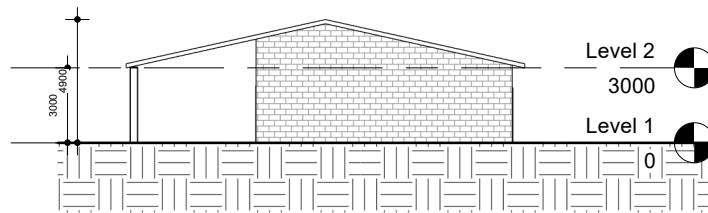
1 South Elevation
1 : 200



2 North Elevation
1 : 200



3 East Elevation
1 : 200



4 West Elevation
1 : 200

Scale 1 : 200

5/04/2023 12:24:05 PM



EXISTING AUTOMOTIVE WORKSHOP

**10 WALTERS ROAD
BYFORD**

ENVIRONMENTAL ACOUSTIC ASSESSMENT

MAY 2023

OUR REFERENCE: 31052-1-23123

DOCUMENT CONTROL PAGE

ENVIRONMENTAL ACOUSTIC ASSESSMENT AUTOMOTIVE WORKSHOP

Job No: 23123

Document Reference: 31052-1-23123

FOR

DERVISH AUTO REPAIRS

DOCUMENT INFORMATION				
Author:	Ashwin Sharma	Checked By:	George Watts	
Date of Issue:	18 May 2023			
REVISION HISTORY				
Revision	Description	Date	Author	Checked
DOCUMENT DISTRIBUTION				
Copy No.	Version No.	Destination	Hard Copy	Electronic Copy
1	1	Dervish Auto Repairs Attn: Eray Ed Dervish Email: ed@dervishautorepairs.com		✓

This report has been prepared in accordance with the scope of services and on the basis of information and documents provided to Herring Storer Acoustics by the client. To the extent that this report relies on data and measurements taken at or under the times and conditions specified within the report and any findings, conclusions or recommendations only apply to those circumstances and no greater reliance should be assumed. The client acknowledges and agrees that the reports or presentations are provided by Herring Storer Acoustics to assist the client to conduct its own independent assessment.

Herring Storer Acoustics

CONTENTS

1.	INTRODUCTION	1
2.	SUMMARY	1
3.	CRITERIA	1
4.	MODELLING	5
5.	RESULTS	7
6.	ASSESSMENT	7
6.1	L _{A1} Noise Emissions – Mechanical Equipment	7
6.2	L _{Amax} Noise Emissions – Car Door Slams	9

APPENDICIES

A	Plans and Photos
---	------------------

1. INTRODUCTION

Herring Storer Acoustics were commissioned by Dervish Auto Repairs to undertake an acoustic assessment of noise emissions associated with the existing automotive workshop located at 10 Walters Road, Byford. The workshop consists of two working areas – an outdoor area and an indoor garage. It is noted that there are proposed extensions to the workshop, and these are shown in Appendix A.

This report assesses noise emissions from the premises with regards to compliance with the requirements of the *Environmental Protection (Noise) Regulations 1997*. It is understood that the workshop consists of a range of mechanical equipment, with the noise assessable units being:

- Compressor
- Tech Gun
- Rattle Gun
- Air Gun
- Ratchet Gun
- Car door slams.

For reference, the plan for the proposed development is attached in Appendix A.

2. SUMMARY

The closest neighbouring residences to this development are located to the west, north, east and south of the development. As the facility is open from 0730 to 1800 hours on weekdays and Saturdays, noise received at the neighbouring noise (highly) sensitive premises from these noise sources needs to comply with the appropriate assigned noise levels for all periods.

Analysis of the noise from the workshop shows that compliance with the assigned L_{A1} noise levels would be achieved with the following noise mitigation measures in place:

- o Rattle and air guns not to be operated outside.
- o Doors to be closed when operating rattle and air guns inside workshop.

From the analysis undertaken, noise emissions from the development have been assessed to comply with the requirements of the *Environmental Protection (Noise) Regulations 1997* at all times with the above noise mitigation measures in place.

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
Commercial Premises	All times	60	75	80

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, as shown on Figure 3.1 below.



FIGURE 3.1 – AREA AROUND PROPOSED DEVELOPMENT

The influencing factor has been calculated for the premises listed in Figure 3.1. This is shown below in Figure 3.2.

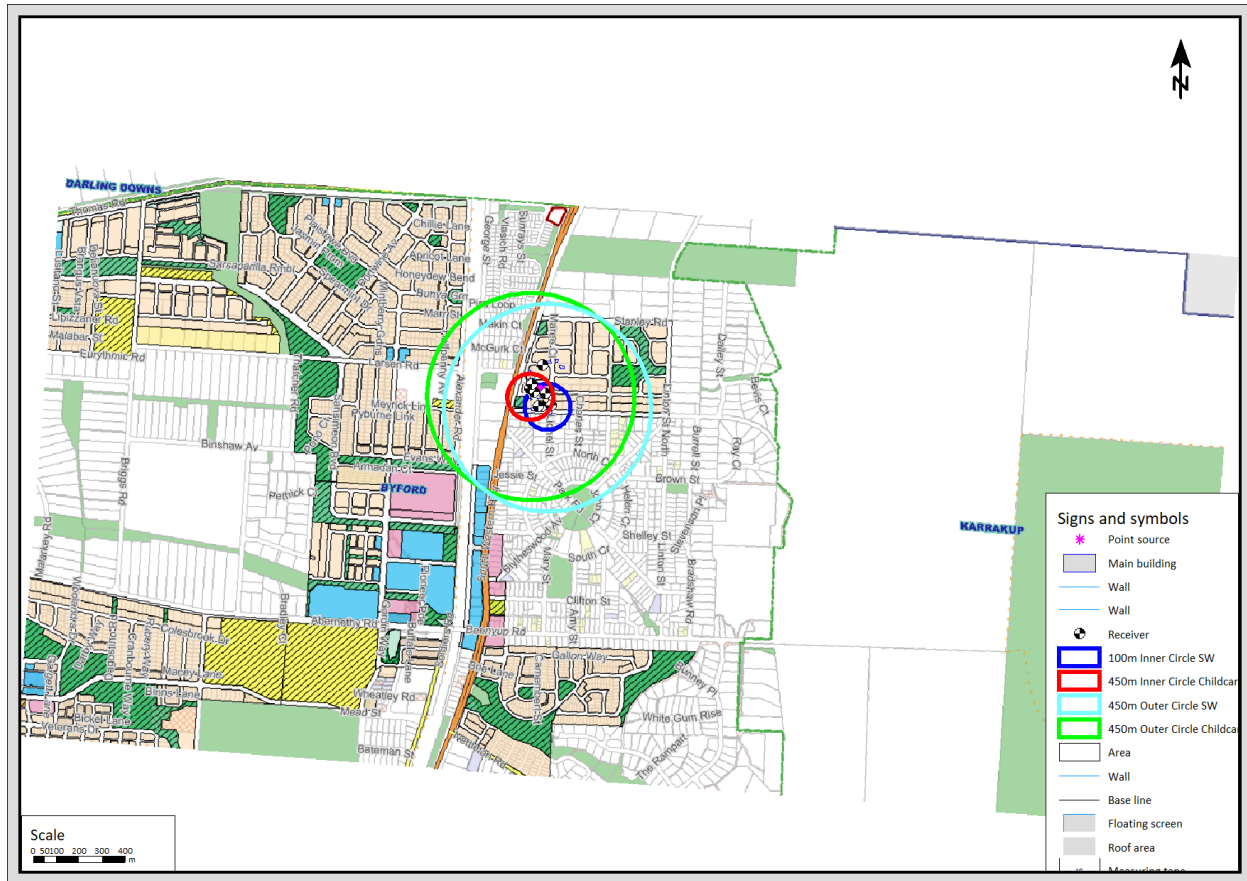


FIGURE 3.2 – LAND USE MAP FOR INFLUENCING FACTOR CALCULATION

The areas in blue on the map are zoned for commercial use by the Shire of Serpentine/Jarrahdale.

The influencing factors at the nearest residential locations to the vehicle mechanic have been determined as summarised in Table 3.3.

TABLE 3.3 – INFLUENCING FACTORS

Influencing Factor Parameter	Influencing Factor (dB) R1, R2, R3
Major Road within inner circle	+6
Major Road within outer circle	+2
Secondary Road within inner circle	0
Commercial Premises within inner circle	0
Commercial Premises within outer circle	+0.06
TOTAL IF	+6.06
Influencing Factor Parameter	Influencing Factor (dB) R4 – R8
Major Road within inner circle	0
Major Road within outer circle	+2
Secondary Road within inner circle	0
Commercial Premises within inner circle	0
Commercial Premises within outer circle	+0.06
TOTAL IF	+2.06

Note: The total transport factor due to roads can be a maximum of 6dB. The influencing factor is always rounded to the nearest whole number, so therefore there is an addition of **6dB** for receivers R1, R2 and R3 and an influencing factor of **+2dB** for receivers R4 to R8.

Based on the above, the assigned noise levels are as listed in Table 3.4.

**TABLE 3.4 - ASSIGNED OUTDOOR NOISE LEVEL
 FOR RESIDENCES IN RESIDENTIAL LOT 1**

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L _{A 10}	L _{A 1}	L _{A max}
Noise sensitive premises: Highly sensitive area R1, R2, R3	0700 - 1900 hours Monday to Saturday	51	61	71
	0900 - 1900 hours Sunday and Public Holidays	46	56	61
	1900 - 2200 hours all days	46	56	61
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	41	51	61
Noise sensitive premises: Highly sensitive area R4-R8	0700 - 1900 hours Monday to Saturday	47	57	67
	0900 - 1900 hours Sunday and Public Holidays	41	51	57
	1900 - 2200 hours all days	41	51	57
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	37	47	57
Commercial Premises	All times	60	75	80

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” using the CONCAWE algorithm. 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”.

Ground absorption was considered in the model and uses values of 0.65 for grassed areas, and 0.1 for paved areas such as roads and car parks.

Google Earth ground contours were utilised to account for the topography of the area.

Noise emissions from the development, include:

- Compressor
- Tech Gun
- Rattle Gun
- Air Gun
- Ratchet Gun
- Car Door Slams

The calculations were based in the sound power levels listed in Table 4.1.

TABLE 4.1 –EQUIPMENT SOUND POWER LEVELS

Plant Item	Sound Power Level dB(A)
Compressor	65
Tech Gun	74
Rattle Gun	96
Air Gun	87
Ratchet Gun	83
Car Door Slams	86

It was ascertained that during operation of the workshop, it is unlikely that more than one piece of 'noisy' machinery will operate at any one time due to the size of the operation and the low number of personnel (a maximum of two workers at any one time).

Therefore, the modelling was conducted to simulate the maximum noise received at a noise sensitive premise from any one of the noise sources at a time. These levels were assessed against the L_{A1} criteria.

Modelling was also conducted with the rattle gun and air gun not operating outside, and with the doors of the workshop closed when these two items were operating on the inside.

Modelling was also conducted with the proposed extensions in place, but it was found that these extensions did not affect the noise levels at the receivers significantly.

Car door slams were assessed separately against the $L_{A_{Max}}$ criteria.

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

L_{A1} - Mechanical Equipment

$L_{A_{Max}}$ - Car door slams

Figure 4.1 below illustrates the location of all sources and receivers within the model.



FIGURE 4.1 – SOURCE AND RECEIVER LOCATION

5. RESULTS

Calculations were undertaken to all the residences noted on Figure 4.1.

Table 5.1 and 5.2 below show the calculated noise levels at all the receivers.

**TABLE 5.1 – CALCULATED NOISE LEVELS
NOISE SOURCES REQUIRING COMPLIANCE – ALL MECH EQUIPMENT**

Item	Calculated Noise Levels (dB(A))							
	R1	R2	R3	R4	R5	R6	R7	R8
Mech Equipment	61	61	62	45	44	44	54	51
Car Door Slams	46	42	42	49	26	24	37	34

**TABLE 5.2 – CALCULATED NOISE LEVELS
NOISE SOURCES REQUIRING COMPLIANCE – MECH EQUIPMENT (NO RATTLE AND AIR GUN OUTSIDE,
WORKSHOP DOORS CLOSED WHEN OPERATING RATTLE AND AIR GUNS INSIDE)**

Item	Calculated Noise Levels (dB(A))							
	R1	R2	R3	R4	R5	R6	R7	R8
Mech Units	34	31	32	35	23	34	44	41
Car Door Slams	46	42	42	49	26	24	37	34

6. ASSESSMENT

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

6.1 L_{A1} NOISE EMISSIONS – MECHANICAL EQUIPMENT

During operation, noise emissions from the workshop would not occur for more than 1% of the time. Most work done within the workshop is not noisy in nature. The nature of operation of the mechanical units listed in Table 4.1 means they are used infrequently and only operate for short periods of time during each use. Thus, noise received at the neighbouring residences needs to comply with the assigned L_{A1} noise levels.

The nature of the equipment used means that the sound emitted may contain impulsive characteristics, so the penalty for impulsiveness has been applied.

Based on the information above, the resultant and assessable noise levels are shown in Table 6.1 below.

**TABLE 6.1 – APPLICABLE ADJUSTMENTS AND ASSESSABLE L_{A1} NOISE LEVELS, dB(A)
VEHICLE MECHANIC – DAY PERIOD (ALL MECH EQUIPMENT)**

Location	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	
R1	61	-	-	+10	71
R2	61	-	-	+10	71
R3	62	-	-	+10	72
R4	45	-	-	+10	55
R5	44	-	-	+10	54
R6	44	-	-	+10	54
R7	54	-	-	+10	64
R8	51	-	-	+10	61

Table 6.2 below shows the assessable noise levels compared to the applicable levels for each receiver.

**TABLE 6.2 – ASSESSMENT OF L_{A1} NOISE LEVEL EMISSIONS
VEHICLE MECHANIC (DAY PERIOD, ALL MECH UNITS)**

Location	Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable Assigned L _{A1} Noise Level (dB)	Exceedance to Assigned Noise Level (dB)
R1	71	Day Period	61	+10
R2	71	Day Period	61	+10
R3	72	Day Period	61	+11
R4	55	Day Period	57	Complies
R5	54	Day Period	57	Complies
R6	54	Day Period	57	Complies
R7	64	Day Period	57	+7
R8	61	Day Period	57	+4

The resultant and assessable noise levels for the scenario where the rattle and air guns do not operate outside, and the workshop doors are closed are shown in Table 6.3 below.

**TABLE 6.3 – APPLICABLE ADJUSTMENTS AND ASSESSABLE L_{A1} NOISE LEVELS, dB(A)
VEHICLE MECHANIC – DAY PERIOD UNITS (NO RATTLE AND AIR GUN OUTSIDE, WORKSHOP
DOORS CLOSED WHEN OPERATING RATTLE AND AIR GUNS INSIDE)**

Location	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	
R1	34	-	-	+10	44
R2	31	-	-	+10	41
R3	32	-	-	+10	42
R4	35	-	-	+10	45
R5	23	-	-	+10	33
R6	34	-	-	+10	44
R7	44	-	-	+10	54
R8	41	-	-	+10	51

Table 6.4 below shows the assessable noise levels compared to the applicable levels for each receiver.

**TABLE 6.4 – ASSESSMENT OF L_{A1} NOISE LEVEL EMISSIONS
VEHICLE MECHANIC (DAY PERIOD, NO RATTLE AND AIR GUN OUTSIDE, WORKSHOP DOORS
CLOSED WHEN OPERATING RATTLE AND AIR GUNS INSIDE)**

Location	Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable Assigned L _{A1} Noise Level (dB)	Exceedance to Assigned Noise Level (dB)
R1	44	Day Period	61	Complies
R2	41	Day Period	61	Complies
R3	42	Day Period	61	Complies
R4	45	Day Period	57	Complies
R5	33	Day Period	57	Complies
R6	44	Day Period	57	Complies
R7	54	Day Period	57	Complies
R8	51	Day Period	57	Complies

From the above assessments, it can be seen that noise received at the neighbouring residences, complies with the requirements of the *Environmental Protection (Noise) Regulations 1997* during all periods, with the following noise mitigation applied to the carwash:

- Rattle and air guns not to be operated outside.
- Doors to be closed when operating rattle and air guns in inside workshop.

6.2 L_{AMAX} NOISE EMISSIONS – CAR DOOR SLAMS

During operation, noise emissions from car door slams would occur for less than 1% of the time and are thus assessed against the assigned L_{AMAX} noise criteria.

The noise has the potential to contain impulsive characteristics, so has been assessed the penalty for impulsiveness.

Based on the information above, the resultant noise levels are shown in Table 6.5 below.

**TABLE 6.5 – APPLICABLE ADJUSTMENTS AND ASSESSABLE L_{A10} NOISE LEVELS, dB(A)
CAR DOOR SLAMS – NIGHT PERIOD**

Location	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	
R1	46	-	-	+10	56
R2	42	-	-	+10	52
R3	42	-	-	+10	52
R4	49	-	-	+10	59
R5	26	-	-	+10	36
R6	24	-	-	+10	34
R7	37	-	-	+10	47
R8	34	-	-	+10	44

The assessable noise levels are compared to the relevant criteria in Table 6.6 below.

**TABLE 6.6 – ASSESSMENT OF L_{A10} NOISE LEVEL EMISSIONS
CAR DOOR SLAMS (NIGHT PERIOD)**

Location	Assessable Noise Level, dB(A)	Applicable Times of Day	Applicable Assigned L _{AMax} Noise Level (dB)	Exceedance to Assigned Noise Level (dB)
R1	56	All Hours	71	Complies
R2	52	All Hours	71	Complies
R3	52	All Hours	71	Complies
R4	59	Night Period	67	Complies
R5	36	Night Period	67	Complies
R6	34	Night Period	67	Complies
R7	47	Night Period	67	Complies
R8	44	Night Period	67	Complies

It is noted that compliance with the night time period implies compliance with all other periods.

APPENDIX A

PLANS AND PHOTOS

