



## **WOOLWORTHS GROUP**

**WOOLWORTHS COMMERCIAL DEVELOPMENT  
TWO ROCKS**

**PRELIMINARY ENVIRONMENTAL ACOUSTIC ASSESSMENT**

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**ENVIRONMENTAL ACOUSTIC ASSESSMENT**  
**WOOLWORTHS TWO ROCKS COMMERCIAL DEVELOPMENT**

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FOR

**WOOLWORTHS GROUP**

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## 1. INTRODUCTION

Herring Storer Acoustics were commissioned by Woolworths Group to undertake an acoustic assessment of noise emissions associated with the proposed commercial development located on Part Lot 9702 Enterprise Avenue, Two Rocks.

The objective of this study was to assess noise emissions from delivery vehicles and mechanical services at the premises surrounding the proposed site for compliance with the requirements of the *Environmental Protection (Noise) Regulations 1997*.

Existing and proposed premises have been considered in this assessment.

This preliminary assessment was undertaken to inform the design development team and accompany the development application.

## 2. SUMMARY

Refrigerated truck deliveries have been calculated to comply at all times.

Smaller truck deliveries, such as bakery deliveries, have been calculated to comply at all times.

Noise levels associated with the typical mechanical plant assumed for the purposes of this preliminary assessment have been calculated to comply at all times.

It is noted that the mechanical plant assumed in our assessment is indicative only, as selection of equipment has not been undertaken at this early stage of development. It is considered appropriate that an assessment of noise level emissions associated with the development would be a condition of approval.

## 3. CRITERIA

### 3.1 ENVIRONMENTAL PROTECTION (NOISE) REGULATIONS 1997

The *Environmental Protection (Noise) Regulations 1997* stipulate the allowable noise levels at any noise sensitive premises from other premises. The allowable noise level is determined by the calculation of an influencing factor, which is added to the baseline criteria set out in Table 1 of the Regulations. The baseline assigned noise levels are listed in Table 3.1.

**TABLE 3.1 – ASSIGNED NOISE LEVELS**

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L <sub>A 10</sub>	L <sub>A 1</sub>	L <sub>A max</sub>
Noise sensitive premises within 15 metres of a dwelling (Highly Sensitive Areas)	0700 - 1900 hours Monday to Saturday	45 + IF	55 + IF	65 + IF
	0900 - 1900 hours Sunday and Public Holidays	40 + IF	50 + IF	65 + IF
	1900 - 2200 hours all days	40 + IF	50 + IF	55 + IF
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays	35 + IF	45 + IF	55 + IF
Commercial Premises	All Hours	60	75	80

Note: The L<sub>A10</sub> noise level is the noise that is exceeded for 10% of the time.  
 The L<sub>A1</sub> noise level is the noise that is exceeded for 1% of the time.  
 The L<sub>Amax</sub> noise level is the maximum noise level recorded.

It is a requirement that noise from the site be free of annoying characteristics (tonality, modulation and impulsiveness) at other premises, defined below as per Regulation 9.

**“impulsiveness”** means a variation in the emission of a noise where the difference between L<sub>Apeak</sub> and L<sub>Amax Slow</sub> is more than 15dB when determined for a single representative event;

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

- (a) is more than 3dB L<sub>A Fast</sub> or is more than 3dB L<sub>A Fast</sub> 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<sub>Aeq,T</sub> 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<sub>A Slow</sub> levels.

Where the above characteristics are present and cannot be practicably removed, the following adjustments are made to the measured or predicted level at other premises.

**TABLE 3.2 – ADJUSTMENTS FOR ANNOYING CHARACTERISTICS**

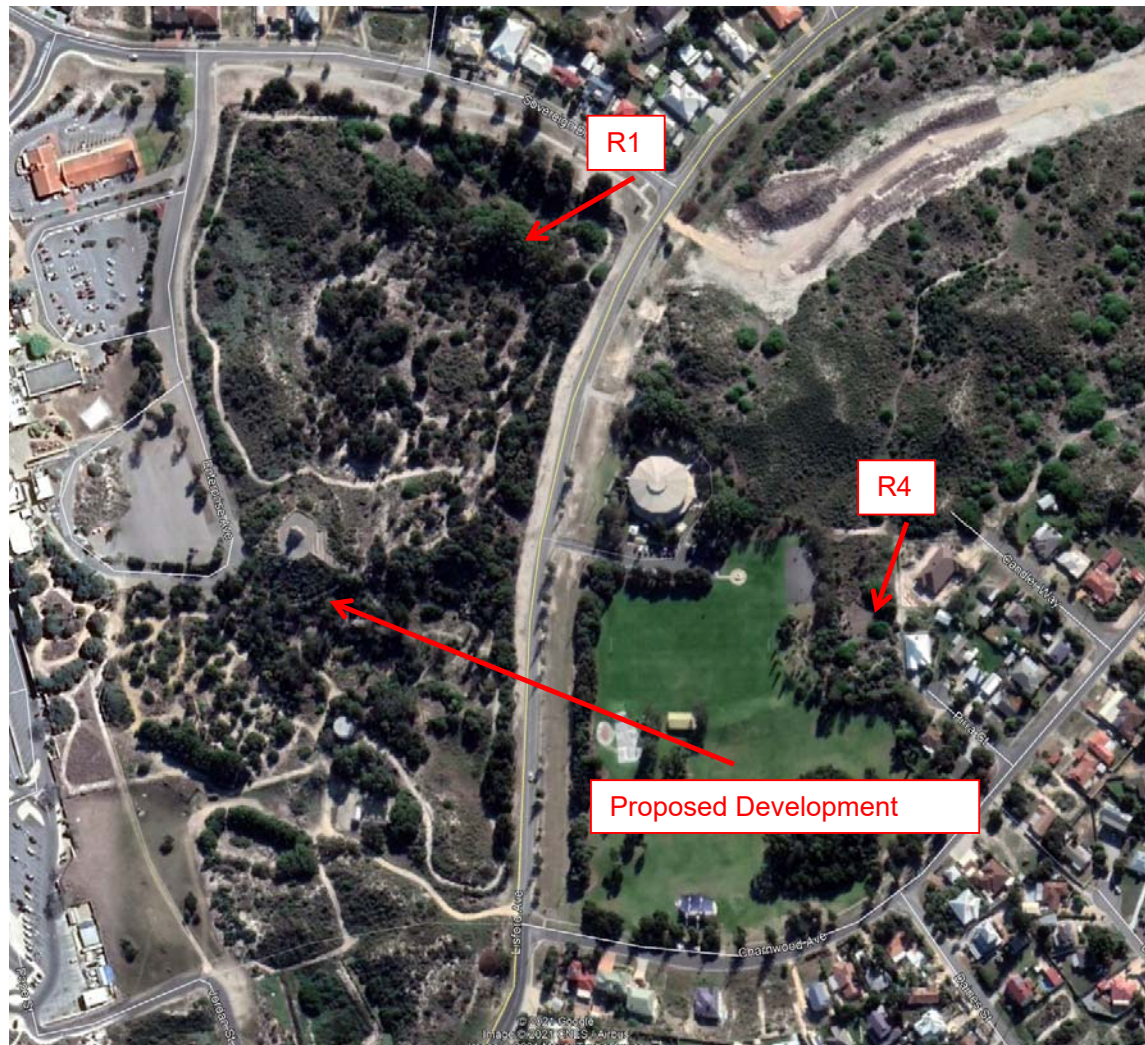
Where tonality is present	Where modulation is present	Where impulsiveness is present
+ 5 dB	+ 5 dB	+ 10 dB

Where the noise emission is music, if the music is audible, then any measured level is adjusted according to Table 3.3 below.

**TABLE 3.3 – ADJUSTMENTS TO MEASURED MUSIC NOISE LEVELS**

Where <b>impulsiveness</b> is not present	Where <b>impulsiveness</b> is present
+10 dB(A)	+15 dB(A)

The following locations have been determined to require an assessment of noise level emissions. It is noted that some locations are proposed, whilst others are existing premises.



**FIGURE 3.1 – RECEIVER POINTS**

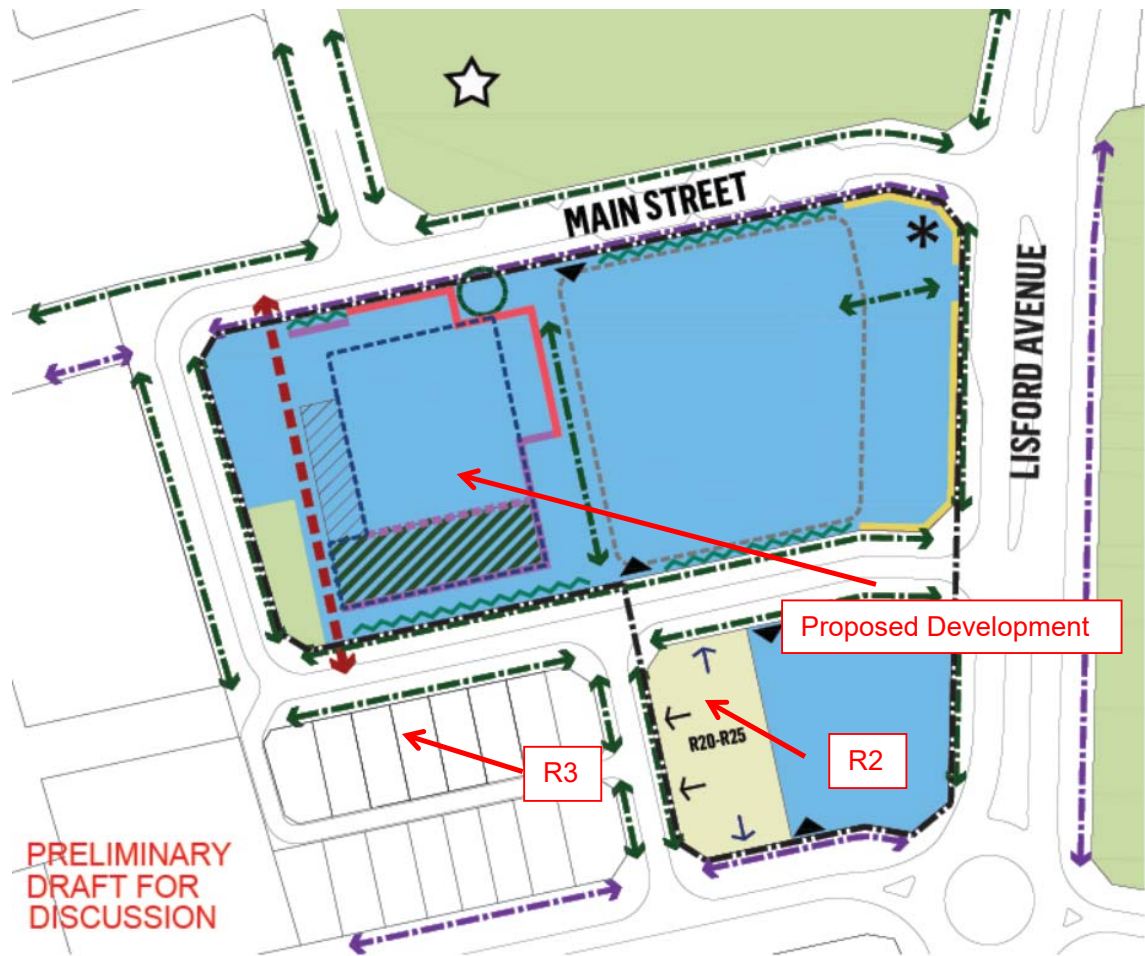


FIGURE 3.2 – RECEIVER POINTS

The influencing factor at the identified noise sensitive premises has been estimated at 0 dB.

Based on the above influencing factor, the assigned outdoor noise levels are listed in Table 3.4.

TABLE 3.4 - ASSIGNED OUTDOOR NOISE LEVEL FOR R1 AND R7

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L <sub>A</sub> 10	L <sub>A</sub> 1	L <sub>A</sub> max
Noise sensitive premises	0700 - 1900 hours Monday to Saturday (Day)	45	55	65
	0900 - 1900 hours Sunday and Public Holidays (Sundays)	40	50	65
	1900 - 2200 hours all days (Evening)	40	50	55
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	35	45	55

Note: L<sub>A</sub>10 is the noise level exceeded for 10% of the time.  
 L<sub>A</sub>1 is the noise level exceeded for 1% of the time.  
 L<sub>A</sub>max is the maximum noise level.

#### 4. PROPOSED DELIVERIES

The use of the delivery dock is understood to accommodate 15m articulated delivery trucks and have been assumed to be refrigerated trucks (i.e worst case scenario). In addition to the larger deliveries, smaller delivery vehicles (i.e. for bakery goods) have been assumed to be a 13m rigid truck.

## 5. MECHANICAL PLANT

Mechanical plant details have been based on information provided for previous Woolworths stores, with information listed in Table 6.3 below. This equipment has been located on the roof of the proposed development above/near the loading dock area.

## 6. METHODOLOGY

Noise modelling of the noise propagation from the site was carried out using the environmental noise modelling computer program, "SoundPlan". Single point calculations were undertaken.

Input data for computer modelling included:

- Location of store as per drawings in Appendix A.
- EPA standard weather condition for the day and night periods (see Table 6.1).
- Sound power levels, as summarised in Table 6.2 and 6.3.

**TABLE 6.1 - WEATHER CONDITIONS**

Condition	Day Period	Night Period
Temperature	20 °C	15 °C
Relative humidity	50%	50%
Pasquil Stability Class	E	F
Wind speed	4 m/s*	3 m/s*

\* From source to receiver

**TABLE 6.2 – SOUND POWER LEVELS OF DELIVERY VEHICLES**

DESCRIPTION	dB(A)
15m articulated delivery truck with refrigeration unit	97
13m rigid delivery truck	85

**TABLE 6.3 – SOUND POWER LEVELS OF MECHANICAL PLANT**

DESCRIPTION	dB(A)
Kitchen Exhaust Fan	83 dB(A)
Exhaust Fans	3 @ 70 dB(A)
Refrigeration Equipment	2 @ 88 dB(A)
Packaged Air Conditioning Unit	75 dB(A)

For the above sound power levels, single point calculations were undertaken for the following scenarios :

**Scenario 1 :** One large refrigerated truck delivery.

**Scenario 2 :** One 13m rigid truck delivery (bakery delivery).

**Scenario 3 :** Mechanical Plant.

Note : For the noise to be less than 10% of the time and be assessed under the  $L_{A1}$  assigned noise levels, the truck engines and refrigeration units would need to be turned off while unloading is occurring.



The  $L_{A1}$  assigned noise level would be the pertinent prescribed noise level in this instance (for deliveries) as the duration of time that the noise of the deliveries is present is less than 10% of a representative time period. The noise associated with the delivery is the manoeuvring of the truck into place, upon which the truck is switched off – hence – even if the delivery takes some time (i.e. 30 – 60 minutes) the noise level associated with the truck is not present throughout the duration of the delivery.

It is noted that this also means the noise assessment is more “realistic” as if the  $L_{A10}$  parameter was to be used as the noise level associated with the truck is not present for more than 10% of a representative time period, the  $L_{A10}$  noise level would be at the ambient noise level of the area, rather than the truck noise.

## 7. RESULTS

Single point calculations were undertaken for all locations shown in Figure 3.1, with the results of the modelling listed in Table 7.1. It is noted that for the locations with multiple floors, the highest noise level has been utilized for ease of report.

**TABLE 7.1 – RESULTANT NOISE LEVEL**

Receiver Location	Scenario / Calculated Noise Level, (dB(A))		
	Scenario 1	Scenario 2	Scenario 3
R1	11	0	27
R2	20	8	28
R3	45	33	28
R4	9	0	24

Given the location and the nature of the noise emissions, noise received at the neighbouring residences are unlikely to be tonal. However, to be conservative, the +5 dB(A) penalty has been added to the assessable noise level, noting that this is only applicable to mechanical services noise. Given the definitions of tonality in accordance with the Environmental Protection (Noise) Regulations 1997, truck deliveries would not be considered tonal. Therefore, Table 7.2 lists the assessable noise level for each scenario (including the adjustment for tonality where applicable).

**TABLE 7.2 – ASSESSABLE NOISE LEVELS**

Receiver Location	Scenario / Assessable Noise Level, (dB(A))		
	Scenario 1	Scenario 2	Scenario 3
R1	11	0	32
R2	20	8	33
R3	45	33	33
R4	9	0	29

Tables 7.3 and 7.4 compares the assessable noise level for large truck deliveries and small truck deliveries against the relevant  $L_{A1}$  Assigned Noise Levels for the day, evening (and Sundays) and night periods. Noise levels that are calculated to exceed the relevant criteria are listed in red.

**TABLE 7.3 – ASSESMENT OF NOISE LEVEL – SCENARIO 1 – LARGE TRUCK DELIVERIES**

Receiver Location	Assessable Noise Level, dB(A)	Assigned Noise Level, L <sub>A1</sub> dB		Exceedance to Assigned Noise Level
	Scenario 1	Time of Day	L <sub>A1</sub> dB	
R1	11	Day	55	Complies
		Sundays	50	Complies
		Evening	50	Complies
		Night	45	Complies
R2	20	Day	55	Complies
		Sundays	50	Complies
		Evening	50	Complies
		Night	45	Complies
R3	45	Day	55	Complies
		Sundays	50	Complies
		Evening	50	Complies
		Night	45	Complies
R4	9	Day	55	Complies
		Sundays	50	Complies
		Evening	50	Complies
		Night	45	Complies

**TABLE 7.4 – ASSESMENT OF NOISE LEVEL – SCENARIO 2 – SMALL TRUCK DELIVERIES**

Receiver Location	Assessable Noise Level, dB(A)	Assigned Noise Level, L <sub>A1</sub> dB		Exceedance to Assigned Noise Level
	Scenario 2	Time of Day	L <sub>A1</sub> dB	
R1	0	Day	55	Complies
		Sundays	50	Complies
		Evening	50	Complies
		Night	45	Complies
R2	8	Day	55	Complies
		Sundays	50	Complies
		Evening	50	Complies
		Night	45	Complies
R3	33	Day	55	Complies
		Sundays	50	Complies
		Evening	50	Complies
		Night	45	Complies
R4	0	Day	55	Complies
		Sundays	50	Complies
		Evening	50	Complies
		Night	45	Complies

Table 7.5 compares the assessable noise level for mechanical plant against the relevant  $L_{A10}$  Assigned Noise Levels for the day, evening (and Sundays) and night periods. Noise levels that are calculated to exceed the relevant criteria are listed in red.

**TABLE 7.5 – ASSESMENT OF NOISE LEVEL – SCENARIO 3 – MECHANICAL PLANT**

Receiver Location	Assessable Noise Level, dB(A)	Assigned Noise Level, $L_{A10}$ dB		Exceedance to Assigned Noise Level
	Scenario 3	Time of Day	$L_{A10}$ dB	
R1	27	Day	45	Complies
		Sundays	40	Complies
		Evening	40	Complies
		Night	35	Complies
R2	28	Day	45	Complies
		Sundays	40	Complies
		Evening	40	Complies
		Night	35	Complies
R3	28	Day	45	Complies
		Sundays	40	Complies
		Evening	40	Complies
		Night	35	Complies
R4	24	Day	45	Complies
		Sundays	40	Complies
		Evening	40	Complies
		Night	35	Complies

Refrigerated truck deliveries have been calculated to comply at all times

Smaller truck deliveries, such as bakery deliveries, have been calculated to comply at all times.

Noise levels associated with the typical mechanical plant assumed for the purposes of this preliminary assessment have been calculated to comply with the Assigned Noise Levels at all times.

It is noted that the mechanical plant assumed in our assessment is indicative only, as selection of equipment has not been undertaken at this early stage of development. It is considered appropriate that an assessment of noise level emissions associated with the development would be a condition of approval.



**WOOLWORTHS SITE - STAGE 1**

SITE AREA	16229m <sup>2</sup>
WOOLWORTHS (WITH EXPANSION)	3600m <sup>2</sup>
WOOLWORTHS (WITHOUT EXPANSION)	2506m <sup>2</sup>
FUTURE EXPANSION - INCL. OFFICE MEZZANINE	1100m <sup>2</sup>
SPECIALTY 1 (BWS)	201m <sup>2</sup>
CAFE	65m <sup>2</sup>
SPECIALTY 2	87m <sup>2</sup>
SPECIALTY 3	242m <sup>2</sup>
<b>TOTAL AREA</b>	<b>4221m<sup>2</sup></b>
<b>PARKING REQUIRED</b>	<b>211 BAYS</b>
WW - 5 BAYS/100m <sup>2</sup> GLA	
<b>PARKING PROVIDED</b>	<b>258 BAYS</b>
GENERAL	245 BAYS
STREET PARKING	10 BAYS
PICKUP	6 BAYS
<b>TOTAL</b>	<b>258 BAYS</b>

**LISFORD AVENUE DEVELOPMENT - STAGE 1**

SITE AREA	1451m <sup>2</sup>
RETAIL / COMMERCIAL	519 m <sup>2</sup>
<b>PARKING REQUIRED</b>	<b>26 BAYS</b>
5 BAYS/100m <sup>2</sup> GLA	
<b>PARKING PROVIDED</b>	<b>23 BAYS</b>
GENERAL	23 BAYS
STREET PARKING	3 BAYS
<b>TOTAL</b>	<b>26 BAYS</b>

**FUTURE DEVELOPMENT SITE**

SITE AREA	1015 m <sup>2</sup>
ESTIMATE COMMERCIAL AREA	420 m <sup>2</sup>
<b>ESTIMATE PARKING REQUIRED</b>	<b>21 BAYS</b>
PARKING 5 BAYS/100m <sup>2</sup> GLA	

SITE PLAN  
1:500