Attachment Six

Environmental Acoustic Assessment

MAZE ARCHITECTS

ALDI STORE
YANCHEP

ENVIRONMENTAL ACOUSTIC ASSESSMENT

FEBRUARY 2020

OUR REFERENCE: 25396-1-20043

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ENVIRONMENTAL ACOUSTIC ASSESSMENT

ALDI STORE – YANCHEP

Job No: 20043

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FOR

MAZE ARCHITECTS

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APPENDICES

1. INTRODUCTION

Herring Storer Acoustics were commissioned by ALDI, through Maze Architects, to undertake an acoustic assessment of noise emissions associated with the proposed Aldi Store to be located in Yanchep, on the corner of Kakadu Road and Yanchep Beach Road.

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

The assessment was undertaken to inform the design development team of the store and accompany the development application submission for the proposed development.

The site plan is attached in Appendix A.

2. SUMMARY

Noise emissions associated with the proposed Aldi store have been determined to comply with the *Environmental Protection (Noise) Regulations 1997* – with the exception of large truck deliveries during the night period at "R3" only, if "R3" was noise sensitive.

It is noted that the status of "R3" is not known at this stage. The location could be a commercial premise, in which case noise levels associated with the proposed Aldi store are calculated to comply at all times.

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)		
		$L_{A\ 10}$	$L_{A\ 1}$	$L_{A\ max}$
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

Note: The L_{A10} noise level is the noise that is exceeded for 10% of the time.
The L_{A1} noise level is the noise that is exceeded for 1% of the time.
The L_{Amax} 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_{Apeak} and $L_{Amax\ Slow}$ 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 $L_{A\ Fast}$ or is more than 3dB $L_{A\ Fast}$ 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 $L_{A\ Slow}$ 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

The following locations have been determined to require an assessment of noise level emissions.

It is noted that R2 and R3 have been assumed as potential future residential premises, however, this is to ensure a conservative assessment as no information has been provided in this regard.

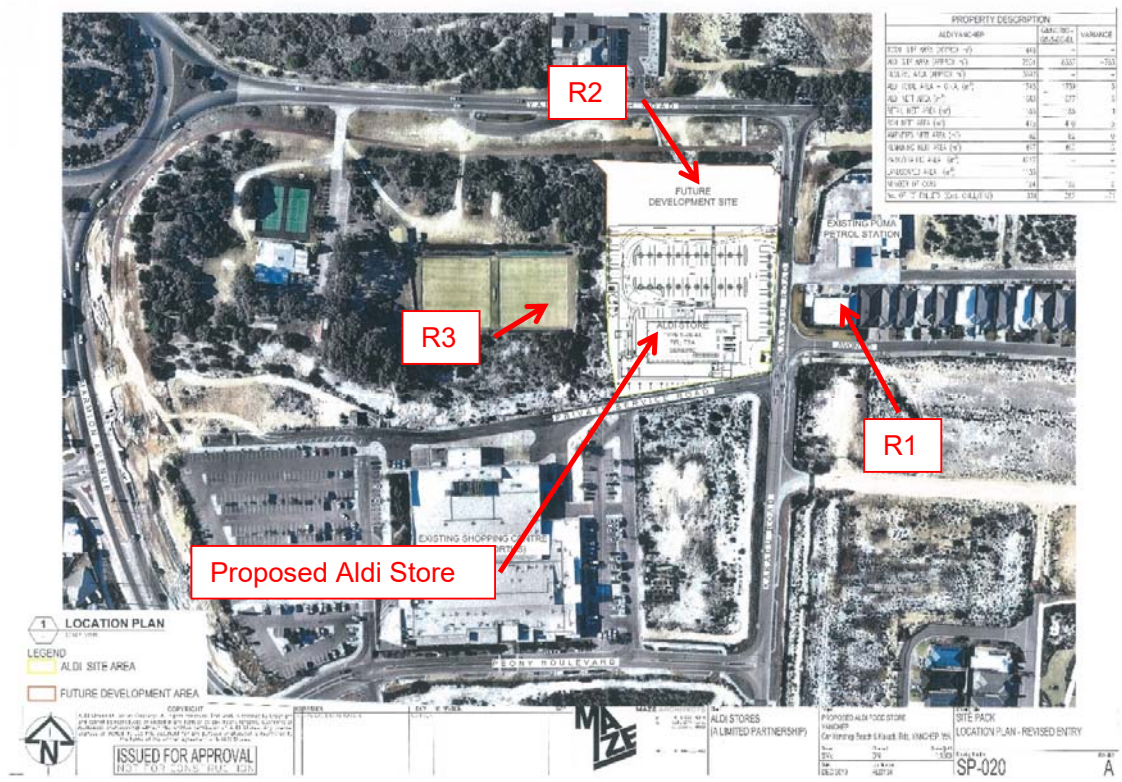


FIGURE 3.1 – RECEIVER POINTS

The influencing factor at the identified noise sensitive premises has been estimated as follows :

Major Road within the outer circle;
Marmion Ave + 2 dB

Commercial Premises within the inner circle;
40 % + 2 dB

Commercial Premises within the outer circle;
20 % + 1 dB

Hence, the influencing factor is estimated at 8 dB (rounded down).

Based on the above influencing factor, the assigned outdoor noise levels are listed in Table 3.3.

TABLE 3.3 - ASSIGNED OUTDOOR NOISE LEVEL FOR R1 TO R3

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 (Day)	50	60	70
	0900 - 1900 hours Sunday and Public Holidays (Sundays)	45	55	70
	1900 - 2200 hours all days (Evening)	45	55	60
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and Public Holidays (Night)	40	50	60

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. PROPOSED DELIVERIES

The use of the delivery dock is understood to accommodate 19m articulated delivery trucks, and have been assumed to be refrigerated trucks (i.e worst case scenario). In addition to the larger deliveries a bakery delivery occurring between 5am and 7am each morning has been assumed to be a 13m rigid truck.

The truck types assumed in our assessment have been determined through consultation with ALDI stores.

It is noted that the delivery dock is directly accessed via a public place (carpark), hence we have only considered delivery truck noise levels as they enter the dock itself – outside of this space, the trucks are in a public area and therefore compliance with the Regulations are not applicable and hence have not been considered.

It is noted that the parapet wall associated with the child care centre has been included in our modelling (i.e. approximately 9 metre high wall as shown in Figure 4.1 below). This parapet wall acts as an effective loading dock wall to the proposed development.

5. MECHANICAL PLANT

Mechanical plant details have been based on information provided for previous Aldi stores and provided information are located on the roof as shown in the drawings in Appendix A, housed within a walled/louvred enclosure. Acoustic data is contained in Table 6.3.

It is noted that the louvres for the roof top plant room are notated as being inverted to block sight lines, with the acoustic effect of such an installation taken into account in our assessment.

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:

- Design 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.

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)
19m articulated delivery truck with refrigeration unit	97
13m rigid delivery truck	85

TABLE 6.3 – NOISE LEVELS OF MECHANICAL PLANT

DESCRIPTION	dB(A)
Condenser Unit (Daikin RXYQ54TNY1A(E))	67 dB(A) @ 3m
Refrigeration Plant	61 dB(A) @ 3m
R134A Aldi Pack	61.8 dB(A) @ 3m

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.

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.

TABLE 7.1 – RESULTANT NOISE LEVEL

Receiver Location	Scenario / Calculated Noise Level, (dB(A))		
	Scenario 1	Scenario 2	Scenario 3
R1	15	4	27
R2	42	30	26
R3	49	37	18

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. Therefore, Table 7.2 lists the assessable noise level for each scenario (including the adjustment for tonality).

TABLE 7.2 – ASSESSABLE NOISE LEVELS

Receiver Location	Scenario / Assessable Noise Level, (dB(A))		
	Scenario 1	Scenario 2	Scenario 3
R1	20	9	32
R2	47	35	31
R3	54	42	23

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_{A1} dB		Exceedance to Assigned Noise Level
	Scenario 1	Time of Day	L_{A1} dB	
R1	20	Day	60	Complies
		Sundays	55	Complies
		Evening	55	Complies
		Night	50	Complies
R2	47	Day	60	Complies
		Sundays	55	Complies
		Evening	55	Complies
		Night	50	Complies
R3	54	Day	60	Complies
		Sundays	55	Complies
		Evening	55	Complies
		Night	50	+ 4 dB

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

Receiver Location	Assessable Noise Level, dB(A)	Assigned Noise Level, L_{A1} dB		Exceedance to Assigned Noise Level
	Scenario 2	Time of Day	L_{A1} dB	
R1	9	Day	60	Complies
		Sundays	55	Complies
		Evening	55	Complies
		Night	50	Complies
R2	35	Day	60	Complies
		Sundays	55	Complies
		Evening	55	Complies
		Night	50	Complies
R3	42	Day	60	Complies
		Sundays	55	Complies
		Evening	55	Complies
		Night	50	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	32	Day	50	Complies
		Sundays	45	Complies
		Evening	45	Complies
		Night	40	Complies
R2	31	Day	50	Complies
		Sundays	45	Complies
		Evening	45	Complies
		Night	40	Complies
R3	23	Day	50	Complies
		Sundays	45	Complies
		Evening	45	Complies
		Night	40	Complies

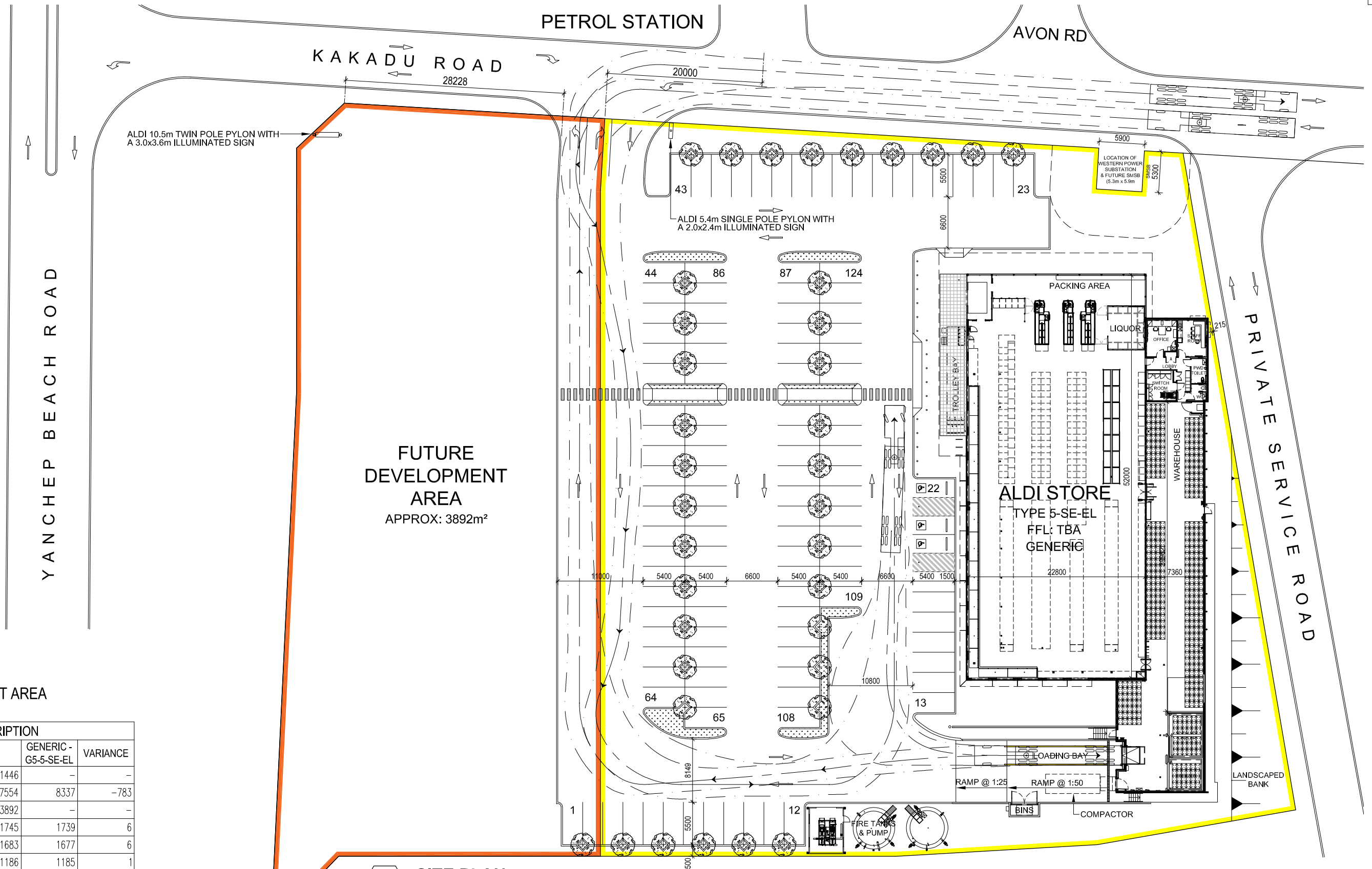
Truck deliveries (both refrigerated and bakery delivery trucks) have been calculated to comply at all times, with the exception of large refrigerated truck deliveries, where noise levels have been calculated to exceed the relevant Assigned Noise Levels during the “night” period at “R3”, if “R3” was noise sensitive.

It is noted that the status of “R3” is not known at this stage. The location could be a commercial premise, in which case large refrigerated truck deliveries are calculated to comply at all times.

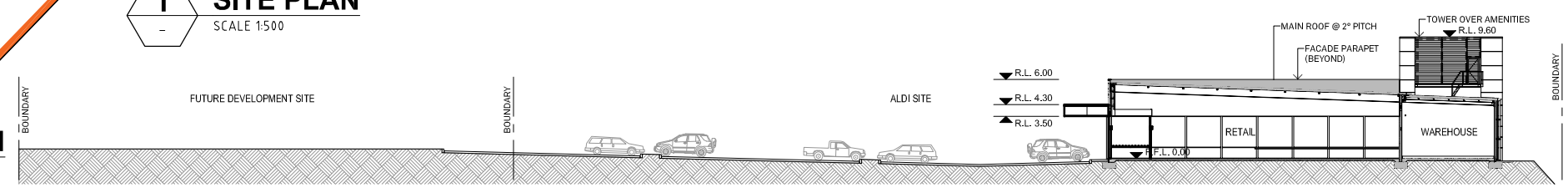
Noise levels associated with the mechanical plant has also been calculated to comply at all times.

APPENDIX A

DEVELOPMENT PLANS



1 SITE PLAN
SCALE 1:500



2 SECTION
SCALE 1:500

LEGEND

ALDI SITE AREA

FUTURE DEVELOPMENT AREA

PROPERTY DESCRIPTION			
ALDI YANCHEP		GENERIC - G5-5-SE-EL	VARIANCE
TOTAL SITE AREA (APPROX m^2)	11446	–	–
ALDI SITE AREA (APPROX m^2)	7554	8337	-783
RESERVE AREA (APPROX m^2)	3892	–	–
ALDI TOTAL AREA – G.F.A. (m^2)	1745	1739	6
ALDI NETT AREA (m^2)	1683	1677	6
RETAIL NETT AREA (m^2)	1186	1185	1
BOH NETT AREA (m^2)	415	410	5
AMENITIES NETT AREA (m^2)	82	82	0
REMAINING NETT AREA (m^2)	497	492	5
PARK/TRAFFIC AREA (m^2)	4217	–	–
LANDSCAPED AREA (m^2)	1136	–	–
NUMBER OF CARS	124	122	2
No. OF 'D' PALLETS (Excl. CHILL/FRZ)	331	352	-21

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NO	REVISION	DATE
A	REVISED ENTRY OPTION.	15/01/20

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Client
ALDI STORES
(A LIMITED PARTNERSHIP)

Project
PROPOSED ALDI FOOD STORE
YANCHEP
Cnr Yanchep Beach & Kakadu Rds, YANCHEP, WA

Drawn: SMc | Checked: DN | Scale @ A3: 1:500
Date: DEC 2019 | Job Number: ALD134

Drawing Title
SITE PACK
SITE PLAN - REVISED ENTRY

Drawing Number: SP-021
Revision: A