Acoustic Consulting Australia Pty.Ltd.

Consultants on Noise and Vibration

Director: David J. Dolly

PO Box 332
Heidelberg
Victoria 3084

Phone 0412 375 234
Email: acaust@bigpond.com
ABN 49 085 932 092

Project: North Shepparton Shopping Centre Retail Development

Subject: Environmental Noise Control

Addressee: Lascorp Pty Ltd

Issued To: Robert Harris

Date: 23 January 2017

Reference: 18091-2

Prepared by: David Dolly (Director) B.App.Sc. M.A.A.S

CONTENTS

1.0 Introduction

This report refers to the control of environmental noise generated by new mechanical plant, refrigeration plant and a loading dock that will be associated with the proposed development located as shown below:

Source: TP Drawings I2C Architects

A major and minor retail stores and a fuel outlet are planned to be located at the subject site.

This report provides advice on the matter of controlling environmental noise emissions to the residences existing on lands adjacent to the subject site.

This report also considers noise impact to land zoned for residential usage, which does not (as yet) have any residential occupation.

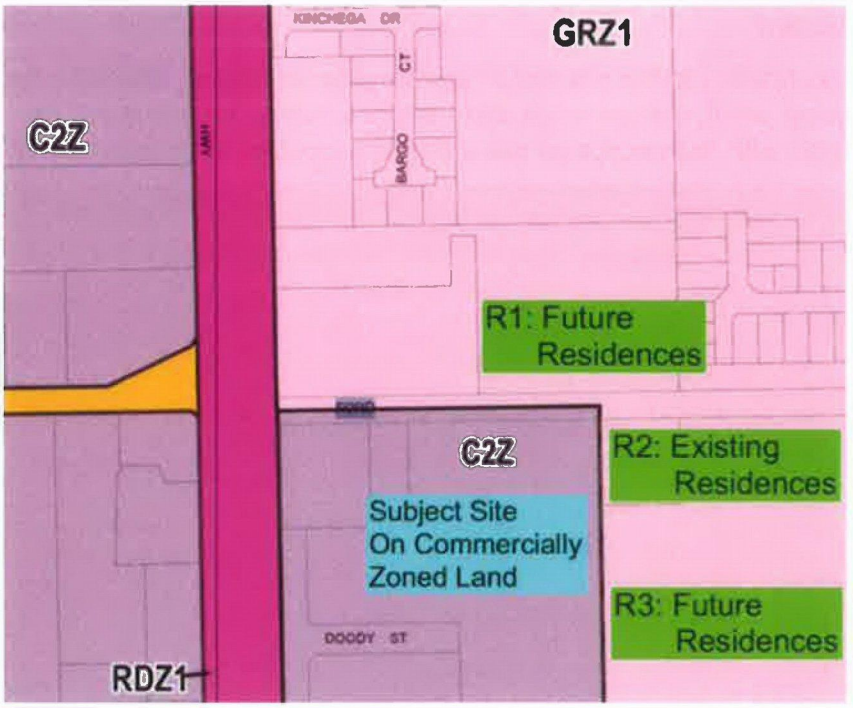
2.0 Noise Sensitive Locations

The nearest residentially zoned lands are located adjacent to the eastern boundary of the site and on the northern sides of Ford Road.

Residences established at this location will become compliance points once occupation occurs.

There are existing residences located to the east of the subject site and these will represent compliance points applicable from the first day of shopping centre operation.

The following summarizes the land zoning details and noise sensitive locations relevant to this evaluation:



Zoning Types:

Commercial
- C1Z Commercial 1 Zone
- C2Z Commercial 2 Zone

Industrial
- IN1Z Industrial 1 Zone

Public Land
- PUZ3 Public Use Zone - Health And Community
- PUZ1 Public Use Zone - Service And Utility
- RDZ1 Road Zone - Category 1
- RDZ2 Road Zone - Category 2

Residential
- GRZ1 General Residential Zone - Schedule 1
- LDRZ Low Density Residential Zone
- NRZ1 Neighbourhood Residential Zone - Schedule 1

Rural
- FZ1 Farming Zone - Schedule 1

3.0 Environmental Noise Design Goals

3.1 State Environment Protection Policy No N-1

The State Environment Protection Policy (SEPP N-1) No. N-1 noise limits will be applicable to this development. The SEPP N-1 document sets limits on the level of commercial, trade or retail noise that can be emitted to residences.

The SEPP N-1 policy is applicable in the Shepparton Unban area.

In the case of this development the SEPP N-1 permissible noise limits must be applied to noise emitted from all mechanical plant and equipment to be installed at the site overall.

According to the SEPP N-1 Policy criteria, the noise level limits are calculated for each residence individually taking account of the following factors.

(i) The time of day (day, evening or night).

(ii) The proportions of land zoned for residential, industrial and commercial use in the immediate local area.

(iii) The background noise level, which would occur at the residence with no noise emitted from the subject site.

As the refrigeration plant will operate on a 24 hour basis, noise from the site must comply with all limits (day, evening and night periods).

Permissible noise limits have been determined for key locations R1 and R2 as follows:

Table 1: SEPP N-1 Permissible Noise Levels

SEPP N-1 Permissible Noise Level, dB(A)						
Location (Refer Plan Above)	Week Day (7am to 6pm)	Saturday (7am-1pm)	Weekday (6pm-10pm)	Saturday (1pm-6pm)	Sunday (7am-10pm)	All Days (10pm-7am)
R1	57	57	51	51	51	46
R2	53	53	47	47	47	42
R3	54	54	48	48	48	43

Notes:

- Saturday afternoon (1pm to 6pm), Sundays and Public holidays (7am to 6pm) are also considered to be relatively sensitive and therefore the SEPP N-1 policy applies a more stringent noise limit to these periods.
- The above-tabulated permissible levels are most applicable to noise from refrigeration and mechanical services noise as well as loading dock operations.
- An additional 5dB(A) is added to the above limits for the emergency generator for night period operation.
- The limits must be met outside the residential dwelling not greater than 10m from a habitable room.

3.2 Vehicle Noise (Fuel Station and Truck Access)

This refers to noise generated by vehicles entering and departing the facility.

No statutory noise limits apply to the noise generated by vehicle movement to and from the site when vehicles are on public roads.

Noise levels generated by vehicles on Ford and Numurkah Roads (entering and departing this site) will be similar to those experienced as a result of other general traffic moving along these roads.

During the day, evening and early night periods, noise levels from vehicles entering and departing the site are not likely to be differentiated from those on public roads.

During the early am period (midnight to 5am) vehicle noise can be more noticeable and in this case the Environment Protection Authority's guidelines should be adopted.

The EPAs technical noise control guideline (prepared for local councils) on the control of noise from Supermarket and Service Station deliveries activities should be adopted for this project.

This Guideline reads as follows:

9 DELIVERIES TO SHOPS, SUPERMARKETS AND SERVICE STATIONS

Where a residential area will be impacted by noise from deliveries, then deliveries should be inaudible in a habitable room of any residential premises (regardless of whether any door or window giving access to the room is open) outside the hours contained in the schedule.

Schedule: Deliveries to shops, supermarkets & service stations
7 am – 10 pm Monday to Saturday
9 am – 10 pm Sundays and public holidays

Note: All ancillary motors or trucks should be turned off whilst making the delivery.

End Guideline.

It is recommended that the supermarket loading dock be operated in accordance with the above guideline.

Noise from truck movement on the subject site as well as noise from any mechanical plant associated with the service station (e.g. compressor, air conditioning) would be included in any SEPP N-1 evaluation.

4.0 Environmental Noise Control

4.1 SEPP N-1 Compliance

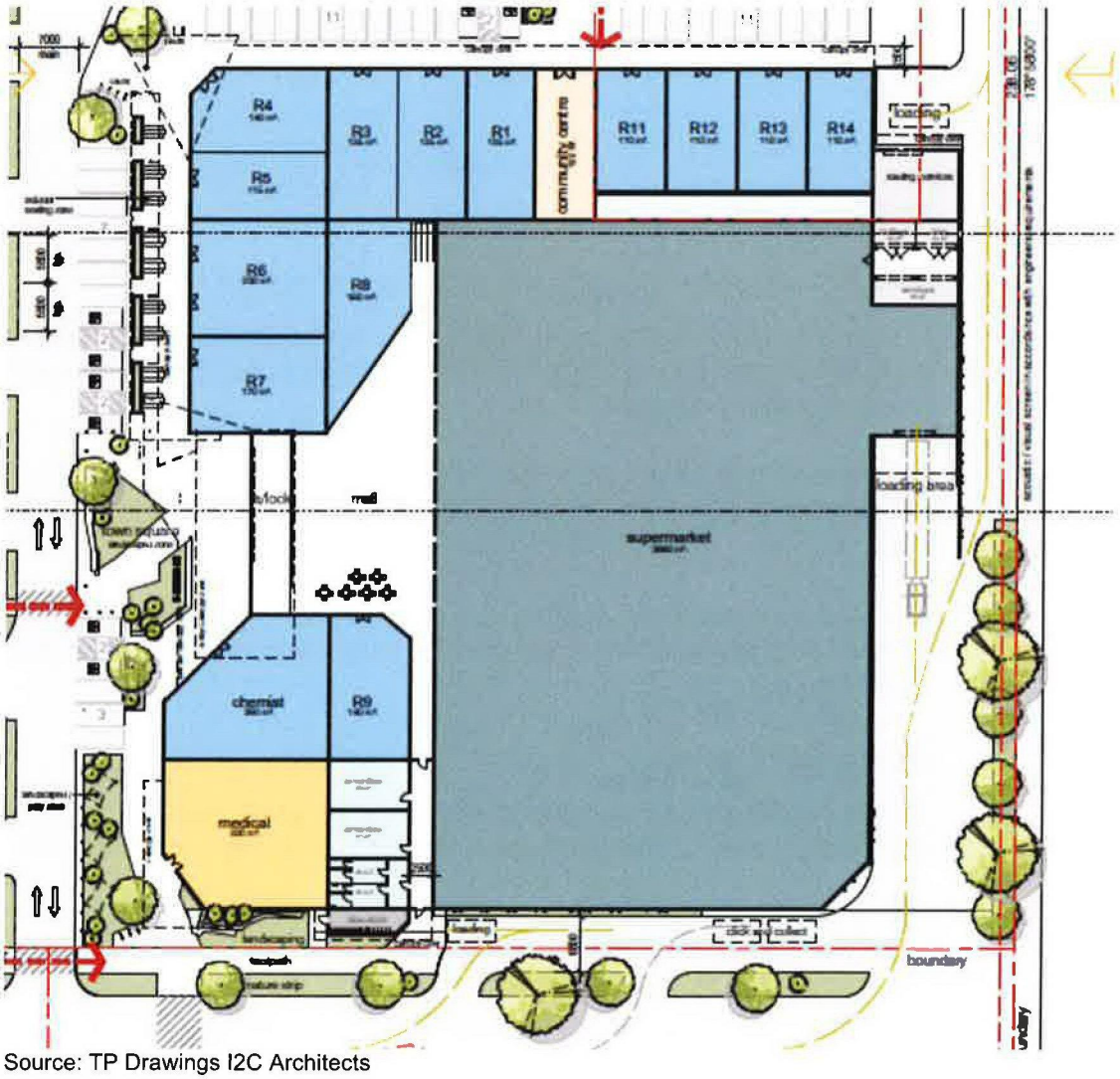
4.1.1 Site Layout and Equipment Locations

We have based our evaluation on a typical supermarket and specialty store equipment layout and configuration, which is generally repeatable from project to project.

Heat rejection plant will to be located on the roof; which is a commonly adopted supermarket configuration.

The supermarket plant room will be constructed at mezzanine level and will require a specific acoustical design discussed later in this report.

The following building configuration is currently proposed:



Source: TP Drawings I2C Architects

The loading dock location shown in more detail on the plan on the below:

Source: TP Drawings I2C Architects

4.1.2 Refrigeration and Air Conditioning Condensers (Roof Platform)

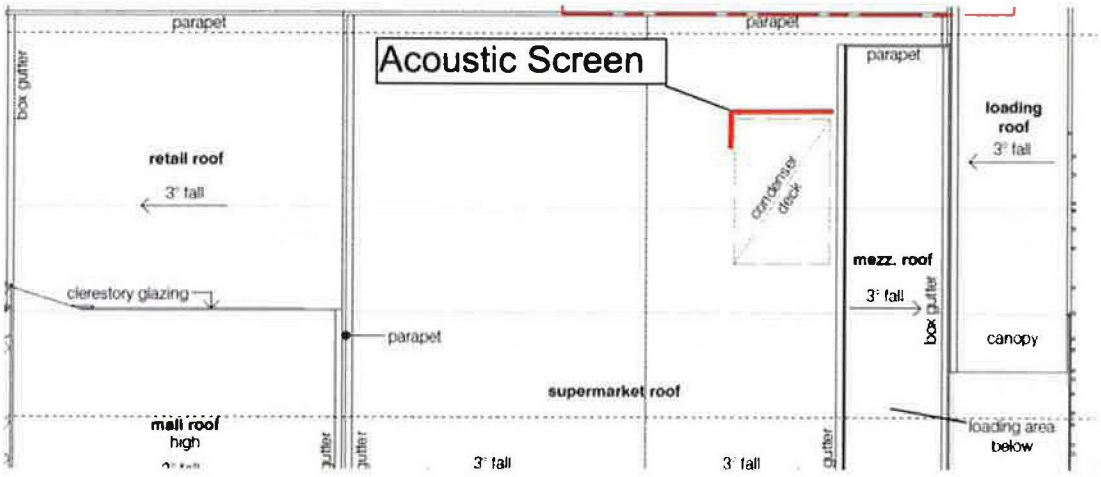
Preliminary calculations have been made based on a typical supermarket store plant configuration incorporating variable speed fan motors to reduce noise emissions at night.

Condensers are assumed to be capable of meeting a noise rating of 58dB(A) at a reference distance of 3 metres when operating at full daytime load.

A noise rating 54dB(A) at 3metre is adopted during the night period (10pm to 7am) based on reduced fan speed operation during lower ambient conditions.

Evaluation Finding

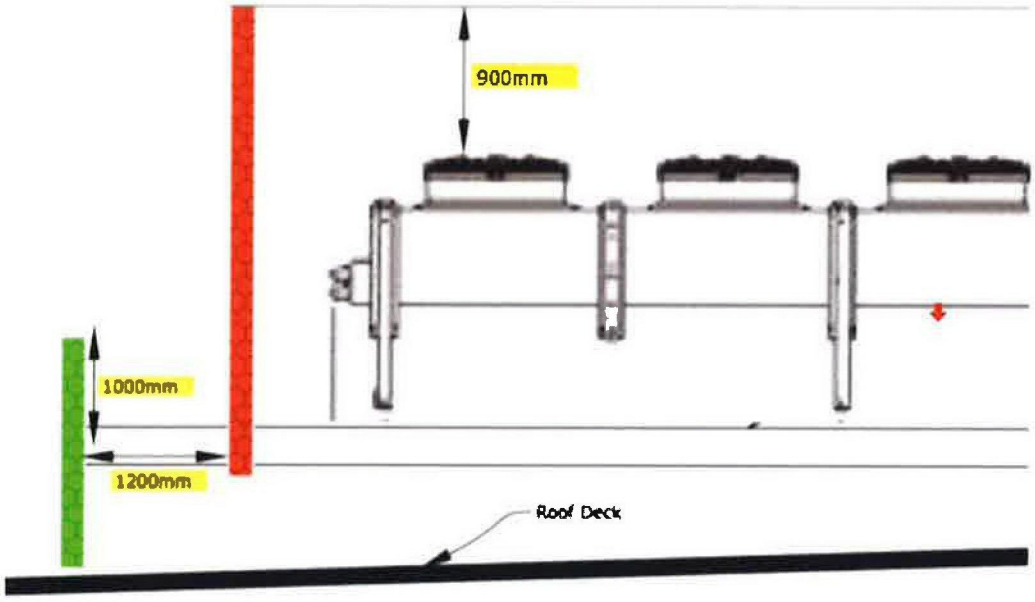
Based on the above information it is concluded that acoustic screening will be required around the condenser platform as shown indicatively below:



The extent of acoustic screening on the north side may be reduced if the building design offers the required acoustic screening in this direction and depending on the final height of the deck.

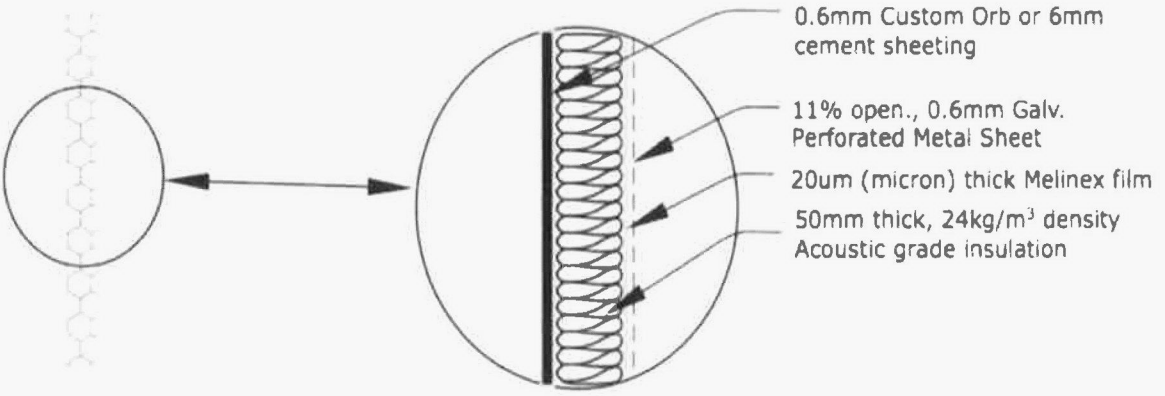
The screens will most likely be required to extend to a height not less than 900mm above the top of the condenser fans.

In section, the screen would be configured as follows:



NOT TO SCALE

Acoustic Screening Construction for Primary **and** Secondary screens



Final acoustic screening requirements should be reviewed as part of the detailed design phase.

All condensers must be mounted on rubber waffle pad (not less than 8mm thick).

4.1.3 Supermarket Refrigeration Compressors

The refrigeration compressor racks are to be located inside the dedicated and acoustically treated plant room.

For the purpose of this evaluation, allowance has been made for a typical supermarket store compressor room, including a plant room ventilation system.

The plant room must include the following designs:

- Roof: Metal decking on thermal insulation.
- Walls: Masonry being 125mm thick precast concrete panels **or** 110mm blockwork **or** a light weight wall comprising metal cladding externally and 1x9mm cement sheeting internally with 90mm acoustic insulation in the wall cavity.
- Any natural air ventilation opening to the plant room must be positioned on the **western** side of the plantroom and may require an acoustic rated louver depending on final size and position.
- Plantroom ventilation fans must be located inside the plantroom and fitted with sound attenuation sufficient to ensure that the noise level occurring outside the ventilation point does not exceed 56dB(A) at 1 metre. Ventilation points to be located only on the northern side of the plantroom.

- The emergency generator will require as specific review once the generator selection is made.

  The noise level emitted by the generator must not exceed 63dB(A) when measured 1 metre outside any room ventilation opening.

  The noise level emitted by the generator exhaust must not exceed 67dB(A) when measured 1 metre from the emission exhaust point.

- All plant (including the generator, all fans and compressors) and pipework in the plantroom must be mounted/fixed via anti vibration mounts to control vibration generated noise emission from the building envelope to the residential development land.

  Vibration isolators must achieve not less than 90% vibration isolation efficiency.

4.1.4 Other Roof Mounted Plant – General Supply Air and Exhaust Fans

Based on typical installations used at other Woolworths facilities no specific sound attenuation is likely to be required for roof mounted supply air or exhaust air fans installed at roof level on this project provided that:

- Fans installed must be capable of meeting a noise level specification of 55dB(A) at 3metres and;

- No fan should be placed within 8m of the northern or eastern edge of the project-building envelope.

The developed design should be reviewed to confirm if any particular fan requires sound attenuation due to its noise emission rating and or positioning.

4.2 Environmental Noise Control for the Loading Dock

4.2.1 Noise Limits Proposed for Deliveries to the Loading Dock

Noise from Truck movements on the site as well as noise from unloading activities must comply with the SEPP N-1 noise limits where assessed over any 30minute period.

Noise from truck movements to and from the loading dock must be managed using a tall acoustically rated fence and an access curfew.

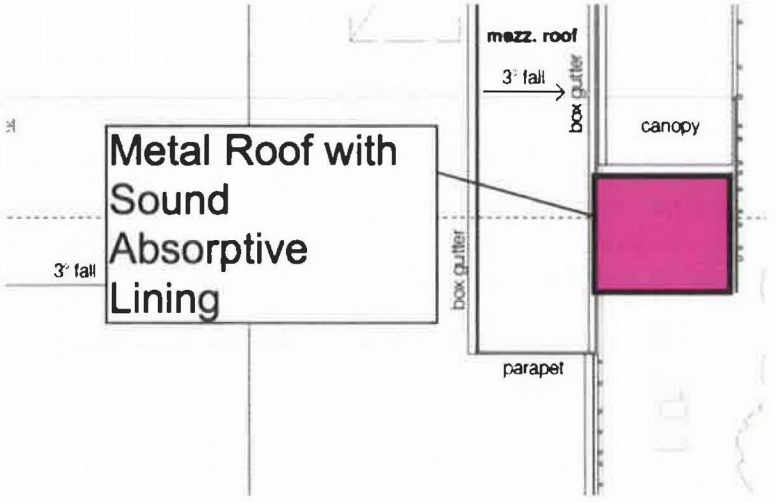
The loading dock is to be located close to land that will be occupied by residents.

Noise from the truck unloading process (carried out at the dock) would most impact the residences at R3.

This noise impact is expected to exceed the SEPP N-1 evening period noise limit between 6pm and 10pm.

It is therefore recommended that:

- The unloading area should be treated acoustically as shown below:



- It is recommended that acoustic rated fencing be installed at the locations shown below (shown in Green).

- The barrier formed by the fence or fence/bund combination must achieve a total height of not less than 2.8m above the roadway height.

The fence height could taper down to 2.0m over an 8m length at the Ford Road end.

The fence design must ensure that all gaps and openings are eliminated at the time of construction and that the materials and designs used ensure that the fence remains gap and opening free over time.

The structure of the fence should be deigned by a suitably qualified structural engineer.

The fencing should have a construction incorporating:

- A cladding system, which eliminates all gaps from the pavement to the top of the fence and;
- The fence cladding is to have a minimum surface weight of 11kg/m^2 with no gaps between panels.

Intermittent noise maxima from truck movements to and from the loading dock are to be managed by constraining the site delivery times to the period defined in the EPA guideline mentioned in section 3.2.

4.3 Environmental Noise Control for the Service Station

The scheduling of deliveries to and from the service station should comply with the recommendations of the guideline described in section 3.2.

All plant and equipment shall be selected and designed to ensure that noise emissions are appropriately attenuated in accordance with the SEPP No N-1 noise limits.

Noise from vehicles entering and departing the service station is not expected to cause a detrimental impact to future residences located on the north side of Ford Street.

The above finding is based on the distance buffering (greater than 50metres to the façade of a future dwelling) and the masking noise provided by pre existing traffic flows along Numurkah and Ford Roads.

5.0 Conclusion

Environmental noise associated with the various operations proposed at the subject site has been considered.

It is concluded that environmental noise emissions can comply with the statutory environmental noise limits and other relevant standards described in this report by adopting appropriate acoustic designs.

David Dolly
Acoustic Consulting Australia Pty Ltd