



PROPOSED BUNNINGS STORE, SHEPPARTON  
ENVIRONMENTAL NOISE ASSESSMENT

Rp 001 R04 2013211ML | 24 March 2015



Project: **PROPOSED BUNNINGS STORE, SHEPPARTON  
ENVIRONMENTAL NOISE ASSESSMENT**

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Report No.: **Rp 001 R04 2013211ML**

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#### Document Control

Status:	Rev:	Comments	Date:	Author:	Reviewer:
Draft		Issued as a draft	16 July 2013	SJD	TMM
	R01	Revised site layout	19 November 2013	SJD	TMM
	R02	Revised site layout D	20 November 2013	SJD	
	R03	Revised site layout P8	11 March 2015	SJD	RCL
	R04	Update Figure 3 & Section 9.0	24 March 2015	SJD	

## EXECUTIVE SUMMARY

The results of this assessment indicate that the proposed Bunnings retail development at 90 Benalla Road, Shepparton, can achieve the relevant environmental noise requirements provided that certain noise mitigation measures are implemented into the design and operation of the store.

In general, the mitigation items include the construction of screening for the outdoor loading bay and bulk trade services area, together with the implementation of some managerial controls such as a restriction on delivery truck arrivals and forklift activity in the evening period. The details are provided in the recommendation section of this report. In accordance with EPA guidelines, no inward goods deliveries shall be undertaken during the night period.

Schematic design recommendations to assist the future detailed design of the mechanical services for the store are also provided within the report.

The noise mitigation measures recommended in this report are considered to be feasible and together with the implementation of certain best operational practices previously adopted by Bunnings at other sites, it is considered that the development can comply with the relevant environmental noise requirements.

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## 1.0 INTRODUCTION

It is proposed to develop a Bunnings Store at 90 Benalla Road, Shepparton. On behalf of Benalla Road Enterprises Pty Ltd, Marshall Day Acoustics Pty Ltd (MDA) has prepared this report to assess potential noise impacts associated with the development to the nearby noise sensitive receivers and provide comment on appropriate noise mitigation measures, if required.

Part of the site for the development is proposed to be rezoned from GRZ1 (General Residential Zone) to C2Z (Commercial 2 Zone). A survey of the existing noise environment has been conducted as part of the assessment.

Acoustic terminology used throughout this report is described in Appendix A.

## 2.0 SITE DESCRIPTION

The nearest residential interface to the development site is located across an existing road, Fordyce Street, to the west.

The site is bounded by the following:

- Benalla Road to the north and open land to the south
- An existing Shopping Centre to the east
- Fordyce Street to the west.

An aerial photograph of the site is shown in Figure 1 and the proposed site plan utilised for this assessment (extract from Drawing No. TP-01 Revision P8 prepared by Michael Carr Architects Pty Ltd) is shown in Figure 2.

**Figure 1: Aerial photograph of proposed site**

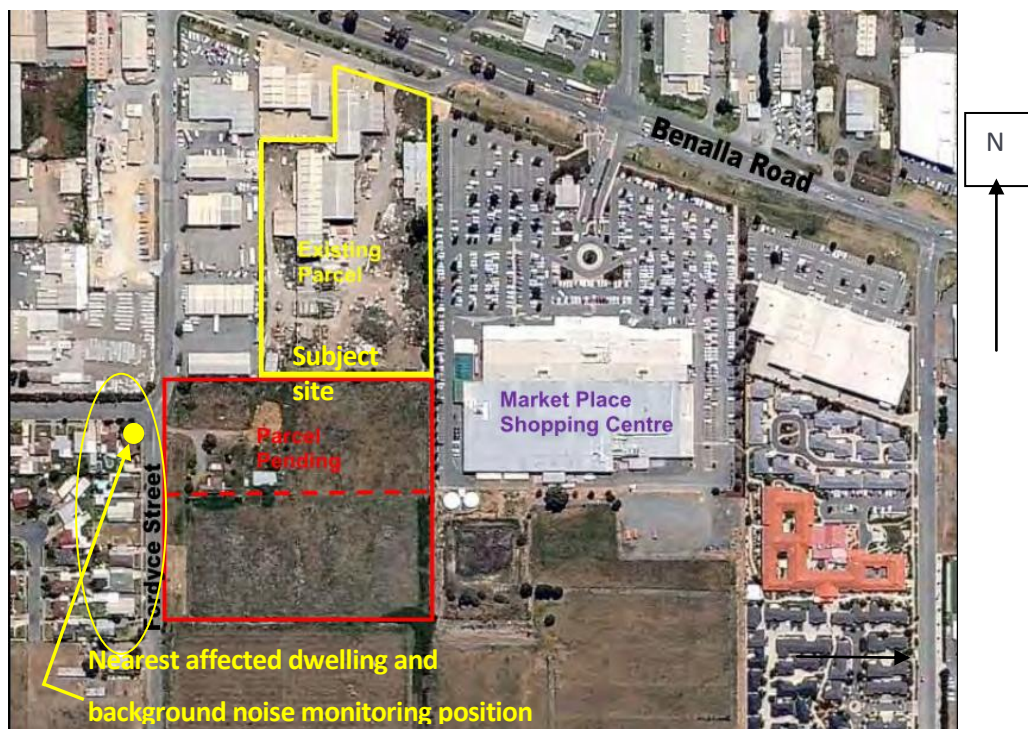
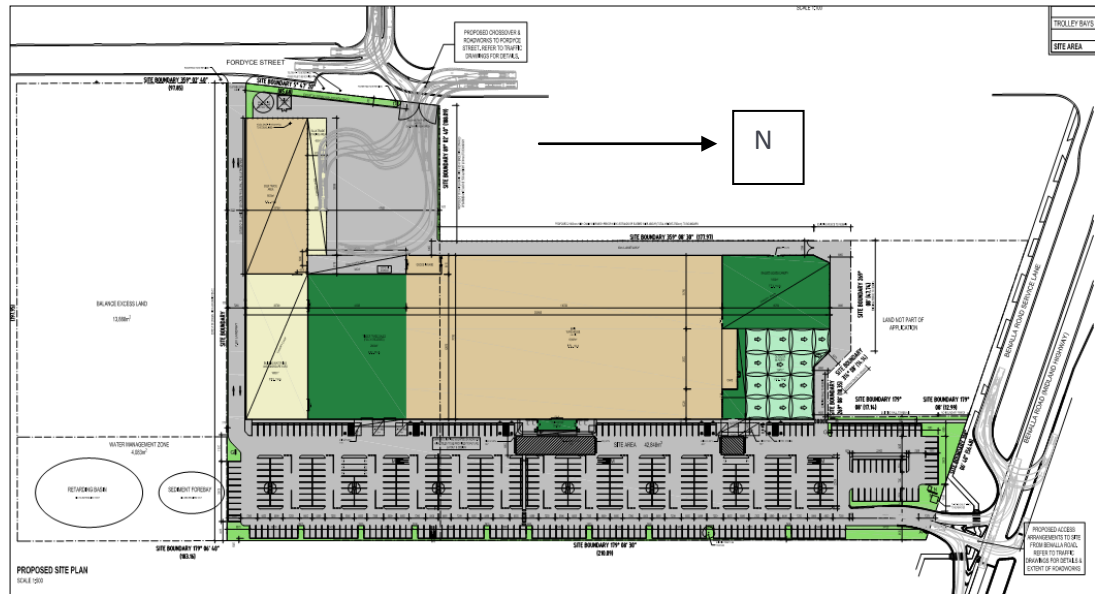


Figure 2: Proposed site plan



As shown in Figure 2, the Bunnings site retail area comprises the fully enclosed main store warehouse and timber trade area, open canopy building and landscape materials yard, outdoor nursery, bagged goods canopy area. The south west area of the site, nearest to local dwellings, comprises an open canopy bulk trade and goods staging area, the loading dock and truck bay area which is accessed via a driveway on Fordyce Street.

The nearest affected residences to the west of the subject site across Fordyce Street (as shown in Figure 1) are single storey and the nearest dwelling is at the corner of Gilchrist Street. The topography of the surrounding area is described as flat.

A planning map showing the current land uses is contained in Appendix B.

### 3.0 OPERATING SCHEDULE AND PROPOSED NOISE CONTROL FEATURES

#### 3.1 Operation times

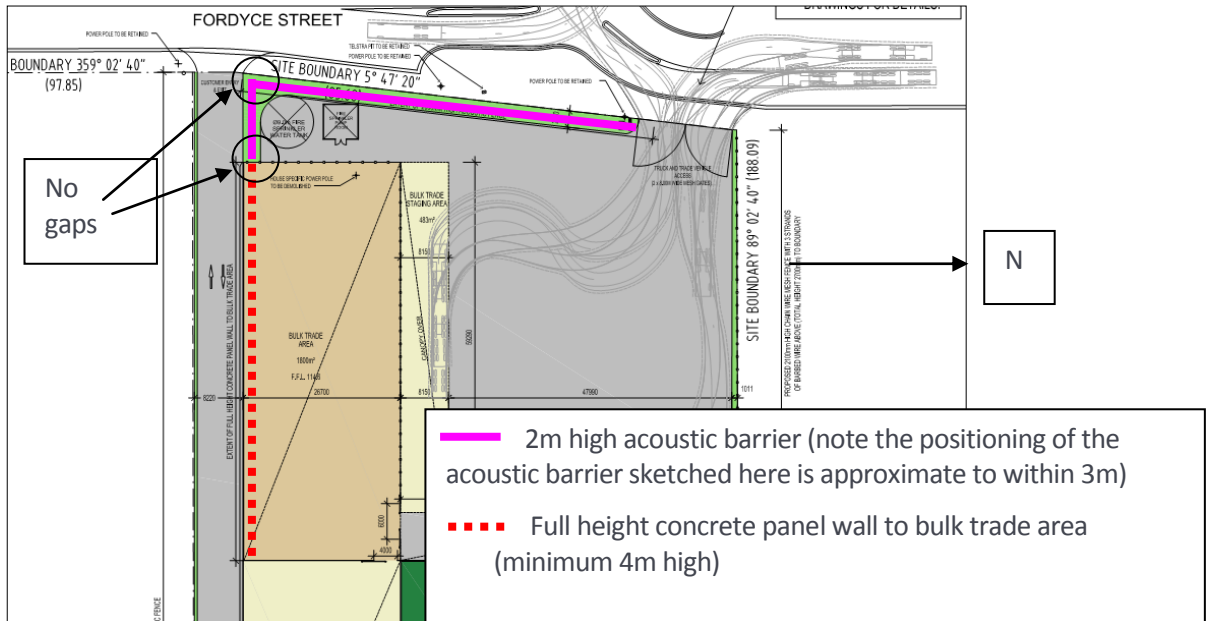
The proposed operational times for the Bunnings site are:

- 0600 – 2200hrs Monday to Saturday
- 0600 – 1900hrs Sunday and Public Holidays
- Deliveries will occur between 0700-2200hrs (7:00am-10:00pm).

#### 3.2 Acoustic screening for loading dock and truck bay

The primary method of noise control from the loading dock and truck bay area is a 2m high acoustic barrier extending around the south and west boundaries providing screening in the direction of the nearby dwellings. The acoustic barrier is proposed to intersect with the full height concrete panel wall to the rear of the bulk trade area. A sketch illustrating the extent of the acoustic barrier and concrete panel wall and where the intersection between the two structures must have no gaps is provided in Figure 3.

Figure 3: Location of proposed 2m high noise barrier



We advise that the acoustic calculations in this assessment assume that the both the 2m high acoustic barrier and the concrete panel wall are built to the extent as per Figure 3. Regarding construction of the 2m high acoustic barrier, there are many different options available for the construction and some schematic design recommendations are provided in Section 9.0 of this report.

#### 4.0 POTENTIAL NOISE IMPACTS

A number of potential noise impacts are associated with the operation of the proposed Bunnings site. Table 1 lists these impacts and the relevant legislation or guideline applicable for the assessment of each.

Table 1: Potential noise impacts

Potential noise impact	Source of assessment criteria	Document status
Mechanical services noise	SEPP N-1 (NIRV)	Legislation
Noise from delivery trucks and waste collection	SEPP N-1 (NIRV)	Legislation
	EPA Publication 1254	Guidelines

#### 5.0 NOISE MEASUREMENTS

##### 5.1 Existing background noise

Ambient noise levels in the vicinity of the site at a dwelling on Fordyce Street were measured from 16 to 20 June, 2013.

The local noise environment is generally described as tranquil with the ambient noise levels dominated by traffic noise from Benalla Road. The lowest measured background noise levels obtained during the monitoring period are shown in Table 2.

**Table 2: Measured background noise levels, L<sub>A90</sub> dB**

Time period	Background noise level*
Day	44
Evening	37
Night	33

\*Obtained using a Rion Type NL31 IEC Class 1 sound level meter

The location where the noise monitor was placed is shown in Figure 1.

## 6.0 NOISE SOURCES

In order to predict noise emissions from the proposed development, reference noise level data from previous Marshall Day Acoustics' noise surveys and work at Bunnings have been used for this assessment. The reference noise data includes noise levels of delivery truck movements and waste removal. Results of these measurements are summarised in Table 3.

**Table 3: Noise of delivery vehicles, L<sub>Aeq</sub> dB**

Activity	Measured noise level
3-5 tonne truck passing @ 3m	67dB
5-10 tonne truck passing @ 3m	74dB
Garbage truck passing @3m	80dB
Garbage truck bin emptying @3m	76dB

The measured noise levels shown in Table 3 and additional data from the Marshall Day Acoustics' noise database, have been used to calculate the sound power levels of truck pass-bys, loading bay activity as well as waste removal activity. The derived sound power level data is provided in Table 4.

**Table 4: Sound power levels of delivery vehicles, L<sub>eq</sub> dB\***

Description	Octave band centre frequency							Hz
	63	125	250	500	1k	2k	4k	
Small truck/van (< 4 tonnes)	93	91	89	89	89	86	79	dBW
Medium rigid truck (<8 tonnes)	100	94	95	90	90	90	86	dBW
Semi-trailers (articulated)	109	111	106	101	100	98	93	dBW
Loading bay activities (forklift)	96	94	92	90	89	82	95	dBW
Garbage truck pass-by	102	100	98	98	98	95	88	dBW
Garbage truck bin emptying	99	99	93	91	90	91	87	dBW

\*Sound Power data taken from MDA noise source database, current as of 2015

Semi-trailer data used in our assessment is based on an engine height of 1.5m and an exhaust height of 3.5m.

For the modern delivery trucks expected to arrive at this store, the engine is the significant contributor to the maximum noise level. Noise levels from the engine are generally 15dB higher than noise from the exhaust stacks.



MDA has also conducted numerous noise surveys involving maximum noise levels generated by car and truck movements including braking, engine starting and acceleration from a stationary position.

Vehicle activity noise on this site will potentially consist of truck movements, vehicles braking, doors slamming, cars accelerating away from a stationary position, and general noise from people talking and laughing. Table 5 shows the maximum noise levels due to these activities used for assessing risk of sleep disturbance from activity on site during the night period (early morning prior to 0700hrs).

**Table 5: Maximum noise levels due to night-time activities**

Activity	Measured noise level, dB $L_{Amax}$ at 10m
“Normal” car	60-67
“Worst-case” car	75
Laughter and conversation	60-70
Truck brake system air release	90

A “normal” vehicle can be described as a vehicle being driven in a sensible manner. A “worst-case” vehicle can be described as a V8 or other high-powered vehicle being driven recklessly. This above data has been used in the acoustic calculations in Section 8.2.

## 7.0 NOISE LEGISLATION & GUIDELINES

### 7.1 Noise from Industry in Regional Victoria (NIRV)

Commercial and industrial noise outside of the Greater Melbourne Metropolitan Area is assessed in accordance with Environment Protection Authority (EPA) publication 1411 *Noise from Industry in Regional Victoria – Recommended Maximum Noise Levels from Commerce, Industry and Trade Premises in Regional Victoria* (NIRV) dated October 2011.

Under NIRV, when either the noise emitter or noise receiver is located within a major urban area, noise limits are determined in accordance with *State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1* (SEPP N-1).

The EPA provides maps which indicate the location of the major urban area boundary. The subject site is located within the Shepparton urban area boundary as defined by the EPA. Therefore the assessment should be performed in accordance with the SEPP N-1 methodology.

The objective of SEPP N-1 is to protect residential areas from noise generated by commercial, industrial or trade premises. Compliance is achieved if the adjusted  $L_{Aeq}$  noise level at any residence affected by noise from the facility is below the noise limit.

The adjusted  $L_{Aeq}$  is determined by applying corrections for such characteristics as duration, intermittency, tonality and impulsiveness. This adjusted  $L_{Aeq}$  is called the effective level,  $L_{eff}$ .

The assessment of noise emission under SEPP N-1 is based on the calculation of a noise limit at a receiver position, taking into account a zoning noise level derived from the land-use in the surrounding area and the measured background noise level.

The SEPP N-1 time periods, zoning levels and noise limits for the nearest residences for each applicable time period are detailed in Table 6 and are based on the measured background noise levels for day, evening and night-time presented previously in Table 2.

**Table 6: SEPP N-1 time periods and limit derivation for nearby receivers, dB**

Period	Day of week	Time period	Measured background, $L_{A90}$	Zoning level, $L_{eff}$	Noise limit, $L_{eff}$
Day	Monday-Friday	0700-1800hrs	44	52	52
	Saturday	0700-1300hrs			
Evening	Monday-Friday	1800-2200hrs	37	46	46
	Saturday	1300-2200hrs			
	Sunday	0700-2200hrs			
Night	Monday-Sunday	2200-0700hrs	33	41	41

Referring to Table 6, it is noted that the night background noise is “neutral” according to the procedures of SEPP N-1. In this case, the respective noise limits are equal to the zoning levels. To comply with SEPP N-1, noise emission from all plant and equipment and commercial vehicles (such as delivery and waste collection trucks and vans; not customer cars or customer commercial vehicles) when within the boundaries of the site must comply with the noise limits in Table 6.

## 7.2 EPA Guideline Publication 1254

### 7.2.1 Industrial Waste Collection

The Victoria EPA Publication 1254, *Noise Control Guidelines* (Guidelines) provides the following recommendations for industrial waste collections:

- *Refuse bins should be located at sites that provide minimal annoyance to residential premises*
- *Compaction should be carried out while the vehicle is moving*
- *Bottles should not be broken up at the collection site*
- *Routes which service predominantly residential areas should be altered regularly to reduce early morning disturbances*
- *Noisy verbal communication between operators should be avoided where possible*

The Guidelines recommend that collections should be restricted to the following times:

One collection per week

*6:30am-8pm Monday to Saturday*

*9am-8pm Sunday and Public Holidays*

Two or more collections per week

*7am-8pm Monday to Saturday*

*9am-8pm Sunday and Public Holidays.*

We recommend that waste collections at the proposed site should adhere to the recommendations and times provided in the Guidelines, outlined above. Our assessment does not consider noise from waste collection during the period 2000-0700hrs.

### 7.2.2 Commercial deliveries

EPA Publication 1254 Noise Control Guidelines states the following in regards to deliveries:

*Where a residential area will be impacted by noise from deliveries, the 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*

*7am-10pm Monday to Saturday*

*9am-10pm Sundays and Public Holidays.*

These guidelines generally mean that if nearby houses are impacted, then deliveries during the night period are not allowed.

### 7.3 Sleep Disturbance

The Bunnings facility is proposed to operate predominantly during day and evening periods, however the morning period from 0600hrs-0700hrs is classified as night-time under SEPP N-1. Noise from patrons and staff in the carpark during this hour in the morning has the potential to cause noise impact to nearby residents.

There is currently no government legislation or policy which governs noise from patrons' use of the facility at night. It is considered appropriate to adopt criteria based on protection against sleep disturbance.

The NSW Department of Environment Climate Change and Water (now the Office of Environment and Heritage) document, *NSW Road Noise Policy*, March 2011, undertook a literature review of noise based sleep disturbance studies and found: (p. 35)

- *Maximum internal noise levels below 50-55dB  $L_{Amax}$  are unlikely to cause awakening reactions*
- *One or two noise events per night, with maximum internal noise levels of 65-70dB  $L_{Amax}$  are not likely to affect health and wellbeing significantly.*

Conventional dwellings with windows partially open provide approximately 10dB noise reduction from outside to inside. Therefore, in accordance with the *NSW Road Noise Policy* sleep disturbance findings, we recommend that maximum noise levels from all on-site activities at night should not exceed 60-65dB  $L_{Amax}$  outside an openable window of existing or future residential dwellings.

## 8.0 NOISE ASSESSMENTS

### 8.1 Deliveries and waste collection

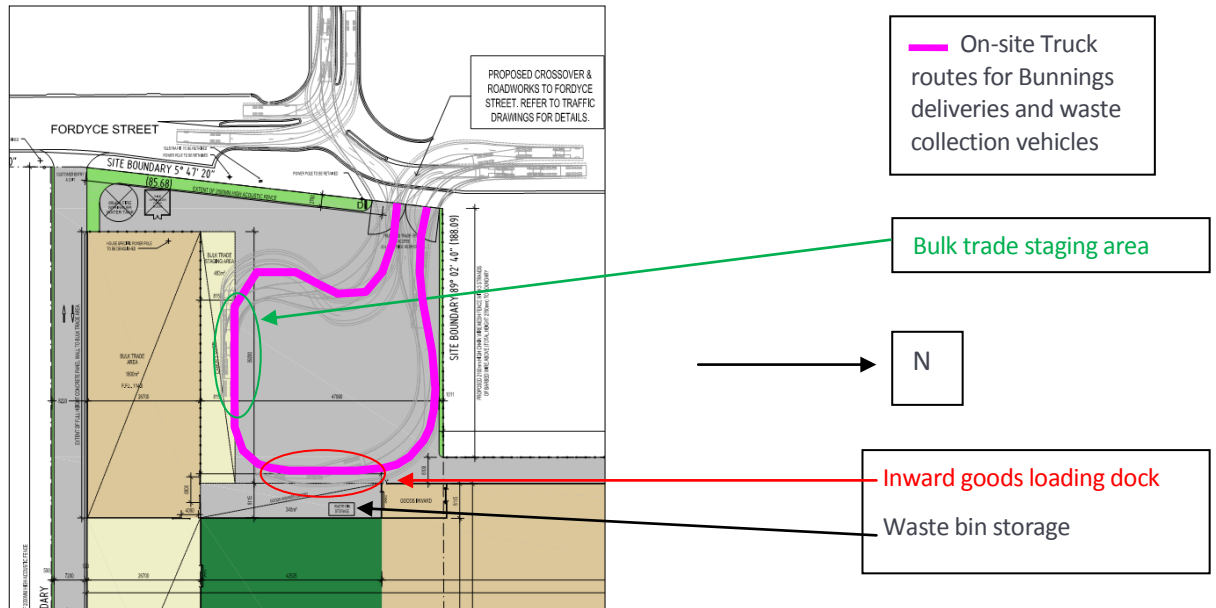
Noise from commercial vehicles such as delivery and waste collection trucks & vans accessing the site during the daytime and evening periods must meet the SEPP N-1 noise limits. Compliance of commercial vehicle noise emission with SEPP N-1 is determined by comparing the estimated effective noise level  $L_{eff}$  to the noise limits at the nearest affected noise-sensitive premises over any worst case half hour periods. The effective noise level is calculated by predicting the noise level at the nearest premises and including the following corrections, if appropriate:

- Distance attenuation to dwellings and any shielding from intervening barriers or buildings
- Approximate duration of truck noise exposure at residential dwellings
- Any required SEPP N-1 corrections for audible characteristics, e.g. tonality.

Trucks making deliveries to the site will enter the site via the Fordyce Street driveway and are assumed to follow the route as illustrated in Figure 4.



Figure 4: Truck route for Bunnings goods deliveries and waste collection



Based on information provided by the client, the estimates of truck arrivals to the site are detailed in Table 7.

Table 7: Expected Truck volumes

Vehicle type	Day period total volume	Evening period total volume
Heavy Rigid & Articulated (19m)	13	5
Medium Rigid (12m)	31	13
Total	44	18

Based on these figures, an average of 4-5 arrivals per hour would be expected during each day and evening period. For our calculations, we have assumed that the worst case scenario for inward goods deliveries in any 30-minute assessment period is estimated to be 1 semi-trailer delivery and 2 medium rigid truck deliveries. Compared to the average rate of arrival, this represents an overestimation of likely inward goods deliveries per hour and is therefore considered to be a conservative worst case scenario.

The effective noise level of loading bay activity and truck movements on site has been calculated according to the following assumptions:

- The 2m high acoustic barrier and the concrete panel wall at the boundary of the bulk trade staging area are built to the extent as per Figure 3
- In the worst case scenario, activity involving two forklifts operating simultaneously and continuously over a full 30 minute period and, one unloading delivery truck at the loading dock and one at the bulk trade staging area (e.g. loading customer truck). Forklift reversing beepers are assumed to be broadband noise type design
- The provision of acoustically absorptive surface linings to the underside of the bulk trade and staging area canopy and to the wall areas within the canopy (to reduce reflective noise build-up). Note that this is not an item in the current schematic design
- Trucks typically travel at 10km/h whilst on-site and any access gate operating at the Fordyce Street driveway operates with no significant operational noise

- Waste bin emptying operation takes 1.5 minutes maximum.

The predicted noise levels at the nearest affected property for the worst-case 30 minute inward goods delivery scenario to the Bunnings site are provided in Table 8.

**Table 8: Effective noise level of deliveries and loading bay activity, dB**

Source	Noise at nearest affected Fordyce Street residence		
	$L_{Aeq}$	Duration adjustment	$L_{eff}$
1 x Semi trailer truck movement	54	- 14	40
2 x Medium rigid truck movement	46	-14	32
Bulk trade staging area (1 x forklift )	46	0	46
Inward goods loading dock (1 x forklift )	42	0	42
Sum all sources			48
SEPP N-1 corrections			
Tonality			+2
Total effective noise level, $L_{eff}$			50

Referring to Table 8, the effective noise for the assumed worst case 30 minute delivery scenario, including three truck deliveries and two forklifts operating continuously in any half hour period, complies with the SEPP N-1 daytime noise limit of 52dB  $L_{eff}$  (as per Table 6 ) at the nearest affected dwelling on Fordyce Street but would not comply with the not the SEPP N-1 evening noise limit of 46dB  $L_{eff}$ .

Table 9 details the noise prediction for a single waste collection.

**Table 9: Effective noise level of Bunnings waste collection, dB**

Source	Noise at nearest affected Fordyce Street residence		
	$L_{Aeq}$	Duration adjustment	$L_{eff}$
Garbage truck movement	50	- 14	36
Bin emptying (1.5min)	39	-13	26
Sum all sources			36
SEPP N-1 corrections			
Tonality			+2
Impulsiveness			+5
Total effective noise level, $L_{eff}$			43

Referring to Table 9, the effective noise from waste collection complies with the SEPP N-1 daytime and evening period noise limits of 52dB  $L_{eff}$  and 46dB  $L_{eff}$  respectively at the nearest affected Fordyce Street dwelling.

As it is possible that a delivery and waste collection may occur within the same half hour period, accordingly, the cumulative impacts must be assessed. The cumulative noise level of these two events occurring coincidentally (within the same half hour period) is shown in Table 10.

**Table 10: Cumulative noise level of deliveries & waste collection, worst-case scenario,  $L_{eff}$  dB**

Source per 30 minute period	Noise at nearest affected Fordyce Street residence
Worst-case scenario for inward goods deliveries and loading bay activity (3 Trucks arrive & depart with two forklifts operating continuously)	50
Total noise level due to one waste collection	43
Total Cumulative noise level	51

Noise levels from the cumulative impact of the assumed worst case inward goods delivery scenario and a waste collection at the Bunnings site are predicted to comply only with the SEPP N-1 daytime noise limit of 52dB  $L_{eff}$ .

With some restrictions, cumulative compliance with the evening noise limit is possible as demonstrated by the assessment provided in Table 11.

**Table 11: Cumulative noise level of deliveries & waste collection, restricted scenario,  $L_{eff}$  dB**

Source per 30 minute period	Noise at nearest affected Fordyce Street residence
Restricted scenario for inward goods deliveries and loading bay activity (1 Medium rigid truck arrives & departs with one forklift operating for 15minutes at the inward goods loading dock)	41
Total noise level due to one waste collection	43
Total Cumulative noise level	45

Noise levels from the cumulative impact of the restricted scenario for inward goods delivery and a simultaneous waste collection at the Bunnings site are predicted to comply with the SEPP N-1 Evening period noise limit of 46dB  $L_{eff}$  (as per Table 6 ). The recommended managerial controls to restrict inward goods deliveries during the evening period are summarised in Section 9.0 of this report.

## 8.2 Sleep disturbance

As the proposed operating hours commence at 0600hrs, a sleep disturbance assessment is applicable to staff and customer activity in the car park and customer activity in the bulk trade staging area prior to 0700hrs.

The typical maximum noise from car activity in the carpark is expected to consist of cars braking, doors slamming and cars accelerating away from a stationary position as well as general noise from people talking within the car parking area. The proposed car parking facilities at the subject site are located to the east of the main building where the approximate distance separating the nearest Fordyce Street residences to the carpark is 130m. For the assessment, we have assumed the worst case scenario of cars located at the southern end of the carpark being unshielded by the main building to the west. In the bulk trade staging area, the worst case maximum noise scenario assumed for this assessment is a brake system air release on a customer truck.

In order to assess noise from these sources, data has been sourced from our in-house database and from measurements performed by MDA, as detailed in Table 5. The maximum noise levels calculated at the nearest affected Fordyce Street residence are shown in Table 12.:



**Table 12: Maximum noise level at nearest residential properties,  $L_{Amax}$  dB**

Source	Noise at nearest affected Fordyce Street residence
“Normal” car	40-45
“Worst-case” car	50
Laughter and raised voice conversation	40-45
Truck brake system air release at Bulk trade staging area	66
Truck brake system air release at the inward goods loading dock	61

Referring to the above predictions, the maximum noise levels of staff and customer activity in the car park is expected to comply with the sleep disturbance criteria nominated in Section 7.3 (65dB  $L_{Amax}$ ) at the nearest affected Fordyce Street residence. For the worst –case scenario of a customer truck brake system air release in the bulk trade staging area, compliance with the sleep disturbance criteria is expected provided truck parks at the inward goods loading dock prior to 0700hrs and not at the bulk trade staging area (See Figure 4).

### 8.3 Best practice for noise control

Consistent with other Bunnings operations, appropriate practical measures for noise control are expected to be implemented. For example, forklifts operating on-site would be expected to exhibit low noise characteristics common to modern plant, including but not limited to broad-band noise type reversing beepers, as assumed in the calculations. The detailed recommendations relating to best practices for control are provided in Section 9.0 of this report.

### 8.4 Mechanical Services - preliminary review

In order to achieve the SEPP N-1 noise limit, all mechanical services equipment must be designed so that total cumulative noise emissions from all sources do not exceed the applicable noise limit at the nearest residential dwellings. So as not to affect the noise emissions expected from site activities assessed in Section 8.1, it is recommended the noise from mechanical services, when operating at 100% duty, do not exceed the following effective noise levels at the nearest affected dwelling:

- 36dB  $L_{eff}$  for all equipment operating during SEPP N-1 night and evening periods
- 42dB  $L_{eff}$  for all equipment operating during SEPP N-1 daytime period.

At this stage, the mechanical services design has not been completed, however, it will be necessary to use the above limits for detailed design of the store mechanical plant.

Mechanical services equipment associated with the development may include inlet or exhaust fans, air handling units and air conditioning condensers. As the design progresses an acoustic analysis can be performed to determine the exact nature of the treatments required. To perform a detailed analysis of noise from the proposed mechanical plant equipment, the following information would be required for review:

- Full mechanical equipment schedules providing equipment selections and operating duties
- Manufacturer’s noise level data
- Mechanical services drawings showing equipment locations.

This data would be used to predict noise emissions from the operation of mechanical plant and determine whether SEPP N-1 compliance will be achieved.

If required, proprietary methods of noise control such as the use of low noise equipment, duct attenuators, Where necessary, solid screening around any roof deck plant area must extend at least 1m higher than the highest item of plant; the final extent of a surround must be finalised during detailed design such that the above SEPP N-1 noise criterion is satisfied.

It is generally accepted that noise from mechanical services equipment can be reasonably controlled to the required levels provided that the units are suitably selected, sited and attenuated.

Planning conditions may assist in achieving compliance with SEPP N-1 and an example of a suitable planning permit condition relating to mechanical services noise control is provided below.

*Prior to the centre commencing operation, a report prepared by a suitably qualified acoustic consultant must be provided to the Responsible Authority demonstrating that noise from all mechanical services equipment complies with the noise limits detailed in accordance with State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1 (SEPP N-1).*

*Once the centre is operational, commissioning measurements must be performed to illustrate that compliance with SEPP N-1 has been achieved. If noise emitted from the subject site exceeds the SEPP N-1 noise limits, then additional noise control treatment will be required.*

## 9.0 RECOMMENDATIONS

The noise mitigation measures recommended for the proposed Bunnings Shepparton store development are summarised as follows:

### *Design measures*

- A 2.0m high acoustic barrier (perimeter fence) and concrete wall surrounding the bulk trade services and loading bay truck area as depicted in Figure 3. The construction of the acoustic barrier, will be required to be solid, for example colour-bond sheet metal, wood, cement sheet, Hebel or similar; Specific options for the barrier construction are provided in Appendix C. Any option chosen must satisfy the following minimum requirements:
  - The barrier must have a minimum mass of 14kg/m<sup>2</sup>
  - The barrier must be free of any holes or gaps
  - Any proprietary products must be constructed in accordance with the manufacturer's specifications
  - The height of the acoustic barrier is to be determined from ground level on the residential side of the interface.
- The provision of acoustically absorptive surface linings to the underside of the service area canopy and to the wall areas within the canopy. An appropriate form of treatment may comprise of 50mm thick polyester or fibreglass insulation with a minimum density of 48kg/m<sup>3</sup> faced with an open restraining layer (for example wire mesh or perforated facings with a minimum open area of 30%)

### *Managerial controls*

- For inward goods deliveries and forklift activity during the SEPP N-1 Evening period (1800-2200hrs Weekdays, 1300-2200hrs Saturdays, 0700-2200hrs Sundays) managerial controls are recommended to limit delivery truck arrivals to one medium size rigid truck (< 8 tonne) during any half hour period. Single forklift activity only at the loading dock for a maximum of 15 minutes during any half hour period. The forklift reversing beepers are broadband noise type design.

- No inward goods deliveries or any forklift activities between the hours of 2200-0700hrs (night-time). Noting this restriction, managerial controls are also recommended for the bulk trade area to ensure large customer trucks only park at the inward goods loading bay area prior to 0700hrs (not at the bulk trade staging area)
- As consistent with the EPA guidelines and assuming there will be more than one waste collection from the site per week, waste collection to occur only between the hours of 7am-8pm Monday to Saturday and 9am-8pm Sunday and public holidays.

*Other recommendations*

As consistent with Bunnings operational procedures elsewhere, implementation of the following best practices is suggested:

- All staff using the area are to be advised of the proximity of the yard to residential land uses. This knowledge be conveyed by way of induction and signage in the service yard
- The operation of and any operating mechanism for the mesh gates at the Fordyce driveway entry to the loading bay and bulk trade services area is required to be low noise or inaudible at a distance greater than 20m.
- Any speaker systems (announcement or background music related) other than EWIS should only be provided in indoor areas
- Usage of the external refuse and compactor equipment restricted to day time hours
- Forklifts are to be contemporary gas-powered type with all associated noise control treatment maintained in good working order
- Forklift reversing alarms are to be the broad-band noise type fitted to any forklifts working outside instead of conventional reversing beepers
- A smooth operating surface is to be maintained where trucks and forklifts operate on the site. Specifically, speed humps, drains, or other forms of surface undulation or defect are to be avoided in the interest of minimising unnecessary impact noise.

*Mechanical services*

The detailed mechanical services design phase is recommended to take into consideration the following:

- The noise from mechanical services equipment (excluding any emergency/stand-by equipment) be designed such that the overall noise associated with mechanical services operating at full capacity does not exceed the daytime, evening and night-time effective noise levels ( $L_{eff}$ ) detailed in the mechanical services preliminary review Section 8.4.

## 10.0 CONCLUSIONS

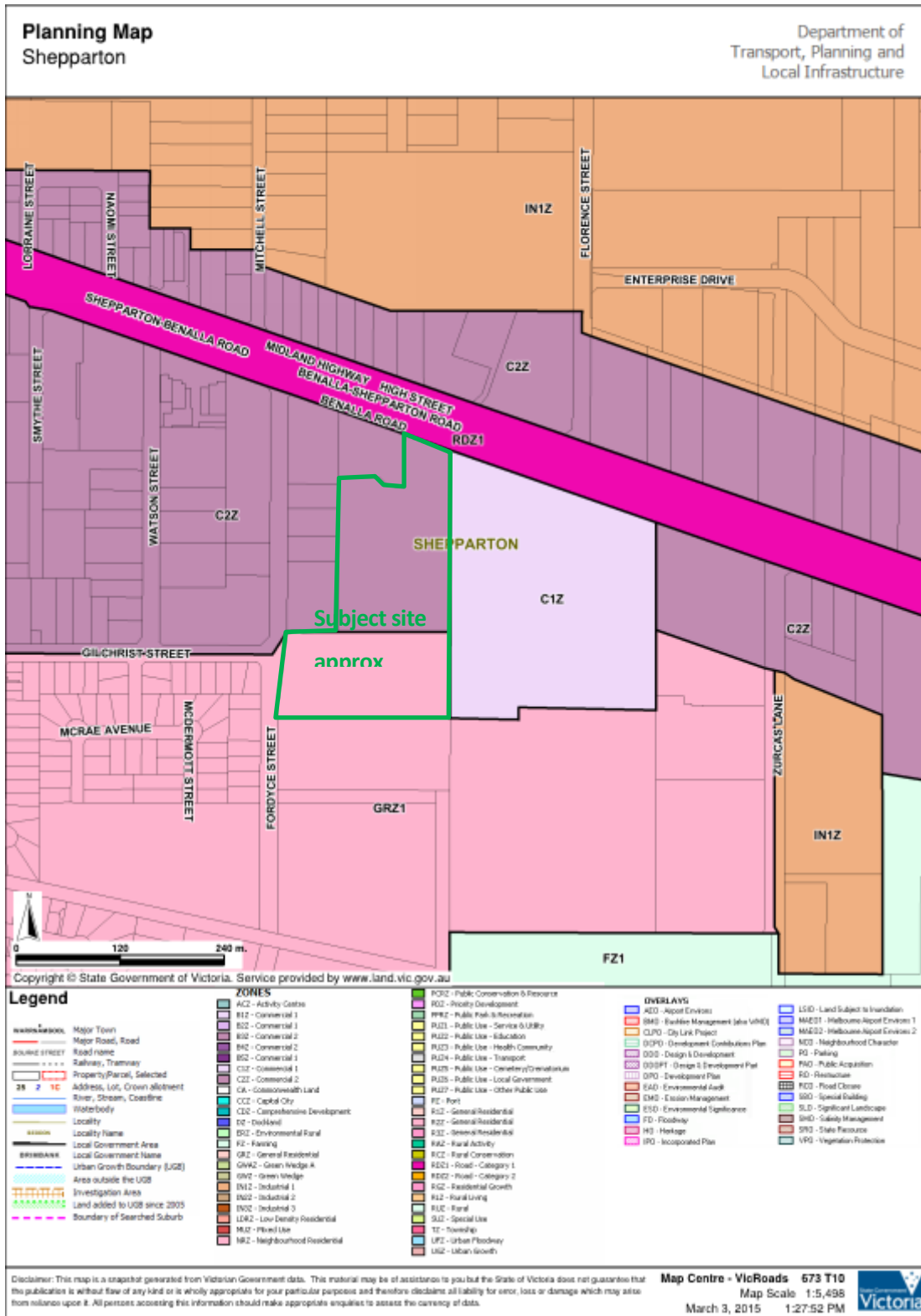
The proposed Bunnings development a 90 Benalla Road, Shepparton has been assessed for environmental noise impacts based on the current proposed site layout. The assessment indicates that all relevant Victorian legislation requirements and guidelines for noise can be achieved provided that the noise mitigation measures detailed in Section 9.0 of this report are implemented.



## APPENDIX A GLOSSARY OF TERMINOLOGY

Ambient	The ambient noise level is the noise level measured in the absence of the intrusive noise or the noise requiring control. Ambient noise levels are frequently measured to determine the situation prior to the addition of a new noise source.
$L_{\text{eff}}$	The effective noise level of commercial or industrial noise determined in accordance with <i>State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1</i> (SEPP N-1). This is the $L_{\text{Aeq}}$ noise level over a half-hour period, adjusted for the character of the noise. Adjustments are made for tonality, intermittency and impulsiveness.
$L_{\text{Aeq}}$	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level.
$L_{\text{A90}}$	The A-weighted noise level equalled or exceeded for 90% of the measurement period. This is commonly referred to as the background noise level.
$L_{\text{Amax}}$	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
SWL	<u>Sound Power Level</u> A logarithmic ratio of the acoustic power output of a source relative to $10^{-12}$ watts and expressed in decibels. Sound power level is calculated from measured sound pressure levels and represents the level of total sound power radiated by a sound source.

APPENDIX B PLANNING MAP



## APPENDIX C NOISE BARRIER OPTIONS

### *Boral Ezyshield*

Boral Ezyshield plywood panels are acceptable acoustically, based on the 24mm thick *Ezyshield Commercial* panel, which has a nominal weight of 14kg/m<sup>2</sup>. An extract from the manufacturer's published material is shown in Figure .

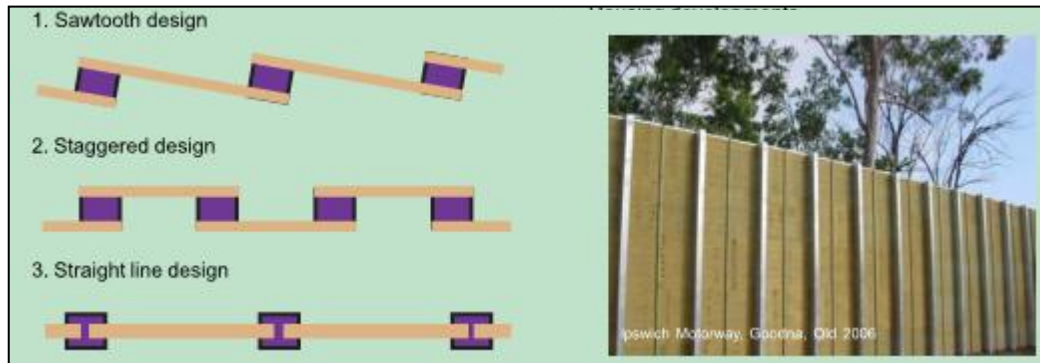


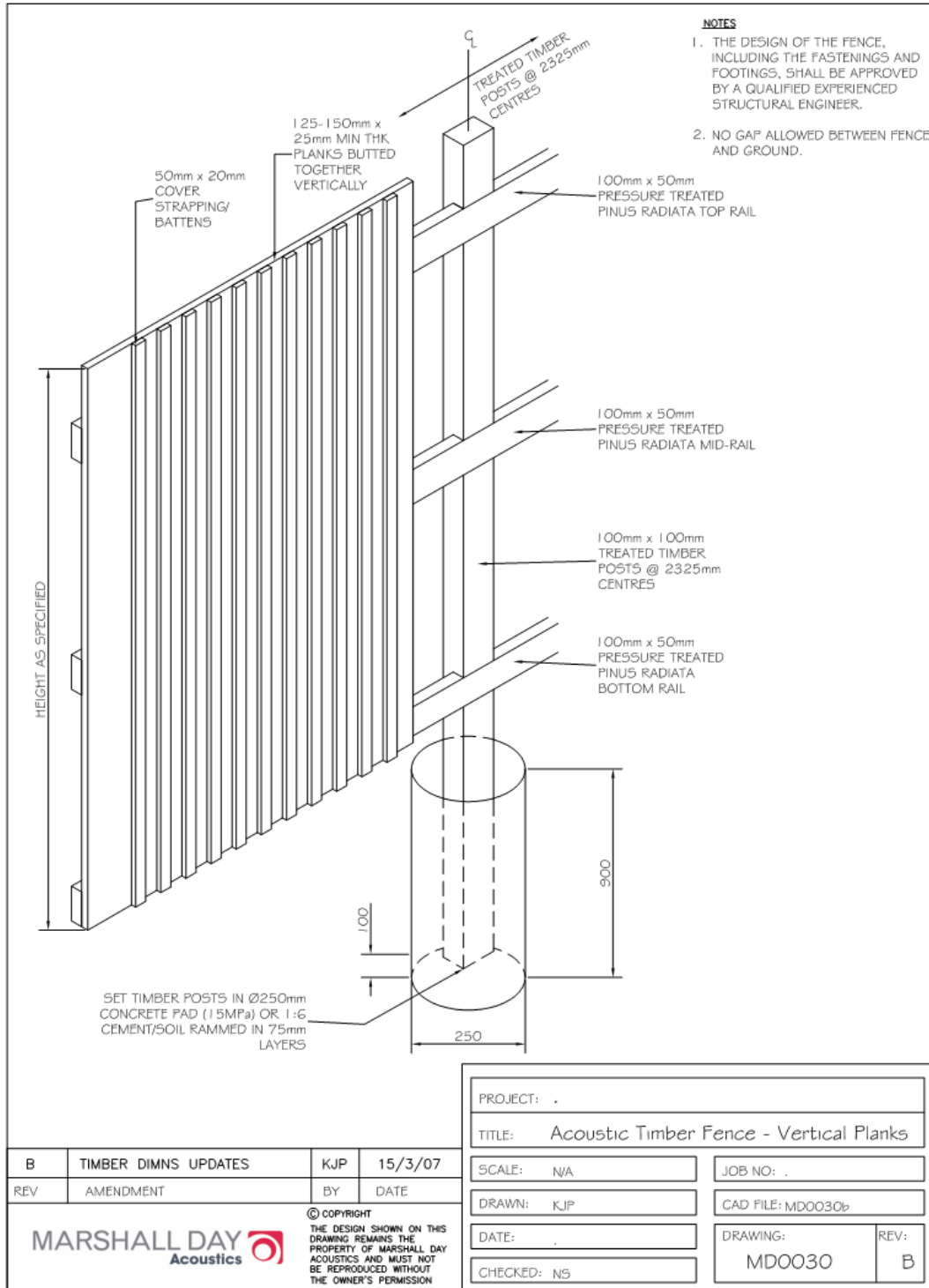
Figure C1: Boral Ezyshield plywood acoustic barrier

### *Masonry*

Any type of masonry such as concrete, brick, block or lightweight concrete such as Hebel aerated concrete is a suitable material for construction of acoustic barriers.

### *Vertical timber plank acoustic barrier*

An option for the acoustic barrier using vertical timber planks is shown in Figure .



**Figure C2: Acoustic barrier option using vertical timber planks**

*Horizontal timber plank acoustic barrier*

An option for the acoustic barrier using horizontal timber planks is shown in Figure .

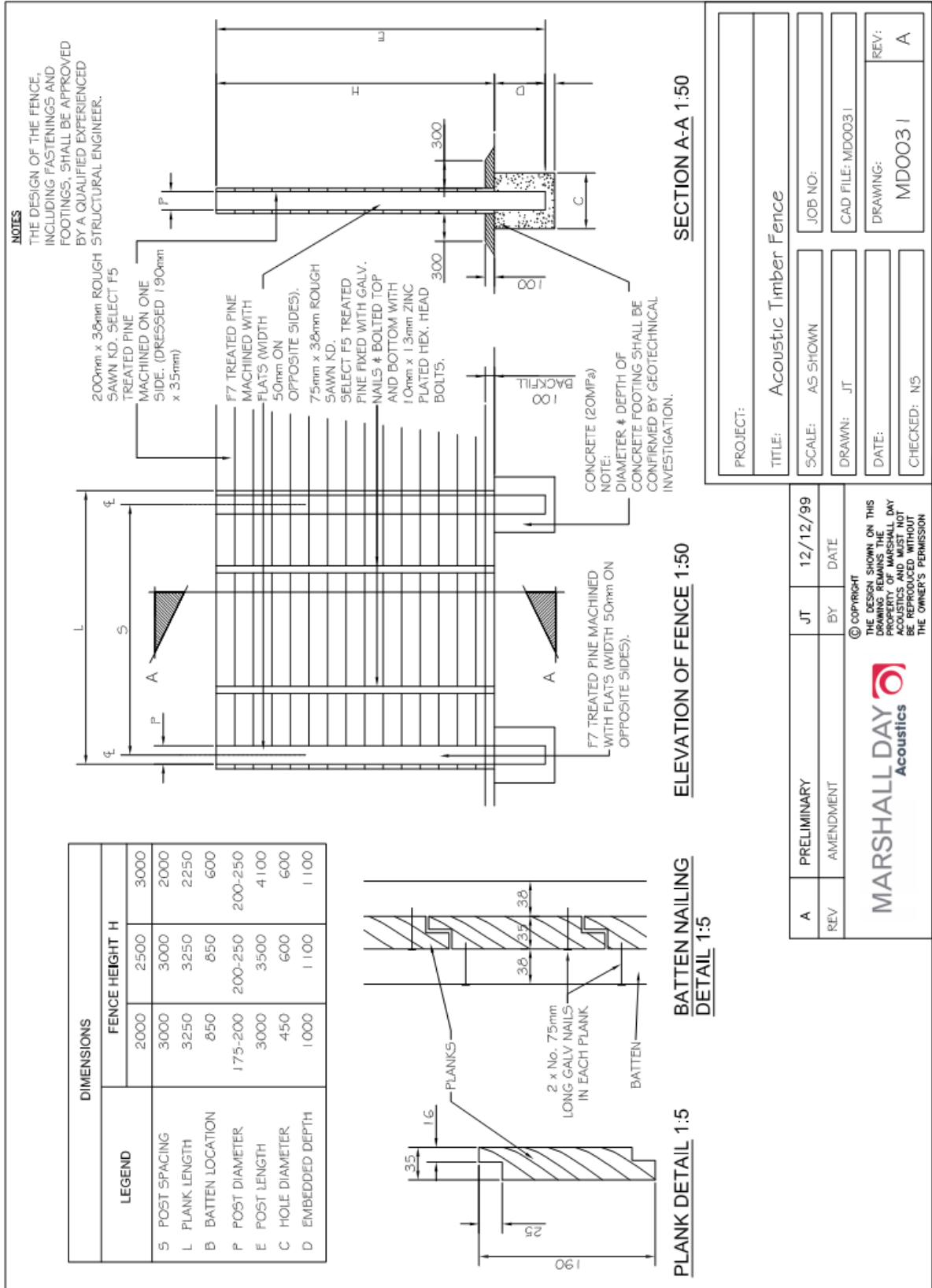


Figure C3: Acoustic barrier option using horizontal timber planks