CLARITY
ACOUSTICS

Report R01 Rev1 21189

27 April 2022

2420 Warburton Highway, Yarra Junction

Planning Application Acoustic Assessment

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PROJECT SUMMARY:

R01 Rev1 21189

2420 Warburton Highway, Yarra Junction

Planning Application Acoustic Assessment

PREPARED FOR:

Warburton Highway Developments Pty Ltd

P O Box 278

Lilydale VIC 3140

ATTENTION:

Robert Pace

REFERENCE	REV	STATUS	DATE	AUTHOR	REVIEWER
R01 21189	-	DRAFT	18 APR 2022	A CHANDHOK	R LEO
R01 21189	-	ISSUED	20 APR 2022	A CHANDHOK	R LEO
R01 21189	-	UPDATED	27 APR 2022	A CHANDHOK	R LEO

AAAC

Clarity Acoustics is a member of the *Association of Australasian Acoustical Consultants* (AAAC), the not-for-profit peak body representing the acoustic consulting industry in Australia and New Zealand.

Contents

1.0 INTRODUCTION

It is proposed to develop land at 2420 Warburton Highway, Yarra Junction (subject site) for a commercial development. The development will comprise a car and dog wash facility including two auto car wash bays, four vacuum bays and two dog wash bays and an unmanned service station which will include six fuel bowsers.

Clarity Acoustics Pty Ltd (Clarity Acoustics) has been engaged by Warburton Highway Developments Pty Ltd to undertake an acoustic assessment of the proposed development to be submitted as part of the planning application.

This report provides details of the proposed site operations, measured background noise levels, relevant noise criteria, recommended noise controls and an assessment of operational noise from the site with the incorporation of the recommended noise controls.

A glossary of acoustic terminology used in this report is provided in APPENDIX A.

2.0 PROJECT DESCRIPTION

2.1 Subject site

The subject site is located at 2420 Warburton Highway in Yarra Junction and is bounded by the following:

- Warburton Highway directly to the north with a public reserve beyond
- Station Street to the east with commercial premises and vacant land beyond
- Linden Avenue to the south with a child care centre on Station Street beyond
- A drainage easement directly west with commercial premises and dwellings on Warburton Highway beyond.

The subject site is located in a General Residential Zone (GRZ1) with further GRZ1, Mixed Use Zone (MUZ), Neighbourhood Residential Zone 2 (NRZ2) and Public Park and Recreation Zone (PPRZ) in the immediate environs. The relevant planning map for the subject site is provided in APPENDIX B.

The nearest affected receivers are dwellings to the south-west on Crescent Road, to the west on Linden Avenue and to the west and north-west on Warburton Highway. The childcare centre at 4 Station Street is also considered a noise sensitive receiver during its hours of operation (understood to be 0630-1800 hours).

Table 1 provides details of the nearest affected receivers that have been considered in the following assessment.

Table 1 - Details of the nearest noise sensitive receivers

ID	Address	Description
R1	4 Station Street	Single storey child care centre to the south of the subject site
R2	3/1 Crescent Road	Single storey dwelling to the south west of the subject site
R3	4/1 Crescent Road	Single storey dwelling to the south west of the subject site
R4	8 Linden Avenue	Two storey dwelling currently under construction to the west of the subject site
R5	2416 Warburton Highway	Single storey dwelling to the west of the subject site
R6	2409 Warburton Highway	Single storey dwelling to the west of the subject site

An aerial photograph of the subject site and nearest affected receivers is provided in Figure 1.

Figure 1 - Aerial photograph of the subject site and receivers (source: Nearmap)

2.2 Proposed operations

As outlined above, the proposed development is to include two (2) auto car wash bays, four (4) vacuum bays, two (2) dog wash bays and six (6) self-serve fuel bowsers.

The auto car wash bays are to be located to the south of the site and will be provided with a full height wall and canopy to the entrance and roller doors to the exits. It is understood that the auto car wash cycles will incorporate blowers which will operate prior to the car exiting the wash bay. It is noted that the exit roller door will remain closed for the entire duration of the auto car wash cycle including the use of the blowers.

All mechanical plant associated with the subject site will be located within an enclosed plant room located adjacent to the auto car wash bays. The fuel canopy will be located directly north of the plant room and will be self-serve i.e., payment will be accepted via credit card at the bowser.

Four vacuum bays will be located to the north of the site. The dog wash bays will be located adjacent to the north-eastern site boundary and will be provided 1.5 m high acoustic screening (12 mm thick clear Perspex) to the west of each bay. The proposed site layout is provided in APPENDIX C.

The proposed hours of operation of the subject site are as follows:

- Auto car wash bays and fuel bowsers – 24 hours a day, 7 days a week
- Vacuum bays – 0500-2200 hours, 7 days a week
- Dog Wash bays – 0700-2200 hours, 7 days a week.

3.0 VICTORIAN GUIDELINES AND LEGISLATION

A summary of the key noise legislation and related guidelines and standards commonly referenced in Victoria in relation to the proposed development is provided in Table 2 below.

Table 2 – Relevant legislation and standards

Legislation/ Guideline	Description
Environment Protection Act 2017 (the Act)	Legislative framework for the protection of the environment in Victoria that establishes obligations for environmental noise control.
Environment Protection Regulations 2021 (S.R. No. 47/2021)	The Environment Protection Regulations set out the framework for noise from residential, commercial, industrial and trade premises as well as from indoor and outdoor entertainment venues and events. The Regulations require that noise levels from commercial, industrial and trade premises and indoor and outdoor entertainment venues and events are set to protect noise sensitive areas from unreasonable noise.
EPA Publication 1826-4 *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (Noise Protocol)	The Noise Protocol outlines the EPA's approach to the determination of noise limits and to the measurement, prediction and analysis of noise. Part I of the Noise Protocol outlines the methodology to establish noise limits applicable to noise from commercial, industrial or trade premises in both urban and rural areas of Victoria. Operational noise levels from the subject site must comply with the noise limits derived under Part I of the Noise Protocol.
NSW Road Noise Policy (RNP)	The NSW Environmental Protection Authority (EPA) conducted a review of sleep disturbance studies the results of which are outlined in the NSW EPA's RNP. Based on the conclusions of the EPA in relation to sleep disturbance, it is recommended that night-time maximum noise levels from on-site activities not exceed 65 dB L_{Amax} outside an openable window of nearby dwellings.

A detailed description of the noise legislation and guidelines referred to in Table 2 and their application is provided in APPENDIX D.

4.0 NOISE MONITORING/MEASUREMENTS

4.1 Existing Noise Environment

As outlined in Section 3.0 and APPENDIX D, noise limits applicable to the subject site are required to be set accounting for existing background noise levels in the vicinity of the proposed use. As such, noise monitoring was undertaken at the subject site between Tuesday, 30 November and Friday, 3 December 2021 in accordance with the procedures set out in the Noise Protocol to quantify the background noise levels in the area.

The measured minimum daily average background noise levels relevant to the proposed hours of operation of the subject site are detailed in Table 3. The background noise levels in the morning shoulder period between 0500-0700 hours are considerably higher than the rest of the night time period due to additional traffic on the local road network from 0500 hours onwards and as such, background noise levels for this period have also been presented.

Table 3 – Measured minimum daily average background noise levels

Period	Time Period (relevant to subject site operating hours)	Measured background noise level, $L_{A90,\ 1\ hour}$
Day	0700 - 1800 hours	42 dB
Evening	1800 - 2200 hours	37 dB
Night	2200-0500 hours	31 dB
Morning Shoulder	0500 - 0700 hours	39 dB

The measured background noise levels have been used to derive the noise limits applicable to the subject site under the Noise Protocol. Details of the noise monitoring position, duration and the noise monitoring equipment used are provided in APPENDIX E.

4.2 Candidate noise survey

The proposed car wash is to be an Ecowash facility with a Laserwash 360+ auto car wash system. It is understood that the auto car wash equipment will be similar to that installed at 325 Ballarto Road, Carrum Downs and that the dog wash equipment to be installed at the subject site is similar to that installed at an existing Ecowash site located at 6 Link Road, Seville. As such, measurements of the auto car wash system and dog wash system were undertaken at Carrum Laserwash facility on 23 April 2022 and the Ecowash facility in Seville on 30 November 2021 respectively.

Nearfield measurements were undertaken using Class 1 sound level meters (Svantek 977 & 979 Sound & Vibration Analysers – serial numbers 59804/69401). The equipment was checked before and after the noise survey using a Class 1 Calibration (Svantek SV35A – serial number 58085) and no significant calibration drifts were observed.

The measured noise levels are detailed in Table 4.

Table 4 – Noise levels of equipment measured at existing Ecowash & Laserwash sites

Description	Measured noise level, L_{Aeq}	Measured noise level, L_{Amax}	Comment
Reverberant noise level within plant room	88 dB	90 dB	
Dog wash blower at 1 m	89 dB	94 dB	Typical dog wash cycle is 7-8 minutes with the dog wash blower being used for up to 1 minute per cycle.
2 m from auto car wash entrance during wash cycle (wash cycle includes blowers)	82 dB	89 dB	Typical auto car wash cycle is 6 minutes with blower use and 5 minutes if blowers are not used. Car wash exit door remains closed until the wash cycle is complete.
2 m from auto car wash entrance during wash cycle (no blower use)	77 dB	87 dB	
1 m from auto car wash exit door during wash cycle (1 mm thick exit roller door closed; wash cycle includes blowers)	78 dB	89 dB	

The measurements detailed above have been used to derive sound power levels for the proposed auto car wash, and dog wash equipment associated with the subject site.

5.0 RECOMMENDED NOISE AND OPERATIONAL CONTROLS

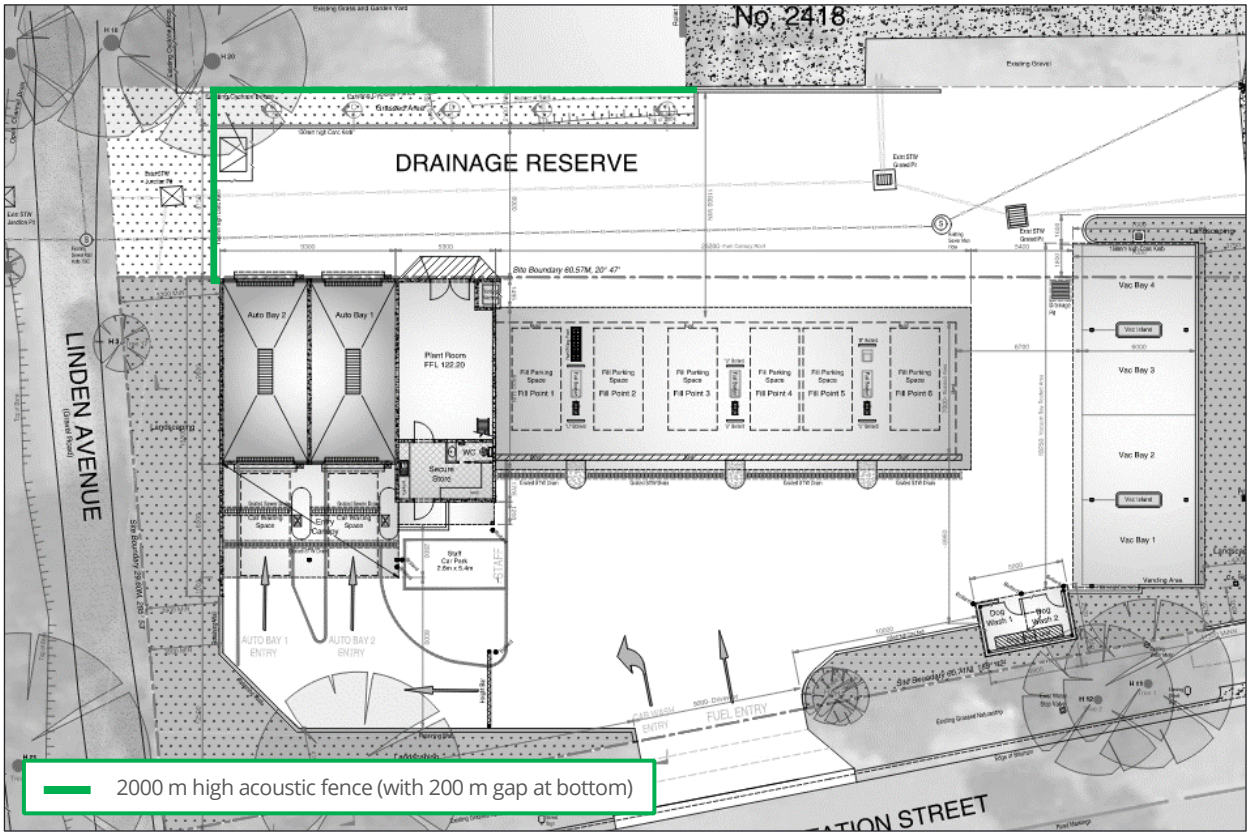
A 3-D noise model of the proposed subject site and surrounding area has been created to predict operational noise from the subject site at the nearest affected receivers. Outcomes of the noise modelling indicate that in order to enable compliance with the Noise Protocol noise limits the following noise and operational controls will be required.

5.1 Acoustic Fencing

It is recommended that a 2000 mm high acoustic fence be provided to sections of the western and southern site boundaries. To ensure that drainage requirements are met, it is understood that a 200 mm gap will be required at the bottom of the acoustic fence. This is acceptable from an acoustic perspective and the recommended acoustic fence should be constructed to a height of 2.0 m relative to the NGL.

The extent of acoustic fencing required is outlined in Figure 2.

Figure 2 – Location and extent of acoustic screening (source: TMC Design)



To provide adequate noise attenuation, the construction material of the recommended acoustic fence must have a minimum surface density of 12 kg/m^2 and be free from holes and gaps. The required surface density can be achieved by materials such as 9 mm thick fibre cement sheet or 25 mm thick plywood timber panelling. A typical timber acoustic fence detail is provided in APPENDIX F.

If a material which meets the above acoustic requirements and does not restrict light is required, 12 mm thick Perspex, 16 mm thick Thermoclear or 6 mm thick float glass can be used.

5.2 Selection of low noise vacuum units

It is recommended that the vacuum units selected and installed at the subject site not exceed a sound power level of 90 dB L_{Aw}.

5.3 Plant room construction

It is understood that the plant room is proposed to be constructed of precast concrete with a metal deck roof. It is recommended that a 50 mm thick insulation blanket with foil sarking facing be installed to the underside of the sheet metal roof.

In addition, doors to the front and rear of the plant room should be minimum 35 mm thick solid core doors and must remain closed during operation of the car wash except for egress/ingress.

5.4 Auto Car Wash Doors

It is proposed to fit automatic roller doors to the exits of the auto car wash bays. The roller doors should be selected to achieve a minimum sound insulation rating of 20 dB R_w (3 mm thick clear PVC doors such as those manufactured by Premier Doors or any other doors which meet the sound insulation requirement will be acceptable).

5.5 Operational controls

To enable compliance with the environmental noise criteria, it is recommended that the following operational controls are implemented:

- Fuel deliveries to the site should be scheduled to only occur between 0700-2200 hours, 7 days a week
- The operation of the vacuum bays should be limited to 0500-2200 hours, 7 days a week
- The operation of the dog wash bays should be limited to 0700-2200 hours, 7 days a week.

6.0 ASSESSMENT OF OPERATIONAL NOISE AGAINST THE NOISE PROTOCOL

Noise associated with the operation of the proposed development must comply with the noise limits derived under Part I of the Noise Protocol. Compliance is determined by comparing the predicted effective noise level (L_{eff}) from the operation of the subject site to the derived noise limits at the nearest affected receivers.

The following sections detail the methodology for noise prediction from the proposed development and the noise limits applicable to the subject site under Part I of the Noise Protocol and compare the predicted operational noise levels with the background derived noise limits for the subject site.

6.1 Assessment methodology

Noise levels from the subject site have been calculated using the proprietary noise modelling software SoundPLAN v8.2 which implements International Standard ISO 9613-2:1996 *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation* (ISO 9613-2).

The noise modelling considers the following:

- Attenuation of noise provided by distance between the source and receiver, built form of the subject site and any intervening screening structures and the noise mitigation measures and operational controls outlined in Section 5.0
- Reflections from built form, adjacent buildings, screening structures and the ground surface
- Adjustments for specific noise characteristics such as tonality or intermittency, where necessary
- Duration of exposure at the receiver locations, assessed over a 30-minute period in accordance with the requirements of the Noise Protocol
- The noise prediction methodology outlined in APPENDIX G
- Source noise levels for noise sources associated with the proposed operation of the subject site and operational assumptions as summarised in Table 4 and APPENDIX H.

6.2 Noise limits

The noise limits for the subject site have been calculated in accordance with the methodologies prescribed in Part I of the Noise Protocol and are provided in Table 5.

Table 5 – Noise limits derived under the Noise Protocol

Period	Time Period	Measured background noise level, dB L_{A90}	Noise limit, dB L_{eff}
Day	0700-1800 hours	42	52
Evening	1800-2200 hours	37	46
Night	2200-0500 hours	28	38
Morning Shoulder	0500-0700 hours	39	42

To comply with the requirements of the Noise Protocol, the total noise level from all of the subject site noise sources covered under the Noise Protocol must not exceed the above noise limits in the day, evening, night-time and morning shoulder periods when assessed over a 30-minute period. It should be noted that the Noise Protocol noise limits only apply at the child care centre during periods of operation of the child care centre.

6.3 Source noise data

Noise sources associated with the subject site assessable under the Noise Protocol include:

- Operation of the auto car wash bays, vacuum bays and dog wash bays
- Operation of mechanical plant within the plant room
- Semi-trailer fuel deliveries to the subject site.

Late night/early morning patron and vehicular activity is not covered under the Noise Protocol. An assessment of maximum noise levels from night time activities associated with the subject site is provided in subsequent sections.

Source noise levels for fuel deliveries and low noise vacuum units have been taken from measurements conducted by Clarity Acoustics at similar sites. Source noise levels for auto car wash bays and dog wash bays have based on equipment measured at the Carrum Laserwash and Ecowash Seville sites as outlined in Table 4. A detailed schedule of the noise source data used in our noise model is provided in APPENDIX H.

In accordance with the requirements of the Noise Protocol, a 2 dB correction for tonality associated with fuel delivery vehicle reversing beepers has been applied.

6.4 Predicted noise levels

Predicted noise levels from the operation of noise sources associated with the subject site are provided below based on the following operational assumptions for a worst-case 30-minute period:

Table 6 – Operational assumptions for worst case 30-minute period

Period	Fuel deliveries	Car wash operation
Day (0700-1800 hours)	1 fuel delivery	4 cycles of each auto car wash including blowers (24 minutes per car wash bay) 2 vacuum bays operating continuously for 30 minutes 2 cycles of each dog wash bay (2 minutes of blower use each)
Evening (1800-2200 hours)	1 fuel delivery	2 cycles of each auto car wash including blowers (12 minutes per car wash bay) 2 vacuum bays operating continuously for 15 minutes 2 cycles of each dog wash bay (2 minutes of blower use each)
Night (2200-0500 hours)	-	1 cycle of each auto car wash including blowers (6 minutes per car wash bay) No vacuum bay or dog wash use proposed
Morning Shoulder (0500-0700 hours)	-	1 cycle of each auto car wash including blowers (6 minutes per car wash bay) 2 vacuum bays operating continuously for 7.5 minutes No dog wash use proposed

It is noted that the above assumptions have been confirmed by the applicant as a worst-case scenario for the busiest 30-minute period during the day, evening, night time and early morning periods.

For the purpose of this assessment, it has been assumed that all plant located within the plant room has the potential to operate continuously for a 30-minute period at any time of the day.

6.4.1 Day and evening period operation

Predicted noise levels from the proposed operation of the subject site during the day and evening periods are presented in Table 7 and Table 8. The predicted noise levels take into account the noise and managerial controls detailed in Section 5.0 and include a +2 dB adjustment for tonality associated with delivery vehicle reversing beepers.

Table 7 - Predicted operational noise levels (Day), dB L_{eff}

	Predicted noise level at receiver (Day)					
Source	**3/1 Crescent Rd**	**4/1 Crescent Rd**	**8 Linden Ave**	**2416 Warburton Hwy**	**2409 Warburton Hwy**	**4 Station St**
Auto Car wash	38	36	29	33	28	33
Dog Wash	36	35	35	39	38	39
Fuel Deliveries	36	35	40	37	36	35
Plant Room	34	32	33	19	26	32
Vacuums	41	45	48	47	47	44
Cumulative noise level	**45**	**46**	**49**	**48**	**48**	**46**
Noise Limit (Day)	**52**	**52**	**52**	**52**	**52**	**52**
Compliance?	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**

Table 8 - Predicted operational noise levels (Evening), dB L_{eff}

	Predicted noise level at receiver (Evening)				
Source	**3/1 Crescent Rd**	**4/1 Crescent Rd**	**8 Linden Ave**	**2416 Warburton Hwy**	**2409 Warburton Hwy**
Auto Car wash	35	33	26	30	25
Dog Wash	36	35	35	39	38
Fuel Deliveries	36	35	40	37	36
Plant Room	34	32	33	19	26
Vacuums	38	42	45	44	44
Cumulative noise level	**43**	**44**	**46**	**46**	**46**
Noise Limit (Evening)	**46**	**46**	**46**	**46**	**46**
Compliance?	**YES**	**YES**	**YES**	**YES**	**YES**

As detailed in Table 7 and Table 8, compliance with the day/evening period noise limits is predicted to be achieved at the nearest affected receivers with the incorporation of the recommended operational and noise controls.

6.4.2 Night time and morning shoulder period operation

Predicted noise levels from the proposed operation of the site during the night time period (2200-0500 hours) and during the early morning/morning shoulder period (0500-0700 hours) are presented in Table 9 and Table 10 respectively. The predicted noise levels take into account the noise and managerial controls detailed in Section 5.0.

Table 9 - Predicted operational noise levels (Night), dB L_{eff}

	Predicted noise level at receiver (Night)				
Source	**3/1 Crescent Rd**	**4/1 Crescent Rd**	**8 Linden Ave [1]**	**2416 Warburton Hwy**	**2409 Warburton Hwy**
Auto Car wash	33	32	35	27	21
Plant Room	34	33	34	19	26
Cumulative noise level	**37**	**36**	**37**	**27**	**27**
Noise Limit (Night)	**38**	**38**	**38**	**38**	**38**
Compliance?	**YES**	**YES**	**YES**	**YES**	**YES**

Table 10 - Predicted operational noise levels (Morning shoulder period), dB L_{eff}

	Predicted noise level at receiver (Morning Shoulder Period)					
Source	**3/1 Crescent Rd**	**4/1 Crescent Rd**	**8 Linden Ave**	**2416 Warburton Hwy**	**2409 Warburton Hwy**	**4 Station St**
Auto Car wash	32	30	23	27	22	27
Plant Room	34	32	33	19	26	32
Vacuums	35	39	42	40	41	38
Cumulative noise level	**39**	**40**	**42**	**41**	**41**	**39**
Noise Limit	**42**	**42**	**42**	**42**	**42**	**42**
Compliance?	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**

As detailed in Table 9 and Table 10 above, compliance with the night time (2200-0500 hours) and morning shoulder period (0500-0700 hours) noise limits is predicted to be achieved at the nearest affected dwellings with the incorporation of the recommended operational and noise controls.

[1] For the night time (2200-0500 hours) the most affected receiver position for 8 Linden Avenue is Bedroom 3, however, for the morning shoulder, day and evening periods the most affected receiver position for 8 Linden Avenue is Bedroom 1.

7.0 SLEEP DISTURBANCE ASSESSMENT

Noise from night time activity associated with the proposed development should be assessed against the sleep disturbance criteria at the nearest affected dwellings. Night time noise associated with the use of the subject site could include operation of the auto car wash bays and vacuums, car movements within fuel and car wash areas, cars braking, doors closing and cars accelerating away from a stationary position. Noise from patrons talking also needs to be considered.

Predicted maximum noise levels from the above activities are provided in Table 11.

Table 11 - Predicted maximum noise levels from late night activity, dB L_{Amax}

Receiver	'Normal' car[1]	Worst case car[2]	Patron voices	Vehicle pass by	Auto Car Wash	Vacuum unit	Compliance with 65 dB L_{Amax}?
3/1 Crescent Rd	51	60	56	49	46	49	Yes
4/1 Crescent Rd	49	58	55	48	47	48	Yes
8 Linden Ave	54	62	60	53	50	49	Yes
2416 Warburton Hwy	54	63	52	52	42	53	Yes
2409 Warburton Hwy	44	54	50	45	37	53	Yes

[1] Includes door closing and vehicle start up from stationary

[2] A 'worst-case' car includes a V8 or high-powered vehicle driving in an aggressive manner

It can be seen from Table 11 that the night-time maximum levels from the operation of the subject site will comply with the sleep disturbance criterion of 65 dB L_{Amax} at the nearest affected receivers.

8.0 SUMMARY

It is proposed to develop land at 2420 Warburton Highway, Yarra Junction (subject site) for a commercial development. The development will comprise a car and dog wash facility including two auto car wash bays, four vacuum bays and two dog wash bays and an unmanned service station which will include six fuel bowsers.

Clarity Acoustics has carried out an environmental noise assessment of the proposed development in accordance with the relevant Victorian EPA legislation and accepted industry practice.

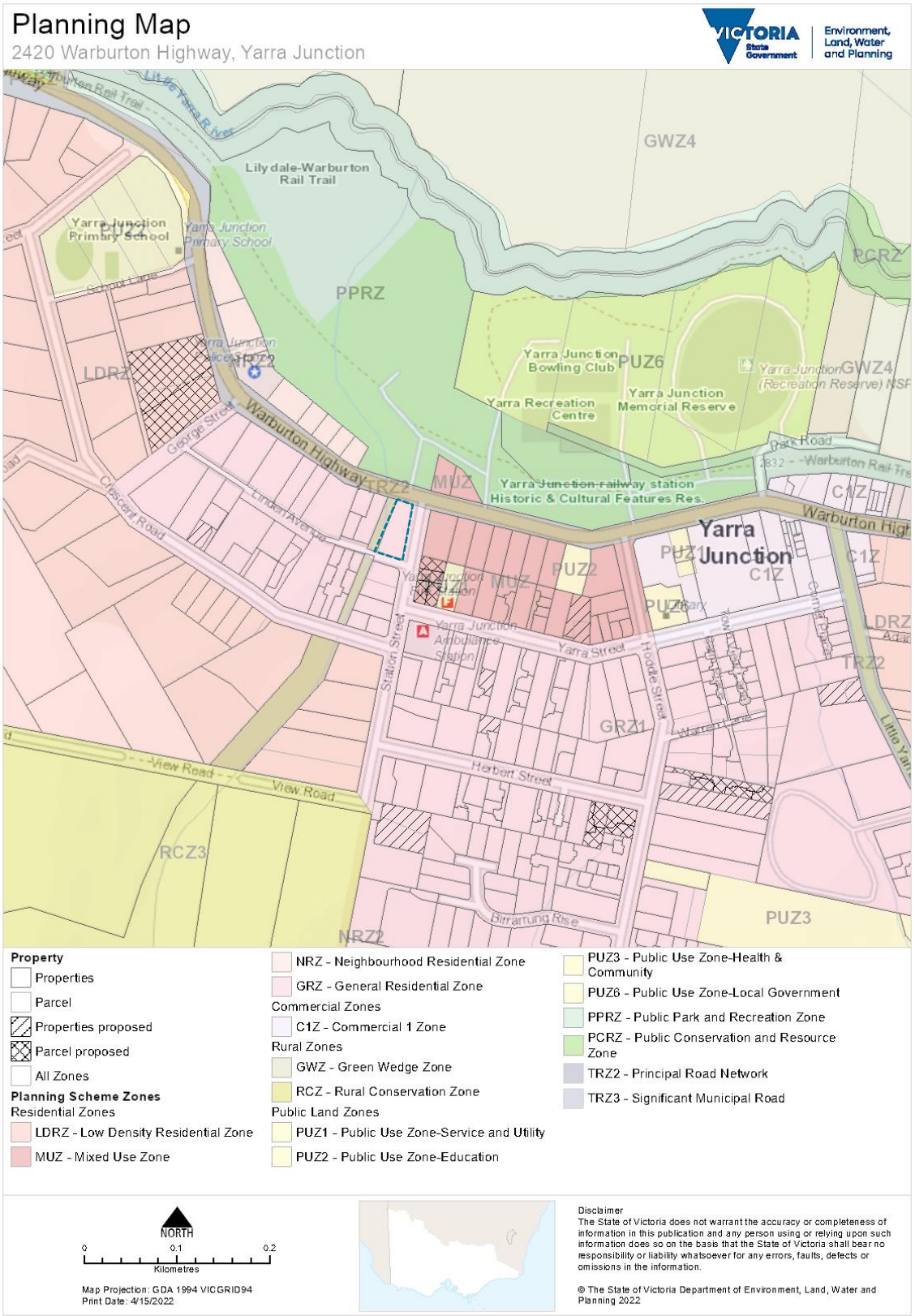
Based on the proposed design of the development, the relevant environmental noise criteria for the site can be met by implementing the operational and noise control measures outlined in Section 5.0 which are summarised below:

- Provision of a 2.0 m high (relative to NGL with 200 mm gap at the bottom) acoustic fence to sections of the western and southern site boundaries
- Scheduling fuel deliveries to the site to only occur between 0700-2200 hours, 7 days a week
- Limiting the use of the dog wash to 0700-2200 hours, 7 days a week
- Provision of 35 mm thick solid core doors to the plant room and incorporating a layer of 50 mm thick insulation with foil sarking facing to the underside of the proposed sheet metal roof
- Provision of acoustic roller doors with a minimum sound insulation rating of 20 dB R_w to the exits of both auto car wash bays
- Selection of vacuum units with a maximum sound power level of 90 dB L_{Aw} and limiting the use of the vacuums to 0500-2200 hours, 7 days a week.

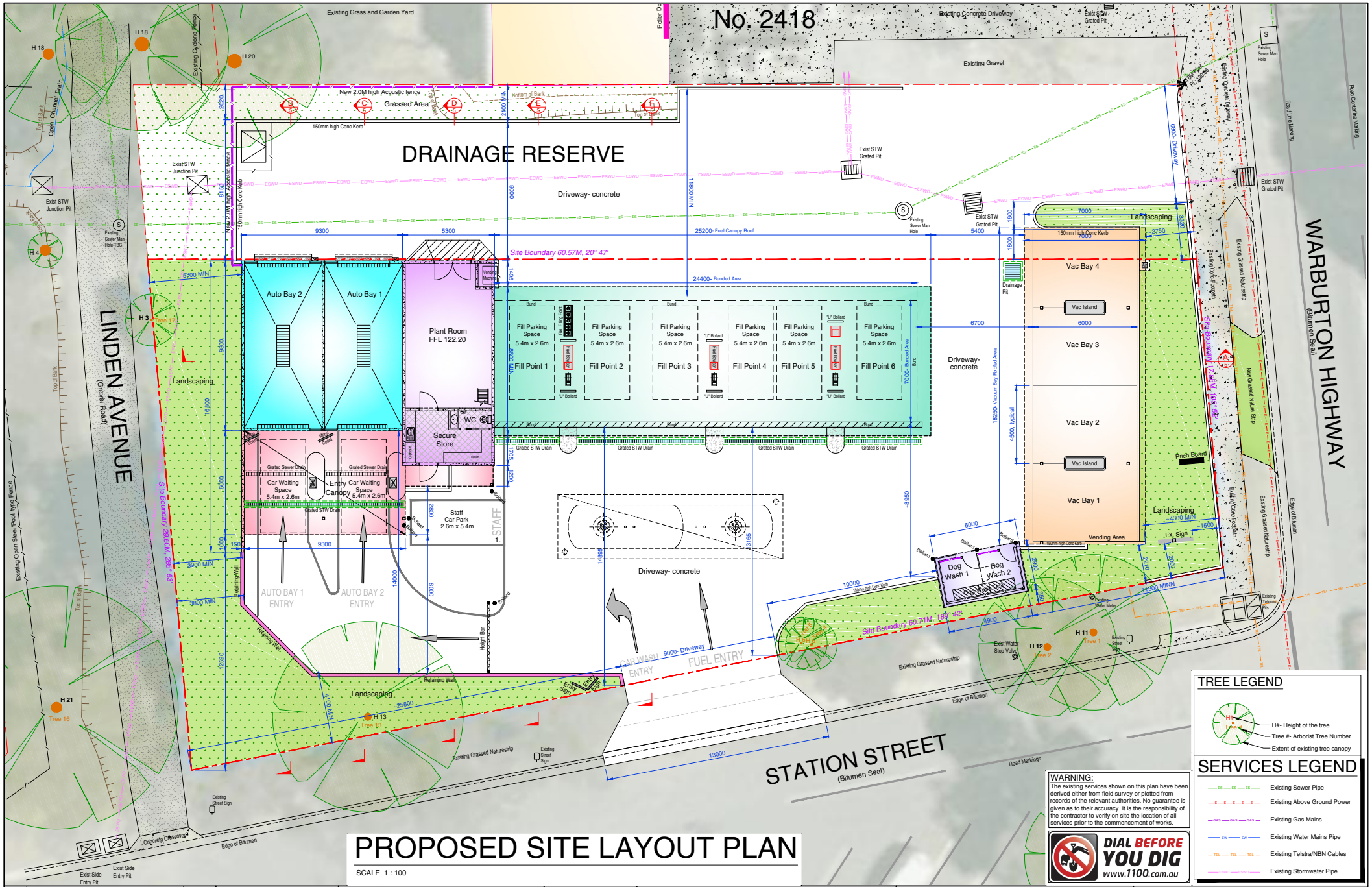
APPENDIX A GLOSSARY OF TERMINOLOGY

dB	Decibel (dB) a relative unit of measurement widely used in acoustics, electronics and communications. The dB is a logarithmic unit used to describe a ratio between the measured sound level and a reference or threshold level of 0 dB.
A-weighting	The A-weighting filter covers the full audio range - 20 Hz to 20 kHz and the shape is similar to the response of the human ear at lower levels. A-weighted measurements correlate well with the perceived loudness at low sound levels, as originally intended.
Hz	Hertz (Hz) the unit of Frequency or Pitch of a sound. One hertz equals one cycle per second. 1 kHz = 1000 Hz, 2 kHz = 2000 Hz, etc.
$L_{A90\,(t)}$	The sound level exceeded for 90% of the measurement period, A-weighted and averaged over time (t) and commonly referred to as the background sound level.
$L_{Aeq\,(t)}$	A –weighted equivalent continuous sound Level is the sound level equivalent to the total sound energy over a given period of time (t). Commonly referred to as the average sound level.
L_{Amax}	The A-weighted maximum noise level. The highest sound level which occurs during the measurement period or a noise event.
L_{eff}	The level of noise emitted from the commercial, industrial or trade premises and adjusted, if appropriate, for character and duration.

APPENDIX B PLANNING MAP



APPENDIX C PROPOSED SITE LAYOUT



PROPOSED SITE LAYOUT PLAN

SCALE 1 : 100

TREE LEGEND

H#- Height of the tree
Tree #- Arborist Tree Number
Extent of existing tree canopy

SERVICES LEGEND

- Existing Sewer Pipe
- Existing Above Ground Power
- Existing Gas Mains
- Existing Water Mains Pipe
- Existing Telstra/NBN Cables
- Existing Stormwater Pipe

WARNING:
The existing services shown on this plan have been derived either from field survey or plotted from records of the relevant authorities. No guarantee is given as to their accuracy. It is the responsibility of the contractor to verify on site the location of all services prior to the commencement of works.

DIAL BEFORE YOU DIG www.1100.com.au

ISSUE	DESCRIPTION	DATE
A	Issued For Council Planning Approval	21-04-2022

REVISIONS

TC 21 Apr 2022 11:46 AM - T:\TMC\2021\21-037 Robert Pace\- Yarra Junction, VIC\21-037 TP Rev A. dwg

ISSUED FOR PLANNING APPROVAL
NOT TO BE USED FOR CONSTRUCTION PURPOSES

NORTH

PROPOSED FUEL & CAR WASH DEVELOPMENT

AT: 2420 WARBURTON HIGHWAY, YARRA JUNCTION, VIC, 3797.

FOR: ECO WASH AUSTRALIA PTY LTD

Drawn: T. MICHAELS
Designed: T. MICHAELS

Design Matters National
The peak body for the building design profession
Member

TMC | Building Design Group
P.O. Box 3494, Mornington, VIC, 3931. Phone No. 0416 114 573
E:mail- tracey@tmcdesign.com.au

Scale: 1:100 (A1)	Date: APRIL 2022	Issue:
Sheet No: 2 of 6.	Job No: 21-037 TP	A

APPENDIX D 1826-4 (NOISE PROTOCOL)

The following sections outline the key noise legislation in Victoria and related guidelines and standards commonly referenced in Victoria in relation to the proposed development.

D1 Environment Protection Act 2017

The Environment Protection Act 2017 (the Act) provides a legislative framework for the protection of the environment in Victoria and establishes obligations for environmental noise control. The Act does not specify noise limits but sets out the legal requirements for compliance with the subordinate legislation tools. Subordinate legislation tools have been designed to support the Act which include the Environment Protection Regulations.

D2 Environment Protection Regulations 2021

The Environment Protection Regulations 2021 (S.R. No. 47/2021) set out the framework for noise from residential, commercial, industrial and trade premises as well as from indoor and outdoor entertainment venues and events. The Regulations require that noise levels from commercial, industrial and trade premises and indoor and outdoor entertainment venues and events are set to protect noise sensitive areas from unreasonable noise.

The Environment Protection Regulations replace the following legislative instruments:

- *State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1* (SEPP N-1)
- *State Environment Protection Policy (Control of Music Noise from Public Premises) No. N-2* (SEPP N-2)
- *Environment Protection (Residential noise) Regulations 2018*.

Regulation 113 (Part 5.3) of the Regulations requires that the prediction, measurement and analysis of noise from commercial, industrial and trade premises and indoor and outdoor entertainment venues and events must be undertaken in accordance with the Noise Protocol (i.e., EPA Publication 1826-4).

D3 1826-4 – Part I

Part I of the Noise Protocol outlines the methodology to establish noise limits applicable to noise from commercial, industrial or trade premises in both urban and rural areas of Victoria. The Noise Protocol also outlines the methodology to undertake a measurement of prediction of the effective noise level at a noise sensitive area from the noise generator.

The subject site is located within the Melbourne Major Urban Area (MUA) boundary and, therefore, noise limits for the subject site are derived using the urban area method.

The calculation of noise limits for commercial, trade and rural premises in urban areas takes into account a zoning noise level, which is based on the land zoning types in the surrounding 200 metre radius of the noise sensitive area, and the background noise level in the vicinity of the relevant noise sensitive areas.

Once a noise limit is established, the noise level from the premises is measured or predicted as a 30-minute equivalent average noise level ($L_{Aeq,\,30\,min}$) and if necessary, adjusted to account for duration, measurement position and noise character (such as tonality, intermittency and impulsiveness) to determine the effective noise level (L_{eff}).

Table 12 provides a summary of relevant definitions.

Table 12 – Noise Protocol Part I definitions

Term	Definition
Commercial, industrial and trade premises	any premises except the following: (a) residential premises (other than common plant under the control of an owner's corporation); b) a street or road, including every carriageway, footpath, reservation and traffic island on any street or road; (c) a railway track used by rolling stock in connection with the provision of a freight service or passenger service – (i) while travelling on a railway track or tramway track; or (ii) while entering or exiting a siding, yard, depot or workshop; (d) a railway track used by rolling stock in connection with the provision of a passenger service, while in a siding yard, depot or workshop and is – (i) powering up to commence to be used in connection with the provision of a passenger service; or (ii) shutting down after being used in connection with the provision of a passenger service; (e) the premises situated at Lower Esplanade, St Kilda and known as "Luna Park" and being the whole of the land more particularly described in Certificate of Title Volume 1204 Folio 109.
Residential premises	Any building or part of a building used as or for the purposes of a private residence or residential flat
Noise sensitive residential use	a community care accommodation, dependent person's unit, dwelling, residential aged care facility, residential village, retirement village or rooming house
Background noise level	The arithmetic average of the hourly L_{A90} levels that represents the background sounds in a noise sensitive area, in the absence of noise from any commercial, industrial or trade premises which appears to be intrusive at the point where the background level is measured, when measured according to Part I, section A4 of the Noise Protocol
Effective noise level	the level of noise emitted from commercial, industrial and trade premises and, if appropriate, adjusted to take into account the character and duration of the noise and the measurement conditions, as determined in accordance with the Noise Protocol

Day period	Monday-Saturday (excluding public holidays)	0700-1800 hours
Evening period	Monday-Saturday	1800-2200 hours
	Sunday and public holidays	0700-2200 hours
Night period	Monday-Sunday/Public Holidays	2200-0700 hours
Noise sensitive area	(a) that part of the land within the boundary of a parcel of land that is - (i) within 10 metres of the outside of the external walls of any of the following buildings – a dwelling (including a residential care facility but not including a caretaker's house), a residential building, a noise sensitive residential use; or (ii) within 10 metres of the outside of the external walls of any dormitory, ward, bedroom or living room of one of more of the following buildings – a caretaker's house, a hospital, a hotel, a residential hotel, a motel, a specialist disability accommodation, a corrective institution, a tourist establishment, a retirement village, a residential village; or (iii) within 10 metres of the outside of the external walls of a classroom or any room in which learning occurs in the following buildings (during their operating hours) – a child care centre, a primary school, a secondary school; or (b) in the case of a rural area only, that part of the land within the boundary of – (i) a tourist establishment, or (ii) a campground; or (iii) a caravan park.	

The noise limits applicable to the subject site have been derived in accordance with the methodology prescribed in the Noise Protocol and the background noise levels outlined in Table 3. The derived noise limits are provided in Table 13.

Table 13 – Noise limits derived under the Noise Protocol

Period	Time period	Measured background noise level, dB L_{A90}	Zoning Level, dB	Background relative to zoning level	Noise limit, dB L_{eff}
Day	0700-1800 hours	42	52	Neutral	52
Evening	1800-2200 hours	37	46	Neutral	46
Night	2200-0500 hours	28	41	Low	38
Morning Shoulder	0500-0700 hours	39	41	High	42

Compliance with the Noise Protocol is achieved when the effective noise level from all of the subject site noise sources covered under the Noise Protocol/Environment Protection Regulations do not exceed the noise limit in the relevant noise period when assessed over a 30-minute period.

D4 NSW Road Noise Policy 2011

The NSW Environmental Protection Authority (EPA) conducted a review of sleep disturbance studies the results of which are outlined in the NSW EPA's *Road Noise Policy* (RNP). The NSW EPA concluded that:

- maximum internal noise levels below 50–55 dB L_{Amax} are unlikely to awaken people from sleep
- one or two noise events per night, with maximum internal noise levels of 65-70 dB L_{Amax} are not likely to affect health and wellbeing significantly.

An open window provides an approximate noise reduction of 10-15 dB from outside to inside (refer to World Health Organisation guidelines and RNP). Therefore, night-time maximum noise levels from on-site activities should not exceed 65 dB L_{Amax} outside an openable window of nearby residential dwellings.

APPENDIX E BACKGROUND NOISE MONITORING SUMMARY

Background noise monitoring was conducted at the subject site using a Svantek 977 Class 1 Sound and Vibration Analyser (serial Number – 59804) between Tuesday, 30 November and Friday, 3 December 2021.

The noise monitor was installed at the rear of the subject site with the microphone set at a height of 1.5 m above ground level. The location of the background noise monitoring position is provided in Figure 3 below.

Figure 3 – Background noise monitoring position (source: Nearmap)

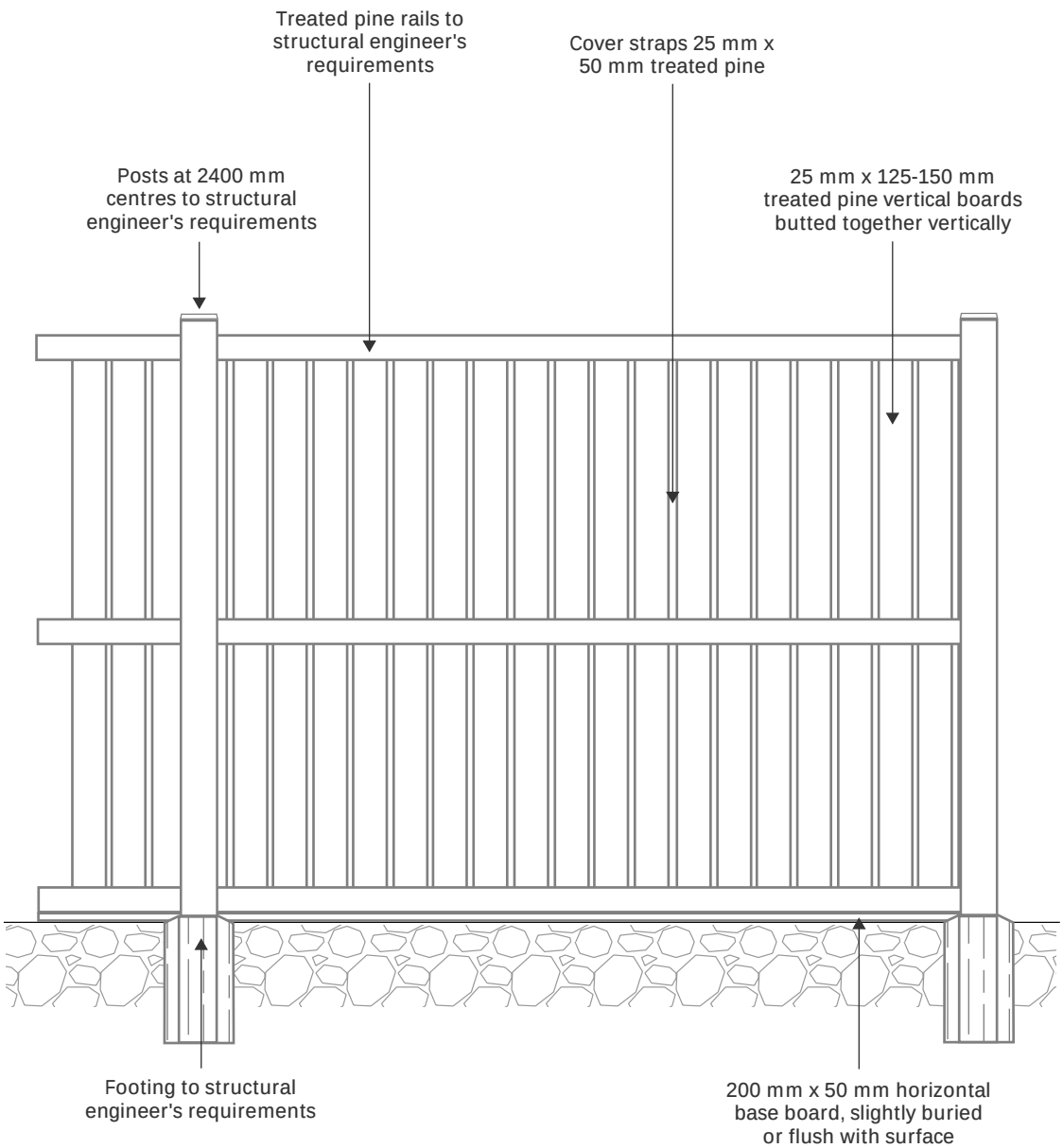
The equipment was checked before and after the survey using a Class 1 calibrator (Svantek SV35 – serial number 58085) and no significant calibration drifts were observed.

Weather data for the monitoring period has been sourced from the nearest Bureau of Meteorology weather station at Coldstream. Any monitoring data affected by rainfall and high wind speeds (i.e., above 5 m/s) has been excluded.

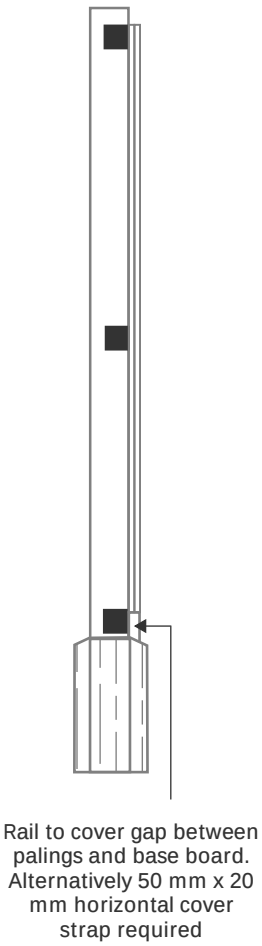
APPENDIX F TYPICAL ACOUSTIC FENCE DETAIL

TYPICAL ACOUSTIC FENCE SPECIFICATION

CLARITY ACOUSTICS



ELEVATION

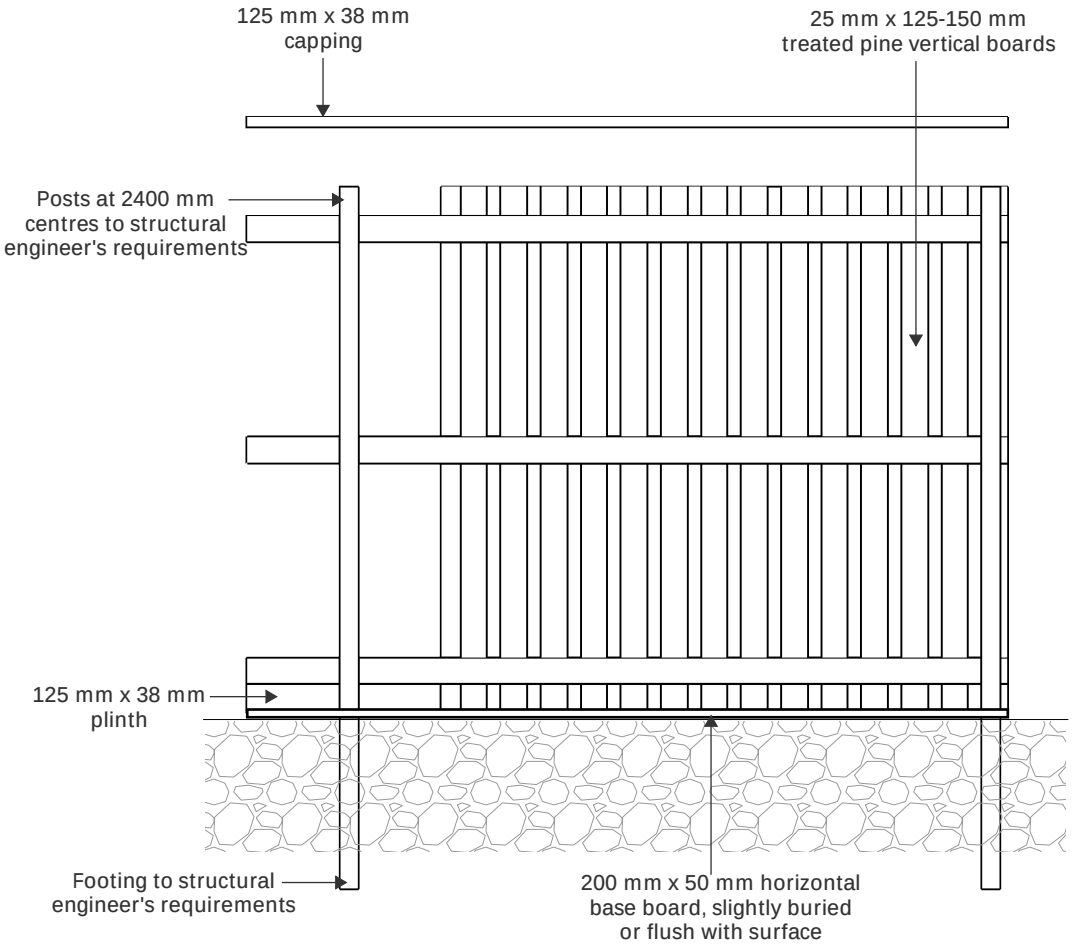


SECTION

NOTES:
1. Drawing is not to scale.
2. Specification provided for indicative purposes only. Final specification will be based on individual requirements.
3. Fence, fastenings and footings should be designed by a suitably qualified structural engineer.

TYPICAL LAPPED ACOUSTIC FENCE SPECIFICATION

CLARITY ACOUSTICS



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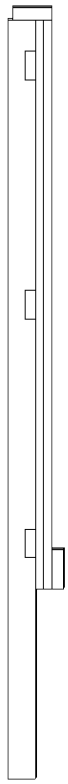
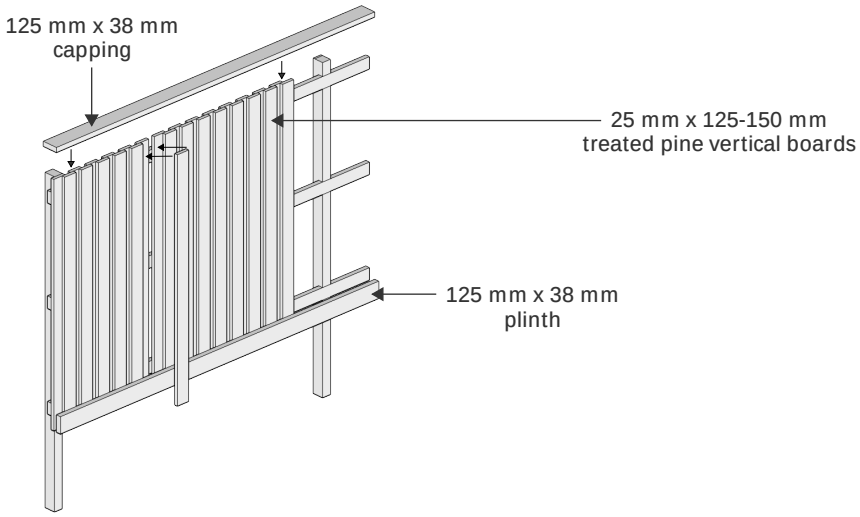


SECTION



ISOMETRIC VIEW

NOTES:
1. Drawing is not to scale.
2. Specification provided for indicative purposes only. Final specification will be based on individual requirements.
3. Fence, fastenings and footings should be designed by a suitably qualified structural engineer.

APPENDIX G NOISE PREDICTION METHODOLOGY

Predictions of noise from the subject site have been undertaken on the basis of:

- The sound emissions of noise sources associated with the development as outlined in Table 4 and APPENDIX H
- A digital noise model of the site and surrounding environment
- International standard(s) used for the calculation of environmental noise propagation.

Details of the prediction methodology are summarised in Table 14 below.

Table 14 - Noise prediction methodology

Detail	Description
Software	Proprietary noise modelling software SoundPLAN v8.2
Method	International Standard ISO 9613-2:1996 *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation* (ISO 9613-2).
Ground conditions	Ground factor of G = 0.5
Atmospheric conditions	Temperature 10°C and relative humidity 70% This represents conditions which result in relatively low levels of atmospheric sound absorption.
Receiver heights	1.5 m above FFL

APPENDIX H EQUIPMENT AND ACTIVITIES NOISE LEVELS

Noise from fuel delivery vehicles, low noise vacuum units, car movements and patron activity has been sourced from measurements conducted by Clarity Acoustics at similar sites. The sound power level data for these noise sources used in our assessment is summarised in Table 15.

Table 15 - Sound power level of proposed equipment and activity, dB L_w

	Octave band centre frequency							
Noise source	**63 Hz**	**125 Hz**	**250 Hz**	**500 Hz**	**1 kHz**	**2 kHz**	**4 kHz**	**A**
Equivalent Average Noise Level, L_{eq}								
Semi-Trailer (Fuel delivery)	102	101	96	98	99	98	94	104
Vacuum unit	66	68	70	78	87	84	78	90
Auto Car Wash (with blower)	101	98	92	95	92	91	88	98
Auto Car Wash (no blower)	100	94	85	83	83	85	87	92
Dog Wash Blower	80	82	83	83	86	92	91	96
Maximum Noise Level Events, L_{max}								
'Normal' car[1]	108	96	95	90	90	86	79	94
'Worst-case' car[1,2]	110	108	101	96	99	98	91	104
Car pass by	104	95	88	88	89	85	79	93
Patron maximal shout	83	92	98	97	92	87	87	98

[1] Includes door closing and vehicle start up from stationary

[2] A 'worst-case' car includes a V8 or high-powered vehicle driving in an aggressive manner