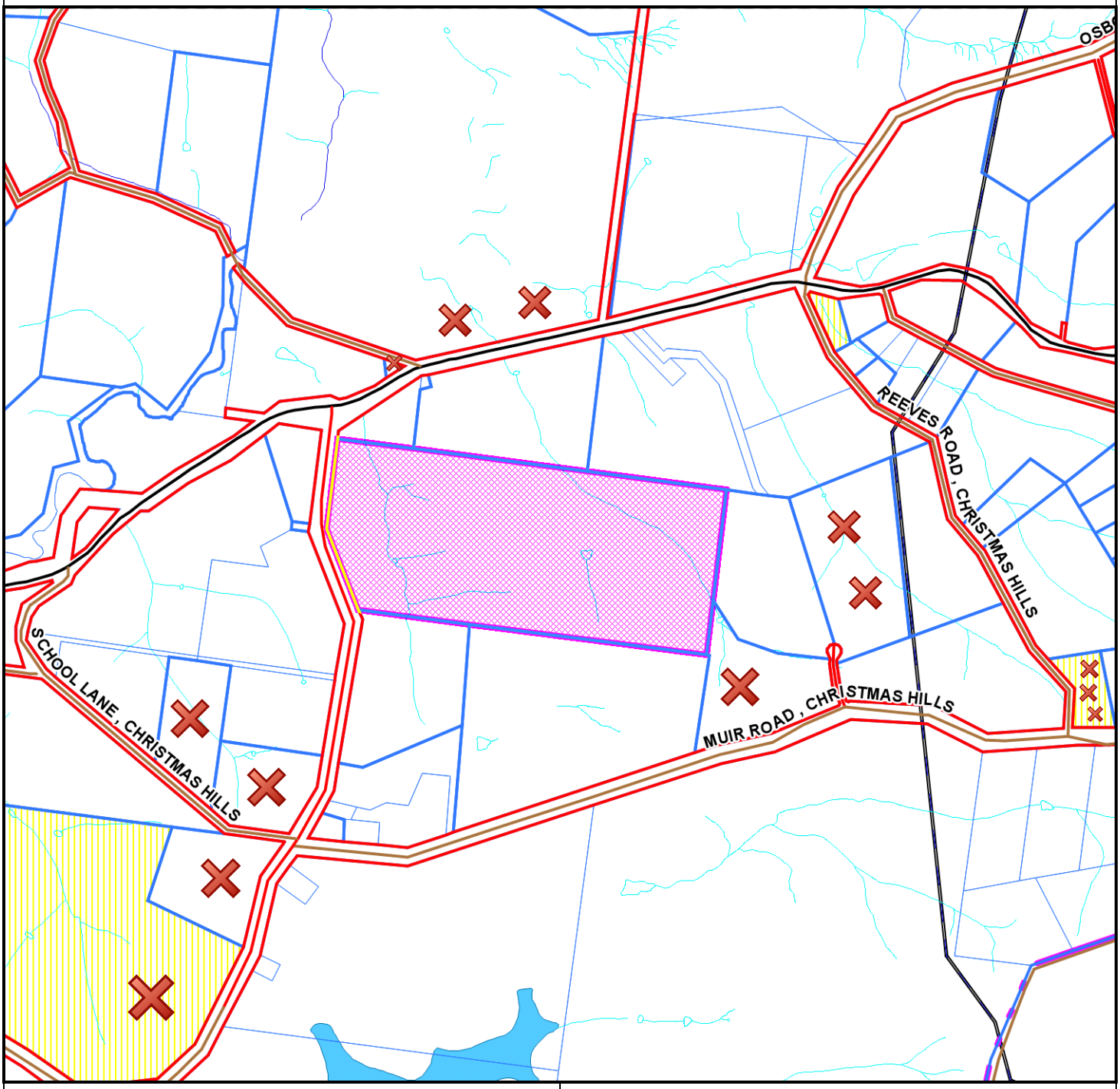
Subject Site and Surrounds

Subject Site: 790 Ridge Road, Christmas hills	File Reference: R032/00/790P
Application Number:517/2018/02P	Melway's Reference: 265J12



Subject Site

Objectors

Nearby Objectors: 13

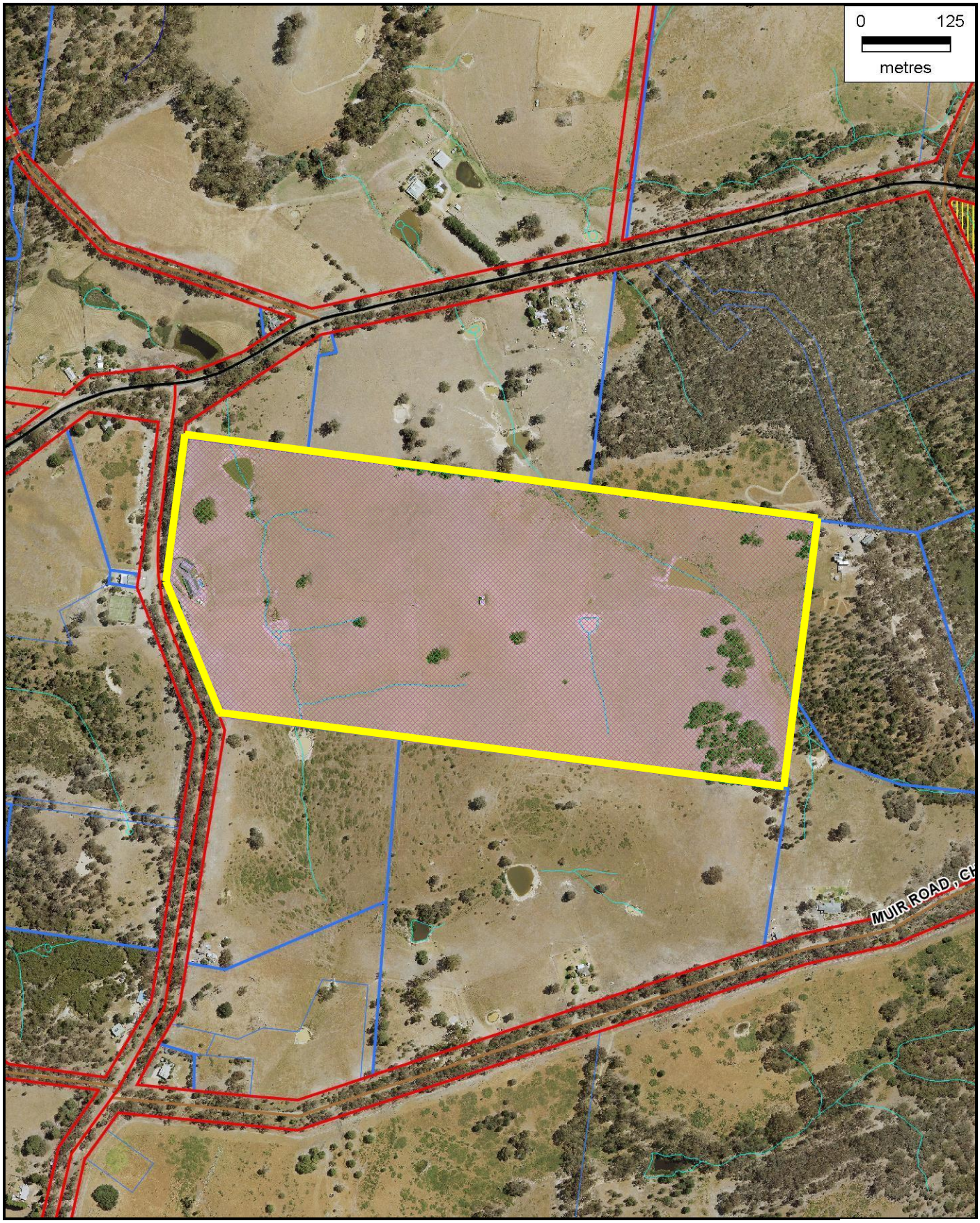
Total: 15

© Nillumbik Shire Council 2018	
Map Width:	2523 m
Produced By:	Planning and Building Services
Responsible Officer:	Tyson McAdie
Date:	Tuesday, 12 November 2019

N

Nillumbik Shire Council

790 Ridge Road, Christmas Hills



Map Width: 1361 m

Date: Thursday, 14 November 2019

N

Attachment 3

SUBJECT TO APPROVAL

Millar | Merrigan

Mill & Merrigan Pty Ltd
Major
Regional
Mail

PROPOSED SIGN

Yarra Valley Dog Retreat

2.00

1.00

OVERALL SITE (not to scale)

331°00' (196.74)

EXISTING 1.3m HIGH POST AND WIRE F

Proposed Retaining Wall

Wall to intercept with existing batter

Existing batter edge of driveway

EXIT

EX. SHED

ENTRY

Existing gravel driveway

PROPOSED CARPORT FOR 2 CARS FL97.50

Proposed Retaining Wall (max cut 1.60m)

Gravel track at existing grade

PROPOSED KENNELS (50 DOGS) FL95.50

Existing Post & Wire fence

Existing fence

EXISTING FARM GATES TO BE REMOVED

EX HOUSE

Ex. concrete

POOL

Ex. water tanks

EXISTING 1.3m POST & WIRE FENCE

ROSEWALL WALL

GATE

Concrete Path

Exercise yard

Landscaping

Proposed Effluent Field

600sqm Effluent field

Proposed Post & Wire fence

Proposed Post & Wire fence

PHOTOGRAPH 1- Existing access

ACCESS PLAN (not to scale)

NILLUMBIK SHIRE COUNCIL
PLANNING SERVICES
25 JUL 2019
RECEIVED

SITE LAYOUT & FLOOR PLAN

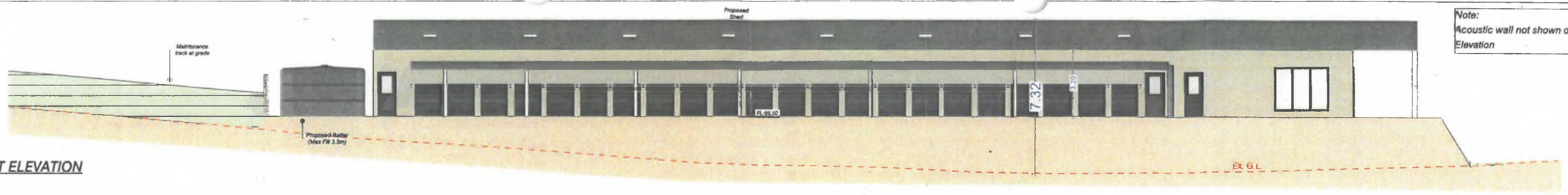
PROPOSED DEVELOPMENT

790 Ridge Rd, Christmas Hills
NILLUMBIK SHIRE COUNCIL

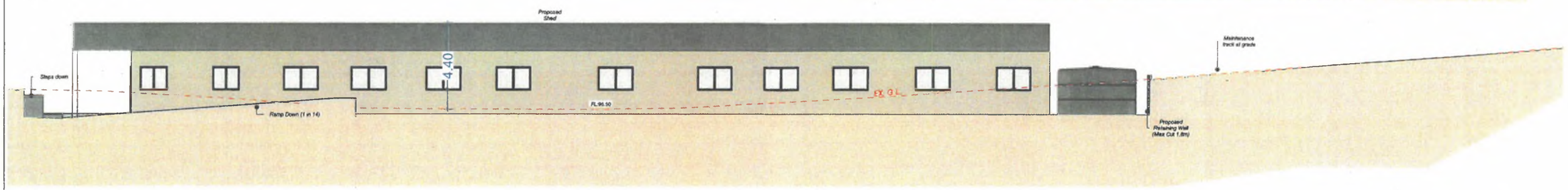
14488 P1
Version 03

Note:
Acoustic wall not shown on East Elevation

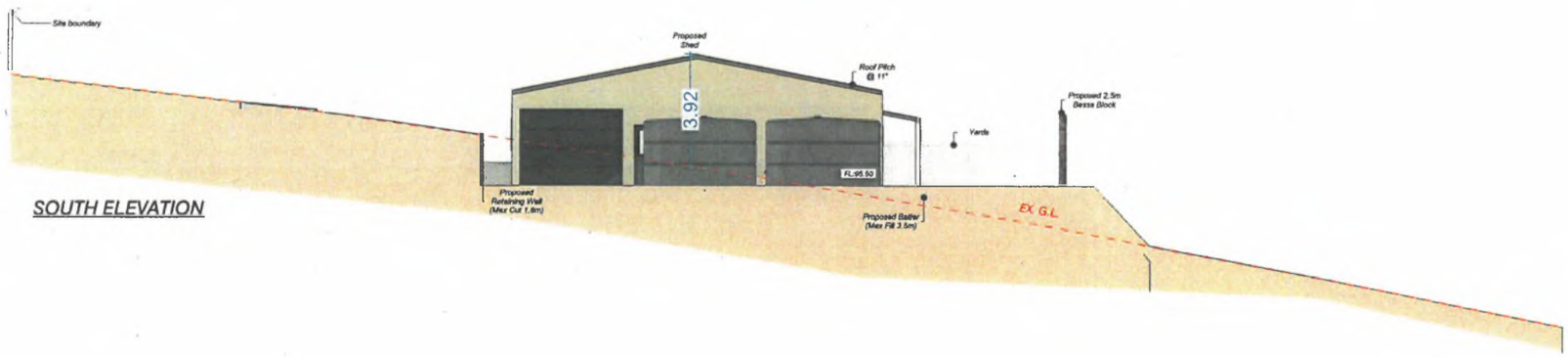
EAST ELEVATION



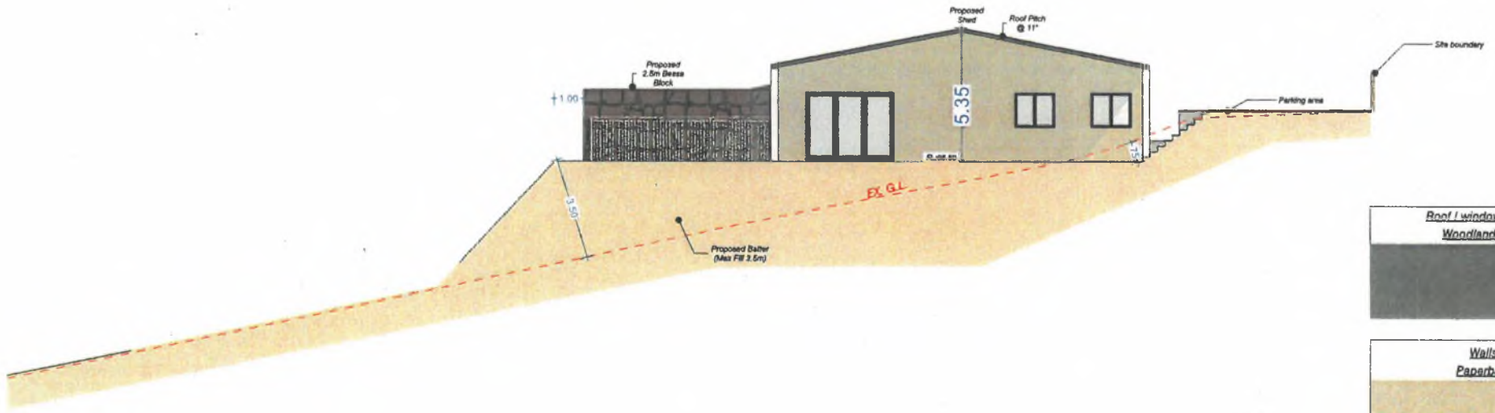
WEST ELEVATION



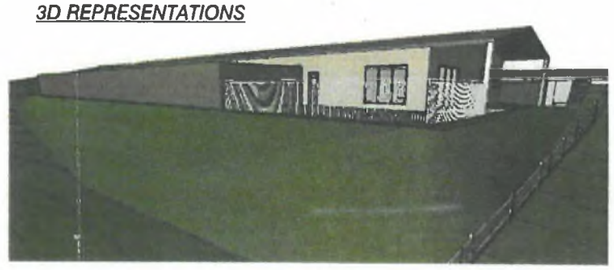
SOUTH ELEVATION

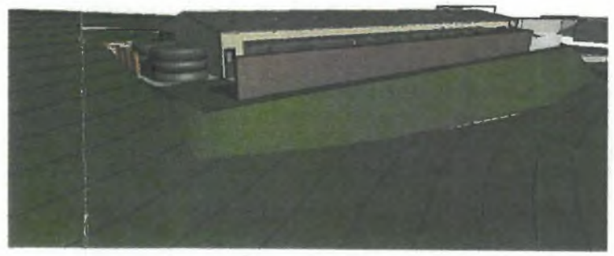


NORTH ELEVATION



3D REPRESENTATIONS





Roof / window frames
Woodland Grey

Walls
Paperbark

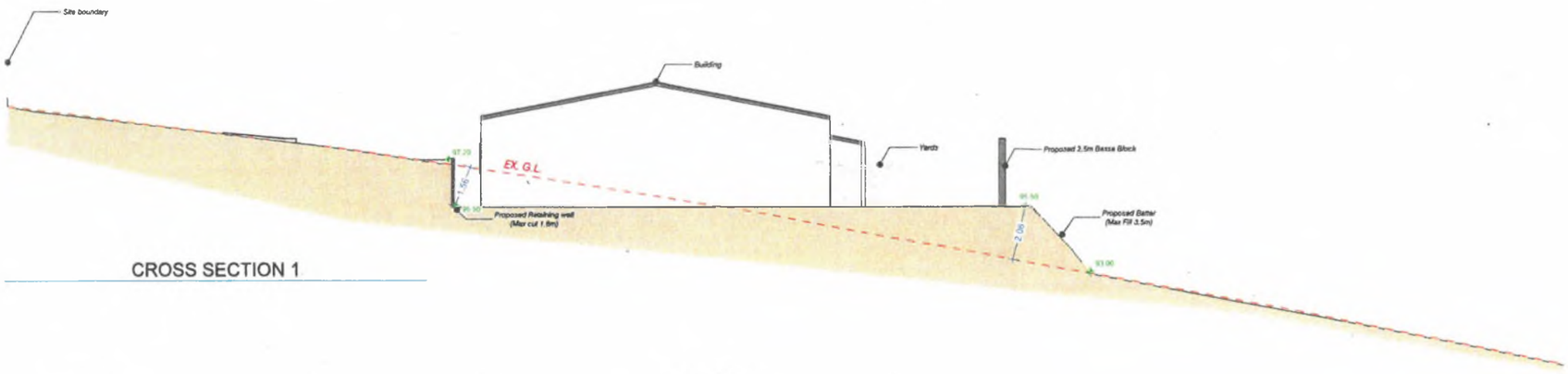
SUBJECT TO APPROVAL

Millar | Merrigan

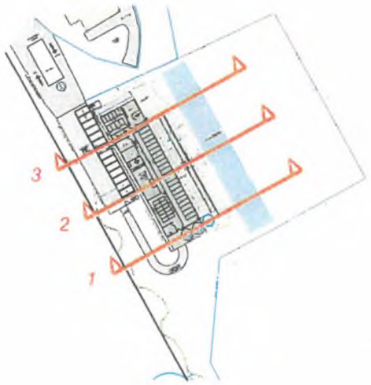
Millar & Merrigan Pty Ltd
Metro
Regional
Mail

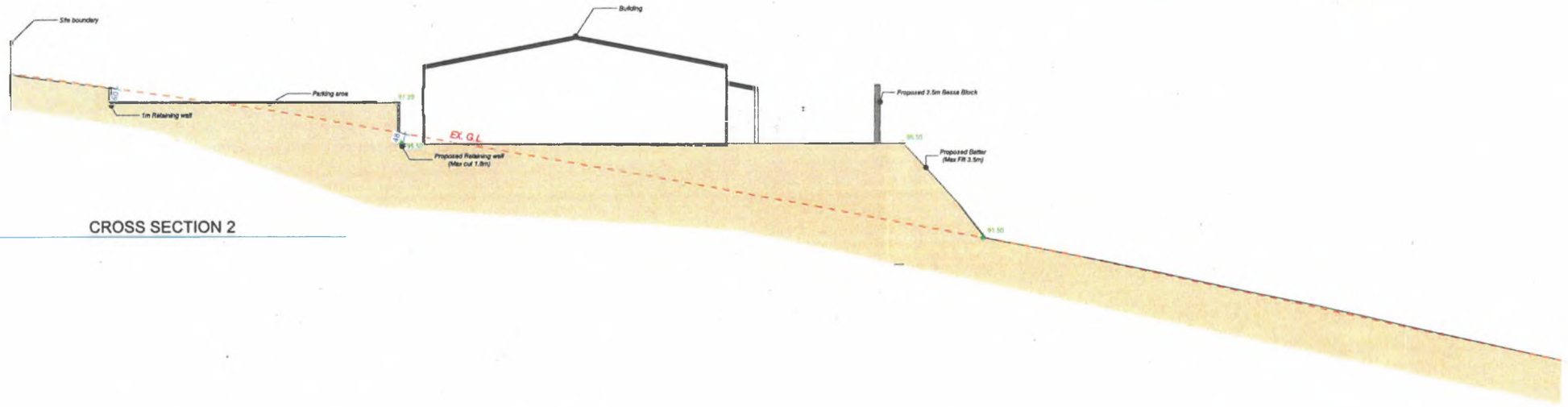
BUILDING ELEVATIONS
PROPOSED DEVELOPMENT
790 Ridge Rd., Christmas Hills
NILLUMBIK SHIRE COUNCIL

14488 P2
Version 03

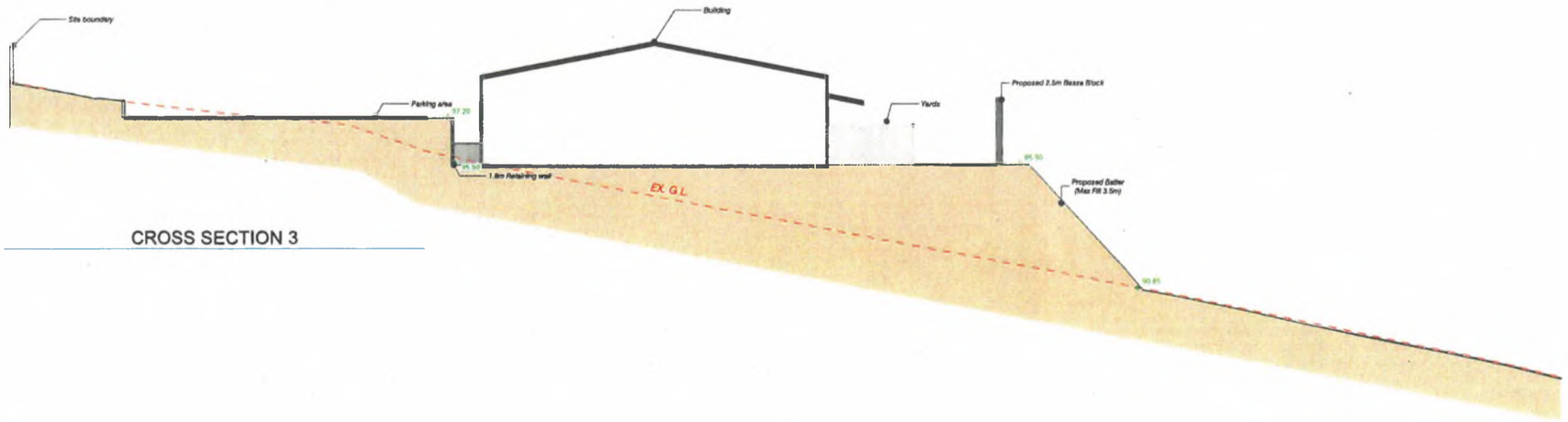


CROSS SECTION 1





CROSS SECTION 2



CROSS SECTION 3

SUBJECT TO APPROVAL

Millar | Merrigan

Millar & Merrigan Pty Ltd
Metro
Regional
Mail

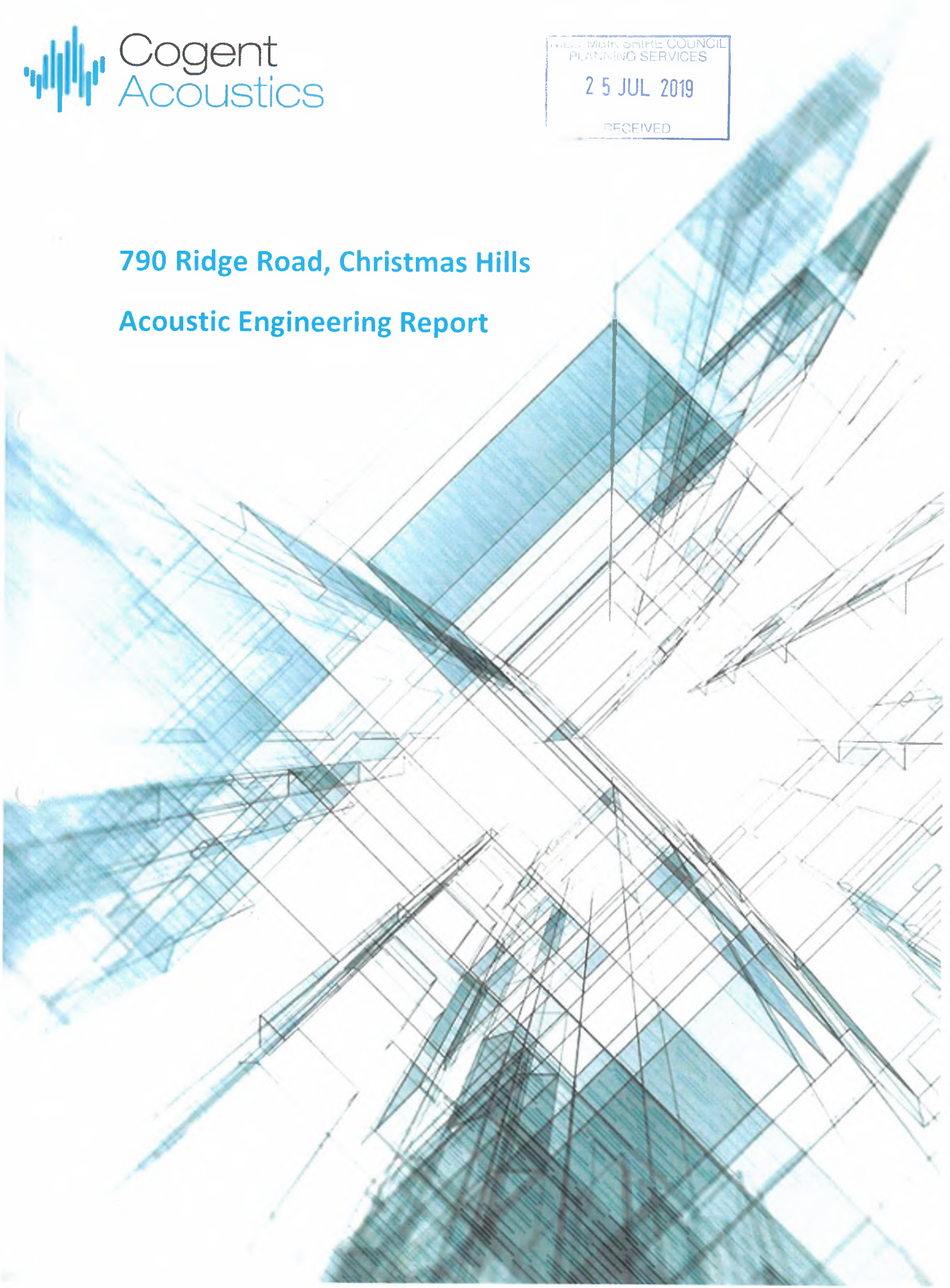
CROSS SECTIONS
PROPOSED DEVELOPMENT
790 Ridge Rd., Christmas Hills
NILLUMBIK SHIRE COUNCIL

14488 P3
Version 03

Cogent Acoustics

790 Ridge Road, Christmas Hills

Acoustic Engineering Report



Cogent Acoustics

790 Ridge Road, Christmas Hills

Acoustic Engineering Report

Prepared for:

Millar Merrigan
PO Box 247
Croydon VIC 3136

Prepared by:

Cogent Acoustics Pty Ltd
ABN: 13 610 344 986
11/27 Thornton Crescent,
Mitcham VIC 3132
03 8814 3250

Project Number: 18106

Prepared by **Te-liang Chong**
Bachelor of Mechanical Engineering
te@cogentacoustics.com.au

Signature

Reviewed by **Andrew Mitchell**
BE(Hons) Mech, ME
MAAS MASNZ
RBP (Vic) EM-45042
andrew@cogentacoustics.com.au

Signature

Revision History

Rev.	Date	Purpose	Prepared by:	Reviewed by:
0	02/10/2018	Draft for comment	Te-liang Chong	Andrew Mitchell
1	08/10/2018	Revised distances between dog kennel and Noise Sensitive Areas	Te-liang Chong	Andrew Mitchell
2	17/10/2018	Final	Te-liang Chong	Andrew Mitchell
3	16/07/2019	Revised based on updated layout and acoustic peer review comments	Te-liang Chong	Andrew Mitchell
4	24/07/2019	Revised wording	Te-liang Chong	Andrew Mitchell

Cogent Acoustics

Executive Summary

Millar Merrigan has appointed Cogent Acoustics Pty Ltd to perform an environmental noise assessment of the proposed dog boarding kennel at 790 Ridge Road, Christmas Hills.

Assessment of the predicted noise emissions due to the proposed dog kennel has been undertaken with regard to the guidelines prescribed by EPA Publication 1411 'Noise from Industry in Regional Victoria' (NIRV) (EPA Victoria, 2011).

The results of the assessment have determined that noise mitigation measures to control noise emissions from VIP dog pen external yards during the NIRV 'Evening' period are required to comply with the NIRV recommended maximum noise levels.

Recommended noise mitigation options have been presented in Section 8 of the report.

It is considered that noise emissions from the proposed dog boarding kennel will comply with the reference acoustic criteria provided that the dog kennel building construction and operational details specified in Section 7.1 of the report are adhered to and the recommended noise mitigation options (refer to Section 8) are implemented.

Cogent Acoustics

Contents

Cogent Acoustics

1 Introduction

1.1 Purpose

Millar Merrigan has appointed Cogent Acoustics Pty Ltd to undertake an acoustic assessment of the proposed dog boarding kennel at 790 Ridge Road, Christmas Hills.

The scope of the assessment includes:

- Assessment of environmental noise emissions due to the proposed dog boarding kennel in relation to the EPA Guideline 'Noise from Industry in Regional Victoria; (NIRV) (EPA Victoria, 2011).
- Provision of advice on noise attenuation measures necessary to comply with the established environmental noise limits and protect nearby noise sensitive areas from noise emissions due to the proposed development.

This report documents the investigations and advice provided in relation to the above services.

A glossary of the acoustic nomenclature used in this report is presented in Appendix A.

1.2 Reference Documentation

This report is based on information contained in the following documents and drawings:

Table 1 Reference Documentation

Document	Prepared by	Issue
Site Layout and Floor Plan; 14488 P1; Version 03	Millar Merrigan	Received: 04/09/2018
Building Elevations; 14488 P2; Version 03	Millar Merrigan	Received: 04/09/2018
Email To: Te-liang Chong Subject: RE: 790 Ridge Road, Christmas Hills - Proposed boarding kennels	Mandy Edwards, Millar Merrigan	Wed 26/09/2018 8:05 PM
Email To: Skye McDonald; Te-liang Chong Subject: RE: 18106-PCN01-R0 790 Ridge Road, Christmas Hills	Mandy Edwards, Millar Merrigan	Wed 10/07/2019 6:52 PM

1.3 Report Limitations

The following limitations are applicable with respect to the acoustic advice presented in this report:

- Cogent Acoustics has prepared this document for the sole use of the Client and for the specific purpose expressly stated in the document. No other party should rely on this document without the prior written consent of Cogent Acoustics. Cogent Acoustics undertakes no duty, nor accepts any responsibility, to any third party who may rely upon or use this document.
- The information contained in this document provides advice in relation to acoustics and vibration only. No claims are made and no liability is accepted in respect of design and construction issues falling outside of the specialist field of acoustics and vibration engineering including and not limited to structural integrity, fire rating, architectural buildability and fitness-for-purpose, waterproofing and the like. Supplementary professional advice should be sought in respect of these issues.
- Reports marked 'Not for Construction' or 'Draft' may be subject to change and are not released as final reports. Cogent Acoustics accepts no liability pending release of the final version of the report.
- In preparing this document Cogent Acoustics may have relied upon information provided by the client and other third parties, some of which may not have been verified. Cogent Acoustics accepts no responsibility or liability for any errors or omissions which may be incorporated into this document as a result.
- The recommendations, data and methodology documented in this assessment are based on the listed reference documentation. The recommendations apply specifically to the project under consideration, and must not be utilised for any other purpose. Any modifications or changes to the project from that described in the listed reference documentation may invalidate the advice provided in this document, necessitating a revision.
- Subject to the above conditions, this document may be transmitted, reproduced or disseminated only in its entirety.

2 Project Characteristics

The project site is located at 790 Ridge Road, Christmas Hills, as shown in Figure 1 .The topography in the area of the site is hilly.

Figure 1 Aerial Image of Site (Image Source: Google Maps)

The project is understood to comprise development of a new boarding kennel facility with capacity for up to 50 dogs. The facility will include 44 dog pens of various sizes, an internal exercise yard, and an external exercise yard. The proposed site plan is presented in Figure 2.

The proposed operating hours of the dog kennel are as follows:

- 7 am to 7 pm Monday to Friday;
- 8:30 am to 5 pm Saturday and Sunday;
- Operating hours will vary on public holidays.

It is understood that dog day care and training will be the main activities that occur during the proposed operating hours. However, dog training sessions involving dog owners are also proposed to be held at the kennel, and will extend half an hour later than the normal operating hours for one weeknight a week. The proposed times for training sessions involving owners are as follows:

- 6 pm to 7:30 pm on one weeknight a week; and
- 9 am to 11 am on Saturday and Sunday.

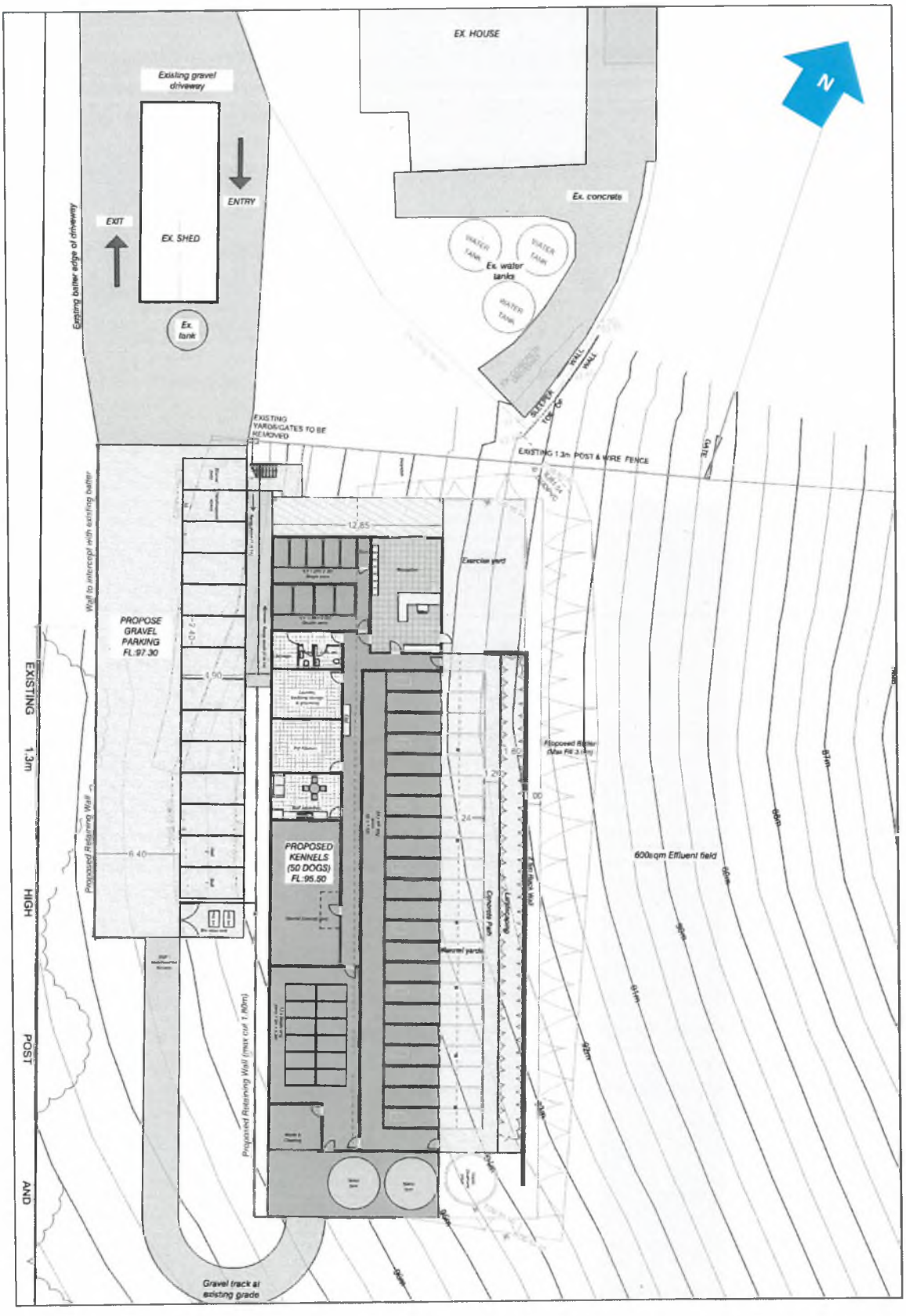


Figure 2 Proposed Dog Kennel Site Plan (Image Source: Millar Merrigan)

3 EPA Publication 1411 – Noise from Industry in Regional Victoria

EPA Publication 1411 - Noise from Industry in Regional Victoria (NIRV) (EPA Victoria, 2011) is a non-statutory guideline that provides guidance on industry noise levels and limits for regional Victoria.

NIRV provides Recommended Maximum Noise Levels ('recommended levels') for noise emissions from commercial, industrial and trade premises to defined Noise Sensitive Areas such as homes. NIRV's recommended levels are intended to provide a balance between protecting community wellbeing and amenity near industrial premises and supporting the social and economic value of industry in regional Victoria.

NIRV refers to *State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1* (SEPP N-1) (State of Victoria, 2001) for noise measurement procedures. In accordance with SEPP N-1, noise emissions from the source under consideration are measured so as to obtain an L_{Aeq} sound pressure level that is representative of the audible noise at the Noise Sensitive Area over a continuous 30-minute period. Adjustments to the measured level are applied where necessary to account for characteristics such as duration, intermittency, reflections, impulsiveness, tonality, and measurement location. The adjusted noise level is termed the Effective Noise Level, and it is the Effective Noise Level that is assessed in relation to the recommended levels.

4 Noise Sensitive Areas

The potentially most-affected Noise Sensitive Areas (NSA) in the vicinity of the project site are highlighted in Figure 3, as follows:

Table 2 Location of Potentially Most-Affected Noise Sensitive Areas (NSA)

Ref.	Address	Distance from Dog Kennel Boundary, m	NIRV Receiver Distance*, m
NSA 1	610 One Tree Hill Road, Christmas Hills	385	160
NSA 2	1524 Eltham-Yarra Glen Road, Christmas Hills	280	70
NSA 3	734 Ridge Road, Christmas Hills	360	300

* NIRV defines this distance as the shortest distance that separates the NSA and the zone in which the noise generator (the dog kennel) is located.

There are two residential dwellings currently located at 790 Ridge Road. The dwelling to the north is a bed and breakfast operated by the owner of the proposed dog kennel. The dwelling to the south is occupied by the owner and operator of the bed and breakfast and kennel. As the owner and operator of the dog kennel has full control over the level of sound insulation of the buildings at 790 Ridge Road, it is considered that achieving acceptable noise levels at and within these buildings will be at the discretion of the owner. The bed and breakfast and residential dwelling have therefore not been considered as NSAs for the purpose of this assessment.

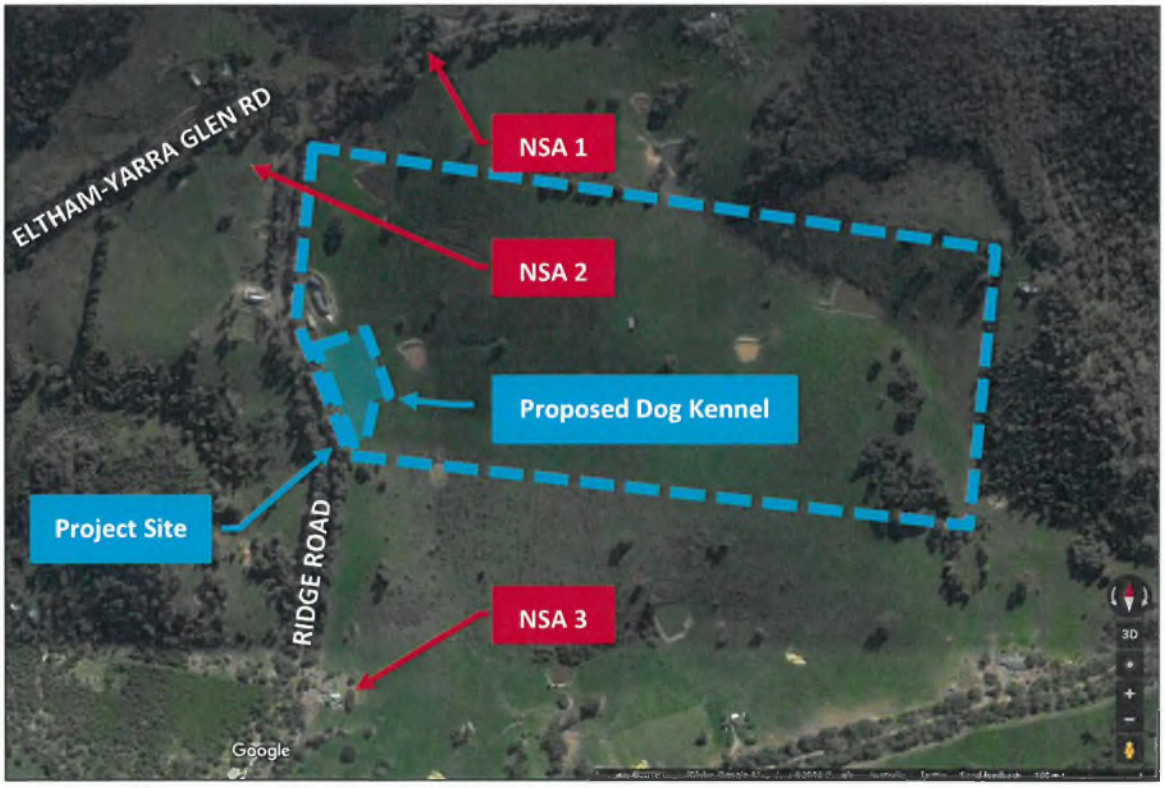


Figure 3 Nearest Noise Sensitive Areas (Image Source: Google Maps)

5 Existing Acoustic Environment

5.1 Soundscape

The existing soundscape in the vicinity of the site is relatively quiet with birds, insects, and wind-induced vegetation noise being the main noise contributors. Peaks in noise levels occur due to vehicles passing occasionally on Ridge Road.

5.2 Background Noise Levels

Environmental noise logging was performed at the site to establish the background noise levels between 27 August and 3 September 2018. Details of the measurement location and measurement methodology are presented in Appendix B.

The background noise levels at the selected noise logging location are likely to be lower than the background noise levels at the potentially most-affected receptors due to some of the receptors being closer to the main sources of road traffic noise in the area (Eltham-Yarra Glen Road). The background noise levels measured at the logging location are therefore conservative for the purpose determining noise limits.

Table 3 presents a summary of the measured background noise levels, as determined in accordance with the procedures given by SEPP N-1 as prescribed by NIRV. Graphs showing the variation of background noise level over the full measurement period are presented in Appendix C.

Table 3 Background Noise Levels

Period	Applicable Times	L_{A90} Background Noise Level, dB(A)
Day	▪ 7 am to 6 pm Monday to Friday ▪ 7 am to 1 pm Saturday	32
Evening	▪ 6 pm to 10 pm Monday to Friday ▪ 1 pm to 10 pm Saturdays ▪ 7 am to 10 pm Sundays and Public Holidays	31
Night	▪ 10 pm to 7 am All Days	21

6 NIRV Recommended Maximum Noise Levels

The recommended maximum noise levels presented in Table 4 have been determined to apply at the potentially most affected noise sensitive areas in accordance with NIRV. The generating zone and NSA 1 have been identified as Rural Conservation Zones (RCZ4) whilst NSA 2 and NSA 3 have been identified as Public Use Zones (PUZ1).

Table 4 NIRV Recommended Maximum Noise Levels at NSAs

Period	Applicable Times	Recommended Maximum Noise Levels, L_{eff}, dB(A)		
		NSA 1[1]	NSA 2[2]	NSA 3[3]
Day	▪ 7 am to 6 pm Monday to Friday ▪ 7 am to 1 pm Saturday	45[4]	45	45[4]
Evening	▪ 6 pm to 10 pm Monday to Friday ▪ 1 pm to 10 pm Saturdays ▪ 7 am to 10 pm Sundays and Public Holidays	37	40	37
Night	▪ 10 pm to 7 am All Days	32	35	32

1 A distance adjustment of -1 dB has been applied to the NIRV recommended maximum noise levels at NSA 1 for each period to account for the 160 m separation distance between NSA 1 and the generating zone.

2 No distance adjustment has been applied to the NIRV recommended maximum noise levels at NSA 2 as the separation distance between NSA 2 and the generating zone is less than 100 m.

3 A distance adjustment of -3 dB has been applied to the NIRV recommended maximum noise levels at NSA 3 for each period to account for the 300 m separation distance between NSA 3 and the generating zone.

4 In accordance with the procedure prescribed by NIRV, the recommended maximum noise levels should not be below the base noise level of 45 dB(A).

Cogent Acoustics

7 Noise Modelling

7.1 Methodology

SoundPLAN version 7.4 environmental noise modelling software was used to model the future environmental noise emissions from the proposed dog kennel.

Key modelling parameters include:

- Site layout and nearest identified NSAs modelled according to the reference documentation and the latest Google Maps satellite image.
- 50 mm thick ASKIN XFLAM panel external walls throughout the kennel achieving a sound insulation rating of R_w 24 with no additional internal wall lining;
- 75 mm thick ASKIN XFLAM panel roof throughout the kennel achieving a sound insulation rating of R_w 25 with no additional internal ceiling lining;
- 50 mm thick ASKIN XFLAM panel external doors with non-acoustic weather seals to the full perimeter achieving a sound insulation rating of R_w 20.
- 3 mm thick single glazed external windows and skylights achieving a sound insulation rating of R_w 30.
- All external doors have been modelled as shut at all times except to allow movement of people and/or dogs.
- External windows have been modelled as shut whenever there are dogs within the same room or if the entrance door to the room is kept open.
- 2.5 m high solid noise barrier east of the VIP dog pen yards, at the location highlighted in Figure 4. The noise barrier has been modelled as constructed from a solid material with minimum mass of 12 kg/m^2.
- 1 m high solid masonry wall between each VIP dog pen yards. The masonry wall has been modelled as constructed from a solid material with minimum mass of 12 kg/m^2.
- Noise modelling has been performed based on 50 dogs being boarded at the proposed dog kennel.
- Noise emissions from the dog kennel have been modelled for two different time periods, as follows:
  - The kennel operating hours during which dog day care, exercise, and training activities are conducted; and
  - The kennel non-operating hours where dog day care, exercise, and training activities are no longer conducted, and the dogs are boarded in their respective pens.
- During the dog kennel operating hours, dogs have been modelled based on:

  - A maximum of 1 dog within the outdoor exercise yard, at the location highlighted in Figure 4. The dog at this location has been modelled as not barking as it is understood that there would be no stimulus in this yard that would typically cause the dog to bark;
  - 22 dogs at the VIP dog pen external yards. The dogs at these locations have been modelled as barking;
  - Remaining 27 dogs within their respective indoor pens. The dogs at these locations have been modelled as barking.
- During the dog kennel non-operating hours, all 50 dogs have been modelled within their respective indoor pens. The dogs at these locations have been modelled as barking.
- Note: As the external construction is proposed to be the same for the whole kennel building, it is considered that the model will yield similar results regardless of where each of the dogs are within the building i.e. the modelled noise levels at the NSAs will be similar whether all 50 dogs are within their respective pens or within the internal exercise yard or both.
- The modelled dog barking noise levels have been based on noise measurements performed by Cogent Acoustics of 22 dogs of mixed breeds boarded at a dog boarding kennel at Lysterfield, where a spatially averaged sound pressure level of 91 dB(A) was measured. The measurements were conducted with the dogs in a heightened state of excitement with continuous barking. The measurement results are therefore considered to represent worst-case scenario noise levels.
- No adjustment for increased number of dogs at the proposed kennel has been applied as noise levels due to groups of dogs barking are generally independent of the number of dogs but rather the external auditory and visual stimuli, breed, and temperament of the dogs.
- An impulsiveness adjustment of +5 dB has been applied to the modelled dog barking noise levels to account for the impulsive characteristics of the dog barks, in accordance with SEPP N-1.
- 2-off outdoor air-conditioning condenser units have been included in the model. As equipment specifications are not yet available, the units have been modelled based on Mitsubishi PURY-P250YNW-A (28 kW cooling capacity and 31.5 kW heating capacity) with an individual sound power level of 71 dB(A). The units have been modelled as located at the southern end of the kennel building, at the location highlighted in Figure 4.

Full details of noise modelling input parameters and data sources are presented in Appendix D.

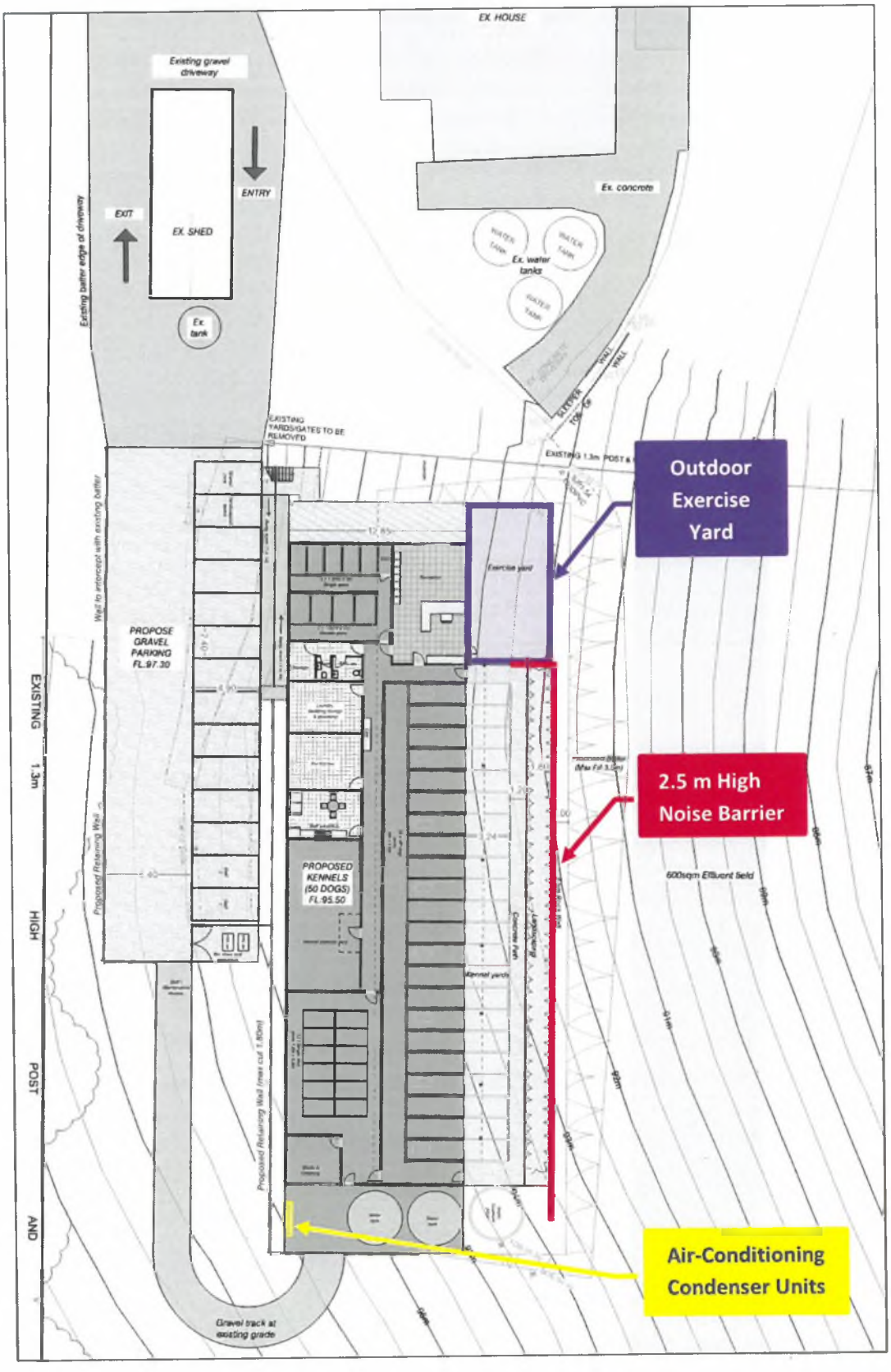


Figure 4 Modelled Features (Image Source: Millar Merrigan)

7.2 Calculated Noise Levels (Without Noise Mitigation)

7.2.1 During Kennel Operating Hours

Table 5 presents the calculated Effective Noise Levels at the potentially most-affected NSAs during operating hours as per the input parameters presented in Section 7.1.

Table 5 Calculated Effective Noise Levels During Kennel Operating Hours – Without Noise Mitigation

NSA	Calculated Noise Level, L_{Aeq}, dB(A)	SEPP N-1 Impulse Adjustment, dB	Calculated Effective Noise Level, L_{eff}, dB(A)	NIRV Maximum Noise Levels and Compliance Status	
				Day	Evening
NSA 1	34	+5	39	45 ✓	37 ✗
NSA 2	26	+5	31	45 ✓	40 ✓
NSA 3	27	+5	32	45 ✓	37 ✓

Figure 5 presents a calculated Effective Noise Level contour map during the kennel operating hours. The presented contours include the +5 dB(A) impulsiveness adjustment that has been applied in accordance with SEPP N-1.

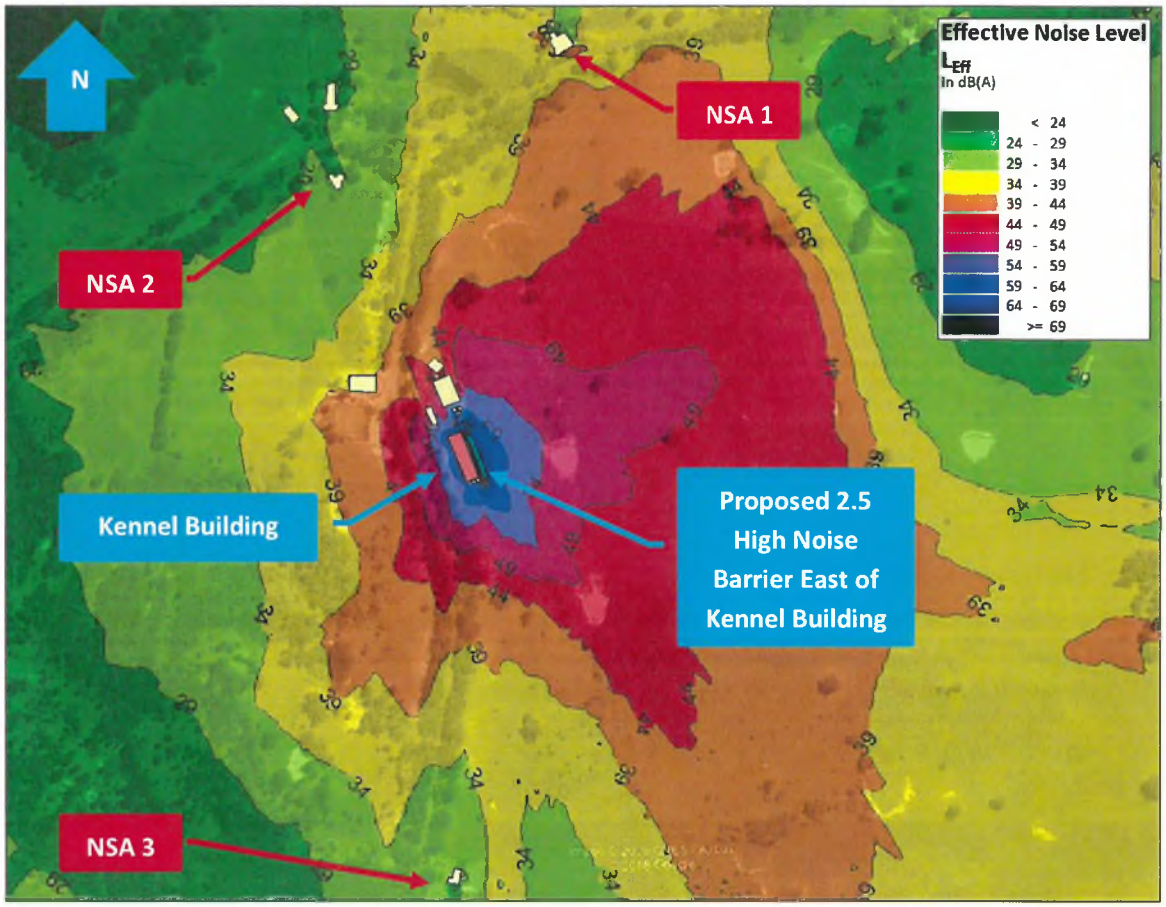


Figure 5 Calculated Noise Contour Map During Kennel Operating Hours – Without Noise Mitigation

Based on the results presented above, the proposed dog boarding kennel will exceed the NIRV 'Evening' recommended maximum noise levels by up to 2 dB(A) at the potentially most-affected NSAs during operating hours. The primary source of noise emission is the 22 dogs at the VIP dog pen external yards.

Therefore, noise mitigation measures will need to be implemented to comply with the NIRV recommended maximum noise levels.

7.2.2 During Kennel Non-Operating Hours

Table 6 presents the calculated Effective Noise Levels at the potentially most-affected NSAs during non-operating hours as per the input parameters presented in Section 7.1.

Table 6 Calculated Effective Noise Levels During Kennel Non-Operating Hours – Without Noise Mitigation

NSA	Calculated Noise Level, L_{Aeq}, dB(A)	SEPP N-1 Impulse Adjustment, dB	Calculated Effective Noise Level, L_{eff}, dB(A)	NIRV Maximum Noise Levels and Compliance Status	
				Evening	Night
NSA 1	24	+5	29	37 ✓	32 ✓
NSA 2	19	+5	24	40 ✓	35 ✓
NSA 3	21	+5	26	37 ✓	32 ✓

Figure 6 presents a calculated Effective Noise Level contour map during the kennel non-operating hours. The presented contours include the +5 dB(A) impulsiveness adjustment that has been applied in accordance with SEPP N-1.

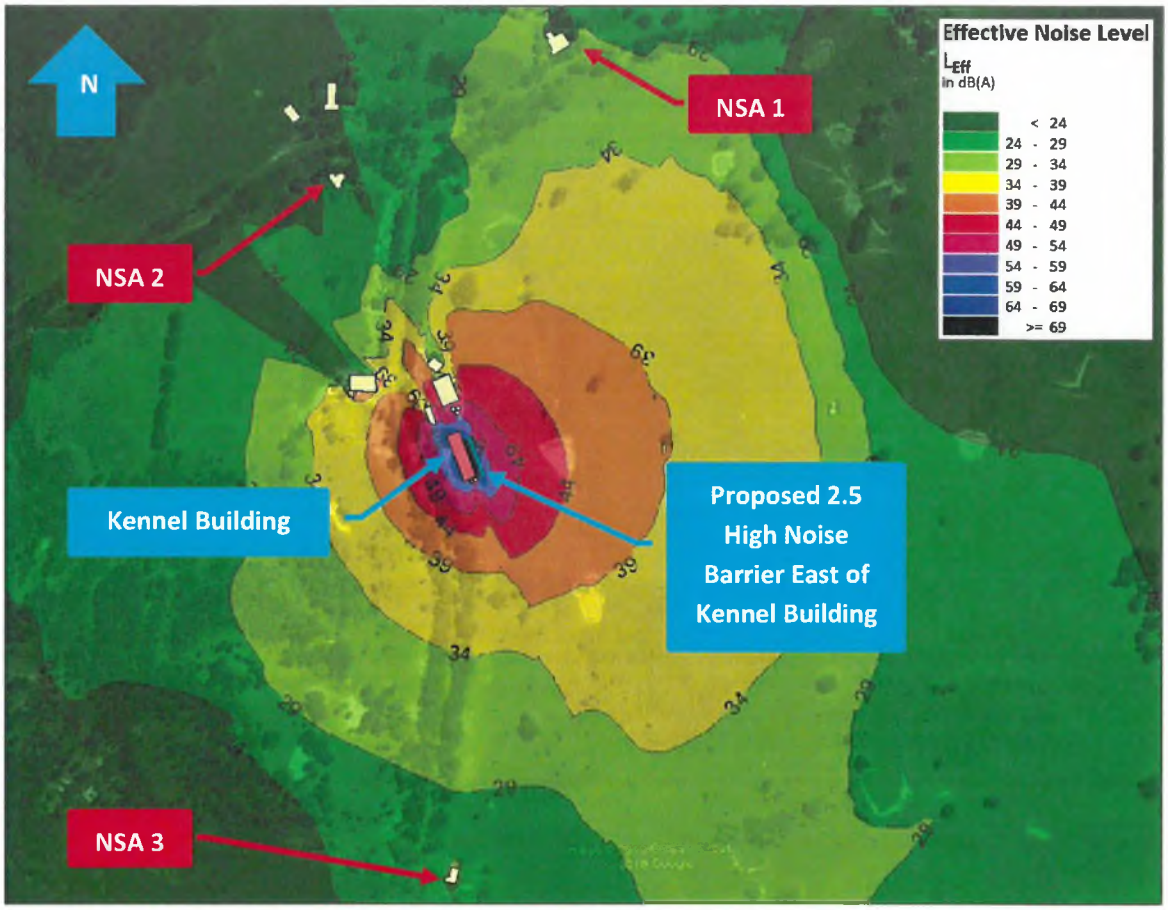


Figure 6 Noise Contour Map During Kennel Non-Operating Hours – Without Noise Mitigation

The noise modelling results presented above show that with all 50 dogs kept indoors, compliance with the NIRV recommended maximum noise levels will be achieved without acoustic treatment, provided the kennel construction and operation details specified in Section 7.1 are adhered to.

8 Recommended Noise Mitigation

To control noise emissions from the VIP dog pen external yards, the following noise mitigation measures are recommended to each outdoor location:

- The 2.5-metre-high noise barrier east of the VIP dog pen yards should be extended up to the kennel building, as shown in Figure 7.
- The extended part of the noise barrier must not have any gaps between panels (if applicable) or between the barrier and the ground. Acoustically acceptable materials for construction include Bessa blockwork, 1.6 mm thick steel, 9 mm thick fibre cement sheet, 8 mm thick Perspex or polycarbonate, or other material with a minimum mass of 12 kg/m^2.
- The documented and extended parts of the noise barrier on the kennel building side should be lined with 50 mm thick sound absorbing material suitable for outdoor environments (e.g. Stratocell Whisper UV or Pyrotek Reapor).

The acoustic requirements for the noise barrier are presented schematically in Figure 8.

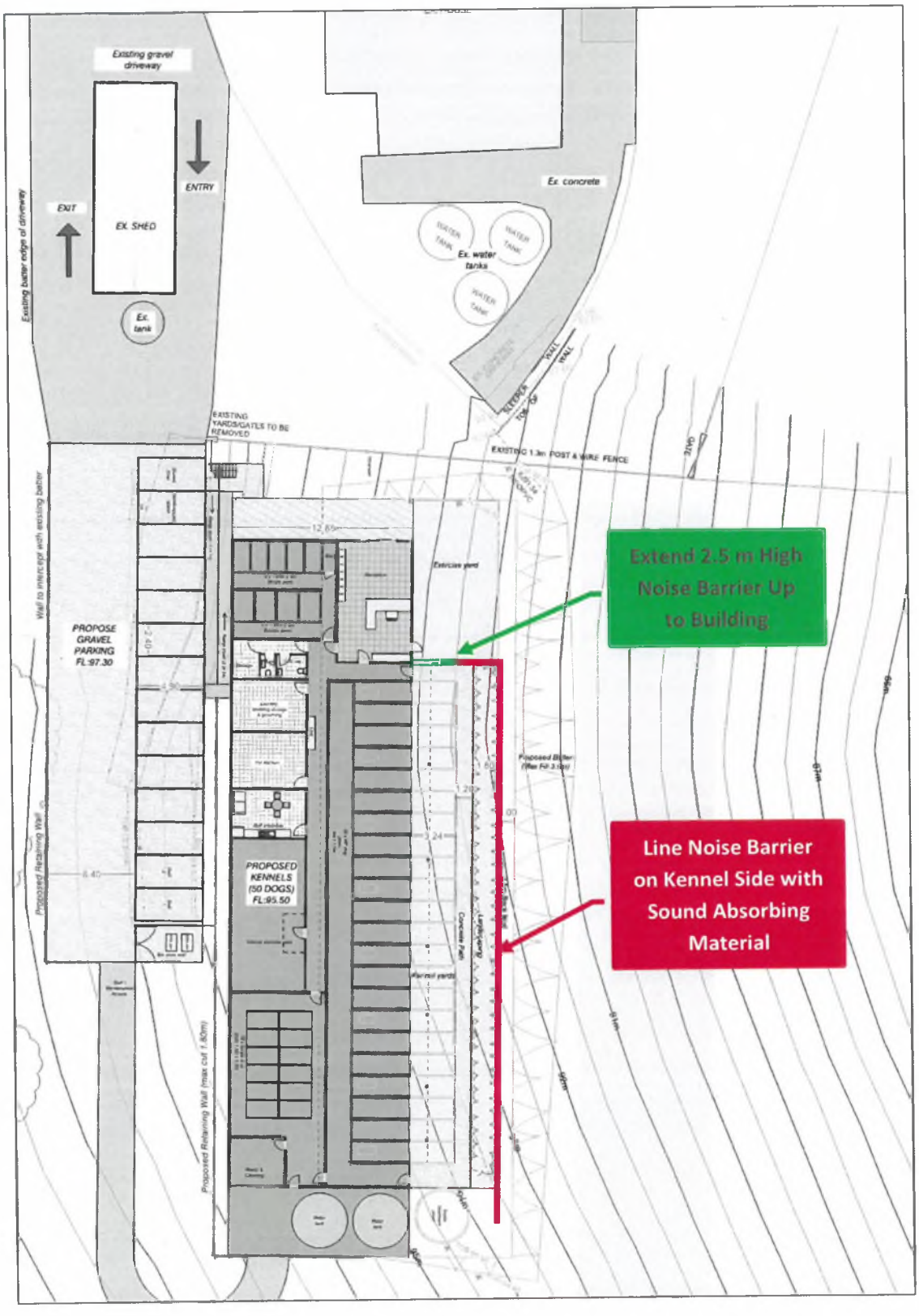


Figure 7 Extension of Noise Barrier East of VIP Dog Pen External Yards (Image Source: Millar Merrigan)

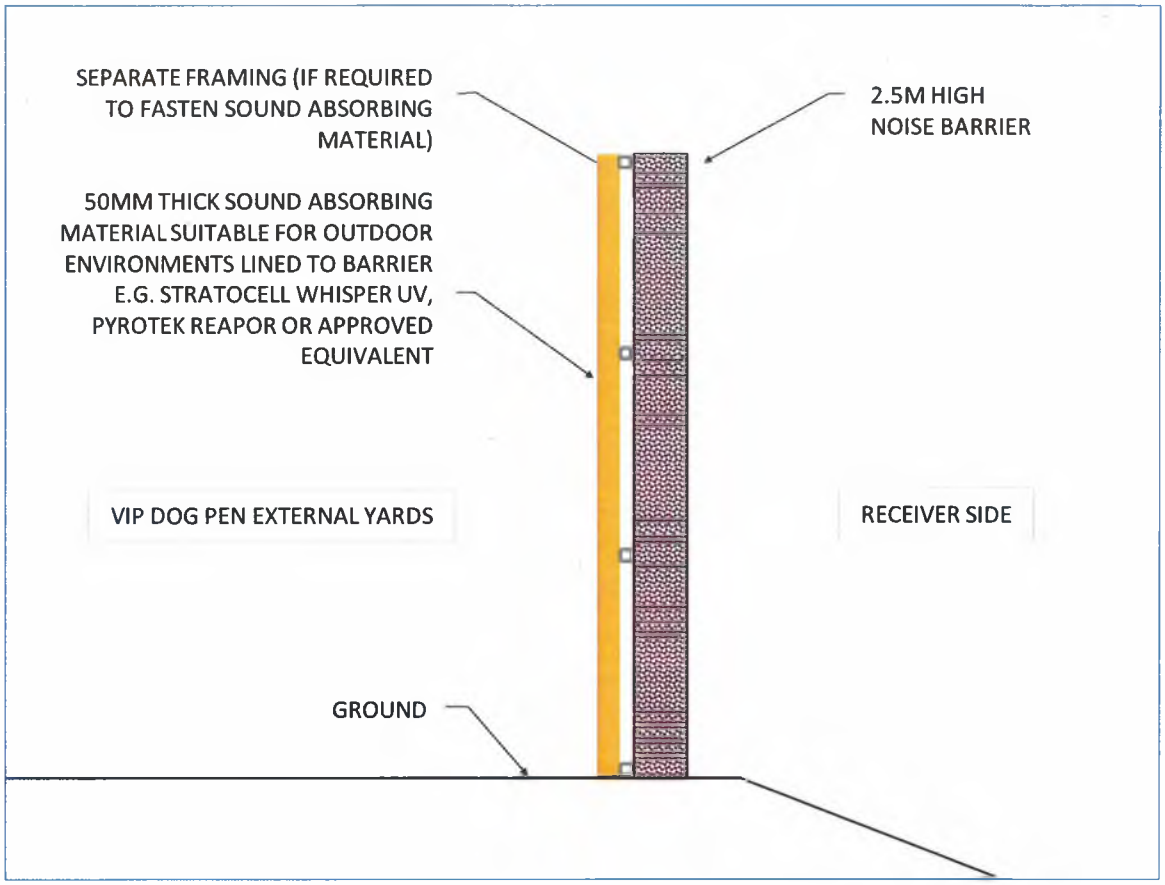


Figure 8 Noise Barrier with Sound Absorbing Material Schematic (Not to Scale)

Table 7 presents the calculated Effective Noise Levels at the potentially most-affected NSAs during the NIRV 'Evening' period with the recommended noise mitigation measures implemented to the noise barrier east of the VIP dog pen external yards.

Table 7 Calculated Effective Noise Levels During Kennel Operating Hours – With Noise Mitigation

NSA	Calculated Noise Level, L_{Aeq}, dB(A)	SEPP N-1 Impulse Adjustment, dB	Calculated Effective Noise Level, L_{eff}, dB(A)	NIRV 'Evening' Maximum Noise Levels and Compliance Status
NSA 1	32	+5	37	37 ✓
NSA 2	26	+5	31	40 ✓
NSA 3	27	+5	32	37 ✓

Figure 9 presents a calculated Effective Noise Level contour map during the kennel operating hours with the recommended noise mitigation measures implemented. The presented contours include the +5 dB(A) impulsiveness adjustment that has been applied in accordance with SEPP N-1.

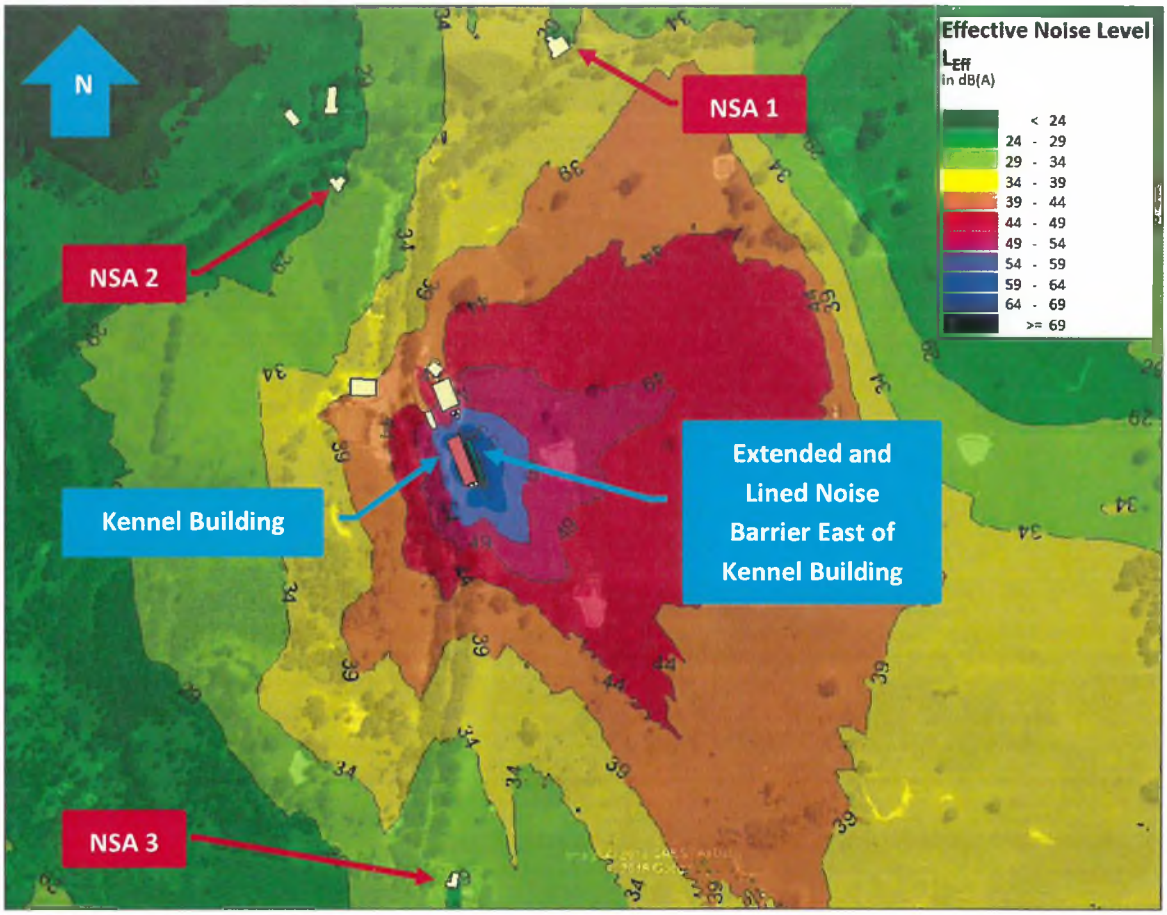


Figure 9 Noise Contour Map During Kennel Operating Hours – With Noise Mitigation

9 Conclusion

An environmental noise assessment of the proposed dog boarding kennel at 790 Ridge Road, Christmas Hills.

Assessment of the potential noise emissions due to operation of the dog kennel has been undertaken with regard to the guidelines prescribed by EPA Publication 1411 'Noise from Industry in Regional Victoria' (EPA Victoria, 2011).

The results of the assessment have determined that noise mitigation measures to control noise emissions from VIP dog pen external yards during the NIRV 'Evening' period are required to comply with the NIRV recommended maximum noise levels.

Recommended noise mitigation options have been provided in Section 8 of the report. It is considered that noise emissions from the proposed dog boarding kennel will comply with reference acoustic criteria with implementation of the recommended noise control options.

Cogent Acoustics

10 References

Cogent Acoustics. (2017). *17333 32 Powells Road, Lysterfield.*

EPA Victoria. (2011, October). Noise from Industry in Regional Victoria - Recommended Maximum Noise Levels from Commerce, Industry and Trade Premises in Regional Victoria. *EPA Publication 1411*.

ISO. (1996). ISO 9613-2:1996 Acoustics - Attenuation of Sound During Propagation Outdoors - Part 2: General Method of Calculation. *First Edition, 1996-12-15*. International Standards Organisation.

State of Victoria. (2001). State Environment Protection Policy (Control of Noise from Industry, Commerce and Trade) No. N-1. *No. S31, 16/5/1992, Gazette 15/6/1989, As varied 15/9/1992, No. G37, Gazette 23/9/1992, As varied 31/10/2001, No. S183, Gazette 31/10/2001*.

Appendix A Glossary of Acoustic Terms

dB / dB(A) — Decibels or 'A'-weighted Decibels, the units of Sound Pressure Level and Sound Power Level. 'A'-weighting adjusts the levels of frequencies within the sound spectrum to better reflect the sensitivity of the human ear to different frequencies at sound pressure levels typical of everyday sounds. [Unit: dB / dB(A)]

The following are examples of the decibel readings of every day sounds;

- 0 dB The faintest sound we can hear
- 30 dB A quiet library or in a quiet location in the country
- 45 dB Typical office space. Ambience in the city at night
- 60 dB The sound of a vacuum cleaner in a typical lounge room
- 70 dB The sound of a car passing on the street
- 80 dB Loud music played at home
- 90 dB The sound of a truck passing on the street
- 100 dB The sound of a rock band
- 120 dB Deafening

$L_{A90,T}$ — The value of A-weighted Sound Pressure Level which is exceeded for 90 percent of the time during given measurement period T. This is commonly used to represent the background noise level. [Unit: dB / dB(A)]

$L_{Aeq,T}$ — The Equivalent Continuous A-weighted Sound Pressure Level measured over the period T (also known as Time-Average Sound Pressure Level). The Equivalent Continuous A-weighted Sound Pressure Level is the constant value of A-weighted Sound Pressure Level for a given period that would be equivalent in sound energy to the time-varying A-Weighted Sound Pressure Level measured over the same period. In simple terms, this can be thought of as the average sound pressure level. [Unit: dB / dB(A)]

Noise Sensitive Area — For the purposes of assessment of noise levels in relation to *State Environment Protection Policy (Control of Noise from Commerce Industry and Trade) No. N-1*, *State Environment Protection Policy (Control of Music Noise from Public Premises) No. N-2*, or the *Interim Guidelines for Control of Noise from Industry in Country Victoria*, a Noise Sensitive Area is defined as:

a) That part of the land within the apparent boundaries of any piece of land which is within 10 metres outside the external walls of any of the following buildings:

- A dwelling (except Caretaker's House)
- Residential Building

b) That part of the land within the apparent boundaries of any piece of land on which is situated any of the following buildings which is within a distance of 10 metres outside the external walls of any dormitory, ward or bedroom of such buildings:

- Caretakers house
- Hospital
- Hotel
- Institutional home
- Motel
- Reformative institution
- Tourist establishment
- Work release hostel

R_w	Weighted Sound Reduction Index. A single number rating of the airborne sound insulation performance of a specific building element in the absence of flanking transmission. A higher R_w value indicates better airborne sound insulation. [Unit: dB]
Sound Power Level	A measure of the total sound energy radiated by a source, per unit time. Mathematically, it is ten times the logarithm to the base ten of the ratio of the sound power (W) of the source to the reference sound power; where the reference sound power is $1x10^{-12}$ W. [Unit: dB]
Sound Pressure Level	A measure of the magnitude of a sound wave. Mathematically, it is twenty times the logarithm to the base ten of the ratio of the root mean square sound pressure at a point in a sound field, to the reference sound pressure; where sound pressure is defined as the alternating component of the pressure (Pa) at the point, and the reference sound pressure is $2x10^{-5}$ Pa. [Unit: dB]

Appendix B Noise Measurement Methodology

Measurement Procedure

Environmental noise logging was performed in the vicinity of the project site to establish the background noise levels. The following are details of the measurement:

Table 8 Noise Measurement Details

Location	Measurement Type		Start Time	Start Date	End Time	End Date
	Attended	Unattended				
1	☐	☒	12:00 PM	Monday 27/08/2018	9:30 AM	Monday 3/09/2018

The equipment was configured to provide the measurement results as continuous series of 1 second A- and Z-weighted octave band sound pressure levels in terms of L_{eq}, L_{90}, and a range of other metrics.

The microphone was mounted at approximately 1.3 m above ground level. A 90mm diameter foam windscreen was installed on the microphone to minimise the effect of wind-induced pressure fluctuations on the measurements.

Figure 10 and Figure 11 present a map and a photograph of the measurement location respectively.

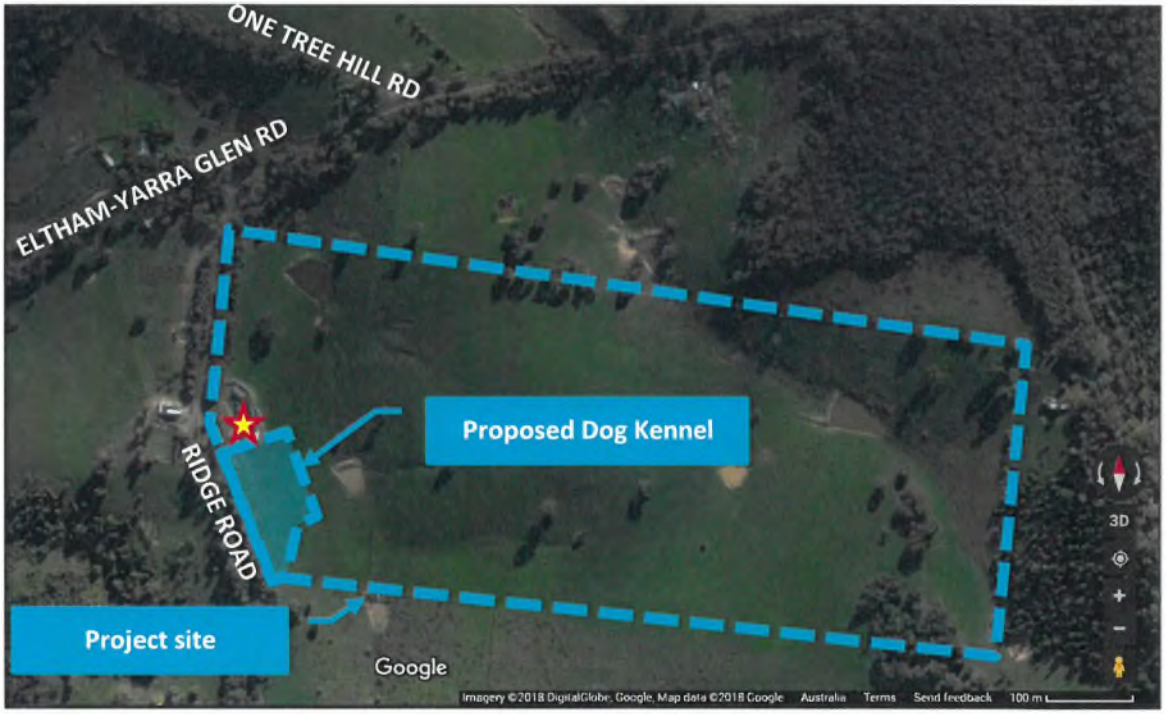


Figure 10 Noise Measurement Location (Image Source: Google Maps)

Figure 11 Background Noise Logging Location – Photo Facing South-East

Instrumentation

All acoustic instrumentation used for the measurements held a current certificate of calibration from a National Association of Testing Authorities (NATA) accredited laboratory at the time of the measurements. A field check to confirm correct calibration of the instrumentation was performed at the beginning and end of the measurement period using a laboratory calibrated portable Sound Level Calibrator. At the time of each check the instrumentation was found to be reading correctly and the deviation between consecutive checks was found to be less than 1 dB.

Details of the acoustic instrumentation used for measurements are presented in Table 9.

Table 9 Acoustic Instrumentation Details

Position	Instrument Description	Serial No.	Date of Last Laboratory Calibration*
1	Svantek 977 Class 1 Sound Level Meter	45759	19/09/2016
-	Svantek SV33 Portable Sound Level Calibrator	57427	2/05/2018

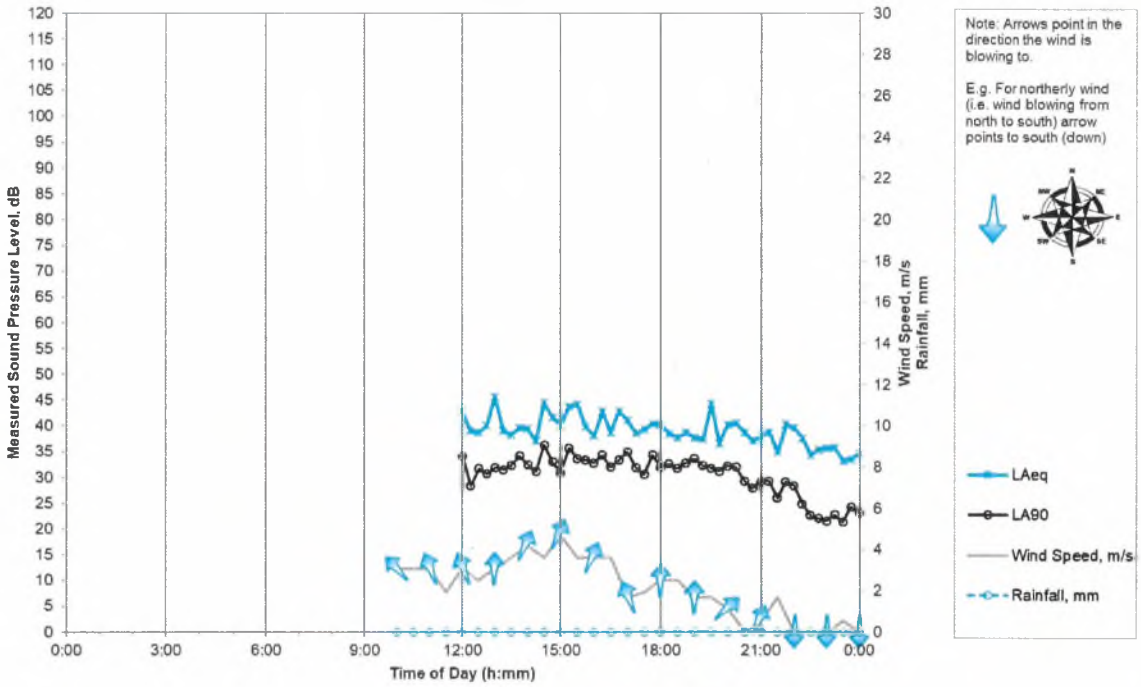
*In accordance with AS 1055.1-1997 and National Association of Testing Authorities Guidelines, Sound Level Meters and Environmental Noise Loggers are required to have comprehensive laboratory calibration checks carried out at intervals not exceeding two years.

Meteorological Data

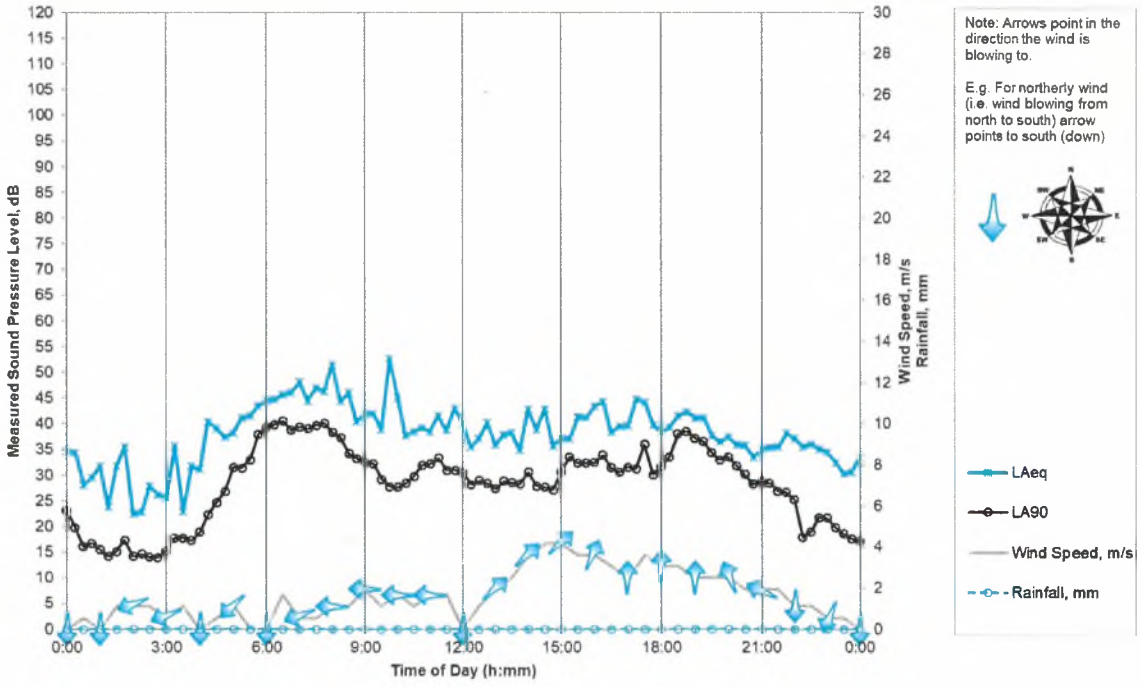
Weather observations during the monitoring period were taken from the Bureau of Meteorology Weather Station at Viewbank, approximately 21 km away. Appendix C shows the meteorological observations plotted against the measured L_{Aeq} and L_{A90} sound pressure levels for the duration of the measurement period.

Appendix C Graphed Background Noise Measurements

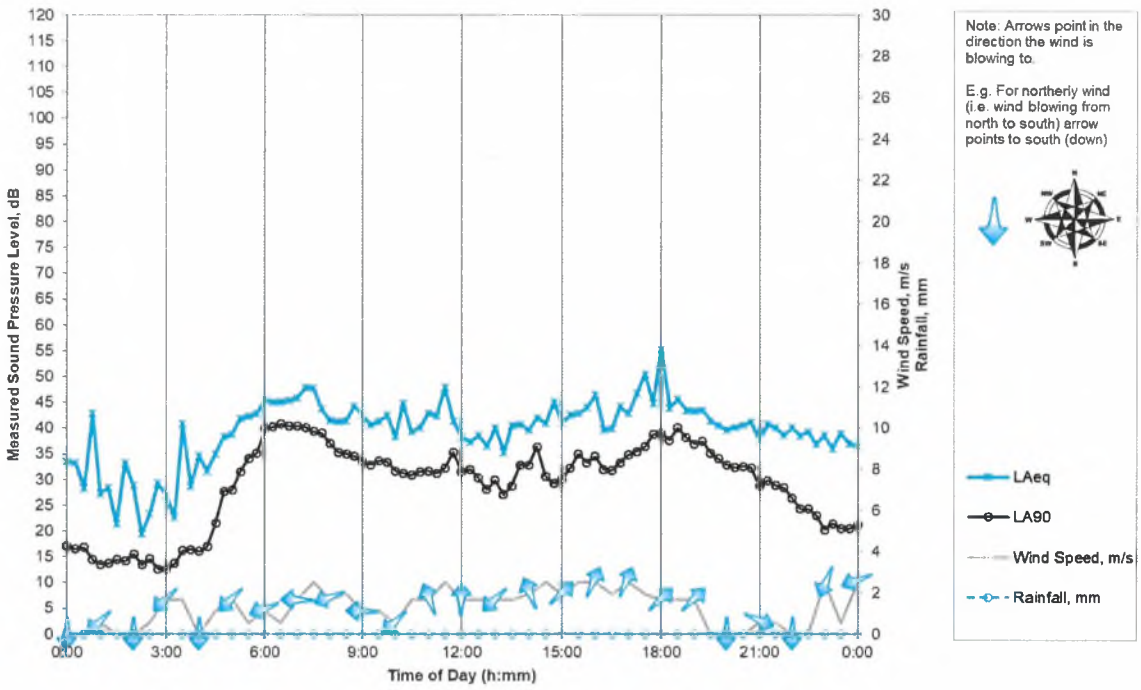
Monday, 27 August 2018



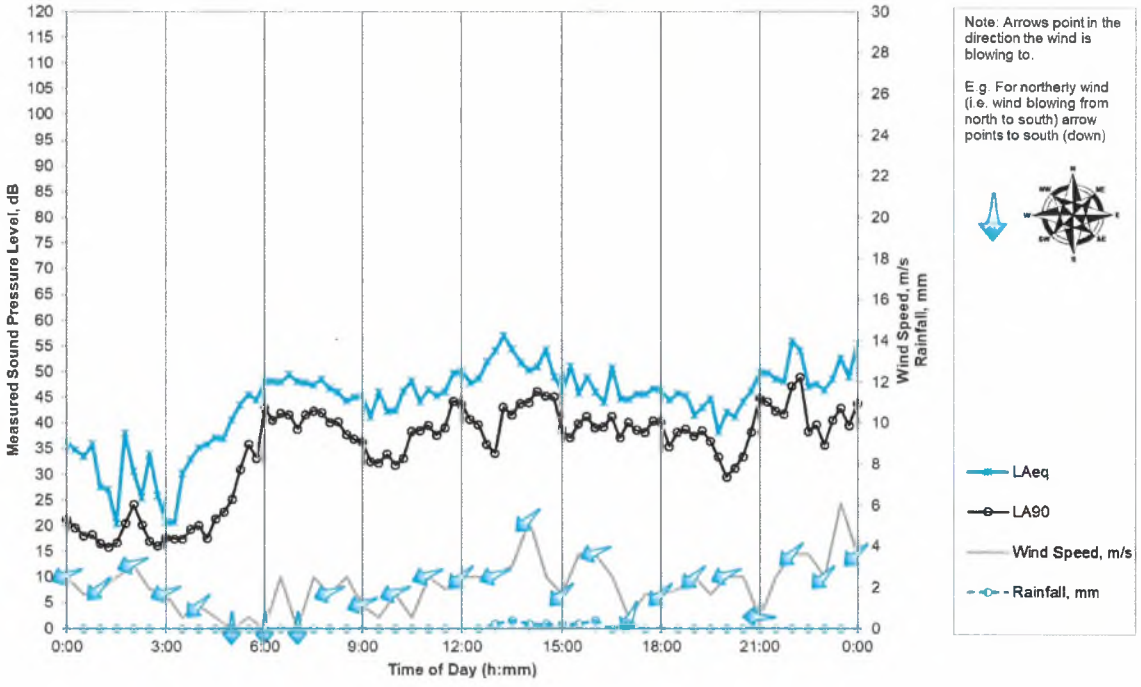
Tuesday, 28 August 2018



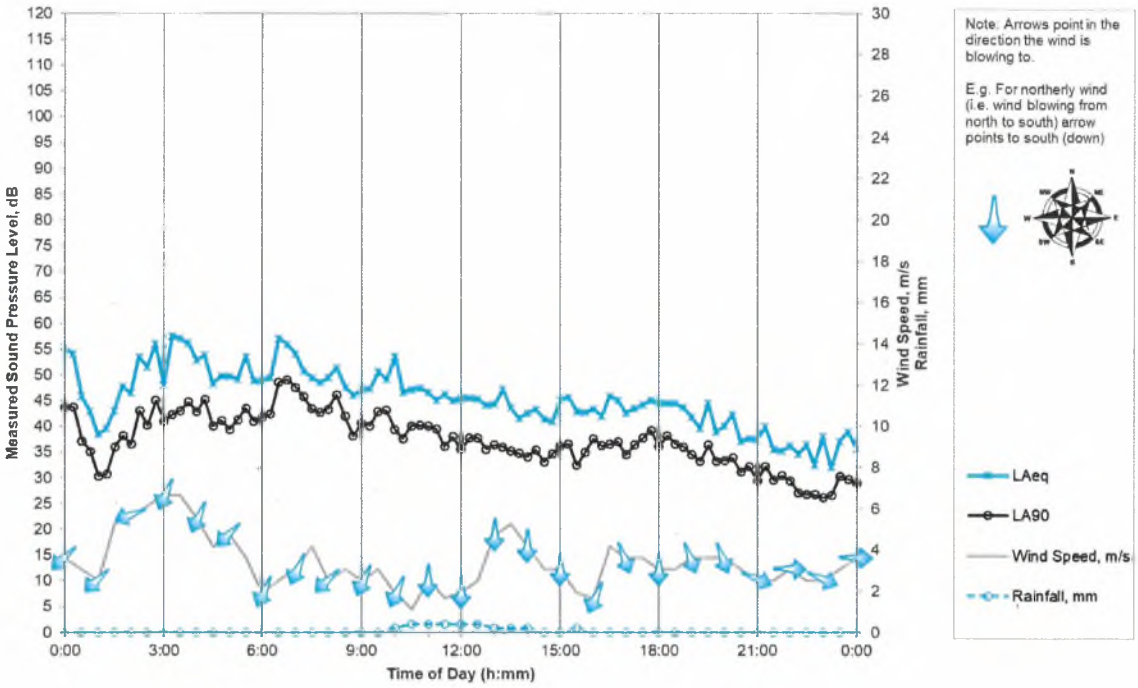
Wednesday, 29 August 2018



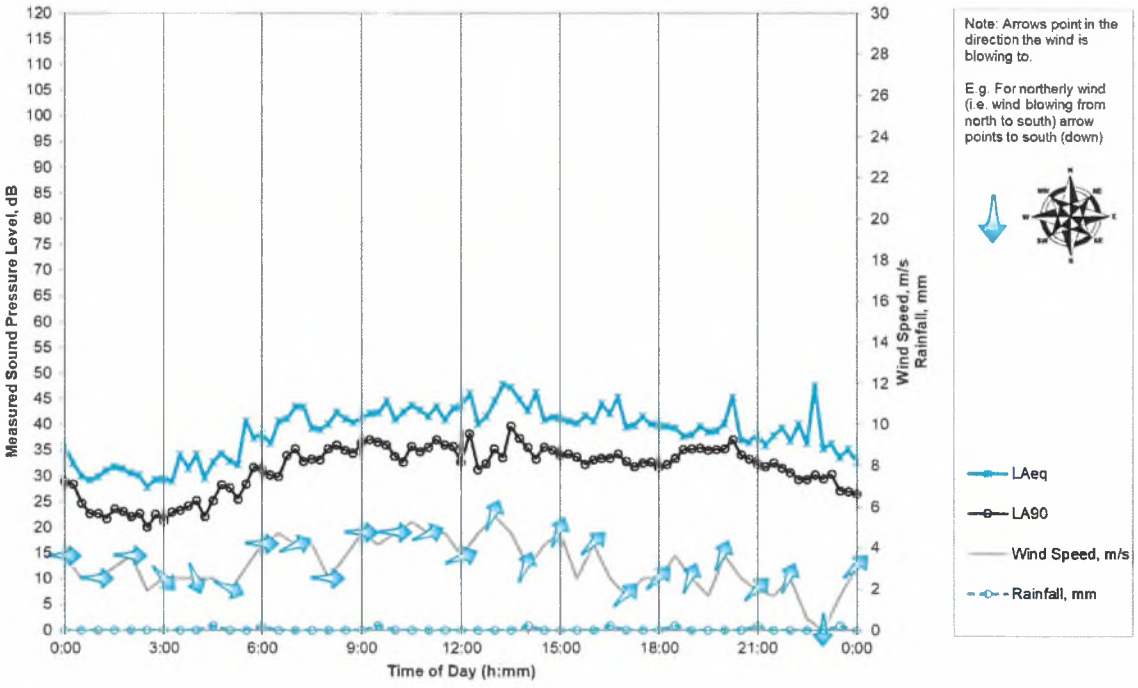
Thursday, 30 August 2018



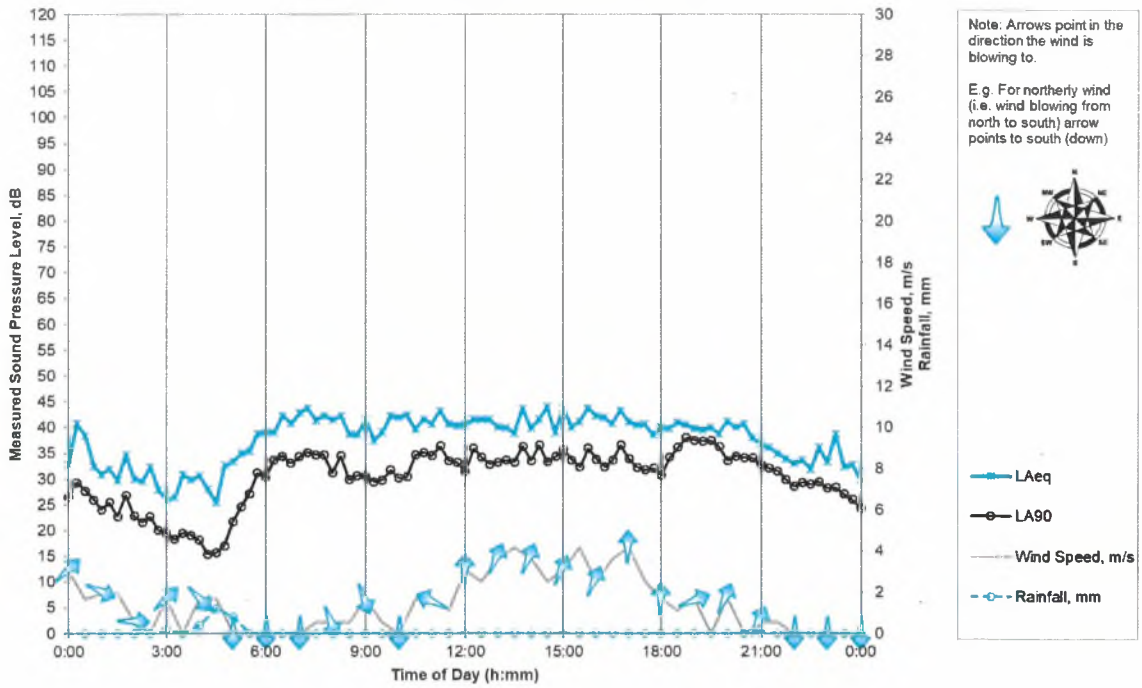
Friday, 31 August 2018



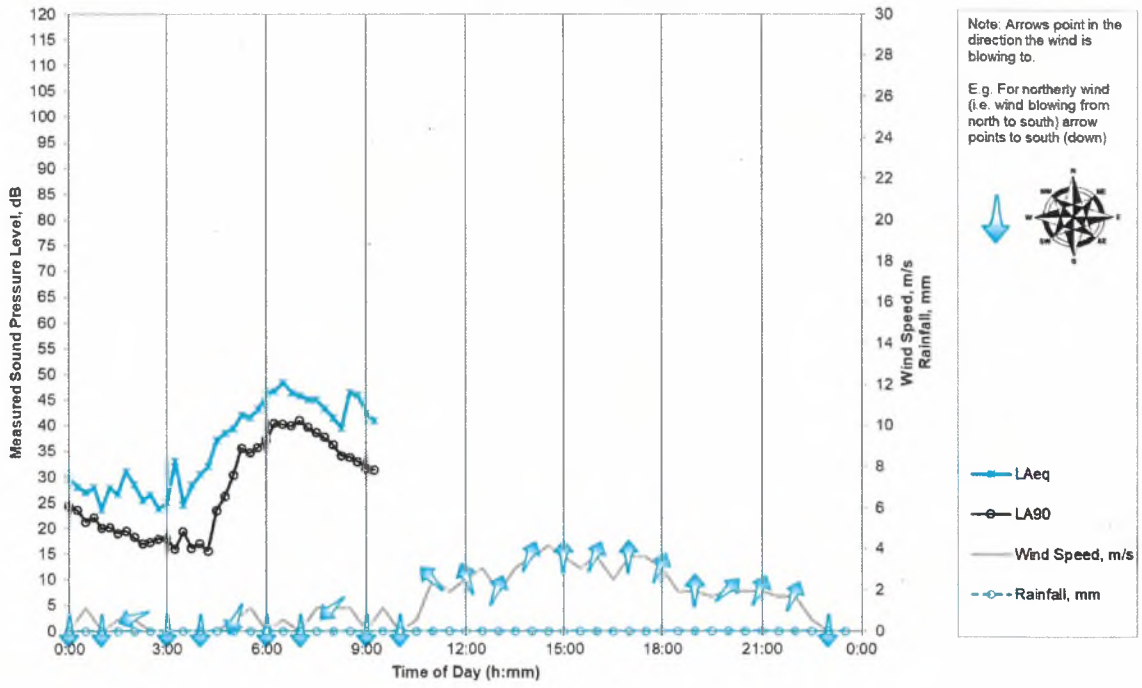
Saturday, 1 September 2018



Sunday, 2 September 2018



Monday, 3 September 2018



Cogent Acoustics

Appendix D Modelling Parameters

General

Parameter	Description
Software	SoundPLAN Version 7.4
Calculation Method	ISO 9613-2 Acoustics - Attenuation of Sound During Propagation Outdoors - Part 2: General Method of Calculation (ISO, 1996)

Geometrical Parameters

Parameter	Description
Site Layout	▪ As per reference documentation. ▪ The area in the vicinity of the site has been modelled as per the latest Google Maps satellite image.
Terrain	Digital ground map was constructed using 1 second Digital Elevation Model data from the Geoscience Australia Elevation Information System (ELVIS).
Ground absorption	▪ Areas immediately surrounding the dog kennel has been modelled as hard ground, using a ground factor of 0 (approximately 0% absorptive). ▪ All other areas have been modelled as soft ground using a ground factor of 0.5 (approximately 50% absorptive).
Proposed Dog Kennel Building	The proposed dog kennel building has been modelled as a 4.6 m high single-storey building with the external wall, glazing, door, and roof construction as detailed in Section 7.1.
Residential and Public Buildings	All residential buildings were modelled as: ▪ 4 m high single-storey buildings with layouts and locations in each lot according to the latest Google Maps satellite image. ▪ Only buildings identified as the nearest and potentially most-affected NSAs were modelled. The Christmas Hills Hall Building was modelled as: ▪ A 6 m high single-storey building with layout and location according to the latest Google Maps satellite image.
Receptor / Noise Contour Height	Noise levels were assessed at 1.5 m above ground level.

Noise Source Parameters

<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td>Indoor Dog Barking Noise</td><td>The modelled indoor dog barking noise has been based on:
Noise measurements conducted by Cogent Acoustics (Cogent Acoustics, 2017) on 1 November 2017 at a dog kennel in Lysterfield. The measured octave band sound pressure level spectrum for 22 dogs barking is as follows:
<table>
<tr><th>Frequency, Hz</th><th>63</th><th>125</th><th>250</th><th>500</th><th>1K</th><th>2K</th><th>4K</th><th>Total</th></tr>
<tr><th>Sound Level, dB(Z)</th><td>52</td><td>54</td><td>64</td><td>86</td><td>88</td><td>80</td><td>65</td><td>91</td></tr>
</table></td></tr>
<tr><td>Outdoor Dog Barking Noise</td><td>The outdoor dog barking noise has been modelled as:
An area source spanning the VIP Dog Pen Yards at 0.5 m above ground level.
The area sources have been specified a Sound Power Level that has been based on the noise measurements conducted at the dog kennel at Lysterfield.
The octave band spectrum Sound Power Level for 22 dogs barking outdoors is as follows:
<table>
<tr><th>Frequency, Hz</th><th>63</th><th>125</th><th>250</th><th>500</th><th>1K</th><th>2K</th><th>4K</th><th>Total</th></tr>
<tr><th>Sound Level, dB(Z)</th><td>69</td><td>71</td><td>80</td><td>103</td><td>105</td><td>97</td><td>82</td><td>107</td></tr>
</table></td></tr>
</table>