Noise Assessment – 241 Fishers Hill Road Vacy, NSW.

Prepared for
Perception Planning

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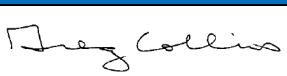
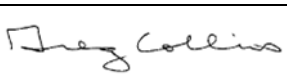
2222392_220719	0	19 July, 2022	Gregory Collins - MAAS	
2222392_220719_1	1	08 September 2022	Gregory Collins - MAAS	

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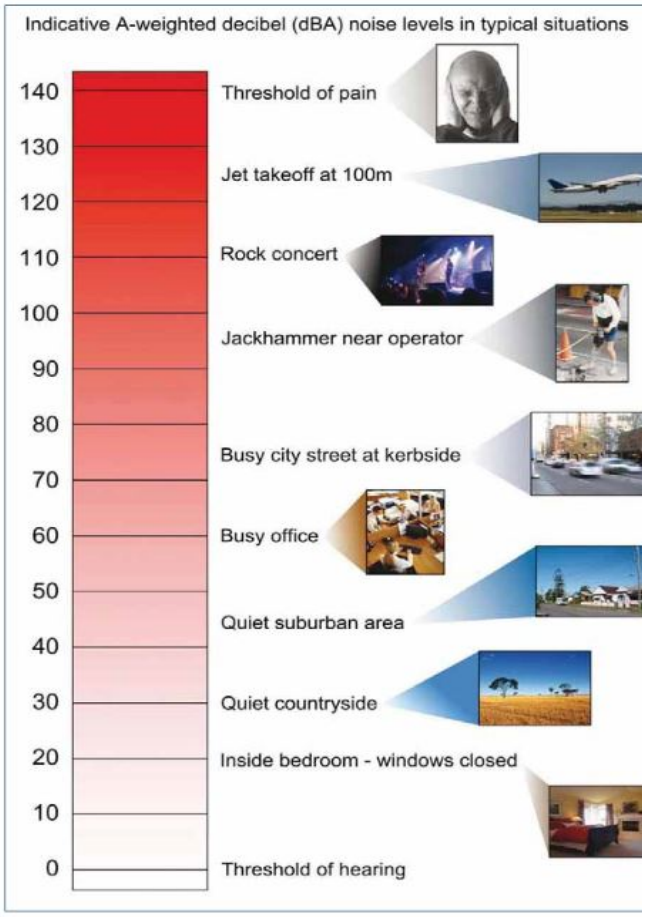
Glossary of Acoustic Terms

Term	Definition
dB	Decibel is the unit used for expressing the sound pressure level (SPL) or power level (SWL) in acoustics. The picture below indicates typical noise levels from common noise sources. 
dB(A)	Frequency weighting filter used to measure 'A-weighted' sound pressure levels, which conforms approximately to the human ear response, as our hearing is less sensitive at very low and very high frequencies.
$L_{Aeq(period)}$	Equivalent sound pressure level: the steady sound level that, over a specified period of time, would produce the same energy equivalence as the fluctuating sound level actually occurring.
$L_{A10(period)}$	The sound pressure level that is exceeded for 10% of the measurement period.

$L_{A90(period)}$	The sound pressure level that is exceeded for 90% of the measurement period.
L_{Amax}	The maximum sound level recorded during the measurement period.
Noise sensitive receiver	◗ An area or place potentially affected by noise which includes: ◗ A residential dwelling. ◗ An educational institution, library, childcare centre or kindergarten. ◗ A hospital, surgery or other medical institution. ◗ An active (e.g. sports field, golf course) or passive (e.g. national park) recreational area. ◗ Commercial or industrial premises. ◗ A place of worship.
Rating Background Level (RBL)	The overall single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period.
Feasible and Reasonable (Noise Policy for Industry Definition)	**Feasible** mitigation measure is a noise mitigation measure that can be engineered and is practical to build and/or implement, given project constraints such as safety, maintenance and reliability requirements. Selecting **Reasonable** measures from those that are feasible involves judging whether the overall noise benefits outweigh the overall adverse social, economic and environmental effects, including the cost of the mitigation measure. To make a judgement, consider the following: ◗ Noise impacts ◗ Noise mitigation benefits ◗ Cost effectiveness of noise mitigation ◗ Community views.
Sound power level (SWL)	The sound power level of a noise source is the sound energy emitted by the source. Notated as SWL, sound power levels are typically presented in dB(A).

1. Introduction

1.1 Background

RAPT Consulting has been engaged to undertake a noise assessment for Perception Planning to inform a Development Application (DA) for a for a new kennel development located at 241 Fishers Hill Road Vacy, NSW. Based on information provided, it is understood the development is seeking to accommodate up to 100 dogs.

The site and surrounding area is shown in Figure 1-1 and approximate kennel site location is shown in Figure 1-2.

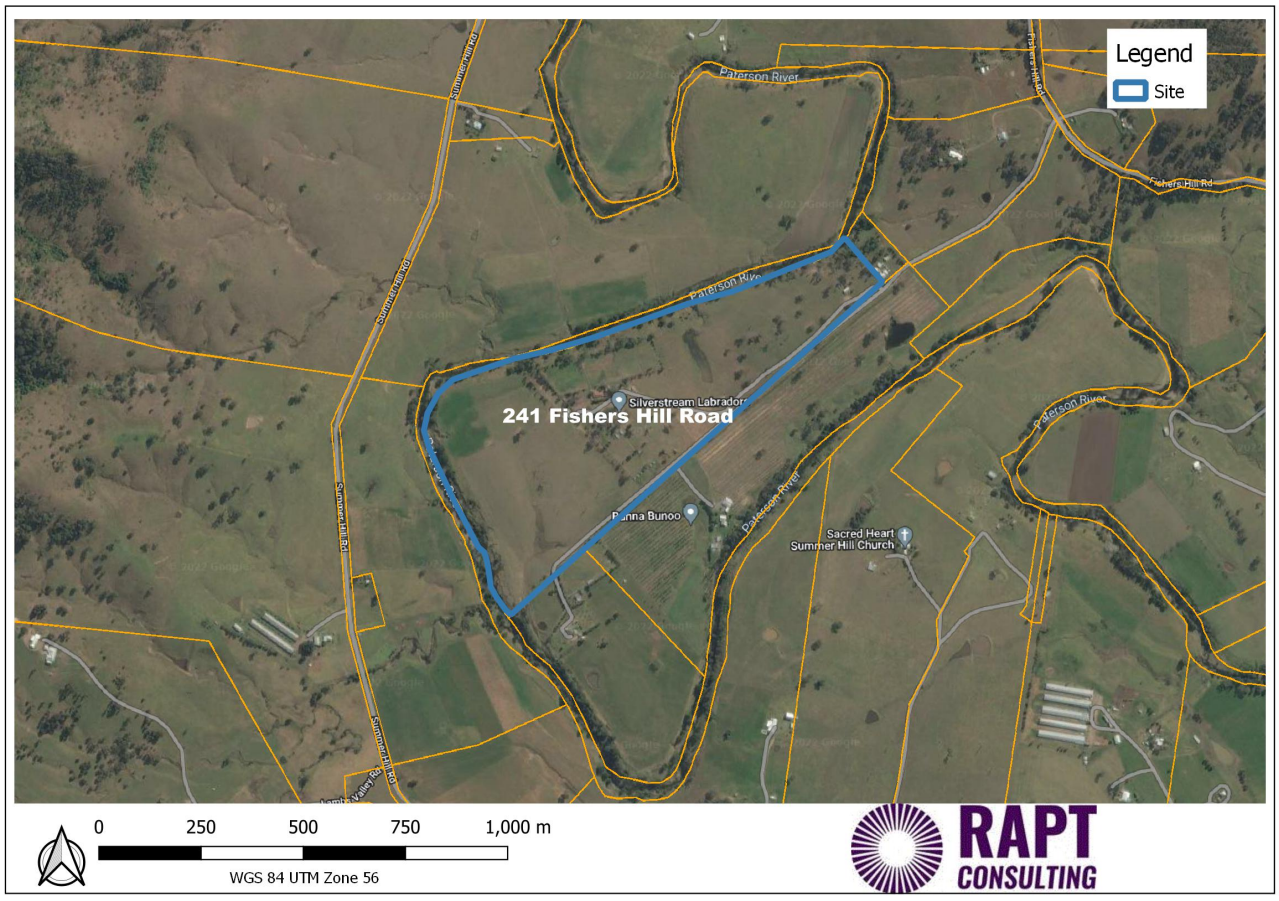


Figure 1-1 Site and Surrounding Area

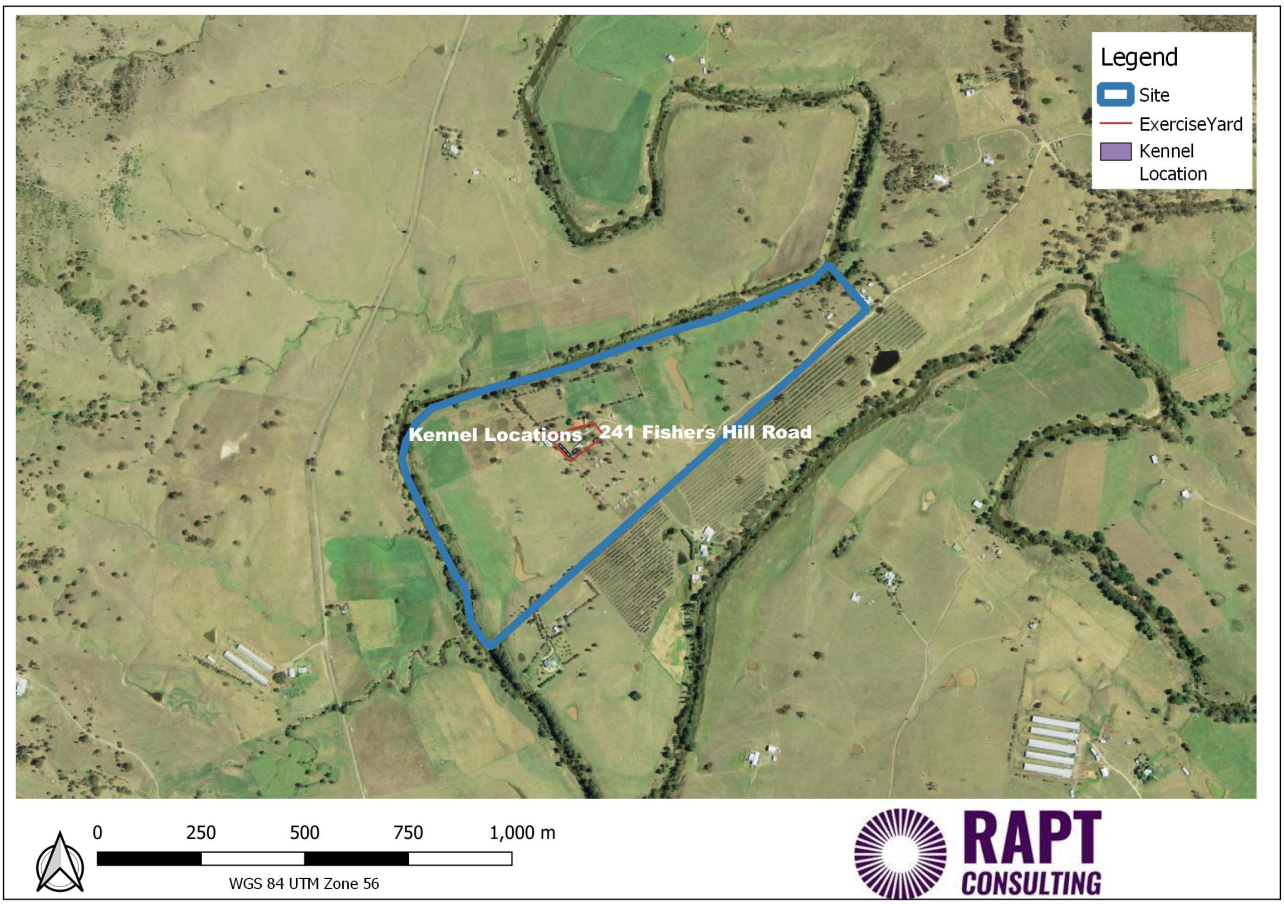


Figure 1-2 Approximate Kennel Site Location

1.2 Assessment Objectives

This acoustic assessment considers the potential impacts of the operation of the proposal. The purpose is to assess potential noise from the proposal and to recommend mitigation measures where required.

1.3 Scope

The acoustic assessment scope of work included:

- Initial desk top review to identify noise sensitive receptors from aerial photography
- Establish project noise goals for the operation of the proposal
- Identify the likely principal noise sources during operation and their associated noise levels
- assessment of potential noise impacts associated with operation aspects of the project
- provide recommendations for feasible and reasonable noise mitigation and management measures, where noise objectives may be exceeded.

1.4 Relevant Guidelines

The relevant policies and guidelines for noise and vibration assessments in NSW that have been considered during the preparation of this assessment include:

- Australian Standard AS 1055.2, Acoustics – Description and Measurement of Environmental Noise
- Noise Policy for Industry (NPfI), Environment Protection Authority (EPA), 2017
- Dungog Development Control Plan Part C Chapter 12 The Keeping of Dogs For Commercial Purposes
- Noise Guide for Local Government (NGLG), (EPA), 2013

1.5 Limitations

The purpose of this report is to provide an independent noise assessment for the proposal.

It is not the intention of the assessment to cover every element of the acoustic environment, but rather to conduct the assessment with consideration to the prescribed work scope.

The findings of the noise assessment represent the findings apparent at the date and time of the assessment undertaken. It is the nature of environmental assessments that all variations in environmental conditions cannot be assessed and all uncertainty concerning the conditions of the ambient environment cannot be eliminated. Professional judgement must be exercised in the investigation and interpretation of observations.

In conducting this assessment and preparing the report, current guidelines for noise were referred to. This work has been conducted in good faith with RAPT Consulting's understanding of the client's brief and the generally accepted consulting practice.

No other warranty, expressed or implied, is made as to the information and professional advice included in this report. It is not intended for other parties or other uses.

2. Existing Environment

2.1 Receptors

The site and surrounding area is currently zoned RU1 Primary Production. A map showing the land use zonings in the vicinity of the proposal are shown in Figure 2-1.

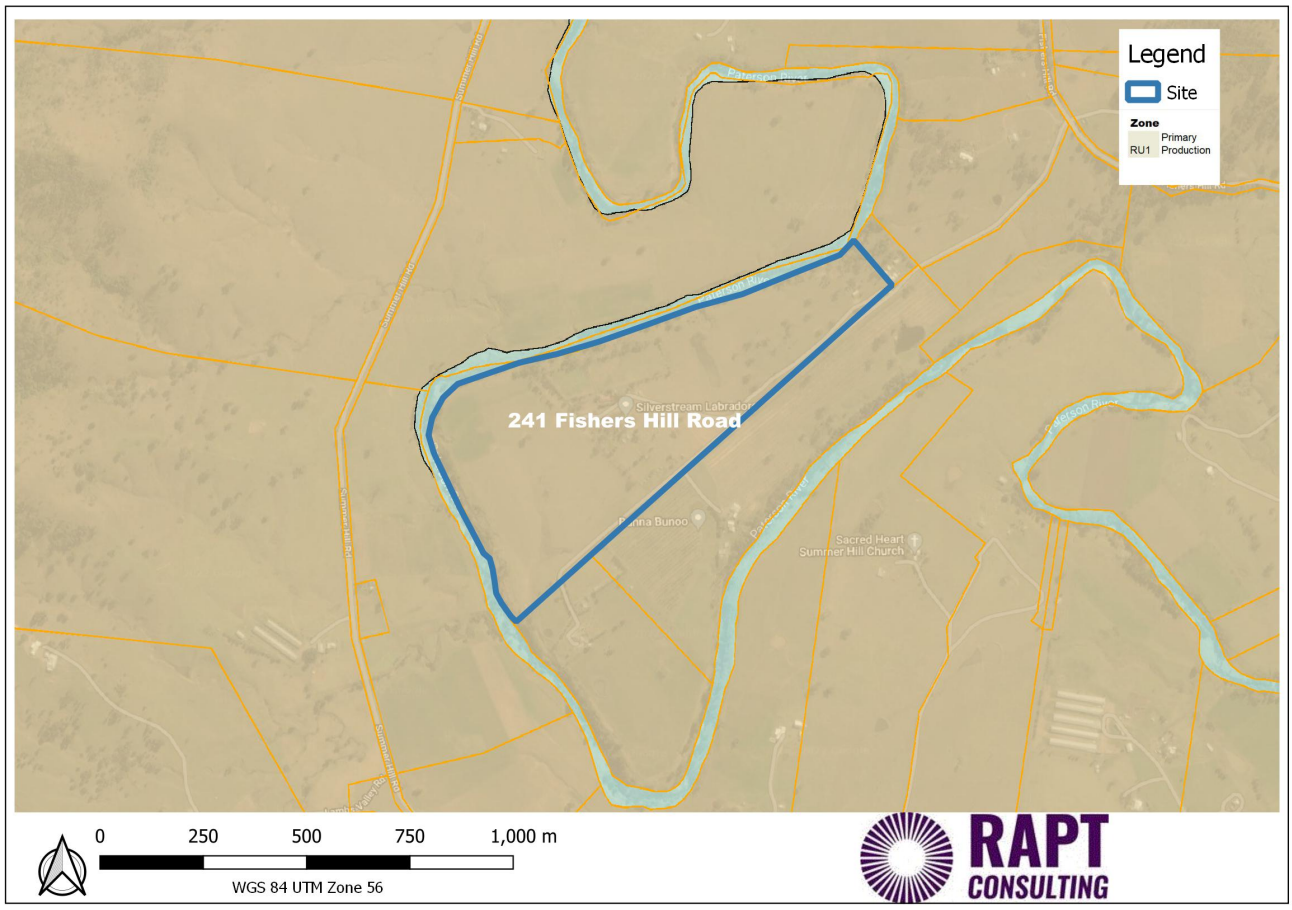


Figure 2-1 Land Use Zonings

Closest receptors to the proposal assessed in this acoustic assessment are identified in Table 2-1 and Figure 2-2.

Table 2-1 Nearest Receptors to Study Area

Receiver ID	Location	Receptor Type	Easting	Northing
R1	Lot 122 DP601225	Residential	360488	6401254
R2	Lot 21 DP622804	Residential	360792	6402357
R3	Lot 2 DP1027037	Residential	361429	6402627
R4	Lot 4 DP1027037	Residential	361979	6402488
R5	Lot 2 DP154880	Residential	361919	6402278
R6	Lot 16 DP1045212	Residential	361720	6402057
R7	Lot 1 DP1045212	Residential	361334	6401470
R8	Lot 1 DP730516	Residential	361010	6401176
R9	Lot 4 DP169158	Residential	361482	6400940
R10	Lot 1 DP571903	Place of Worship	361774	6401349

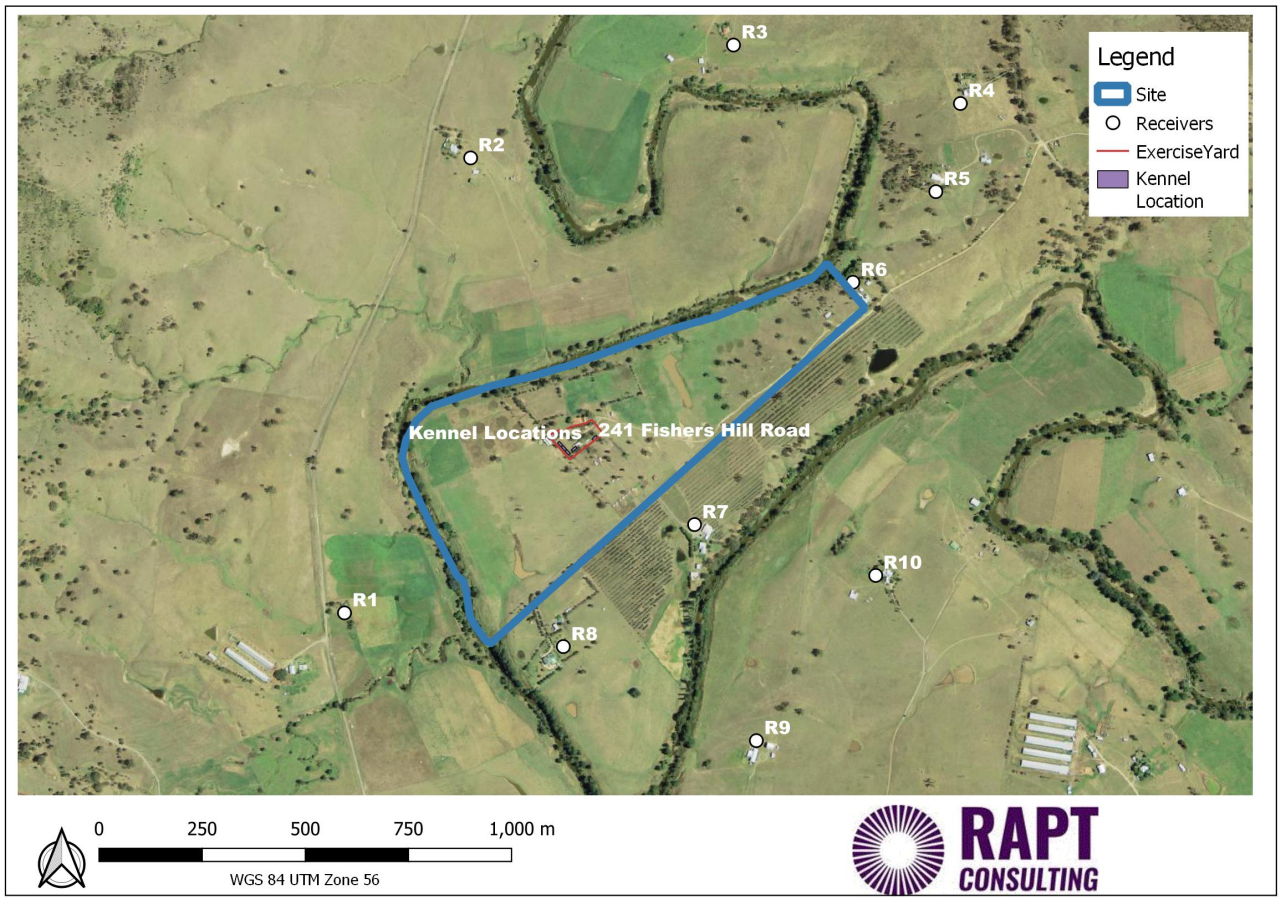


Figure 2-2 Receptors Surrounding the Proposal Site

3. Noise Objectives

3.1 Dungog Development Control Plan Part C Chapter 12 The Keeping of Dogs For Commercial Purposes

The Dungog Development Control Plan (DCP) identifies a high end establishment as *large scale operations requiring significant investment and involves the keeping of more than four (4) dogs for commercial purposes*.

This proposal qualifies as a high end establishment as it proposes to house up to 100 dogs.

Chapter 12.9.3 of the DCP stipulates *Dogs must not generate offensive noise as defined under the Protection of The Environmental Operations Act 1997. Consideration must be given to appropriate inbuilt features to control noise. Suggestions are provided in this guideline. An Acoustic Engineers Report may be required where it is considered that noise impact on adjoining properties is an issue.*

Offensive noise' is defined in the dictionary of the POEO Act as noise:

- *that, by reason of its level, nature, character or quality, or the time at which it is made, or any other circumstances:*
    - *is harmful to (or is likely to be harmful to) a person who is outside the premises from which it is emitted, or*
    - *interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted, or*
- *that is of a level, nature, character or quality prescribed by the regulations or that is made at a time, or in other circumstances, prescribed by the regulations.*

This does not recommend noise limits or other criteria to be applied to these situations. Therefore, the NPfI will be utilised as a guide for the purposes of this assessment.

3.2 Noise Policy for Industry

The New South Wales *Noise Policy for Industry* (NPfI) provides guidance on the assessment of operational noise impacts. The guidelines include both intrusive and amenity criteria that are designed to protect receivers from noise significantly louder than the background level and to limit the total noise level from all sources near a receiver.

Intrusive noise levels set by the NPfI control the relative audibility of operational noise compared to the background level. Amenity criteria limit the total level of extraneous noise. Both sets of criteria are calculated and the lower of the two in each time period normally

apply. Intrusive criteria are simply 5 decibels above the measured (or adopted) background level with a minimum of 40 dB(A) for daytime and 35 dB(A) for evening and night time.

Amenity noise levels are determined based on the overall acoustic characteristics of the receiver area and the existing level of noise excluding other noises such as traffic and insects. Residential receiver areas are characterised into ‘urban’, ‘suburban’, ‘rural’ or other categories based on land uses, the existing level of noise from industry, commerce, and road traffic. Project amenity noise levels are the recommended amenity noise level (Table 2.1 of the NPfI) minus 5 dB(A) and plus 3 dB(A) to convert from a period level to a 15-minute level. The project noise trigger level is the lower value between the intrusive and the amenity noise levels.

The NPfI noise criteria are planning levels and are not mandatory limits required by legislation however the noise criteria assist the regulatory authorities to establish licensing conditions. Where noise criteria are predicted to be exceeded, feasible and reasonable noise mitigation strategies should be considered. In circumstances where noise criteria cannot be achieved negotiation is required to evaluate the economic, social and environmental costs and benefits of the development against the noise impacts.

The NPfI is generally intended for large and complex industrial sources and are not strictly applicable to these situations. However, it is the most useful guideline policy for the assessment of noise impact to surrounding receivers. Therefore, the NPfI will be referred to for determining operational noise goals for this proposal.

Nearest residential receptors are considered Rural as it is an area with an acoustical environment that is dominated by natural sounds, having little or no road traffic noise. For conservatism, the lowest adoptable values for residential receivers with consideration to the NPfI have been adopted as project noise trigger levels. Target noise levels are provided for residences and commercial premises in Table 3-1.

Table 3-1 Project Noise Trigger Levels dB(A)

	Day 7am to 6pm	Evening 6pm to 10pm	Night 10pm to 7am
Project Intrusive Noise Level, $L_{Aeq(15min)}$	35	30	30
Project Amenity Noise Level (Rural), $L_{Aeq(Period)}$	45	40	35
Project Amenity Noise Level $L_{Aeq(15min)}$	48	43	38
Project Trigger Level Residential $L_{Aeq(15min)}$	**40**	**35**	**35**
Places of Worship (Internal) (When in use) $L_{Aeq(15min)}$	**38**	**38**	**38**

Maximum Noise Level Assessment

The NPfI requires the potential for sleep disturbance to be assessed by considering maximum noise levels events during the night-time period.

Where the subject development/premises night-time noise levels at a residential location exceed the following screening levels a detailed maximum noise level event assessment should be undertaken:

- LAeq,15min 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- LAFmax 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,

The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period.

Based on the adopted background noise levels during the night, the sleep disturbance criteria

for the nearest noise sensitive residential receivers are provided in Table 3-2.

Table 3-2 Night-Time Sleep Disturbance Screening Levels

Receiver type	Assessment Level $L_{Aeq,15min}$	Assessment Level L_{AFmax}
Residential	40	52

The NSW Road Noise Policy (RNP) (DECCW 2011) provides additional information on sleep disturbance and concludes that:

- *Maximum internal noise levels below 50–55 dB(A) are unlikely to awaken people from sleep*
- *One or two noise events per night, with maximum internal noise levels of 65–70 dB(A), are not likely to affect health and wellbeing significantly.*

The above references identify that internal noise levels of 50 to 55 dB(A), are unlikely to cause awakenings. On the assumption that there is a 10 dB(A) outside-to-inside noise loss through an open window (see Section 2.6 of the NPfI, p15), this indicates that external noise levels of LAmax 60 to 65 dB(A) are unlikely to cause awakening reactions. LAmax 65 dB(A) has then been used as the assessment noise level to determine the potential for awakening reactions.

4. Noise Assessment

4.1 Operational Noise

Assessment approach

Acoustic modelling was undertaken using Bruel and Kjaer's "Predictor" to predict the effects of site noise. Predictor is a computer program for the calculation, assessment and prognosis of noise propagation. Predictor calculates environmental noise propagation according to ISO 9613-2, "Acoustics – Attenuation of sound during propagation outdoors". Terrain topography, ground absorption, atmospheric absorption and relevant shielding objects are taken into account in the calculations.

Modelling results are based on available information provided and should only be used as a guide for comparative purposes. Site layout and building structures were based on information provided at the time of the assessment.

Enhancing Weather Conditions

Fact Sheet D of the NPfI provides guidance for accounting for noise-enhancing weather conditions. Two options are available to consider meteorological effects:

1. Adopt the noise-enhancing meteorological conditions for all assessment periods for noise impact assessment purposes without an assessment of how often these conditions occur – a conservative approach that considers source-to-receiver wind vectors for all receivers and F class temperature inversions with wind speeds up to 2 m/s at night. Or

2. Determine the significance of noise-enhancing conditions. This involves assessing the significance of temperature inversions (F and G class stability categories) for the night-time period and the significance of light winds up to and including 3 m/s for all assessment periods during stability categories other than E, F or G. Significance is based on a threshold of occurrence of 30% determined in accordance with the provisions in this policy. Where noise-enhancing meteorological conditions occur for less than 30% of the time, standard meteorological conditions may be adopted for the assessment.

As a detailed analysis of the significance of noise enhancing conditions has not been undertaken, option 1 has been utilised. Table D1 from the NPfI is reproduced in Table 4-1 and shows the noise enhancing meteorological conditions that have been adopted for this assessment.

Table 4-1Noise Enhancing Meteorological Conditions

Meteorological Conditions	Meteorological Parameters
Noise-enhancing meteorological conditions	Daytime/evening: stability category D with light winds (up to 3 m/s at 10 m AGL). Night-time: stability category F with winds up to 2 m/s at 10 m AGL.

Note 1 m/s = metres per second; m = metres; AGL = above ground level; where a range of conditions is nominated, the meteorological condition delivering the highest-predicted noise level should be adopted for assessment purposes. However, feasible and reasonable noise limits in consents and licences derived from this process would apply under the full range of meteorological conditions nominated under standard or noise-enhancing conditions as relevant. All wind speeds are referenced to 10 m AGL. Stability categories are based on the Pasquill–Gifford stability classification scheme.

Labrador Sound Levels

Sound levels of Labradors were undertaken by RAPT Consulting during a site visit on 11 April 2022. The noise measurements were conducted using a RION NL-42 Sound Level Meter with Type 2 Precision. The attended noise surveys were conducted with consideration to the procedures described in Australian Standard AS 1217.7:1985, "Acoustics – Determination of Sound Power Levels of Noise Sources – Part 7 Survey Method. Calibration was checked before and after each measurement and no significant drift occurred. The acoustic instrumentation used carries current NATA calibration and complies with AS/NZS IEC 61672.1-2019-Electroacoustics – Sound level meters – Specifications. The monitoring was undertaken during calm conditions. The noise measurement results are provided in Table 4-2.

Table 4-2 SWL of Labradors Barking

	SWL dB(A) Octave Band Centre Frequency, Hz									
	31.5	**63**	**125**	**250**	**500**	**1K**	**2K**	**4K**	**8K**	**dB(A)**
Individual Dog L_{max}	26	46	60	76	104	102	100	86	80	**107**
L_{eq} (10 dogs)	17	38	53	68	95	91	88	75	69	**97**

Kennel Building Materials

It is understood the kennels will be insulated, for the purposes of the assessment the building walls have been assumed to be constructed of fibre cement cladding with sheet metal roofing. reduction indexes (Rw) of building elements are provided in Table 4-3.

Table 4-3 Standard Building Materials

	31.5	63	125	250	500	1K	2K	4K	8K
Sheet metal	4	6	11	17	22	27	23	23	23
Fibre cement Sheet	8	10	12	16	20	24	30	31	36

To simulate typical daily scenario, it was assumed 100 dogs were in the outdoor play area each barking 50% of the time as not all dogs would be barking simultaneously or continuously for 15 minutes. During the night it was assumed the dogs would be in their insulated kennels and barking at the same rate as previously described.

Other key assumptions in the model include:

- topographical information was obtained from NSW Government Spatial Services
- all cleared areas were modelled considering a ground factor of 1.0 to account for grassed areas
- all residential receivers were modelled at 1.5 metres above the ground surface
- Dog noise sources considered to be .5 metre tall
- All dogs will be in their insulated kennels from 10pm - 7am
- No dogs in the exercise areas during evening or night time

The modelled results for day, evening and night-time are provided in Table 4-4.

Table 4-4 Operational Noise Assessment Results dB(A) Leq(15min)

Receiver ID	Project Noise Trigger Level Day / Evening / Night dB(A) Leq(15min)	Predicted Results Day / Evening / Night dB(A) Leq(15min)	Comply Y / N
R1	40 / 35 / 35	24 / 9 / 9	Y / Y / Y
R2	40 / 35 / 35	25 / 12/ 12	Y / Y / Y

Receiver ID	Project Noise Trigger Level Day / Evening / Night dB(A) Leq(15min)	Predicted Results Day / Evening / Night dB(A) Leq(15min)	Comply Y / N
R3	40 / 35 / 35	20 / 9 / 9	Y / Y / Y
R4	40 / 35 / 35	16 / 4 / 4	Y / Y / Y
R5	40 / 35 / 35	19 / 7 / 7	Y / Y / Y
R6	40 / 35 / 35	22 / 9/ 9	Y / Y / Y
R7	40 / 35 / 35	24 / 13 / 13	Y / Y / Y
R8	40 / 35 / 35	26 / 12 / 12	Y / Y / Y
R9	40 / 35 / 35	19 / 9 / 9	Y / Y / Y
R10	38 (internal)	18 / 4/ 4	Y / Y / Y

The sleep disturbance modelled results are provided in Table 4-5.

Table 4-5 Sleep Disturbance Results Lmax dB(A)

Receiver ID	Sleep Disturbance Trigger Level dB(A) Lmax	Predicted Results dB(A) Lmax	Comply Y / N
R1	52	12	Y
R2	52	15	Y
R3	52	12	Y

Receiver ID	Sleep Disturbance Trigger Level dB(A) Lmax	Predicted Results dB(A) Lmax	Comply Y / N
R4	52	7	Y
R5	52	10	Y
R6	52	12	Y
R7	52	16	Y
R8	52	15	Y
R9	52	12	Y
R10	N/A	N/A	N/A

The results of the assessment indicate compliance with project noise trigger levels may be achieved in all assessed situations.

While compliance is expected, it is recommended the construction of the kennels be such that rubber perimeter seals be installed on the doors so that no gaps can be found when the doors are closed.

5. Conclusion

This noise assessment has been undertaken to inform a Development Application (DA) for a new kennel development located at 241 Fishers Hill Road Vacy,

Based on the results and the information provided regarding the development, compliance with all noise goals is expected for the development on neighbouring residences and commercial operators.