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TL417-03F02 Technical memo (r0)

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604 Ourimbah Creek Road, Palm Grove - Revise Noise Assessment for Dog Boarding Facility

1 Introduction

Renzo Tonin & Associates was engaged to reassess the noise impacts from the dog boarding facility at 604 Ourimbah Creek Road, Palm Grove following a Local Planning Panel (LPP) meeting held on 1st October 2020. Following the meeting the LPP decision regarding the noise assessment presented in the previous acoustic report prepared by Renzo Tonin & Associates (ref. TL417-01F02 (r2) Noise Assessment, dated 20 July 2020) was issued as follows:

> *"The Local Planning Panel deferred the consideration of the proposal to allow:*
>
> 1. *Council's Senior Environmental Protection Officer to identify and design the parameters for an acoustic study report that properly addresses the noise impacts of the proposed development. This will identify the shortcomings of the current acoustic report and require measurement of the actual noise currently generated by dogs on the site. This specification is to be provided to the applicant within 7 days of the date of the Panel's decision.*
> 2. *3 weeks from the date the requirements were provided to the applicant, the applicant is to:*
>
> - *Provide an acoustic report undertaken on the design parameters identified by the Council as per 1 above.*
> - *Provide amended plans and information that mitigate and ameliorate the noise impacts on receptors based on the findings of the acoustic report, which includes treatments and a revised plan of management."*

To address Item 1 in the LPP's decision, Central Coast Council's Senior Environmental Protection Officer prepared the following requirements for the acoustic study:

> "*The Acoustic Study Report Specifications are as follows:*
>
> *As the proposal is not considered to be a typical industrial activity where the NPfI can be applied using the LAeq 15MINS, it is recommended that Renzo Tonin & Associates utilise the noise descriptor with a parameter of* ***LA5****. It is considered that this change would capture and be more reflective of the dog breeding/boarding activities currently being used and more reflective in the findings of the predictive modelling.*
>
> *Based on the number of objections to the current proposal, it is recommended that Renzo Tonin & Associates also consider the parameters surrounding the definition of "Offensive Noise" under the Protection of the Environment Operations Act. Consideration has to be given to the concerns raised by the community on how the proposal unreasonably interferes with their amenity, eg frequency, impulsiveness etc and how that may be resolved.*
>
> *The Plan of Management does not provide enough assurance for the monitoring, supervision and stimulation of the dogs, which would prevent excessive barking from occurring.*"

In addition, to address the first dot point of Item 2 in the LPP's decision, this technical memo has been prepared as the acoustic study report.

2 Noise Criteria

In response to Council's requirements, the $L_{A5\ (15min)}$ noise descriptor in lieu of the $L_{Aeq\ (15min)}$ noise descriptor will be used for the assessment. It should be noted that there is currently no guideline, policy, standard, etc that utilises the L_{A5} descriptor as an assessment parameter.

Therefore, the applicable project noise trigger levels, as established in the previous acoustic report and applied to this reassessment, is presented in the following table.

Table 1 – Project Noise Trigger Levels, dB(A)

Receiver Location	$L_{A5\ (15min)}$ Project Noise Trigger Levels		
	Day	Evening	Night
Receiver R1 - 628 Ourimbah Creek Road	40	35	35
Receiver R2 - 654 Ourimbah Creek Road	40	35	35
Receiver R3 - 570 Ourimbah Creek Road	40	35	35
Receiver R4 - 50 Moores Point Lane	40	35	35
Receiver R5 - 20 Moores Point Lane	40	35	35
Receiver R6 - 10 Moores Point Lane	40	35	35

Notes:
1. Assessment based on the L_{A5} descriptor, as per Council's request
2. Monday to Saturday – Daytime 7.00am to 6.00pm; Evening 6.00pm to 10.00pm; Night time 10.00pm to 7.00am
3. On Sundays and Public Holidays – Daytime 8.00am to 6.00pm; Evening 6.00pm to 10.00pm; Night time 10.00pm to 8.00am

3 Source Noise Levels

3.1 Dogs Barking

In order to establish existing noise levels from dogs barking at the facility, attended noise measurements were undertaken at the facility on Friday 23rd October 2020. During the measurements the dogs were located within the outdoor dog kennels / runs and had to be induced to bark to allow barking noise to be measured.

The measured L_{A5} sound pressure level of a dog barking was as follows:

- **1 dog barking = L_{A5} 75dB(A) @ 1 metre**

Based on the above sound pressure level, the following table presents the sound power level of one dog barking (as measured) and the normalised sound power level for 30 dogs barking to represent a maximum of 30 dogs in the outdoor dog kennel / run area or inside the evening house building at any one time.

Table 2 – Summary of Noise Levels from Barking Dogs

Noise Source	Descriptor	Sound Power Level, dB(A) re. 1pW
1 dog barking	L_{A5}	83
30 dogs barking		98

Notes: 1. Based on previous measurements of dogs barking at a similar facility

3.2 Mechanical Plant

As presented in the previous acoustic report the following make, model numbers and associated sound power levels for the two (2) air conditioning units used to service the evening house building were obtained from the manufacturer's specification data.

- Mitsubishi Electric, model no. DXC24ZMA-S: **66dB(A) re. 1pW**
- Mitsubishi Electric, model no. MUZ-GL35VGD: **62dB(A) re. 1pW**

Furthermore, for noise modelling purposes and for a conservative assessment, the "Whirlybirds" proposed to be installed on the roof of the evening house building are assumed to provide no noise attenuation benefits and are considered to be holes in the roof.

4 Predicted Noise Levels

Noise emissions from dogs barking and the mechanical plant were determined by modelling the noise sources, receiver locations, topographical features of the intervening area, buildings and possible noise control treatments using the Cadna-A (version 2020) computer noise modelling program. The program calculates the contribution of each noise source at each specified receptor point and allows for the prediction of the total noise from a site.

The noise prediction models takes into account:

- Location of noise sources and receiver locations
- Height of sources and receivers
- Topographical features of the surrounding area
- Separation distances between sources and receivers
- Ground type between sources and receivers (soft)
- Attenuation from barriers (natural and purpose built)
- Meteorological conditions.

Furthermore, the following adverse meteorological conditions were also considered.

- **Calm & isothermal conditions (acoustically neutral)** – no wind and no temperature inversion
- **Slight to gentle breeze** – 3m/s wind velocity at 10m from ground level between each noise source and each wind affected noise receiver (as per NPfI default wind conditions). Wind direction was based on wind travelling from the source to the receiver.
- **Moderate temperature inversion** – applicable for noise predictions during night time periods only

Noise predictions were based on architectural drawings and mark-ups provided by SJH Planning & Design (Sheet 2, dated 21 January 2020; Sheet A2, dated 16 June 2020; Sheet A1 Revision C, dated 16 October 2020) and the following assumptions:

- Source noise levels for dogs barking and the air conditioner units are based on the data presented in Table 1 and Table 2, respectively;
- The dog boarding facility will accommodate up to 30 dogs at any one time;
- During the day and evening periods dogs are kept in the outdoor dog kennels / runs and moved to the evening house building during the night time period (typical scheduling during daylight saving period);
- As a 'worst case' daytime and evening scenario, all 30 dogs are located outside in the outdoor dog kennels / runs, with all dogs barking at the same time continuously (atypical scenario, which is unlikely to occur);
- As a 'worst case' night time scenario, all 30 dogs are in the evening house building (with all doors closed) and barking at the same time (atypical scenario, which is unlikely to occur); and
- All air conditioner units are operating at full load during the day, evening and night periods (atypical scenario).

Based on the measured noise levels of the dogs barking, the mechanical plant noise level data, the architectural drawings and the above assumptions, noise impacts at the nearest affected receiver locations nominated in the previous acoustic report were predicted and are presented in Table 3 below.

Table 3 – Predicted $L_{A5\ (15min)}$ Noise Levels, dB(A)

Receiver	Period	Project Noise Trigger Levels	Predicted $L_{A5\ (15min)}$ Noise Levels		
			Calm & Isothermal Conditions	Slight to Gentle Breeze[1]	Moderate Temperature Inversion[2]
R1 - 628 Ourimbah Creek Rd	Day	*40*	11	-	-
	Evening	*35*	11	-	-
	Night	*35*	<10	-	<10
R2 - 654 Ourimbah Creek Rd	Day	*40*	19	-	-
	Evening	*35*	19	24	-
	Night	*35*	<10	-	<10
R3 - 570 Ourimbah Creek Rd	Day	*40*	32	-	-
	Evening	*35*	32	-	-
	Night	*35*	20	24	24
R4 - 50 Moores Point Ln	Day	*40*	19	-	-
	Evening	*35*	19	-	-
	Night	*35*	<10	-	14
R5 - 20 Moores Point Ln	Day	*40*	22	-	-
	Evening	*35*	22	-	-
	Night	*35*	12	-	17
R6 - 10 Moores Point Ln	Day	*40*	25	-	-
	Evening	*35*	25	-	-
	Night	*35*	13	-	18

Notes:
1. Slight to gentle breeze (ie. adverse wind) conditions only applicable to Receivers R2 and R3 for the evening and night periods, respectively, as per Section 4.2 of the previous acoustic report
2. Moderate temperature inversion conditions only applicable for night time periods
3. 'Worst case' scenario – assuming all 30 dogs barking within the outdoor dog kennels / runs and/or in the evening house building, and the two air conditioner units are operating at full load. This is unlikely to occur in practice.

The results in the above table show that noise from the operation of the dog boarding facility will comply with previously established project noise trigger levels at all receiver locations during all meteorological conditions for the day, evening and night periods.

Furthermore, to address the community's concern and Council's requirement for consideration of impulsive noise from dogs barking, a 5dB(A) correction is applied to the predicted $L_{A5\ (15min)}$ noise levels, which is usually applied to L_{Aeq} noise levels. It is noted that the NSW Environment Protection Authority (EPA) recognises that impulsive noise is not considered to be an annoying characteristic. This is evident in the omission of the modifying factor correction for impulsive noise in Fact Sheet C of the NSW 'Noise Policy for Industry' (NPfI, 2017).

Notwithstanding, the corrected predicted $L_{A5\ (15min)}$ noise level at Receiver R3 during the evening period would be 37dB(A), which is 2dB(A) above the project noise trigger level of 35dB(A). However, it is noted that up to a 2dB(A) exceedance is considered to be negligible and is not discernible or noticeable to the average person, as described in Table 4.1 and Table 4.2 of the NPfI. Therefore, the predicted noise levels at all receivers are determined to be acceptable.

5 Conclusion

Renzo Tonin & Associates has completed a reassessment of the environmental noise impact from the proposed dog boarding facility at 604 Ourimbah Creek Road, Palm Grove following the LPP's decision regarding the noise assessment presented in the previous acoustic report.

To address the LPP's decision and Council's acoustic study specifications, noise measurements of existing noise from dogs barking at the facility was undertaken and results have been used in the remodelling of noise impacts to nearby affected receivers. The reassessment of the noise impact from the operation of the dog boarding facility was predicted to comply with the established project noise trigger levels during the day, and evening periods and during all meteorological conditions.

Furthermore, impulsive noise from the dogs barking and the applicable correction were considered, although not a requirement in the NPfI. The corrected predicted noise level at one receiver location during the evening period was 2dB(A) above the project noise trigger level, which in accordance with the NPfI, is negligible and not discernible or noticeable to the average person.

Therefore, the operation of the dog boarding facility is determined to be in compliance with the specifications issued by Central Coast Council and addresses the requirements of the LPP's decision.

Document Control

Date	Revision history	Non-issued revision	Issued revision	Prepared	Instructed	Reviewed / Authorised
05/11/2020	Generate technical memo	0	1	M. Chung	-	W. Chan

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APPENDIX A Glossary of Terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment period	The period in a day over which assessments are made.
Assessment point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of every day sounds: 0dB The faintest sound we can hear 30dB A quiet library or in a quiet location in the country 45dB Typical office space. Ambience in the city at night 60dB CBD mall at lunch time 70dB The sound of a car passing on the street 80dB Loud music played at home 90dB The sound of a truck passing on the street 100dB The sound of a rock band 115dB Limit of sound permitted in industry 120dB Deafening
dB(A)	A-weighted decibels. The A- weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies.
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L_{Max}	The maximum sound pressure level measured over a given period.
L_{Min}	The minimum sound pressure level measured over a given period.

L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_5	The sound pressure level that is exceeded for 5% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
L_{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.