



13SYA0001 R01
Cranebrook Lake West, Castlereagh Road, Cranebrook
Acoustic Assessment for Subdivision

Penrith Lakes Development Corporation

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1. Executive Summary

Soundmatters has been engaged by Penrith Lakes Development Corporation (PLDC) to carry out an acoustic assessment for a development application of the site at Cranebrook Lake West that is subject to a proposed subdivision into seven lots.

Road traffic noise from Castlereagh Road is the only significant source of noise that affects the proposed site.

Unattended and attended noise measurements were undertaken on the site between 8th and 15th October 2013. The existing noise levels are significantly below the applicable *NSW Road Noise Policy* criteria, even when assuming a doubling of road traffic volume, which is considered highly unlikely.

Providing care is taken during the design and space planning of any new residences on the site, then the internal noise criterion given in Clause 102 of the Infrastructure *State Environmental Planning Policy (SEPP)* is expected to be met using typical construction methods and materials.

2. Introduction

2.1. Background

TTM Soundmatters Consulting has been engaged by Penrith Lakes Development Corporation (PLDC) to undertake an acoustic assessment with regard to the proposed subdivision of land at Farrells Lane, Cranebrook Lake West into seven residential lots. It is understood that a Development Application (DA) will be lodged with Penrith City Council and this acoustic assessment will form part of the DA documentation.

2.2. Scope

This report identifies and assesses potential noise impacts on the proposed subdivision from the local environment and potential noise impacts on the environment from the subdivision. To appropriately assess any likely adverse acoustic impacts this report has considered:

1. Background noise levels;
2. relevant noise criteria to assess noise sources against;
3. existing and future traffic flows on Castlereagh Road;
4. existing noise mitigation and site conditions; and
5. practical and appropriate noise mitigation where required.

3. Site

3.1. Location and Description

The site is named by PLDC as the 'Cranebrook Lake West Lot Disposal' at consists of seven proposed lots on land situated between Farrells Lane to the North and the new Castlereagh Road to the West as shown in Figure 1. Residences off Sardam Avenue to the east and open ground to the south.

Castlereagh Road is elevated above the proposed site by approximately 4m, but is also largely hidden from view behind an earth bund and approximate 2.5m high barrier. The road barrier and bund were designed to mitigate traffic noise from the new Castlereagh Road, which was completed a few years ago.

The other side of Castlereagh Road is currently occupied by Penrith Lakes Development Corporation who are engaged in quarrying activities. However, these activities are due to finish in 2015/16 when the Penrith Lakes site is developed into residential and leisure uses. This subdivision is part of that proposed PLDC scheme.

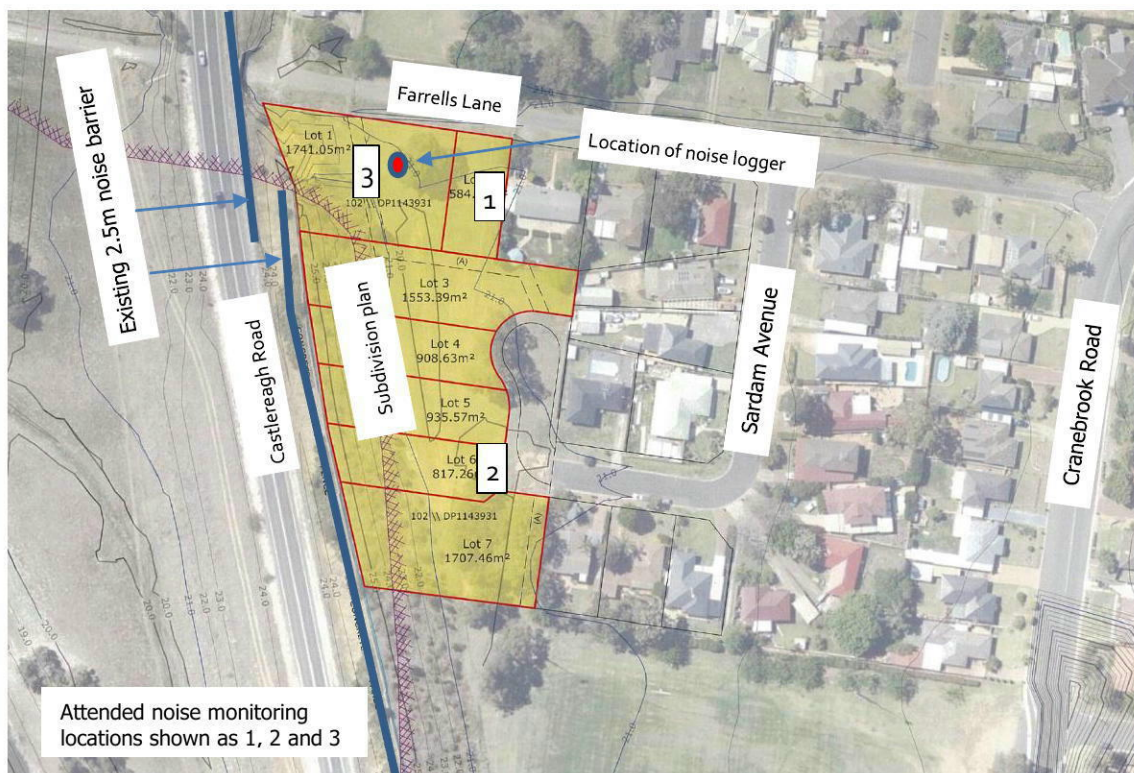


Figure 1: Site location

4. Noise Measurements

4.1. Existing Acoustic Environment

Traffic noise from Castlereagh Road is the dominant noise source on the proposed subdivision site. Other noise sources include natural sources such as birds and the rustle of leaves during the wind. Occasional noise from trucks and equipment on the PLDC site across the road is also audible. However, this noise will not exist when the PLDC's activities cease on the site in 2015/16 and residences are occupied on the proposed subdivision. Therefore, noise impact from this source has not been considered.

4.2. Measurements

Unattended noise measurement were recorded for a period of seven consecutive days at a representative worst case location on the site, see Figure 1. This site was chosen as it the most exposed area of the site to traffic noise from Castlereagh Road.

Average, maximum and statistical noise parameters were recorded at 15 minute intervals. Where appropriate recorded noise levels affected by adverse weather have been removed from this assessment.

The unattended noise levels have been presented as 'average hourly' weekday and weekend noise levels in Figure 2 and Figure 3. These Figures provide a convenient way of looking at noise levels impacting the site during the week and weekend periods where different traffic patterns exist.

Attended noise measurements were also taken on-site to verify and supplement the unattended noise logger data. These are presented in Figure 2 and Figure 3. All measurements were taken generally in accordance with AS1055¹.

¹ AS 1055 - Description and measurement of environmental noise

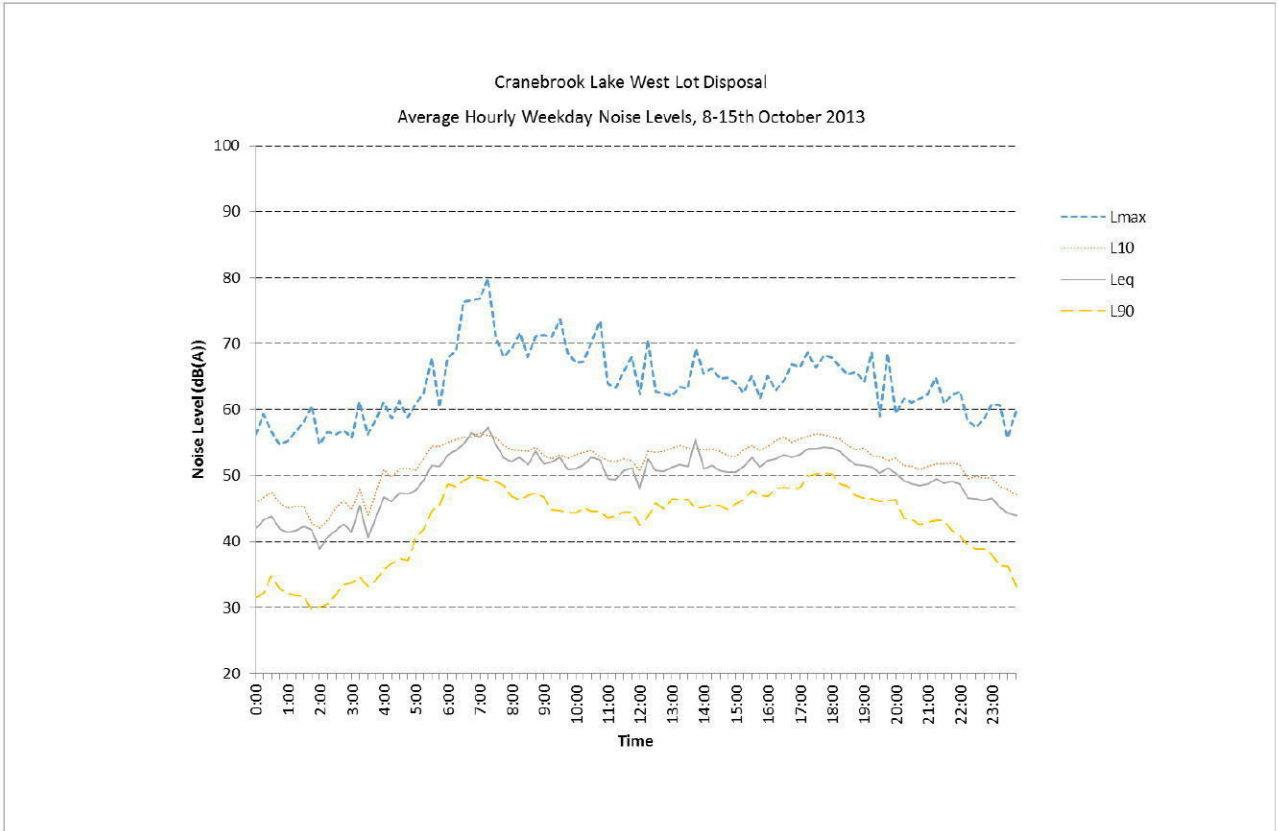


Figure 2: Average Hourly Weekday Noise Levels on Lot 2 of Subdivision

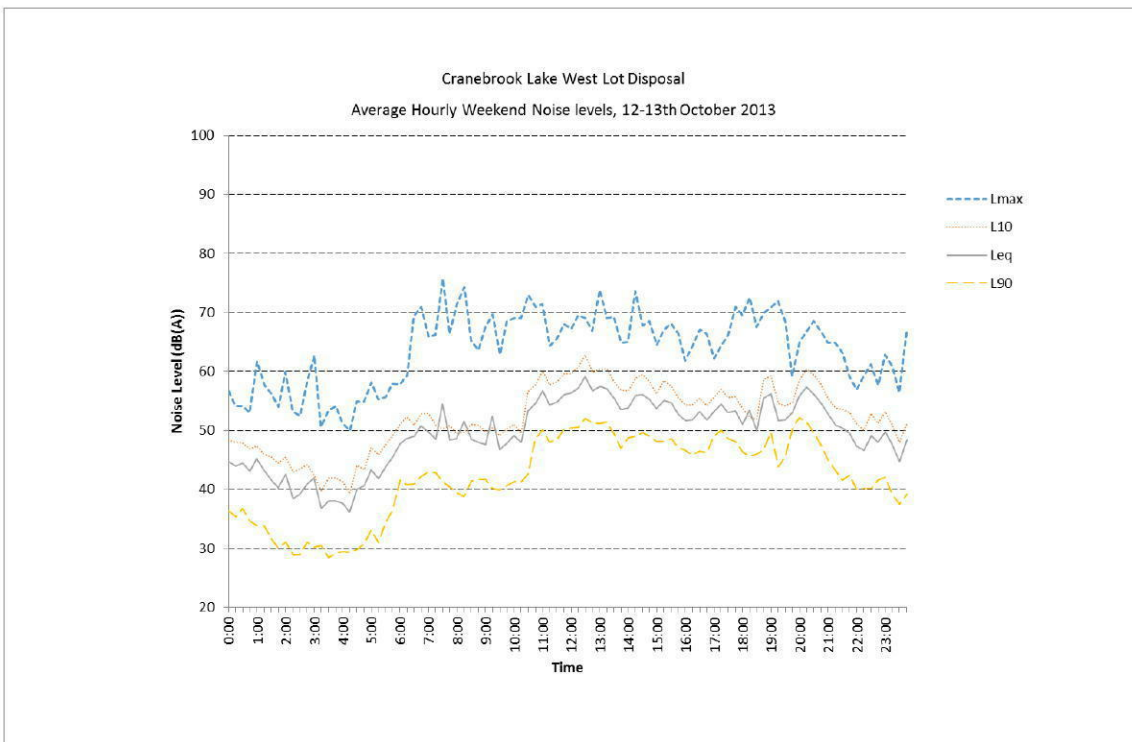


Figure 3: Average Hourly Weekend Noise Levels on Lot 2 of Subdivision

Location	Date	Time	L _{Aeq} dB	L _{A10} dB	L _{A90} dB	L _{Amax} dB	Comments
1	8/10/13	13:00 - 13:15	50	53	46	61	Traffic noise dominant and truck exhausts sometimes visible above barrier along bridge
2	8/10/13	13:35 - 13:50	49	52	44	58	Traffic noise dominant but not visible above barrier
3	8/10/13	14:00 - 14:15	52	54	48	67	Beside logger. Noise from rustle in trees, including L _{Amax}
3	15/10/13	11:45 - 12:00	46	49	38	54	Traffic dominant. No noise from wind in trees and L _{Amax} from truck exhaust

Table 1: Attended noise measurements on-site

5. Noise Criteria

5.1. NSW Department of Planning - Development near Rail Corridors and Busy Roads – Interim Guideline

The *Department of Planning - Development near Rail Corridors and Busy Roads – Interim Guideline*, must be taken into account under Clause 102 of the *State Environmental Planning Policy (SEPP) for Infrastructure, 2007*.

Clause 102 requires that residential and other specified developments on land adjacent to a road with an annual average daily traffic volume of more than 40,000 vehicles and the consent authority considers it likely to be adversely affected by road noise or vibration.

For Clause 102 (road) the following internal noise levels are not to be exceeded:

- 35 dB L_{Aeq} in any bedroom in the building at between 10pm-7am
- 40 dB L_{Aeq} anywhere else in the building (other than a garage, kitchen, bathroom or hallway) at any time.

5.2. NSW Road Noise Policy

The *NSW Road Policy* states the following noise criteria for residential land uses close to sub-arterial roads, which Castlereagh Road is considered to be for this assessment.

Road category	Type of land use	Assessment criteria dB(A)	
		Day (7am – 10pm)	Night (10pm -7am)
Freeway/arterial/ sub-arterial roads	Existing residences affected by noise from redevelopment of existing freeway/arterial/sub-arterial roads	$L_{Aeq,15hour}$ 60 (external)	$L_{Aeq,9hour}$ 55 (external)

Table 2: External noise criteria

The *NSW Road Policy* also provides additional considerations of a noise criterion for the passive use of open space for contemplative activities. This is considered to be appropriate noise criteria for back yards and gardens.

Existing sensitive land use	Type of land use	Assessment criteria dB(A)	
		Day (7am – 10pm)	Night (10pm -7am)
Open space (passive use)	Passive use is characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, e.g. playing chess and reading	$L_{Aeq,15hour}$ 55 (external) When in use	-

Table 3: Noise criteria for the passive use of open space

6. Assessment of noise affecting the development subdivision

Road traffic noise from Castlereagh Road is the only significant noise source impacting the Cranebrook Lane West proposed subdivision. Noise from Cranebrook Road and Farrells Lane is insignificant due to the low volumes of traffic using them.

Another minor noise source is from the trucks and plant operating on the existing Penrith Lake quarry. However, operations on the quarry are due to cease in 2015/16 when the whole site will be rezoned into residential and recreational use. Therefore, this source of noise is not relevant to future housing on the Cranebrook Lake West site and has not been assessed.

The only other sources of noise are natural, such as birds and insects.

This assessment will therefore focus on the road traffic noise from Castlereagh Road.

6.1. Road traffic noise

Castlereagh Road has been redeveloped and realigned in recent years and no major changes are expected other than two new intersections proposed for future housing on the Penrith Lakes site. As part of the realignment an earth noise bund and approximately 2m high concrete noise barrier was constructed to protect the residents currently living on Farrells Lane and Sardam Avenue. This has already reduced noise levels on the proposed subdivision site.

$L_{Aeq,15hour}$ and $L_{Aeq,9hour}$ noise levels affecting the proposed subdivision site were measured from 8th-15th October 2013. These are given in Table 4 below and compared directly against the *Road Noise Policy* criteria.

Date	Measured Noise Levels dB(A)		Assessment criteria dB(A)		Meets Criteria? ✓/✗	
	Day (7am – 10pm) $L_{Aeq,15hour}$ (external)	Night (10pm - 7am) $L_{Aeq,9hour}$ (external)	Day (7am – 10pm) $L_{Aeq,15hour}$ (external)	Night (10pm - 7am) $L_{Aeq,9hour}$ (external)	Day (7am – 10pm) $L_{Aeq,15hour}$ (external)	Night (10pm - 7am) $L_{Aeq,9hour}$ (external)
Weekday average	52	46	60	55	✓	✓
Weekend average	54	44			✓	✓
Overall average	53	45			✓	✓

Table 4: Existing measured road traffic noise levels versus Road Noise Policy criteria

Table 4 shows that the external noise criteria is met already on the site with no further noise control required. The existing traffic noise affecting the site is 8 dB(A) and 6 dB(A) below the

daytime criterion and 9 dB(A) and 11dB(A) below the night time criterion for weekday and weekends respectively.

Table 5 below shows existing and future predicted traffic flows to 2015 on Castlereagh Road taken from an Arup automated traffic count in May 2012. TTM has assumed a 3% growth per annum in traffic along Castlereagh Road as a typical growth factor where some development takes place.

Road	Existing 2012/2013	2013/2014 1 year	2014/2015 2 years	2022/2023 10 years
	Average Weekday Traffic	Average Weekday Traffic	Average Weekday Traffic	Average Weekday Traffic
Castlereagh Road (North of Nepean Street)	18,343* including 7% Heavy Goods Vehicles	18,893*	19,460*	24,651 [#]

Table 5: Forecast traffic volumes on Castlereagh Road (North of Nepean Street)

* Does not include the projected increase in HGV's due to PLDC's Virgin Excavated Natural Material programme as part of the Penrith Lakes remediation program, as this will be complete by the time any new buildings on the Cranebrook Lake West site are ready for occupation.

Represents an approximate 25% increase in traffic volume in 10 years.

In 10 years' time the projected increase in traffic flow will be approximately 25%. This equates to an increase in noise of approximately 1.3 decibels. This increase in noise will be typically unnoticeable to the average person and the overall traffic noise levels will still be significantly under the criteria. Therefore, a traffic noise impact is not expected on the site.

6.1.1. Internal noise for future residences

Given the existing low traffic noise impact on the site the internal noise criteria for future residential buildings on the site given by Clause 102 of the *Infrastructure SEPP* is expected to be met with typical construction methods and materials.

6.1.2. Sleep Disturbance

It was noted whilst on-site that some trucks were visible above the noise bund and barrier as they passed over Farrells Lane in the northwest corner of the site. Their exhausts were at high level and consequently also visible and clearly audible.

Sleep disturbance is complex and can be affected by average noise levels through the night, but also maximum noise levels by individual truck pass-bys and the number of pass-by events. However, the 35 dB L_{Aeq} in bedrooms criterion given by Clause 102 of the *Infrastructure SEPP* is consistent with that recommended by the World Health Organisation (WHO) and providing it can be met during construction, sleep disturbance is unlikely to be an issue for most people.

Noise measurements of truck by passes were carried out on site adjacent to the noise logger location, which is considered to represent a worst case location and where likely building footprints could be. These are presented in Table 6

Location	Duration (seconds)	L _{Aeq} dB	L _{Amax} dB
Beside noise logger	7	58	61
	5	53	57
	6	58	62

Table 6 Truck pass-by noise measurements

Providing windows and doors are closed then the internal noise criteria for future residential buildings can be met with typical building methods and materials.

6.1.3. Passive use of open space

There is no criteria specifically for gardens and back yards. However, the *NSW Road Noise Policy* recommends a criterion of 55dB L_{Aeq,15hour} the passive use of open space for quiet activities such as reading. This considered an appropriate criterion for gardens and backyards.

Table 4: Existing measured road traffic noise levels versus Road Noise Policy criteria shows that this is also met by the existing traffic noise levels on the site.

7. Recommendations

The relevant noise criteria for the site is expected to be met for traffic noise impact on the site and providing care and attention to noise impact is considered during the design of the building the internal noise criteria is also expected to be met.