

MANAGING DIRECTORS

MATTHEW PALAVIDIS
VICTOR FATTORETTO

DIRECTORS

MATTHEW SHIELDS
BEN WHITE



Lot 3008, Lord Sheffield Circuit, North Penrith

Noise Impact Assessment

SYDNEY

A: 9 Sarah St Mascot NSW 2020

T: (02) 8339 8000

F: (02) 8338 8399

SYDNEY MELBOURNE BRISBANE CANBERRA

LONDON DUBAI SINGAPORE GREECE

ABN: 11 068 954 343

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1 INTRODUCTION

Acoustic Logic Consultancy (ALC) have been engaged for the acoustic assessment of noise impacts associated with the proposed residential development to be located at Lot 3008, DP1184498 Penrith.

Noise impacts addressed in this assessment include:

- Rail noise and vibration impacts from the Main Western Rail Line;
- Noise impacts from commercial on the Ground floor of the development. Noise impacts are discussed in principle only and will be subject to individual use applications;
- Noise impacts from mechanical plant.

Noise impacts have been addressed in accordance with:

- Penrith City Council DCP 2014
- Environment Protection Authority (EPA) Industrial Noise Policy.

Predicted noise levels from the operation of the facility as presented in this report indicate that the proposed development can comply with the aforementioned authorities and regulations for all periods of the day, evening and night.

2 SITE LOCATION AND PROPOSAL

The proposed site is to be located on Lot 3008, DP1184498 which is situated along the Lord Sheffield Circuit, Penrith.

2.1 SURROUNDING USES

The site is surrounded via the following land uses:

- Mixed use retail/residential development to the east at 81 Lord Sheffield Circuit.
- Mixed use retail/residential development to the north at 101 Lord Sheffield Circuit.
- Carparking across vacant allotments to the west.
- Penrith rail station to the south.

Refer to Figure 1 for surrounding uses.

2.2 SITE PROPOSAL

The proposal includes the provision for the following uses:

- Ground level retail;
- Level 1 and 2 parking;
- Level 3 - 8 of residential apartments.



Figure 1: Site Survey and Monitoring Positions

3 EXISTING ACOUSTIC ENVIRONMENT

Acoustic monitoring has been previously conducted at the site to establish the background noise levels which will be used as basis for this assessment.

3.1 ENVIRONMENTAL NOISE DESCRIPTORS

Environmental noise constantly varies. Accordingly, it is not possible to accurately determine prevailing environmental noise conditions by measuring a single, instantaneous noise level.

To accurately determine the environmental noise a 15-20 minute measurement interval is utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters.

In analysing environmental noise, three-principle measurement parameters are used, namely L_{10} , L_{90} and L_{eq} .

The L_{10} and L_{90} measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement intervals.

The L_{10} parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the 15 minute period. L_{eq} is important in the assessment of environmental noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of environmental noise.

3.2 BACKGROUND NOISE LEVELS

Background noise levels which will be used as a basis for this assessment are detailed in the following sections.

3.2.1 Measurement Equipment

Unattended noise monitoring was conducted using an Acoustic Research Laboratories noise monitor. The monitor was programmed to store 15-minute statistical noise levels throughout the monitoring period. The monitor was calibrated at the beginning and end of the measurement period using a RION NC-73 sound level calibrator with no significant drift detected. All noise measurements were taken on A-weighted fast response mode.

Attended noise measurements were obtained using a Norsonic 140 Sound Level Analyser, set on A-weighted fast response. The sound level meter was calibrated before and after the measurements using a Norsonic 1251 Sound Level Calibrator. No significant drift was recorded.

3.2.2 Measurement Period and Location

Unattended noise monitoring was conducted from 6-12 October 2015 at the location indicated in Figure 1.

3.2.3 Background Noise Levels

Measured background noise levels are presented below. Refer to Appendix 1 for noise logging data.

Table 1 – Rating Background Noise Levels

Location	Period/Time	Background Noise Level dB(A) L ₉₀
Monitor location	Day (7am-6pm)	58
	Evening(6pm-10pm)	52
	Night(10pm-7am)	47

4 RAIL NOISE ASSESSMENT

4.1 RAIL NOISE CRITERIA

4.1.1 Penrith City Council

Rail noise impact has been addressed in accordance with Section 12.2 of the Penrith Development Control Plan 2014 which nominates the following controls.

1) **Rail noise and vibration**

- a) *The siting and design of developments on land sited on, or within, 80m of an operating rail corridor or land reserved for the construction of a railway line is to address the matters raised in the Development Near Rail Corridors and Busy Roads – Interim Guideline (Department of Planning, 2008) and, where appropriate, incorporate any recommendations into the design of the development.*
- b) *Council will not grant consent to residential development, residential subdivision or other sensitive land uses on land in the vicinity of a rail corridor unless it complies with the relevant standards and criteria set by the EPA and Department of Planning, as well as any relevant Australian Standards.*
- c) *Council will not grant consent to any development which potentially has sensitive occupancies (such as residential, office or laboratory premises) and is proposed to be constructed within 20m of the rail line unless an assessment of the vibration impacts from the rail line has been carried out. This is to be undertaken by a recognised acoustic consultant to demonstrate that the impact of vibration from the rail corridor will not significantly impact upon the future occupants of the development.*
- d) *Sensitive land uses subject to rail noise and vibration criteria referred to in (b) above include educational establishments (including schools), places of public worship, hospitals, nursing homes, mixed use development, offices/workplaces, and passive and active recreation areas.*

ALC note that the nearest point of the development (that being the southern corner) is 85m from the nearest operating rail line and does not require further assessment to comply with the noise requirement in Section 12.2-C1(a) and vibration requirement of 12.2-C1(c).

4.1.2 NSW SEPP Infrastructure (2007)

The State Environmental Planning Policy (Infrastructure) 2007 (the 'Infrastructure SEPP') includes requirements for potential noise impacts on sensitive development from rail and road noise and vibration. For rail noise and vibration, the following controls apply:

“87 Impact of rail noise or vibration on non-rail development

- (1) *This clause applies to development for any of the following purpose that is on land in or adjacent to a rail corridor and that the consent authority considers is likely to adversely affected by rail noise or vibration:*
 - (a) *a building for residential use,*
 - (b) *a place of public worship,*
 - (c) *a hospital,*
 - (d) *an educational establishment or child care centre.*
- (2) *Before determining a development application for development to which this clause applies, the consent authority must take into consideration any guidelines that are issued by the Director-General for the purpose of this clause and published in the Gazette.*
- (3) *If the development is for the purposes of a building for residential use, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceed:*
 - (a) *in any bedroom in the building – 35 dB(A) at any time between 10.00 pm and 7.00 am,*
 - (b) *anywhere else in the building (other than a garage, kitchen, bathroom or hallway) – 40 dB(A) at any time.”*

The Department of Planning ‘Development near Rail Corridors and Busy Roads – Interim Guideline’ is the document nominated by the Director General for the purposes of Clause 87(2) of the State Environment Planning Policy (SEPP) Infrastructure 2007.

Figure 3.1 below from the interim guideline provides minimum distances from the rail line for determining whether a development requires assessment

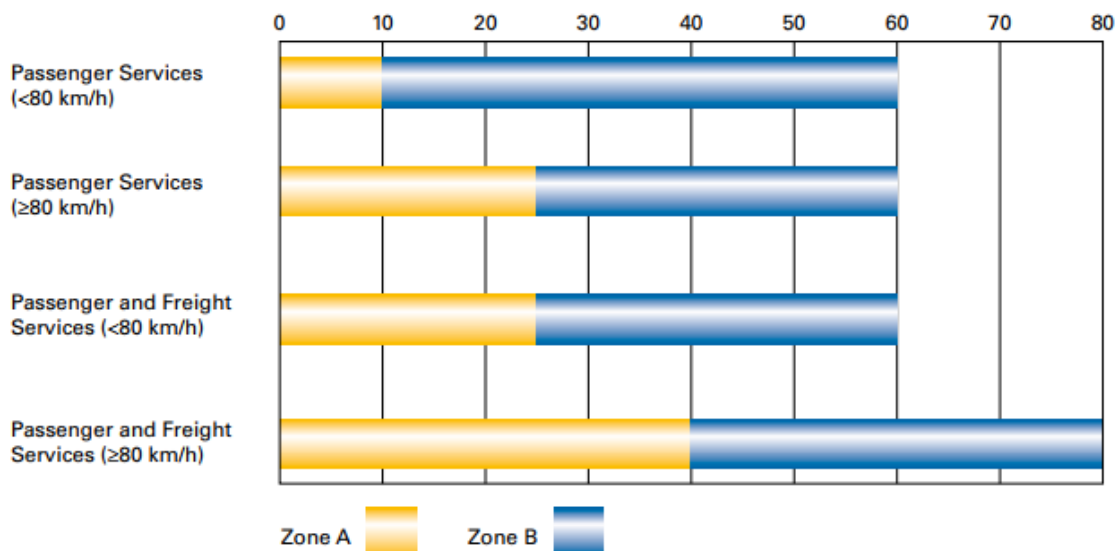


Figure 3.1: Acoustic Assessment Zones based on distance (m) of noise-sensitive development from operational track (not corridor)

The development is in excess of 80m from the rail line and as such does not require any further acoustic assessment to satisfy the requirements of the Infrastructure SEPP.

5 ASSESSMENT OF OPERATIONAL NOISE IMPACTS

5.1 NOISE EMISSION CRITERIA

Noise emissions from the site have been assessed in accordance with the Penrith City Council DCP 2014.

5.1.1 Penrith City Council DCP

Criteria to govern noise emanating from the operation of the site has been adopted from Section C12.4 of the Penrith City Council DCP which requires the following:

C. Controls

1) General

- a) *Council will not grant consent to any noise generating industrial development, commercial development or licensed premises unless it can be demonstrated that:*
 - i) *The development complies with the relevant State Government authority or agency standards and guidelines for noise, as well as any relevant Australian Standards;*
 - ii) *The development is not intrusive (as defined in the EPA's Industrial Noise Policy);*
 - iii) *Road traffic noise generated by the development complies with the provisions of Section 12.1 Road Traffic Noise of this Section;*
 - iv) *The development complies with rail noise and vibration criteria (refer Section 12.2 Rail Traffic Noise and Vibration of this Section); and*
 - v) *The development does not adversely impact on the amenity of the area or cause sleep disturbance.*

5.1.2 EPA - Industrial Noise Policy

The INP provides guidelines for assessing noise impacts from industrial developments. The recommended assessment objectives vary depending on the potentially affected receivers, the time of day, and the type of noise source. The INP has two requirements which both must be complied with, namely an amenity criterion and an intrusiveness criterion.

Intrusiveness Criterion

The guideline is intended to limit the audibility of noise emissions at residential receivers and requires that noise emissions measured using the L_{eq} descriptor not exceed the background noise level by more than 5 dB(A).

Rating background noise levels for the area have been established from long term unattended noise monitoring as detailed in Section 3.2. Intrusive criteria based on the noise monitoring conducted at the site are detailed in Table 2.

Table 2 – INP Intrusiveness Criteria

Time of day	Background Noise Level dB(A)_{L90}	Intrusiveness Criteria (Background+5dB(A)) dB(A)_{Leq}
Day	58	63
Evening	52	58
Night	47	52

Amenity Criterion

The guideline is intended to limit the absolute noise level from all noise sources to a level that is consistent with the general environment. The Industrial Noise Policy sets out acceptable noise levels for various land uses. Table 2.1 on Page 16 of the policy has four categories to distinguish different residential areas. They are rural, suburban, urban and urban/industrial interface.

Pursuant to Section 2.2.1 of the INP, ‘Suburban’ and ‘Urban’ are defined as areas which have acoustical environments which incorporate the following characteristics.

Suburban - An area that has local traffic with characteristically intermittent traffic flows or with some limited commerce or industry. This area often has the following characteristics:

- Decreasing noise levels in the evening period (1800-2200); and/or
- Evening ambient noise levels defined by the natural environment and infrequent human activity.

Urban - an area with an acoustical environment that:

- Is dominated by ‘urban hum’ or industrial source noise
- Has through traffic characteristically heavy and continuous traffic flows during peak periods
- Is near commercial districts or industrial districts
- Has any combination of the above,

Where ‘urban hum’ means the aggregate sound of many unidentifiable, mostly traffic-related sound sources.

ALC would determine the acoustic environment in the immediate vicinity of the site as ‘Urban’ given that the acoustic environment would not be defined by the natural environment and infrequent human activity.

The corresponding Amenity Criteria noise emission goals are presented below.

Table 3 – INP Amenity Acceptable Noise Levels

Type of Receiver	Indicative Noise Amenity Area	Time of day	Recommended Acceptable Noise Level dB(A) L_{eq}
Residence	Urban	Day	60
		Evening	50
		Night	45
Commercial premises	All	When in use	65

5.2 NOISE EMISSION ASSESSMENT

5.2.1 Noise Associated with Commercial Uses

The use of the retail tenancies on the ground floor is currently unknown. On this basis, noise associated with ground level retail uses will be assessed via individual use applications. It is expected that:

- Retail outlets (excluding food and beverage with external seating) will have negligible acoustic impact on surrounding uses.
- Licensed restaurants tenancies with patrons sitting along Lord Sheffield Circuit should be assessed on a case by case basis. Awnings may be required to inhibit direct line of site to patrons. Licensed tenancies may require that a noise impact assessment be conducted as part of the licensing agreement in accordance with the NSW Liquor and Gaming noise emission requirements.

5.2.2 Noise from Increased Traffic Generation on Public Streets

For land use developments with the potential to create additional traffic on public streets the development should comply with the EPA Road Noise Policy.

It is expected that Lord Sheffield Circuit was designed with consideration to the uses that would be adjoining it, that being mixed use residential and commercial use. Given the development falls within this use and is not likely to generate significant vehicle movements, noise impacts associated with traffic generated by the site would be acoustically acceptable.

5.2.3 Noise from Mechanical plant

Detailed acoustic design of mechanical plant cannot be undertaken at approval stage, as plant selections and locations are not finalised.

Cumulative assessment of both plant noise with other noise sources is recommended when conducting acoustic design of plant items.

Compliance with INP acoustic criteria as set out in Section 5 will be achievable, provided that detailed acoustic review of plant items is undertaken once plant is selected.

6 CONSTRUCTION IMPACTS

This section presents processes to manage noise and vibration impacts associated with the proposed construction activities for the facility and the potential for noise and vibration impact to surrounding receivers.

The principal issues to be addressed in this Section are:

- Identification of the noise and vibration standards which will be applicable to this project.
- Formulation of an in principle strategy for the minimisation of construction related noise and vibration.

The expected activities can be expected to include:

1. Detailed excavation and site preparation works.
2. Piling works for footings.
3. Formwork and concrete pours.
4. Façade and fitout works.

6.1 CONSTRUCTION NOISE MANAGEMENT LEVELS

Noise emanating from the construction site has been assessed in accordance with the recommendations of the EPA *Interim Construction Noise Guideline*.

The guideline reflects on feasible and reasonable mitigation strategies, management controls and public liaising in the effort to reach realistic compromises between construction sites and potential noise affected receivers.

Table 4 – Construction Noise Management Levels

Management level, LAeq (15min)	How to apply
Noise affected RBL + 10dB	<p>The noise affected level represents the point above which there may be some community reaction to noise.</p> <ul style="list-style-type: none"> • Where the predicted or measured LAeq (15 min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. • The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.

Management level, L_{Aeq} (15min)	How to apply
Highly noise affected 75 dB(A)	<ul style="list-style-type: none"> The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: <ol style="list-style-type: none"> times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences) if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.

Section 4.1.2 of the ICNG provides guidance on construction noise management levels for sensitive uses other than residential dwellings. These uses as detailed in the following Table.

Table 5 – Construction Noise Management Levels

Land Use	Management level, L_{Aeq} (15min) (applies when properties are being used)
Commercial Development	70dB(A)

A summary of noise emission goals for standard hours of construction are presented below.

Table 6 – Construction Noise Emission Objectives

Location	“Noise Affected” Level dB(A) L_{eq} (15min)	“Highly Noise Affected” Level dB(A) L_{eq} (15min)
Residences	68 (Standard Construction Hours)	75
Commercial Development	70	N/A

6.2 CONSTRUCTION VIBRATION

Vibration goals for the amenity of nearby land users are those recommended by the EPA document *Assessing Vibration: A technical guideline*. These levels are presented below:

Table 7 – Construction Vibration Objectives

Location	Time	Peak velocity (mm/s)	
		Preferred	Maximum
Continuous Vibration			
Residences	Daytime	0.28	0.56
Commercial	When in use	0.56	1.12
Impulsive Vibration			
Residences	Daytime	8.6	17
Commercial	When in use	18	36

6.3 CONSTRUCTION NOISE AND VIBRATION MANAGEMENT STRATEGY

Noise impacts on nearby development will be dependent on the activity and where on the site the activities will be undertaken.

We note that a detailed construction noise management plan is generally not practical at the development application stage as no contractor is engaged and no equipment schedule or site operations methodologies (locations of equipment, truck routes, timetabling) will be available.

For this reason, detailed construction noise and vibration management plans are typically prepared at CC stage, when upon the contractor has been engaged. In this regard, practical and reasonable acoustic treatments and management strategies may be applied.

Notwithstanding above, the general process in the formulation of a suitable construction noise and vibration strategy will typically entail the following:

- On completion of the construction program, acoustic review of proposed construction activities and plant/methods should be undertaken to identify work items likely to exceed NSW EPA guidelines.
- For those activities likely to generate high noise and vibration levels, the analysis should identify where on site the activities are likely to generate high noise levels. This will then assist in determining the likely time period for which high noise levels will occur.
- Identify feasible acoustic controls or management techniques (use of screens, scheduling of noisy works, notification of adjoining land users, respite periods) when excessive levels may occur.
- For activities where acoustic controls and management techniques still cannot guarantee compliant noise levels, implement a notification process whereby nearby development is made aware of the time and duration of noise intensive construction processes.

Through adoption of the above, noise impacts on nearby development can be suitably managed to prevent excessive impact.

7 CONCLUSION

Noise emissions associated with the proposed mixed-use development to be located at Lot 3008, DP1184498 Penrith has been assessed. In this regard;

- Noise intrusion into the development has been assessed. No additional measures are required to comply with the requirements of the Penrith City Council DCP.
- An analysis of typical operational noise (commercial uses, vehicles, mechanical equipment) indicates that the site is capable of complying with relevant noise emission criteria.
- Detailed acoustic review of mechanical plant will be undertaken once the design is further progressed (plant selections finalised etc.).
- A discussion of construction noise and vibration has been included. A detailed noise and vibration management plan may be determined as part of the construction certificate phase to ensure that acoustic impacts associated with the construction of the development are minimised as practically possible.

On this basis, ALC confirm that the development will comply with the acoustic requirements of Penrith City Council.

We trust this information is satisfactory. Please contact us should you have any further queries.

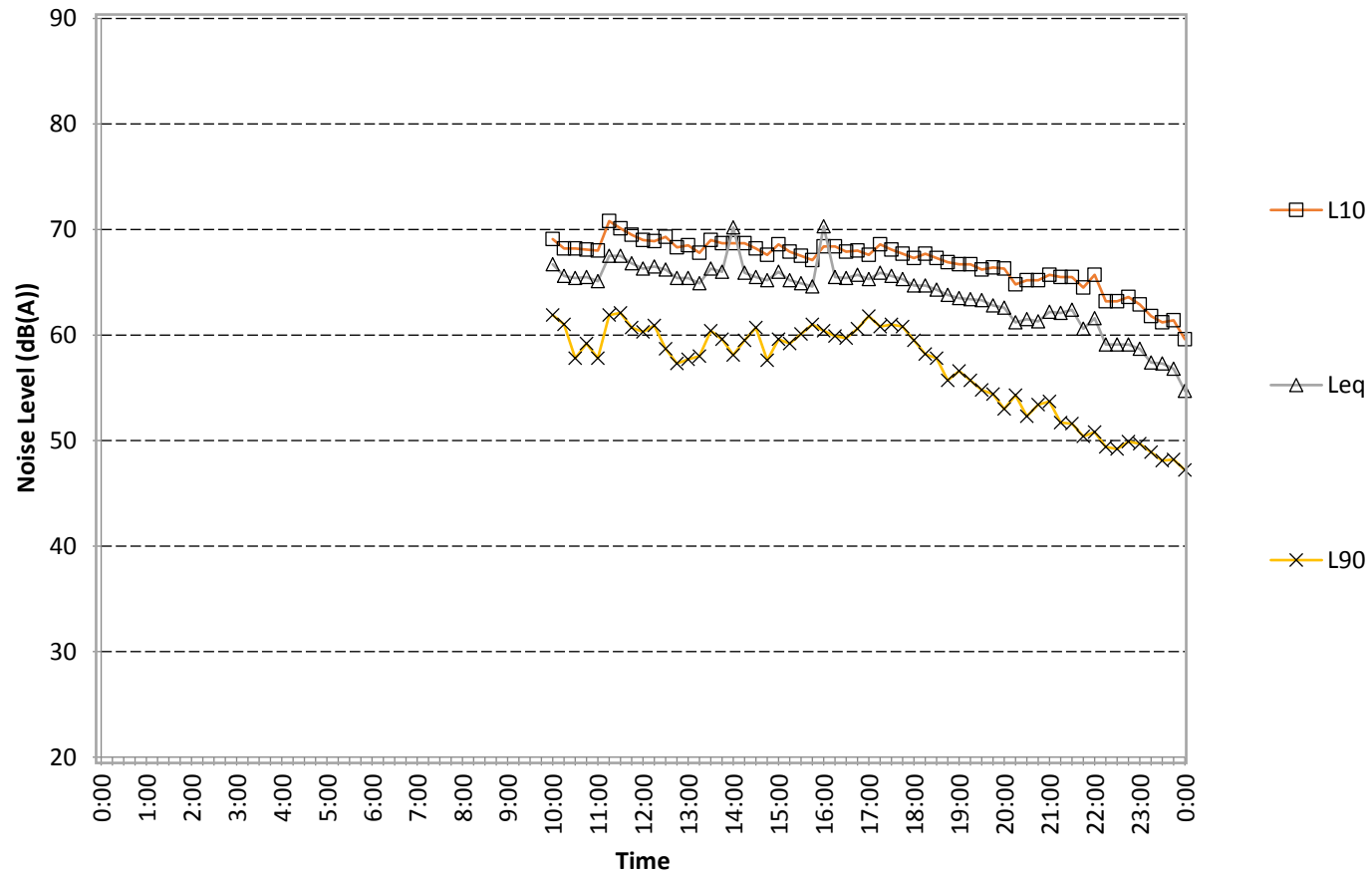
Yours faithfully,



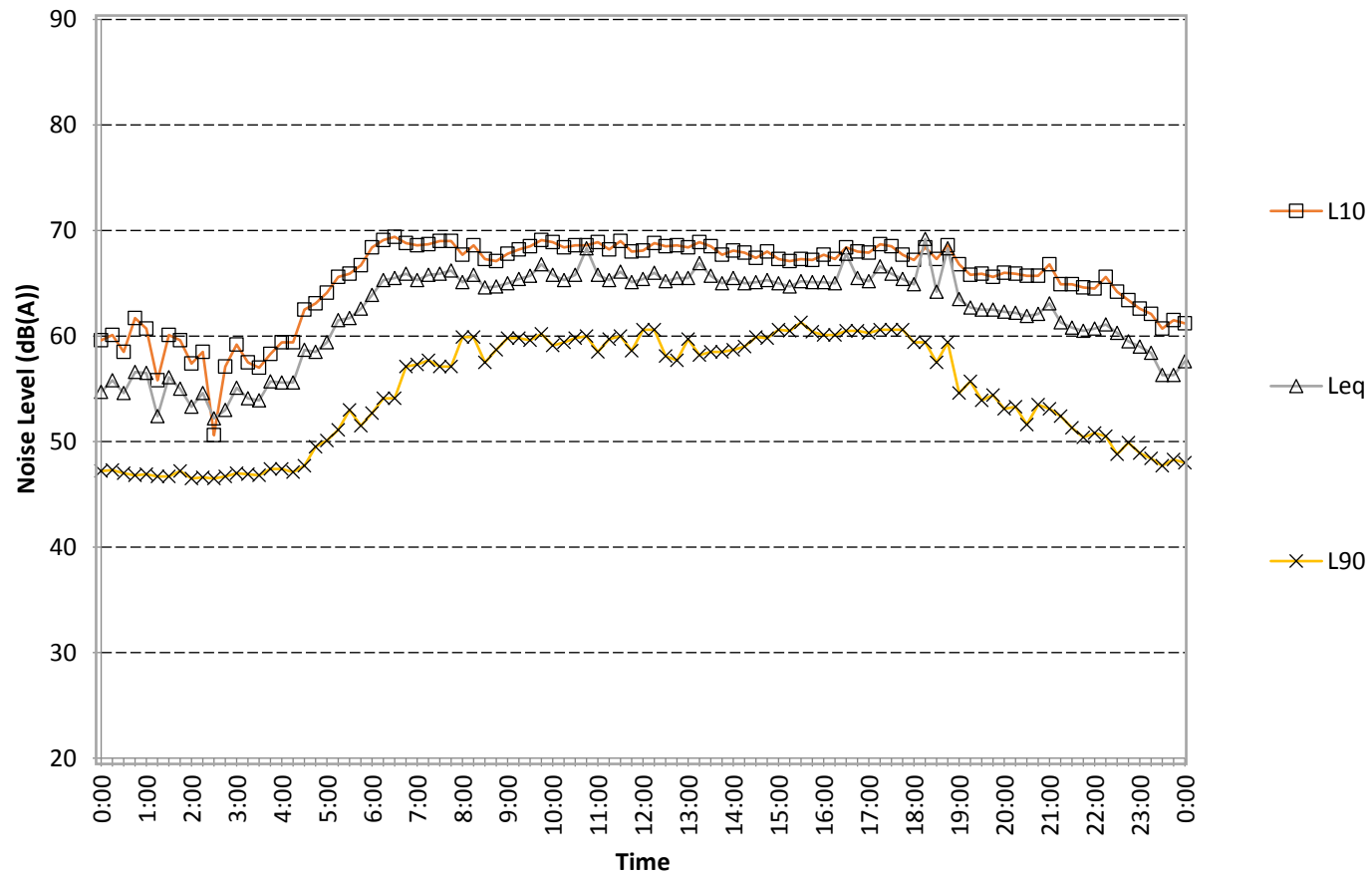
James Small
Acoustic Logic Consultancy Pty Ltd

UNATTENDED NOISE MONITORING DATA

Penrith
Monday October 6, 2015

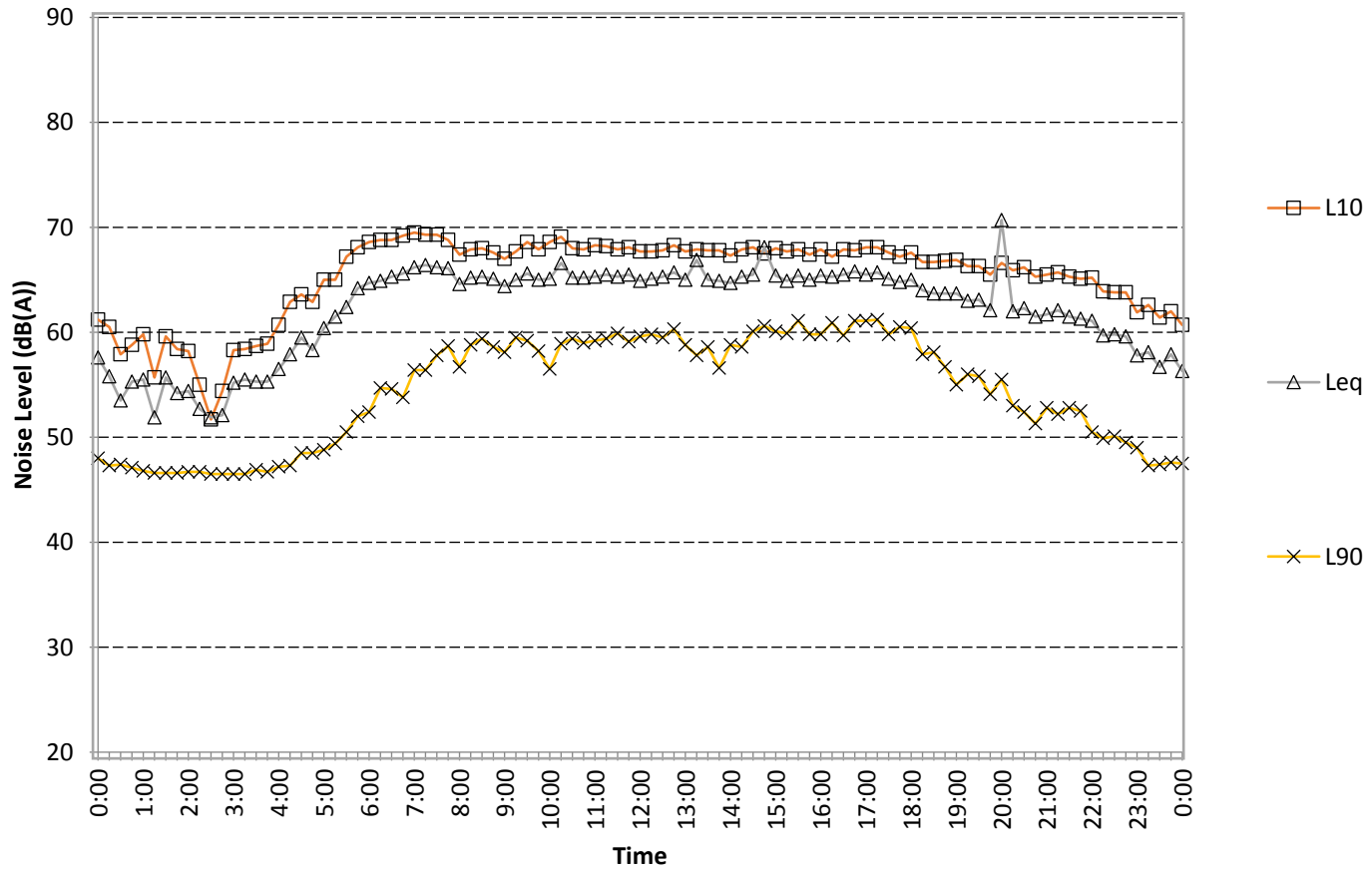


Penrith
Tuesday October 7, 2015

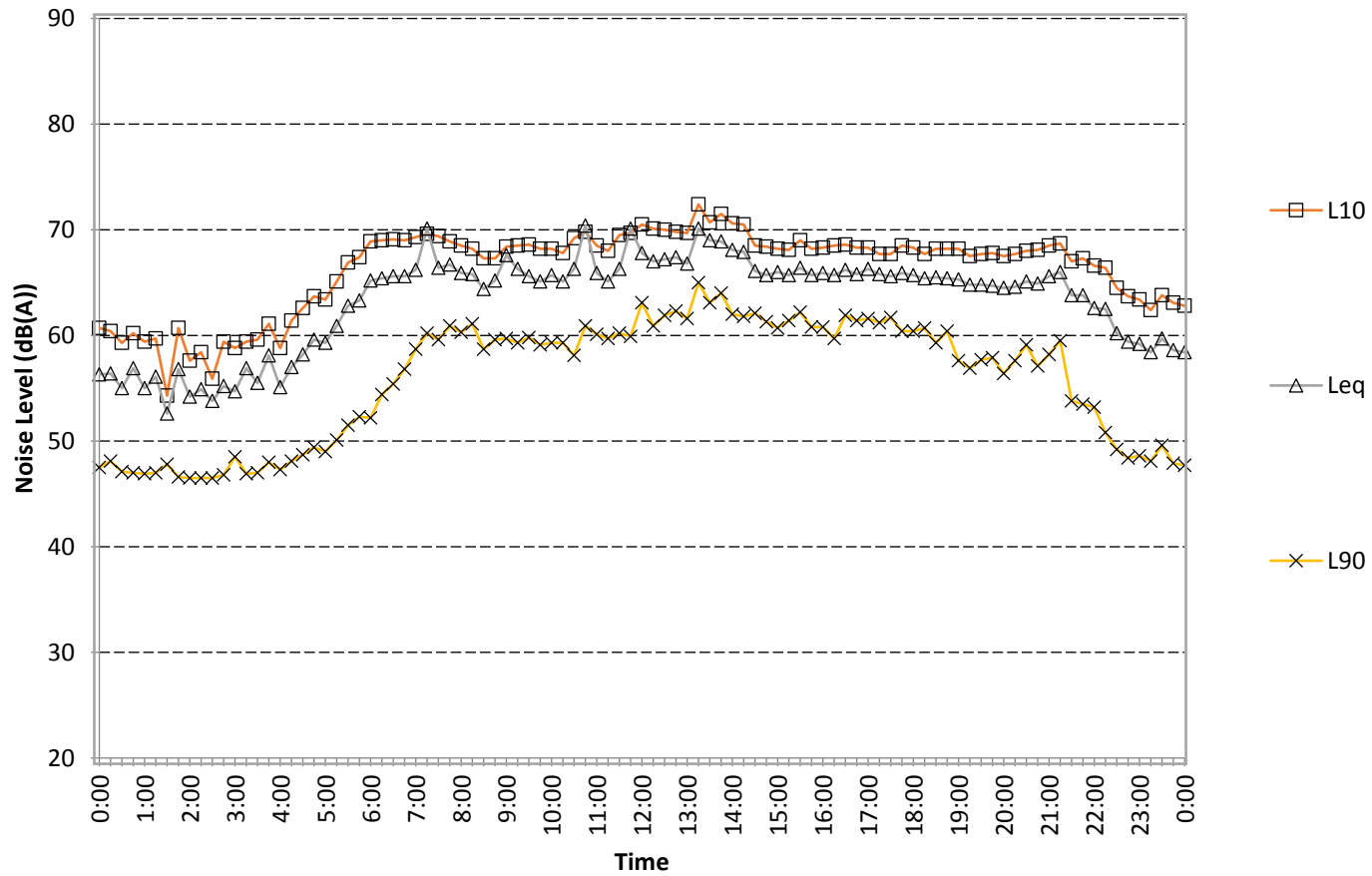


Penrith

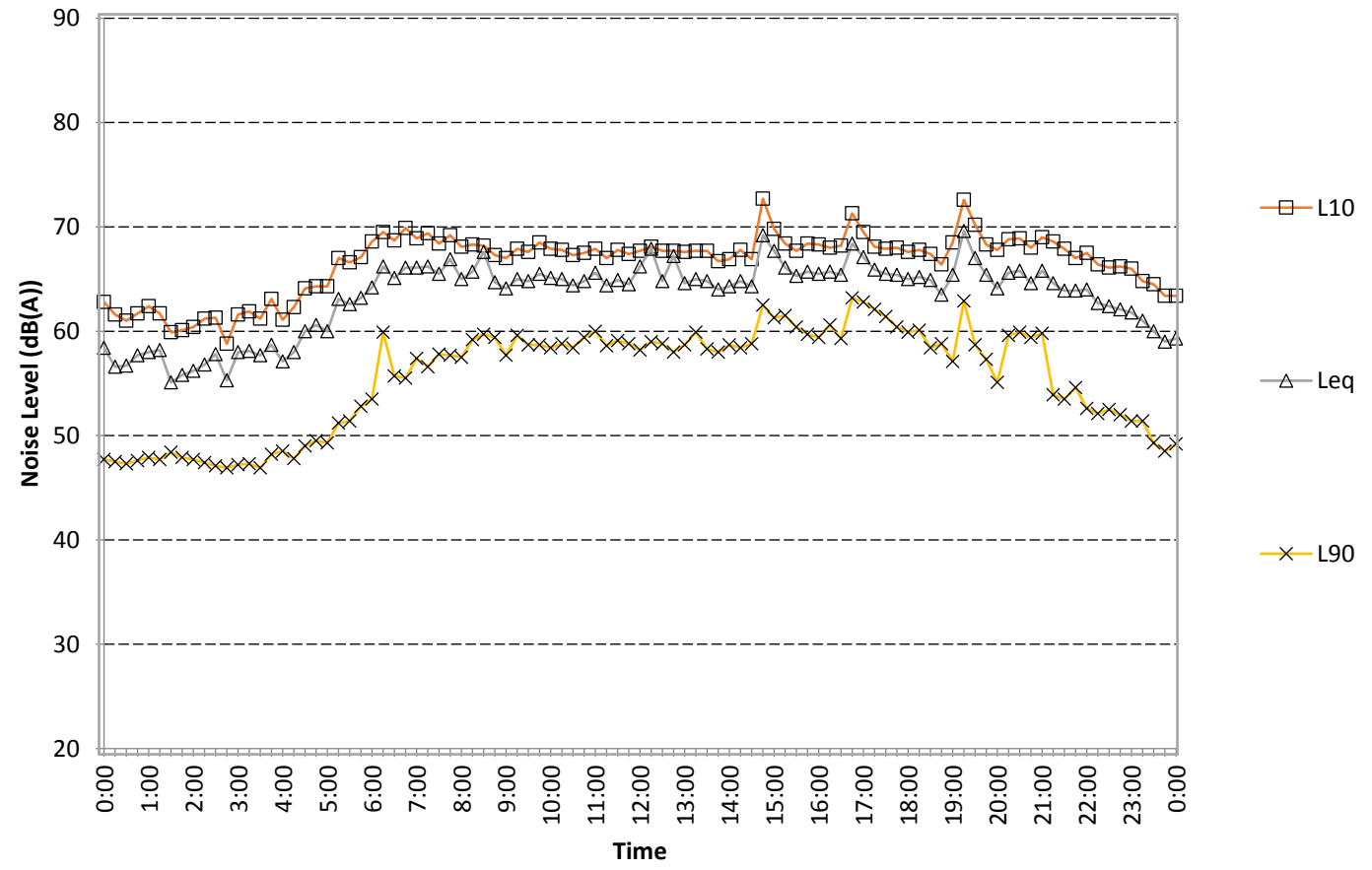
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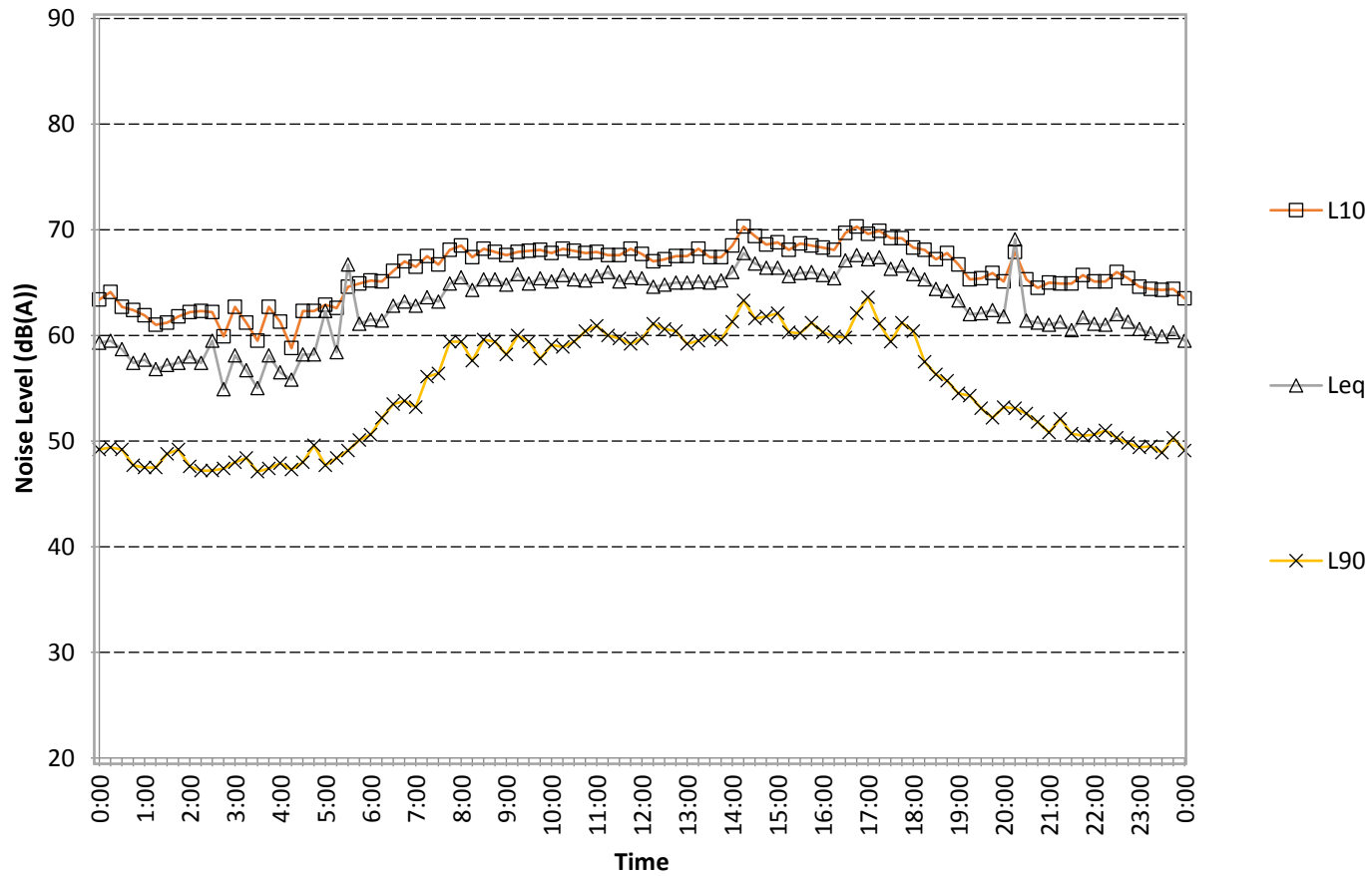
Penrith
Thursday October 9, 2015



Penrith
Friday October 10, 2015



Penrith
Saturday October 11, 2015



Penrith
Sunday October 12, 2015

