ACOUSTICS AND AIR

MT GILEAD REZONING

NOISE ASSESSMENT

REPORT NO. 13136
VERSION D

SEPTEMBER 2014

PREPARED FOR

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DOCUMENT CONTROL

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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

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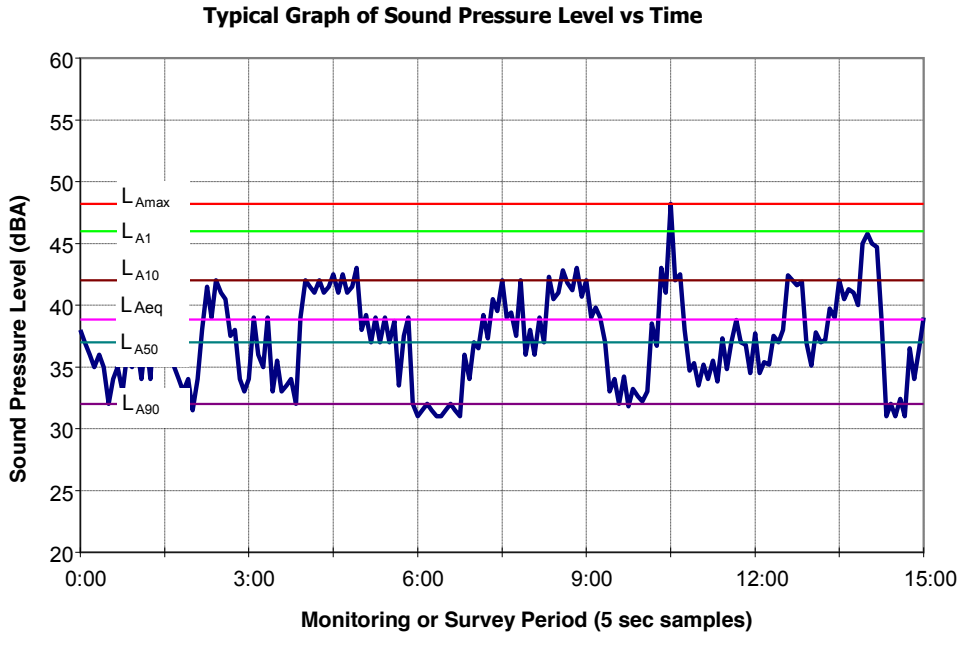


1 INTRODUCTION

It is proposed to rezone land at Mount Gilead for residential development. The land is on Appin Road south of Rosemeadow.

The MDP dwelling numbers listed is as 1500 dwellings. The planning studies are investigating a range of 1400-1700 dwellings, with any number above the 1500 MDP number to be justified on the basis of capacity of the site and infrastructure. This study has assumed the maximum number of 1700 dwellings as a conservative base case for the generation of noise impact.

This report presents a noise assessment of the rezoning. The aspects covered are:

- Noise impact of existing industrial noise on the proposed housing lots;
- Noise impact of future traffic noise on the proposed housing lots; and
- Noise impact from future traffic noise generated by the development on existing residential areas.

2 SITE DESCRIPTION

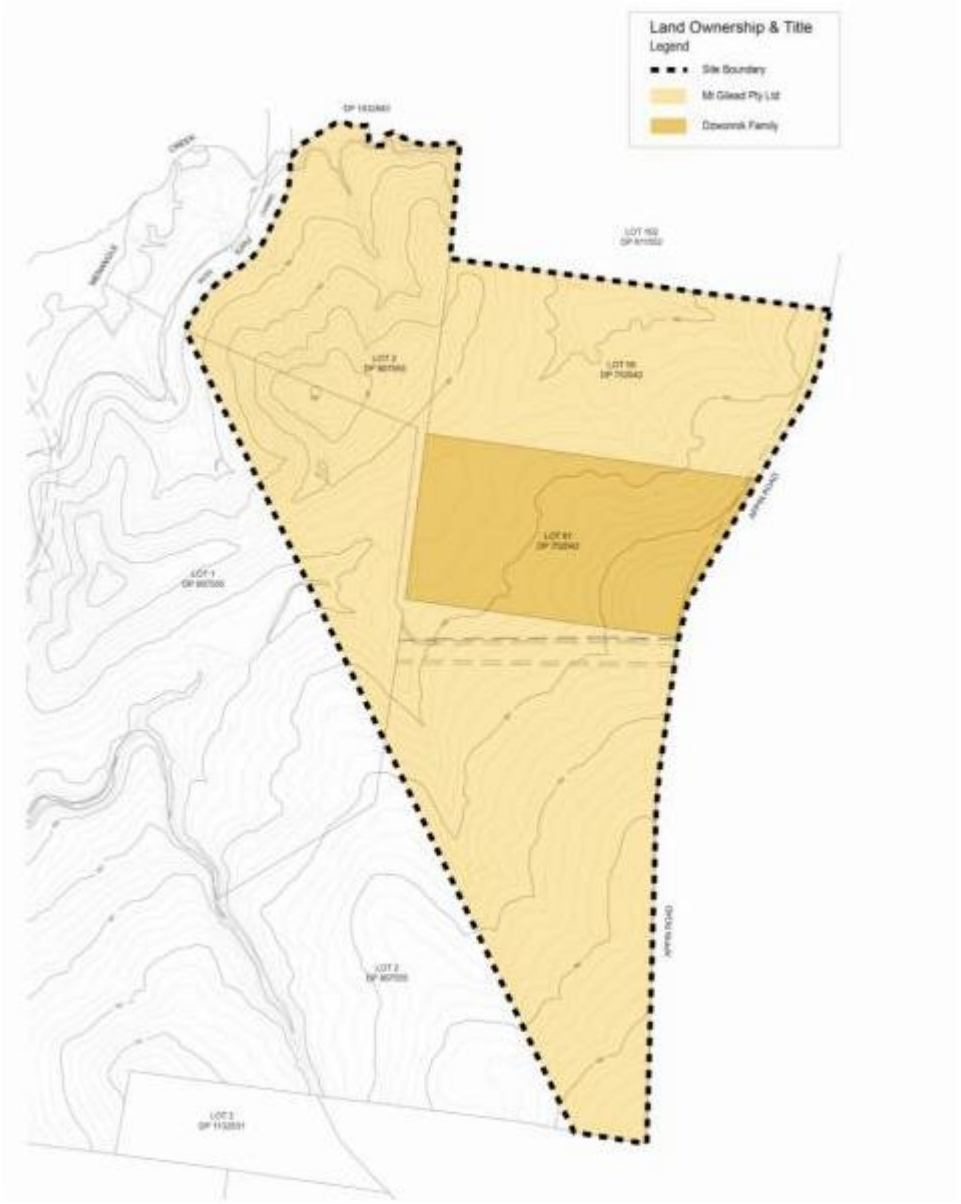
The site comprises a total area of 210 hectares. The boundary of the site is shown on Figure 2-1.

There are two land owners: Mt Gilead Pty Ltd, and S & A Dzwonnik. The ownership is shown on Figure 2-2.

The site is bordered by Appin Road to the east, and access to all residences will be through Appin Road. A 30m buffer zone has been set by on the eastern side of Appin Road. This allows for the future widening of Appin Road, and gives a future distance of at least 30m from Appin Road to the nearest residence.

Figure 2-1 Site Boundary

Figure 2-2 Land Ownership



Source: Cox Richardson

3 EXISTING NOISE ENVIRONMENT AT THE SITE

3.1 Site Survey

A site noise survey was undertaken on 27 March 2013. Short term measurements of background and traffic noise were done at several locations. A noise logger was set up to determine traffic noise from Appin Road.

The noise monitoring equipment used for these measurements consisted of environmental noise loggers set to A-weighted, fast response continuously monitoring over 15-minute sampling periods. This equipment is capable of remotely monitoring and storing noise level descriptors for later detailed analysis. The equipment calibration was checked before and after the survey and no significant drift was noted.

The logger determines L_{A1}, L_{A10}, L_{A90} and L_{Aeq} levels of the existing noise environment. The L_{A1}, L_{A10} and L_{A90} levels are the levels exceeded for 1%, 10% and 90% of the sample time respectively. The L_{A1} is indicative of maximum noise levels due to individual noise events such as the occasional pass-by of a heavy vehicle. The L_{A90} level is normally taken as the background noise level. The L_{Aeq} level is the Equivalent Continuous Sound Level and has the same sound energy over the sampling period as the actual noise environment with its fluctuating sound levels. Whilst the L_{A10} has in the past been used as a descriptor for traffic noise, the L_{Aeq} is now the standard descriptor for traffic noise.

The noise logger was located as shown in Figure 3-1, approximately 40m from the existing alignment of Appin Road. This is approximately the boundary line of the future residences west of the Appin Road buffer.

Figure 3-1 Noise Logger Location

Traffic noise level recorded at the logger was:

- $L_{Aeq,15hr}$ 60dBA (daytime from 7.00am to 10.00pm); and
- $L_{Aeq,9hr}$ 55dBA (night time from 10.00pm to 7.00am).

The implication of these measurements is discussed in Section 4.

The background noise levels measured are shown in Table 3-1 in terms of Rating Background Level. These levels are typical of rural areas.

Table 3-1 Rating Background Levels

Daytime (7.00am-6.00pm)	Evening (6.00pm-10.00pm)	Night time (10.00pm-7.00am)
46	42	32

3.2 Short Term Noise Measurements

Short term noise level measurements were done to assess existing industrial noise.

All measurements were conducted using a Bruel and Kjaer Type 2236 Sound Level Meter. This sound level meter conforms to Australian Standard 1259 *Acoustics - Sound Level Meters* as a Type 1 Precision Sound Level Meter which has an accuracy suitable for field and laboratory use. The A-Weighting filter of the meter was selected and the time weighting was set to "Fast". The calibration of the meter was checked before and after the measurements with a Bruel and Kjaer Type 4231 sound level calibrator and no significant drift was noted.

The Bruel and Kjaer Type 2260 and Type 4231 have been laboratory calibrated within the previous two years in accordance with our in-house Quality Assurance Procedures.

3.3 Noise from Rosalind Park Gas

The Rosalind Park Gas Plant operated by AGL is approximately 1.1km west of the development.

The operating limits of the plant at the nearby Mt Gilead homestead area 37dBA (Day) and 36dBA (Evening and Night). On the western side of the ridge west of the development, the plant is just audible during daytime. Due to topographic shielding, the plant was inaudible at the site, and is not expected to present a noise nuisance.

During the site visit the L_{A90} at the western boundary of the site was 35dBA. This is 7dBA less than the long term RBL measured at the noise logger, indicating that traffic noise from Appin Road is significantly less at the western side of the site.

3.4 Noise from Quarry

There is a quarry adjacent to the Rosalind Park Gas Plant. It operates daytime hours only and is inaudible at the development site.

3.5 Noise from Leafs Gully Gas Fired Power Station

The proposed Leafs Gully Gas Fired Power Station has been abandoned and therefore noise from the power station is not an issue to consider.

3.6 Suitability of the Land for Residential Rezoning

The noise measurements and site observations indicate that the site is suitable for residential development.

4 TRAFFIC NOISE TO OTHER RESIDENTIAL AREAS

4.1 Road Noise Criteria

This section concerns noise from traffic generated by the proposal impacting on other residential areas.

The NSW *Road Noise Policy*, March 2011, (RNP) sets out criteria for assessment of noise from vehicles on public roads.

The *RNP* sets out noise criteria for 'arterial', 'sub-arterial' and 'local roads' (RNP Section 2.2).

Appin Road would be considered as an arterial road. Criteria for "existing residences affected by **additional traffic** are shown in Table 4-1.

Table 4-1 *RNP* Criteria

Road Category	Type of Project / Land Use	Assessment Criteria – dB(A)	
		Day (7am–10pm)	Night (10pm–7am)
Freeway / arterial / sub-arterial roads	Existing residences affected by additional traffic on existing arterial / sub-arterial roads generated by land use developments	$L_{Aeq15hr}$, 60 (external)	$L_{Aeq,9hr}$ 55 (external)

Where predicted noise levels exceed the project-specific noise criteria, an assessment of all feasible and reasonable mitigation options should be considered. The *RNP* states that *an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person*.

4.2 Traffic Flow Numbers

Traffic generated by the development is discussed in the Parsons Brinckerhoff report *Mt Gilead Rezoning – Traffic, Transport and Access Study*, dated 20 June 2013.

The arterial road serving the development is Appin Road. All traffic entering and exiting the development would approach from the north or south on Appin Road. The current AADT of Appin Road is 21,500. According to growth figures in the traffic report, the increase in noise due to growth on Appin Road, without the development, from 2013 to 2026 would be approximately 1dBA.

The traffic generated by the development will depend on the final number of dwellings built. At the assumed upper limit of 1700 dwellings, the predicted traffic flow on Appin Road north of the site is:

- 1,290 vehicles per hour during peak hour without the development; and
- 2,247 vehicles per hour with the development.

This constitutes an increase in noise of 2.4dBA for that peak hour. Housing developments tend to generate most of their traffic during peak hours, and because the traffic noise on Appin Road is assessed over the full 15-hour day, the increase in 15-hour traffic noise would be less than 2.4dBA. Based on diurnal variation of traffic flows, the estimated increase in $L_{Aeq,15hr}$ for the worst case development is 2.0 – 2.2dBA.

The *RNP* notes that an increase of 2dBA is considered barely noticeable. Hence the increase in traffic noise at residences outside the development due to the development is considered to be a marginal impact.

5 TRAFFIC NOISE TO HOUSES IN THE DEVELOPMENT

This section assesses the impact on the development of traffic noise from Appin Road.

5.1 Noise Guidelines

Guidelines are given in Department of Planning document *Development Near Rail Corridors and Busy Roads – Interim Guideline.* That document provides guidelines for compliance with the requirement of the State Environmental Planning Policy (Infrastructure) 2007 (SEPP), which was introduced to provide guidelines for new dwellings built beside road and rail corridors.

The SEPP applies to road corridors with an AADT greater than 40,000 and is recommended for road corridors greater than 20,000 AADT. Appin Road in the future would fall into the road corridors greater than 20,000 AADT category and as such the Department of Planning guidelines forms best practice.

The Department of Planning's guideline for building near busy roads gives detailed advice concerning suitable building requirements for houses built near roads of varying categories. There are three categories of house to consider within this development:

- Houses facing Appin Road without obstruction;
- Houses on the entrance roads to the development; and
- Houses spread throughout the development on minor access roads.

The guidelines would not be mandatory at these locations, however noise should be considered in house design.

The criteria for traffic noise into new dwellings are shown in Table 5-1.

Table 5-1 Noise Criteria - State Environmental Planning Policy (Infrastructure) 2007

Internal Space	Time Period	Road or Railway Noise Level $L_{Aeq,1hr}$
Living and sleeping areas	Day (7am to 10pm)	40 dBA
	Night (10pm to 7 am	35 dBA

The night time 'sleeping areas' criterion is 5dBA more stringent than the 'living areas' criteria to promote passive acoustic design principles. For example, designing the building such that sleeping areas are less exposed to road or rail noise than living areas may result in less onerous requirements for glazing, wall construction and acoustic seals. If internal noise levels with windows or doors open exceed the criteria by more than 10dBA, the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia.

Using the existing noise levels measured by the noise logger, the estimated noise levels at the façades of houses closest to Appin Road without any obstructions, once the development is complete, are:

- $L_{Aeq,15hr}$ 62dBA (daytime from 7.00am to 10.00pm); and
- $L_{Aeq,9hr}$ 57dBA (night time from 10.00pm to 7.00am).

5.2 Noise at Houses along Appin Road

It is expected that there will be a buffer zone of approximately 30m between Appin Road and the houses in the development.

To achieve the guideline level at houses facing Appin Road, facades most exposed to traffic noise should consider glazing as shown in Table 5-2 to satisfy noise attenuation requirements.

External doors should be fitted with acoustic seals.

Side facades would not generally require treatment, but this would depend on the design of individual houses.

Table 5-2 Recommendations for Mitigation against Road Noise

Location	Future Traffic Noise, L_{Aeq}	Noise Criteria	Recommended Glazing
Facades facing Appin	62	Daytime, $L_{AEq,15hr}$ 40dBA	5mm (living areas)
Road	57	Night time $L_{Aeq,9hr}$ 35dBA	5mm (bedrooms)

In a room with windows open, the noise level is typically 10dBA less than the external noise. Hence with an external level of 62dBA the internal level would be 52dBA. As this is more than 10dBA above the internal criterion, design solutions such as ventilation, dwelling layout and fencing may be required. This should be confirmed during the detail design phase for the project.

5.3 Noise from the M31 Hume Motorway

The M31 Hume Motorway is approximately 1.8km west of the site.

During our site survey, the Hume Motorway was just audible from the western part of the site. The L_{Aeq} contribution from the Hume Motorway was below 36dBA.

Based on this measurement, the internal noise levels due to the Hume Motorway, at any dwelling at the proposal, will be below 30dBA at all times. This complies with the requirements in Table 5-1.

6 CONCLUSION

The acoustic aspects of the proposed rezoning at Mt Gilead were investigated.

No industrial noise was found to have significant impact at the site.

Concerning traffic noise impacts on the site:

- Traffic noise from the Hume Motorway will not cause noise impacts.
- Traffic noise impacts the site near Appin Road. There is a buffer zone anticipated between the site and Appin Road, however some houses may require acoustic architectural treatment to achieve acceptable levels in habitable rooms. This applies only to the first row of houses facing Appin Road.
- The need for this can be minimised by design of fences between the houses and the road, and specific design consideration for the houses. For example bedrooms could be on facades not exposed to noise.
- The need for acoustic attenuation treatments will be more accurately assessed at subdivision design stage.

Traffic noise generated by the development is predicted to increase the existing noise by 2.0-2.2 dBA at residences on Appin Road north and south of the development. This constitutes a marginal impact.

All potential noise impacts can be appropriately managed in accordance with relevant noise policies.

The proposed use of the subject site for residential purposes and the associated zones is suitable from a noise impact and management standpoint.

APPENDIX A

NOISE MEASUREMENT RESULTS

Location: Appin Road Logger
Data shaded: meteo; extraneous

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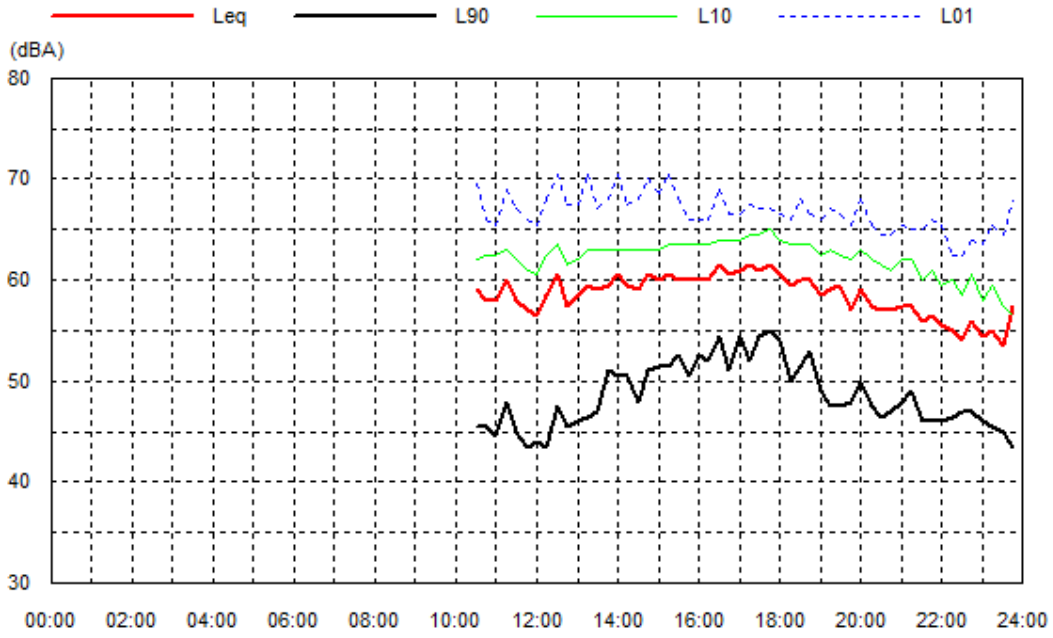

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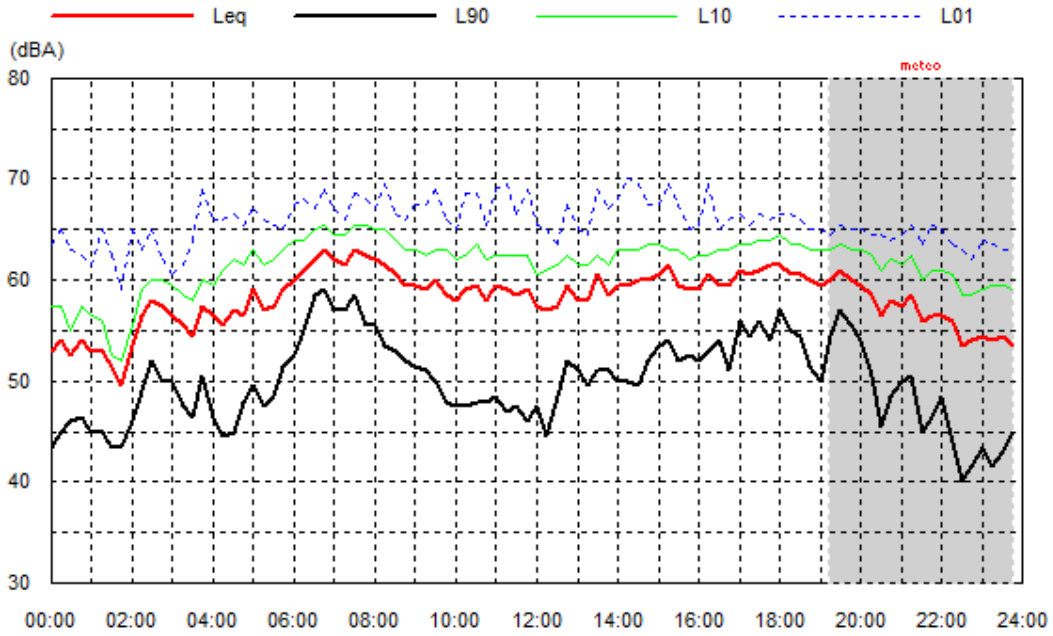

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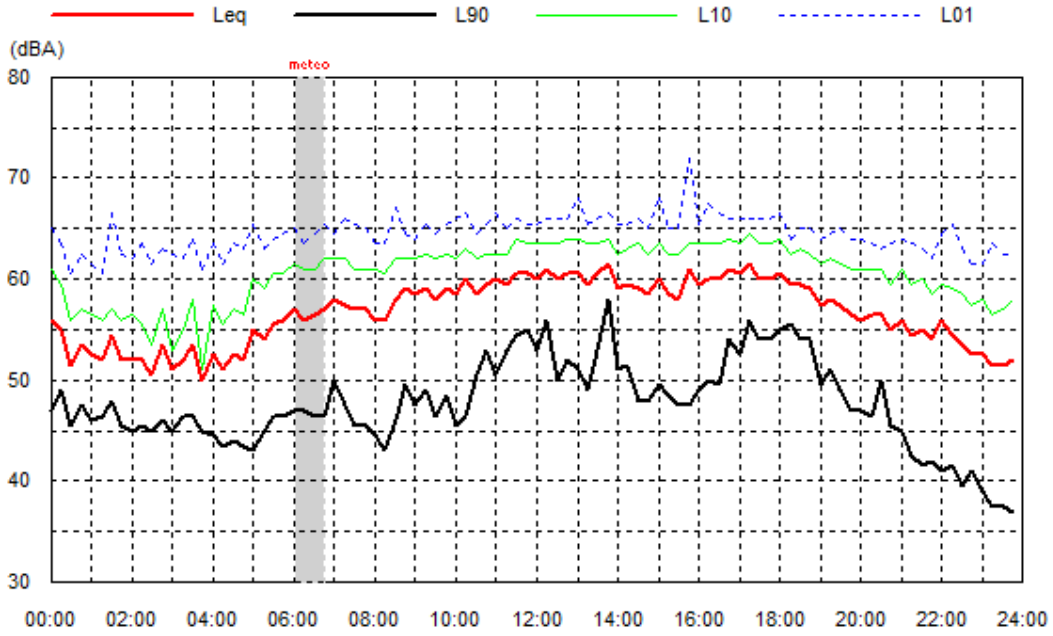

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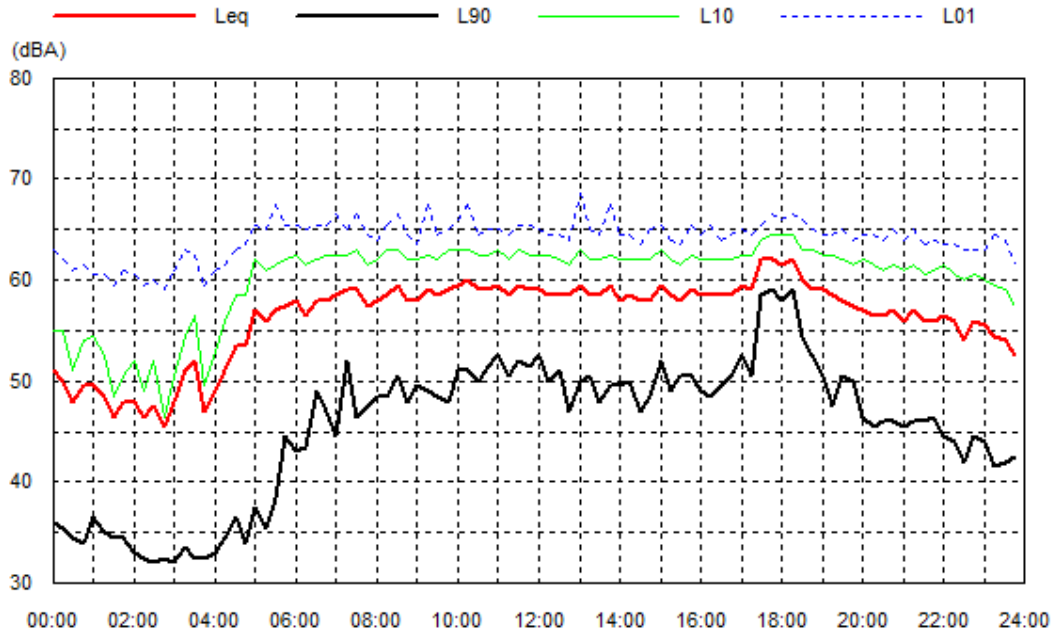

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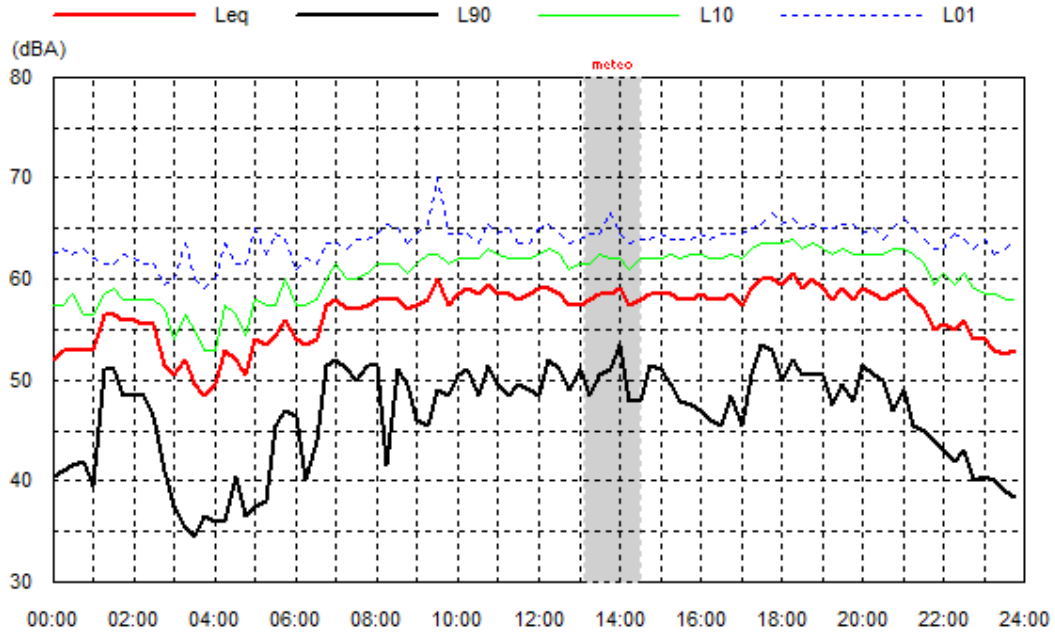

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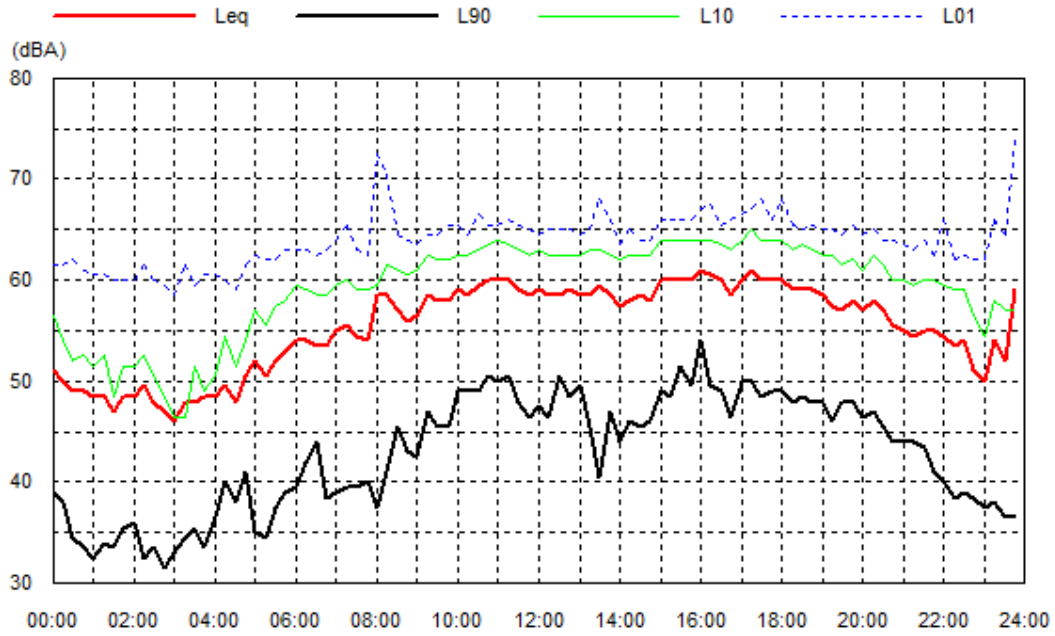

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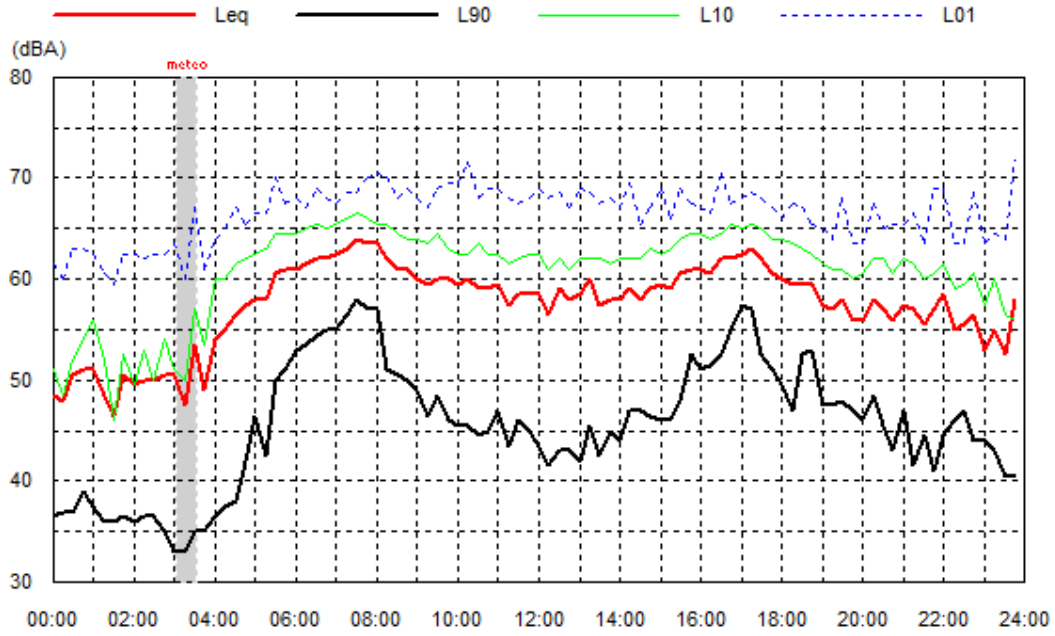

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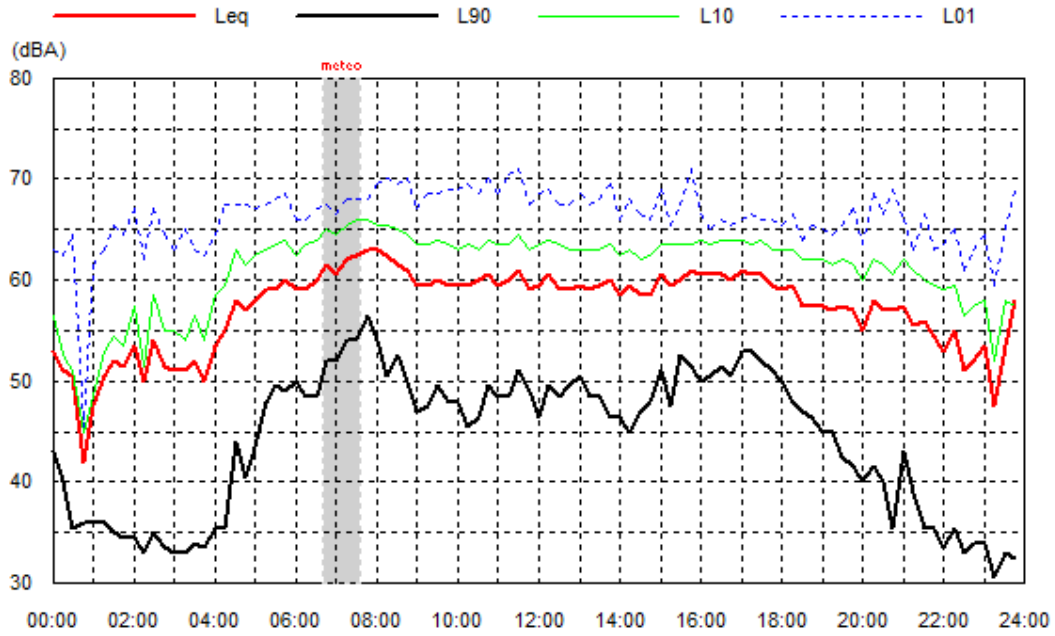

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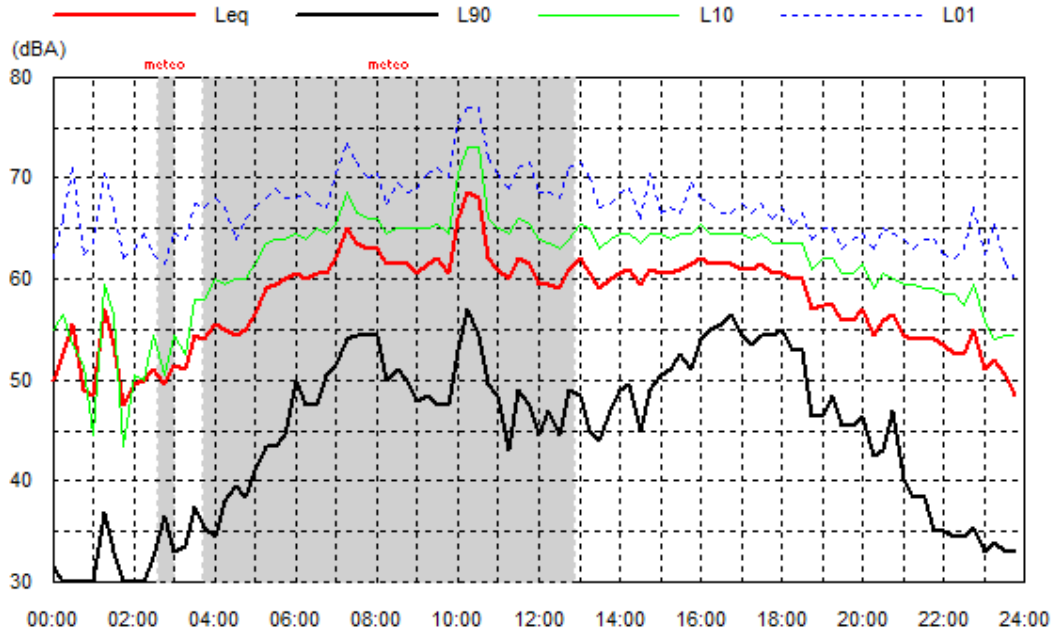

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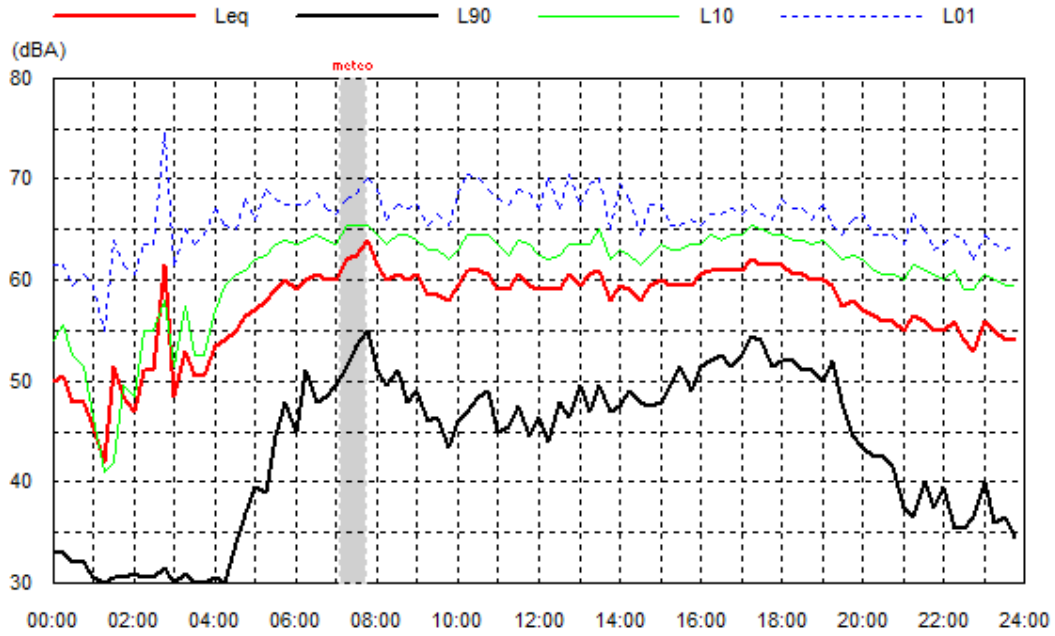

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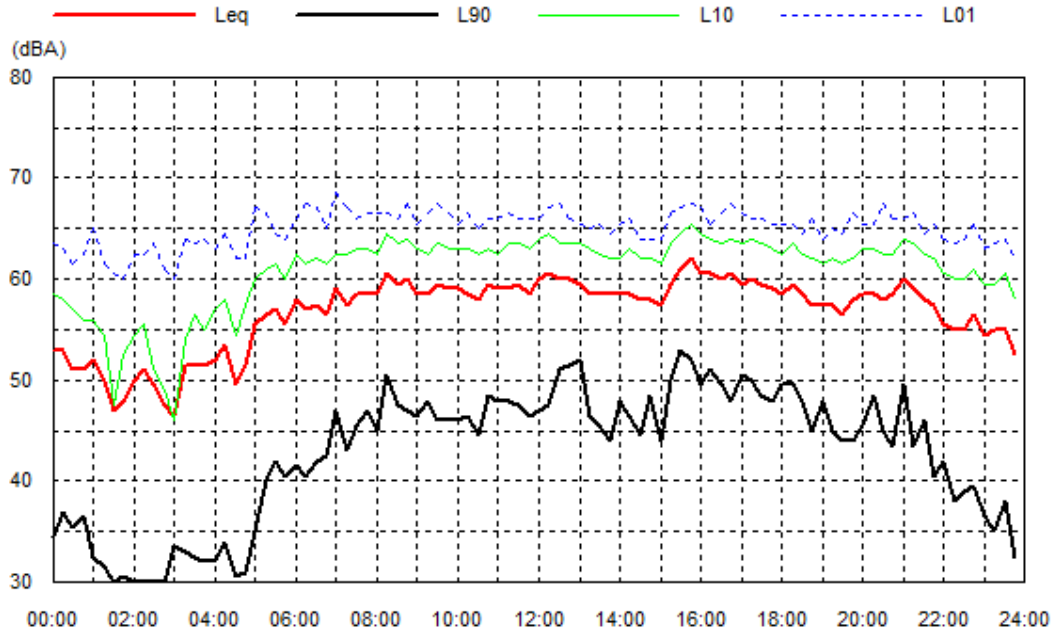

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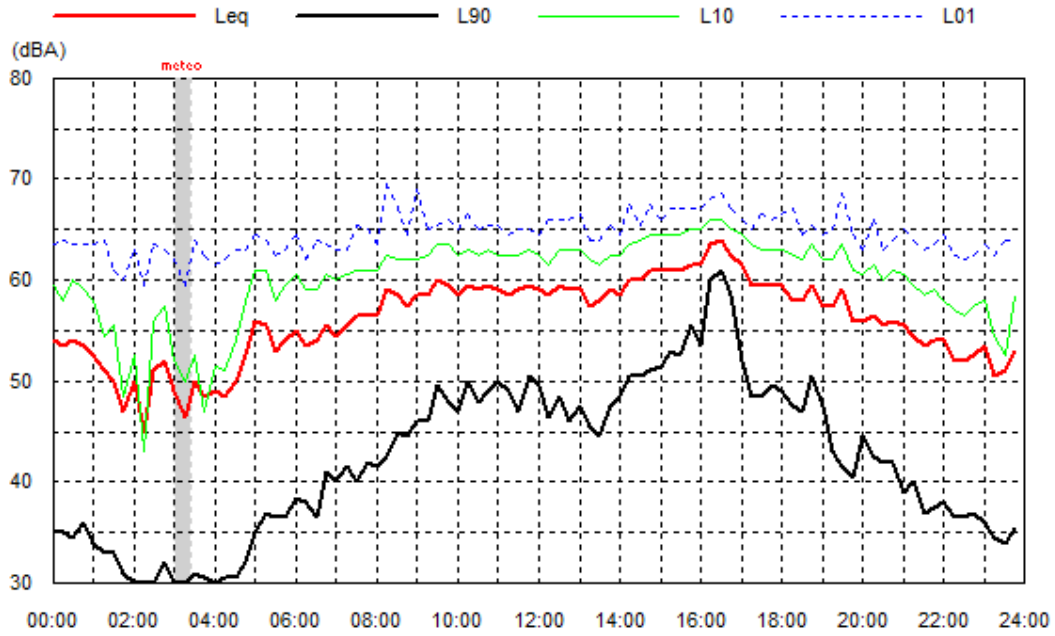

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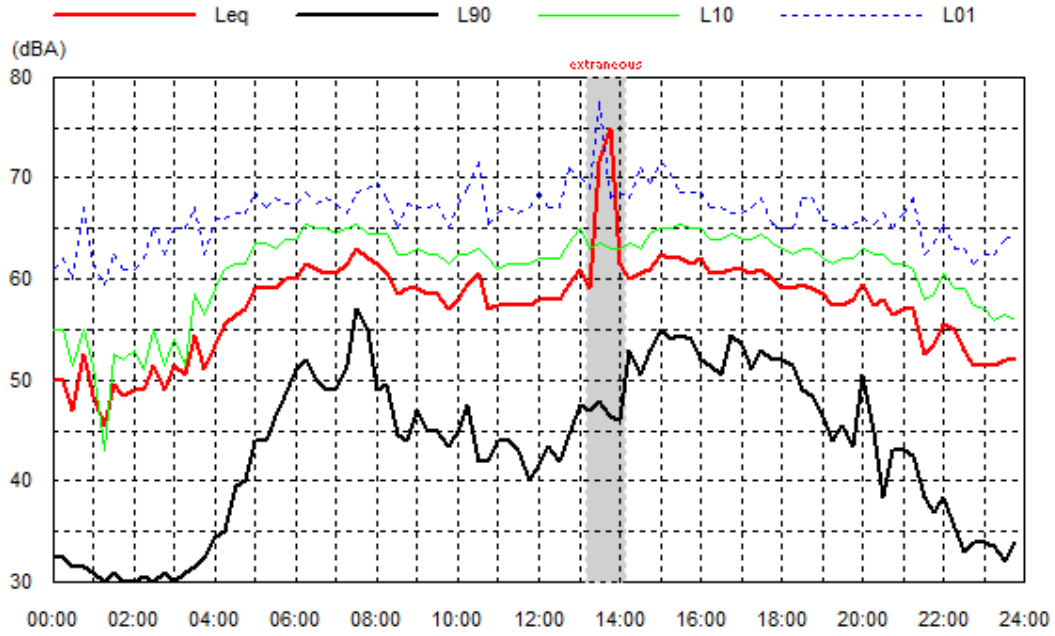

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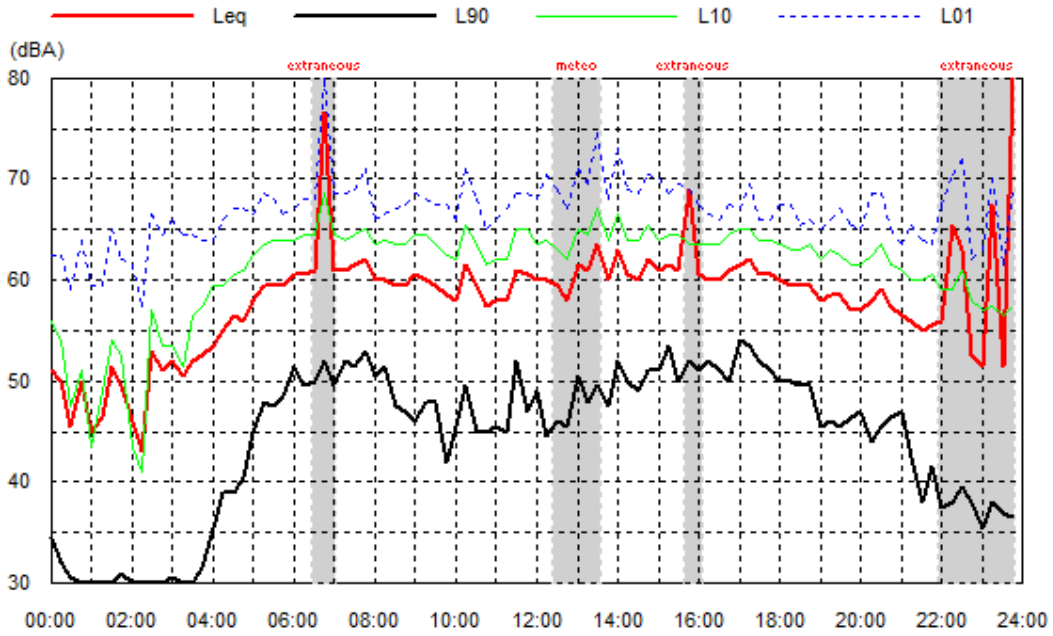

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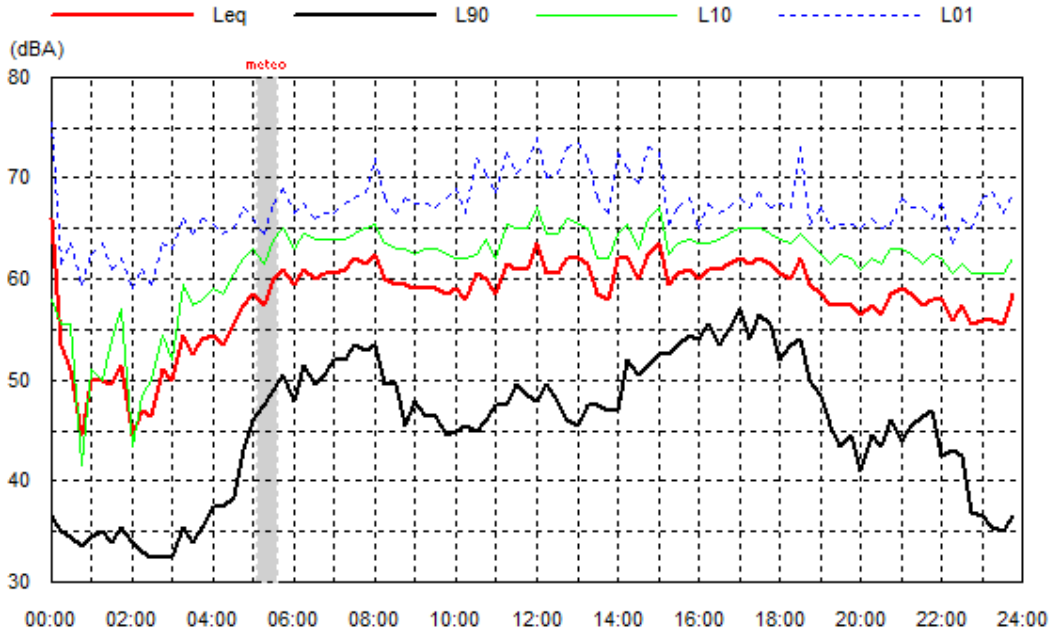

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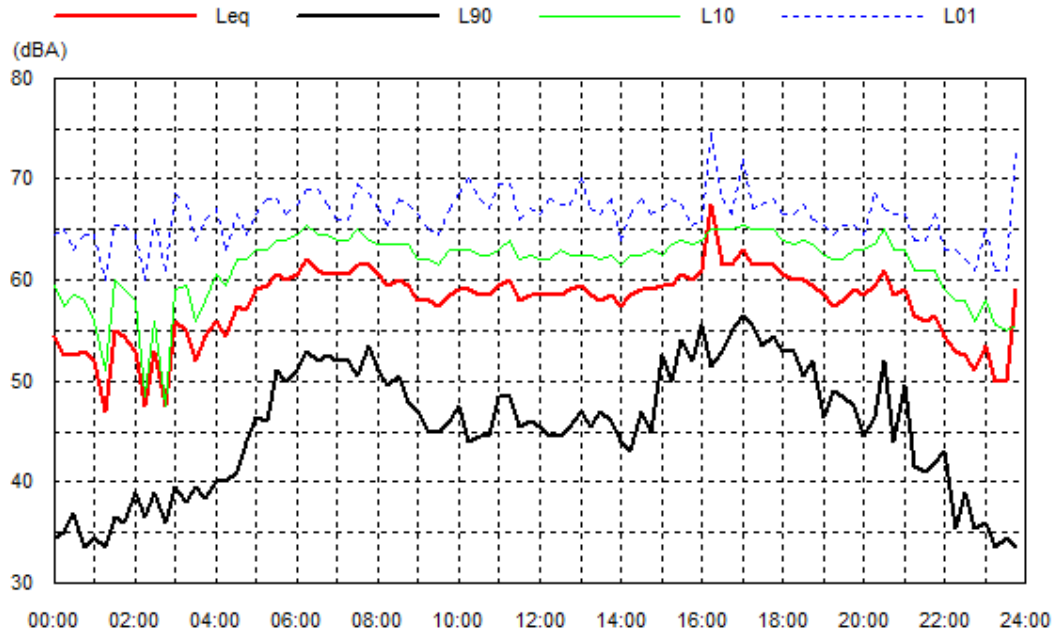

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