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## Noise Impact Report

### Project details

|                |                                                             |
|----------------|-------------------------------------------------------------|
| Client         | JSM Company Group Limited                                   |
| Client Address | 18 – 26 Fleet Street<br>Liverpool<br>L1 4AN                 |
| Site Address   | 9-11 Regent Street<br>Wrexham<br>LL11 1SG                   |
| Survey Dates   | First Visit: 03 – 06/02/23<br>Second Visit: 24 – 27/08/2024 |
| Reference      | 20664                                                       |

### Quality Assurance

|               |                              |
|---------------|------------------------------|
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| Issue date    | 11/09/2024                   |

### Revision History

| Version | Date       | Editor         | Notes                                                                     |
|---------|------------|----------------|---------------------------------------------------------------------------|
| V1      | 06/03/2023 | Pawel Tatar    | First issue                                                               |
| V2      | 11/09/2024 | Alejo Garcigoy | Additional monitoring position and subsequent recommendations. Formatting |



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## 1 Introduction

JSM Company Group Limited has instructed Spratt and Hamer Limited to undertake an environmental noise survey in order to assess the impact from the nearby road, night clubs, commercial units, as well as other general noise within the local environment which may have an impact on future residents of the proposed development.

The proposed development site is an existing three-storey building that currently comprises ground floor retail and commercial space. It is proposed to convert the entire first and second floors into 20no. 1-bedroom and 2-bedroom residential apartments, while maintaining ground floor commercial units.

Version 2 of the report outlines further comparison and sound level analysis and sets the recommendations in line with the additional measurement undertaken at the new Monitoring Position 4 with the Rocking Chair entertainment venue fully operational.

This report is prepared solely for JSM Company Group Limited. Spratt and Hamer Limited accepts no responsibility for its use by any third party.

This document has been prepared using the various documents listed within the appendices of this report, together with drawings, technical information and additional verbal representations made by third parties. We have not audited nor independently verified the content or accuracy of any of the documents and information provided to us in the preparation of this report.

If additional information comes to light subsequent to the production of this report, we reserve the right to revise our opinions and the conclusions reached within this report.

### 1.1 An Environmental Noise Assessment

Spratt and Hamer Limited carried out a first environmental noise survey at the above site with noise levels measured externally over 24-hour periods, consisting of 16-hour days (07:00 – 23:00) and eight-hour nights (23:00 – 07:00). The measurements were carried out during weekdays and over a weekend (11:30 Friday – 11:30 Monday).

A second environmental survey has been undertaken with noise levels measured externally over a 72-hour period, consisting of 16-hour days (07:00 – 23:00) and eight-hour nights (23:00 – 07:00). The measurements were carried out during weekdays and over a weekend (Saturday to Tuesday) from 24/08/2024 to 27/08/2024.

This report will state the measured noise levels and will refer to guidance relevant to the nature of this survey whilst considering Local Planning Authority guidance and conditions.



## 2 Assumptions, Limitations & Uncertainty

- a. All suggested specifications require a good level of workmanship and for materials to be installed as the manufacture intends. Any poor workmanship may lead to weaknesses in the sound attenuation provided by the building elements.
- b. It is assumed that the sound pressure levels measured on site during the environmental noise survey are typical of the site.
- c. It is assumed that the technical data provided by glazing and ventilation manufacturers is up to date and correct.
- d. It is assumed that drawings and information supplied by JSM Company Group Limited are up to date and correct.
- e. It should also be noted that building elements modelled in INSUL are only an approximation of the proposed specifications due to the limitation of materials available within the software. These models are shown in the appendix.
- f. All building elements modelled in INSUL Acoustic Prediction Software have had a 3 dB correction applied to account for a margin of error within the software.
- g. It is assumed that single-glazed front façade windows are 6mm thick.



## 3 Planning Policies, Guidance and Criteria

The planning policies and criteria listed below are taken from associated relevant guidance documents, all of which should be considered for the internal and external noise levels.

### 3.1 Planning Policy Wales

The Planning Policy Wales Edition 12/ February 2024 (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. PPW, the TANs<sup>1</sup>, MTANs<sup>2</sup> and policy clarification letters comprise national planning policy.

The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation and resultant duties such as the Socio-economic Duty. A well-functioning planning system is fundamental for sustainable development and achieving sustainable places.

PPW promotes action at all levels of the planning process which is conducive to maximising its contribution to the well-being of Wales and its communities. It encourages a wider, sustainable and problem solving outlook which focuses on integrating and addressing multiple issues rather than on an approach which is fragmented, un-coordinated and deals with issues in isolation. It provides an opportunity to remove any actual or perceived problems in current approaches and stimulate and support innovative and creative ideas as well as high standards of evidence and assessment to underpin the preparation of development plans and strategies and individual proposals. Monitoring and learning from development outcomes so as to drive sustainable improvements in planning practice is also important.

Technical Advice Note 11 of the previous edition 11/ February 2021 of PPW: Noise provides a way of assessing noise exposure inside new residential dwellings by separating it into distinctive categories. When planning applications are considered, local planning authorities should determine into which of the categories the proposed site falls. Noise categories are expressed in Table 2 overleaf.



## Noise Exposure Categories for New Dwellings

|   |                                                                                                                                                                                                                                                                             |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A | Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as desirable.                                                                                         |
| B | Noise Should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection.                                                                                                             |
| C | Planning permission should not normally be granted. Where it is considered that permission should be given, for example, because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise. |
| D | Planning permission should normally be refused.                                                                                                                                                                                                                             |

| Noise Source  |               | Noise Exposure Category |                  |                  |                  |
|---------------|---------------|-------------------------|------------------|------------------|------------------|
|               |               | A                       | B                | C                | D                |
|               |               | $L_{Aeq,T}$ (dB)        | $L_{Aeq,T}$ (dB) | $L_{Aeq,T}$ (dB) | $L_{Aeq,T}$ (dB) |
| Road Traffic  | 07:00 – 23:00 | <55                     | 55 – 63          | 63 – 72          | >72              |
|               | 23:00 – 07:00 | <45                     | 45 – 57          | 57 – 66          | >66              |
| Rail Traffic  | 07:00 – 23:00 | <55                     | 55 – 66          | 66 – 74          | >74              |
|               | 23:00 – 07:00 | <45                     | 45 – 59          | 59 – 66          | >66              |
| Air Traffic   | 07:00 – 23:00 | <57                     | 57 – 66          | 66 – 72          | >72              |
|               | 23:00 – 07:00 | <48                     | 48 – 57          | 57 – 66          | >66              |
| Mixed Sources | 07:00 – 23:00 | <55                     | 55 – 63          | 63 – 72          | >72              |
|               | 23:00 – 07:00 | <45                     | 45 – 57          | 57 – 66          | >66              |

Table 1: Noise Exposure Categories in Accordance with Technical Advice Note 11: Noise

In addition, para 6.7.5 of PPW Edition 12 states that:

“(…) it will be important to consider the relationship of proposed development to existing development and its surrounding area and its potential to exacerbate or create poor air quality or inappropriate soundscapes. The agent of change principle says that a business or person responsible for introducing a change is responsible for managing that change. In practice, for example, this means a developer would have to ensure that solutions to address air quality or noise from nearby pre-existing infrastructure, businesses or venues can be found and implemented as part of ensuring development is acceptable.”



## 3.2 Criteria

### 3.2.1 Communications & Local Planning Authority Criteria

Environmental Health Office (EHO) from Wrexham County Borough Council has commented about noise.

“The EHO has advised that the development site is in an area that can be affected by noise from the night-time economy, and you are therefore required to carry out a noise survey in order to determine noise levels for both day (07:00 – 23:00 hours) and night (23:00 – 07:00 hours) having regard to relevant Planning Guidance (Wales). The report of the noise survey findings shall include:

- a) Noise levels arising from day/night-time activities in the vicinity of the proposed development site and the impact upon the proposed accommodation, and
- b) A detailed scheme of noise insulation and / or attenuation measures so designed to safeguard the amenity of the future occupants of the proposed accommodation hereby approved.”

The Conservation Officer commented about front façade windows.

“9 to 11 Regent Street is within Wrexham Town Centre Conservation Area. Regent Street is part of one of the key shopping streets in the conservation which includes several buildings of character. This is reflected in the elevation which faces Regent Street, especially in the upper floors.

Windows to the Regent Street elevation are timber sliding sashes. It is important that these are retained. Please confirm if there are any proposals to undertake work on these windows, for example to 'upgrade' from single to double glazing? Changing to double glazing will only be appropriate if it can be demonstrated that the windows are currently in poor condition, and that the thicker glazing unit can be accommodated without significant change to the thickness of frames and glazing bars. The method of opening should remain as sliding. Provided that assurance can be given on proposals for the windows to the Regent Street elevation of the building, I have no objections to the application.”

Following the submission of V1 of this report; in April 2024 the client made Spratt and Hamer aware of further comments that have been provided by the Local Authority, as outlined below.

“The noise report submitted did reference noise from external factors such as the public and identify the potential for noise from nearby entertainment premises in the objectives. Measurements particularly those taken at Position 3 over Friday – Monday should have monitored any noise from the live music venue situated to the rear of the proposed apartments. Noise Levels measured were correctly compared to TAN11 in relation to mixed noise sources and mitigation in the form of glazing insulation specified.

However, this objection raises the concern that entertainment music noise breakout from the neighbouring business may be a factor to consider in determining the acceptable use of this property for residential purposes. No other residential accommodation is located close to the music venue. The venue has a premises licence to 4am in the morning over the weekends. There are no licence conditions attached to the Premises Licence that controls noise levels with reference to neighbouring residential premises. Any adverse impact on the residents, generating complaints and the likelihood of enforcement action against the existing business, must be avoided.

Low frequency (bass) noise produced by such venues has high energy and is exceptionally hard to mitigate, however such low frequency noise does not especially impact the standard



measurement (dB(A) scales, and therefore use of TAN 11 alone will not preclude the potential for adverse or justified complaints in the future.

We seek confirmation of the nature of the music noise that was occurring during the monitoring period in the report submitted. There is no specific reference to any music noise being witnessed, however there is some indication that this monitoring was remote, and no technician may have been on site during the monitoring period overnight on the weekends.

If this cannot be explained and assessed, through revision of the existing report further monitoring specifically aimed to determine the extent that music / entertainment noise will impact the proposed residential properties requires completing. The objector has asked for liaison with the music venue so that realistic and typical noise levels from the venue can be assessed.

Significant impact of low frequency music on residential premises from the venue that currently holds a 4am licence may result in this department not being able to support the application as mitigation may not be economically achievable.”

### 3.2.2 BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

The British Standard BS 8233:2014, Guidance on Sound Insulation and noise reduction for buildings, provides appropriate internal levels of noise within dwellings, flats and rooms in residential use when unoccupied.

Section 7.2.2 ‘Internal ambient noise levels in dwellings’ of BS 8233: 2014 states that ‘In general, for steady external noise sources, it is desirable that the internal ambient noise level does not exceed the guideline values in Table 4’.

| Activity                   | Location         | 07:00 to 23:00         | 23:00 to 07:00        |
|----------------------------|------------------|------------------------|-----------------------|
| Resting                    | Living Room      | 35 dB $L_{Aeq,16hour}$ | -                     |
| Dining                     | Dining room/area | 40 dB $L_{Aeq,16hour}$ | -                     |
| Sleeping (daytime resting) | Bedroom          | 35 dB $L_{Aeq,16hour}$ | 30 dB $L_{Aeq,8hour}$ |

Table 2: Table 4 of BS 8233:2014 Indoor ambient levels for dwellings

Note 7 of section 7.7.2 states ‘Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed up to 5 dB and reasonable internal conditions still achieved’.

In addition, Note 4 of section 7.7.2 states, ‘Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or  $L_{Amax,F}$ , depending on the character and number of events per night. Sporadic noise events could require separate values”.

In the absence of a specific performance criterion within BS 8233 for short-term noise maxima, reference can be made to guidance published by the WHO. In particular, the WHO publication ‘Guidelines for Community Noise’ (1999), from which the guidance given in BS 8233: 2014 is itself derived, states that ‘for a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB  $L_{AFmax}$  more than ten to fifteen times per night’.

The WHO publication ‘Guidelines for Community Noise’ (1999) has since been updated in 2018; however, it is widely accepted by Local Authorities that  $L_{AFmax}$  45 dB is the target level for short-term noise maxima between 23:00-07:00.



## 3.2.3 WHO Guidelines for Community Noise

In 1999, the WHO (World Health Organisation) published Guidelines for Community Noise, stating the following internal noise levels are applicable within dwellings.

| Specific Requirement | Critical Health Effect (s)                                         | $L_{Aeq}$ (dB) | Time base (hours)* | $L_{AFmax}$ (dB) |
|----------------------|--------------------------------------------------------------------|----------------|--------------------|------------------|
| Outdoor living area  | Serious annoyance, daytime and evening                             | 55             | 16                 | -                |
|                      | Moderate annoyance, daytime evening                                | 50             | 16                 | -                |
| Dwelling, indoors    | Speech intelligibility and moderate annoyance, daytime and evening | 35             | 16                 | -                |
| Inside bedrooms      | Sleep disturbance, night-time                                      | 30             | 8                  | 45               |
| Outside bedrooms     | Sleep disturbance, window open (outdoor values)                    | 45             | 8                  | 60               |

Table 3: A Summary of the Guidance Noise Levels

## 3.3 Criteria Summary

In order to meet the requirements of Wrexham County Borough Council, in line with their latest commentary and the 'agent of change' principle, the assessment and recommendations will be made in reference to BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings and WHO Guidelines for Community Noise.

In order to account for sources of various nature, in particular entertainment noise emanating from the neighbouring venue The Rocking Chair, the assessment will consider a more onerous approach by using the highest measured 1-hour ambient noise level, as well as the inclusion of the 63Hz octave band within the calculation at those proposed residential apartments exposed to entertainment noise.



## 4 Site Description

The proposed development at 9-11 Regent Street is an existing three-storey building situated in the city centre of Wrexham, approximately 220m east of Wrexham Central train station.

The front façade of the building faces north onto Hope Street, which is a pedestrianised area with multiple commercial units including cafés and shops.

The west façade faces Hill Street which is considered to be a busy street. There are commercial units as well as Hill Street Social bar and Grove Park Theatre to the west. Due to the front façade being in a conservation area, windows to the Regent Street are to be retained. The east boundary of the site directly adjoins the neighbouring building.

The south façade faces a building which consists of several units. Lot 11, The Priory and Rock Suite café, as well as a music venue i.e. The Rocking Chair.

Due to the central location of the site, it is likely to be impacted by night time activity, especially during weekends. There are multiple bars and public houses located within the central area of Wrexham. Multiple mechanical plant can be found within the area from various commercial premises. The street at the rear of the building is typically accessed by bin lorries in early mornings.

It is important to note that during the time of the survey, an event i.e. DJ set took place at the Rocking Chair which commenced at 22:00 and finished approximately at 02:00. The music included hip hop and funk being played through the venue's large PA system, with particular high content of the low frequencies, characteristic of this type of music. The event poster can be found in the appendix.

### 4.1 Subjective Observations

During site attendance, subjectively the main source of noise was road traffic on Hill Street, on Hope Street primarily pedestrians were audible. At the rear façade facing Brynyffynnon some bin lorries were observed. Mechanical plant units were observed in the area; however, they were inaudible on the day.

### 4.2 Weather

| First Visit<br>03-06/02/2023 | Daytime Average   | Night time Average |
|------------------------------|-------------------|--------------------|
| Temperature                  | 6°C               | 4°C                |
| Wind Speed                   | 4.3m/s            | 3.3m/s             |
| Wind Direction               | E                 | E                  |
| Precipitation                | Light for 2 hours | None               |
| Damp road/ wet ground        | None              | None               |
| Fog/snow/ice                 | None              | None               |

Table 4: First Visit Weather Conditions.

Weather data taken from [www.windy.com](http://www.windy.com).



| Second Visit<br>24-27/08/2024 | Saturday             | Sunday               | Monday      | Tuesday              |
|-------------------------------|----------------------|----------------------|-------------|----------------------|
| Temperature (°C)              | 12.8 – 19.9          | 9.6 – 18.1           | 13.0 – 20.4 | 14.3 – 19.0          |
| Wind Speed (m/s)              | 0.1 – 6.5 (mean 1.6) | 0.0 – 6.2 (mean 2.3) | 0.0 – 4.8   | 0.0 – 5.9 (mean 2.1) |
| Wind Direction                | WSW                  | SW                   | SW          | SSW                  |
| Precipitation (mm/h)          | 0.0                  | 0.0                  | 0.0         | 0.0 – 1.8            |
| Damp road/ wet ground         | No                   | No                   | No          | Yes                  |
| Fog/snow/ice                  | None                 | None                 | None        | None                 |

Table 5: Second Visit Weather Conditions

Second visit’s weather data taken from [www.metoffice.gov.uk](http://www.metoffice.gov.uk) from the Erbistock weather station, located at approximately 2.1km south of the proposed development.



5 Noise Measurement Procedure

5.1 Survey Date

First Visit: 03 – 06/02/23  
Second Visit: 24 – 27/08/2024

5.2 Personnel Present

First Visit: Pawel Tatar BSc AMIOA  
Second Visit: Jonny Spratt BSc (Hons)

5.3 Survey Equipment Used

| Manufacturer | Model     | Serial No. | Description                                          |
|--------------|-----------|------------|------------------------------------------------------|
| Rion         | NA-28     | 00211583   | Integrating Sound Level Meter and Real Time Analyser |
| Rion         | NL-52     | 01032413   | Integrating Sound Level Meter and Real Time Analyser |
| Rion         | NL-52     | 00976149   | Integrating Sound Level Meter and Real Time Analyser |
| Rion         | NC-74     | 35125832   | Acoustic Calibrator                                  |
| Rion         | NC-74     | 34678495   | Acoustic Calibrator                                  |
| Rion         | NL-52     | 01054205   | Integrating Sound Level Meter and Real Time Analyser |
| Pulsar       | Model 105 | 59964      | Acoustic Calibrator                                  |

Table 5: Survey Equipment Used

5.4 Calibration

The sound level meters were calibrated with the field calibrator to a level of 94.0 dB @ 1 kHz prior to and on completion of the survey. No significant drift in calibration was observed. The meters used during the survey are precision grade Class 1.  
Calibration certificates are available on request.

5.5 External Ambient Sound Measurements

The measurement locations chosen during the survey were deemed suitable for the determination of the noise levels able to impact upon the façades of the proposed development.  
The sound level meters were set to measure broadband  $L_{Aeq}$ ,  $L_{A90}$ ,  $L_{A10}$ , and  $L_{AFmax}$  in 5-minute periods, as well as A-weighted 1:1 octave spectrum analysis over a 72-hour weekend period.



## 5.5.1 Monitoring Position 1

A microphone was placed 3m above the ground floor surface at first-floor level 1m from the west façade overlooking Hill Street/Regent Street. The sound level meter was set to record WAV file audio recordings for all maximum sound level events above 75 dBA.

## 5.5.2 Monitoring Position 2

A microphone was placed on a roof outside front window, 1.5m above the canopy surface and 1m away from the front façade, overlooking Hope Street. The sound level meter was set to record WAV file audio recordings for all maximum sound level events above 70dBA.

## 5.5.3 Monitoring Position 3

A microphone was placed 3m above the ground floor surface at first-floor level 1m from the rear façade overlooking Brynyffynnon.

## 5.5.4 Monitoring Position 4 (2<sup>nd</sup> Visit)

A microphone was placed protruding through the window at second floor level 1m away from the façade directly overlooking the Rocking Chair entertainment venue. The sound level meter was set to record WAV file audio recordings for all maximum sound level events above 70dBA. The meter was set to measure the complete survey duration.



## 5.6 Location Plan of Measurement Positions

The location plan below shows the proposed development and location positions of the meters.

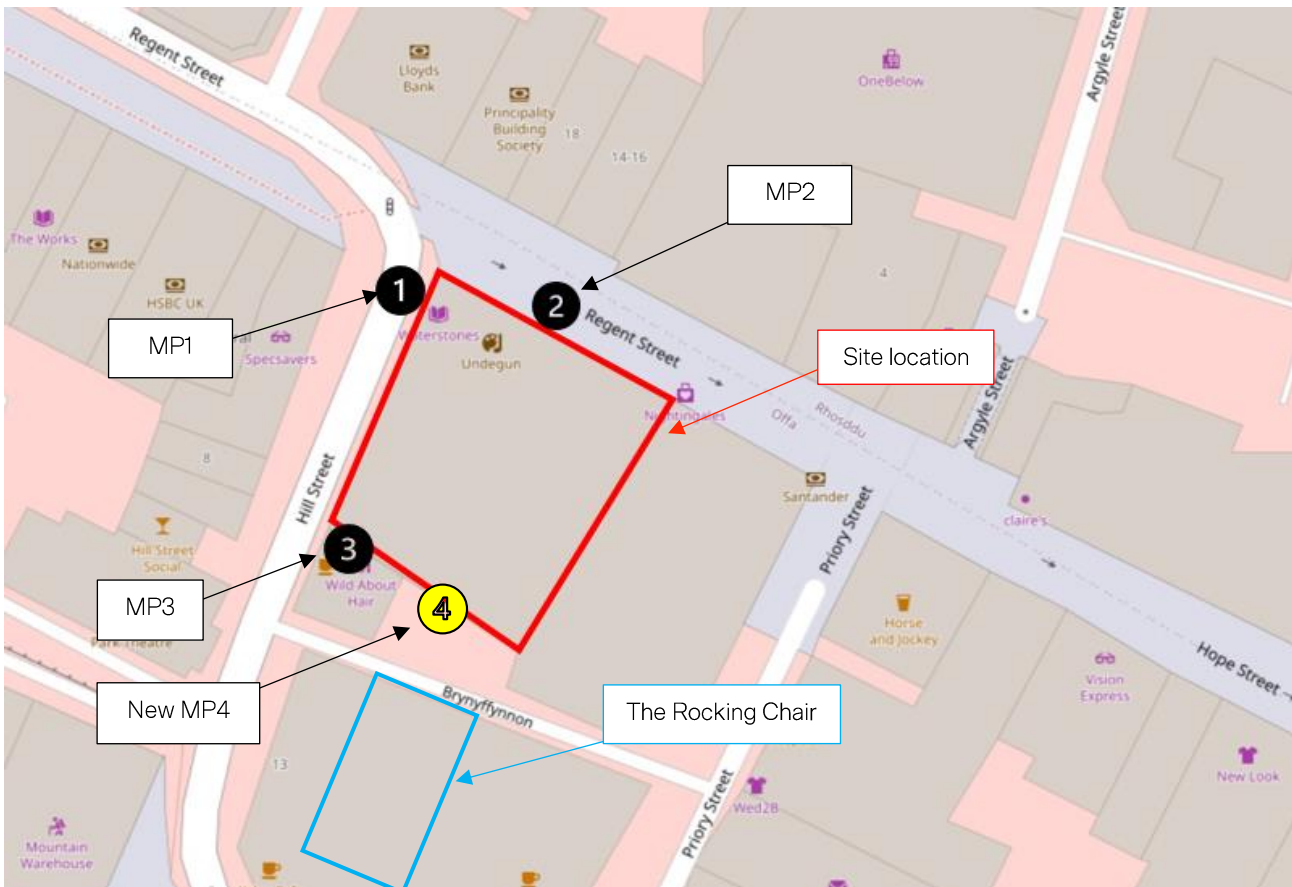


Figure 1: Indicative Site Map. Image Taken from [www.openstreetview.org](http://www.openstreetview.org)



## 6 Results and Analysis

### 6.1 External Ambient Sound Measurement Analysis in Accordance with BS 8233:2014

The following table presents the measured results from all monitoring positions during the first visit.

| Monitoring position | Day      | Time Period | Time Base T (hours) | $L_{Aeq,T}$ (dB) | $L_{AFmax}$ (dB) | $L_{A90}$ (dB) | $L_{A10}$ (dB) |
|---------------------|----------|-------------|---------------------|------------------|------------------|----------------|----------------|
| 1                   | Friday   | Daytime     | 16                  | 66.6             | -                | 56.8           | 68.0           |
|                     |          | Night time  | 8                   | 63.7             | 62.4 – 104.5     | 51.7           | 63.2           |
|                     | Saturday | Daytime     | 16                  | 66.6             | -                | 57.4           | 67.9           |
|                     |          | Night time  | 8                   | 62.9             | 64.8 – 94.1      | 52.9           | 64.8           |
|                     | Sunday   | Daytime     | 16                  | 65.5             | -                | 54.5           | 66.7           |
|                     |          | Night time  | 8                   | 57.4             | 50.4 – 83.3      | 49.7           | 58.1           |
| 2                   | Friday   | Daytime     | 16                  | 61.2             | -                | 52.6           | 60.6           |
|                     |          | Night time  | 8                   | 58.2             | 54.7 – 92.2      | 47.0           | 55.9           |
|                     | Saturday | Daytime     | 16                  | 59.4             | -                | 53.0           | 60.6           |
|                     |          | Night time  | 8                   | 59.5             | 56.3 – 91.6      | 48.3           | 58.1           |
|                     | Sunday   | Daytime     | 16                  | 65.1             | -                | 50.1           | 58.8           |
|                     |          | Night time  | 8                   | 51.0             | 46.8 – 81.0      | 45.8           | 51.0           |
| 3                   | Friday   | Daytime     | 16                  | 62.4             | -                | 52.8           | 64.2           |
|                     |          | Night time  | 8                   | 58.2             | 56.8 – 93.0      | 43.4           | 55.9           |
|                     | Saturday | Daytime     | 16                  | 61.7             | -                | 52.1           | 63.4           |
|                     |          | Night time  | 8                   | 56.6             | 53.0 – 92.2      | 44.7           | 57.3           |
|                     | Sunday   | Daytime     | 16                  | 61.4             | -                | 47.6           | 61.5           |
|                     |          | Night time  | 8                   | 51.7             | 42.1 – 83.2      | 42.1           | 49.8           |

Table 6: Measurement Results

Data charts can be found in the appendix.

The following table presents the measured results from Monitoring Position 4, undertaken during the second visit. For this monitoring position, the noise profile of the area includes entertainment noise emanating from the Rocking Chair. As such, in order to provide a robust approach, results show the measured ambient sound levels in 1-hour intervals during both day and night time periods.



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| Monitoring position | Day      | Time Period | Time Base $T$ | $L_{Aeq,T}$ (dB) | Highest $L_{Aeq,1hour}$ (dB) | $L_{AFmax}$ (dB) |
|---------------------|----------|-------------|---------------|------------------|------------------------------|------------------|
| 4                   | Saturday | Daytime     | 13hr          | 59.8             | 62.8                         | -                |
|                     |          | Night-time  | 8hr           | 57.1             | 62.1                         | 56.3 - 86.6      |
|                     | Sunday   | Daytime     | 16hr          | 54.0             | 56.2                         | -                |
|                     |          | Night-time  | 8hr           | 50.5             | 54.0                         | 49.7 - 79.4      |
|                     | Monday   | Daytime     | 16hr          | 54.1             | 57.4                         | -                |
|                     |          | Night-time  | 8hr           | 52.3             | 58.3                         | 47.5 - 93.5      |
|                     | Tuesday  | Daytime     | 4hr           | 54.5             | 55.5                         | -                |

Table 7: Second Visit MP4 Measurement Results

As can be seen, the highest  $L_{Aeq,t}$  occurred on the Saturday when a special event i.e. DJ session was taking place within the Rocking Chair. The session started at 22:00 and finished at around 02:00, this period being where the measured ambient noise levels are the highest. Data charts are shown in the appendix.

Analysis shows that the highest  $L_{Aeq,1hour}$  during the day time occurred at 13:00 and was in its majority influenced by patron activity in the vicinity. The highest  $L_{Aeq,1hour}$  during the nighttime occurred at 23:00 whilst a hip-hop DJ (DJ Format) session was taking place. Further analysis has shown that the low frequency content is significantly high, typical of a hip-hop music playback.

As such, in consultant's opinion, in order to provide a robust scenario, both highest  $L_{Aeq,1hour}$  of 62.8 and 62.1 during the day and nighttime, respectively, will be used in the assessment in order to provide the recommendations at this monitoring position.

## 6.2 Night Time $L_{AFmax}$ Analysis

The  $L_{AFmax}$  measured during the night time (23:00-07:00) has been analysed. WHO Community Noise Guidelines states "For a good night sleep it is believed that indoor sound pressure should not exceed approximately 45 dB  $L_{AFmax}$  more than 10 – 15 times per night (Vallet & Vernet 1991).

### 6.2.1 Night Time $L_{AFmax}$ Selection

All max levels were considered. It was found that multiple max events were related to night time activities during the weekend time, on Friday and Saturday nights. Table shown in Section 8.3 shows an amount of max level exceedances during night time every night based on the collected data and calculations.

### 6.2.2 Night Time $L_{AFmax}$ at Monitoring Position 1

The maximum measured  $L_{AFmax}$  is 104.5 dB, which occurred at 02:00 on Friday night. The next highest  $L_{AFmax}$  is 94.1 dB, which occurred at 23:15 on Saturday.  $L_{AFmax}$  100.0 dB is exceeded only once and  $L_{AFmax}$  90.0 dB is exceeded six times during the night time periods throughout the weekend.

The WAV file recordings and frequency spectrum data indicate that on Friday the  $L_{AFmax}$  104.5 dB as well as 90.0 dB events were from modified exhaust vehicles accelerating, 88.8 dB which occurred at 06:20 is also due to a vehicle acceleration. The  $L_{AFmax}$  85.4 dB event was from an HGV/road sweeper.



On Saturday the  $L_{AFmax}$  94.1 dB event was related to people shouting, and the 91.6 dB event was from a metallic object being dropped on the floor. Both events are likely to be related to night time activities. The  $L_{AFmax}$  90.6 dB was from modified exhaust vehicle acceleration.

The  $L_{AFmax}$  94.1 dB event which occurred at 23:15 on Saturday night will be used for the assessment at this monitoring position as this is considered representative of other  $L_{AFmax}$  events during the weekend night time period.

## 6.2.3 Night Time $L_{AFmax}$ at Monitoring Position 2

The maximum measured  $L_{AFmax}$  is 92.2 dB, which occurred at 02:00 on Friday night which is the same max event as measured at monitoring position 1. The next highest  $L_{AFmax}$  is 91.6 dB, which occurred at 00:35 on Saturday night.  $L_{AFmax}$  90.0 dB is exceeded only twice and  $L_{AFmax}$  85.0 dB is exceeded eight times throughout the weekend night time periods.

The WAV file recordings and frequency spectrum data indicate that on Friday the  $L_{AFmax}$  92.2 dB event was from modified exhaust vehicle accelerating, the 86.2 dB event was also from a vehicle. The  $L_{AFmax}$  85.3 dB event was from an HGV/road sweeper.

On Saturday the  $L_{AFmax}$  91.6 dB event was from modified exhaust vehicle accelerating and the 86.6 dB event was also from a vehicle.

The  $L_{AFmax}$  85.3 dB event which occurred at 05:50 on Friday night will be used for the assessment at this monitoring position as this is considered representative of other  $L_{AFmax}$  events during the night time period.

Various max events related to the night time economy, such as people shouting, were recorded at this monitoring position. The events however were lower than the  $L_{AFmax}$  level chosen for the assessment.

## 6.2.4 Night Time $L_{AFmax}$ at Monitoring Position 3

The maximum measured  $L_{AFmax}$  is 93.0 dB, which occurred at 04:50 on Friday night. The next highest  $L_{AFmax}$  is 92.2 dB, which occurred at 00:30 on Saturday night.  $L_{AFmax}$  90.0 dB is exceeded only twice and  $L_{AFmax}$  85.0 dB is exceeded seven times during the night time periods.

The frequency spectrum data suggests that the  $L_{AFmax}$  87.7 dB event which occurred on Saturday night was from HGV pass. This event will be used for the assessment as it is considered representative of other max events during the night time.

## 6.2.5 Night Time $L_{AFmax}$ at Monitoring Position 4 (2<sup>nd</sup> Visit)

The maximum measured  $L_{AFmax}$  is 93.5 dB, which occurred at 05:50 on Tuesday morning. The next highest  $L_{AFmax}$  is 86.6 dB, which occurred at 01:30 on Saturday night, which was caused by a sports car revving. Subsequent events were also caused by car passings. As such, this event will be used for the assessment as it is considered representative as well as represent a robust scenario.

It is worth to mention that no  $L_{Amax}$  events coming from the Rocking Chair or any patron activity associated with the venue were between the highest maximum events, which were mostly caused by passing cars in the vicinity.



## 7 Recommendations

The estimated internal noise levels attributed by the external noise sources have been assessed over an average of  $L_{Aeq,T}$  from the daytime and night time survey periods and  $L_{AFmax}$  values from the night time.

For Monitoring Position 4 (2<sup>nd</sup> visit), in order to provide a more robust approach for those residential apartments at the rear façade, the estimated internal noise levels for both day and nighttime periods have been assessed using:

- The highest 1-hour interval  $L_{Aeq,T}$  and octave band sound levels for both day and nighttime.
- The  $L_{AFmax}$  maximum value analysis from the night time.

With the following considerations:

- The most onerous glazing and ventilation specification between MP3 and MP4 will be applied universally to the whole rear façade.
- Due to the front façade being in a conservation area, windows to the Regent Street are to be retained. As such, a secondary window specification is recommended.

### 7.1 Glazing & Ventilation Specification 1 – Front Façade

The glazing specification in all habitable rooms on the front façade should consist of at least 4mm glass (existing) / 100mm void / 6mm glass secondary window unit; in well-sealed frames.

The ventilation specification should consist of a quality mechanical system or a passive acoustic vent as shown in the table below.

| Room         | Glazing                                                        | Ventilation                                                     |
|--------------|----------------------------------------------------------------|-----------------------------------------------------------------|
| Bedrooms     | Existing single-glazed sash window /<br>100mm void / 6mm glass | Greenwood MA3051 wall acoustic vent or<br>Active MV ventilation |
| Living rooms |                                                                |                                                                 |

Table 5: Specification 1

Existing windows must be made good and to ensure the frames are well sealed and tightly fitted with no cracks or gaps. The reveals of the secondary glazing should be well sealed and preferably lined with an absorbent material.

### 7.2 Glazing & Ventilation Specification 2 – Rear Façade

The glazing and ventilation specification in bedrooms & living rooms is outlined in the table below. Two glazing options will be set out, a triple-glazing unit comprising a typical double-glazed unit with a secondary window and a double Pilkington Optiphon unit. Both options will require replacing any existing window sets.



| Room         | Glazing                                                                                                                                                        | Ventilation                                                      |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| Bedrooms     | Option 1 – Triple Glazing 6mm glass / 16mm air / 4mm glass / 150mm air / 6mm glass<br>Option 2 – Double glazing 12.8mm Optiphon / 20mm argon / 16.8mm Optiphon | Greenwood MA3051 wall acoustic vent or mechanical ventilation    |
| Living rooms | 8mm glass / 16mm air / 4mm glass                                                                                                                               | Greenwood Vent 5000EA + 2 Acoustic Set or mechanical ventilation |

Table 5: Specification 2

Additionally, upgrades i.e. independent acoustic wall lining to the external wall in bedrooms will be required in order to achieve the internal noise level criteria, as shown in the following section.

## 7.2.1 External Wall Specification

The external wall specification in bedrooms is shown in the table below.

| Room         | External Wall Construction     | Upgrade                                                                                                                                                                                                                                                    |
|--------------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bedrooms     | Existing 300mm solid brickwork | <ul style="list-style-type: none"> <li>- External wall.</li> <li>- 15mm cavity.</li> <li>- 75x50mm timber batten filled with 50mm mineral wool insulation of 45kg/m<sup>3</sup>.</li> <li>- 2 no. layers of 15mm sound/fire rated plasterboard.</li> </ul> |
| Living rooms |                                | None                                                                                                                                                                                                                                                       |

Table 5: External Wall Upgrade for Specification 2

## 7.3 Glazing & Ventilation Specification 3 – West Façade

The glazing and ventilation specification in bedrooms & living rooms should consist of double glazed unit in well-sealed frames and a quality mechanical system or a passive acoustic vent as shown in the table below.

| Room         | Glazing                                  | Ventilation                                                   |
|--------------|------------------------------------------|---------------------------------------------------------------|
| Bedrooms     | 10mm glass / 16mm argon / 8.8mm Optiphon | Greenwood MA3051 wall acoustic vent or mechanical ventilation |
| Living rooms | 8mm glass / 16mm air / 4mm glass         | Greenwood Vent 5000EA + 2 Acoustic Set or mechanical          |

Table 5: Specification 3

## 7.4 Glazing & Ventilation Specification 4 – Atrium Façade

The glazing and ventilation specification in bedrooms & living rooms should consist of double glazed unit in well-sealed frames and a quality mechanical system or a passive acoustic vent as shown in the table below.



| Room         | Glazing                          | Ventilation                                          |
|--------------|----------------------------------|------------------------------------------------------|
| Bedrooms     | 8mm glass / 16mm air / 4mm glass | Greenwood Vent 5000EA + 2 Acoustic Set or mechanical |
| Living rooms |                                  |                                                      |

Table 5: Specification 4

7.5 Habitable Room Ceilings in Roof Space

All ceilings/roof in bedrooms and living rooms on the top floor are assumed to be constructed of a min. 100mm concrete structure. This construction should be capable of meeting the minimum required sound reduction.

7.6 Specification Guide

Below is a visual aid to identify the location of the glazing specifications as described above for all floors.

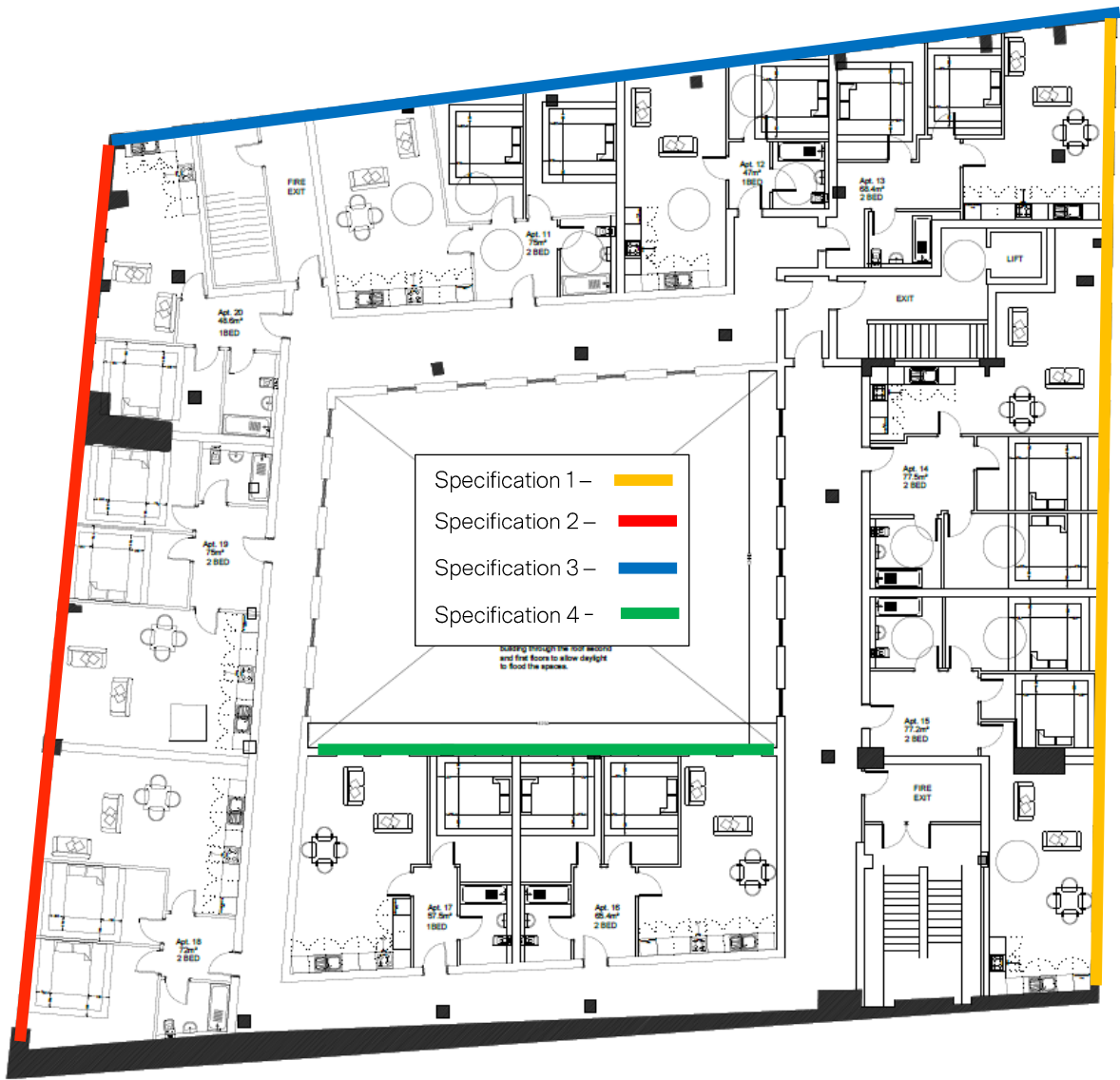


Figure 2: Specification Guide



## 7.7 Notes on Ventilation

NOTE 5 in section 7.7.2 of BS 8233:2014 states “if relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.”

It should be noted that it's the responsibility of JSM Company Group Limited to ensure that the ventilation strategy is sufficient to meet the requirements of Building Regulations Part F

It is our understanding that all dwellings may be ventilated either with passive vents or mechanically ventilated. Where mechanical ventilation is utilised, the system is to be designed by a suitably qualified engineer or M&E consultant. The system shall be designed so the sound levels from any external plant or inlet/outlets do not exceed the background noise level at any noise receptor, i.e., outside a neighbouring window. This may require further assessment once the type and location of system has been specified.

The glazing and ventilation suggestions have been calculated assuming the windows are tightly closed. However, it must be noted that windows are suggested to be openable to provide rapid or purge ventilation or means of escape.



## 8 Calculation Methodology

Calculations for the BS 8233:2014 assessment have been based on the rigorous calculation method of BS 8233:2014 and BS EN 12354-3.

In order to calculate the glazing recommendations, the measurements at all positions have had a façade correction of 3 dB applied in order to adjust the measurement so that it is comparable to a free-field sound pressure level.

The calculations are based on one vent per room. If more ventilation is required, then further calculations will need be carried out. Part F (Ventilation) expert advice must be sought

All room dimensions used in calculations are based on drawings provided by the architect. See appendix – Site plans.

The calculations assume the external walls to be solid brickwork. Some building elements have been modelled in INSUL Acoustic Prediction Software with a 3 dB correction applied to account for a margin of error within the software.

The calculations assume each living room has a reverberation time of 0.5 and each bedroom of 0.4 seconds.

The predictions also have been calculated assuming all windows are tightly closed.

### 8.1 Building Elements

The following table shows the expected performance of the glazing and ventilation. The selected units or products described have been used as a guide to form part of the specification. Other similar units or products can be used provided they can achieve the given minimum acoustic performance.

| Element     | Description                                      | $R_w/D_{n,e,w}$<br>( $C, C_{tr}$ )<br>(dB) | Octave Centre Frequencies (Hz)<br>SRI / $D_{n,e}$ (dB) |     |     |    |    |    |
|-------------|--------------------------------------------------|--------------------------------------------|--------------------------------------------------------|-----|-----|----|----|----|
|             |                                                  |                                            | 125                                                    | 250 | 500 | 1k | 2k | 4k |
| Glazing     | 4mm / 100mm / 6mm<br>secondary glazing           | 46 (-2;-7)                                 | 27                                                     | 33  | 46  | 57 | 52 | 50 |
|             | 6mm / 16mm / 4mm /<br>150mm / 6mm triple glazing | 46 (-1;-4)                                 | 31                                                     | 37  | 43  | 48 | 45 | 58 |
|             | 12.8mm / 20mm / 16.8mm<br>Pilkington Optiphon    | 51 (-1;-4)                                 | 35                                                     | 45  | 49  | 50 | 54 | 65 |
|             | 10mm / 16mm / 8.8mm<br>Pilkington Optiphon       | 44 (-2;-6)                                 | 28                                                     | 31  | 42  | 45 | 50 | 58 |
|             | 8mm / 16mm / 4mm<br>double glazing               | 33 (-1;-4)                                 | 22                                                     | 21  | 28  | 38 | 40 | 47 |
| Ventilation | Greenwood MA3051<br>Acoustic Wall Ventilator     | 55 (-1;-3)                                 | 47                                                     | 46  | 49  | 56 | 66 | 69 |
|             | Greenwood EA5000.AC2<br>Acoustic Passive Vent    | 42 (-2;-4)                                 | 40                                                     | 38  | 32  | 47 | 54 | 48 |

Table 7: Table showing suggested Glazing & Ventilation



## 8.2 Example of Estimated Performance

The following table compares the estimated performance values with the measured values at the most exposed habitable rooms for each façade, thus representing a worst-case scenario.

| Location                       | Room        | Time period                | Measured Level      |                     | Estimated Internal  |                     |
|--------------------------------|-------------|----------------------------|---------------------|---------------------|---------------------|---------------------|
|                                |             |                            | $L_{Aeq,T}$<br>(dB) | $L_{AFmax}$<br>(dB) | $L_{Aeq,T}$<br>(dB) | $L_{AFmax}$<br>(dB) |
| Front Façade                   | Bedroom     | Daytime (07:00 – 23:00)    | 64.2                | –                   | 25.2                | –                   |
|                                |             | Night time (23:00 – 07:00) | 60.8                | 91.1                | 21.1                | 41.6                |
|                                | Living room | Daytime (07:00 – 23:00)    | 64.2                | –                   | 22.7                | –                   |
| Rear Façade<br>$L_{Aeq,1hour}$ | Bedroom     | Daytime (07:00 – 23:00)    | 59.8                | –                   | 16.2                | –                   |
|                                |             | Night time (23:00 – 07:00) | 59.1                | 83.6                | 29.9                | 38.7                |
|                                | Living room | Daytime (07:00 – 23:00)    | 59.8                | –                   | 27.1                | –                   |
| West Façade                    | Bedroom     | Daytime (07:00 – 23:00)    | 62.1                | –                   | 16.6                | –                   |
|                                |             | Night time (23:00 – 07:00) | 56.5                | 82.3                | 16.4                | 43.2                |
|                                | Living room | Daytime (07:00 – 23:00)    | 62.1                | –                   | 22.9                | –                   |

Table 8: Estimated performance



## 9 Conclusion

When installing the glazing and ventilation detail as well as any other relevant external wall upgrades as discussed in the recommendations section, the recommended internal noise levels described in BS 8233:2014 can be achieved in all habitable rooms.

The report has considered the commercial character and noise profile of the area, including entertainment noise, especially at the rear façade overlooking the Rocking Chair, considering all elements of the building fabric, including external wall, glazing and roof following a stricter methodology.



## 10 References

Planning Policy Wales Edition 11: February 2021

Planning Policy Wales Edition 12: February 2024

BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

World Health Organisation Guidelines for Community Noise

BS 7445-1:2003 Description and measurement of environmental noise – Part 1: Guide to quantities and procedures

BS EN 12758:2011 Glass in building – Glazing and airborne sound insulation

[openstreetmap.org](https://www.openstreetmap.org)

INSUL 9.0 Sound Insulation Prediction Software

### 10.1 Drawing References

520-P-02 First Floor

520-P-03 Second Floor

520-P-04 Elevations



## Appendix

Figure 1: Photograph Showing Monitoring Position 1



Figure 2: Photograph Showing Monitoring Position 2



Figure 3: Photograph Showing Monitoring Position 3



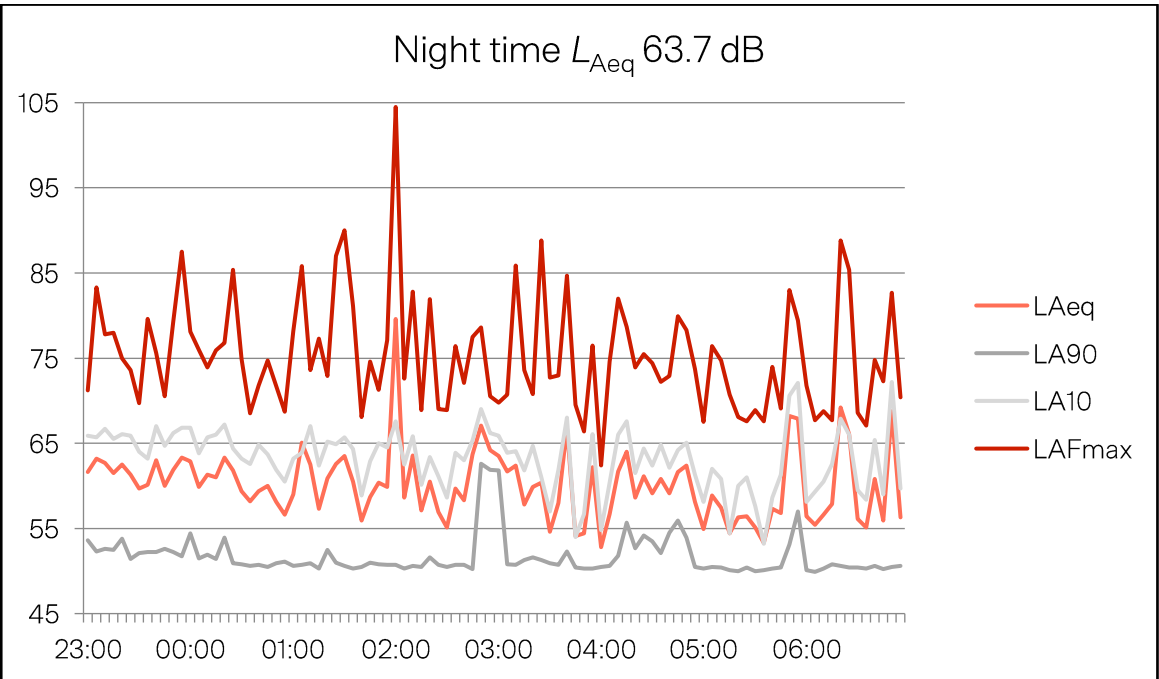
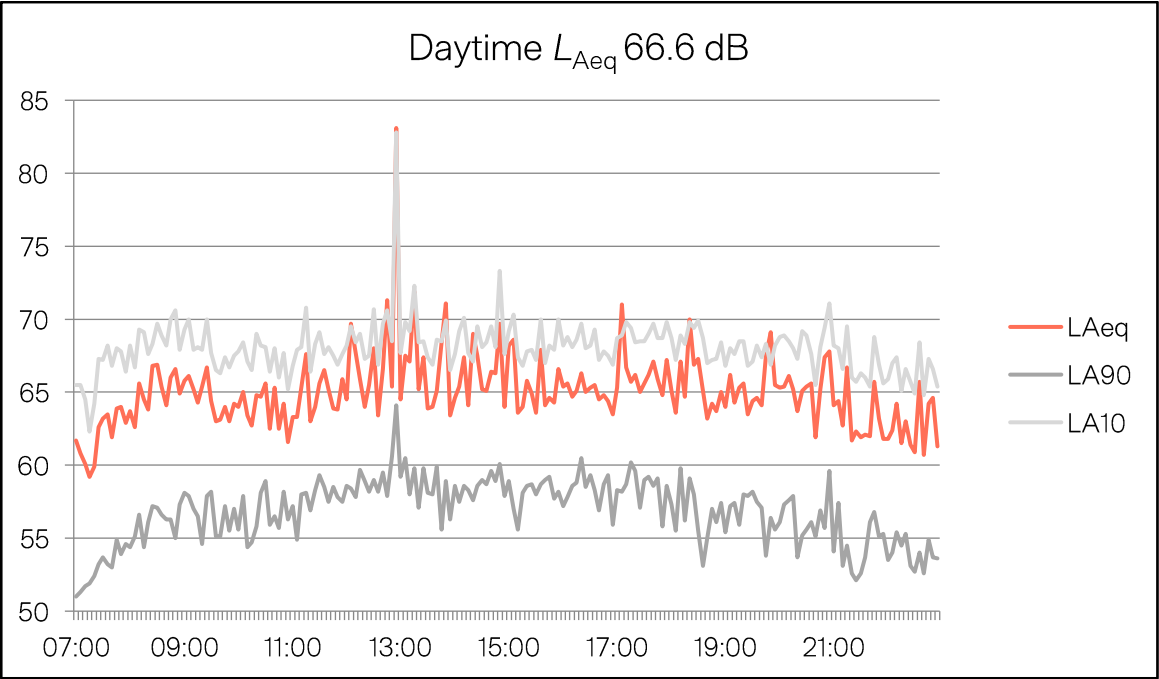
Figure 4: Photograph Showing Monitoring Position 4 (2<sup>nd</sup> Visit)



Measurement Results

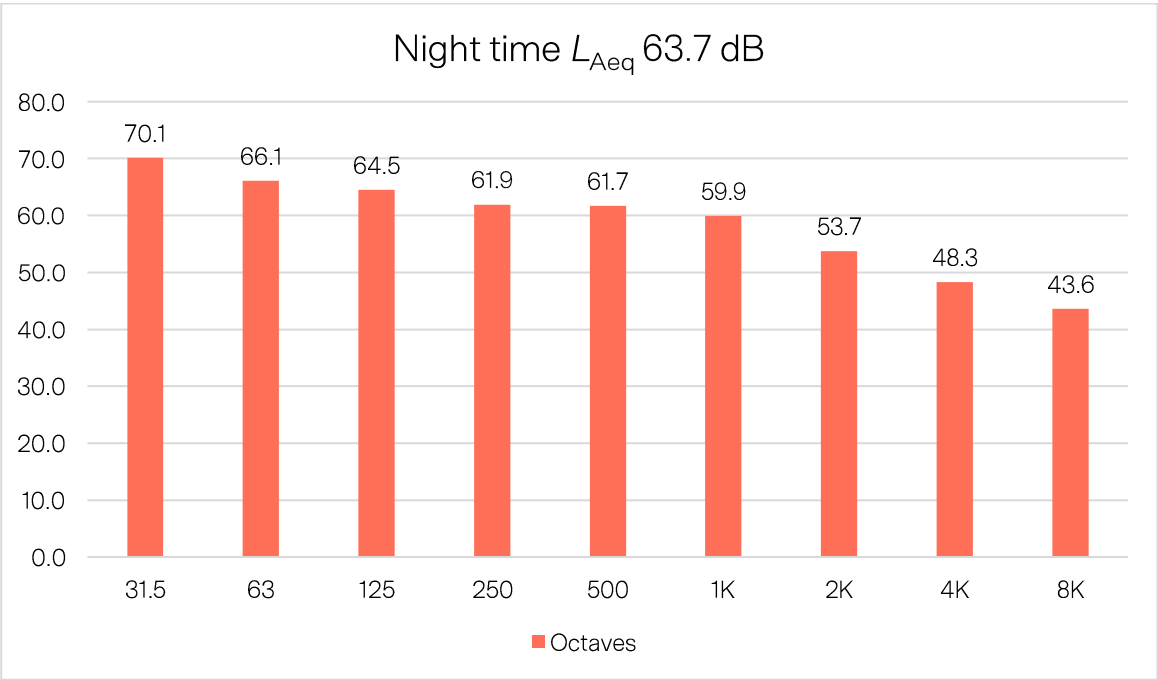
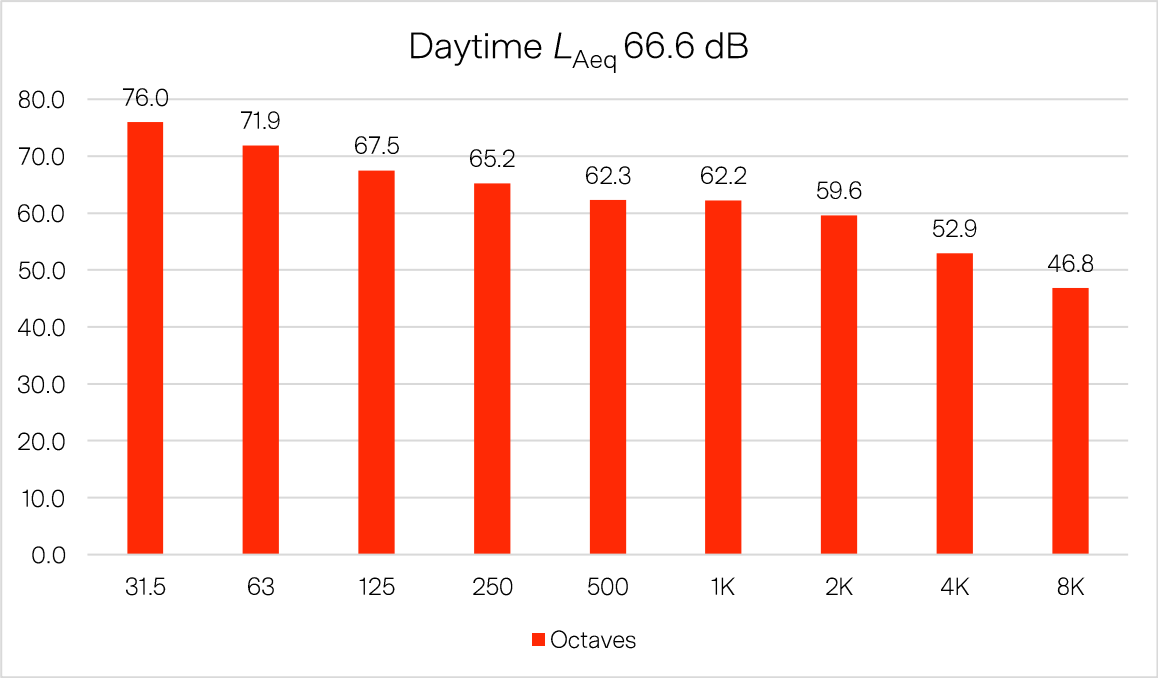
Monitoring Position 1

Friday/Monday

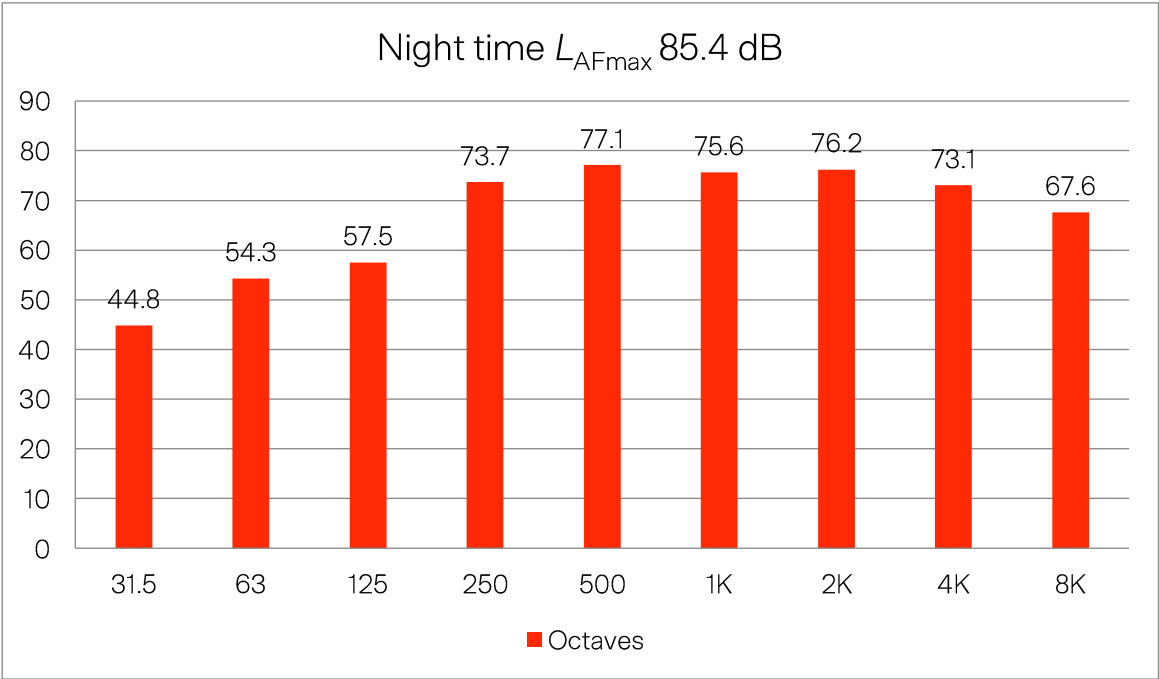


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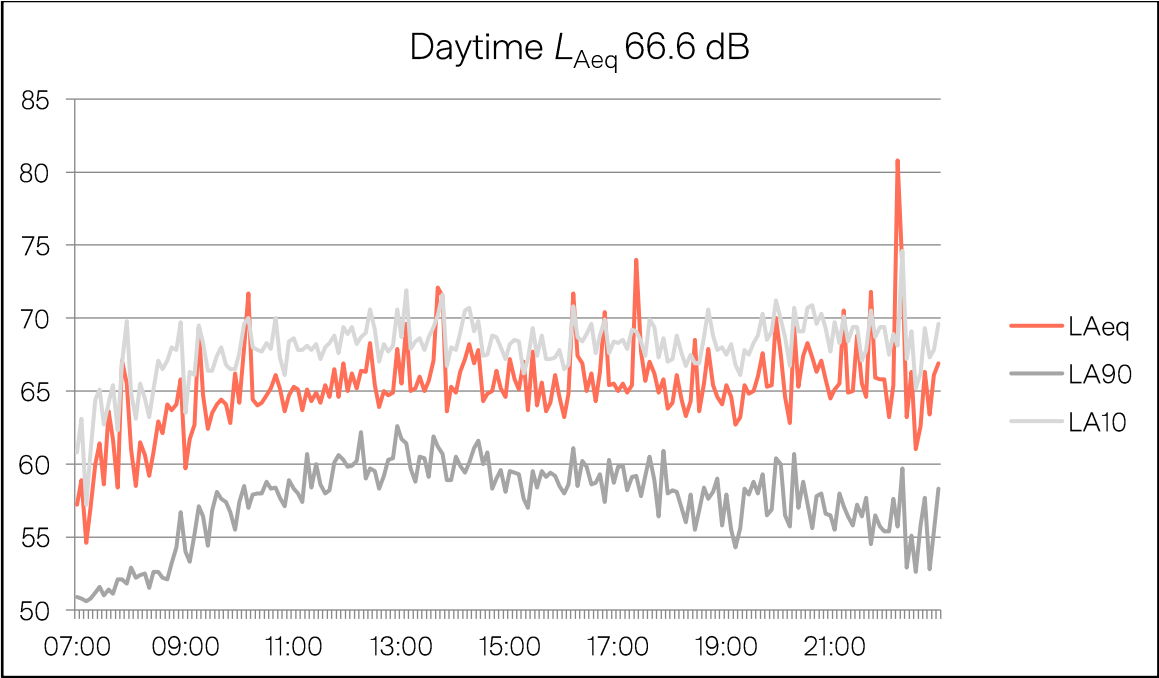
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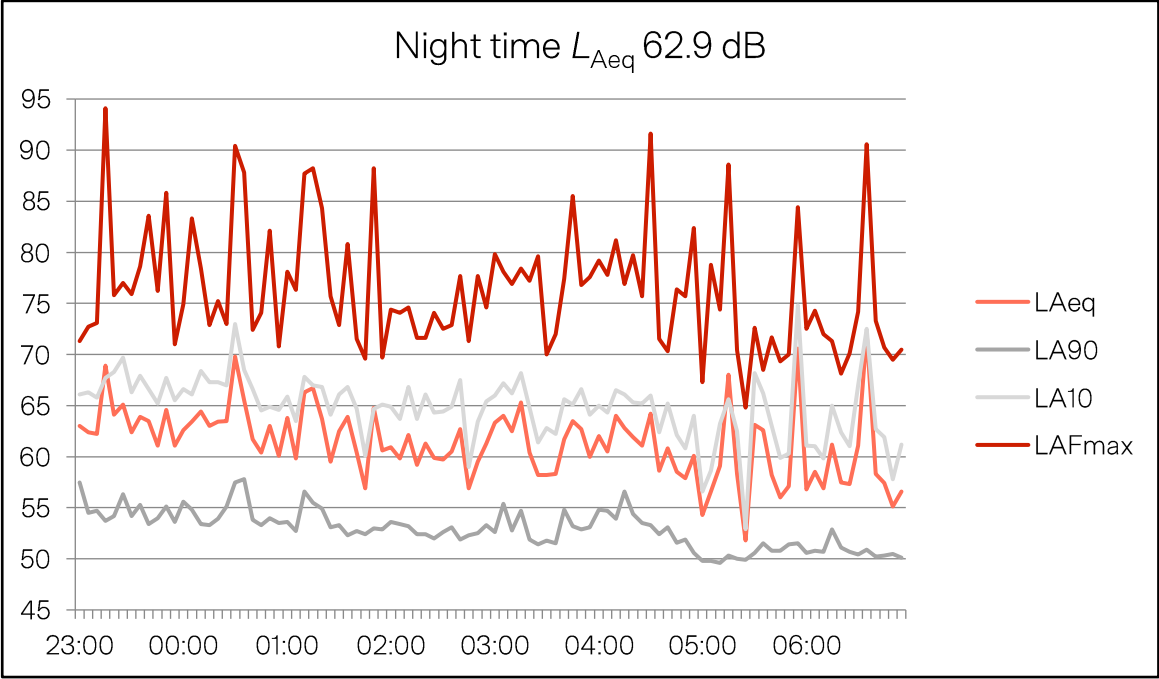


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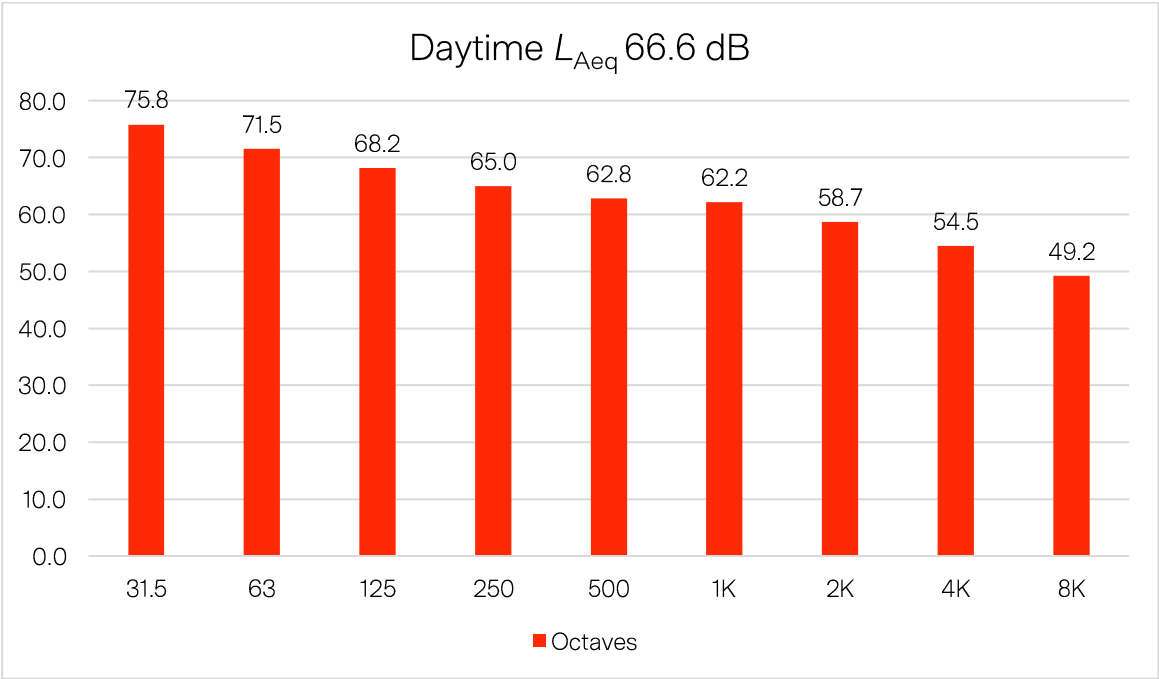


Saturday

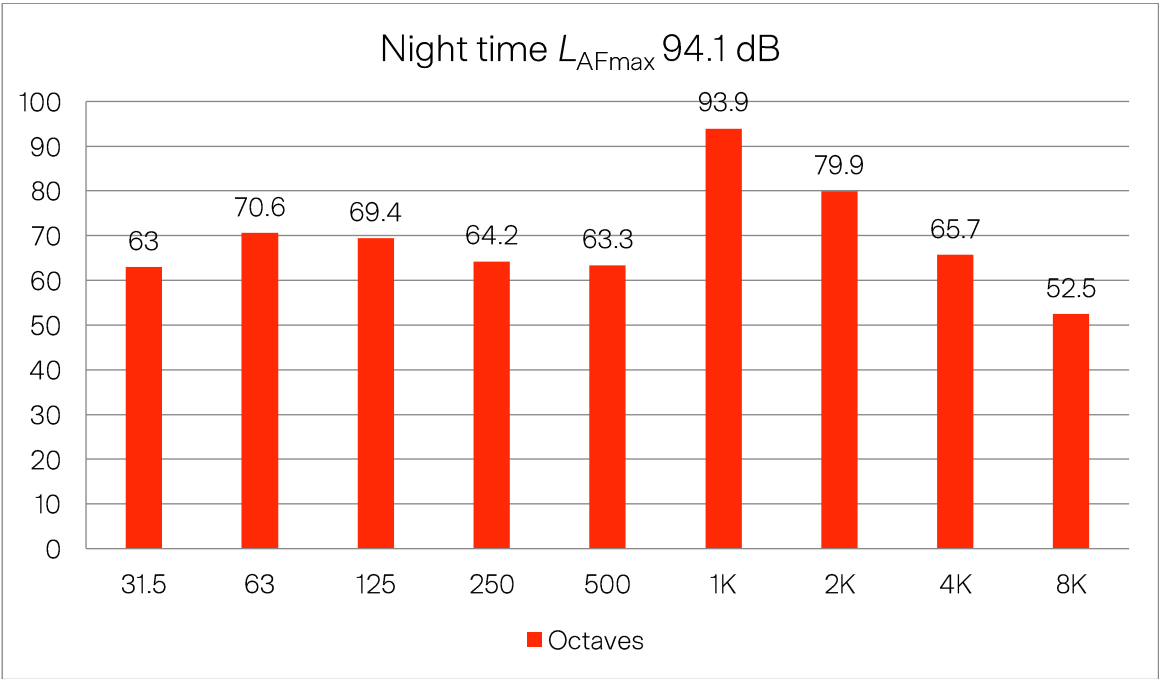
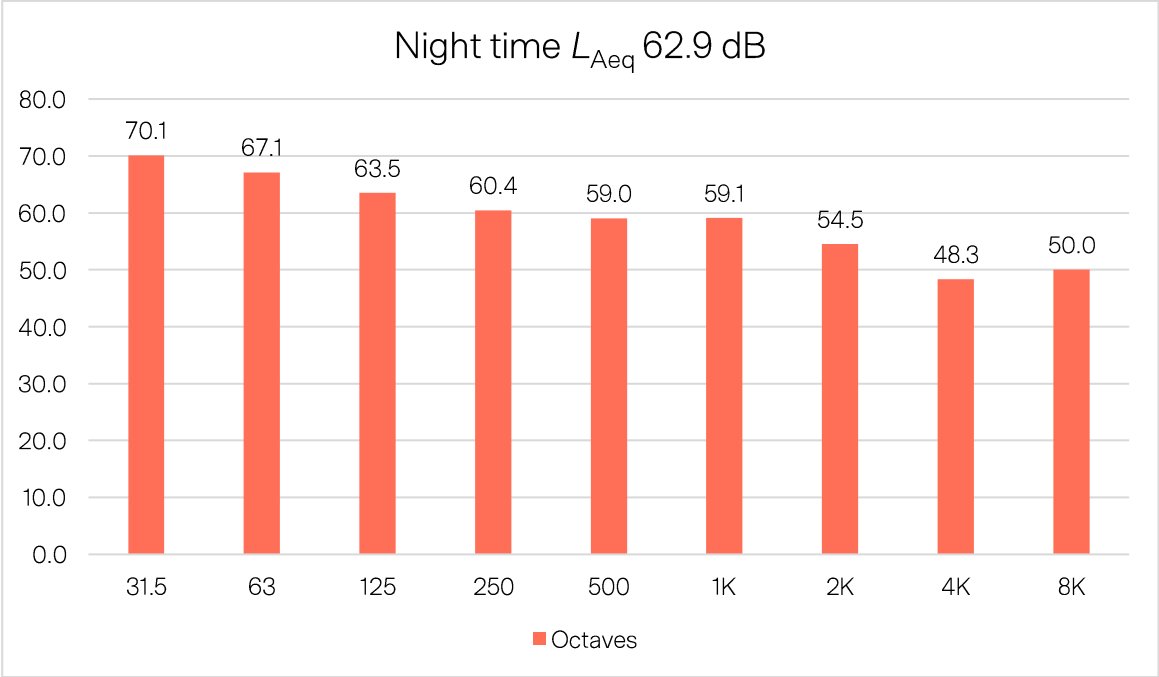




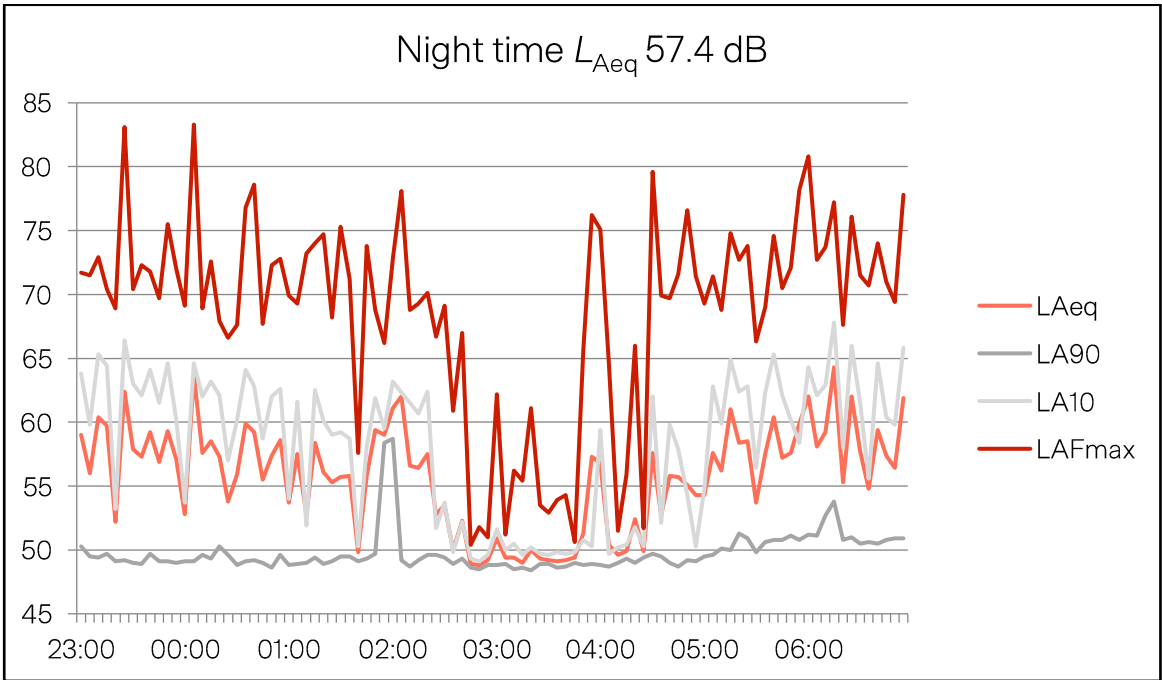
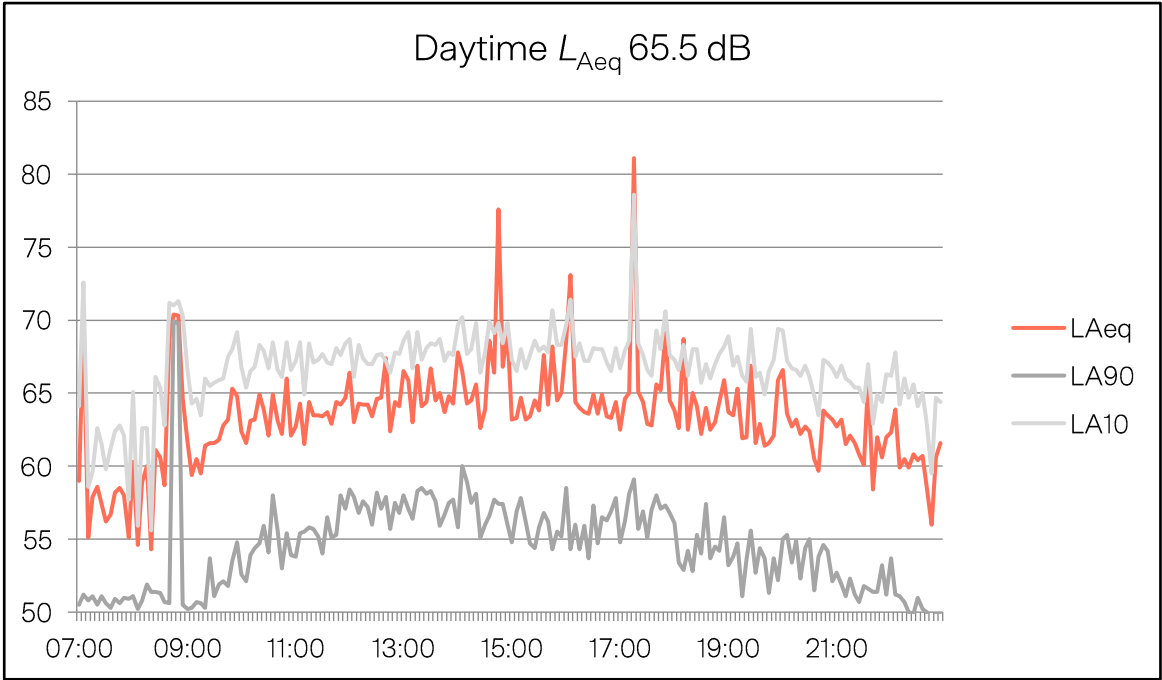
Un-weighted 1:1 Octave Results



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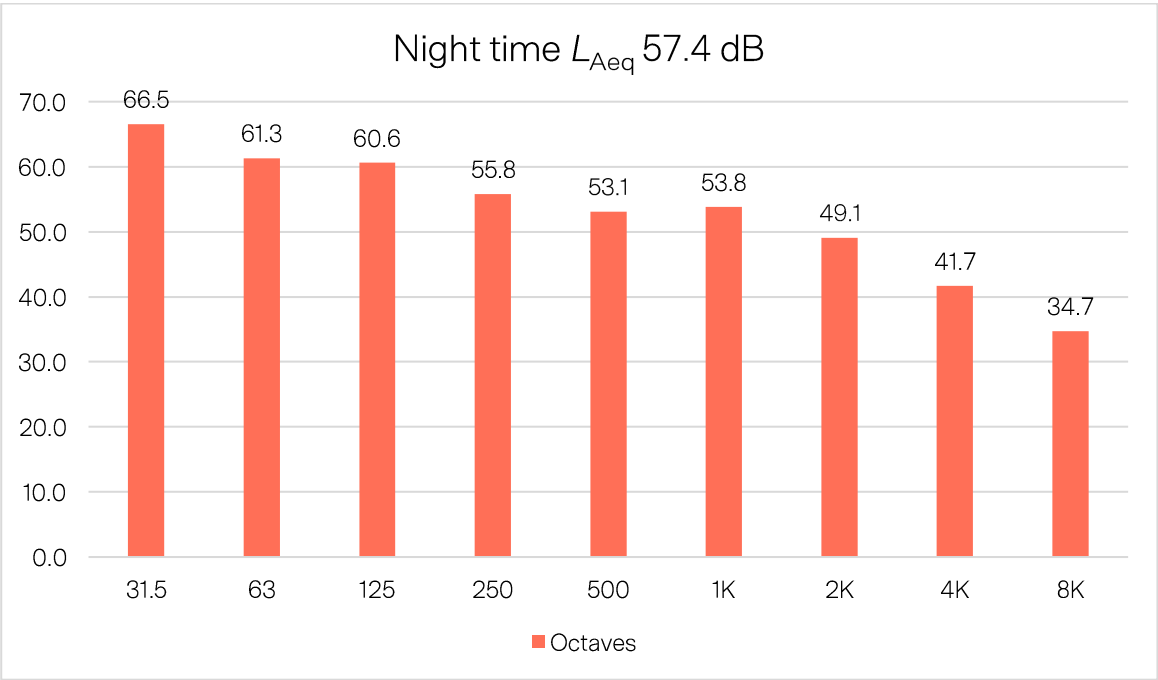
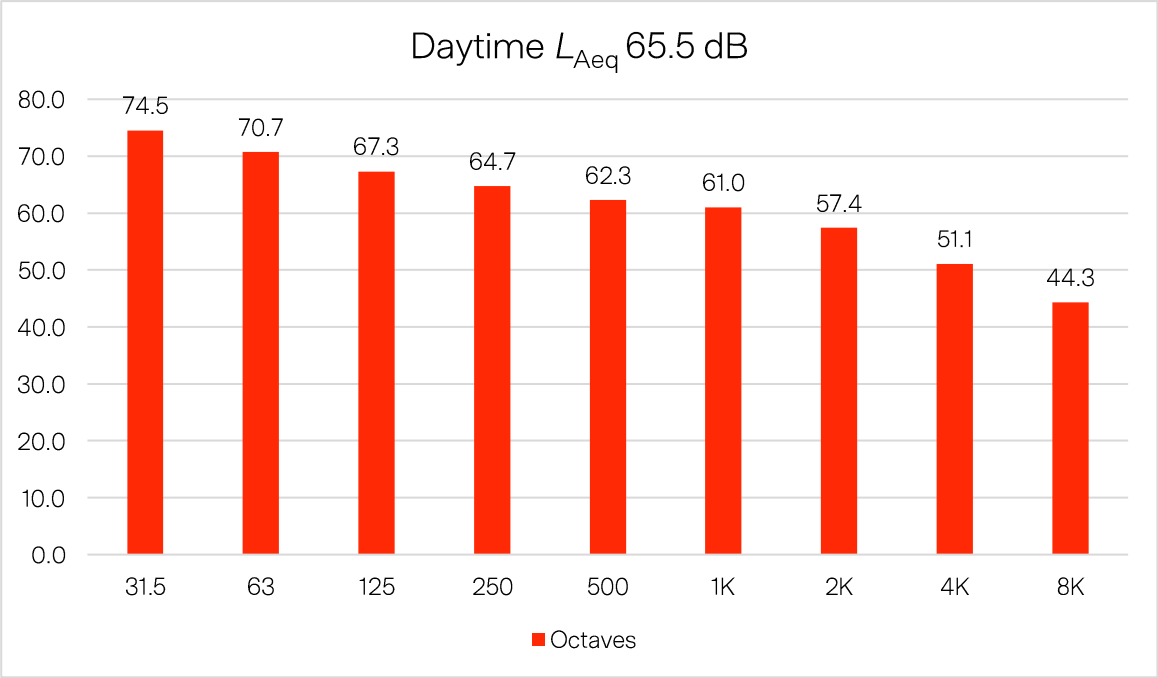


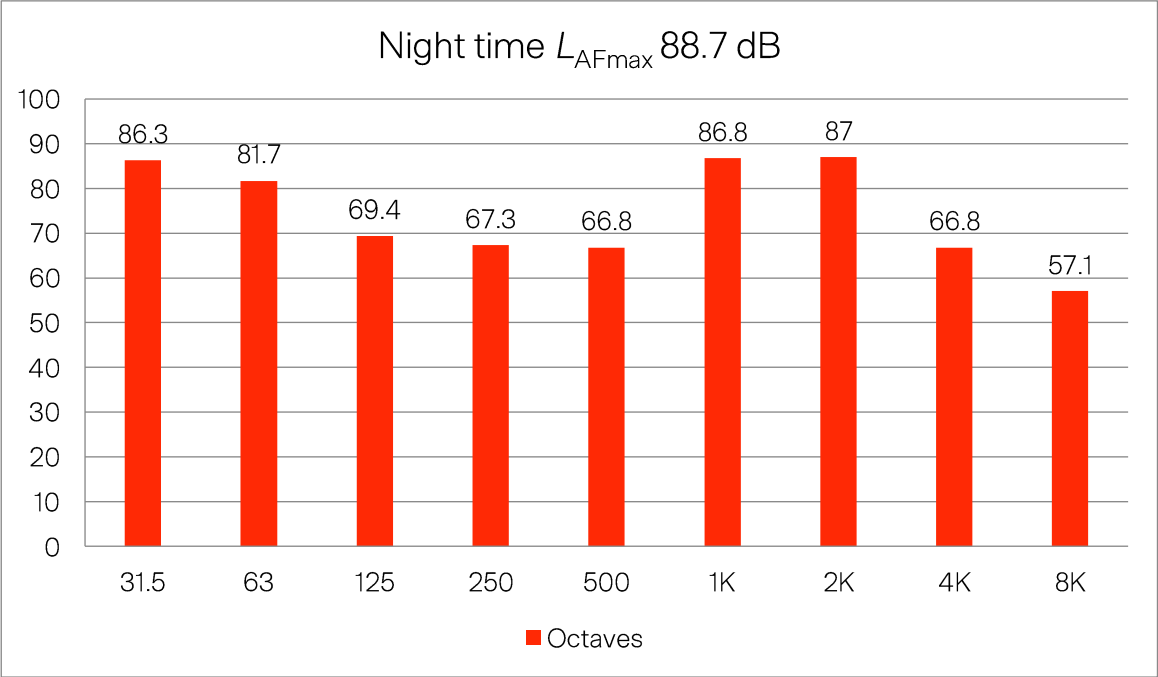
Sunday



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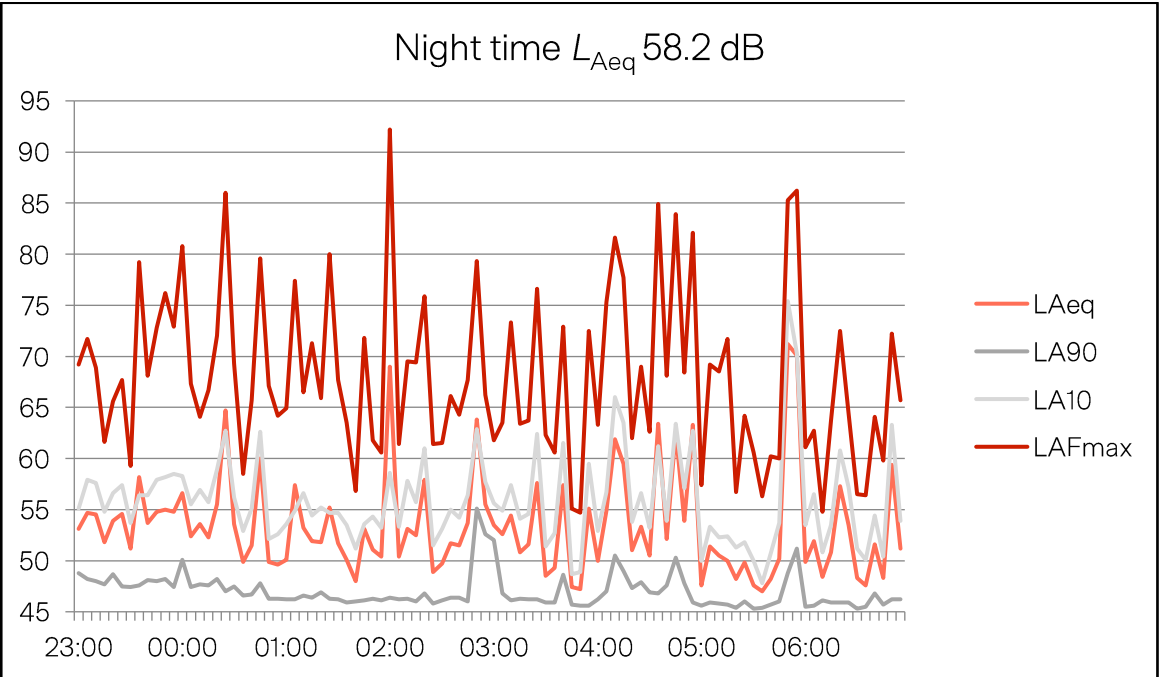
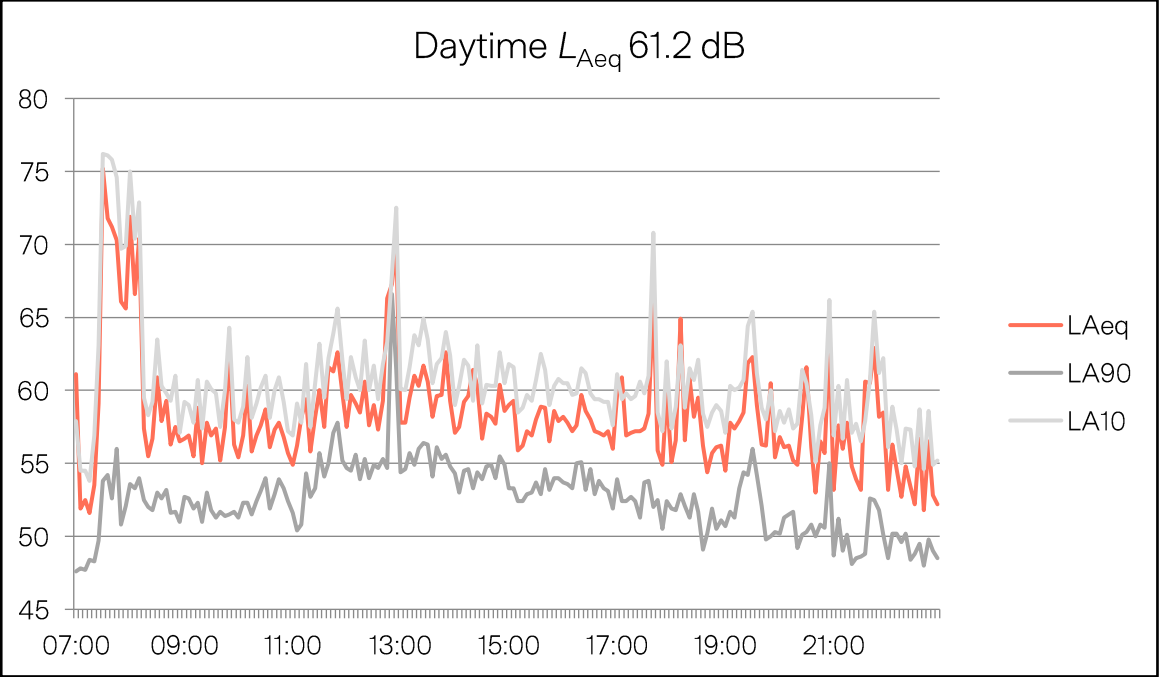
## Un-weighted 1:1 Octave Results





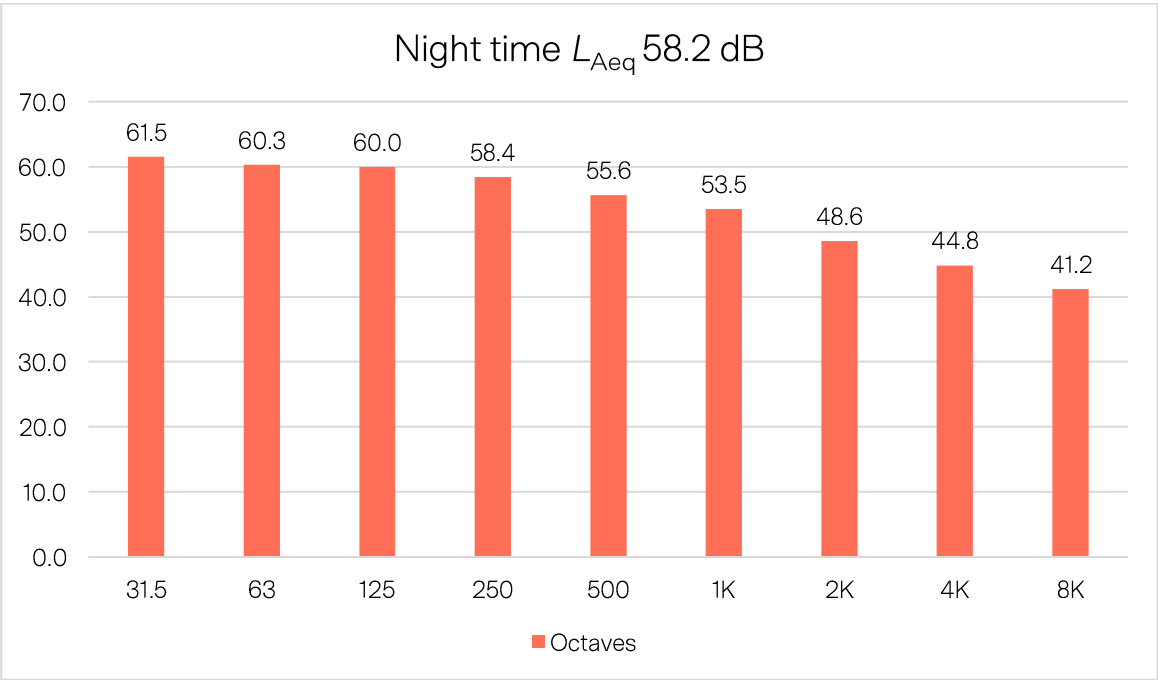
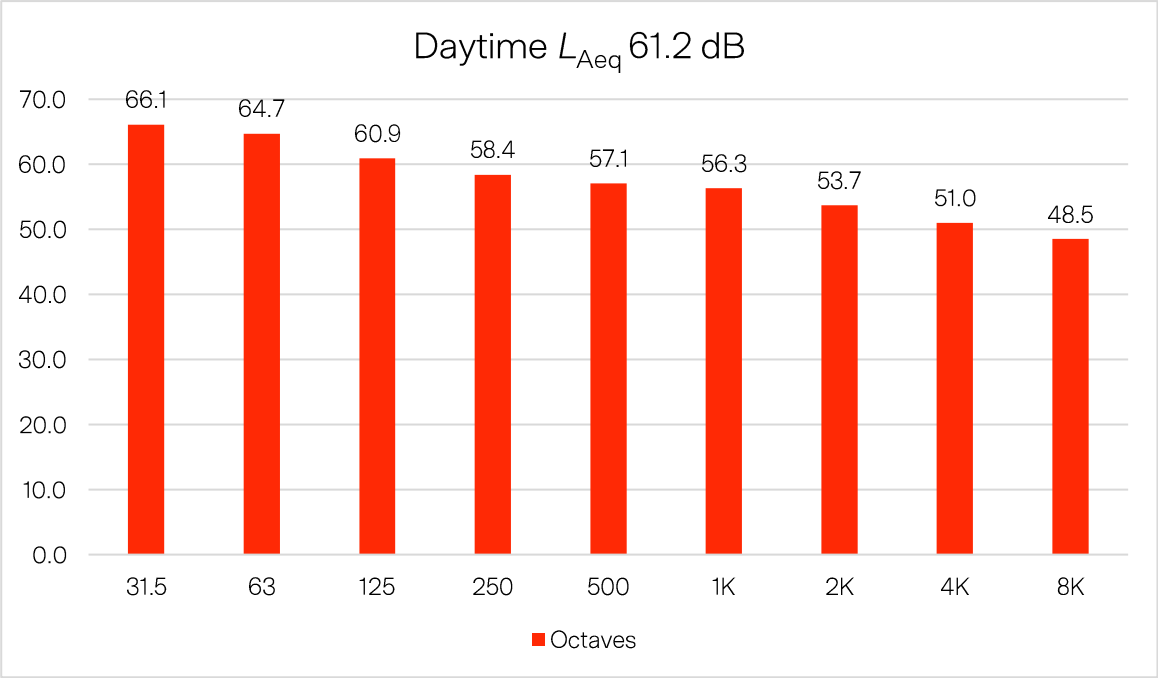
Monitoring Position 2

Friday/Monday

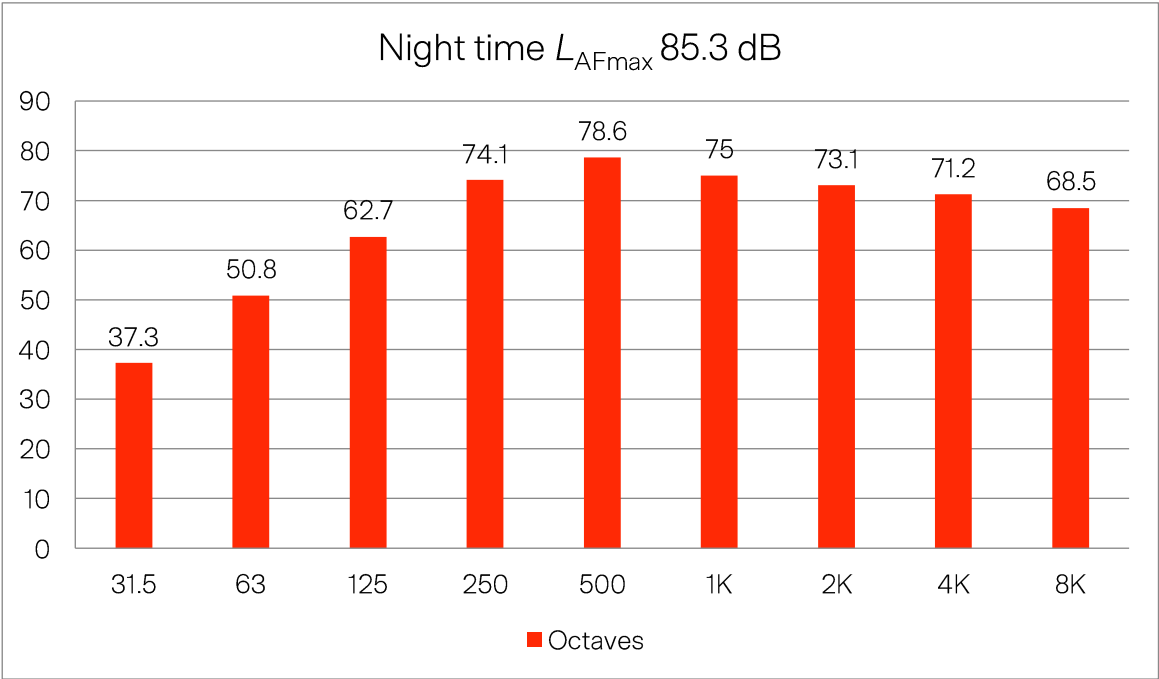


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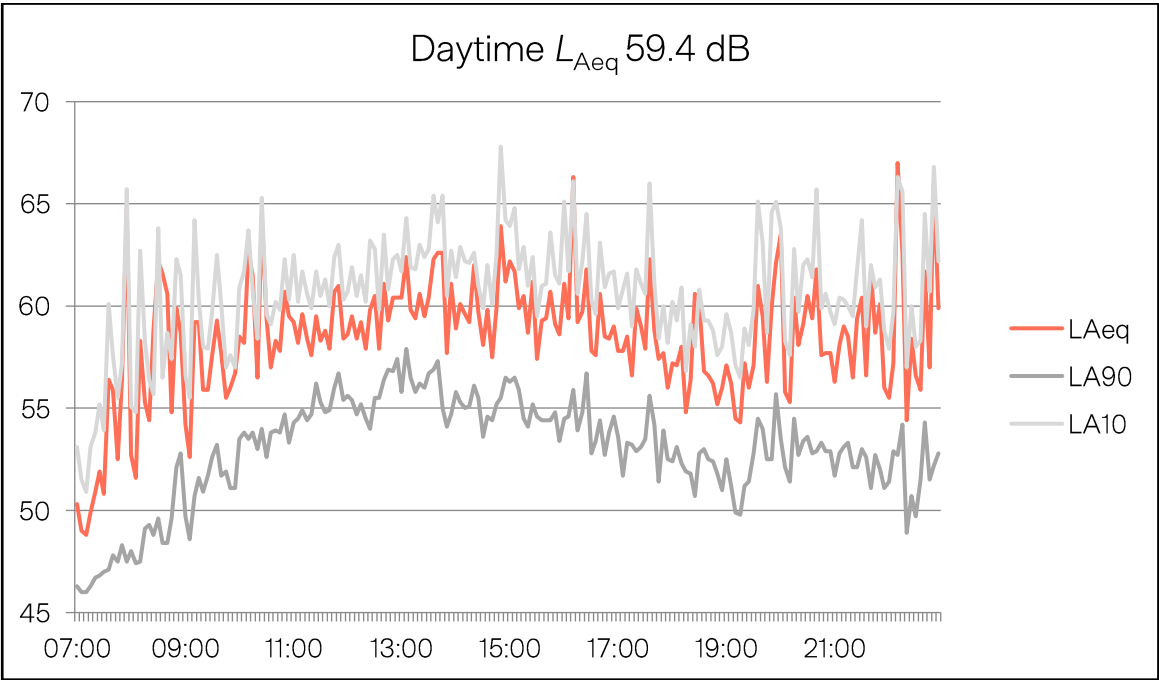
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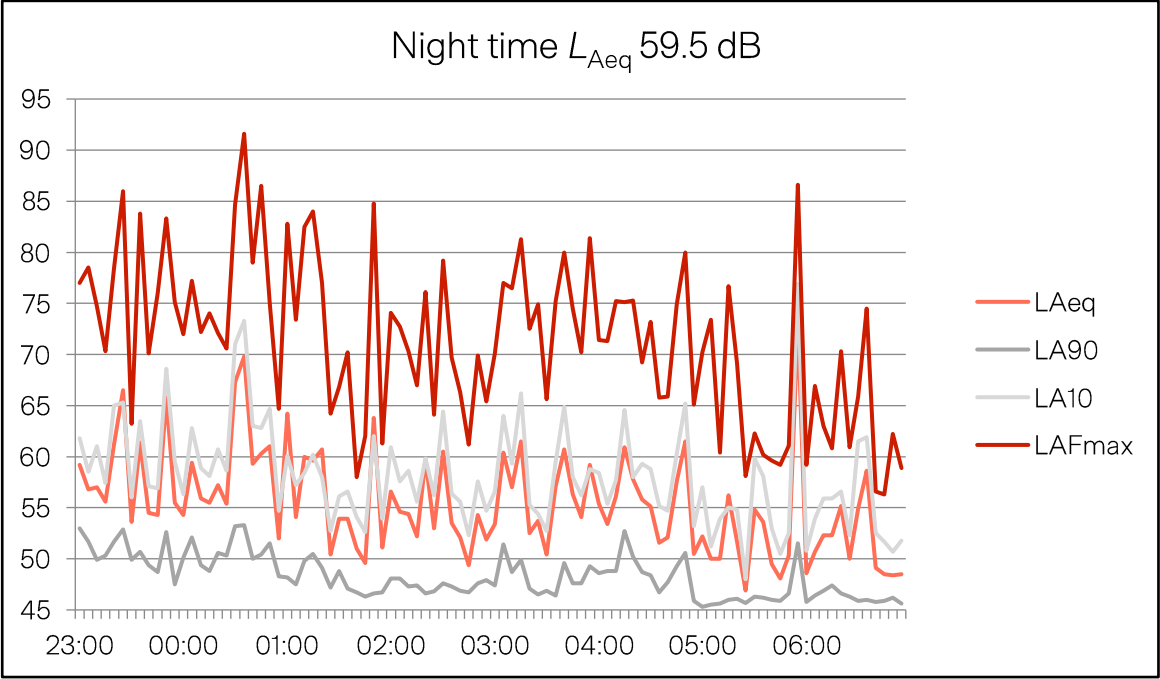


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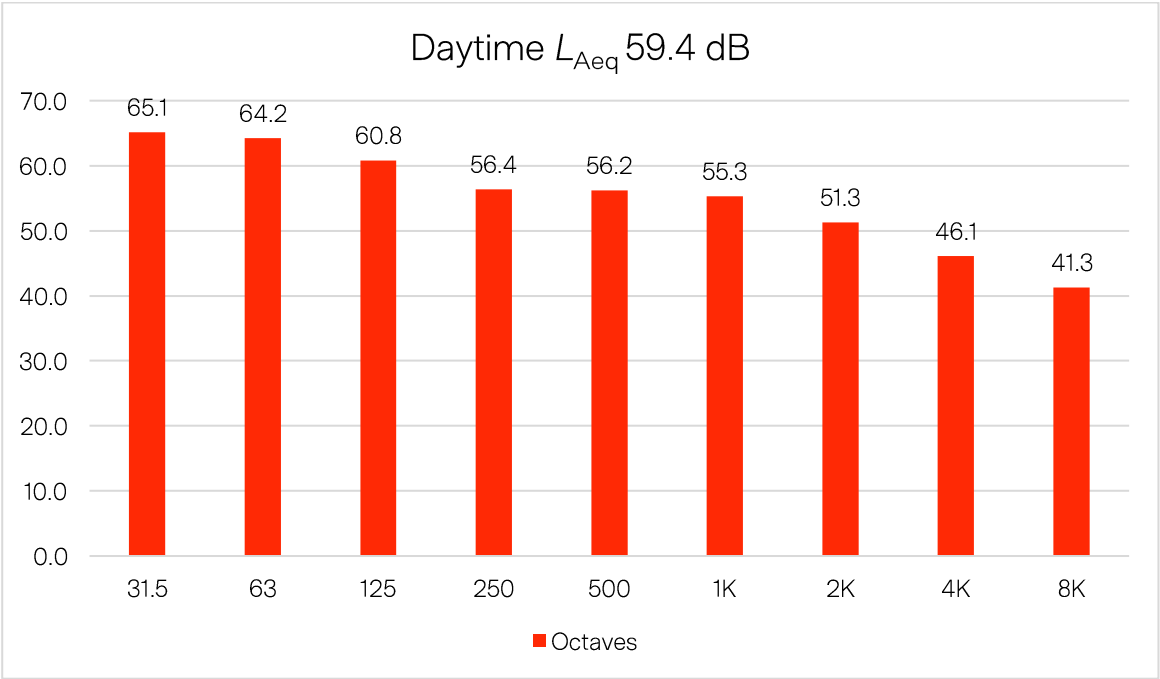


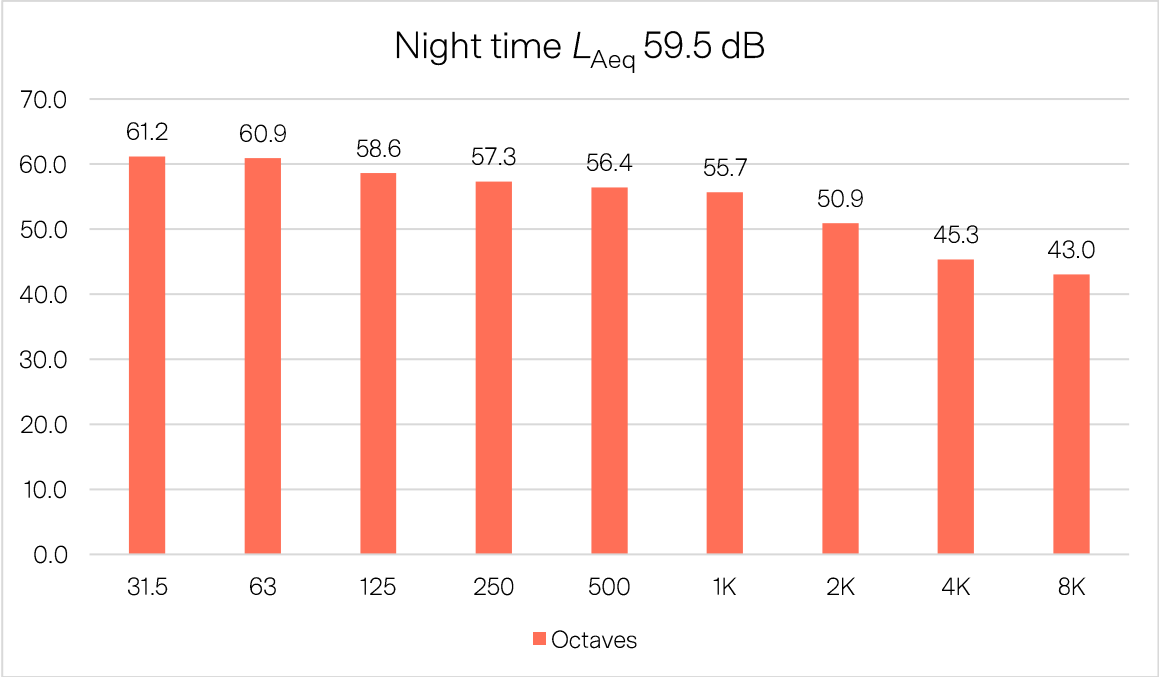
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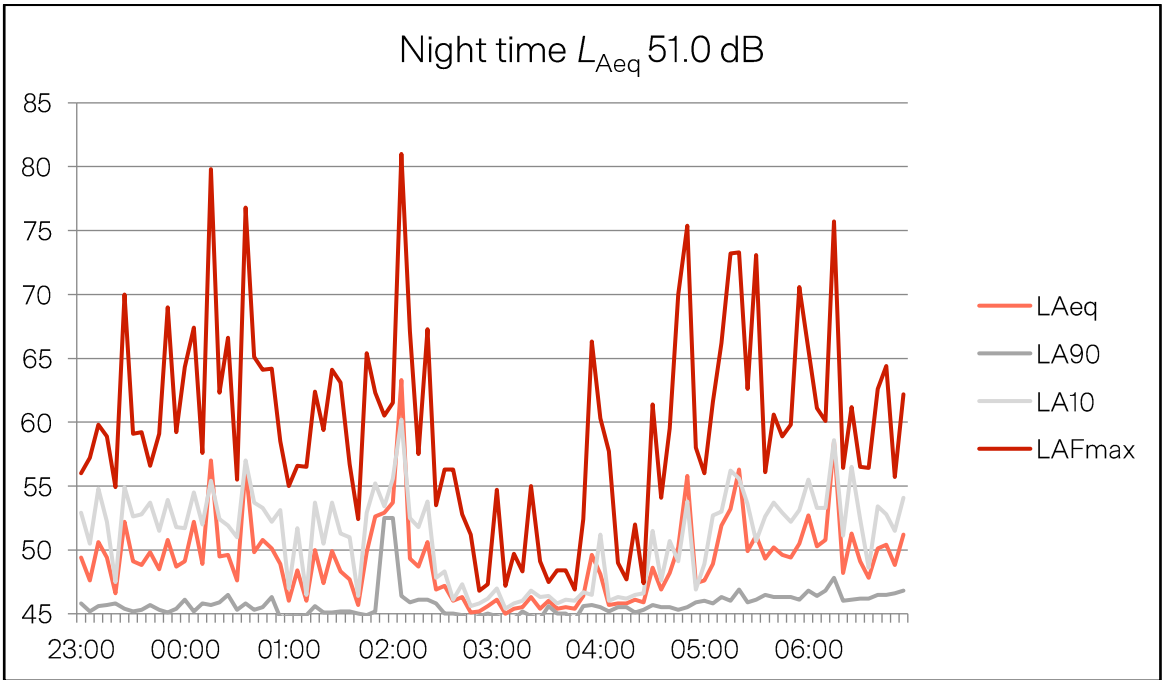
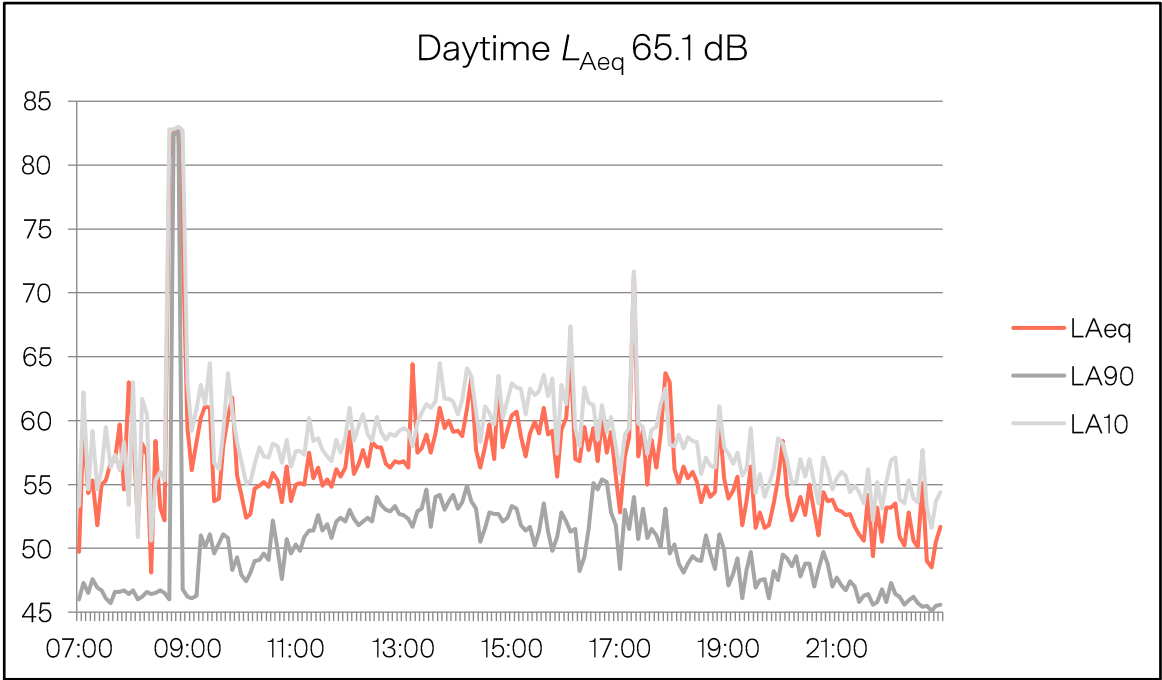


Un-weighted 1:1 Octave Results



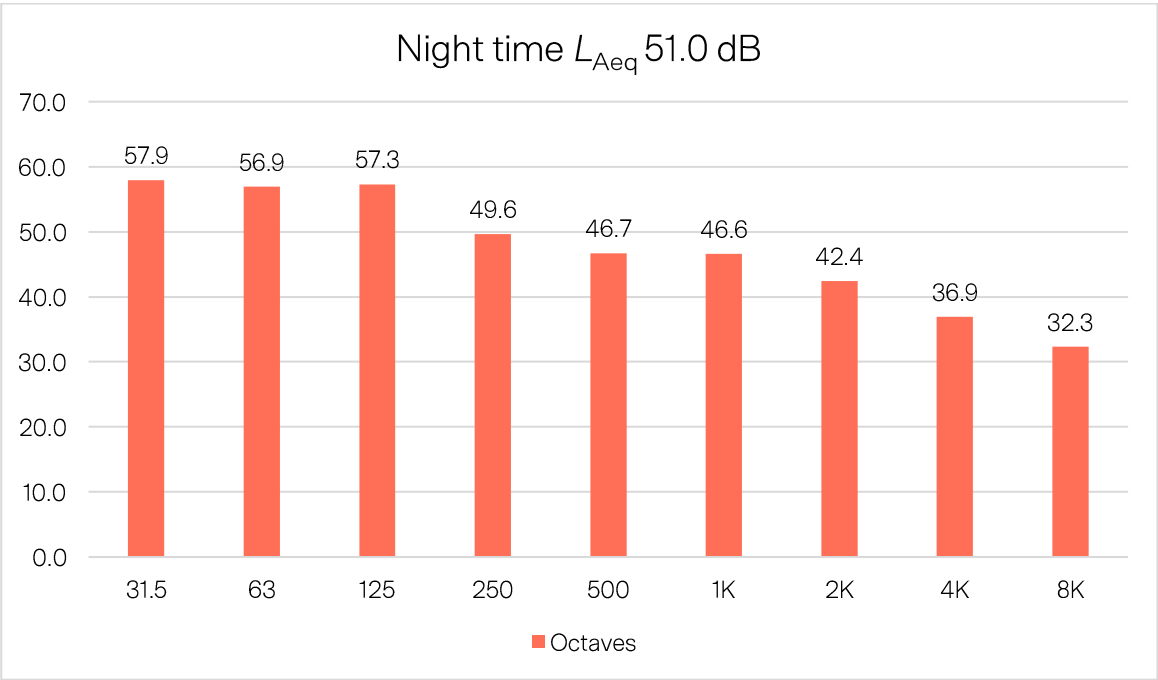
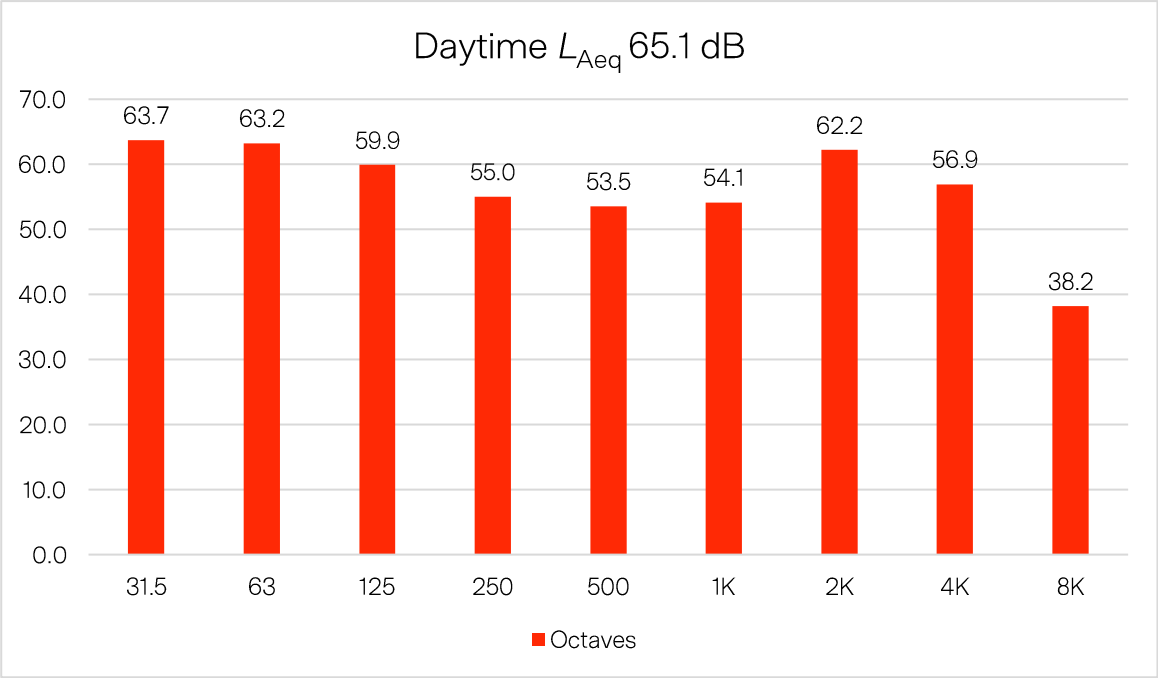


Sunday



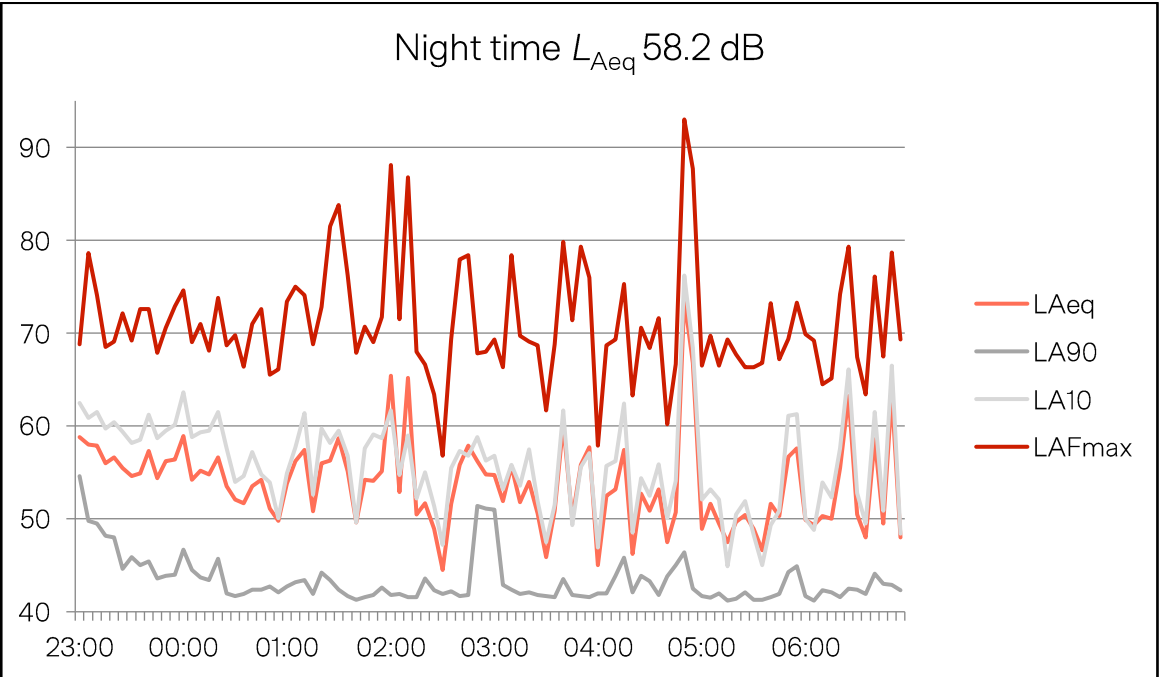
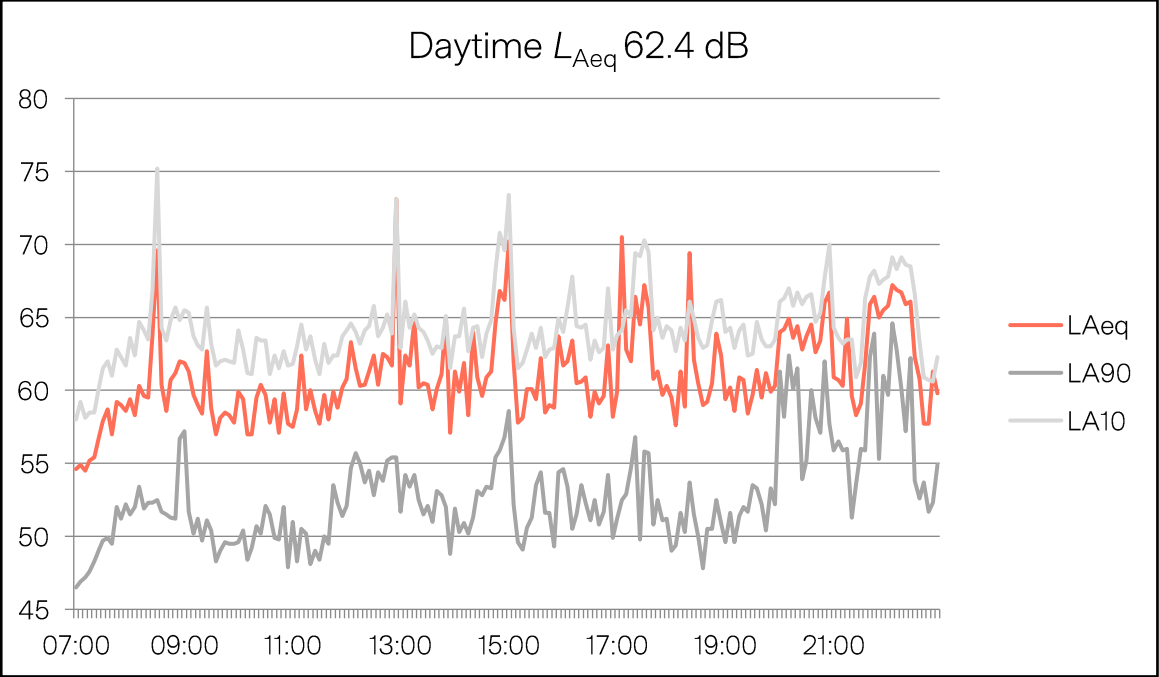
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## Un-weighted 1:1 Octave Results



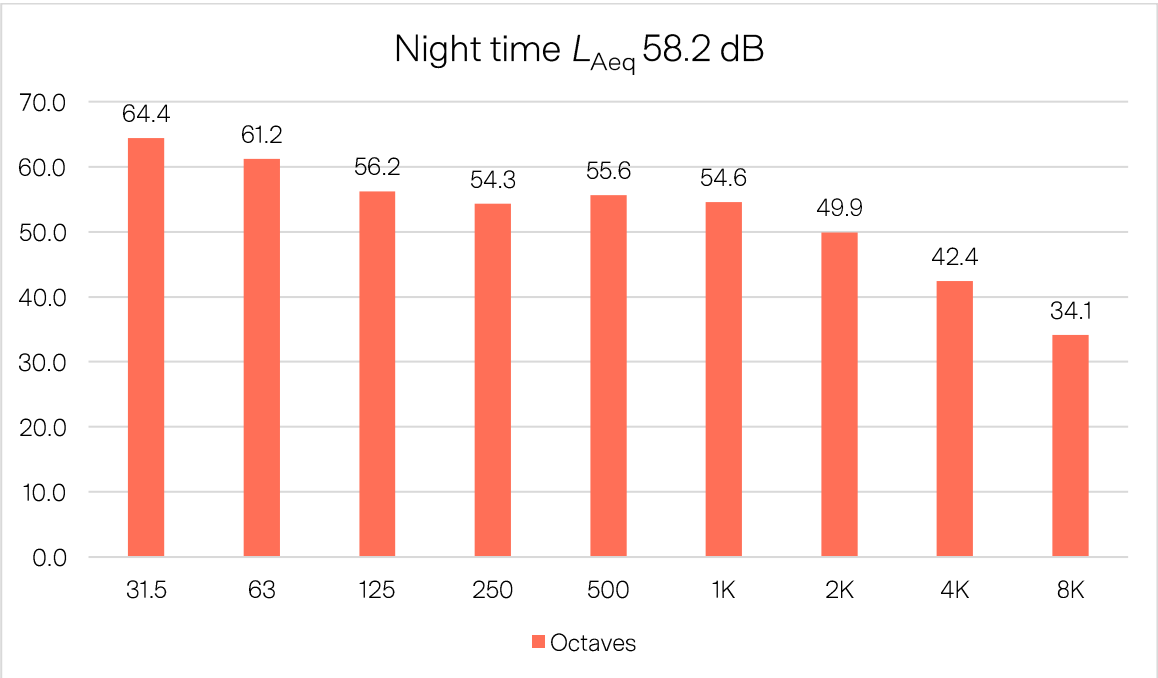
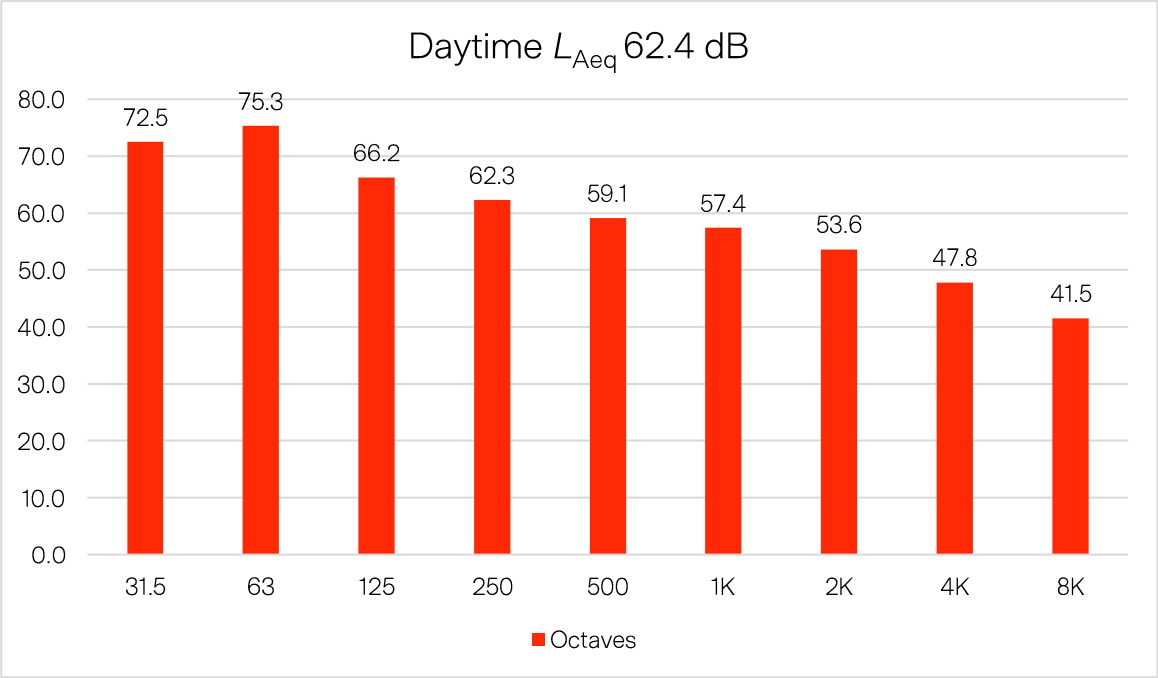
Monitoring Position 3

Friday/Monday

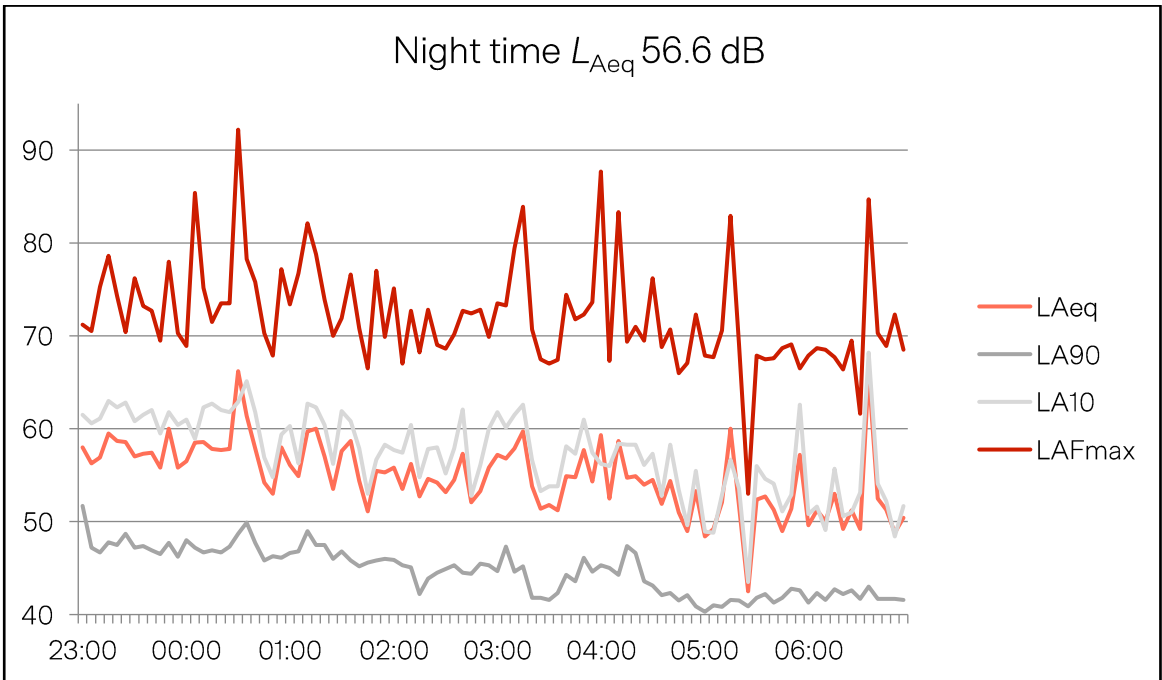
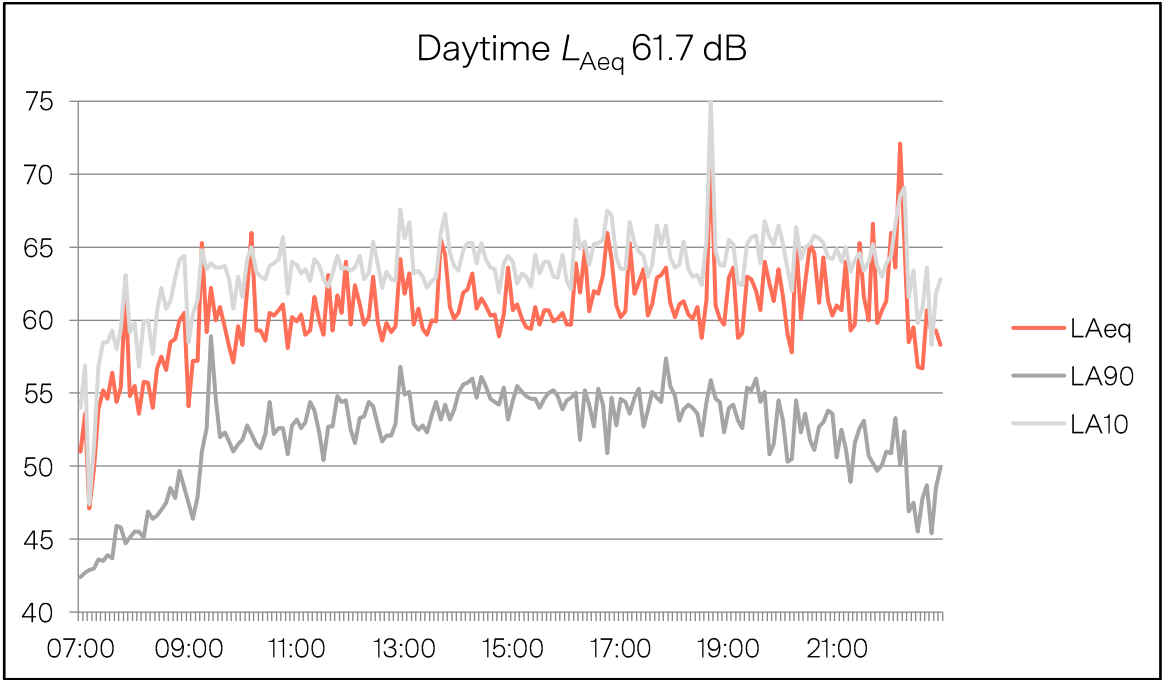


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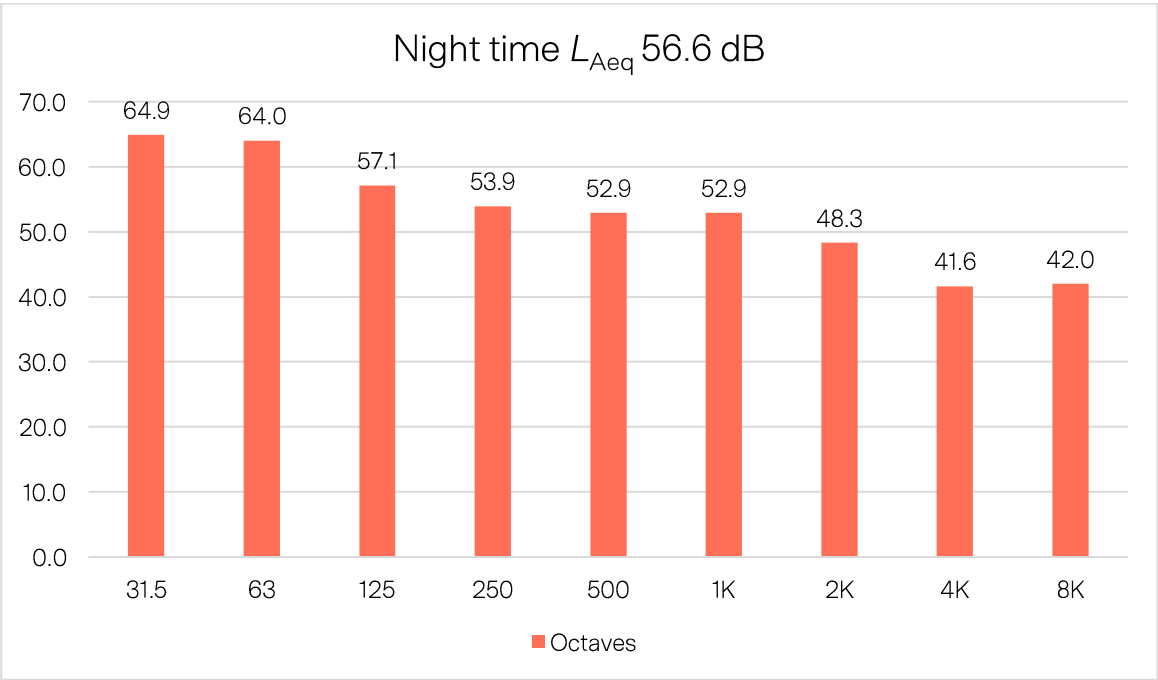
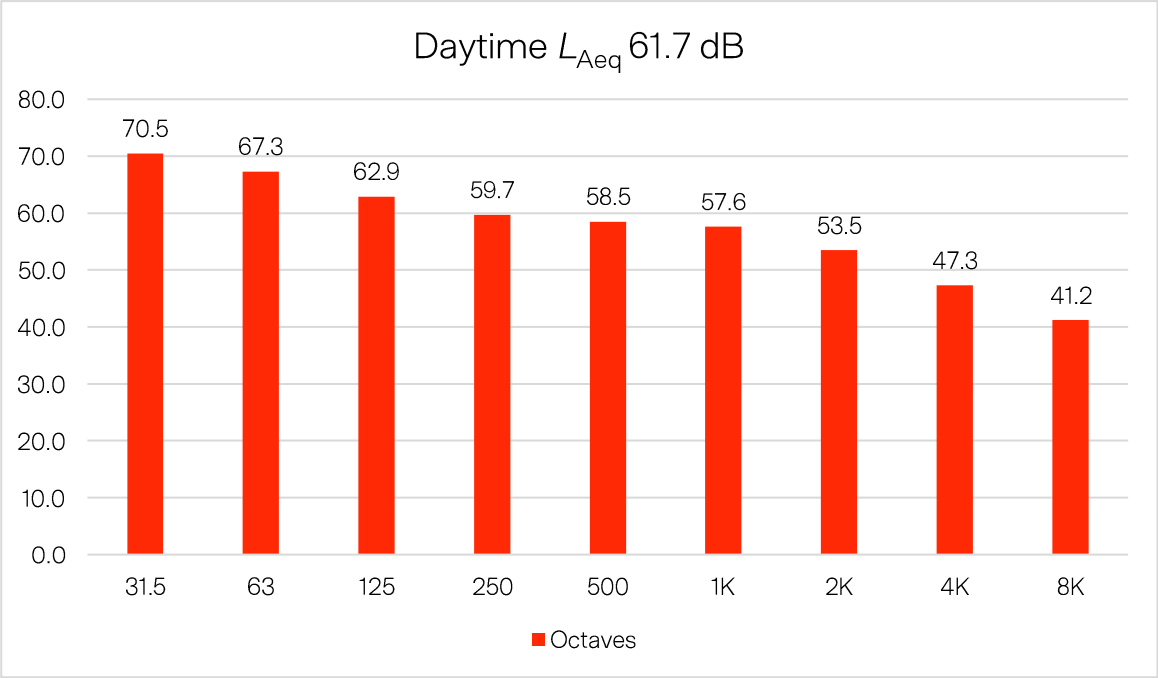


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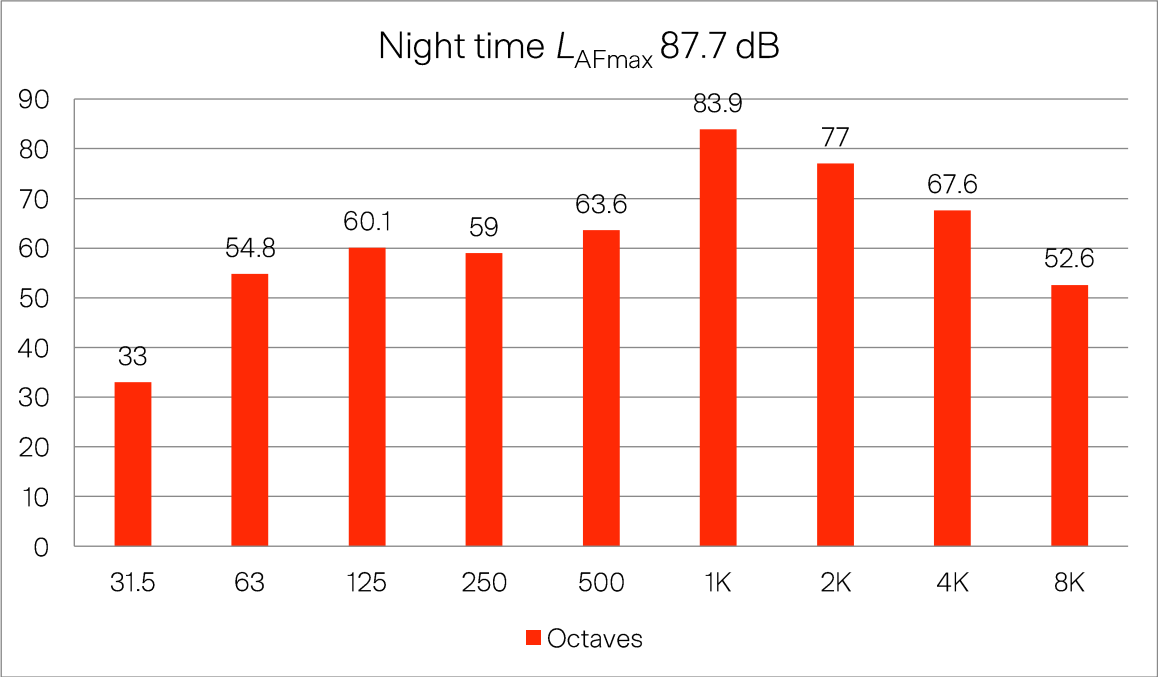


# SPRATT+HAMER

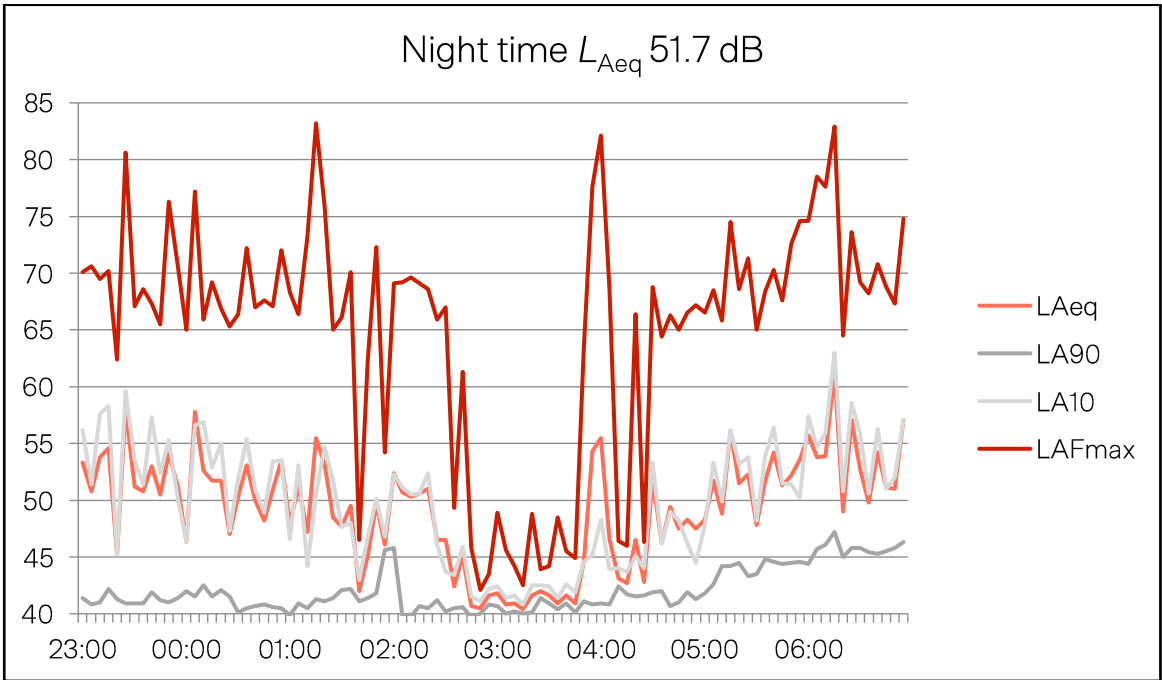
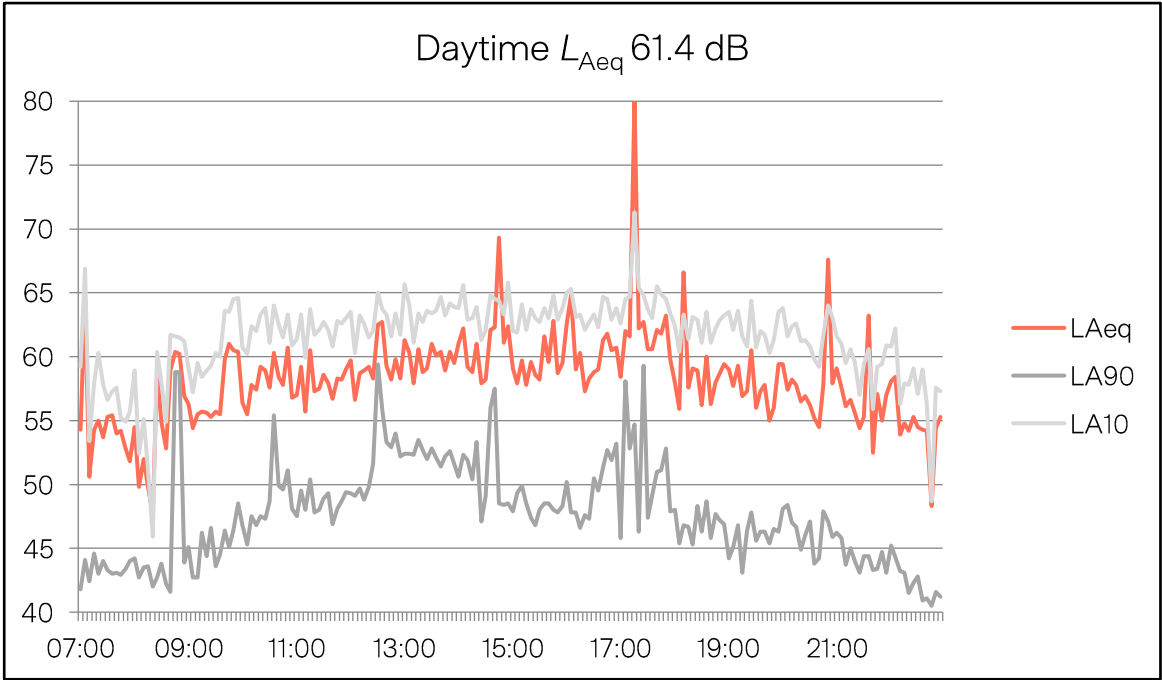
## Un-weighted 1:1 Octave Results



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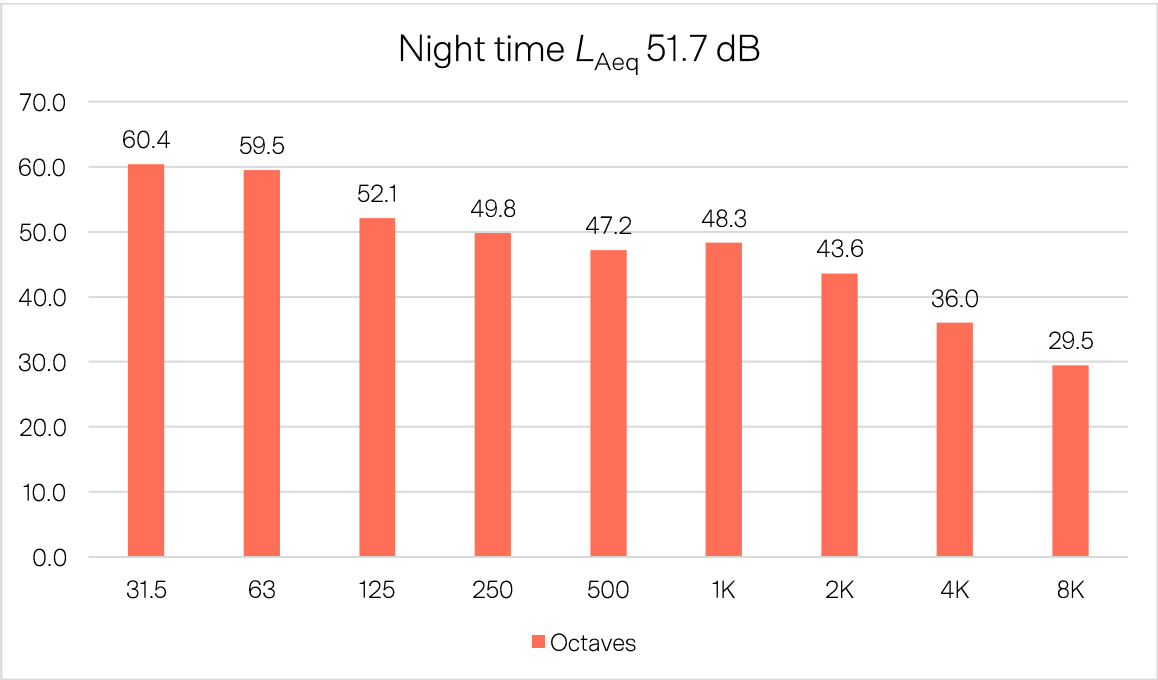
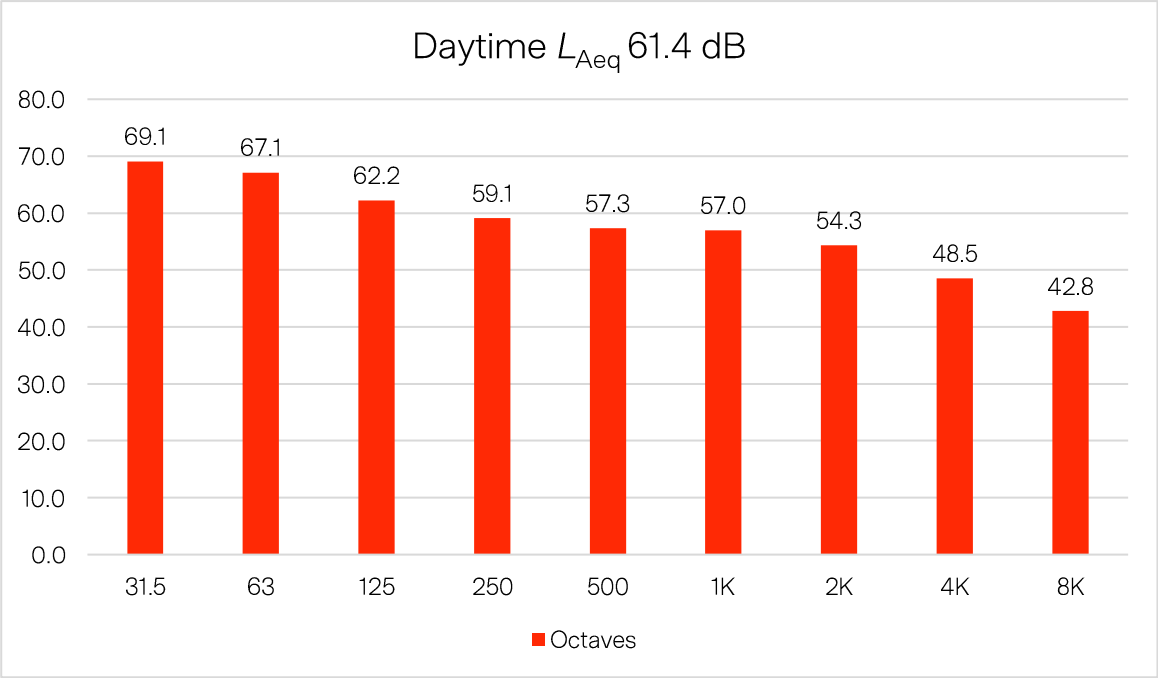


Sunday

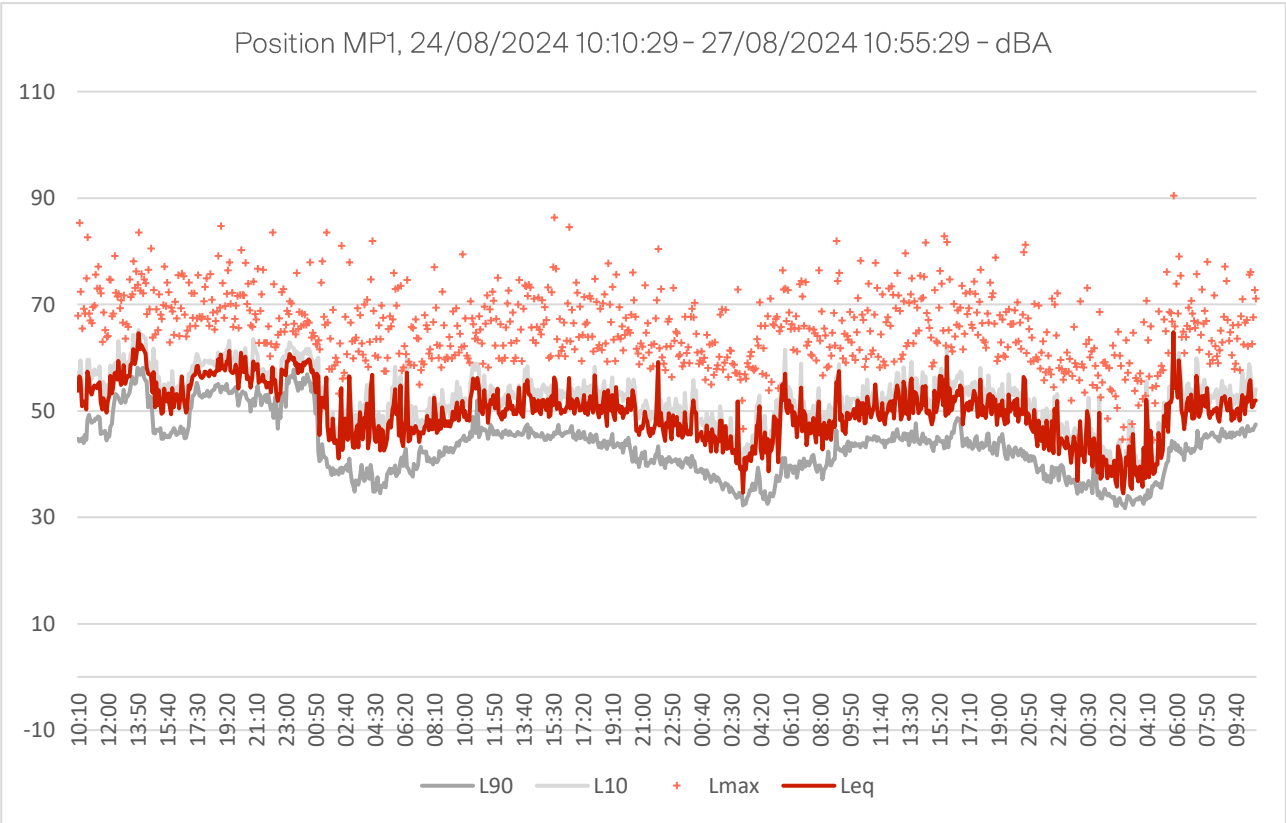


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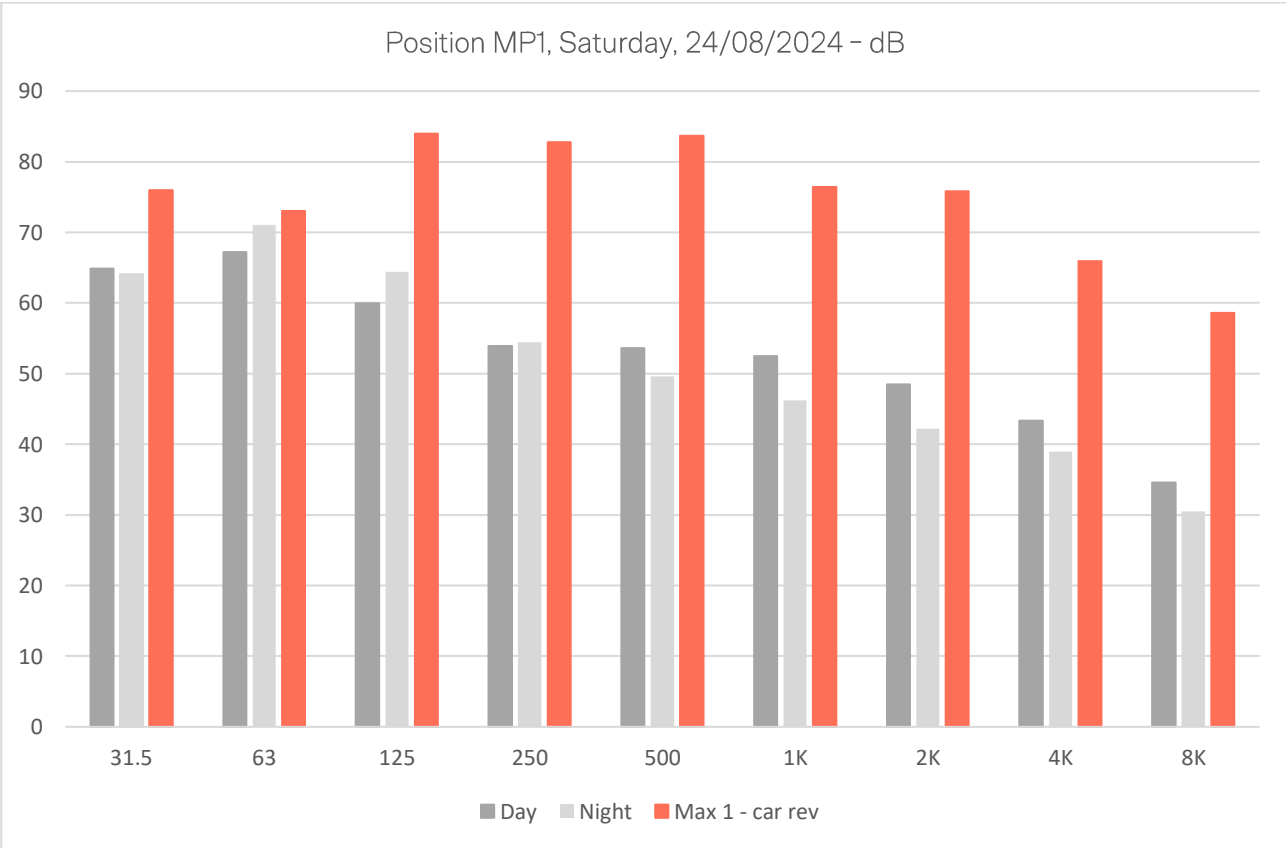
## Un-weighted 1:1 Octave Results



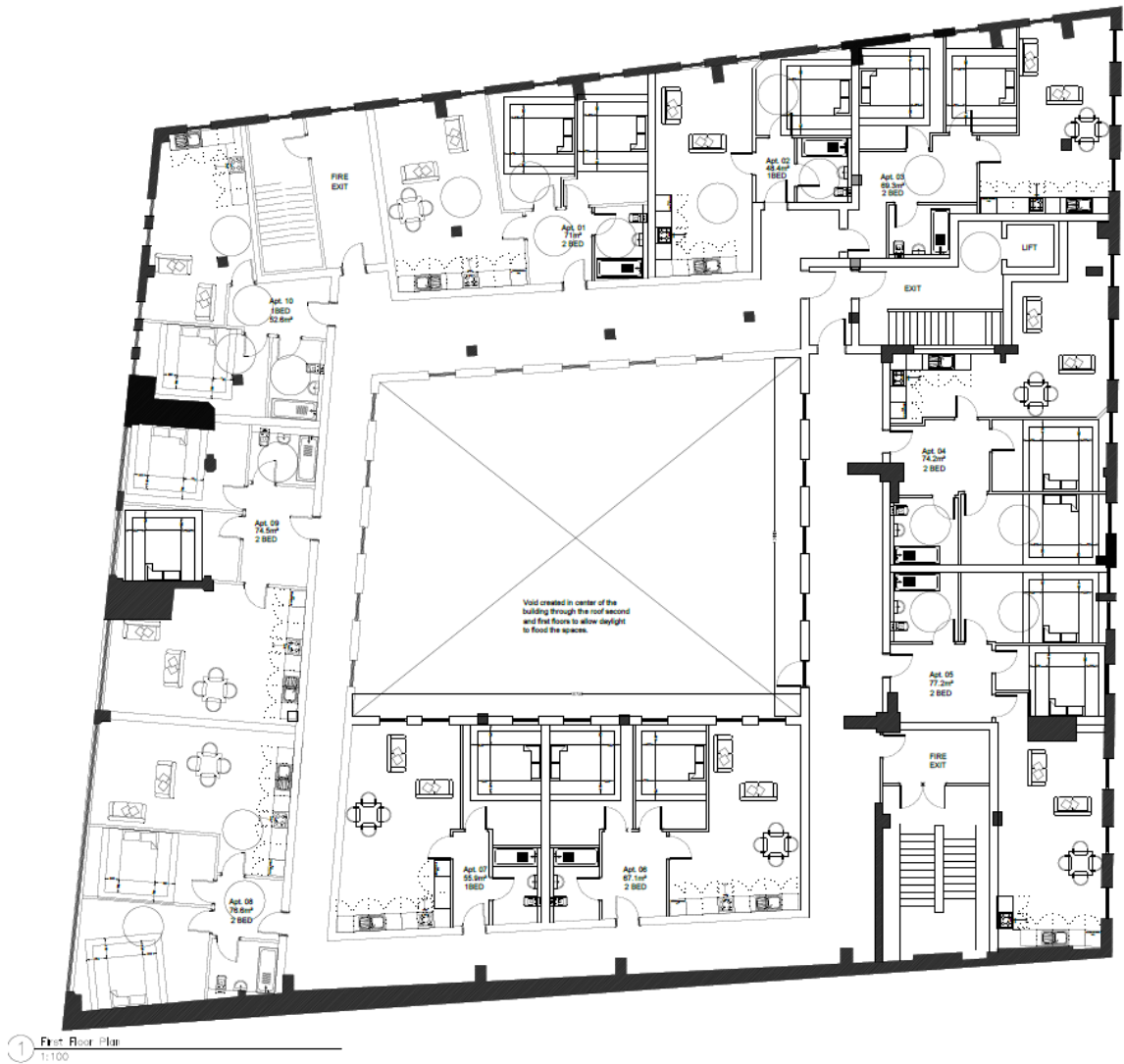
Monitoring Position 4



Un-weighted 1:1 Octave Results



Proposed Site Plans



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This drawing must be read in conjunction with all associated architect's, consultants', sub-contractors', specialist drawings and specifications.

Do not scale from this drawing.

Notes:

Amount of Apartments:

1 BEDS = 4

2 BEDS = 8

|              |                               |
|--------------|-------------------------------|
| Drawn By     | Checked By                    |
| REVISED      |                               |
| STANDARD NO: | 520-P-02                      |
| STANDARD NO: | A                             |
| STANDARD NO: | PLANNING                      |
| SCALE        | 1:100@A2                      |
| STANDARD NO: | RN                            |
| STANDARD NO: | First Floor Proposed          |
| STANDARD NO: | 9-11 Regent Street Wrexham    |
| STANDARD NO: | WD Architects                 |
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## Event Posters



## Glossary of Acoustical Terms

### A-weighting

Noise levels are corrected to represent human response to sound.

### $L_{Aeq}$

This is a continuous equivalent of time varying noise, or effectively the average measured (A weighted) noise level over a defined period of time.

### $L_{Aeq,16hour}$

A 16 hour long measurement of the  $L_{Aeq}$  over the period between 07:00 and 23:00, also known as a daytime measurement.

### $L_{Aeq,8hour}$

An 8 hour long measurement of the  $L_{Aeq}$  over the period between 23:00 and 07:00, also known as a night time measurement.

### $L_{AFmax}$

The highest, or maximum A-weighted sound pressure level measured over a specified time period. The 'F' defines a time weighting in Fast.

### $L_{A90}$

The A-weighted noise level or average level which is exceeded for 90 percent of the measured time period. Also known as a background level.

### $L_{A10}$

The A-weighted noise level or average level which is exceeded for 10 percent of the measured time period.

### 1:1 & 1:3 octave spectrum analysis

A single measurement that is separated into frequency bands to allow for a more detailed analysis of the noise source in question.

### $R_w$

The weighted sound reduction index of a partition or facade. A single number value based on the performance of a partition between two rooms across the frequency range 100Hz to 3150Hz. The level is adjusted for the effects of reverberation and background noise.



$D_{n,e,w}$

The weighted level difference of a partition or façade which takes into account a small element such as a grill or vent.

SEL (sound exposure level)

A measure of A-weighted sound energy used to describe a particular event, such as a train pass. It is the sound energy, which, if occurring over one second would contain the same energy as the event.

Free field sound pressure

Is where the radiation or spread of sound is completely unaffected by the presence of any reflecting surfaces or boundaries.

Low Frequency Noise

A term generally used for sound below a frequency of 100 to 150Hz.





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