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# 61-65 CHARLOTTE STREET, LONDON

## NOISE EXPOSURE ASSESSMENT

Report **9677-NEA-01**

Prepared on 18 December 2014

Issued For

**Energy Rating Services**
**131 Oxford Road**
**Kidlington**
**Oxford**
**OX5 2NP**

## Contents



## List of Attachments

## 1.0 INTRODUCTION

Clement Acoustics has been commissioned by Energy Rating Services to assess the suitability of the site at 61-65 Charlotte Street, London W1T 4PF for residential development in accordance with the National Planning Policy Framework published on 27 March 2012 (replacing Planning Policy Guidance 24).

Proposals are to build an extension to the existing property which will encompass a commercial space, offices and residential premises.

This report presents the results of environmental noise surveys undertaken in order to measure prevailing background levels and outlines any necessary mitigation measures.

## 2.0 SITE DESCRIPTION

The proposed development site is currently occupied by property guardians with proposals for an extension to the existing building which will encompass a commercial space, offices and residential premises.

The site is on Charlotte Street and has an existing commercial premises on the ground floor. At the time of the survey, the background noise climate was dominated by road traffic noise from Charlotte Street.

## 3.0 ENVIRONMENTAL NOISE SURVEY

### 3.1 Procedure

A noise survey was undertaken at two positions on the proposed site as shown in Figure 9677-SP1. Locations were chosen in order to obtain representative noise levels due to the main observed noise sources around the site.

Continuous automated monitoring was undertaken for the duration of the survey between 14:45 on the 12 December and 23:00 on 14 December 2014.

Noise levels at the monitoring positions were dominated by road traffic noise from Charlotte Street and Tottenham Street as well as noise emissions from nearby commercial premises and entertainment venues.

Weather conditions were generally dry with light winds and therefore suitable for the measurement of environmental noise.

The measurement procedure generally complied with BS7445:1991 "*Description and measurement of environmental noise, Part 2- Acquisition of data pertinent to land use*".

## 3.2 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed.

The equipment used was as follows.

- 2 No. Svantek Type 957 Class 1 Sound Level Meter
- Norsonic Type 1251 Class 1 Calibrator

# 4.0 RESULTS

## 4.1 Environmental Noise Survey

The $L_{Aeq:\ 5min}$, $L_{Amax:\ 5min}$, $L_{A10:\ 5min}$ and $L_{A90:\ 5min}$ acoustic parameters were measured throughout the duration of the survey.

Measured levels are shown as a time histories in Figures 9677-TH1-2.

| | Ambient Noise Level $L_{Aeq,T}$ | Typical Maximum Noise Level $L_{Amax}$ |
|---|---|---|
| | Position 1 [*Front Facade*] | |
| **Daytime** [07:00 - 23:00] | 63 | - |
| **Night-time** [23:00 - 07:00] | 61 | 78 |
| | Position 2 [*Rear Facade*] | |
| **Daytime** [07:00 - 23:00] | 59 | - |
| **Night-time** [23:00 - 07:00] | 60 | 88 |

**Table 4.1: Site average noise levels for daytime and night time**

The levels presented in Table 4.1 are expected due to the properties location near the centre of London. Provided adequate mitigation measures are put in place during the design and construction phase of the development, recommended internal noise levels can be achieved. Outline mitigation measures are described in Sections 5 and 6 of this report.

Maximum noise levels shown in Table 4.1 are deemed to be 'not normally exceeded' as required for maximum internal noise level specification purposes (described in Section 5).

## 5.0 NOISE EXPOSURE ASSESSMENT

### 5.1 Internal Noise Criteria

BS8233:2014 "*Sound insulation and noise reduction for buildings*" describes recommended acceptable internal noise levels for residential spaces during daytime and night-time hours. These levels are shown in Table 5.1.

| Activity | Location | Design range $L_{Aeq,T}$ dB | |
|---|---|---|---|
| | | Daytime (07:00-23:00) | Night-time (23:00-07:00) |
| Resting | Living Room | 35 dB(A) | - |
| Dining | Dining Room/Area | 40 dB(A) | - |
| Sleeping | Bedroom | 35 dB(A) | 30 dB(A) |

**Table 5.1: BS8233 recommended internal background noise levels**

The latest revision of the document does not include a recommended maximum internal noise level. However, in order to provide a suitably robust assessment, the guidance of the previous document (1999 revision) will be used, which is based on WHO recommendations.

BS8233:1999 states that for reasonable standards in a bedroom at night, individual noise events should not normally exceed a maximum noise level $L_{Amax}$ of 45 dB(A).

The external building fabric would need to be carefully designed to achieve these recommended internal levels.

## 5.2 External Building Fabric - Non Glazed Elements

It is currently assumed that the non-glazed external building fabric elements of the proposed development would be comprised of existing masonry. This would contribute towards a significant reduction of ambient noise levels in combination with a good quality window configuration, as shown in Section 5.3.

All non-glazed elements of the building facades have been assumed to provide a sound reduction performance of at least the figures shown in Table 5.2 when tested in accordance with BS EN ISO, 140-3:1995.

| Element | Octave band centre frequency SRI, dB | | | | | |
|---|---|---|---|---|---|---|
| | 125 | 250 | 500 | 1k | 2k | 4k |
| Non glazed element SRI | 41 | 43 | 48 | 50 | 55 | 55 |

**Table 5.2: Non-glazed elements assumed sound reduction performance**

## 5.3 External Building Fabric - Specification of Glazed Units

Sound reduction performance calculations have been undertaken in order to specify the minimum performance required from glazed elements in order to achieve recommended internal noise levels shown in Table 5.1.

Calculations will be based on bedrooms, which have more onerous requirements particularly during night-time hours. The calculations also take into account maximum noise levels monitored during the environmental noise survey, as per the recommendations of earlier revisions of the standard.

Calculations have been based on bedrooms with relatively higher ratios of glazing to masonry, in order to present a more onerous assessment. This specification therefore presents the most robust assessment, for BS8233:2014 criteria for internal noise levels in a bedroom at all affected facades.

As a more robust assessment, $L_{Amax}$ spectrum values of night-time peaks have also been considered and incorporated into the glazing calculation in order to cater for the interior limit of 45 dB $L_{Amax}$ for individual events, as specified in BS8233:1999 and WHO guidance.

The minimum sound reduction index (SRI) value required for all glazed elements to be installed is shown in Table 5.3. The performance is specified for the whole window unit, including the frame and other design features such as the inclusion of trickle vents as specified.

| Glazing Type | Required Overall Sound Reduction Performance $R_w$ | Glazing Type - *Indicative Only* |
|---|---|---|
| Type A [*Front Facade*] | 45 dB | $R_W$ 45 dB Secondary Glazing System [*eg 6mm glass/100mm gap/4mm glass*] |
| | | Acoustic Trickle Ventilator [*Required $D_{n,e,w}$ 49dB*] |
| Type B [*Rear Facade*] | 49 dB | $R_W$ 49 dB Glazing System [*eg 10mm glass/200mm gap/6mm glass*] |
| | | Mechanical Ventilation |

**Table 5.3: Required glazing performance**

All major building elements should be tested in accordance with BS EN ISO 140-3:1995. Sole glass performance data would not necessarily demonstrate compliance with this specification.

No further mitigation measures would be required to achieve good internal noise levels.

## 6.0 CONCLUSION

An environmental noise survey has been undertaken at 61-65 Charlotte Street, London W1T 4PF SE8 3FD in order to measure ambient noise levels in the area.

Measured noise levels have allowed an assessment of the level of exposure to noise of the proposed development site to be made.

Outline mitigation measures, including a glazing specification and the use of appropriate ventilation have been recommended and should be sufficient to achieve good internal noise levels for the proposed development according to BS8233:2014.

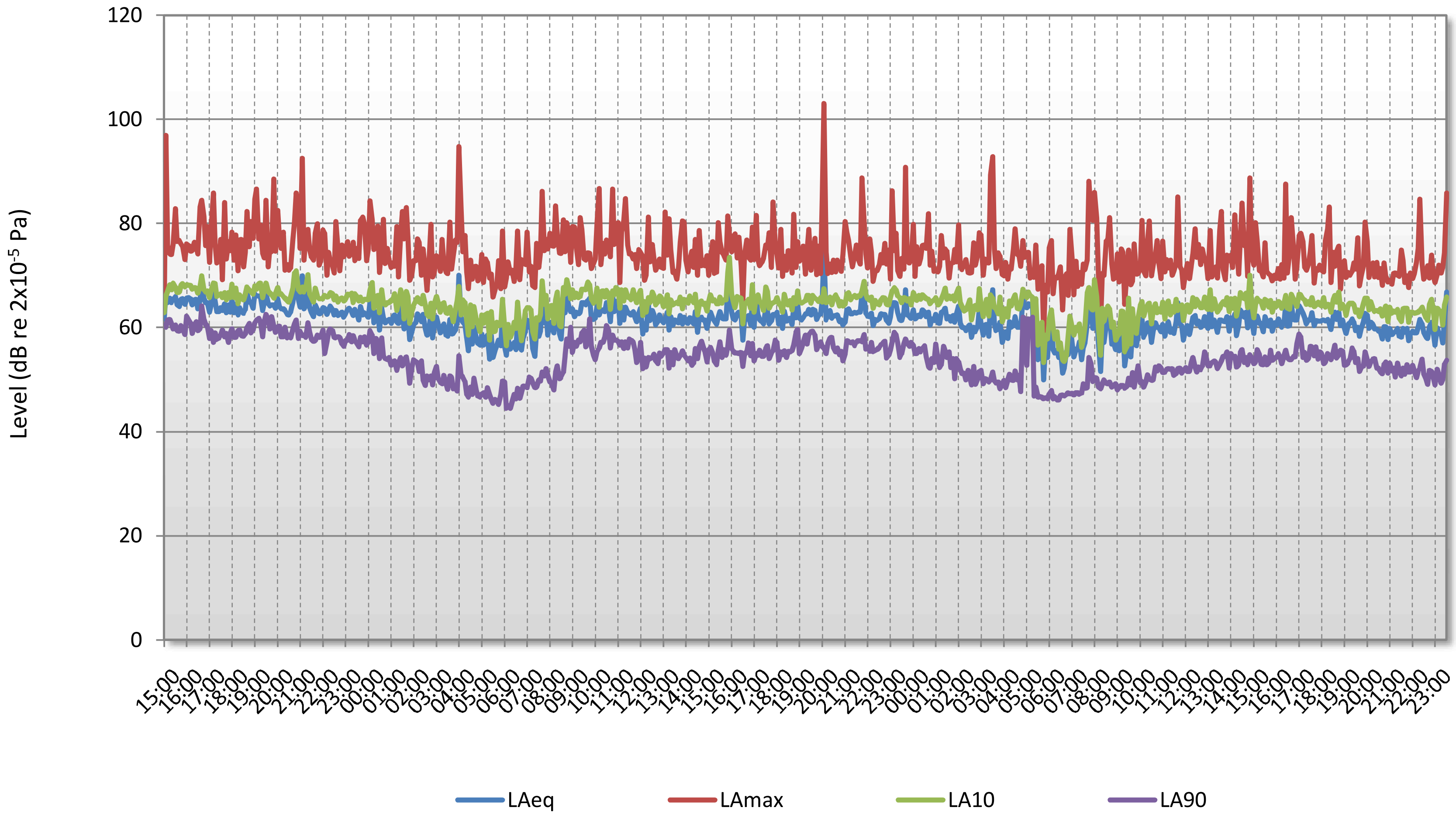
| Report by | Checked by |
|---|---|
| **Andrew Thomas** | **Duncan Martin MIOA** |


**9677-SP1** Indicative site plan showing noise monitoring position **Date:** 19 December 2014

## 61-65 CHARLOTTE STREET, LONDON *[Position 2]*

Environmental Noise Time History

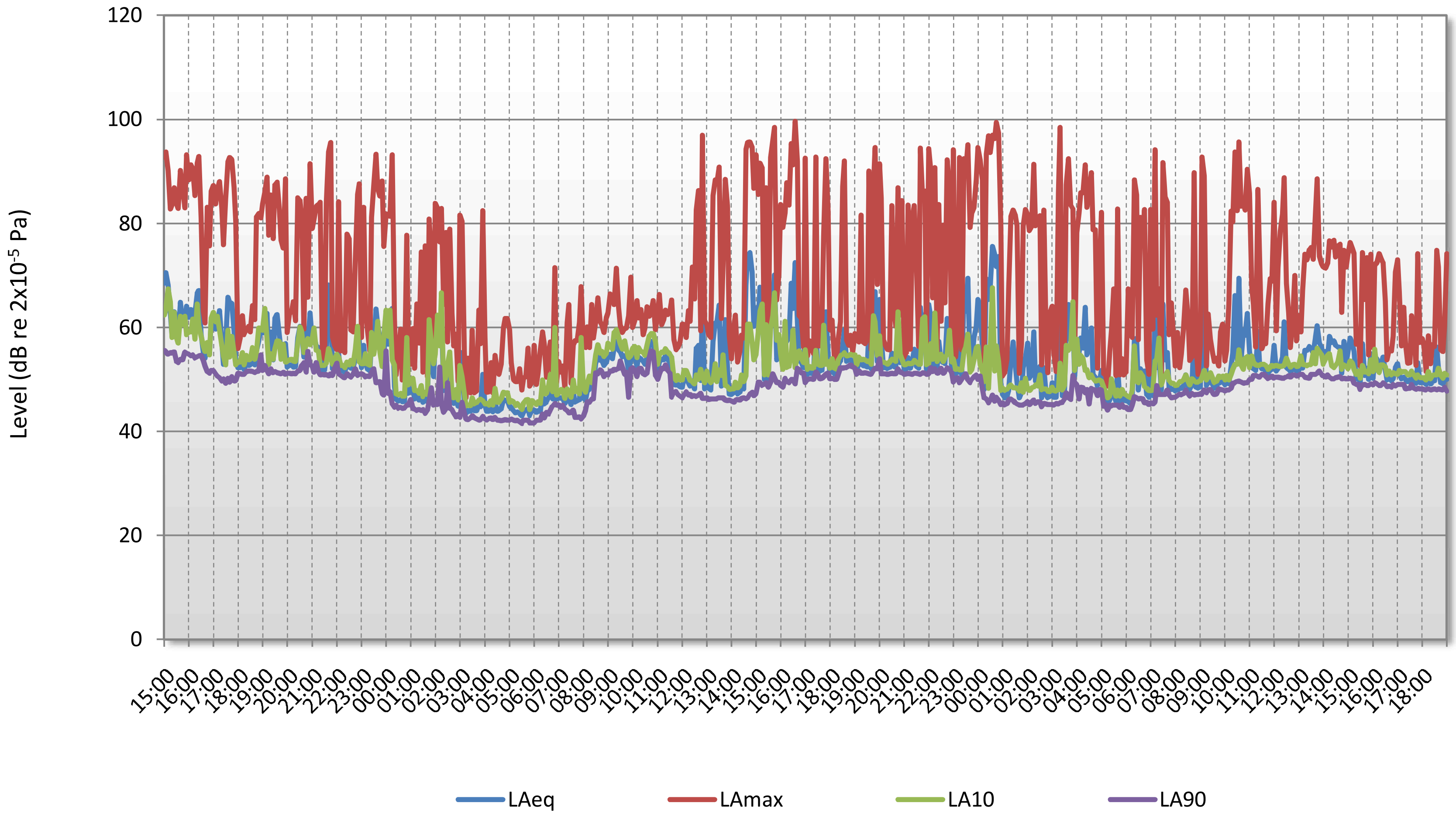
12 December to 14 December 2014




9677-TH1

## 61-65 CHARLOTTE STREET, LONDON *[Position 1]*

Environmental Noise Time History
12 December to 14 December



# APPENDIX A

## GLOSSARY OF ACOUSTIC TERMINOLOGY

### dB(A)

The human ear is less sensitive to low (below 125Hz) and high (above 16kHz) frequency sounds. A sound level meter duplicates the ear's variable sensitivity to sound of different frequencies. This is achieved by building a filter into the instrument with a similar frequency response to that of the ear. This is called an A-weighting filter. Measurements of sound made with this filter are called A-weighted sound level measurements and the unit is dB(A).

**$L_{eq}$**

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level $L_{eq}$. The $L_{eq}$ is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

**$L_{10}$**

This is the level exceeded for not more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise

**$L_{90}$**

This is the level exceeded for not more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

**$L_{max}$**

This is the maximum sound pressure level that has been measured over a period.

### Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 10 such octave bands whose centre frequencies are defined in accordance with international standards.

### Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than one alone and 10 sources produce a 10dB higher sound level.

### Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3dB for each doubling of distance.

### Subjective impression of noise

Sound intensity is not perceived directly at the ear; rather it is transferred by the complex hearing mechanism to the brain where acoustic sensations can be interpreted as loudness. This makes hearing perception highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a reasonable guide to help explain increases or decreases in sound levels for many acoustic scenarios.

| Change in sound level (dB) | Change in perceived loudness |
|---|---|
| 1 | Imperceptible |
| 3 | Just barely perceptible |
| 6 | Clearly noticeable |
| 10 | About twice as loud |
| 20 | About 4 times as loud |

### Barriers

Outdoor barriers can be used to reduce environmental noises, such as traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and its construction.

### Reverberation control

When sound falls on the surfaces of a room, part of its energy is absorbed and part is reflected back into the room. The amount of reflected sound defines the reverberation of a room, a characteristic that is critical for spaces of different uses as it can affect the quality of audio signals such as speech or music. Excess reverberation in a room can be controlled by the effective use of sound-absorbing treatment on the surfaces, such as fibrous ceiling boards, curtains and carpets.