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SIR RICHARD STEELE PUB, HAVERSTOCK HILL, LONDON

EXTERNAL BUILDING FABRIC ASSESSMENT

Report 10741.EBF.01

Prepared on 13 February 2014

For:

Faucet Inn Limited

88-90 George Street

London

W1U 8PA

Site Address	Report Date	Revision History
Sir Richard Steele Pub, Haverstock Hill, London	15/01/2014	06/02/2014-Rev A 13/02/2014-EBF.01

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List of Attachments

1.0 INTRODUCTION

KP Acoustics has been commissioned by Faucet Inn Limited, 88-90 George Street, London, W1U 8PA, to assess the suitability of the Sir Richard Steele Pub, Haverstock Hill, London, for residential development in accordance with the provisions of the National Planning Policy Framework and the Noise Policy Statement for England (NPSE).

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

2.0 ENVIRONMENTAL NOISE SURVEY

2.1 Procedure

A noise survey was undertaken at the proposed site as shown in Figure 10741.SP1. The location was chosen in order to collect data representative of the worst-case levels expected on the site due to all nearby sources.

Continuous automated monitoring was undertaken for the duration of the survey between 8/01/14 and 10/01/14.

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"*.

2.2 Equipment

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

The equipment used was as follows.

- 1 No. Svantek Type 958 Class 1 Sound Level Meter
- B&K Type 4231 Class 1 Calibrator

3.0 RESULTS

3.1 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 history in Figure 10741.TH1.

Average daytime and night time noise levels are shown in Table 4.1.

4.0 DISCUSSION

The site is bounded by Haverstock Hill to the North East, and commercial and residential properties to the South East, South West and North West. At the time of the survey, the background noise climate was solely dominated by road traffic noise from Haverstock Hill.

Measured noise levels are representative of noise exposure levels expected to be experienced by the North East façade of the proposed development.

	Level dB(A)
Daytime $L_{Aeq,16hour}$	60
Night-time $L_{Aeq,8hour}$	55

Table 4.1 Site average noise levels for daytime and night time

5.0 NOISE IMPACT ASSESSMENT

5.1 Noise Assessment

BS8233:1999 *"Sound insulation and noise reduction for buildings"* describes recommended good to reasonable internal noise levels for residential spaces. These levels are shown in Table 5.1.

Criterion	Typical Situations	Design range $L_{Aeq,T}$ dB	
		Good	Reasonable
Reasonable resting/sleeping conditions	Living Rooms Bedrooms	30 30	40 35

Table 5.1 BS8233 recommended internal background noise levels

The external building fabric would need to be carefully designed to achieve these recommended internal levels. It is understood that the non-glazed external building fabric elements of the proposed development would be comprised of blockwork. This would contribute towards a significant reduction of ambient noise levels in combination with a good quality double-glazed window configuration, as shown in Section 6.

6.0 EXTERNAL BUILDING FABRIC SPECIFICATION

Sound reduction performance calculations have been undertaken in order to specify the minimum performance required from glazed and non-glazed elements in order to achieve 'good' internal noise levels shown in Table 5.1, taking into account average and maximum noise levels monitored during the environmental noise survey.

Typical size bedrooms, with a high ratio of glazing to masonry have been used for all glazing calculations for the North West elevation.

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.

6.1 Non-Glazed Elements

All non-glazed elements of the building façade have been assumed to provide a sound reduction performance of at least the figures shown in Table 6.1 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 6.1 Non-glazed elements assumed sound reduction performance

6.2 Glazed Elements

Minimum octave band sound reduction index (SRI) values required for all glazed elements to be installed are shown in Table 6.2. The performance is specified for the whole window unit, including the frame and other design features such as the inclusion of trickle vents. Sole glass performance data would not demonstrate compliance with this specification.

Glazing performance calculations have been based both on average measured night-time noise levels as well as verified against the L_{Amax} spectrum of individual events in order to comply with a maximum internal noise level of 45dB(A) in bedrooms as recommended by BS8233. The combined most robust results of these calculations are shown in Table 6.2.

Glazing Type	Octave band centre frequency SRI, dB					
	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz
North East Façade Elevation	17	20	23	26	24	19

Table 6.2 Required glazing performance

It is understood acoustic trickle vents will be used to provide natural ventilation. In this case we would recommend any system with a rated acoustic performance of 39-41 dB, $D_{n,e,w}$.

In order to meet the required spectral attenuation figures shown in Table 6.2, we would recommend the installation of a secondary glazing system (5mm-7mm) at a distance of 100mm from the sash window panes, incorporating padded absorptive reveals. This would fully satisfy the figures shown in Table 6.2 while ensuring that internal noise levels are fully commensurate to current Standards.

All major building elements should be tested in accordance with BS EN ISO 140-3:1995.

Independent testing at a UKAS accredited laboratory would be required in order to confirm the performance of the chosen system for an “actual” configuration.

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

7.0 CONCLUSION

An environmental noise survey has been undertaken at the Sir Richard Steele Pub, London. Measured noise levels allowed the proposal of a robust glazing specification which would provide internal noise levels for all residential environments of the development commensurate to “Good” in the design range of BS8233.

No further mitigation measures would be required in order to protect the proposed residential properties from external noise intrusion.

Report by:	Checked by:
Duncan Arkley	**Kyriakos Papanagiotou**
KP Acoustics Ltd.	**KP Acoustics Ltd.**

Sir Richard Steele Pub,Haverstock Hill, London
Environmental Noise Time History
8th January to 10th January 2014

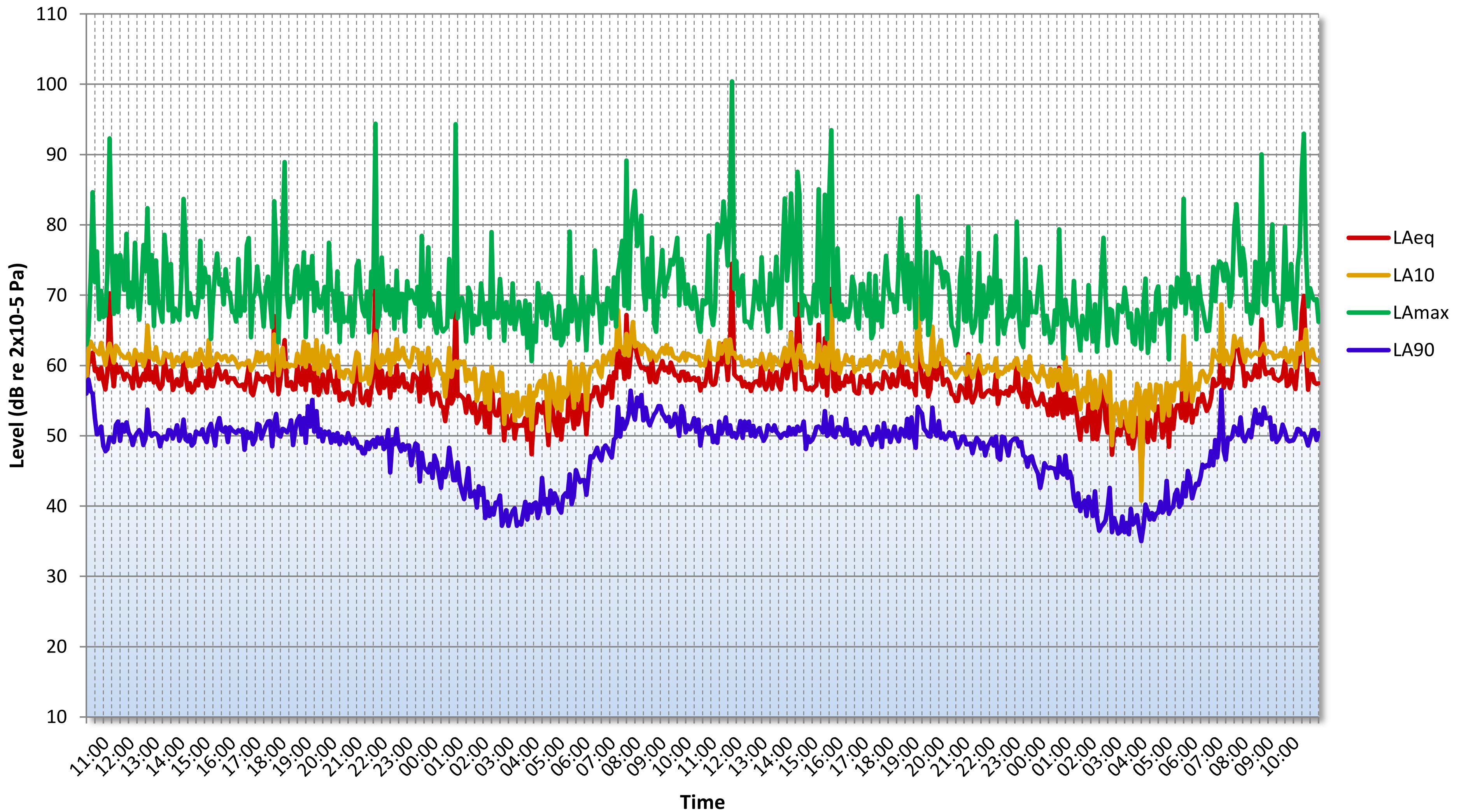
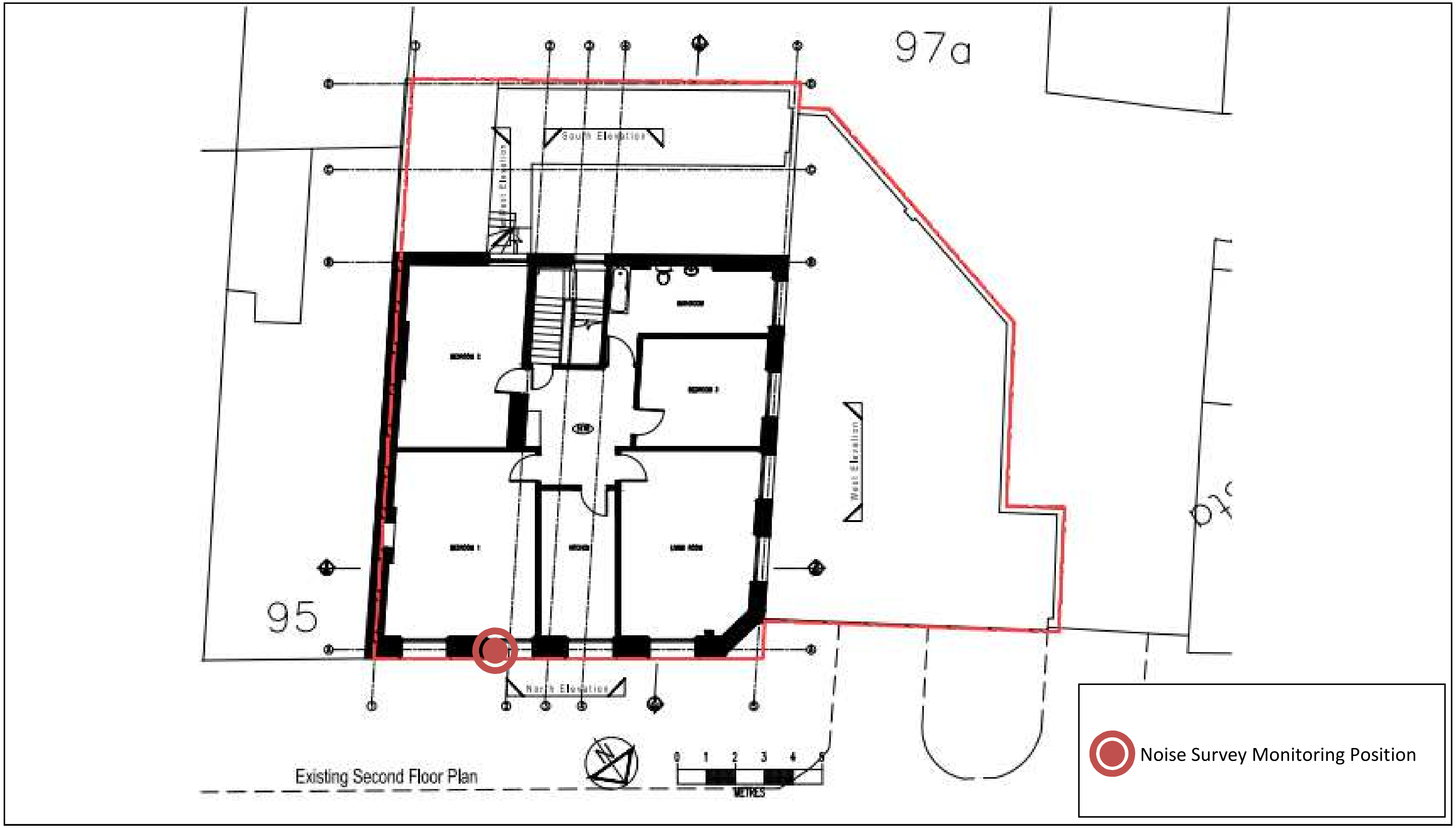


Figure 10741.TH1



Title:

Indicative site plan showing noise monitoring position

Date: 30 January 2014

FIGURE 10741.SP1

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APPENDIX A

GENERAL ACOUSTIC TERMINOLOGY

Decibel scale - dB

In practice, when sound intensity or sound pressure is measured, a logarithmic scale is used in which the unit is the 'decibel', dB. This is derived from the human auditory system, where the dynamic range of human hearing is so large, in the order of 10^{13} units, that only a logarithmic scale is the sensible solution for displaying such a range.

Decibel scale, 'A' weighted - dB(A)

The human ear is less sensitive at frequency extremes, below 125Hz and above 16Khz. A sound level meter models the ears variable sensitivity to sound at different frequencies. This is achieved by building a filter into the Sound Level Meter with a similar frequency response to that of the ear, an A-weighted filter where 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 no 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 no 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 11 such octave bands whose centre frequencies are defined in accordance with international standards. These centre frequencies are: 16, 31.5, 63, 125, 250, 500, 1000, 2000, 4000, 8000 and 16000 Hertz.

Environmental noise terms are defined in BS7445, *Description and Measurement of Environmental Noise*.

APPENDIX A

APPLIED ACOUSTIC TERMINOLOGY

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 a single source and 4 sources produce a 6dB 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

Hearing perception is 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 guide to explain increases or decreases in sound levels for many scenarios.

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

Transmission path(s)

The transmission path is the path the sound takes from the source to the receiver. Where multiple paths exist in parallel, the reduction in each path should be calculated and summed at the receiving point. Outdoor barriers can block transmission paths, for example traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and construction.

Ground-borne vibration

In addition to airborne noise levels caused by transportation, construction, and industrial sources there is also the generation of ground-borne vibration to consider. This can lead to structure-borne noise, perceptible vibration, or in rare cases, building damage.

Sound insulation - Absorption within porous materials

Upon encountering a porous material, sound energy is absorbed. Porous materials which are intended to absorb sound are known as absorbents, and usually absorb 50 to 90% of the energy and are frequency dependent. Some are designed to absorb low frequencies, some for high frequencies and more exotic designs being able to absorb very wide ranges of frequencies. The energy is converted into both mechanical movement and heat within the material; both the stiffness and mass of panels affect the sound insulation performance.