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# THE COCK TAVERN, PHOENIX ROAD, LONDON

## NOISE IMPACT ASSESSMENT REPORT

Report 11674.NIA.01 Rev B

**For:**

**Flamestrike Limited**

**1st Floor, 9 Hampstead West**

**224 Iverson Road**

**London**

**NW6 2HL**

| Site Address | Report Date | Revision History |
|---|---|---|
| The Cock Tavern, Phoenix Road, London, NW1 1HB | 13/10/2014 | Rev A – 01/06/2015<br>Rev B – 02/06/2015 |

## Contents



**List of Attachments**

## 1.0 INTRODUCTION

KP Acoustics Ltd, Britannia House, 11 Glenthorne Road, London, W6 0LH, has been commissioned by Flamestrike Limited, 1st Floor, 9 Hampstead West, 224 Iverson Road, London, NW6 2HL, to undertake an environmental noise assessment at The Cock Tavern, Phoenix Road, London, NW1 1HB, and assess the suitability of the site for a 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 on the proposed site as shown in Figure 11674.SP1. The location was chosen based on accessibility and collecting 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 15:25 on 2 October 2014 and 15:05 on 3 October 2014.

Weather conditions were generally dry with light winds and therefore suitable for the measurement of environmental noise. The measurement procedure fully 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 957 Class 1 Sound Level Meters
- 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 11674.TH1. Average daytime and night time noise levels are shown in Table 4.1.

## 4.0 DISCUSSION

The site is bounded by Phoenix Road to the South, Charlton Street to the West, and existing residential and commercial properties to the North and East. At the time of the survey, the background noise climate was comprised of by road traffic noise from the surrounding roads, and a soundscape typical of an urban cityscape environment.

Table 4.1 shows the average noise levels ($L_{Aeq,}$ 5 minutes) measured for the duration of the survey throughout both daytime and night-time.

| | Level dB(A) |
|---|---|
| **Daytime $L_{Aeq,16hour}$** | 61 |
| **Night-time $L_{Aeq,8hour}$** | 52 |

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

## 5.0 NOISE IMPACT ASSESSMENT

### 5.1 Noise Assessment

BS8233:2014 "*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.

| Activity | Location | 07:00 to 23:00 | 23:00 to 07:00 |
|---|---|---|---|
| Resting | Living Rooms | 35 dB(A) | - |
| Dining | Dining Room/area | 40 dB(A) | - |
| Sleeping (daytime resting) | Bedrooms | 35 dB(A) | 30 dB(A) |

**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 will be a brickwork construction. 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.

It is understood that due to the listed status of the building, some of the current glazed window units may be retained. In order to assess whether the current windows units are compliant with the above requirements, an assessment of the current sound reduction indices of the window units was undertaken. Manual measurements were undertaken internally and assessed against the external noise survey results in order to calculate this performance.

The current performance of the existing window units is shown in Table 5.2 below.

| Existing Glazed Window Units | Octave band centre frequency SRI, dB | | | | | |
|---|---|---|---|---|---|---|
| | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz |
| Front Elevation | 19 | 20 | 25 | 27 | 22 | 16 |

**Table 5.2 Existing glazing performance**

Based on the measured performance of the existing window units, additional upgrade measures would be necessary in order to achieve the recommended levels as stipulated in the BS8233:2014.

A full glazing proposal is included in Section 6.2 below.

## 6.0 EXTERNAL BUILDING FABRIC SPECIFICATION

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

A typical sized student space with a high ratio of glazing to masonry has been used for all calculations in order to specify glazing.

### 6.1 Non-Glazed Elements

It is currently understood that the non-glazed building façade is comprised of a high density cavity brickwork construction, comprised of 215mm brickwork, a 100mm cavity, and 215mm brickwork. This construction would be anticipated 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 | | | | | |
|---|---|---|---|---|---|---|
| | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz |
| 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 Type | Octave band centre frequency SRI, dB | | | | | |
|---|---|---|---|---|---|---|
| | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz |
| All Elevations | 22 | 24 | 30 | 34 | 31 | 22 |

**Table 6.2 Required glazing performance**

*It is understood that part of the existing windows cannot be replaced due to the listed nature of the building. We would therefore recommend the installation of a secondary glazing system (5mm-7mm) at a minimum distance of 100mm from the existing primary window panes, incorporating padded absorptive reveals. In addition, we would recommend the upgrade of any sash windows with a Ventrola system, or similar.*

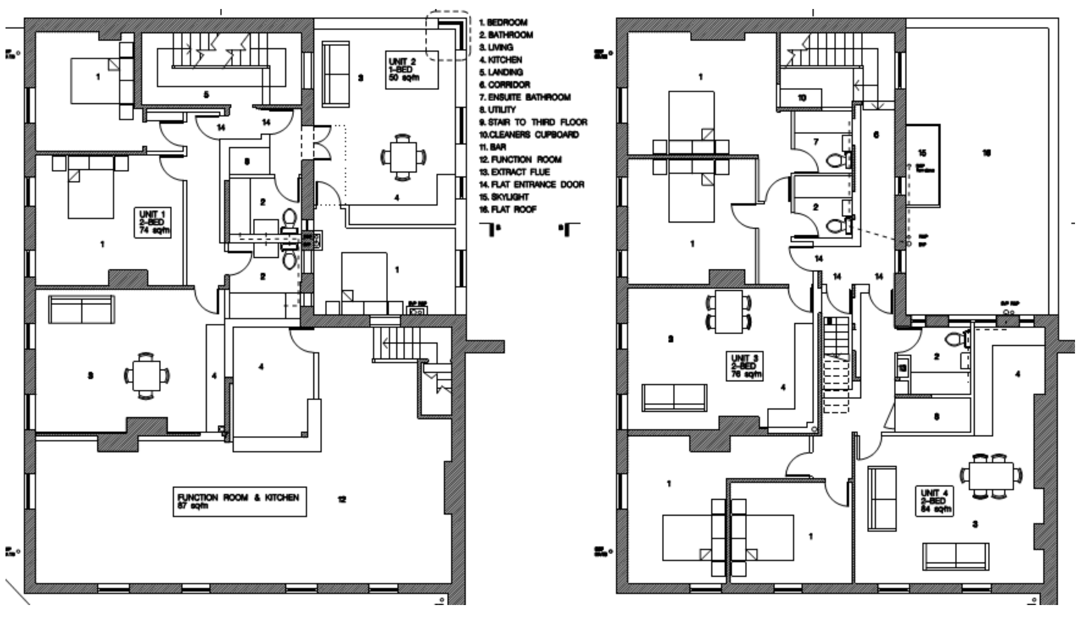
All major building elements should be tested in accordance with BS EN ISO 140-3:1995. Independent testing at a UKAS accredited laboratory will be required in order to confirm the performance of the chosen system for an "actual" configuration.

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

## 7.0 INTERNAL BUILDING FABRIC SPECIFICATION

It is understood that current proposals involve converting the majority of the First and Second Floor to residential units, with a proportion of the First Floor being a Function Room.

The proposed layout of the First and Second Floor is shown in Figure 7.1 below.



Due to the proposed location of noise sensitive spaces adjacent to both the Ground Floor Pub and First Floor Function Room, consideration and careful acoustic design would need to be applied to the following areas:

- Sufficiently insulating the floor separating the Ground Floor pub with the First Floor Flats
- Sufficiently insulating the floor separating the First Floor Function Room with the Second Floor Flats
- Sufficiently insulating the walls separating the First Floor Function Room with the First Floor Flats

### 7.1 Floor Upgrade – Ground Floor Pub & First Floor Flats

It is understood that the floor at present is comprised of timber joist system. In order to address the airborne sound insulation for the single joist system, changes would need to be adopted to the underfloor soffit. However, this would not be possible. We would therefore recommend the following:

- Removal of all current floorboards within the First Floor. If these need to be replaced, they should be removed carefully and numbered to ensure they are replaced in the same manner they were removed.
- It is recommended that the joist void is cleared of all current debris and enhanced by the installation of CMS Quietslab, which is comprised of a 3mm polymeric mass barrier (mass 10kg/m$^2$) sandwiched between 2x50mm mineral wool slabs (density 60kg/m$^3$)
- Installation of an intermediate mass element (19mm Gyproc Plank, or 15mm Fermacell) on timber noggins, or steel angles.
- Direct fixing of 1x19mm Lamaphon cementitious board or 1x18mm Versapanel cementitious board on the joists (If the floorboards need to be replaced, this element should be installed over the existing floorboards)
- 45mm resilient battens as a floating layer with 25mm mineral wool (60kg/m$^3$ density) within the formed void
- Direct fixing of 1x19mm Lamaphon cementitious board or 1x18mm Versapanel cementitious on the battens as the end decking. This layer can then accommodate the end walking surface.

The above floor system would be expected to achieve airborne sound insulation performance values of approximately 52-57 dB $D_{nT,w} + C_{tr}$, therefore comfortably satisfying Building Regulations requirements, and ensuring that any noise generated within the pub is non-intrusive within the Flat.

### 7.2 Floor Upgrade – First Floor Function Room & Second Floor Flats

It is understood that the floor at present is comprised of timber joist system. In order to address the airborne sound insulation for the single joist system, changes would need to be adopted as follows:

- Removal of all current floorboards within the Second Floor. If these need to be replaced, they should be removed carefully and numbered to ensure they are replaced in the same manner they were removed.
- Installation of dense mineral wool (thickness 100-150mm, density 60kg/m$^3$) between the joists, not tightly packed as this would form an acoustic bridge.
- Installation of an intermediate mass element (19mm Gyproc Plank, or 15mm Fermacell) on timber noggins, or steel angles.
- Direct fixing of 1x19mm Lamaphon cementitious board or 1x18mm Versapanel cementitious board on the joists (If the floorboards need to be replaced, this element should be installed over the existing floorboards)
- Installation of GAH-1 resilient hangers to the underside of the timber joists, to provide a 150mm void
- Installation of 2x15mm Fermacell fixed to the GAH-1 hangers as the new underfloor soffit lining

The above floor system would be expected to achieve airborne sound insulation performance values of approximately 52-57 dB $D_{nT,w} + C_{tr}$, therefore comfortably satisfying Building Regulations requirements, and ensuring that any noise generated within the function room is non-intrusive within the Flat.

### 7.3 Wall Upgrade – Wall Separating Lounge of Flat 1 with the Function Room

Due to the proposed Lounge of Flat 1 being adjacent to the Function Room, the existing wall would need to be significantly upgraded in order to ensure noise nuisance would not be an issue.

We would recommend that an independent wall is built on the function room side in the recessed sections either side of the fireplace, as follows:

- Installation of GypFrame fixing channel at 20mm from the existing wall
- Installation of 146mm 'C Studs' at 450-600mm centres, with 100mm mineral wool insulation (density 60kg/$m^3$) between the studs
- Installation of 2x14mm Versapanel as the new wall lining

### 7.4 Wall Upgrade – Wall Separating Bedroom of Flat 2 with the Function Room

Due to the proposed Bedroom of Flat 2 being adjacent to the Function Room, the existing wall would need to be significantly upgraded in order to ensure noise nuisance would not be an issue. It is understood that the existing external window needs to be maintained due to the list status of the building. We would therefore recommend the following to be adopted on the Bedroom side of the party wall:

- Installation of 50mm timber battens fixed directly to the wall, with 25mm mineral wool insulation between (density 60kg/$m^3$) and 1x14mm Versapanel fixed directly to the battens
- Installation of GypFrame fixing channel at 10mm from the installed Versapanel board
- Installation of 70mm 'C Studs' at 450-600mm centres, with 50mm mineral wool insulation (density 60kg/$m^3$) between the studs
- Installation of 2x14mm Versapanel as the new wall lining

## General Advice

For airborne sound insulation, special attention should be given to workmanship regarding the proper sealing of junctions and penetration details. Where any gaps between external (flanking) walls and floors exist, they should be caulked with sealant or similar type material. It should be also noted that flanking strips (Yelofon ES5/100) should be installed around the perimeter of the floor to isolate the floor from walls and skirtings. The strip should be turned up so that the skirting boards rest on them and any excess cut away.

Ideally, a gap between the head of the wall and the underside of the soffit should not be greater than 10mm. A polyethylene backing rod could be inserted in the gap with tightly packed mineral wool while silicone caulk is used to seal the joint.

In the case of any new walls, isolation strips would need to be used, which would isolate the wall leaves from the sub-floor, therefore minimising any flanking paths. Please note that a material such as Monarfloor or Regupol Isolation Strip can be used to isolate any new walls built on any steel structure.

Chimney breasts which bridge two or more separate dwellings should be bricked up in order to stop any flanking of noise via the cavity. The section directly adjacent to the separating floor should be completely filled and any gaps sealed with non-setting mastic of packed with mineral wool. Should the use of bricks not be desired, we would recommend the pattressing of the fireplace by two layers of 15mm SoundBloc with proper sealing of the junctions with non-setting mastic. The installation of a blockage at right angles to the direction of the chimney shaft would also be recommended. We would suggest the installation of a layer of SuperLag Quietslab. This is a sandwich system which is comprised of two 50mm layers of compressed high-density mineral wool slabs (60kg/$m^3$) separated by a 10kg/$m^2$ heavy PVC film.

## 8.0 CONCLUSION

An environmental noise assessment has been undertaken at The Cock Tavern, Phoenix Road, London, NW1 1HB.

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 should be required in order to protect the proposed residential properties from external noise intrusion.

Report by

**Dan Green AMIOA**

**KP Acoustics Ltd**

Checked by

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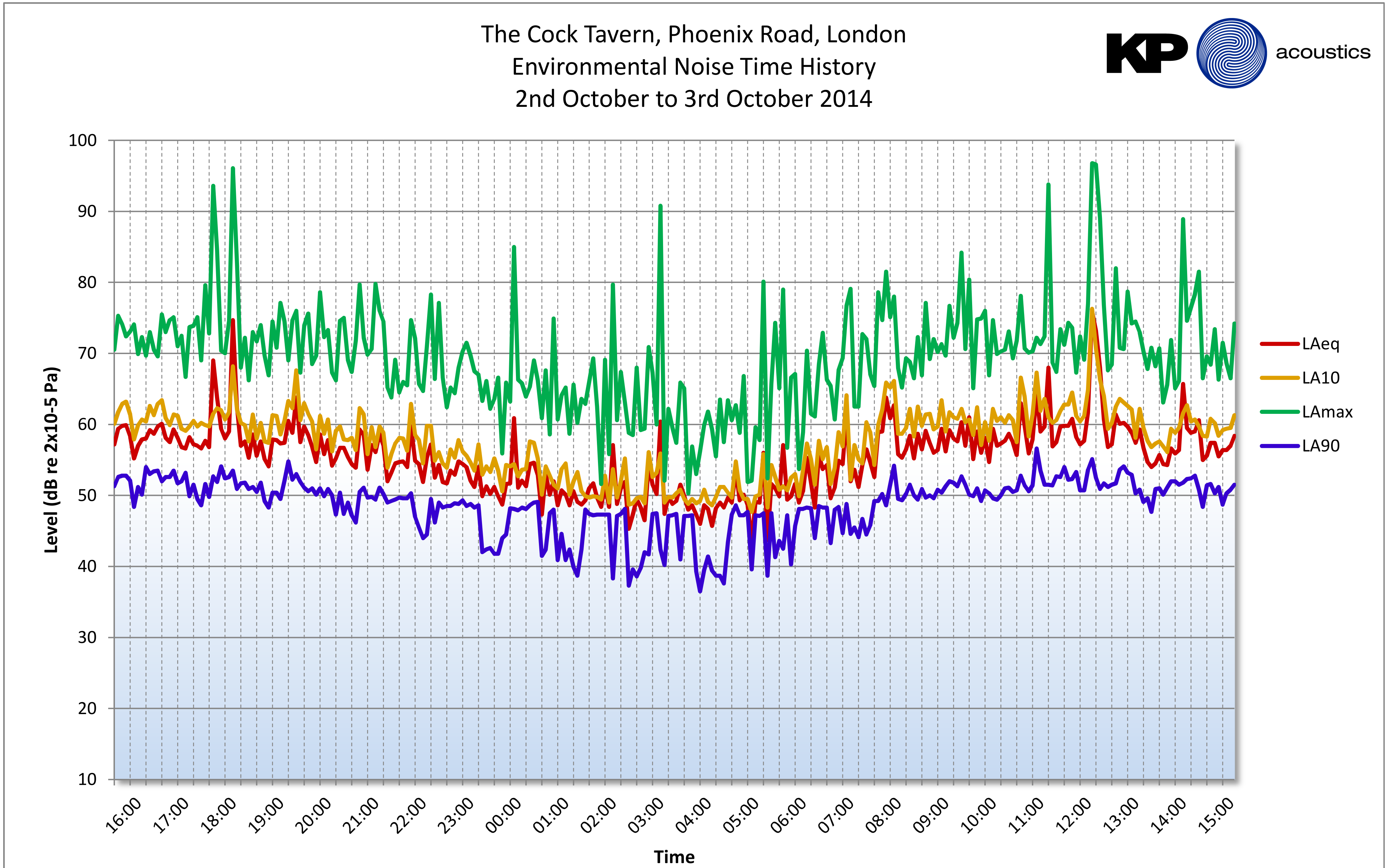
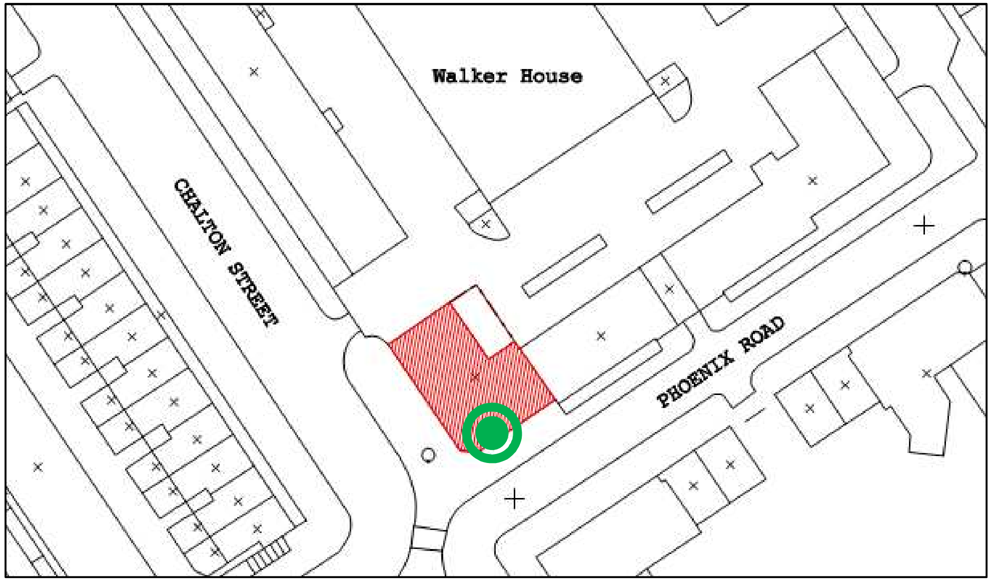
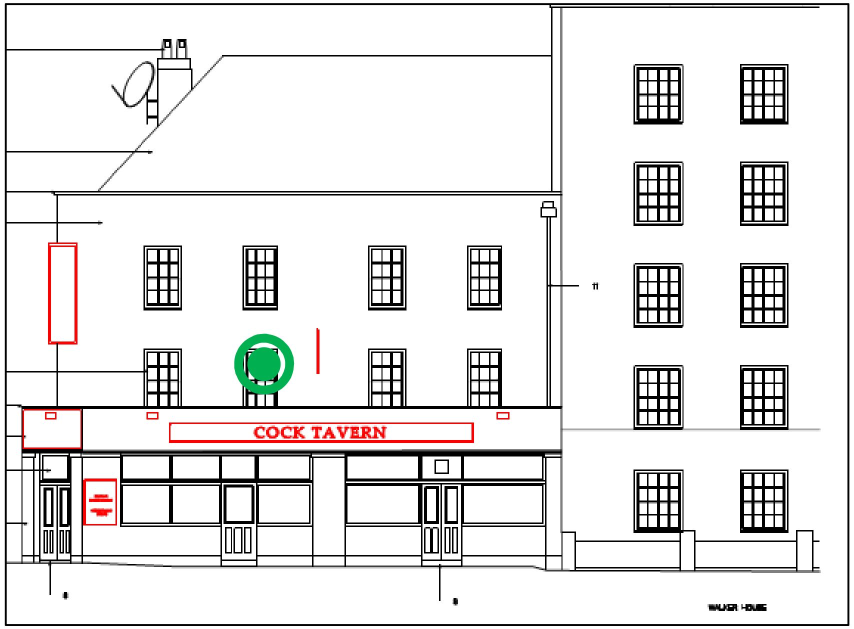



**Figure 11674.TH1**




Noise Survey Monitoring Position

**Title:**

Indicative site plan showing noise monitoring position

**Date:** 13 October 2014

**FIGURE 11674.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.