SANDY BROWN

Consultants in Acoustics, Noise & Vibration

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3,5 & 7 Bayham Street
46 Bayham Place

Environmental noise assessment

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Version	Date	Comments	Author	Reviewer
A	27 Jan 17	Initial Issue	Richard Muir	Daniel Stringer

Summary

Sandy Brown (SB) has been commissioned by the property owners to provide acoustic advice in relation to the proposed development at 3, 5 & 7 Bayham Street and 46 Bayham Place.

An environmental noise survey has been conducted at the site and this survey has been used as the basis for the assessment. In addition, a noise survey for the adjacent site has also been used to supplement the assessment.

The survey has been used to setting appropriate plant noise limits in line with the requirements of the London Borough of Camden and also establishing existing ambient noise levels.

The main noise sources affecting the site are traffic noise on Bayham Street and music noise from KOKO nightclub on Bayham Place.

It is recommended that windows facing Bayham Place have wide airspace double glazing to control music noise and that windows facing Bayham Street have acoustic double glazed units to control traffic noise. A whole house ventilation system is recommended so windows can remain closed.

The representative background sound levels measured during the survey were $L_{A90,15min}$ 46 dB during the daytime and $L_{A90,15min}$ 44 dB at night.

Based on the requirements of the London Borough of Camden and on the results of the noise survey, all plant must be designed such that the cumulative noise level at 1 m from the worst affected windows of the nearby noise sensitive premises does not exceed $L_{Aeq,15min}$ 36 dB during the daytime, and $L_{Aeq,15min}$ 34 dB during the night. These limits are cumulative, and apply with all plant operating under normal conditions. If plant items contain tonal or attention catching features, the limits will be more stringent than those set out above.

Contents

1 Introduction

Sandy Brown (SB) has been commissioned by the property owners to provide acoustic advice in relation to the proposed development at 3, 5 & 7 Bayham Street and 46 Bayham Place.

As part of this, an environmental noise survey is required, the purpose of which is to establish the existing background sound levels in the vicinity of nearby noise sensitive premises and to set appropriate limits for noise egress from building services plant.

In addition, road traffic noise and anticipated music noise levels have been assessed and recommendations made in relation to windows.

This report presents the results of the environmental noise survey and a discussion of acceptable limits for noise emission from building services plant.

2 Site description

2.1 The site and its surrounding

The site location in relation to its surroundings is shown in Figure 1.

2.2 Adjacent premises

Sites adjacent on Bayham Place are currently being redeveloped into residential shown (highlighted in blue) in Figure 1.

Approximately 10 m to the south of the site on the adjacent side of Bayham Place is the KOKO London night club venue (highlighted in yellow).

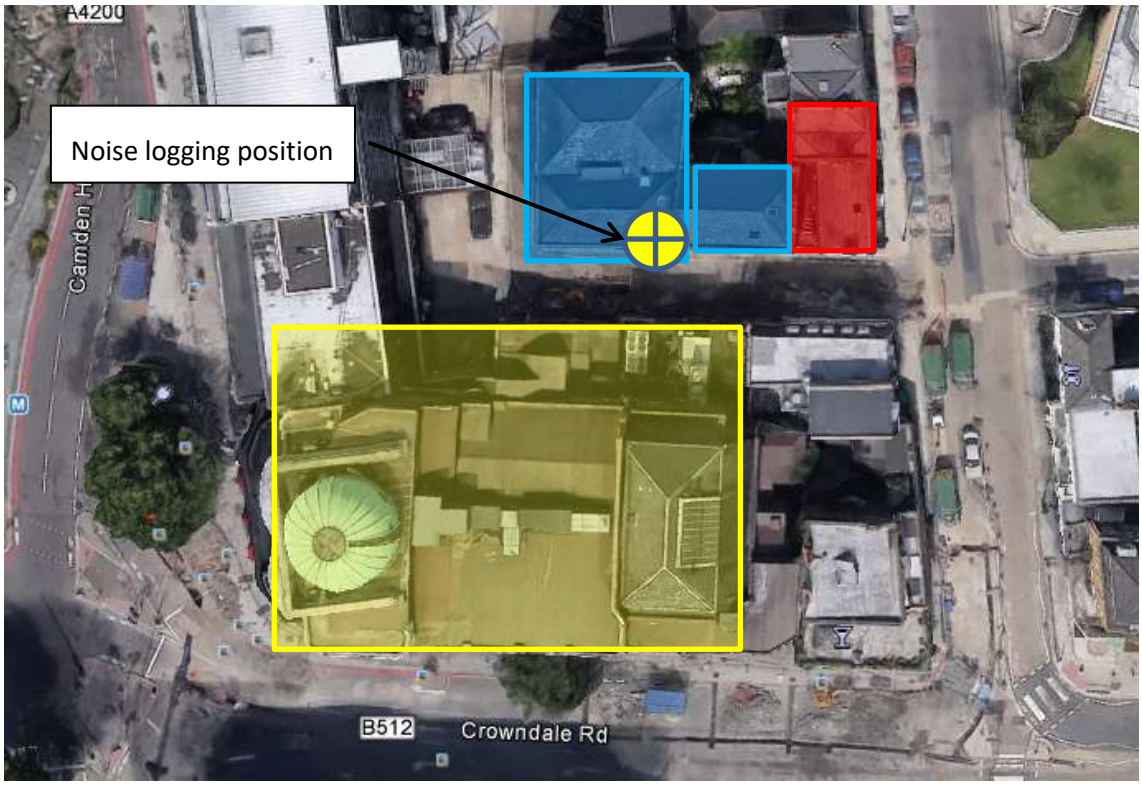


Figure 1 Site map (courtesy of Google Earth Pro)

3 Method

Details of the equipment used, the noise indices and the weather conditions during the survey are provided in Appendix A. Further information on the specific survey method is provided in this section.

3.1 Unattended measurements

Unattended noise monitoring was undertaken at the site to determine the existing background sound levels in the vicinity of nearby noise sensitive premises.

The unattended measurements were performed over 15 minute periods between Friday 9 December 2016 and Thursday 15 December 2016.

The measurement position used during the survey is indicated in Figure 1.

This location was chosen to be reasonably representative of the noise levels experienced by the nearest noise sensitive premises from KOKO nightclub.

The measurements were taken at approximately 20 m above ground level and 1 m from the existing building facade, and therefore the unattended measurement results include the contribution from the facade reflection.

4 Measurement results

4.1 Observations

The dominant noise sources observed at the site during the survey consisted of noise from road traffic along Bayham Street and some rooftop plant.

Noise egress levels from Koko are noted in the results of the unattended survey, and are discussed further below.

4.2 Unattended measurement results

The results of the unattended noise measurements are summarised in the following tables. A graph showing the results of the unattended measurements is provided in Appendix B.

The day and night time ambient noise levels measured during the unattended survey are presented in Table 1.

Table 1 Ambient noise levels measured during the survey

Date	Daytime (07:00 – 23:00) $L_{Aeq,16h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
Friday 9 December 2016	-	57
Saturday 10 December 2016	60	60
Sunday 11 December 2016	64	56
Monday 12 December 2016	64	52
Tuesday 13 December 2016	64	55
Wednesday 14 December 2016	62	52
Thursday 15 December 2016	63	60
Average	63	56

The minimum background sound levels measured during the unattended survey are given in Table 2.

Table 2 Minimum background sound levels measured during the survey

Date	Daytime (07:00 – 23:00) $L_{A90,15min}$ (dB)	Night (23:00 – 07:00) $L_{A90,15min}$ (dB)
Friday 9 December 2016	51 *	45
Saturday 10 December 2016	46	55
Sunday 11 December 2016	53	44
Monday 12 December 2016	46	44
Tuesday 13 December 2016	48	45
Wednesday 14 December 2016	47	45
Thursday 15 December 2016	47	45

* Measurement not made over full period due to monitoring start and end time

The lowest background sound levels measured during the survey were $L_{A90,15min}$ 46 dB during the daytime and $L_{A90,15min}$ 44 dB at night.

5 Assessment criteria

5.1 NPPF and NPSE

The National Planning Policy Framework (NPPF) sets out the government planning requirements, and supersedes previous guidance notes such as PPG24. No specific noise criteria are set out in the NPPF, or in the Noise Policy Statement for England (NPSE) to which it refers.

The NPPF states:

'Planning policies and decisions should aim to:

- *Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*
- *Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.'*

The NPSE states that its aims are as follows:

'Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life; and*
- *Where possible, contribute to the improvement of health and quality of life.'*

As such, although neither of these documents sets out specific acoustic criteria for new residential development, the requirement to control both the effect of existing noise on the new development and the effect of noise from the development on the surroundings needs to be considered.

5.2 External noise levels - noise egress

5.2.1 Standard guidance

Guidance for noise emission from proposed new items of building services plant is given in BS 4142: 2014 '*Methods for rating and assessing industrial and commercial sound*'.

BS 4142 provides a method for assessing noise from items such as building services plant against the existing background sound levels at the nearest noise sensitive.

BS 4142 suggests that if the noise level is 10 dB or more higher than the existing background sound level, it is likely to be an indication of a significant adverse impact. If the level is 5 dB above the existing background sound level, it is likely to be an indication of an adverse impact. If the level does not exceed the background level, it is an indication of having a low impact.

If the noise contains 'attention catching features' such as tones, bangs etc, a penalty, based on the type and impact of those features, is applied.

5.2.2 London Borough of Camden

The development is located in the London Borough of Camden (LBC). The requirements specified by LBC are set out in Table 3.

Table 3 Requirements of LBC

Noise description and location of measurement	Period	Time	Noise level
Noise at 1 metre external to a sensitive facade	Day, evening and night	0000-2400	5 dBA < L_{A90}
Noise that has a distinguishable note (whine, hiss, screech, hum) at 1 metre external to a sensitive facade	Day, evening and night	0000-2400	10 dBA < L_{A90}
Noise that has a distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive facade	Day, evening and night	0000-2400	10 dBA < L_{A90}
Noise at 1 metre external to a sensitive facade where L_{A90} > 60 dB	Day, evening and night	0000-2400	L_{Aeq} 55 dB

5.2.3 Emergency plant noise limits

Typically limits for noise emissions from items emergency plant are set to be 10 dB above the background noise level, outside the window of the nearest noise sensitive or residential premises.

This is on the basis that such plant is only tested between 09:00-17:00 Monday to Friday for a short duration and used only during emergencies.

5.3 Internal noise levels – noise ingress

5.3.1 Standard guidance

Guidance on acceptable internal noise levels in residential dwellings is given in BS 8233:2014 *Sound insulation and noise reduction for buildings*, and is also provided by the World Health Organisation. The guidance given by BS 8233:2014and WHO is shown in Table 4.

Table 4 Internal noise criteria for sleeping/resting

Internal space	Indoor ambient noise level L_{Aeq} (dB)		
	BS 8233 (07:00 to 23:00)	BS 8233 (23:00 to 07:00)	WHO
Living rooms	35	-	30/35[1]
Dining room	40	-	-
Bedrooms	35	30[2]	30[2]

[1] WHO does not differentiate between different types of living spaces, but recommends L_{Aeq} 30 dB in relation to sleep disturbance and L_{Aeq} 35 dB in relation to speech intelligibility. WHO provides a 16 hour time base when referring to speech intelligibility and an 8 hour time base when referring to sleep disturbance.

[2] BS 8233 notes that individual noise events can cause sleep disturbance, and that a guideline value may be set depending on the character and number of events per night, although no specific limit is provided. Section 3.4 of the WHO guidelines for community noise suggests that good sleep will not generally be affected if internal levels of L_{Amax} 45 dB are not exceeded more than 10-15 times per night.

5.3.2 Music noise

A design goal for control of music noise is L_{eq} NR15 in bedrooms and NR20 in living areas.

The survey was conducted during events at KOKO on the 9th, 10th and 11th December and therefore the external noise survey is considered to have captured representative external noise levels on Bayham Place.

6 Facade sound insulation – noise ingress

This section discusses internal noise level criteria and assesses the required facade sound insulation performance. In principle, the required facade specification depends on two factors – the external noise levels at the site, and the internal noise criteria.

The glazing sound insulation performance requirements for the residential units facing Bayham Street are typically dictated by achieving day time internal noise criteria based on traffic noise whereas the residential units facing Bayham Place are typically dictated by achieving the night time internal noise criteria based on music noise.

The following assessment is based on achieving the internal noise levels recommended in BS 8233:2014, which are set out in Section 5.2.2 and in the case of music noise the limits given in 5.3.2.

6.1 Facade noise levels

The noise incident on the facade is primarily from local road traffic along Bayham Street. The lower floors of the facade adjacent to Bayham Street experience the highest noise levels. The daytime road traffic noise levels will be in the region of $L_{Aeq16hr}$ 70dB (Source HTA report 22521/R1 dated 14 June 2106 for 48056 Bayham Place). The highest noise levels measured during the Sandy Brown survey were recorded at roof level and do not necessarily represent worst case traffic noise.

Glazing sound insulation requirements along the Bayham Street facade have been established based upon not exceeding L_{Aeq} 35 dB in bedrooms during the day (which is expected to meet the requirement of L_{Aeq} 30 dB for bedrooms at night, as set out in Section 5.3.1.

It is also assumed that concrete / masonry elements of the facade will achieve a specified sound insulation performance of ≥ R_w+C_{tr} 55 dB.

Glazing rated at R_w+C_{tr} 35 dB will meet the required sound insulation and this can be achieved by a glazing system such as 12.8 mm/12 mm/10 mm combined with mechanical ventilation (eg, whole house ventilation).

6.2 Music noise

The logging survey recorded noise levels over a week long period and captured a number of events at KOKO. The maximum $L_{eq5min63Hz}$ measured during the noise survey was 78 dB and the maximum $L_{Aeq5min}$ was 63 dB. This is consistent with measurements provided by the client for the planning application for the adjacent site. On the basis that these are representative of the external noise levels anticipated from KOKO nightclub and considering a music noise target of NR15 in bedrooms and NR20 in living areas then the windows facing Bayham place need to provide a sound reduction of 33 dB at 63Hz and an overall R_w + C_{tr} of 43dB and this will necessitate wide airspace double glazing such as 16.8 mm/360 cavity/16.8 mm which has a

performance of 41.1 at 63 Hz. This combined with the masonry construction capable of maintaining this performance.

On Bayham Street the windows are screened from KOKO and incident noise levels are expected to be 5-10 dB lower and the glazing to control traffic noise in as outlined in 6.1 will be suitable.

7 Building services noise egress limits

Based on the above criteria and the measurement results, the cumulative noise level resulting from the operation of all new plant at 1 m from the worst affected windows of the nearest noise sensitive premises should not exceed the limits set out in Table 5.

Table 5 Plant noise limits at 1 m from the nearest noise sensitive premises

Time of day	Maximum sound pressure level at 1 m from noise sensitive premises ($L_{Aeq,15min}$ dB)
Daytime (07:00-23:00)	47
Night-time (23:00-07:00)	36

The limits set out in Table 5 do not include any attention catching features.

7.1 Assessment

At this stage, no information is available in relation to the proposed installation of building services plant, and this will need to be assessed in detail as the design progresses. However, all plant items will be designed to achieve the plant noise limits set out above, including any corrections for attention catching features.

8 Conclusion

Based on the requirements of the London Borough of Camden, the relevant plant noise limits at the worst affected existing noise sensitive premises would be L_{Aeq} 47 dB during the day, and L_{Aeq} 36 dB during the night.

These limits are cumulative, and apply with all plant operating under normal conditions. If plant items contain tonal or attention catching features, the limits will be more stringent than those set out above.

Appendix A - Survey details

Equipment

A Svantek 957 sound level meter was used to undertake the unattended measurements. The calibration details for the equipment used during the survey are provided in Table A1.

Table A1 Equipment calibration data

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
Sound level meter	SVAN957/12326	Svantek	03 Aug 17	1508454
Microphone	7052H/41518	Svantek	03 Aug 17	1508454
Pre-amp	SV12L/13571	Svantek	03 Aug 17	1508454
Calibrator	SV30A/10931	Svantek	03 Aug 17	1508440
Sound level meter	2250/2693829	Bruel & Kjaer	11 Feb 18	08930
Microphone	4189/2689268	Bruel & Kjaer	11 Feb 18	08930
Pre-amp	ZC0032/12061	Bruel & Kjaer	11 Feb 18	08930
Calibrator	4231/3001923	Bruel & Kjaer	11 Feb 18	08930

Calibration of the sound level meters used for the tests is traceable to national standards. The calibration certificates for the sound level meters used in this survey are available upon request.

The sound level meters and microphones were calibrated at the beginning and end of the measurements using their respective sound level calibrators.

Noise indices

The equipment was set to record a continuous series of broadband sound pressure levels. Noise indices recorded included the following:

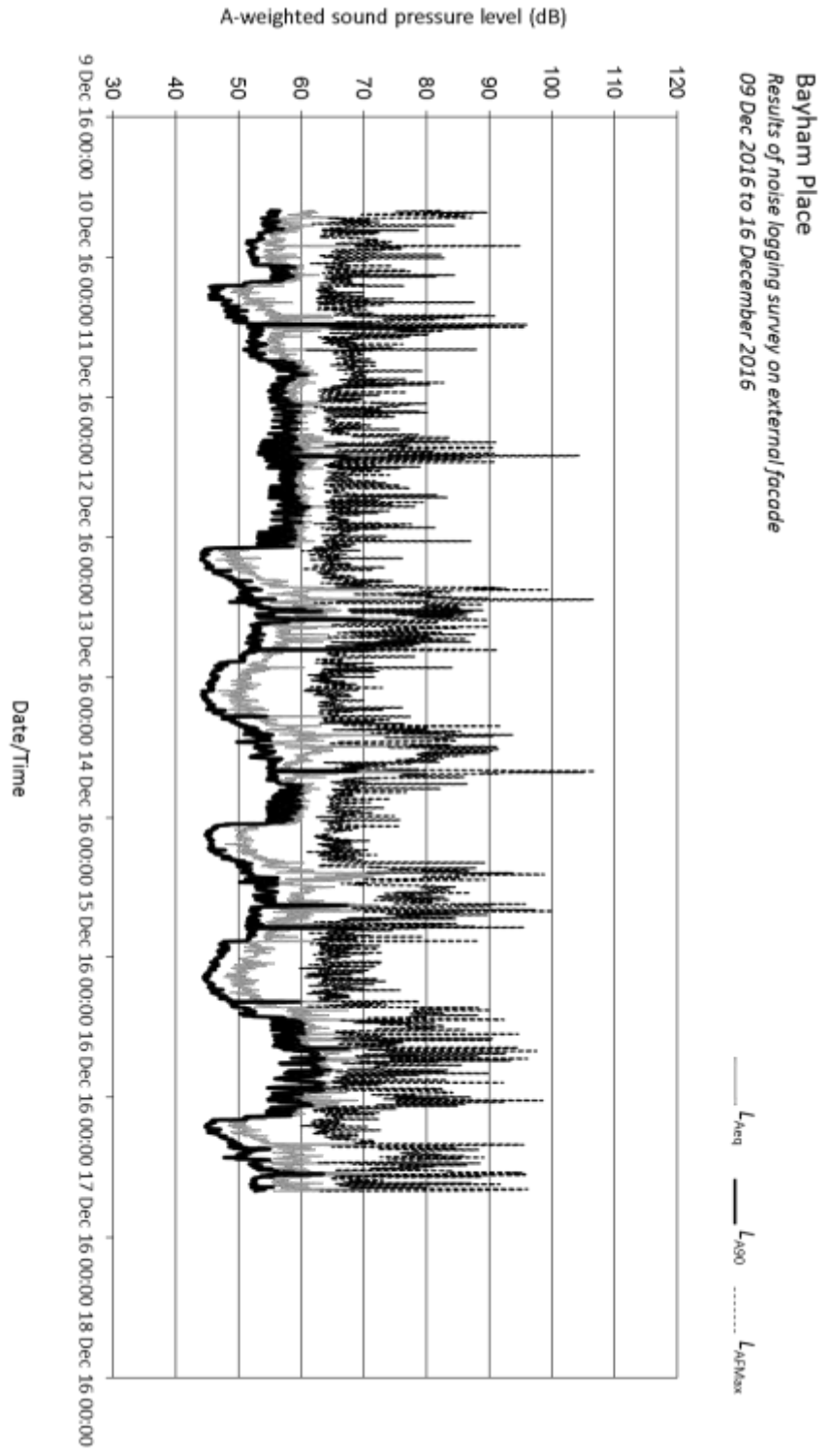
- $L_{Aeq,T}$ The A-weighted equivalent continuous sound pressure level over a period of time, T.
- $L_{AFmax,T}$ The A-weighted maximum sound pressure level that occurred during a given period with a fast time weighting.
- $L_{A90,T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background sound level.

The L_{A90} is considered most representative of the background sound level for the purposes of complying with any local authority requirements.

Sound pressure level measurements are normally taken with an A-weighting (denoted by a subscript 'A', eg L_{A90}) to approximate the frequency response of the human ear.

A more detailed explanation of these quantities can be found in BS7445: Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures.*

Appendix B - Results of unattended measurements at Location 'L'


Bayham Place
Results of noise logging survey on external facade
09 Dec 2016 to 16 December 2016
A-weighted sound pressure level (dB)
120
110
100
90
80
70
60
50
40
30
9 Dec 16 00:00
10 Dec 16 00:00
11 Dec 16 00:00
12 Dec 16 00:00
13 Dec 16 00:00
14 Dec 16 00:00
15 Dec 16 00:00
16 Dec 16 00:00
17 Dec 16 00:00
18 Dec 16 00:00
Date/Time
L_{Aeq}
L_{A90}
L_{AFMax}