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Kilburn & Strode

Environmental noise survey report

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Summary

Sandy Brown has been appointed via Savills to provide acoustic design advice in relation to the Cat B fit-out of Level 5, Lacon House, 84 Theobalds Road, London WC1, which is to house new office accommodation for Kilburn & Strode.

An environmental noise survey has been carried out to determine the existing background sound levels in the area and to set appropriate plant noise limits in line with the requirements of the London Borough of Camden (LBC).

The noise survey was performed between 15:45 on 27 January 2017 and 10:00 on 31 January 2017.

The representative background sound levels measured during the survey were $L_{A90,15min}$ 52 dB during the daytime, $L_{A90,15min}$ 52 dB in the evening and $L_{A90,15min}$ 47 dB at night.

Based on the requirements of the LBC 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 $L_{Aeq,15min}$ 47 dB during the daytime, $L_{Aeq,15min}$ 47 dB during the evening and $L_{Aeq,15min}$ 42 dB during the night. These limits are cumulative, and apply with all plant operation under normal conditions. If plant items contain tonal or attention catching features, a penalty based on the type and impact of those features will be applied, and the limits will be more stringent than those set.

An assessment of the proposed new condenser, to be installed at roof level, has been carried out and demonstrates compliance with the plant noise limits established herein.

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1 Introduction

Sandy Brown has been appointed via Savills to provide acoustic design advice in relation to the Cat B fit-out of Level 5, Lacon House, 84 Theobalds Road, London WC1, which is to house new office accommodation for Kilburn & Strode.

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.

This report presents the survey method, results of the environmental noise survey, and a discussion of acceptable limits for noise emission from building services plant. An assessment has been carried out for the proposed rooftop plant.

2 Site description

2.1 The site and its surrounding

The site location in relation to its surroundings is shown in Figure 1 highlighted in blue. The development is situated on Theobalds Road, with the minor roads of Harpur Street and Lamb's Conduit Street running to the west and east respectively.

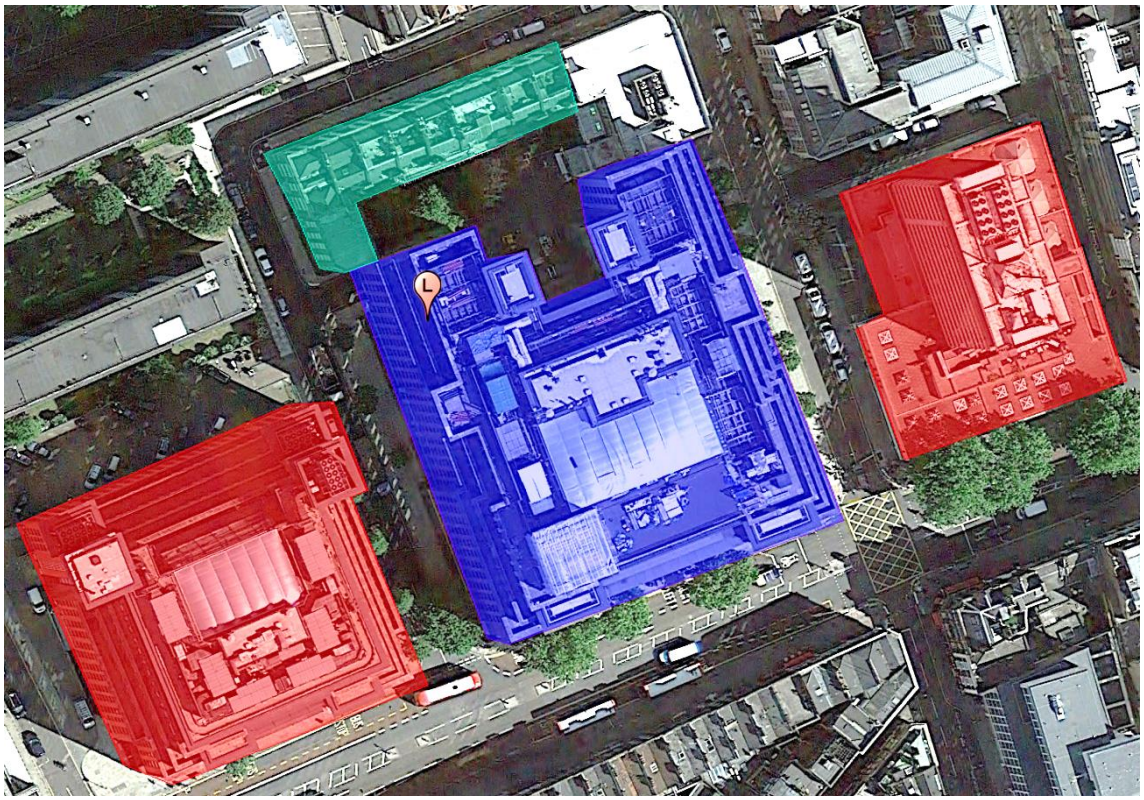


Figure 1 Site map (courtesy of Google Earth Pro)

2.2 Adjacent premises

The area surrounding the site is of mixed use. The closest residences are highlighted in green in Figure 1 and are situated on Dombey Street. The buildings highlighted in red are of commercial use, and are Warner House and Holborn Police station to the west and east, respectively.

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.

Unattended noise monitoring was undertaken at the site over 5 days 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 15:45 on 27 January 2017 and 10:00 on 31 January 2017. The equipment was installed and collected by Sam Daintree.

The measurement position used during the survey is indicated in Figure 1, denoted by the letter 'L'. The logger was installed on the Level 8 balcony of the site. A photograph showing the measurement location is provided Figure 2. This location was chosen to be reasonably representative of the noise levels experienced by the nearest noise sensitive premises. The microphone, whilst it was screened from the road, did have line of sight to the nearest receptor to the west.

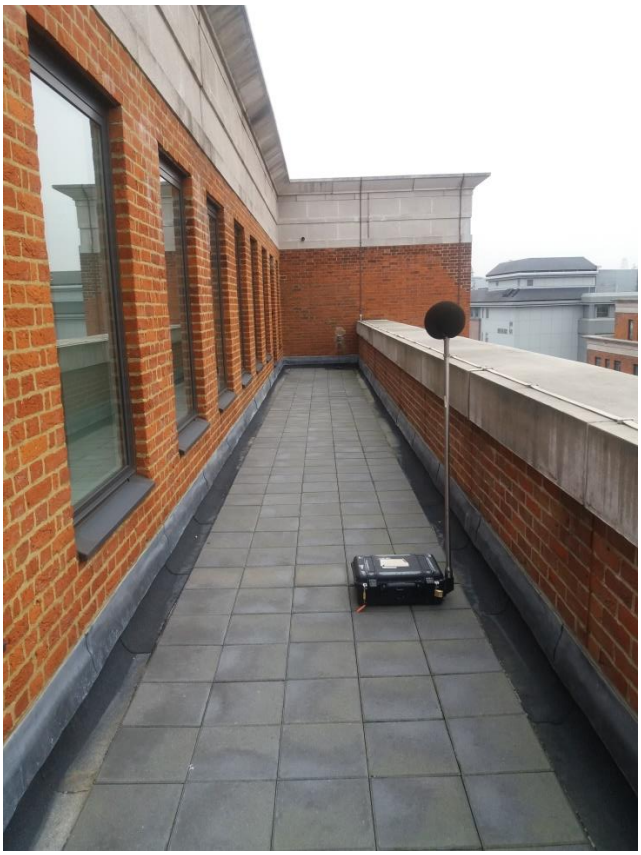


Figure 2 Photograph showing unattended logging position

4 Measurement results

4.1 Observations

The dominant noise sources observed at the site during the survey consisted of traffic noise from Theobalds Road and noise from external plant items on the opposing building (Warner House).

Less significant noise sources included traffic noise from the surrounding side streets, and aircraft noise.

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

The position was approximately 1 m away from the facade of the building, and the measurements can, therefore, be considered to be facade measurements.

Table 1 Ambient noise levels measured during the survey

Date	Daytime (07:00-19:00) $L_{Aeq,12hour}$ (dB)	Evening (19:00-23:00) $L_{Aeq,4hour}$ (dB)	Night (23:00 - 07:00) $L_{Aeq,8hour}$ (dB)
27 Jan 2017	-	58	55
28 Jan 2017	56	55	54
29 Jan 2017	55	56	53
30 Jan 2017	56	54	53
31 Jan 2017	-	-	-
Average	56	56	54

In line with BS 4142:2014, for the purpose of analysis and establishing representative background sound levels, day and night time typical levels have been quantified using statistical analysis from the continuous logging measurements.

Daytime, evening and night time statistical analyses of representative values for the site are given in Figure 3, Figure 4 and Figure 5.

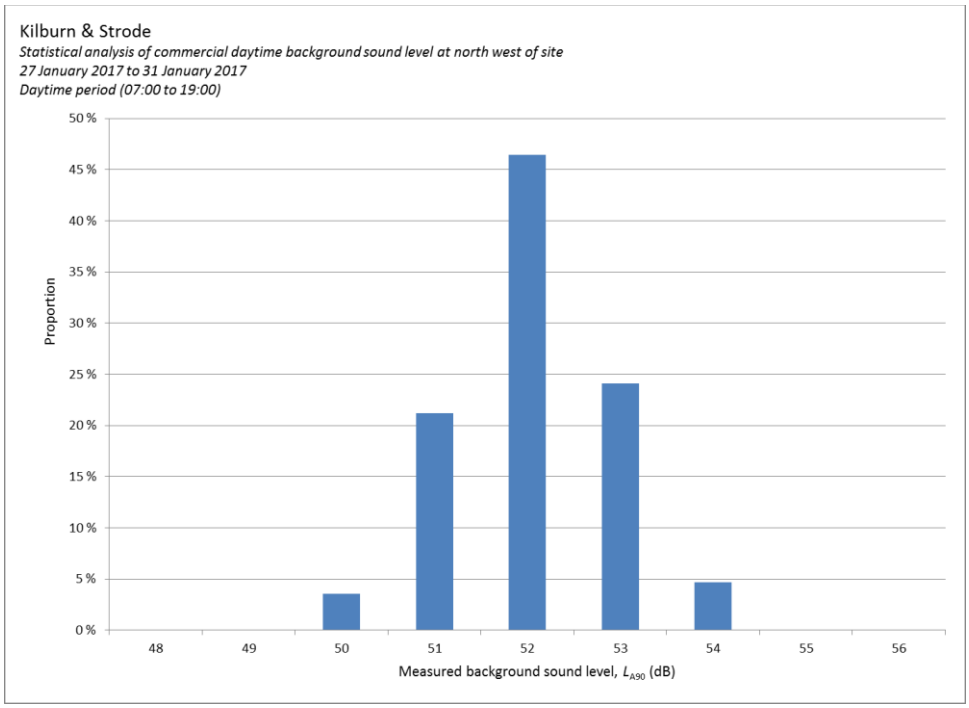


Figure 3 Histogram of measured daytime background levels

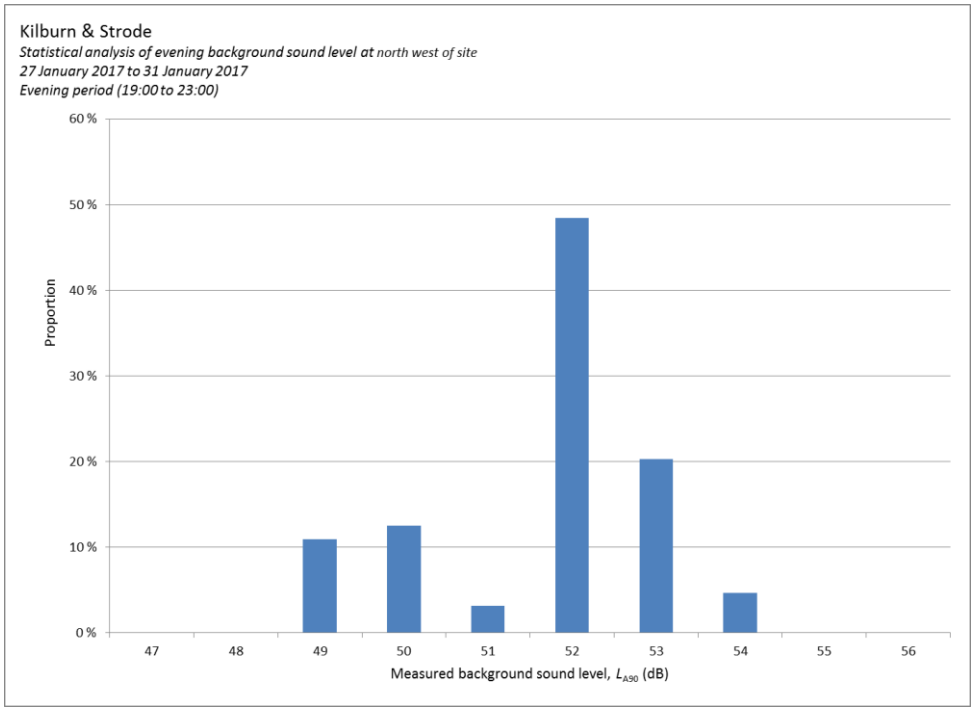


Figure 4 Histogram of measured evening background levels

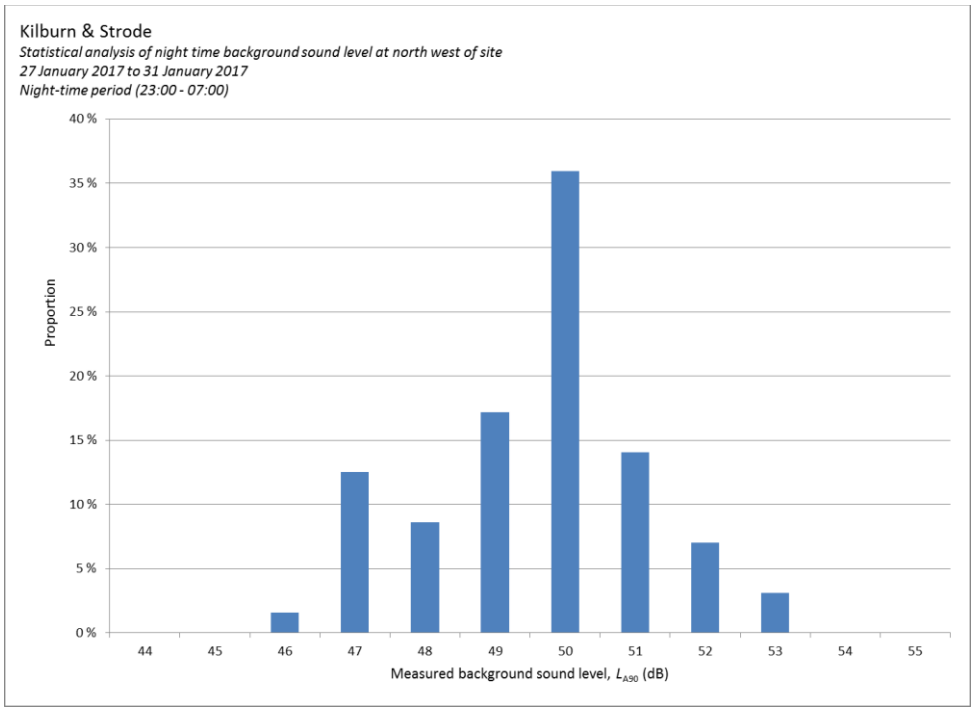


Figure 5 Histogram of measured night time background levels

From this analysis, the representative background sound levels measured during the survey were $L_{A90,15min}$ 52 dB during the daytime, $L_{A90,15min}$ 52 dB and $L_{A90,15min}$ 47 dB at night.

5 Building services noise egress limits

5.1 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 Local Authority criteria

It is understood that LBC stipulates the noise egress criteria set out in Development Policy DP28, as reproduced in Table 2.

Table 2 LBC noise egress criteria

Noise description and location of measurement	Period	Noise level
Noise at 1 m external to a sensitive facade	Day, evening and night (00:00-24:00)	5 dB(A) < L_{A90}
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 m external to a sensitive facade	Day, evening and night (00:00-24:00)	10 dB(A) < L_{A90}
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 m external to a sensitive facade	Day, evening and night (00:00-24:00)	10 dB(A) < L_{A90}
Noise at 1 m external to sensitive façade where L_{A90} > 60 dB	Day, evening and night (00:00-24:00)	L_{Aeq} 55 dB

5.3 Limits

5.3.1 Basic 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 3.

Table 3 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 (07:00-19:00)	47
Evening (19:00-23:00)	47
Night-time (23:00-07:00)	42

The limits set out in Table 3 do not include any attention catching features. The penalties for attention catching features may be significant, and will need to be considered as the building services design progresses. The LBC criteria, as set out in Table 2, stipulates a more onerous criteria for plant which include attention catching features.

5.4 Assessment

A plant noise assessment has been carried out in order to determine the effect the new plant will have on the nearest noise sensitive receptor.

5.4.1 Proposed plant

The proposed plant is a Mitsubishi Electric MXZ-3D54VA2 condenser.

The plant has an overall sound power level of L_w 64 dBA.

The condenser unit will be located on the roof of the site next to existing plant. This location is indicated in Figure 6, with the proposed condenser highlighted in red.

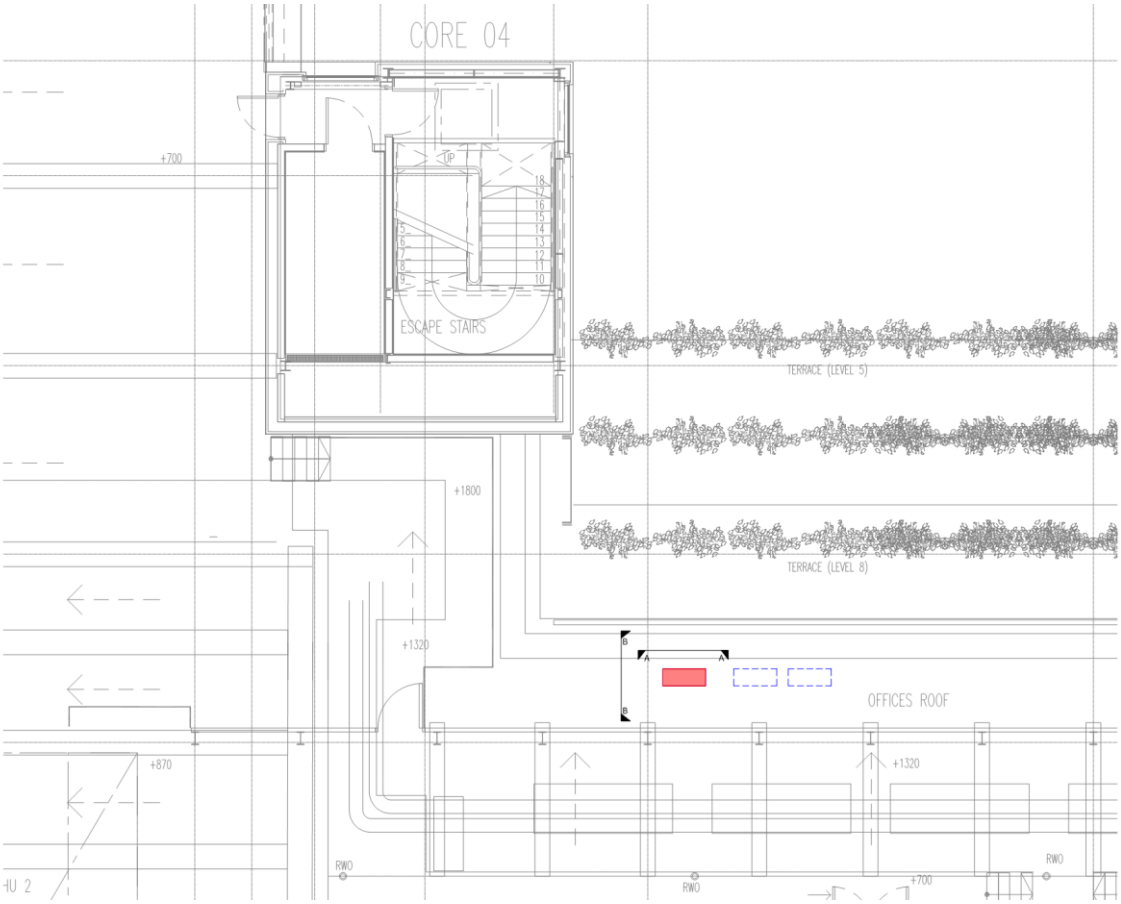


Figure 6 Location of proposed unit (highlighted in red)

5.4.2 Assessment

The proposed plant noise levels have been assessed to the three nearest receptors: residences on Dombey Street (north), Warner House (west) and Holborn Police Station (east).

The results of the assessment are set out in Table 4, taking into account losses for distance, screening and reflective surfaces.

Table 4 Noise emissions to the nearest noise sensitive receptors

Receptor	Noise emissions at 1 m from noise sensitive premises ($L_{Aeq,15min}$ dB)
Dombey Street	15
Warner House	14
Holborn Police Station	10

The calculated noise emissions from the new condenser at the nearest receptors are lower than the limits set out in Table 3, thereby demonstrating compliance with the LBC criteria.

6 Conclusion

A noise survey has been carried out to determine the existing background sound levels in the vicinity of Lacon House and surrounding noise sensitive premises. The representative background sound levels were $L_{A90,15min}$ 52 dB during the day, $L_{A90,15min}$ 52 dB during the evening and $L_{A90,15min}$ 47 dB during the night.

On the basis of 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, L_{Aeq} 47 dB during the evening, and L_{Aeq} 42 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. If plant items contain tonal or attention catching features, a penalty based on the type and impact of those features indicated in Section 5.2 will be applied, and the limits will be more stringent than those set out above.

An initial assessment of the proposed plant items associated with the development has been carried out, which demonstrates compliance with LBC noise egress requirements at all times.

Appendix A

Survey details

Equipment

A Rion NL-32 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	NL-32/00423756	Rion	15 Nov 18	1611595
Microphone	UC-53A/319228	Rion	15 Nov 18	1611595
Pre-amp	NH-21/36631	Rion	15 Nov 18	1611595
Calibrator	NC-74/34625670	Rion	09 Nov 18	1611584

Calibration of the sound level meters used for the tests is traceable to national standards. The calibration certificates for the sound level meter 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. No significant deviation in calibration occurred.

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.*

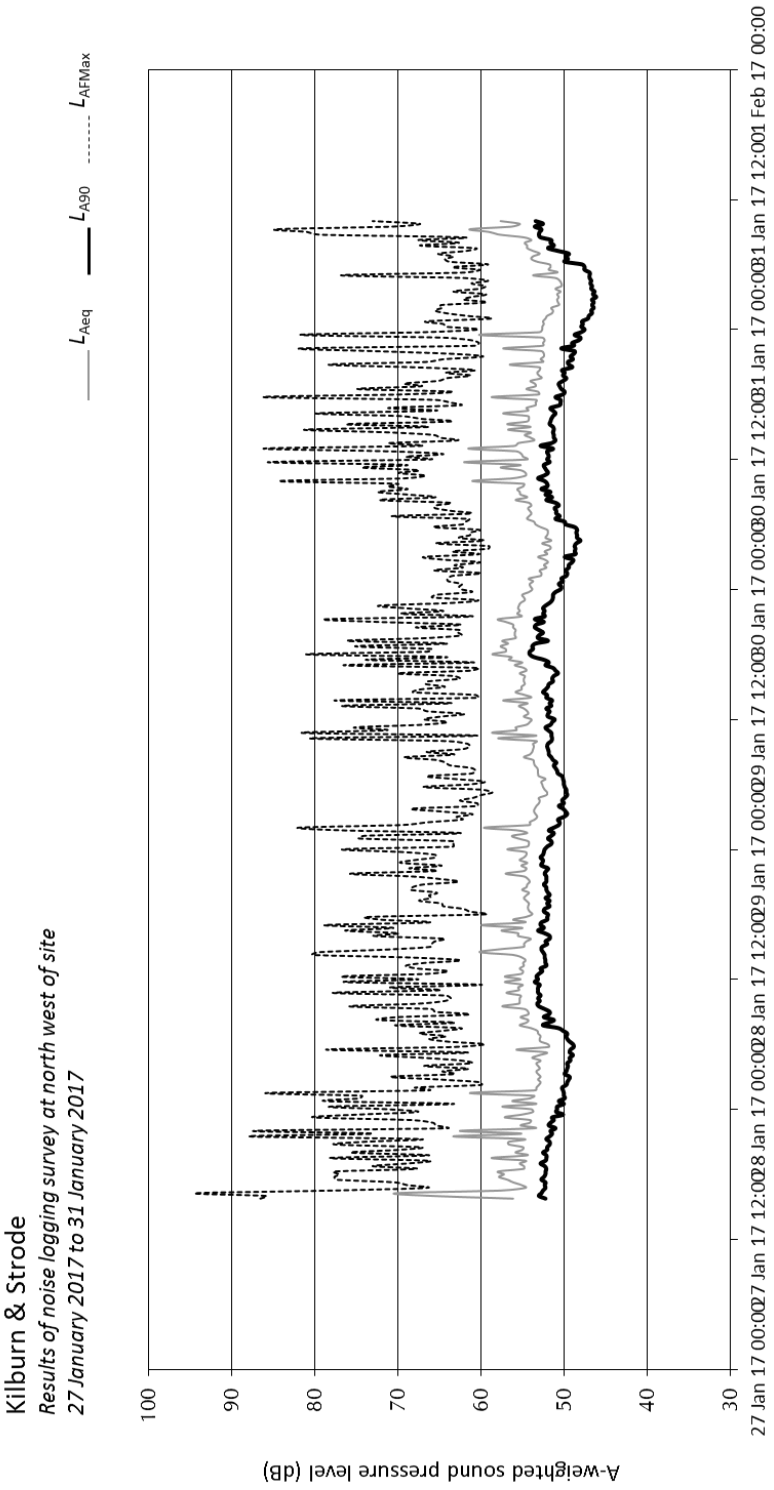
Weather conditions

During the unattended noise measurements between 27 January 2017 and 31 January 2017, weather reports for the area indicated that temperatures varied between -3°C at night and 11°C during the day, and the wind speed was less than 5 m/s.

Precipitation did occur during the survey however, the survey duration was sufficiently long to include periods unaffected by adverse weather and no variation in noise levels was seen to correlate with the weather. These measurements are consequently considered to have obtained representative sample of noise data.

Appendix B

Results of unattended measurements at Location L


Kilburn & Strode
Results of noise logging survey at north west of site
27 January 2017 to 31 January 2017
L_{Aeq}
L_{A90}
L_{AFMax}
A-weighted sound pressure level (dB)
100
90
80
70
60
50
40
30
27 Jan 17 00:00
27 Jan 17 12:00
28 Jan 17 00:00
28 Jan 17 12:00
29 Jan 17 00:00
29 Jan 17 12:00
30 Jan 17 00:00
30 Jan 17 12:00
31 Jan 17 00:00
31 Jan 17 12:00
1 Feb 17 00:00
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