Sandy Brown associates

1 Coleridge Gardens
London NW6 3QH

tel: (020) 7644 6500
fax: (020) 7644 6510
email: post@sandybrown.com

1 of 1

memo A001

to Buro 4 Project Services Matthew Bird

from Adrian Pugsley

copy

date 11 June 2001

file 01004A/DM

pages 1 + 12

New Garden House

Background noise measurements and building services noise design criteria

Further to the noise monitoring carried out at New Garden House, please find attached our report.

The report details the measurements made and the results obtained. The report also gives criteria for building services noise in accordance with the requirements of the London Borough of Camden.

Please call if you have any queries regarding the report.

Regards

PSX 0105374

N16/15/A.

Sandy Brown associates

1 Coleridge Gardens
London NW6 3QH

tel: (020) 7644 6500
fax: (020) 7644 6510
email: post@sandybrown.com

01004A/DM, DC
12 June 2001

New Garden House

Background noise measurements and building services noise design criteria

Introduction

Sandy Brown Associates were commissioned to undertake a noise survey at New Garden House, Hatton Garden, London during spring 2001.

The purpose of the survey was to establish the existing background noise climate in order to set design criteria for noise from building services for a development at the site.

This report presents the survey method and results of background noise measurements. The results of the survey are discussed with respect to relevant noise policy from the local authority, and are used to set design criteria for building services noise.

Site description

Figure 1 shows the site location and layout. At the time of the survey, the site was occupied by a six storey office building to the East of the site, and two buildings (three and six storeys) housing mixed commercial activities to the West.

The above mentioned properties are linked by other buildings on the North and South sides of the site, forming a courtyard at the centre of the site.

The site is surrounded by roads on the North, East and West sides.

Noise sources

The dominant source of noise along Hatton Garden is road traffic.

Background noise at night along Cross Street and Leather Lane is thought to be dominated by distant road traffic. During the daytime, the background noise is typically much quieter than along Hatton Garden as the road is considerably less busy. The main significant noise sources other than road traffic are activities around local shops (such as

loading and unloading), passers by, and the street market which takes place along Leather Lane during the day.

Noise levels to the South of the building are dominated by plant such as condenser units, cooling towers, and air intakes and extracts. The majority of the plant is associated with nearby buildings rather than New Garden House itself. Road traffic noise and noise from nearby construction sites were also noted during the survey.

Background noise in the courtyard at the centre of the site appeared to be predominantly due to a water feature, an air intake, and traffic on nearby roads.

Noise sensitive properties

Dwellings are located along Leather Lane (to the West) and Cross Street (to the North) with windows facing the site. The majority of these dwellings are flats above retail premises. These windows are typically located 10 m from the site boundary (see Figure 1) at a height of 4 m.

There are also dwellings adjacent to the site to the South, some of which have windows facing the site. Some of the properties to the South have roof terraces overlooked by the current buildings. The windows and roof terraces are located at a variety of different heights. At there closest, noise sensitive locations associated with these dwellings are estimated to be around 5 m from the site boundary.

There did not appear to be any dwellings along Hatton Garden to the East of the building. These premises are predominantly used as offices. The facades facing the site are typically 15 m from the site boundary.

Noise measurements

Measurement locations

Figure 1 shows the location of the noise measurement positions.

Hatton Garden

Noise was continuously monitored over a nine day period on the first floor balcony (approximately 6 m above ground) at the front of the building overlooking Hatton Garden. Sample measurements of background noise frequency spectra were made at 1.5 m above ground, below the balcony.

Leather Lane and Cross Street

Noise was continuously monitored over an eight day period from a third floor level window (approximately 13 m above ground) on the West façade of the building overlooking Leather lane. Sample measurements of background noise frequency spectra were made below the monitoring position at a height of 1.5 m above ground and on Cross Street to the North of the site (also at a height of 1.5 m above ground).

Other areas

Noise monitoring was also carried out on a roof at the South of the building at a height of approximately 22 m above ground. This part of the building is used for office space

and the measurement position overlooks mixed residential and commercial properties. A sample measurement of frequency spectra was also made at this position.

A sample measurement of daytime background noise was also made in the courtyard in the centre of the site at a height of 1.5 m above ground.

Noise indices

$L_{90,T}$ – The Sound Pressure Level exceeded for 90% of the time. This figure is indicative of the background noise level.

$L_{eq,T}$ – The continuous equivalent Sound Pressure Level. This is indicative of the 'average' noise level over a given time period.

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

Equipment and procedure

Larson Davis Type 820 sound level meters were used for noise monitoring from Monday 9 to Wednesday 18 April at the location overlooking Leather lane, and from Wednesday 2 to Thursday 10 May 2001 at the Hatton Garden and roof locations. The equipment was used to continuously log the $L_{A90,\ 15\ min}$ noise levels.

A Brüel & Kjær Type 2260 hand held sound investigator was used for sample measurements. Statistical and spectral data were recorded. The measurements were made on 7 March 2001 at locations on Hatton Garden, Leather lane and Cross Street. Further sample measurements were taken at the roof location and in the courtyard on 2 May 2001.

All equipment was calibrated at the beginning and end of measurements. No significant calibration deviation occurred.

Measurement results

Figures 2 - 4 show the results of continuous monitoring at the Hatton Garden, Leather Lane and roof locations.

Table 1 shows the minimum measured background noise level (generally occurring at night) and the typical background noise level (during daytime) from each set of monitoring data. The noise data logged in 15 minute periods was been used to obtain the values presented over periods of 1 hour.

Table 2 shows the results of the sample spectral noise measurements.

Table 1 - Measured background noise levels from logged data

Measurement location	Minimum measured (night-time) background noise level $L_{A90,\ 1\ hour}$ (dB)	Typical daytime background noise level $L_{A90\ 1\ hour}$ (dB)
Leather Lane (to the West)	46	53
Hatton Garden (to the East)	48	59
Roof (to the South)	48	53
Cross Street (to the North)	-	54
Courtyard (centre of site)	-	51

Table 2 - Sample spectra of daytime background noise

	Typical Sound pressure level spectrum ($L_{90,\ 5\ min}$, dB) in octave bands (Hz)							
Location	*63*	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*
Leather Lane (to the West)	58	57	50	50	48	44	39	33
Hatton Garden (to the East)	66	62	54	54	54	52	47	48
Roof (to the South)	59	59	53	50	48	44	38	28
Cross Street (to the North)	59	57	51	51	50	45	40	35
Courtyard (centre of site)	57	57	51	48	46	42	38	33

Environmental noise criteria for building services

Basis of criteria

The site is located within the London Borough of Camden (LBC). The current policy from LBC relating to noise from building services is given in Appendix 1. The main points are summarised below:

- Noise from plant located in the building should be 5 dB below the measured background noise levels ($L_{A90,\ 1\ hour}$) at 1 m from the façade of noise sensitive premises.
- Any plant noise emanating from the building containing a distinguishable note or discrete impulses should be 10 dB below measured background noise levels ($L_{A90,\ 1\ hour}$) at 1 m from the façade of noise sensitive premises.
- Noise levels from plant should not add more than 1 dB to the measured background noise ($L_{A90,\ 1\ hour}$) in each octave band (63 Hz – 8 kHz) at 1 m from the façade of noise sensitive premises.

Times at which criteria should apply

The noise standards given by LBC do not specifically refer to any particular time periods. To account for the inherent variation in noise levels at different times, both daytime and night-time criteria have been calculated on the basis of the measurements in accordance with LBC's requirements.

Daytime noise criteria are based on typical measured daytime background noise levels in each location. Night-time noise criteria are based on the minimum measured night-time background noise level from the continuous noise measurements in each location.

Locations where criteria should apply

There are currently no finalised details with regard to the locations of plant noise sources such as machinery, louvres and grilles. Therefore the criteria can not yet be set for specific noise sources. The criteria adopted therefore apply at set distances from the site boundary.

The distances at which the recommended criteria should apply have been chosen to be representative of the locations of the nearest noise sensitive facades on Leather Lane (to the West), on Cross Street (to the North), and to the South of the building.

There did not appear to be any dwellings along Hatton Garden opposite the building at the time of the survey. However, to account for any future change of use to dwellings, noise criteria have also been set at the facades of these properties.

No continuous measurement was made along Cross Street. However, on the basis of sample noise measurements, noise levels along Leather Lane and Cross Street are similar. Therefore, levels measured along Leather Lane have also been used to set criteria along Cross Street.

Limiting noise levels

In order to meet LBC's requirements, the total noise emitted from the building should not exceed the maximum levels at each of the locations given in Tables 3 and 4.

In addition to these criteria, if the noise emitted from any particular source in the building contains any distinguishable note (whine, hiss, screech, hum) and/or discrete impulses (bangs, clicks, clatters, thumps), that source shall be designed to meet the criteria given in Table 5.

Table 3 – Limiting night-time noise criteria (applying between 07:00 hrs and 23:00 hrs)

	Maximum $L_{eq,\ 5\ min}$ noise level, dB (linear)							
Location where criterion applies	*63*	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*
10 m from the Western site boundary (along Leather lane)	48	46	40	39	36	32	27	22
15 m from the Eastern site boundary (along Hatton Garden)	51	46	38	39	39	36	29	30
5 m from the Southern site boundary	49	49	43	40	38	34	28	18
10 m from the Northern site boundary (Along Cross Street)	46	44	38	38	37	32	27	22

Table 4 – Limiting daytime noise criteria (applying between 23:00 hrs and 07:00 hrs)

	Maximum $L_{eq,\ 5\ min}$ noise level, dB (linear)							
Location where criterion applies	*63*	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*
10 m from the Western site boundary (along Leather lane)	55	53	47	46	43	39	34	29
15 m from the Eastern site boundary (along Hatton Garden)	62	56	49	49	50	50	40	41
5 m from the Southern site boundary	54	54	48	45	43	39	33	23
10 m from the Northern site boundary (Along Cross Street)	54	52	46	46	45	40	35	30
Outdoor recreational areas within the site* (such as courtyards)	52	52	46	43	41	37	34	28

*This is a suggested criterion and is not required by LBC

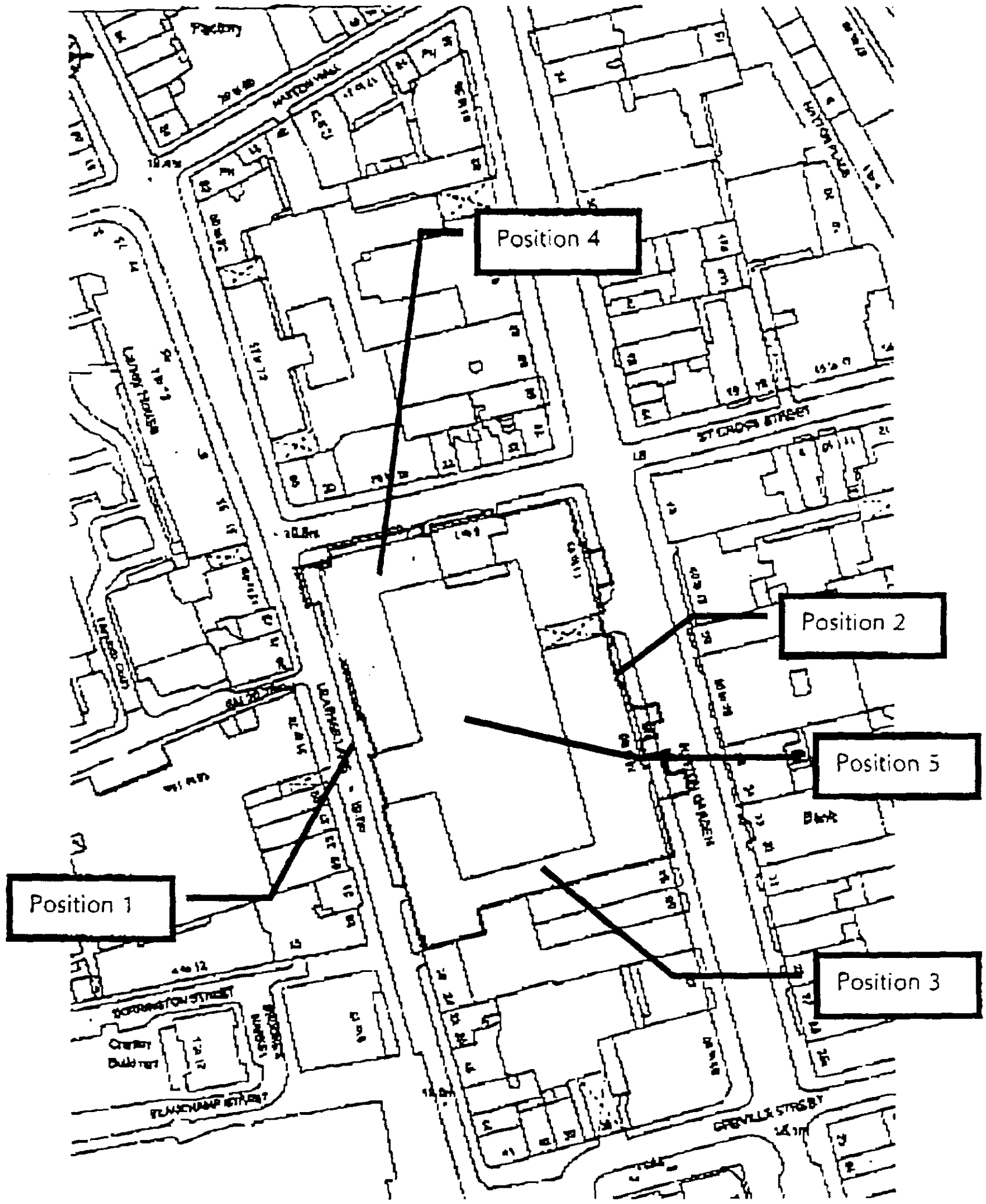
Table 5 – Limiting criteria applying to plant noise containing distinguishable notes or discrete impulses

Location where criterion applies	Maximum $L_{Aeq,\ 5\ min}$ noise level, dB (Broad-band A-weighted)	
	Daytime (07:00 hrs – 23:00 hrs)	Night-time (23:00 hrs – 07:00 hrs)
10 m from the Western site boundary (along Leather lane)	43	36
15 m from the Eastern site boundary (along Hatton Garden)	49	38
5 m from the Southern site boundary	43	38
10 m from the Northern site boundary (Along Cross Street)	44	36

Summary

- Sandy Brown Associates carried out a survey of background noise levels at locations around New Garden House, Hatton Garden, London during spring 2001.
- The minimum measured night-time background noise levels from continuous monitoring were $L_{A90,\ 1\ hour}$ 46 dB at the monitoring location on Leather Lane and $L_{A90,\ 1\ hour}$ 48 dB at the monitoring locations along Hatton Garden and on the roof of New Garden House.
- Typical measured daytime background noise levels were in the range of $L_{A90,\ 1\ hour}$ 50 - 60 dB. Sample measurements of the typical background noise spectrum around the building were also made.
- The dominant source of night time background noise at each of the three monitoring locations was road traffic. Levels measured at the roof location were also affected by noise from plant on the roofs of nearby buildings.
- The survey results have been used to set environmental noise criteria around the building in accordance with the requirements of the London Borough of Camden.

Figure 1 – Site location and layout including measurement positions



1) Location of noise measurements on Leather Lane
2) Location of noise measurements on Hatton Garden
3) Location of noise measurements on the Roof
4) Location of noise measurements on Cross Street
5) Location of noise measurements in the courtyard

Figure 2 – Graph showing measured noise levels on Leather Lane

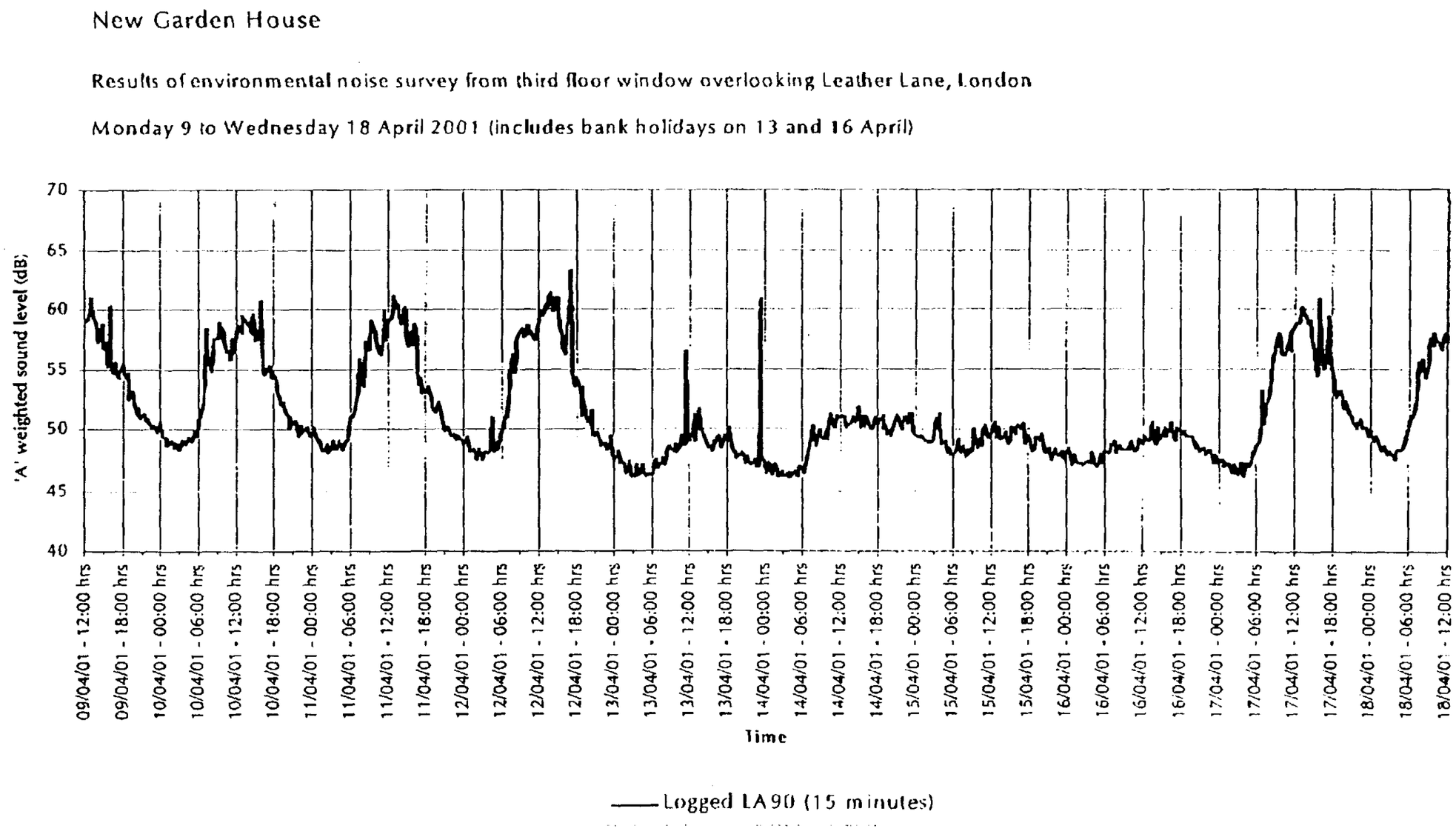


Figure 3 – Graph showing measured noise levels on Hatton Garden

New Garden House

Results of environmental noise survey from first floor balcony overlooking Hatton Garden, London

Wednesday 2 to Thursday 10 May 2001 (includes bank holiday on 7 May)

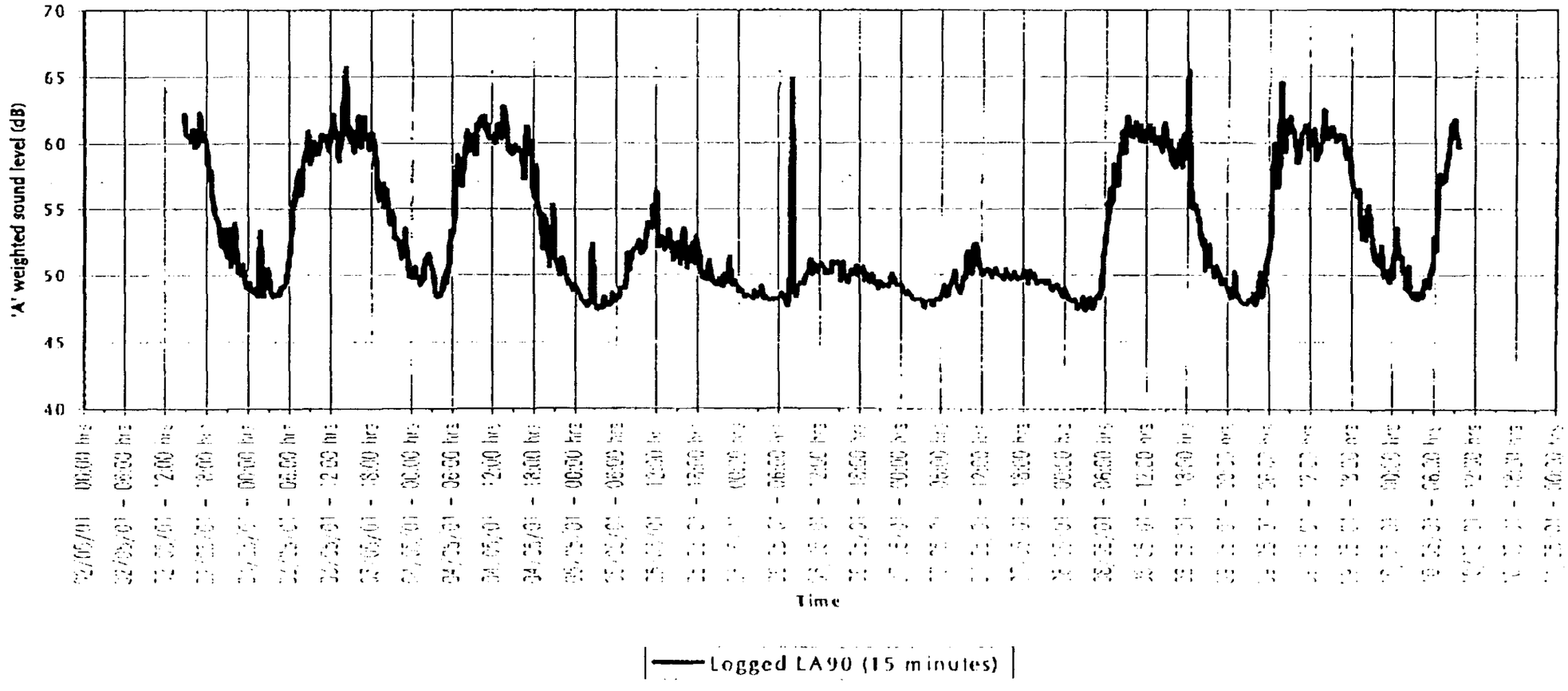
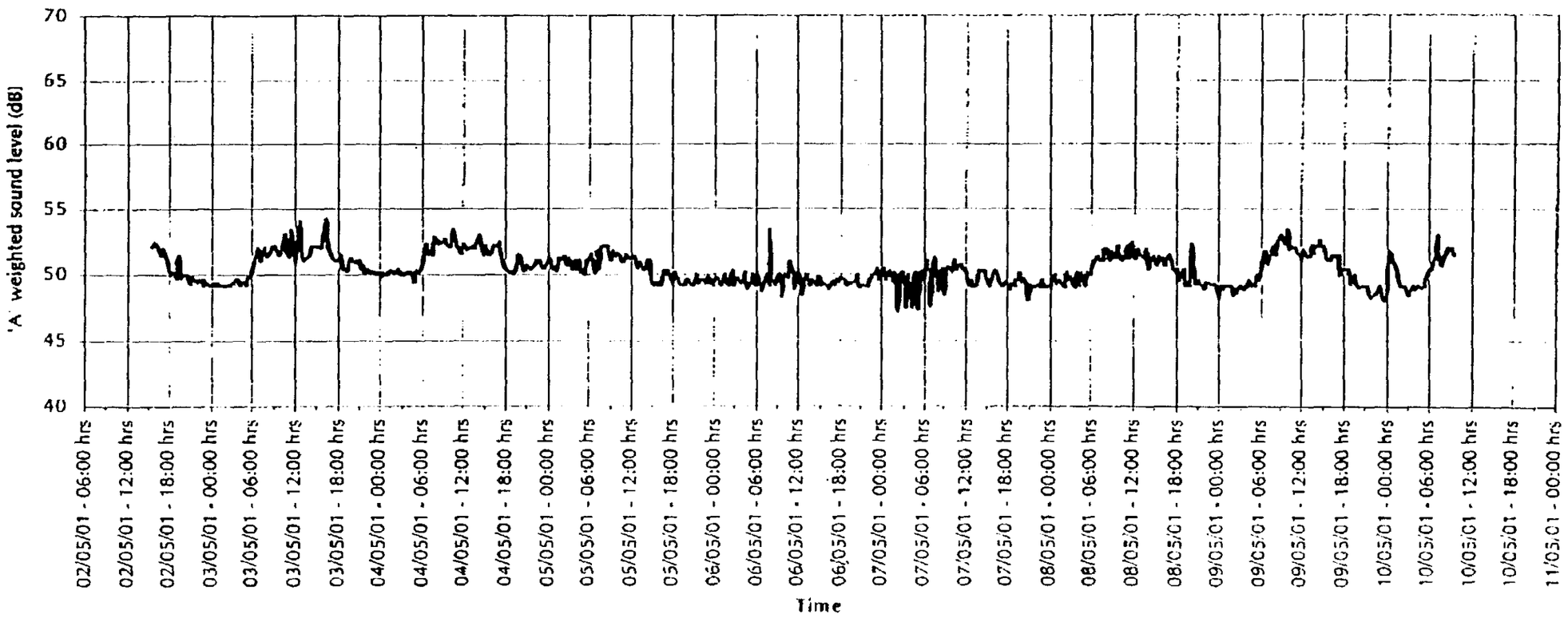


Figure 4 – Graph showing measured noise levels on the roof to the South

New Garden House

Results of environmental noise survey from roof of the link building, off Hatton Garden, London

Wednesday 2 to Thursday 10 May 2001 (includes bank holiday on 7 May)



Appendix 1 – London Borough of Camden noise policy

NOISE STANDARDS FOR PLANNING APPLICATIONS

It is the Council's duty to ensure that no process shall be carried on or equipment/machinery installed which is not such as could be carried on or installed in any residential area without detriment to the amenity of that area because of noise, vibration, smell, fumes, smoke, soot, ash, dust, or grit. Thus, for noise and vibration, an Acoustic Consultant's report is required detailing works to be carried out in order that the Council's requirements are met, taking into consideration the following:

The following standard applies to all air-cooled, heating, ventilation, extraction and conditioning systems and ancillary plant, ducting and equipment, which would have an impact on the **external** environment. In order to protect existing levels and prevent "creep" (a rise in background noise levels), the Council seeks to ensure that noise level output from all such systems does not increase existing **background** noise levels.

Thus, for new developments involving noisy plant/equipment or other uses, design measures should be taken to ensure that:

1a.

Noise levels at a point 1 metre **external** to sensitive facades are at least 5dB(A) less than the existing **background** measurement (L_{A90}), expressed in dB(A) when ALL plant/equipment are in operation. Where it is anticipated that any plant/equipment will have a noise that has a distinguishable, discrete continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses (bangs, clicks, clatters, thumps) special attention should be given to reducing the noise levels from that piece of plant/equipment at any sensitive façade to at least 10dB(A) below the L_{A90}, expressed in dB(A).

And,

1b.

For each of the octave band of centre frequencies 63Hz-8KHz inclusive, noise levels from ALL plant/equipment (measured in L_{Aeq}) when in operation shall at all times add not more than 1 decibel to the existing **background** noise level L_{A90}, expressed in dB(A), in the same octave band as measured 1 metre **external** to sensitive facades.

1c.

All related measurements shall be carried out over a period of 60 minutes (that is, hourly recorded measurements shall be presented over a 24 hour period).