

Project: Pied-à-terre Restaurant, 34 Charlotte Street
Client: Cibenze Services plc

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1.0 Introduction

The premises, located at 34 Charlotte Street, are to be completely refurbished for use as a Class A3 restaurant.

It is proposed that the building be served by ventilation and air-conditioning plant and in view of this, Paragon Acoustic Consultants have been commissioned to conduct a detailed field survey for use in conjunction with the Local Authority Noise Policy to determine the requirements for appropriate noise limits at the affected residential and commercial properties.

This practice has been advised that the mechanical plant shall operate between the hours of 09:00-02:00 hours. The survey and recommendations are therefore based on these operational hours.

Details of the survey are contained in this report, and shall be used to determine the noise impact arising from the operation of the plant upon the amenity of residents occupying nearby premises once mechanical plant selections have been finalised.

The survey data and subsequent assessment will take into consideration the guidance, principles and recommendations contained in the following documents:

- **BS 4142:1997** "Method for rating industrial noise affecting mixed industrial and residential areas".
- **BS 8233:1999** "Sound insulation and noise reduction for buildings" – code of practice.

2.0 Site Description

The four-storey building comprising; ground floor, 1st, 2nd and 3rd floor levels, is located between similar sized properties in Charlotte Street, London. The property lies within a mixed commercial and residential area inside the bounds of the London Borough of Camden. The mechanical plant proposed will be located at third floor roof level and at the rear of the site upon a ground floor roof area.

The main features of the locality as viewed from the rear of the premises are indicated in the sketch plan within Appendix A:

3.0 Existing Noise Climate

3.1 Road Traffic

Noise emanating from vehicular road traffic was deemed to provide the primary contribution to the ambient noise climate proximal to the nearest affected residential premises. The overall noise comprises of both individual "event" type emissions from vehicular movement along local roads such as Charlotte Street and also continuous low frequency "rumble" arising from heavier traffic flows passing along more distant highways.

3.2 Rail Traffic

There was no noise associated with train movements evident at the measurement position.

3.3 Aircraft

Occasional aircraft overflights were observed during the day-time survey period. However, contributions to the ambient and background noise measurements were limited by use of the pause facility on the sound level meter.

3.4 Mechanical Noise Sources

Noise emissions from mechanical ventilation plant operated by third parties was evident at the back of the site, therefore noise monitoring to the rear of the building was undertaken in an alternative location further to north east in Colville Place. Noise levels at this location were considered to be representative of the nearest affected residential properties to the rear of the site and this approach is allowable under clause 7.1.1 of BS4142:1997.

4.0 Environmental Noise Survey

4.1 Measurements

The environmental noise survey was carried out generally in accordance with the principles and procedures set out within **BS 4142:1997** "Method for rating industrial noise affecting mixed industrial and residential areas".

The noise monitoring commenced on Tuesday 3rd May 2005, with the assessment of each hourly period carried out between and 23:00 to 02:00 hours the following day. This was deemed to be an appropriate period for the characterization of the lowest noise climate corresponding to the operational period of the new plant under consideration.

Measurements were made at the location detailed below.

- MP1: At the front of the site approximately 3 metres from the site façade;
- MP2: At the rear of the site to north east in Colville Place;
- MP3: On the site ground floor roof – daytime.

The measurement location is illustrated on the site in Appendix A.

Various statistical broad-band and spectral sound pressure level measurements were obtained during the survey. A measurement time interval $T_m = 5$ minutes was considered sufficient to accurately represent the noise climate for each of the hours during which the readings were obtained. Measurements of the percentile level $L_{A90,T}$ were made using the sound level meter fast time constant (125ms), as per clause 3.10 of BS 4142:1997.

The sound level meter was tripod mounted with the microphone diaphragm positioned 1.2 metres above ground level. The data obtained are deemed as free-field values due to the minimal contribution from reflecting surfaces other than the ground plane.

The quantities recorded included:

- L_{Aeq} : the equivalent continuous noise level over the measurement period
- L_{Amax} : the maximum sound pressure level (Fast time-weighting)
- L_{A10} : the noise level exceeded for 10% of the measurement period
- L_{A90} : the noise level exceeded for 90% of the measurement period

Weather conditions during the survey period were cold and dry and generally clear with light northerly breeze of estimated velocity $< 5 \text{ ms}^{-1}$.

4.2 Instrumentation

Sound pressure level measurements were obtained using the following instrumentation complying with the Type 1 specification of IEC 60651, IEC 60804, IEC 61260 and IEC 61672:

- Norsonic Type 118 Sound level analyser, serial number 30640
- Norsonic Type 1225 ½" microphone

Calibration checks were made prior to and after completion of measurements using a Norsonic Type 1251 acoustical calibrator complying with Class 1 of IEC 942 (1988), calibration level $114.0 \text{ dB} \pm 0.3 \text{ dB}$, @ 1.0 kHz. All instrumentation carries a current manufacturer's certificate of conformance.

A copy of the meter calibration is shown within Appendix C.

4.3 Results

The recorded statistical broad-band sound pressure levels are shown within Appendix B, and the lowest representative night-time background noise level obtained during the survey have been rounded to the nearest integer and are summarised in Table 1.

Table 1: Lowest background sound pressure level

Measurement Position	Night time $L_{A90} (23:00-02:00)$
MP1	49
MP2	44

Measurements at location MP3 were obtained for internal use only and are not reported within the above Table.

5.0 Local Authority Planning Requirements

5.1 Development Plan / Policy

The London Borough of Camden Unitary Development Plan (UDP) sets out the Council's policies and proposals for the use and development of land and buildings in the Borough. The following extracts of the UDP are provided in the italicised text below:

*Ventilation ducts and air handling equipment
16.33*

The following standard applies to all air-cooling, heating, ventilation, extraction and conditioning systems and to any ancillary plant, ducting and equipment which would have an impact on the external environment. The Council seeks to ensure that noise level output from all such systems does not increase existing ambient noise levels, in order to protect existing levels and prevent "creep" (a rise in background noise levels). This may require close co-operation between an environmental or air handling engineer and the architect to agree an acceptable design solution for the particular premises and uses for which the system is designed.

16.34

The Council considers that for new developments involving noisy plant/equipment or other uses, design measures should be taken to ensure that noise levels predicted at a point one metre external to sensitive facades are at least 5dB(A) less than the existing background measurement (LA90) when the equipment is in operation. Where it is anticipated that equipment will have a noise that has a distinguishable, discrete continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses in the noise (bangs, clicks, clatters, thumps), special attention should be given to reducing the noise levels from plant and equipment at any sensitive facade to at least 10dB(A) below the LA90 level.

5.2 Commercial properties

It is also necessary to consider commercial properties existing in the locality of the site. BS 8233:1999 "Sound insulation and noise reduction for buildings", recommends maxima for "Good" and "Reasonable" indoor ambient continuous noise levels, certain of which are reproduced as follows:

Area	Design range L _{Aeq,T} dB	
	Good	Reasonable
Meeting room, executive office	35	40
Open Plan office	45	50

In view of the details presented above it is considered reasonable to adopt a noise criterion of 45 dB L_{Aeq,T} for commercial office space in the proximity of the site.

This criterion is also mentioned within The London Borough of Camden Unitary Development Plan reproduced as follows:

“Developers should aim to achieve the predicted noise levels indicated below in respect of the following activities:

General offices (internal). 45dB(A) LAeq,1h”

BS 8233:1999 indicates that any type of window in a façade when partially open will provide a weighted sound reduction index of 10-15 dB R_w . It is reasonable to consider a noise criterion external to commercial property windows that take account of the internal design range plus the loss expected through an openable window (10 dB being used as this is at the lower range of the values given in the Standard). This provides the following criteria:

Noise criteria external to Commercial office space = 55 dB $L_{Aeq,T}$
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6.0 Noise Limits

In order to achieve the London Borough of Camden Unitary Development Plan it is necessary to achieve the requirements given in section 16.33 of their policy. This will require that noise emissions predicted from the fixed mechanical plant installation will maintain a level at least 10dB lower than the background noise level measured outside the nearest residential window.

The noise limit applicable to this development derived from the survey result given in Table 1 is identified in Table 2, along with the location of the premises at risk from plant noise exposure.

Table 2: Residential noise limit for fixed mechanical plant

Receptor position	Noise Limit $L_{Aeq(5\text{ min})}$
1 metre from Residential property windows to the rear of the site	34 dB
1 metre from Residential property windows fronting Charlotte Street	39 dB
1 metre from Residential windows on properties within Colville Place	34 dB
Commercial office space surrounding the site.	55 dB

7.0 Mechanical plant

At this stage of the project mechanical plant selections have not been finalised. The assessment of mechanical plant noise shall therefore take place at a later stage once the details are issued to this practice.

8.0 Conclusions

A detailed environmental noise survey has been undertaken to determine the prevailing background and ambient noise levels at the site.

Based on the Local Authority Noise Policy and other sourced of guidance, external noise criteria have been provided that are to be used to limit the noise emissions of proposed mechanical plant at the site.

It is expected that when mechanical plant is selected and mitigated as necessary to achieve the limiting noise levels detailed herein, the amenity of local residents shall be maintained.