

5 GOODGE PLACE, LONDON

PLANNING COMPLIANCE REPORT

Report 16179.PCR.01

For:

Cherry Cherry VFX Ltd.

4-5 Goodge Place

London

W1T 4SD

Site Address	Report Date	Revision History
4-5 Goodge Place, London, W1T 4SD	26/06/2017	-

CONTENTS

1.0	INTRODUCTION	2
2.0	ENVIRONMENTAL NOISE SURVEY AND EQUIPMENT	2
2.1	Procedure	2
2.2	Equipment	2
3.0	RESULTS	3
4.0	NOISE CRITERIA	3
5.0	DISCUSSION	4
5.1	Objective overview	4
6.0	CONCLUSION	5

List of Attachments

16179.SP1	Indicative Site Plan
16179.TH1	Environmental Noise Time History
Appendix A	Glossary of Acoustic Terminology
Appendix B	Acoustic Calculations

1.0 INTRODUCTION

KP Acoustics Ltd, Britannia House, 11 Glenthorne Road, London, W6 0LH, has been commissioned by Cherry Cherry VFX Ltd., to undertake an environmental noise survey at, 4-5 Goodge Place, London W1T 4SD. The background noise levels measured will be used to determine daytime and night-time noise emission criteria for a plant unit installation in agreement with the planning requirements of the London Borough of Camden.

This report presents the overall methodology and results from the environmental survey followed by calculations to demonstrate the feasibility of the plant unit installation to satisfy the emissions criterion at the closest noise-sensitive receiver and outline mitigation measures as appropriate.

2.0 ENVIRONMENTAL NOISE SURVEY AND EQUIPMENT

2.1 Procedure

Automated noise monitoring was undertaken at the position shown in Site Plan 16179.SP1. The choice of this position was based both on accessibility and on collecting representative noise data in relation to the nearest noise sensitive receiver relative to the operations on site. The duration of the survey was between 11:30am on 22/06/2017 and 11:30am on 23/06/2017.

Initial inspection of the site revealed that the background noise profile at the monitoring location was largely dominated by several pre-existing units and nearby road traffic noise from the surrounding roads. The unit under assessment was not in operation throughout the duration of the noise survey.

The weather during the course of the survey was generally dry with wind speeds within acceptable tolerances and therefore suitable for the measurement of environmental noise. The measurement procedure 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 the survey and no calibration irregularities were observed.

The equipment used was as follows.

- Svantek Type 957 Class 1 Sound Level Meter
- B&K Type 4231 Class 1 Calibrator

3.0 RESULTS

The results from the continuous noise monitoring are shown as a time history of L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} averaged over 5 minute sample periods in Figure 16179.TH1.

Minimum background noise levels are shown in Table 3.1.

	Minimum background noise level $L_{A90: 5min}$ dB(A)
Daytime (07:00-23:00)	43
Operational Hours (09:00-21:00)	50
Night-time (23:00-07:00)	37

Table 3.1: Minimum measured background noise levels

4.0 NOISE CRITERIA

The criterion of the London Borough of Camden for noise emissions of new plant in this instance is as follows, *“The proposed plant and machinery shall be operated so as to ensure that any noise generated is “not audible” outside the nearest residential premises. To demonstrate inaudibility, you will need to provide calculations that show that the plant noise level is 10dBA below the lowest background level (L_{A90} (15minutes)) 1m from the nearest residential window, over the proposed operating hours”.*

We would therefore propose to set the noise criteria as shown in Table 4.1 in order to comply with the above requirement. Note that compliance to the above criterion would inherently demonstrate compliance to BS4142:2014 ‘Methods for rating and assessing industrial and commercial sound’.

We therefore propose to set the noise criteria as shown in Table 4.1 in order to comply with the above requirement.

	Operational Hours (09:00 to 21:00)	Night-time (23:00 to 07:00)
Noise criterion at nearest residential receiver (10dB below minimum L_{A90})	40dB(A)	27dB(A)

Table 4.1: Proposed Noise Emissions Criteria

After liaising with the client, it was understood that the already installed unit is and will only be used during the operating hours of the business, which is within 9:00 and 21:00. Due to this, the respective operational noise emissions criterion seen in Table 4.1 will be used.

5.0 DISCUSSION

The location of the plant unit being assessed is as shown in indicative site plan 16179.SP1.

The unit is installed on the flat roof to the rear of, 4 Goodge Place, W1T 4SB. The closest noise sensitive receiver to this location is the window of the residences to the West, at a minimum distance of 4m.

It is understood that the installation comprises the following units:

- 1 no. Fujitsu AOYG24LAT3

The sound pressure levels as provided by the manufacturer for the units are shown in Table 5.1.

Unit	Sound Pressure Level (dB) in each Frequency Band (at 1m)							
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Fujitsu AOYG24LAT3	60	57	49	48	44	42	36	30

Table 5.1 Manufacturers Sound Pressure Level at 1m

5.1 Objective overview

Taking all acoustic corrections into consideration, including distance and screening corrections, the noise levels expected at the closest residential window would be as shown in Table 5.2. Detailed calculations are shown in Appendix B.

Receiver - Nearest Noise Sensitive Window	Criterion	Noise Level at Front Receiver
Operating hours	40dB(A)	37dB(A)

Table 5.2: Predicted noise levels and criterion at nearest noise sensitive location

As shown in Appendix B and Table 5.2, transmission of noise to the nearest sensitive window due to the effects of the plant installation fully satisfies the emissions criterion set by the London Borough of Camden.

It is the professional opinion of KP Acoustics that this level is not going to pose any negative impact on the amenity of nearby residential receivers. Furthermore, the value of 40dB(A) is to be

considered outside of the building. Windows may be closed or partially closed leading to further attenuation, as follows.

Further calculations have been undertaken to assess whether the noise emissions from the installed unit would be expected to meet the recognised British Standard recommendations, in order to further ensure the amenity of nearby noise sensitive receivers.

British Standard 8233:2014 '*Sound insulation and noise reduction for buildings – Code of Practice*' gives recommendations for acceptable internal noise levels in residential properties. Assuming worst case conditions, of the closest window being for a bedroom, BS8233:2014 recommends 30-35dB(A) as being 'Good-Reasonable' internal resting/sleeping conditions.

With calculated external levels of 40dB(A), the residential window would not need to provide any additional attenuation, in order for 'Good-Reasonable' conditions to be achieved. According to BS8233:2014, even a partially open window offers 10-15dB attenuation, thus leading to an acceptable interior noise level that meets the criterion.

Receiver	'Good'-'Reasonable' Conditions Design Range – <i>For resting/sleeping conditions in a bedroom, in BS8233:2014</i>	Noise Level at Front Receiver (due to plant installation)
Inside Nearest Residential Space	30-35dB(A)	37dB(A)

Table 5.3: Noise levels and criteria inside nearest residential space

Predicted levels are shown in Table 5.3, with detailed calculations shown in Appendix B. It can therefore be stated that, as well as complying with the requirements of the London Borough of Camden, the emissions from the plant unit installation would be expected to comfortably meet the most stringent recommendations of the relevant British Standard, even with neighbouring windows partially open.

6.0 CONCLUSION

An environmental noise impact survey has been undertaken at, 4-5 Goodge Place, London W1T 4SD, by KP Acoustics Ltd between 11:30am on 22/06/2017 and 11:30am on 23/06/2017. The results of the survey have enabled criteria to be set for noise emissions. Using manufacturer noise data, noise levels are predicted at the nearby noise sensitive receivers for compliance with current requirements.

Calculations show that noise emissions from the installed unit would meet the requirements of the London Borough of Camden.

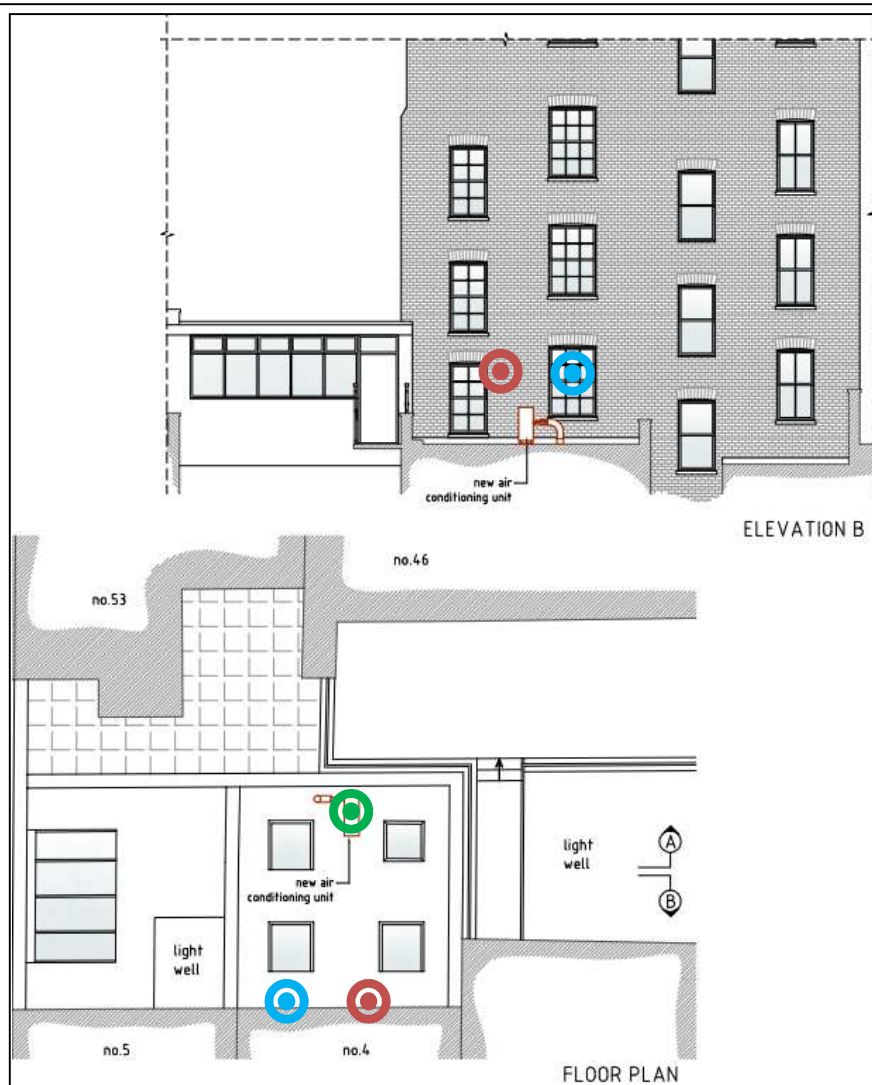
Further calculations have been undertaken with regards to the relevant British Standard and it has been ensured that the amenity of nearby residential receivers will be protected.




Report by:

Kyri Demetriou
KP Acoustics Ltd.

Checked by:

Kyriakos Papanagiotou MIOA
KP Acoustics Ltd.



-  Noise Survey Monitoring Position
-  Location for Unit
-  Nearest Receiver

Title: Indicative site plan showing noise monitoring position and unit location. (Image Source: Google Maps and HSP Architects LLP)

Date: 26th June 2017

FIGURE 16179.SP1



4-5 Goodge Place, London, W1T 4SD
Environmental Noise Time History
22nd June to 23rd June 2017

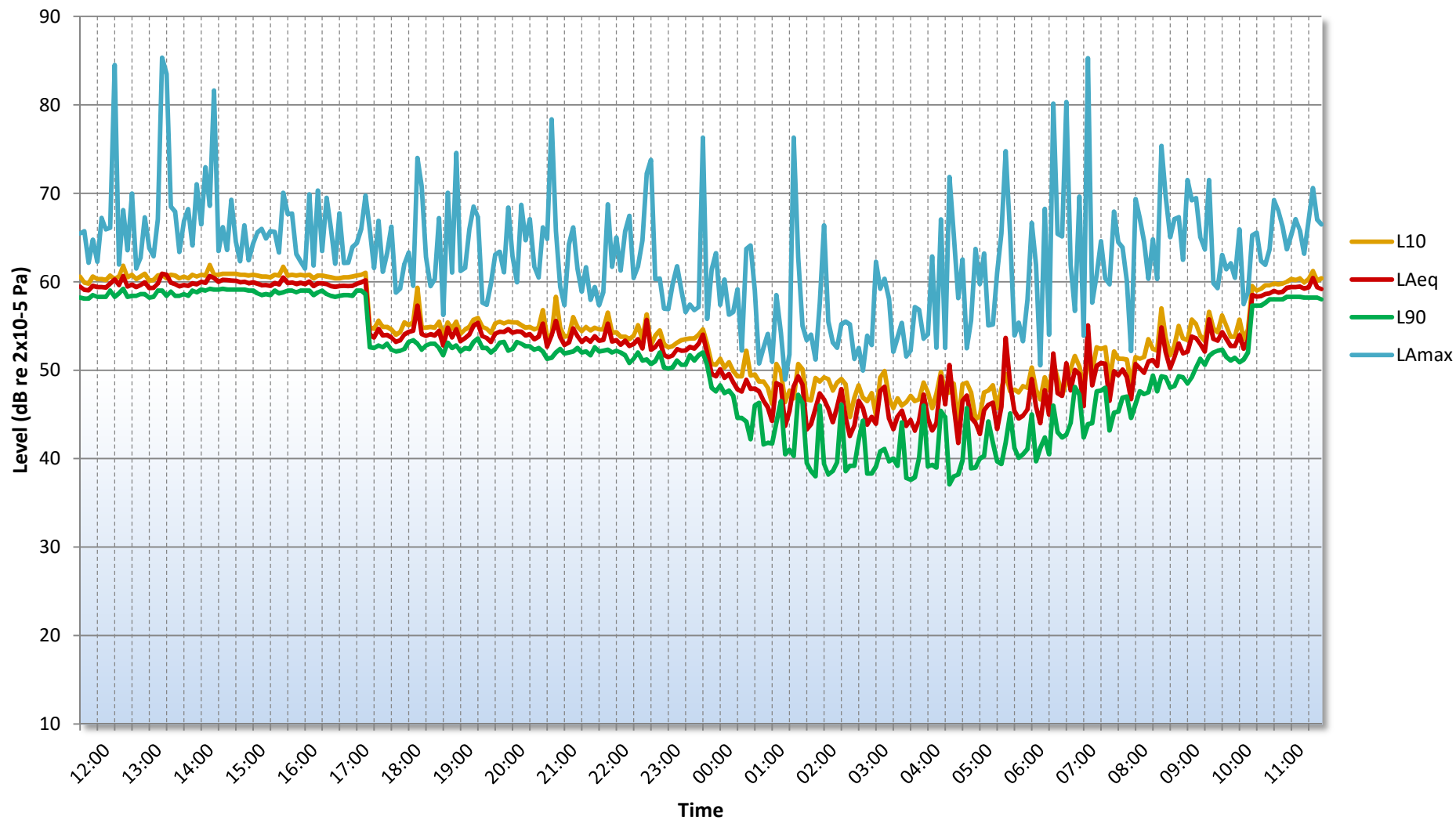


Figure 16179.TH1

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*.

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.

APPENDIX B

4-5 Goodge Place, London, W1T 4SD

AIR CONDITIONING UNIT EMISSIONS CALCULATIONS

Source: Air Conditioning Unit Rooftop Installation

Receiver: Closest Residential Window

	Frequency, Hz								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Fujitsu AOYG24LAT3 SPL@1m	60	57	48	47	44	42	36	30	50
Attenuation provided by directivity, dB	-1	-1	-2	-4	-9	-8	-8	-8	
Correction for surface reflections (1)	3	3	3	3	3	3	3	3	
Minimum attenuation provided by distance (4m)	-12	-12	-12	-12	-12	-12	-12	-12	
Total SPL from Daikin RXYSCQ5TV1 1m from Receiver	51	48	38	34	27	25	19	13	37

Design Criterion	40
------------------	----