KP Acoustics Ltd
Britannia House
11 Glenthorne Road
London
W6 0LH

Tel: +44(0)208 222 8778
Fax: +44(0)208 222 8575
Email: info@kpacoustics.com
www.kpacoustics.com

124-132 CLERKENWELL ROAD, LONDON

PLANNING COMPLIANCE REPORT

Report 12542.PCR.01

For:

Sir Time Ltd

Office 54

101 Clerkenwell Road

London

EC1R 5BX

Site Address	Report Date	Revision History
124-132 Clerkenwell Road, London EC1R 5DJ	22/05/2015	

Registered in England Company No. 7947892
KP Acoustics is the Trading Name of KP Acoustics Limited

CONTENTS

List of Attachments

1.0 INTRODUCTION

KP Acoustics Ltd, Britannia House, 11 Glenthorne Road, London, W6 0LH, has been commissioned by Sir Time Ltd, Office 54, 101 Clerkenwell Road, London, EC1R 5BX to undertake an environmental noise survey at 124-132 Clerkenwell Road, London EC1R 5DJ. The background noise levels measured will be used to determine daytime and night-time noise emission criteria for the existing installation of two air conditioning units and a kitchen extraction system in agreement with the planning requirements of Camden.

This report presents the overall methodology and results from the environmental survey followed by calculations to demonstrate the feasibility of the plant 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 and manual measurements were undertaken on the proposed site as shown in Site Plan 12542.SP1. The choice of the position was based both on accessibility and on collecting representative noise data in relation to the nearest noise sensitive receiver relative to the proposed plant installation. The duration of the survey was between 16:00 on 23/04/2015 and 14:00 on 24/04/2015.

Initial inspection of the site revealed that the background noise profile at the monitoring location was dominated by road traffic noise from the surrounding roads.

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 generally 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.

- 1 No. 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 12542.TH1.

Ambient and Minimum background noise levels are shown in Table 3.1.

	Minimum background noise level $L_{A90:\ 5min}$ dB(A)	**Ambient Noise Levels L_{Aeq} dB(A)**
Daytime (07:00-23:00)	41	52
Night-time (23:00-07:00)	37	44

Table 3.1: Minimum measured background noise levels

4.0 NOISE CRITERIA

The closest residential building is located to the East of 124-132 Clerkenwell Road, on the other side of Herbal Hill as shown in 12542.SP1. Theses residential units would not represent a potentially affected site by noise emissions from the plant units due to the long distance separating them and acoustic screening from entire buildings.

Further to discussions undertaken on site, it is understood that the closest neighbouring window is that of a dance studio, which would not be considered a highly noise-sensitive space. We have therefore adopted an upper internal noise level of 45-50dB(A), based on the current dance training activities. This would indicate that with a semi-open window providing a minimum of 10dB attenuation, the maximum external level should not exceed 60dB(A) externally.

	Internal Noise Levels Criterion	**Outdoor Noise Level Criterion**
Anytime	50	60

Table 4.1 Internal and external noise level criteria.

5.0 DISCUSSION

It is understood that the plant installation is comprised of the following units:

- 2 No. Panasonic U8ME1E81 Outdoors Condenser Unit.
- Encased kitchen extractor fan.
- Kitchen extraction Intake and outtake duct.

The unit are installed in the rear light well of 124-132 Clerkenwell Road as shown in 12542.SP2. The only neighbouring windows facing this location belong to a dance studio. As previously discussed in section 4, the closest noise sensitive receiver to this location will be a window at First Floor Level on the rear façade of the adjacent dance studio building, located at a direct distance of approximately two meters from the encased extractor fan and ac units and three meters from the extraction duct as shown in site plan 12542.SP2.

The sound pressure levels measured on site for the individual units are shown in Table 5.1.

	Sound Pressure Level (dB) by octave frequency band (Hz)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
1 No. Panasonic U8ME1E81 AC Unit (measured at 1m from window's receiver)	65	57	57	53	50	45	38	33
Kitchen extraction system (measured at 1m from window's receiver)	68	68	64	62	65	62	60	54
Extraction Duct noise breakout (measured at third floor level)	-	61	63	64	59	52	45	37

Table 5.1 Sound pressure levels measured on site for each noise source.

5.1 Objective overview

It is understood that the kitchen extraction system would be operating from 6:30 to 7:30 in the mornings and from 18:00 to 19:00 in the evenings. The outdoor condenser units could operate anytime.

Taking into consideration the current layout of the plant units and practical constraints of the site, we would propose the following noise control strategy:

- For the attenuation of the noise emissions from the fan case, it is adviced the installation of an acoustic enclosure using either 50mm CMS Danskin ISO acoustic enclosure panels or PFC Corofil Coated Panels or similar around the fan case. PFC Corofil Intumescent Vent Duct Sleeves or similar should be used for the penetration of the duct in the proposed acoustic panels.

  The panel to be installed on the grilled side of the fan case should be fitted cut to allow air coming out of the fan case grille.

  The height of the acoustic enclosure would contain the outtake duct bend coming out of the top of the fan case.

- In order to mitigate the noise breakout from the outtake ducts, it is recommended the installation of 900mm silencer immediately after the discharge duct bend coming out of the top of the fan case.
- In order to reduce the noise breakout of the intake duct, we would recommend the installation of 600mm silencer immediately before the intake duct penetration on the side of the fan case.
- In regards to the noise emissions levels from the condenser units, the installation of a bespoke acoustic louvred roof on top of the units is recommended. The proposed roof system would be anticipated to provide a minimum 9dB acoustic attenuation. The advice of a M&E engineer should be considered due to the space restriction for intake and air discharged on top of the units.
- The installation of acoustic absorbent panels on the opposite wall to the fan case and ac units (North façade of 124-132 Clerkenwell Road, London) is recommended in order to mitigate acoustic wave reflections. The clad surface should cover the width of the condenser units and fan case and from floor to fan case height.

  Material, installation and mechanical advice could be provided by acoustic solutions suppliers as Noico, EEC, Environ or similar companies.

As shown in Appendix B and Table 5.2, transmission of noise to the nearest window receiver fully satisfies the emissions criterion set provided that the aforementioned noise control measures are installed.

Operating hours	Criterion	Noise Level at Nearest Noise Sensitive Window
Anytime	60 dB(A)	60 dB(A)

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

Furthermore, the value of 60dB(A) is to be considered outside of the receiver's facade. Windows may be closed or partially closed leading to minimum further attenuation of 10dB. Predicted internal levels with detailed calculations are shown in Appendix B.

It can therefore be stated that, the emissions from the air conditioning units and kitchen extraction system would be expected to meet the set criteria in Table 4.1

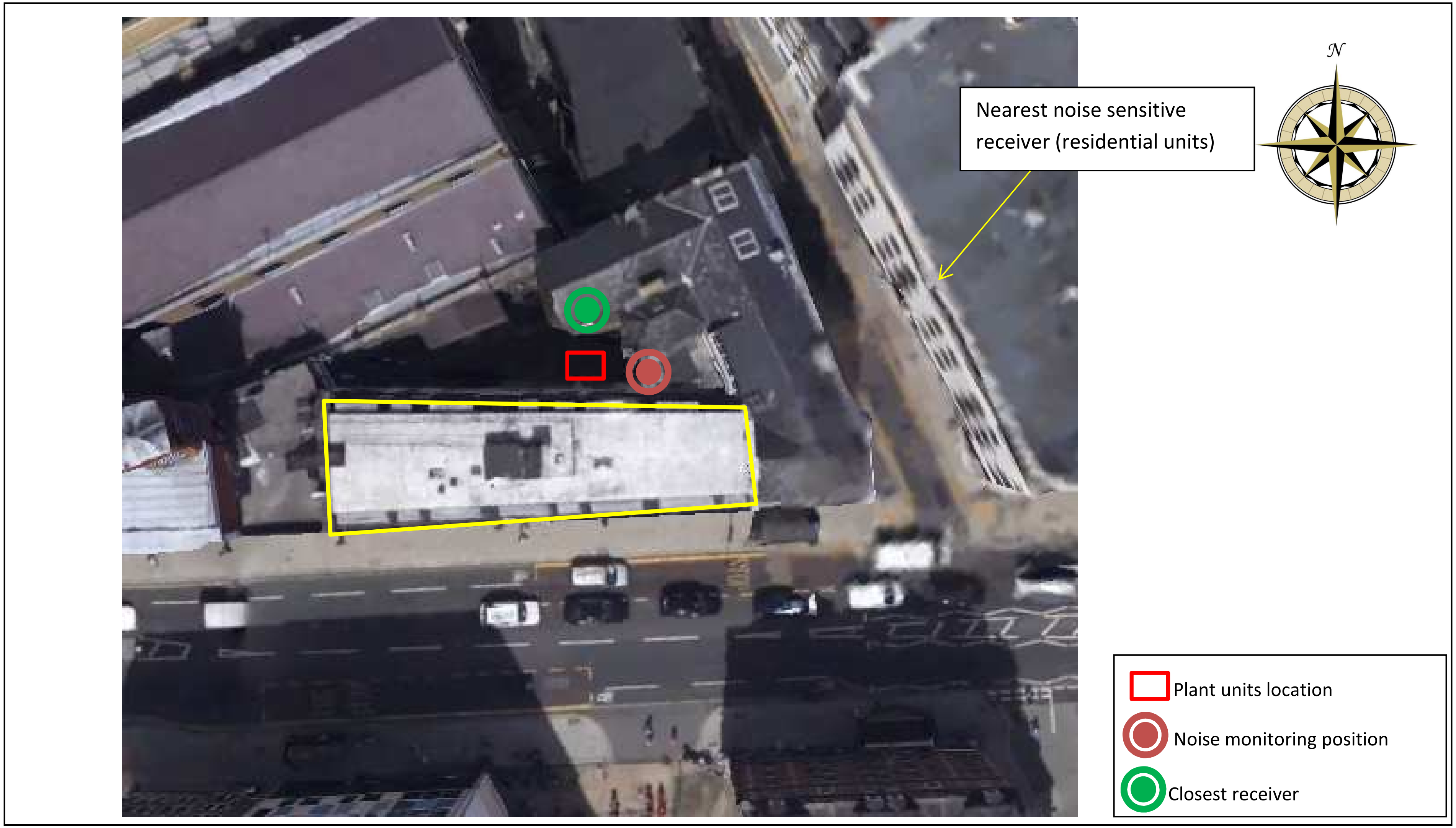
6.0 CONCLUSION

An environmental noise survey has been undertaken at 124-132 Clerkenwell Road, London EC1R 5DJ, by KP Acoustics Ltd between 23/04/2015 and 24/04/2015. The results of the survey have enabled criteria to be set for noise emissions.

Calculations show that noise emissions from the proposed plant unit installation would meet the set requirements, providing the aforementioned noise control measures in section 5.

Based on the current dance training activities, It is believed that the proposed set criterion would protect the amenity of the nearby dance studio receiver.

Report by	Checked by
Victor Lindstrom	**Kyriakos Papanagiotou MIOA**
KP Acoustics Ltd	**KP Acoustics Ltd**



Title:

Indicative site plan showing noise monitoring position, closest noise sensitive receiver and proposed plant units location.

Date: 22 May 2015

FIGURE 12542.SP1

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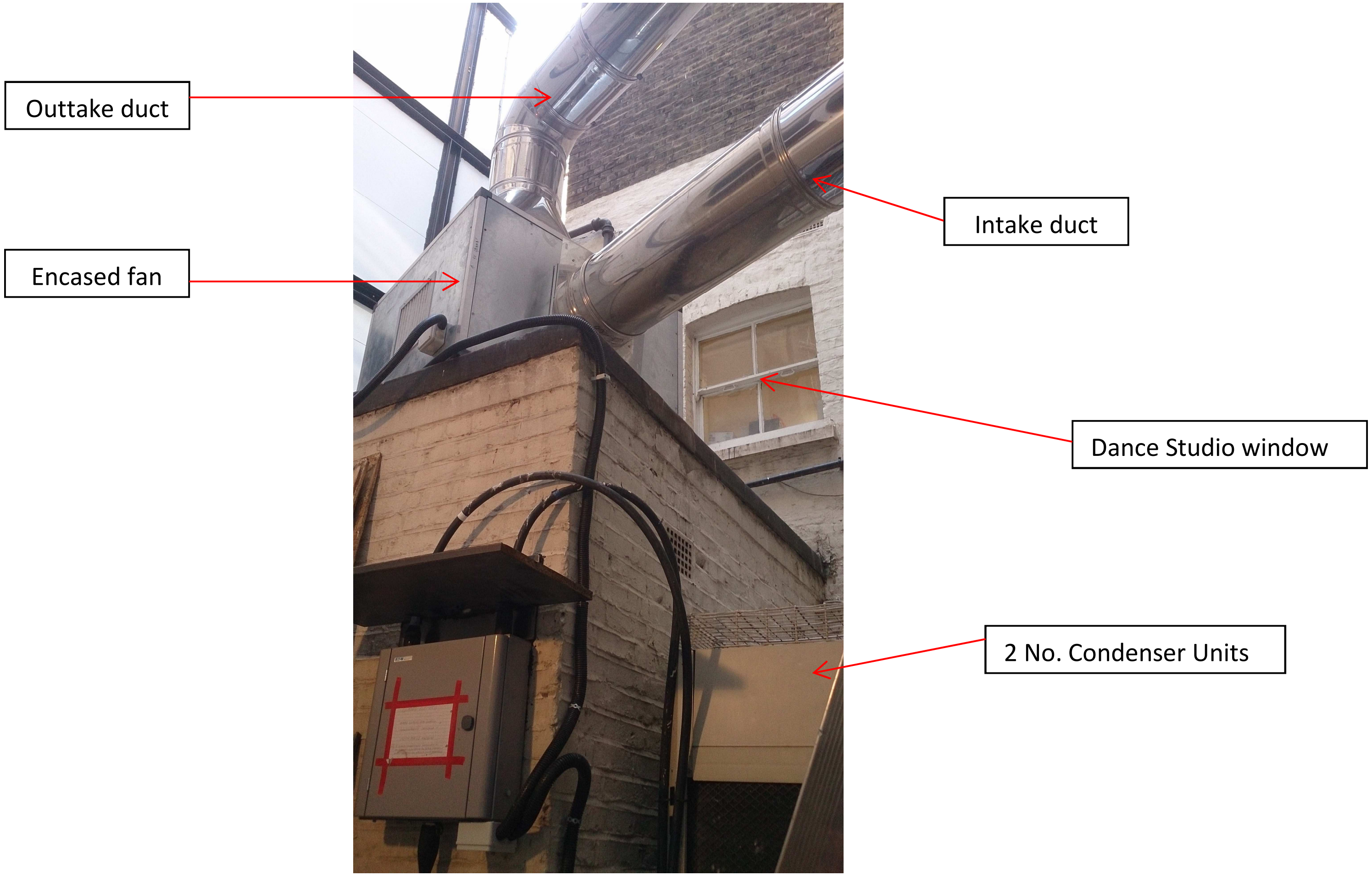

Title:

Indicative site plan showing existing plant units location.

Date: 22 May 2015

FIGURE 12542.SP2

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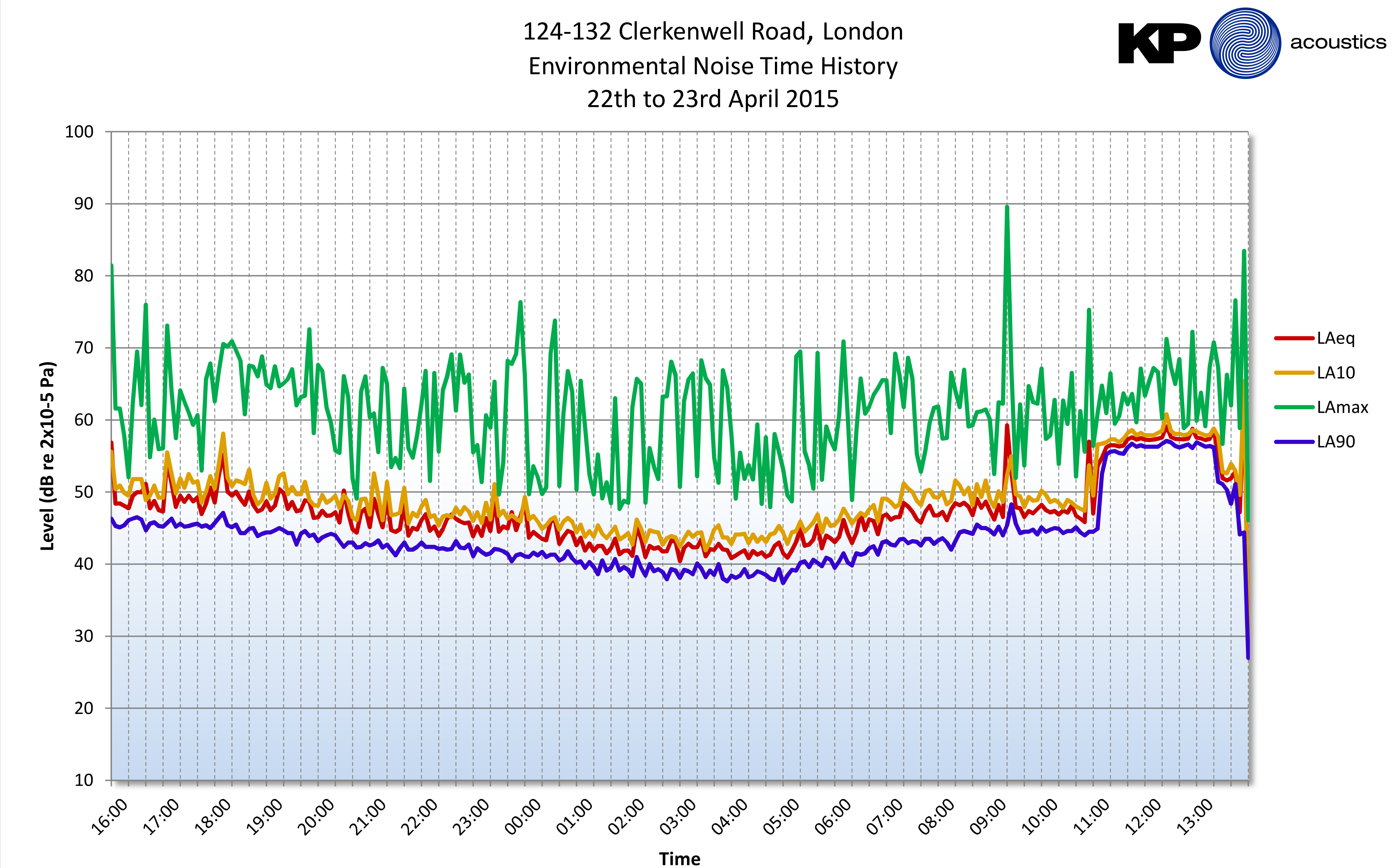

Figure 12542.TH1

APPENDIX A

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*.

APPENDIX A

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

124-132 CLERKENWELL ROAD, LONDON

PLANT UNIT EMISSIONS CALCULATIONS

Source: Kitchen extraction system	*Frequency, Hz*								
Receiver: Rear First Floor Window of adjacent Dance School Building.	***63***	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***	***dB(A)***
Measured Leq on site at 1m from duct. Only fan operating.	-	61	63	64	59	52	45	37	
Correction for duct noise levels at 1m from receiver (2m distance)	-	-5	-5	-5	-5	-5	-5	-5	
corrected noise levels at receiver due to duct breakout	-	56	59	59	54	47	40	32	
Attenuation due to silencer	-	-7	-10	-20	-31	-28	-17	-14	
Total sound pressure level due to duct breakout noise	**-**	**49**	**49**	**39**	**23**	**19**	**23**	**18**	
Measured Leq on site at 1m from receiver. Only fan operating.	68	68	64	62	65	62	60	54	
Corrected levels. Fan breakout - Duct emission levels	68	67	63	60	64	62	60	54	
Attenuation due to acoustic enclosure around fan	-15	-15	-15	-15	-15	-15	-15	-15	
Total sound pressure level due to fan noise emission	**53**	**53**	**49**	**47**	**50**	**47**	**45**	**39**	
Measured Leq on site at 1m from receiver. Only one Ac unit operating.	67	69	67	61	59	57	54	45	
Correction for 2 No. units	3	3	3	3	3	3	3	3	
Attenuation due to acoustic beams on top	-9	-9	-9	-9	-9	-9	-9	-9	
Total sound pressure level due to ac units noise emission	**61**	**63**	**61**	**55**	**53**	**51**	**48**	**39**	
Maximum Sound pressure level at position 1 due to source	**62**	**63**	**62**	**55**	**55**	**53**	**50**	**42**	**60**
						Design Criterion			**60**

Source: Kitchen extraction system	*Frequency, Hz*								
Receiver: Rear First Floor Window of adjacent Dance School Building.	***63***	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***	***dB(A)***
Sound pressure level outside window receiver	62	63	62	55	55	53	50	42	60
Minimum attenuation from partially open bedroom window, dB	-10	-10	-10	-10	-10	-10	-10	-10	-10
Maximum Sound pressure level inside receiver due to source	**52**	**53**	**52**	**45**	**45**	**43**	**40**	**32**	**50**
						Internal Design Criterion			**50**