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11 MANSION GARDENS, LONDON

PLANNING COMPLIANCE REVIEW

Report 16969.PCR.01 Rev.A

For:

Charles Couzens

Ecos Maclean Ltd

8A Chamberlain Street, Primrose Hill

London

NW1 8XB

Site Address	Report Date	Revision History
11 Mansion Gardens, London, NW3 7NG	19/02/2018	Rev.A – 15/03/2018

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KP Acoustics is the Trading Name of KP Acoustics Limited

CONTENTS

List of Attachments

1.0 INTRODUCTION

KP Acoustics Ltd, 1 Galena Road, London, W6 0LT, has been commissioned by Ecos Maclean Ltd, 8A Chamberlain Street, Primrose Hill, London, NW1 8XB, to undertake an environmental noise survey at 11 Mansion Gardens, London NW3 7NG.

The background noise levels measured will be used to determine daytime and night-time noise emission criteria for the installation of plant units, in agreement with the planning requirements of 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 installation to satisfy the emissions criterion at the closest noise-sensitive receivers and outline mitigation measures as appropriate.

2.0 ENVIRONMENTAL NOISE SURVEY AND EQUIPMENT

2.1 Procedure

Automated noise monitoring was undertaken on the site as shown in Site Plan 16969.SP1. The choice of the position was based both on accessibility and on collecting representative noise data in relation to the nearest noise sensitive receivers relative to the plants installation location. The duration of the survey was between 13:20 on 8th February and 13:35 on 9th February 2018.

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

There was light rain during the course of the survey with wind speeds within acceptable tolerances and therefore suitable for the measurement of environmental noise. The measurement procedure generally complied with ISO 1996-2:2007 Acoustics “Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels”.

2.2 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed.

The equipment used was as follows.

- 1 No. Svantek 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 16969.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)	36 dB(A)
Night-time (23:00-07:00)	34dB(A)

Table 3.1: Minimum measured background noise levels

4.0 NOISE CRITERIA

The criterion of London Borough of Camden for noise emissions of new plant in this instance is as follows according to Appendix 3 of Camden Local Plan: "Rating Level of 10dB below background (15dB if tonal components are present) should be considered as the design criterion".

It is anticipated that plant units already installed didn't show any distinguishable, discrete continuous note, impulsive noise or presence of tonal components.

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

	Day-time (07:00 to 23:00)	Night-time (23:00 to 07:00)
Noise criterion at nearest receiver	26dB(A)	24dB(A)

Table 4.1: Proposed Noise Emissions Criterion

As the plant units could be operating during the night time we would recommend the adoption of the nigh-time criterion, in order to ensure that the amenity of the closest receivers will be protected.

5.0 DISCUSSION

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

- 3 No. Mitsubishi MXZ – 4E72VA Condenser Unit.

The plant units are installed on the rear wall of the property facing the main road West Health Road as shown in 16969.SP1. The closest noise sensitive receiver is located approximately 15 meters from the condenser units as shown 16969.SP1.

The sound pressure levels at 1m from the units, as provided by the manufacturer, are shown in Table 5.1.

	Sound Pressure Level (dB) in each Frequency Band (at 1m)								
Unit	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**	**dB(A)**
Mitsubishi MXZ – 4E72VA	59	57	55	51	48	43	36	29	**53**

Table 5.1 Manufacturer's Sound Pressure Levels at 1m

5.1 Objective overview

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

Criterion	Noise Level at 1m from the nearest residential widow
24dB(A)	Non-significant

Table 5.2 Predicted noise level and criterion at nearest noise sensitive receivers

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

5.2 BS8233 Assessment

Furthermore, the predicted figures shown in Table 5.2 are to be considered outside the nearest residential windows. 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 plant units installations 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 dB(A) as being the value for internal resting/sleeping conditions during night-time.

According to BS8233:2014, even a partially open window offers 10-15dB attenuation, thus leading to a further reduced interior noise level.

Receiver	Design Range – *For resting/sleeping conditions in a bedroom, in BS8233:2014*	Noise Level inside Receiver
Closest to plant units location	30 dB(A)	Non-significant

Table 5.3 Plant installation noise level and criterion inside nearest residential space

Criterion and the predicted level inside the receiver's window 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 London Borough of Camden, the noise emissions of the plant unit installation would be expected to comfortably meet the most stringent recommendations of the relevant British Standard BS8233:2014.

6.0 CONCLUSION

An environmental noise survey has been undertaken at 11 Mansion Gardens, London NW3 7NG by KP Acoustics Ltd between 13:20 on 8th February and 13:35 on 9th February 2018. The results of the survey have enabled criteria to be set for noise emissions of the plant unit installation.

Using manufacturer noise data, noise levels are predicted at the nearby noise sensitive receivers for compliance with current requirements of London Borough of Camden and the relevant British Standard BS8233:2014 criteria.

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11 Mansion Gardens, London NW3 7NG
Environmental Noise Time History
From 08 February 2018 To 09 February 2018

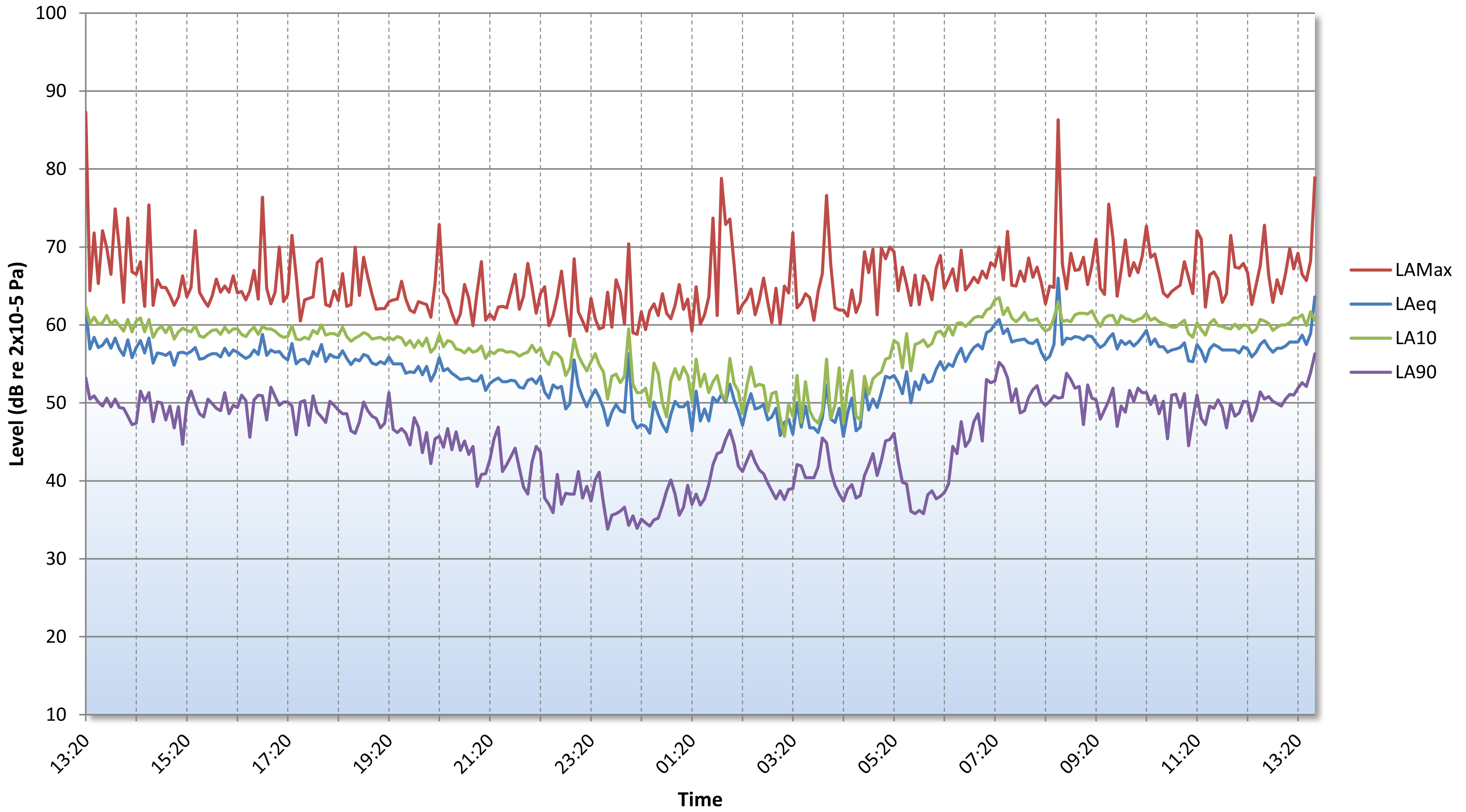

Figure 16969.TH1

Title: Site plan showing noise monitoring position, closest noise sensitive receiver and plant units location.

Date: 19 February 2018

FIGURE 16969.SP1

KP acoustics

APPENDIX B

Flat 1, 101 Mount Street, Mayfair, London

PLANT UNIT EMISSIONS CALCULATIONS

Source: Plant Unit Installation	*Frequency, Hz*								
Receiver: Nearest Residential Window	***63***	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***	***dB(A)***
Manufacturers Sound Pressure Level									
MXZ - 4E72VA Mitshubishi Electric	59	57	55	51	48	43	36	29	53
Correction due to No. of units (3)	5	5	5	5	5	5	5	5	5
Attenuation provided by distance to receiver (min. 15 m)	-24	-24	-24	-24	-24	-24	-24	-24	-24
Attenuation due directivity index	-3	-3	-3	-3	-3	-3	-3	-3	-3
Attenuation due to screening from building envelope	-5	-6	-7	-8	-10	-12	-15	-18	-8
Sound pressure level 1m from nearest residential receiver									**23**

Design Criterion	**24**

Receiver: Inside Nearest Residential Window

	Frequency, Hz								
Source: Plant Unit Installation	***63***	***125***	***250***	***500***	***1k***	***2k***	***4k***	***8k***	***dB(A)***
Sound pressure level outside window									23
Minimum attenuation from partially open window, dB									-10
Sound pressure level inside nearest residential window									**13**

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.