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PAXTON HOUSE,
15 ST GEORGE'S MEWS, CAMDEN TOWN, LONDON

NOISE IMPACT ASSESSMENT

Report **13990-NIA-02 - RevA**

Prepared on 24 April 2019

Issued For:

Craig David

Paxton House

15 St George's Mews

NW1 8XE

Contents

List of Attachments

1.0 INTRODUCTION

Clement Acoustics has been commissioned by Craig David to measure existing background noise levels at Paxton House, 15 St George's Mews, Camden Town, London. The measured noise levels have been used to determine noise emission criteria for a proposed plant installation in agreement with the planning requirements of the London Borough of Camden.

This report presents the results of the environmental survey followed by noise impact calculations and outlines any necessary mitigation measures.

2.0 SITE DESCRIPTION

Current proposals are to install 4 No. condenser units on the first-floor roof to the side of the building.

It is understood that the proposed plant units will be for residential use, operational at any time.

The first-floor windows of 10-12 St George's Mews have been identified as the nearest affected receivers. This nearest noise sensitive receiver was identified through observations on-site. If there are any receivers closer to that identified within this report then a further assessment will need to be carried out. Therefore, the closest noise sensitive receptor should be confirmed by the client before the plant is installed or any noise mitigation measures are implemented.

Locations are shown in attached site plan 13990-SP1.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Procedure

Measurements were undertaken at one position as shown on indicative site drawing 13990-SP1. The choice of this position was based both on accessibility and on collecting representative noise data in relation to the site.

The microphone was mounted on a 1st storey window at the front of the building. The microphone was positioned 1m in front of the window and as such the monitoring position is not considered free-field according to the guidance of BS 4142: 2014. Based on the presence of the reflective surface and the nature of surrounding noise sources, a correction for reflections of 3 dB has been applied, in line with the recommendations of the standard. During the installation and collection of equipment, it was noted that plant units on a neighbouring building were in normal operation, as reflected in the time history, Figure 13990-TH1.

Continuous automated monitoring was undertaken for the duration of the survey between 13:05 on 29 August 2018 and 11:50 on 31 August 2018.

Weather conditions were generally dry with light winds, therefore suitable for the measurement of environmental noise.

The measurement procedure generally complied with BS 7445:1991: '*Description and measurement of environmental noise, Part 2- Acquisition of data pertinent to land use*'.

3.2 Equipment

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

The equipment used was as follows.

- 1 No. Svantek Type 957 Class 1 Sound Level Meter
- Norsonic Type 1251 Class 1 Calibrator

4.0 RESULTS

The $L_{Aeq: 5min}$, $L_{Amax: 5min}$, $L_{A10: 5min}$ and $L_{A90: 5min}$ acoustic parameters were measured at the location shown in site drawing 13990-SP1.

The measured noise levels are shown as a time history in Figure 13990-TH1, with ambient and background noise levels summarised in Table 4.1.

	Average ambient noise level $L_{eq: T}$	Minimum background noise level $L_{90: 5min}$
Daytime (07:00 - 23:00)	51 dB(A)	43 dB(A)
Night-time (23:00 - 07:00)	46 dB(A)	43 dB(A)

Table 4.1: Average ambient and minimum background noise levels

5.0 NOISE CRITERIA

It is understood that, as per the Camden Local Plan (June 2017), the London Borough of Camden general criteria for noise emissions from industrial and commercial noise sources are as follows:

> *"Where appropriate and within the scope of the document it is expected that British Standard 4142: 2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15 dB if tonal components are present) should be considered as the design criterion)."*

It should be noted that the levels given above are for dwellings. As the nearest affected receivers are offices, and would therefore be considered less noise sensitive than dwellings, we therefore propose to set the noise criteria at 38 dB(A), the value 5 dB below the minimum measured background noise level during the daytime hours.

6.0 PLANT NOISE IMPACT ASSESSMENT

6.1 Proposed Installation

The proposed plant installation comprises the following:

- 4 No. Daikin 4MXM80N2V1B condenser units

Noise emissions for the proposed plant units, as provided by the manufacturer, are shown in Table 6.1. Loudest modes of operation have been used in order to present a robust worst-case assessment.

	Sound Pressure Levels (at 1 meter, dB) in each Frequency Band								
Unit	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
Daikin 4MXM80N2V1B	51	52	50	47	43	38	32	27	49

Table 6.1: Manufacturer noise emissions levels

The proposed plant location is on the first-floor roof at the side of the building which is shown on indicative site plan 13990-SP1.

The closest receiver has been identified as the window on the rear facade of an office property adjacent which is a minimum of 1 m from the proposed plant location.

6.2 Proposed Mitigation Measures

In order to reduce the noise levels as much as practically possible, it is recommended that an enclosure is installed around the plant. The enclosure should provide sufficient attenuation to achieve a maximum sound pressure level of 40 dB(A) when measured at 1 m in all directions.

Based on the information provided, an enclosure meeting the sound reduction indices as stated in Table 6.2 should be suitable to achieve this.

	Required Attenuation (dB) in each Frequency Band							
Mitigation	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**
Louvred Enclosure	8	9	16	23	24	24	25	25

Table 6.2: Required attenuation from mitigation

Please note that as an indication, a louvred enclosure extending approximately 600 mm from the plant could be required in order to provide the above attenuation levels.

6.3 Noise Impact Assessment

Taking into account all necessary acoustic corrections, the resulting noise level at the identified noise sensitive windows would be as shown in Table 6.3. Detailed calculations are shown in Appendix B.

Receiver	Night Time Hours Criterion	Noise Level at Receiver (due to proposed plant)
Nearest Noise Sensitive Property	38 dB(A)	40 dB(A)

Table 6.3: Noise levels and criteria at noise sensitive receivers

As presented in Table 6.3 and Appendix B, the noise emissions from the proposed plant installation with acoustic enclosure would be expected to be 2 dB above the proposed criteria. However, it should be noted that subjectively, a change in sound level of 2 dB is generally considered imperceptible.

6.4 British Standard Requirements

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

British Standard 8233: 2014 '*Guidance on sound insulation and noise reduction for buildings*' gives recommendations for acceptable internal noise levels. Assuming the closest window being for an office, BS 8233: 2014 recommends 45-50 dB(A) as being acceptable internal working conditions.

With loudest external levels of 40 dB(A), acceptable internal conditions would be met without taking the attenuation of the window itself into consideration. According to BS 8233: 2014, a typical building facade with a partially open window offers 15 dB attenuation.

It can therefore be predicted that the emissions from the proposed plant would be expected to meet the most stringent recommendations of the relevant British Standard, with neighbouring windows partially open. Predicted levels are shown in Table 6.4.

Receiver	Recomended Target – *For working conditions in an office, in BS8233:2014*	Noise Level at Receiver (due to plant installation)
Inside Office Window	45-50 dB(A)	25 dB(A)

Table 6.4: Noise levels and criteria inside nearest noise sensitive space

7.0 CONCLUSION

An environmental noise survey has been undertaken at Paxton House, 15 St George's Mews, Camden Town, London. The results of the survey have enabled criteria to be set for noise emissions from the proposed plant units in accordance with the requirements of the London Borough of Camden.

A noise impact assessment has then been undertaken using manufacturer noise data to predict the noise levels, due to the proposed plant, at the nearby noise sensitive receivers.

Calculations show that noise emissions from the proposed plant units would be expected to be marginally above the proposed criteria with the recommended mitigation installed as stated herein.

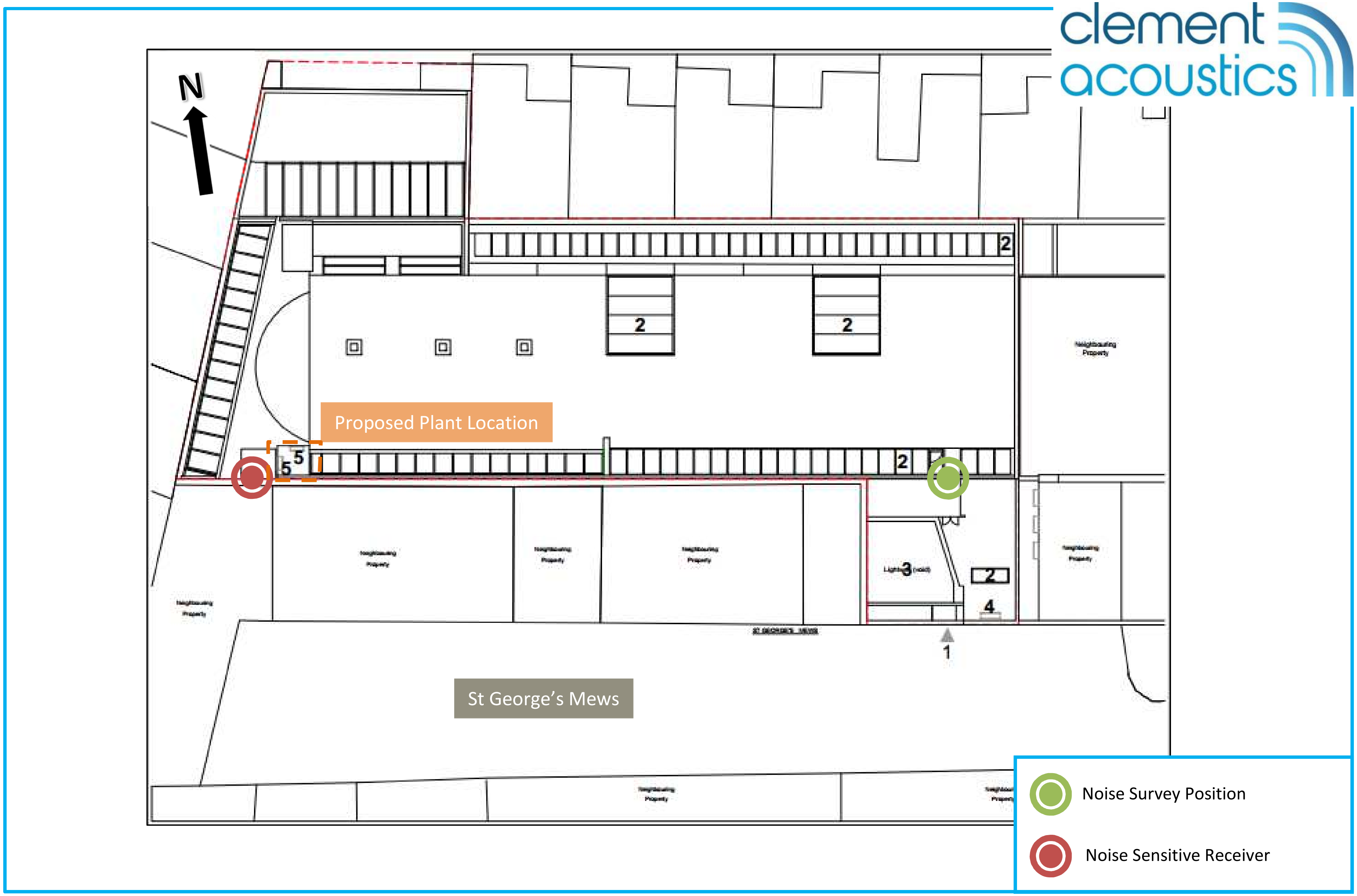
However, subjectively this increase in noise levels would not be expected to be perceptible at the nearest affected receivers.

Report by

Kenny Macleod AMIOA

Checked by

John Smethurst MIOA

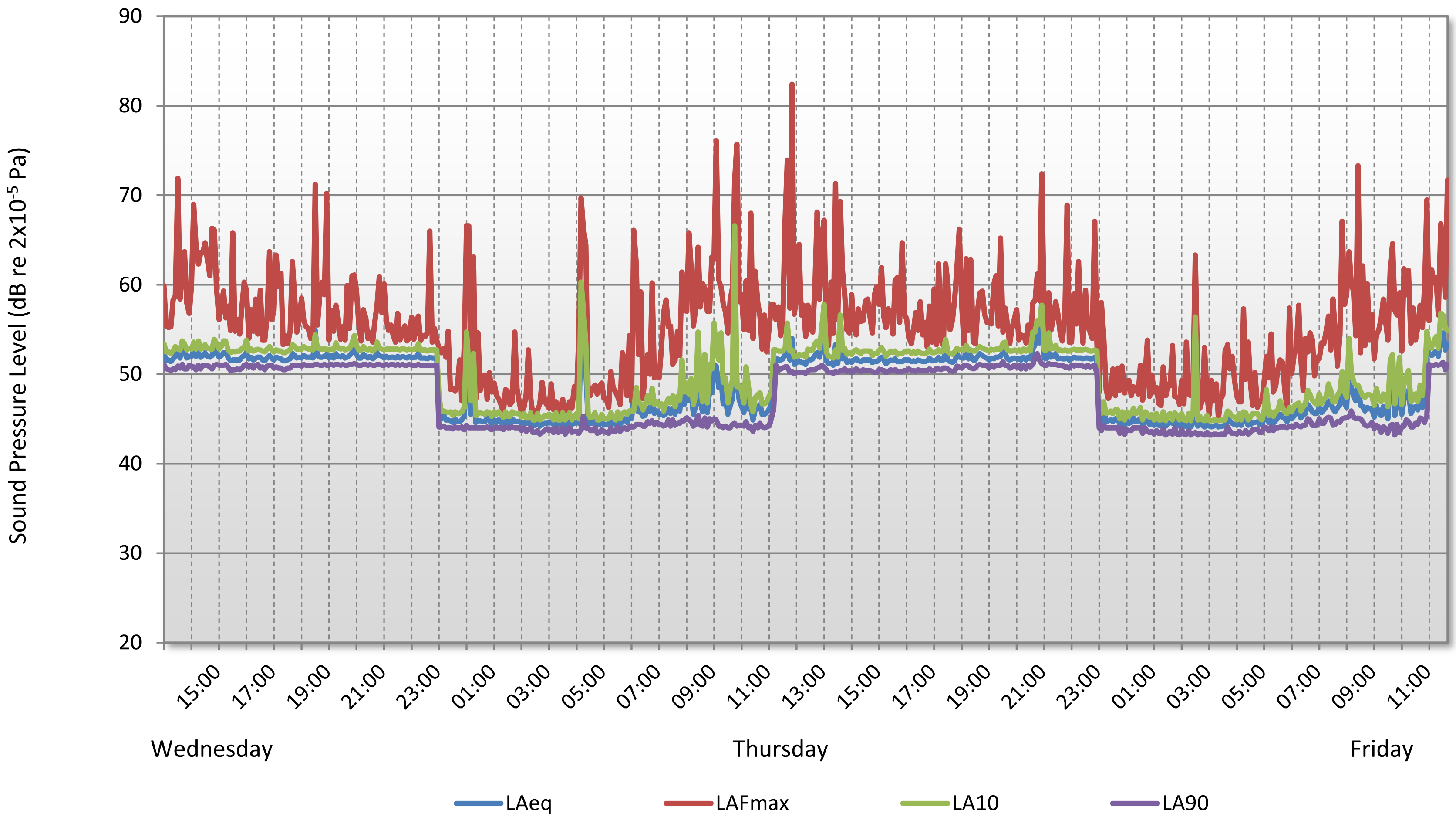


13990-SP1 Indicative site plan indicating noise monitoring position and nearest noise sensitive receiver

Date: 24 April 2019

Paxton House, 15 St George's Mews, Camden Town, London

Environmental Noise Time History
29 August 2018 to 31 August 2018



13990-TH1

APPENDIX A

GLOSSARY OF ACOUSTIC TERMINOLOGY

dB(A)

The human ear is less sensitive to low (below 125Hz) and high (above 16kHz) frequency sounds. A sound level meter duplicates the ear's variable sensitivity to sound of different frequencies. This is achieved by building a filter into the instrument with a similar frequency response to that of the ear. This is called an A-weighting filter. Measurements of sound made with this filter are called A-weighted sound level measurements and 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 not 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 not 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 10 such octave bands whose centre frequencies are defined in accordance with international standards.

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 one alone and 10 sources produce a 10dB 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

Sound intensity is not perceived directly at the ear; rather it is transferred by the complex hearing mechanism to the brain where acoustic sensations can be interpreted as loudness. This makes hearing perception 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 reasonable guide to help explain increases or decreases in sound levels for many acoustic scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud
20	About 4 times as loud

Barriers

Outdoor barriers can be used to reduce environmental noises, such as traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and its construction.

Reverberation control

When sound falls on the surfaces of a room, part of its energy is absorbed and part is reflected back into the room. The amount of reflected sound defines the reverberation of a room, a characteristic that is critical for spaces of different uses as it can affect the quality of audio signals such as speech or music. Excess reverberation in a room can be controlled by the effective use of sound-absorbing treatment on the surfaces, such as fibrous ceiling boards, curtains and carpets.

APPENDIX B

13990

Paxton House, 15 St George's Mews, Camden Town, London

EXTERNAL PLANT NOISE EMISSIONS CALCULATION

Receiver: Nearest Noise Sensitive Receiver
Source: Proposed plant installation

	Frequency, Hz								
	63	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*	*dB(A)*
Manufacturer provided sound pressure level at 1 metre									
Daikin 4MXM80N2V1B	51	52	50	47	43	38	32	27	49
Correction for number of units, dB (4 No.)	6	6	6	6	6	6	6	6	
Correction for reflections, dB	3	3	3	3	3	3	3	3	
Attenuation required by proposed louvred enclosure, dB	-8	-9	-16	-23	-24	-24	-25	-25	
Total sound pressure level at receiver	**52**	**52**	**43**	**33**	**28**	**23**	**16**	**11**	**40**

Design Criterion	**33**

BS 8233 ASSESSMENT CALCULATION

Receiver: Inside Nearest Noise Sensitive Window
Source: Proposed plant installation

	Frequency, Hz								
	63	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*	*dB(A)*
Sound pressure level outside window	52	52	43	33	28	23	16	11	40
Minimum attenuation from partially open window, dB	-15	-15	-15	-15	-15	-15	-15	-15	
Sound pressure level inside nearest noise sensitive premises	**37**	**37**	**28**	**18**	**13**	**8**	**1**	**0**	**25**

Design Criterion	**45**