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66 HEATH STREET, LONDON

NOISE IMPACT ASSESSMENT

Report **7770-NIA-01**

Prepared on 19 November 2012

Issued For:

We Love Pizza Limited

66 Heath Street

London

NW3 1DN

committed to CSCS Platinum award

Contents

List of Attachments

1.0 INTRODUCTION

Clement Acoustics Ltd has been commissioned by We Love Pizza Limited to measure existing background noise levels at 66 Heath Street, London NW3 1DN. Measured noise levels will be used to determine noise emission criteria for a proposed kitchen extract fan 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 ENVIRONMENTAL NOISE SURVEY

2.1 Procedure

Measurements were undertaken at the position shown in Site Plan 7770-SP1. The choice of this position was based both on accessibility and on collecting representative noise data in relation to the nearest noise sensitive receivers.

Continuous automated monitoring was undertaken for the duration of the survey between 17:30 on 16 November 2012 and 08:30 on 19 November 2012.

Background noise levels at the monitoring position were dominated by road traffic noise from Heath Street.

Weather conditions were generally dry with light winds, 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 use and no abnormalities were observed.

The equipment used was as follows.

- Svantek Type 957 Class 1 Sound Level Meter
- Norsonic Type 1251 Class 1 Calibrator

3.0 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 Plan 7770-SP1. The measured levels are shown as a time history in Figure 7770-TH1.

Minimum background levels are shown in Table 3.1.

	Minimum background noise level $L_{A90:\ 5min}$ dB(A)
Daytime [*07:00 - 23:00*]	42
Night-time [*23:00 - 07:00*]	36
Proposed Operating Hours [*Monday - Saturday 11:00 - 22:30, Sunday 11:00 - 22:00*]	49

Table 3.1: Minimum background noise levels

4.0 NOISE CRITERIA

In order to present a robust assessment and protect the amenity of nearby residential receivers, we propose to set noise emissions criteria as follows:

> "*The 'A' weighted sound pressure level from the plant, when operating at its noisiest, shall not at any time exceed a value of 10 dB below the minimum external background noise, at a point 1 metre outside any window of any residential property*."

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

	Noise Emissions Criteria at Receiver [*10dB Below Minimum L_{A90}*]
Daytime	32
Night-time	26
Proposed Operating Hours	39

Table 4.1: Proposed Noise Emissions Criteria

As the proposed kitchen extract fan will only be used during restaurant opening hours, the operating hours criterion of 39 dB(A) will be used in this assessment.

5.0 DISCUSSION

It is understood that the plant installation comprises a kitchen extract fan, selected as shown in Table 5.1 where the manufacturer's specified spectral sound power levels are also shown.

The fan will be situated on top of a proposed flue stack, therefore outside the building envelope of 66 Heath Street. The manufacturer of the fan has specified sound power levels emitted to the surrounding environment, as shown in Table 5.1.

	Sound Power Level (dB) in each Frequency Band							
Source	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**
Exodraft Chimney Fan type RSV014-4-1	71*	71	70	68	61	56	50	44

Table 5.1 Manufacturer's Sound Power Levels

*Data for 63Hz frequency band not provided, known data has therefore been extrapolated

5.1 Proposed Mitigation Measures

Due to the quiet nature of measured background noise levels and the location of proposed plant, we would recommend applying certain mitigation measures to the proposed plant unit.

In order to address noise breakout from the fan to its outdoor surroundings, we would recommend constructing a simple timber screen to block line of sight to surrounding noise sensitive windows.

We would recommend constructing the screen from timber panels, a minimum of 10mm thick, with an absorptive backing formed from a 30-50mm layer of non-flammable absorbent layer, such as rock wool or glass fibre, held in place by a strong, permeable (minimum 20% open area) facing. The panels should be arranged so that the absorptive layers are facing the unit, leaving no gaps at junctions between panels. Sufficient space should be left between the screen and fan to allow circulation of fresh air.

The screen should be constructed to block line of site from all sides of the proposed fan, alhough due to relative heights of receivers; the top can be left completely open to allow ventilation to the fan.

5.2 Noise Impact Assessment

The closest residential window has been identified as a top floor residential window in the rear facade of 66 Heath Street, as shown in indicative site plan 7770-SP1.

The window is located approximately 4m from the proposed chimney fan and proposed mitigation measures will provide a reasonable amount of attenuation.

With all corrections applied including mitigation measures as described, noise emissions levels at the closest residential window would be as shown in Table 5.2, with detailed calculations shown in Appendix B.

Receiver	Operating Hours Criterion	Noise Level at Receiver [*due to proposed plant installation*]
Nearest Residential Window	39 dB(A)	38 dB(A)

Table 5.2: Noise levels and criteria at Receiver

As shown in Appendix B and Table 5.2, transmission of noise to the closest residential window due to the effects of the proposed plant installation would be expected to meet the set noise emissions criteria, provided specified mitigation measures are adopted.

5.3 Internal Noise Requirements

In addition to the above assessment, further calculations will aim 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 8233:1999 '*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, BS8233:1999 recommends 30dB(A) as being 'good' internal resting/sleeping conditions.

With external levels of 38 dB(A), the window itself would need to provide 8dB attenuation in order for 'good' internal conditions to be met. According to BS8233:1999, even a partially open window offers a minimum of 10dB attenuation.

It can therefore be predicted that noise emissions from the proposed plant would be expected to meet the most stringent recommendations of the relevant British Standard, even with neighbouring windows partially open. Predicted levels are shown in Table 5.3, with detailed calculations shown in Appendix B.

Receiver	'Good' Conditions Design Range – *For resting/sleeping conditions in a bedroom, in BS8233:1999*	Noise Level at Receiver (due to plant installation)
Inside Receiver	30 dB(A)	28 dB(A)

Table 5.3 Noise levels and criteria inside Receiver

6.0 CONCLUSION

An environmental noise survey has been undertaken at 66 Heath Street, London NW3 1DN. The results of the survey have enabled criteria to be set for noise emissions from the proposed plant in order to protect the amenity of nearby residential receivers.

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

Calculations show that noise emissions from the proposed plant unit would meet the set requirements as well as the recommendations of the relevant British Standard, provided that the proposed mitigation measures in this report are adopted.

Report by

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Checked by

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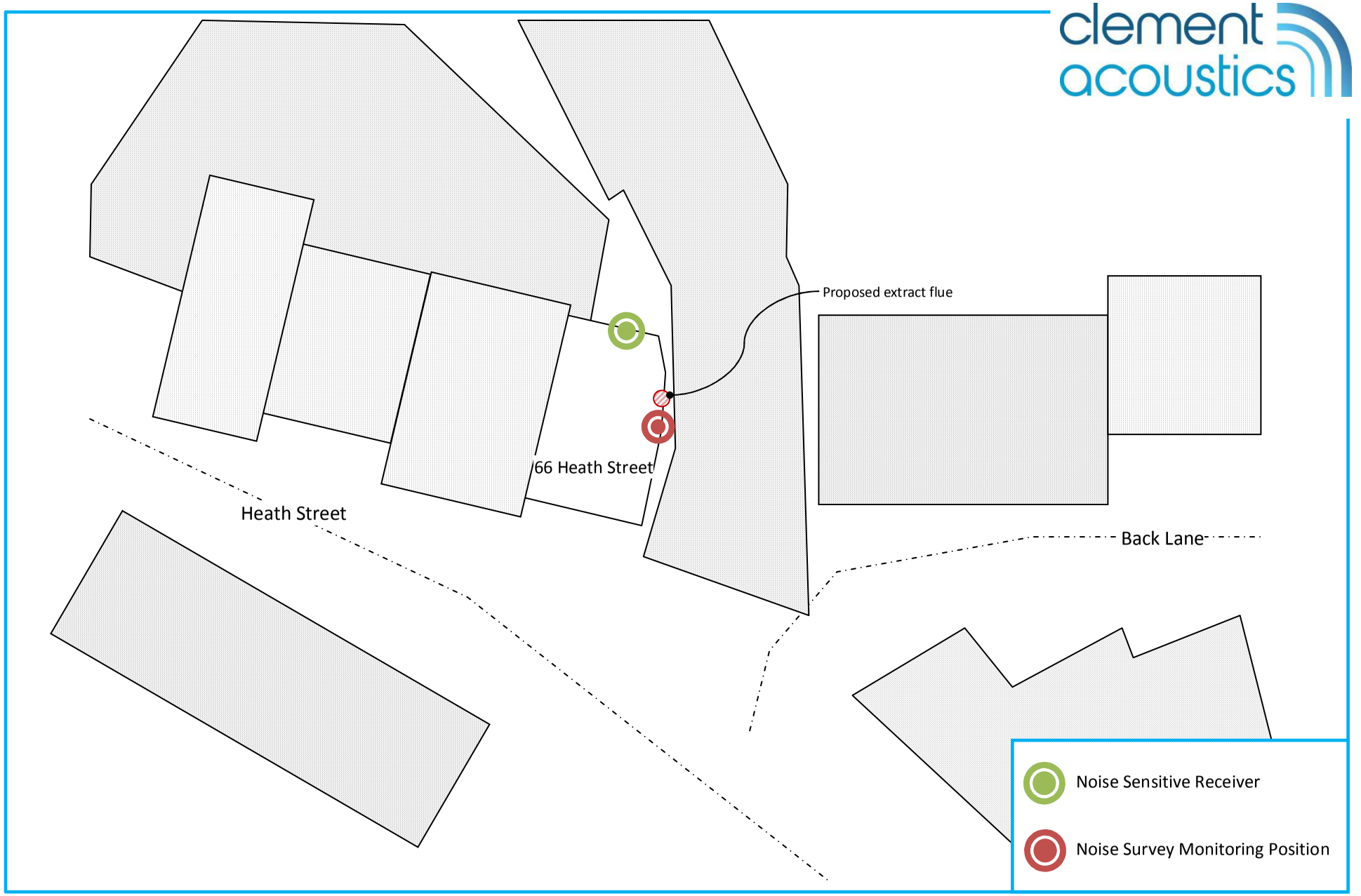

7770-SP1 Indicative site plan showing noise monitoring position and nearest noise sensitive receiver **Date:** 19 November 2012

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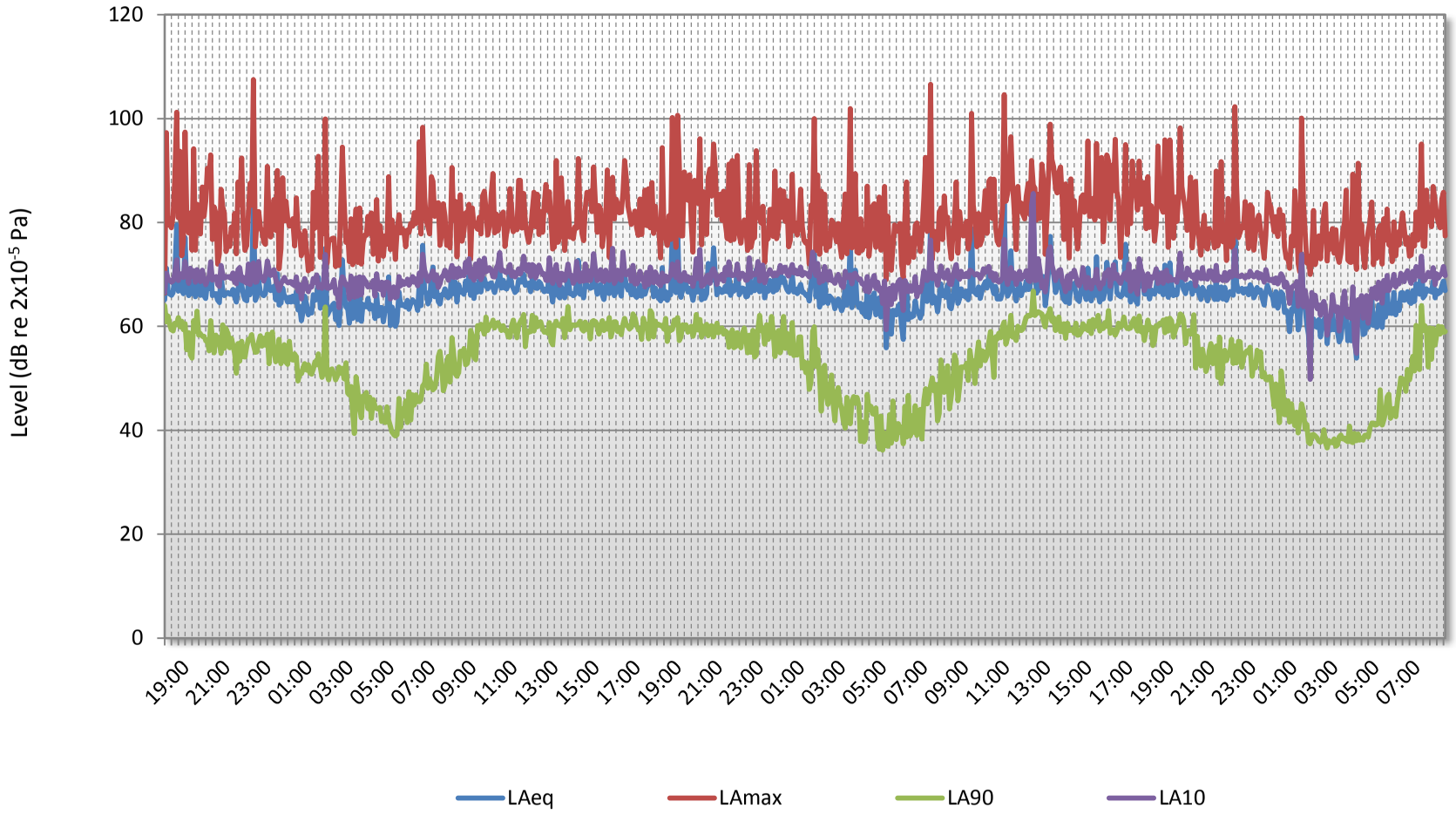
66 HEATH STREET, LONDON

Environmental Noise Time History

16 November 2012 to 19 November 2012



7770-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

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66 Heath Street, London

EXTERNAL PLANT NOISE EMISSIONS CALCULATION

Receiver: Nearest Residential Window
Source: Proposed chimney fan

	Frequency, Hz								
	63	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*	*dB(A)*
Manufacturer's Sound Power Level to surroundings Exodraft Extract Fan type RSV014-4-1	71	71	70	68	61	56	50	44	68
Attenuation from proposed screening, dB	-2	-5	-8	-11	-12	-14	-14	-14	
Conversion to sound pressure level at 1m, accounting for reflections	-8	-8	-8	-8	-8	-8	-8	-8	
Distance correction to Receiver, dB (4m)	-12	-12	-12	-12	-12	-12	-12	-12	
Sound Pressure Level at Receiver due to chimney fan	**49**	**46**	**42**	**37**	**29**	**22**	**16**	**10**	**38**

Design Criterion	**39**

BS 8233 ASSESSMENT CALCULATION

Receiver: Inside Receiver Window
Source: Proposed chimney fan

	Frequency, Hz								
	63	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*	*dB(A)*
Sound pressure level outside window	49	46	42	37	29	22	16	10	38
Minimum attenuation from partially open window, dB	-10	-10	-10	-10	-10	-10	-10	-10	
Sound pressure level inside Receiver	**39**	**36**	**32**	**27**	**19**	**12**	**0**	**0**	**28**

Design Criterion	**30**