



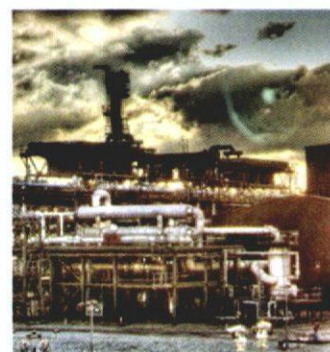
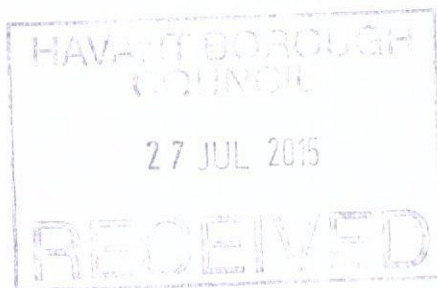
REPORT AS8385.150716.NIA1.1

127A-127B LONDON ROAD, WATERLOOVILLE



NOISE IMPACT ASSESSMENT

Prepared: 16 July 2015



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1.0 INTRODUCTION

Conditional planning consent has been granted to develop land at 127A-127B London Road, Waterlooville for residential use. Existing buildings on the site have been demolished and the site is currently vacant.

The site is bounded to the south by Hulbert Road Roundabout and Maurepas Way, to the west by light industrial development, to the north by existing terraced housing and to the east by London Road.

Condition 14 of Havant Borough Council conditional planning consent, APP/15/00078, relates to acceptable noise impact on the proposed dwellings. Clarke Saunders Associates has been commissioned by Planning Issues Ltd. to address the requirements of the condition by undertaking an assessment of the environmental noise impact on the site.

The assessment will consider a suitable mitigation scheme to control noise impact on the site.

2.0 PLANNING CONDIITON 14

Planning Condition 14 of the conditional planning consent states the following:

- 14 *No development other than the demolition of existing buildings shall take place until a scheme for protecting the proposed dwellings from traffic noise from road traffic (London Road and Maurepas Way) has been submitted to and approved in writing by the Local Planning Authority. Those dwellings shall not be occupied until the implementation of all works forming part of such approved noise protection scheme has been completed in full accordance with all detailed components of such scheme.*

N.B

Maximum noise level (predicted 15 years from completion of dwellings) in habitable rooms, with windows closed and other means of ventilation provided:

Daytime	38 dB $L_{Aeq,16h}$
Night time	30 dB $L_{Aeq,8h}$

3.0 SURVEY PROCEDURE & EQUIPMENT

A survey of the existing noise levels was undertaken at the location shown in site plan AS8385/SP1. Measurements of consecutive 5-minute L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} sound pressure levels were taken between 10:20 hours on Tuesday 7th July and 09:35 hours on Thursday 9th July 2015.

The following equipment was used during the course of the survey:

- Rion data logging sound level meter type NL52;
- Norsonic data logging sound level meter type 116;
- Rion sound level calibrator type NC-74;
- Norsonic sound level calibrator type 1253.

The calibration of the sound level meter was verified before and after use. No significant calibration drift was detected.

The weather during the survey was dry with light winds, which made the conditions suitable for the measurement of environmental noise.

Measurements were made generally in accordance with ISO 1996-2:2007 *Acoustics - Description, measurement and assessment of environmental noise – Part 2: Determination of environmental noise levels*.

Please refer to Appendix A for details of the acoustic terminology used throughout this report.

4.0 RESULTS

Figures AS8385/TH1-TH2 show the L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} sound pressure levels as time histories at measurement Position 1, at the front of the site. Figures AS8385/TH3-TH4 show the sound pressure levels as time histories at measurement Position 2, at the rear of the site.

The site is affected by road traffic using the Hulbert Road Roundabout, Maurepas Way and London Road. The rear of the site is also subject to noise from light industrial processes to the east / north-east.

The average noise levels for the 'Daytime' and 'Night-time' periods are shown in Table 4.1.

Measurement Position	Daytime L_{Aeq} , 16 hour	Night-time, L_{Aeq} , 8 hour
Position 1	69 dB	60 dB
Position 2	56 dB	50 dB

Table 4.1 - Daytime and night-time average noise levels at measurement positions

[dB ref. 20 μ Pa]

5.0 DESIGN REVIEW

The following design review is based on the Planning Issues architectural drawings for the proposed construction available at the time of writing.

The review has been based upon achieving the internal noise levels required by planning condition 14, as shown below in Table 5.1

Period	Internal Noise Level Design Criterion, $L_{Aeq,T}$
Daytime	38 dB
Night time	30 dB

Table 5.1 – Internal noise design criteria

[dB ref. 20 μ Pa]

It should be noted that traffic flow data is not available for London Road / Maurepas Way / Hulbert Road and associated junction for 15-years from completion. In order to provide a robust assessment allowance has been made within the façade incident noise levels for a 25% increase in traffic during this period equivalent to a 1dB increase in overall noise level.

5.1 Architectural Arrangements

It has been assumed that all non-glazed elements, i.e. masonry walls/facings and the roof systems, will provide the following minimum sound insulation performances, when tested in accordance with ISO 10140-2:2010.

Frequency (Hz)	Single Figure Weighted Sound Reduction Figure (dB)
Masonry	R_w 51

Table 5.2 - Assumed minimum sound reduction indices of solid constructions

6.0 REQUIRED GLAZING PERFORMANCE

The minimum sound insulation specifications for the glazed elements of the building are given in the table below. These have been calculated using the monitoring data.

Glazing Type	Single Figure Weighted Sound Reduction Figure (dB)	Ventilator Performance (dB)
Type A	R_w 33	$D_{n,e,w}$ 30

Table 6.1 - Minimum required sound reduction indices for glazing and ventilators

The north east, north west and rear amenity space elevations are sufficiently screened from road traffic noise such that it is expected that standard, thermally sealed double glazing should provide adequate sound reduction to achieve suitable internal levels.

In order that windows may remain closed to maintain the internal noise levels, it is expected that an alternative means of ventilation will be required. If trickle vents are used the performance shown in Table 6.1 will be required. The figures stated are for a single vent per room. If multiple vents are required, then the performance requirement shown in Table 6.1 will increase by a value equal to $+10\log(N)$, with N being the total number of vents serving the room. It should be noted that there is no reason why windows could not be opened as a matter of personal preference or for purge ventilation.

7.0 DISCUSSION

7.1 Glazing Specification

Table 7.1, below, identifies where the performance requirements shown in Table 6.1 apply:

Elevation	Floor	Glazing type required
South East & South west	All	Type A

Table 7.1 - Locations for glazing types

It is important that the quoted minimum sound reduction specifications are met by the panels and windows, including frames, seals, etc. Glass performance alone is not an acceptable means of demonstrating compliance with the specification for window performance.

The sound reduction of the windows should be met with any proposed trickle vents installed and open. If this cannot be met then alternative means of ventilation may be required.

With the above recommendations implemented, the noise levels within the residential dwellings are expected to comply with the planning condition 14 criteria for daytime and night time noise levels, as shown in Table 5.1.

8.0 CONCLUSIONS

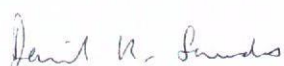
Measurements have been made of the prevailing noise climate at the proposed site for residential development at 127A-127B London Road, Waterloooville.

The measured levels have been assessed against the internal noise criteria stipulated in Condition 14 of the Havant Borough Council planning decision notice, APP/15/00078. In the absence of 15 year traffic flow predictions for London Road / Maurepas Way / Hulbert Road and associated junction, a 25% increase in traffic flow has been assumed in order to ensure a robust assessment.

Due to the screened outlook at the north-east, north-west and rear aspects of the property, it is expected that high quality, thermally sealed double glazing units would be sufficient for all rooms on these façades.

The survey has allowed the minimum sound reduction requirements of the external building fabric on the south east and south west façades to be established as a performance specification, in order to meet the Condition 14 criteria.

However, it is important that the successful contractor demonstrates in a UKAS accredited or an equal and approved laboratory that the minimum sound reduction requirements can be achieved by their proposed window systems.



Daniel Saunders MIOA

CLARKE SAUNDERS ASSOCIATES

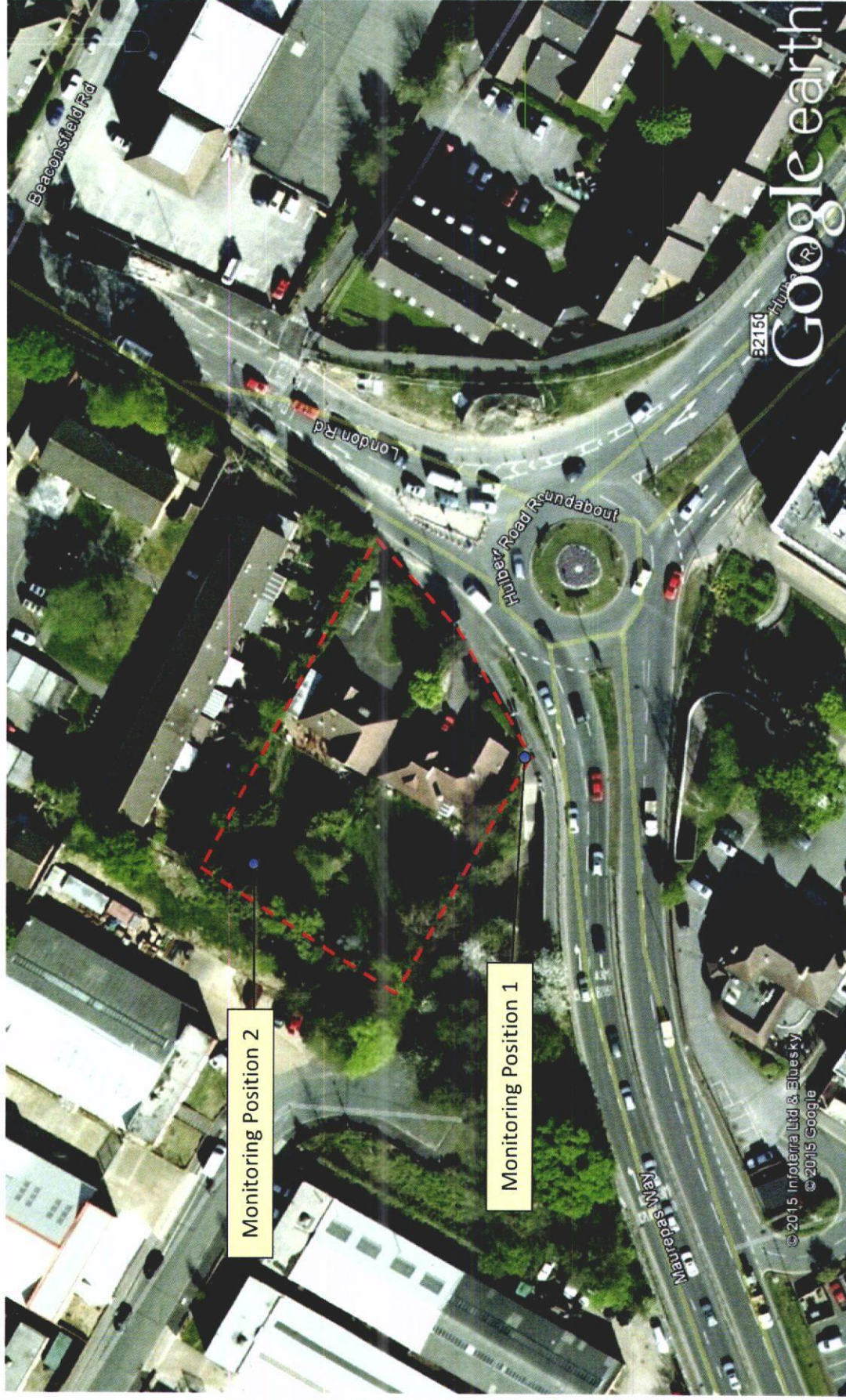
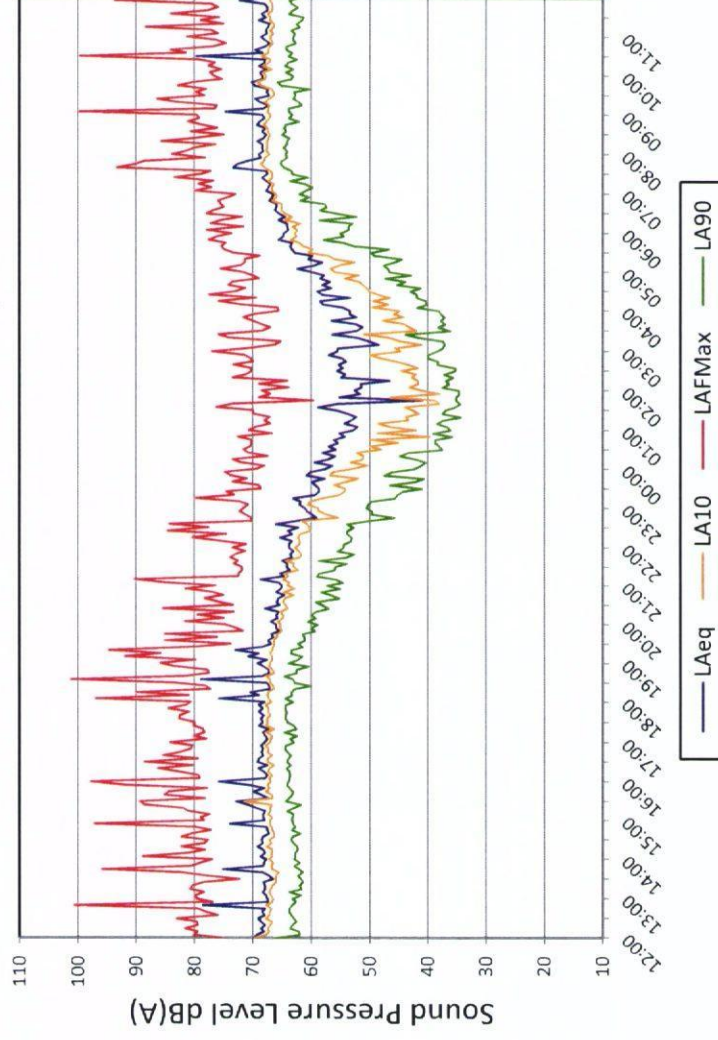


Figure AS8385/SP1

127A-127B London Road, Waterloooville

Environmental Noise Time History: Position 1

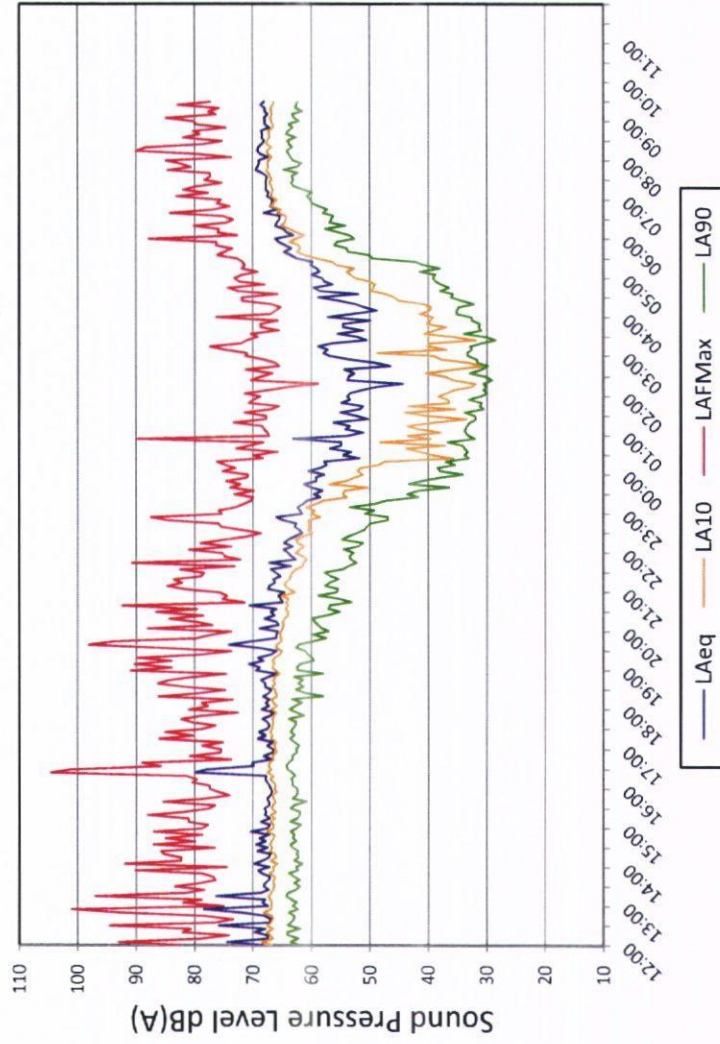


Tuesday 07 July to Wednesday 08 July 2015

Figure AS8385/TH1

127A-127B London Road, Waterloooville

Environmental Noise Time History: Position 1

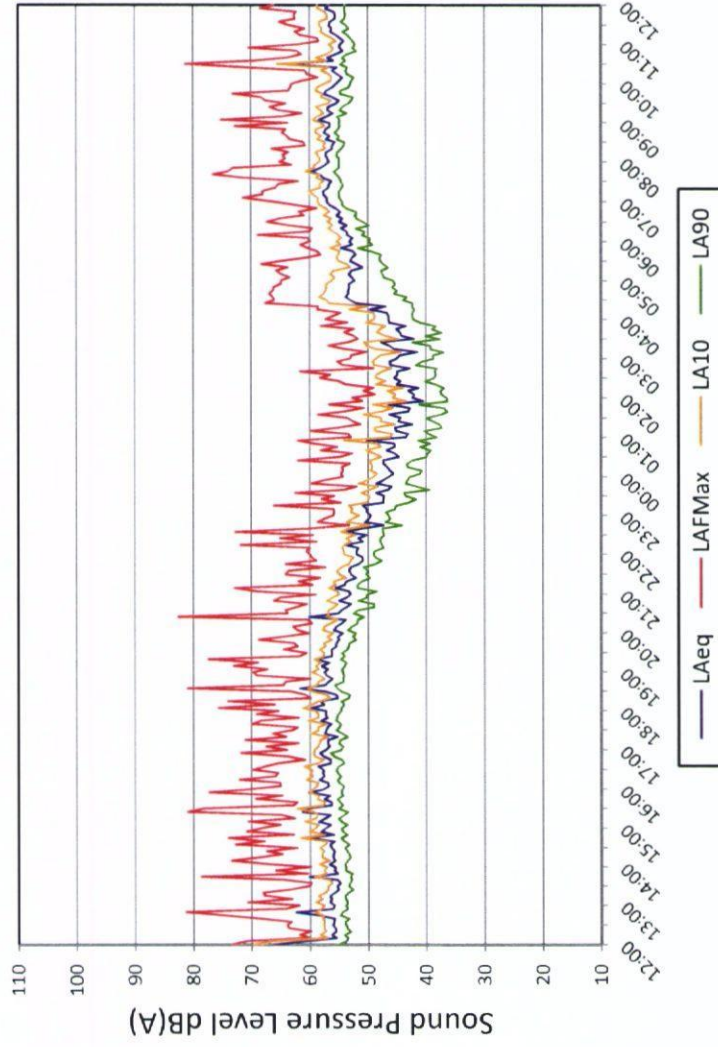


Wednesday 08 July to Thursday 09 July 2015

Figure AS8385/TH2

127A-127B London Road, Waterloooville

Environmental Noise Time History: Position 2

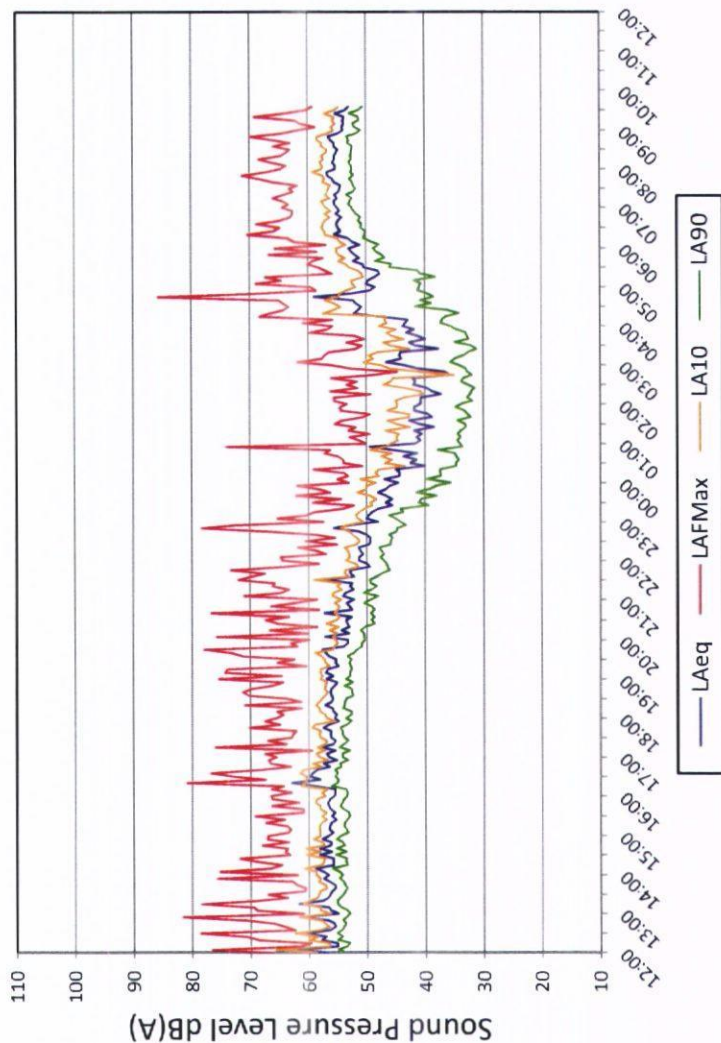


Tuesday 07 July to Wednesday 08 July 2015

Figure AS8385/TH3

127A-127B London Road, Waterloooville

Environmental Noise Time History: Position 2



Wednesday 08 July to Thursday 09 July 2015

Figure AS8385/TH4

APPENDIX A

ACOUSTIC TERMINOLOGY & HUMAN RESPONSE TO BROADBAND NOISE

1.0 ACOUSTIC TERMINOLOGY

The annoyance produced by noise is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and any variations in its level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

dB (A):	The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the 'A' weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average human. It is also possible to calculate the 'A' weighted noise level by applying certain corrections to an un-weighted spectrum. The measured or calculated 'A' weighted noise level is known as the dB(A) level.
L₁₀ & L₉₀ :	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time, hence L₁₀ is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L₉₀ is the average minimum level and is often used to describe the background noise. It is common practice to use the L₁₀ index to describe traffic noise, as being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic noise.
L_{eq} :	The concept of L_{eq} (equivalent continuous sound level) has up to recently been primarily used in assessing noise in industry but seems now to be finding use in defining many other types of noise, such as aircraft noise, environmental noise and construction noise. L_{eq} is defined as a notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (e.g. 8 hour, 1 hour, etc). The use of digital technology in sound level meters now makes the measurement of L_{eq} very straightforward. Because L_{eq} is effectively a summation of a number of noise events, it does not in itself limit the magnitude of any individual event, and this is frequently used in conjunction with an absolute noise limit.
L_{max} :	L _{max} is the maximum sound pressure level recorded over the period stated. L _{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L _{eq} noise level.
D	The sound insulation performance of a construction is a function of the difference in noise level either side of the construction in the presence of a loud noise source in one of the pair of rooms under test. D, is therefore simply the <i>level difference</i> in decibels between the two rooms in different frequency bands.
D_w	D _w is the <i>Weighted Level Difference</i> The level difference is determined as above, but weighted in accordance with the procedures laid down in BS EN ISO 717-1.
D_{nT,w}	D _{nT,w} is the <i>Weighted Standardised Level Difference</i> as defined in BS EN ISO 717-1 and represents the <i>weighted level difference</i> , as described above, corrected for room reverberant characteristics.
C_{tr}	C _{tr} is a spectrum adaptation term to be added to a single number quantity such as D _{nT,w} , to take account of characteristics of a particular sound.
L'_{nT,w}	L' _{nT,w} is the <i>Weighted Standardised Impact Sound Pressure Level</i> as defined in BS EN ISO 717-2 and represents the level of sound pressure when measured within room where the floor above is under excitation from a calibrated tapping machine, corrected for the receive room reverberant characteristics.

APPENDIX A

ACOUSTIC TERMINOLOGY & HUMAN RESPONSE TO BROADBAND NOISE

2.0 OCTAVE BAND FREQUENCIES

In order to determine the way in which the energy of sound is distributed across the frequency range, the International Standards Organisation have agreed on "preferred" bands of frequency for sound measurement and analysis. The widest and most commonly used band for frequency measurement and analysis is the Octave Band. In these bands, the upper frequency limit is twice the lower frequency limit, with the band being described by its "centre frequency" which is the average (geometric mean) of the upper and lower limits, eg. 250 Hz octave band runs from 176 Hz to 353 Hz. The most commonly used bands are:

Octave Band Centre Frequency Hz	63	125	250	500	1000	2000	4000	8000
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3.0 HUMAN PERCEPTION OF BROADBAND NOISE

Because of the logarithmic nature of the decibel scale, it should be borne in mind that noise levels in dB(A) do not have a simple linear relationship. For example, 100dB(A) is not twice as loud as 50 dB(A) sound level. It has been found experimentally that changes in the average level of fluctuating sound, such as traffic noise, need to be of the order of 3 dB(A) before becoming definitely perceptible to the human ear. Data from other experiments have indicated that a change in sound level of 10 dB(A) is perceived by the average listener as a doubling or halving of loudness. Using this information, a guide to the subjective interpretation of changes in traffic noise level can be given.

INTERPRETATION

Change in Sound Level dB(A)	Subjective Impression	Human Response
0 to 2	Imperceptible change in loudness	Marginal
3 to 5	Perceptible change in loudness	Noticeable
6 to 10	Up to a doubling or halving of loudness	Significant
11 to 15	More than a doubling or halving of loudness	Substantial
16 to 20	Up to a quadrupling or quartering of loudness	Substantial
21 or more	More than a quadrupling or quartering of loudness	Very Substantial

4.0 EARTH BUNDS AND BARRIERS - EFFECTIVE SCREEN HEIGHT

When considering the reduction in noise level of a source provided by a barrier, it is necessary to establish the "effective screen height". For example if a 3 metre high barrier exists between a noise source and a listener, with the barrier close to the listener, the listener will perceive the noise source is louder, if he climbs up a ladder (and is closer to the top of the barrier) than if he were standing at ground level. Equally if he sat on the ground the noise source would seem quieter than it was if he were standing. This may be explained by the fact that the "effective screen height" is changing with the three cases above, the greater the effective screen height, in general, the greater the reduction in noise level.

Where the noise sources are various roads, the attenuation provided by a fixed barrier at a specific property will be greater for roads close to the barrier than for roads further away.