



PREPARED: Monday, 02 December 2019

PROPG STAGE 2 ACOUSTIC DESIGN STATEMENT; LAND TO THE WEST OF CHURCH LANE NURSERY, YAPTON

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AST0284/GP Glazing Plan
ProPG Stage 1 Risk Assessment

Project Ref:	AS10284	Title:	Land to the West of Church Lane Nursery, Yapton
Report Ref:	AS10284.191128.ADS	Title:	ProPG Stage 2 Acoustic Design Statement
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Clarke Saunders Acoustics Winchester SO22 5BE		This report has been prepared in response to the instructions of our client. It is not intended for and should not be relied upon by any other party or for any other purpose.	

1.0 EXECUTIVE SUMMARY

- 1.1 Crayfern Homes Ltd propose to develop the land to the west of Church Lane Nursery, Yapton for residential accommodation comprising a total of six new dwellings.
- 1.2 Clarke Saunders Associates has been commissioned by Crayfern Homes Ltd to undertake an assessment of the current environmental noise impact on the site in order to assess its suitability for residential development.
- 1.3 Noise will be assessed in accordance with the National Planning Policy Framework, the recently published ProPG: Planning and Noise¹ for new residential developments and with reference made to the relevant guidance set out in BS8233: 2014 *Guidance on sound insulation and noise reduction for buildings*.
- 1.4 A survey of the prevailing noise climate and subsequent risk assessment following ProPG: Planning and Noise has shown there to be a low to medium risk in terms of noise impact. The ProPG recommends that a Stage 2 Acoustic Design Statement be prepared to consider the noise impact of the site in detail and to address the requirement for any outline measures as appropriate for the proposed residential development. This Stage 2 Acoustic Design Statement therefore considers the extent of this noise impact on the site in detail and any requirement for mitigation measures to address the risk identified.

2.0 ELEMENT 1 – ACOUSTIC DESIGN CONSIDERATIONS

- 2.1 It is understood through liaison with the developer that the risk of noise impact, due to road traffic noise from North End Road to the western boundary of the site, has been well understood from the beginning of initial design and that due consideration of these noise sources have been accommodated in the scheme to encourage good acoustic design of the site. Site and plot layout and dwelling floor plan layout have all been considered in order to mitigate noise impact, including the following examples:
 - Non-glazed building elements of suitable materials and mass have been proposed for each dwelling. All façades are constructed from masonry, with casement double-glazed units.
 - The building mass is set back at least 12 metres from North End Road, creating a buffer between the road and the west facing façades, including proposed hedge planting adjacent to the road.
 - Private external amenity spaces at the eastern side of the development have been located on the eastern façades where they benefit from significant screening effects afforded by the building mass, and all private external amenity spaces include a 1.8m high close-boarded timber boundary fence which also provides further screening from North End Road and other noise sources.
 - The east and west facing façades of plots 3, 4, 5 and 6 are such that summer overheating is minimised if residents wish to keep windows closed to reduce internal noise levels.

¹ <http://ioa.org.uk/publications/propg>

- Any development must balance acoustic design, a variety of monetary and health and safety concerns, as well as other common considerations such as aspect, light and management/utilities access issues. Wherever possible at the proposed site, acoustic design has been implemented in the context of these (sometimes competing) concerns and has been prioritised wherever possible.

3.0 ELEMENT 2 – INTERNAL NOISE LEVEL ASSESSMENT

3.1 The second element of the assessment is to seek and to achieve desirable internal noise levels in habitable rooms in the new residential development.

3.2 PROPG INTERNAL NOISE LEVEL GUIDELINES

3.2.1 ProPG brings together relevant guidance from several sources including a British Standard (BS8233: 2014 *Guidance on sound insulation and noise reduction for buildings*) and internationally published guidance in the form of World Health Organisation *Guidelines for Community Noise* (1999). This is summarised in the following table.

ACTIVITY	LOCATION	07:00 TO 23:00	23:00 TO 07:00
Resting	Living Room	35 dB L_{Aeq} , 16 hour	-
Dining	Dining Room	40 dB L_{Aeq} , 16 hour	-
Sleeping (daytime resting)	Bedroom	35 dB L_{Aeq} , 16 hour	30 dB L_{Aeq} , 8 hour

NOTE 1: The Table provides recommended internal L_{Aeq} target levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Ground-borne noise is assessed separately and is not included as part of these targets, as human response to ground-borne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

NOTE 2: The internal L_{Aeq} target levels shown in the Table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the internal L_{Aeq} target levels recommended in the Table.

NOTE 3: These internal L_{Aeq} target levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.

NOTE 4: Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events (see Appendix A).

NOTE 5: *Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the “open” position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7.*

NOTE 6: *Attention is drawn to the requirements of the Building Regulations*

NOTE 7: *Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as “unreasonable”. Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as “unacceptable” by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing “unacceptable” noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form (see Section 3.D).*

3.3 EXTERNAL BUILDING FABRIC SPECIFICATION & INTERNAL NOISE LEVEL ASSESSMENT

- 3.3.1 The following design review is based on the architectural drawings for the proposed construction and site layout available at the time of writing, targeting the internal noise levels set out in Section 3.2.1.

3.4 PRINCIPAL NOISE SOURCES AND PROPOGATION ACROSS SITE

- 3.4.1 The principal source of noise impact on the site is from road traffic using North End Road, a speed restricted single carriageway, which determines the required performance specification for the external building fabric envelope.
- 3.4.2 The closest proposed dwelling in the development will overlook North End Road from the western façade, where the minimum distance to the centre of the road is at least 12 metres.
- 3.4.3 Noise from road traffic moving at speeds of up to 30mph will be attenuated due to distance propagation, but is still likely to determine the noise climate at the proposed development.
- 3.4.4 Resultant noise levels at the western side of the site are such that, to allow suitable internal noise levels to be maintained, it must be possible for occupants to keep windows closed. The exception is for those with windows on the eastern façade of the development, ground floor of windows of Plot 3 and all windows of Plot 4, 5 and 6 where significant screening is afforded by the building mass and 1.8m garden fencing.
- 3.4.5 On these façades, noise levels are such that natural ventilation strategy, via partially open windows would be acceptable to achieve the targeted internal noise levels. Compliance with other statutory requirements however, specifically Approved Document F, may necessitate provision of background ventilation in any event.

3.4.6 A specification for glazing is provided in sections 3.6.1 and 3.6.2.

3.5 NON-GLAZED FAÇADE ELEMENT

3.5.1 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:

ELEMENT	SINGLE FIGURE WEIGHTED SOUND REDUCTION FIGURE
Masonry	R_w 51 dB

3.6 GLAZING SPECIFICATION

3.6.1 The minimum sound insulation specification for the glazed elements of the building façades are provided in the table below. These have been calculated using the site noise survey data to achieve the internal levels set out in Section 3.2.1.

GLAZING TYPE	SINGLE FIGURE WEIGHTED SOUND REDUCTION FIGURE	VENTILATOR PERFORMANCE	INDICATIVE BUILD UP*
Type A	R_w 30 dB	$D_{n,ew}$ 32 dB	Standard thermal double glazing
Type B	R_w 26 dB	$D_{n,ew}$ 39 dB	Standard thermal double glazing
Type C	R_w 17 dB	$D_{n,ew}$ 32 dB	Standard thermal double glazing
Type D	R_w 26 dB	$D_{n,ew}$ 30 dB	Standard thermal double glazing
Type E	R_w 16 dB	$D_{n,ew}$ 27 dB	Standard thermal double glazing
Type F	Natural ventilation via partially open windows. No acoustic performance requirement.		N/A

* The indicative glazing configurations provided are based on the architectural drawings dated November 2019. Should façade design or internal room layouts change, a further glazing assessment will be required.

3.6.2 The following table identifies the noise sensitive windows to which the performance requirements shown in paragraph 3.6.1 apply. These should be read in conjunction with the attached glazing plan, ASI0284/GP1.

FACADE	LEVEL	TREATMENT REQUIRED
'Red'	Ground	Type A
	1 st	Type B
'Blue'	1 st	Type C
'Green'	Ground	Type D
	1 st	Type E
'Orange'	1 st	Type E
All other façades	All	Type F

3.6.3 Good acoustic design has been prioritised to limit noise levels in rooms on the more affected façades of the development. However, given the proximity of the proposed dwellings on the western side of the development to North End Road, there is limited opportunity to mitigate noise levels at these exposed façades. Nevertheless, the appropriate specification of glazed façade elements and provision of attenuated background ventilation enables windows to remain closed and normal ventilation requirements to be achieved.

3.6.4 If passive ventilation (wall or trickle vents) are used in order that 'Type A' windows may remain closed to maintain internal noise levels, the performance shown in paragraph 3.6.1 will be required. These figures stated are for a single vent per room. If multiple vents are required, then the performance requirement will increase by a value equal to $+10\log(N)$, with N being the total number of vents serving the room.

3.6.5 Glazing units on these façades will still be openable and there is no reason why windows could not be opened as a matter of personal preference or for purge ventilation. No internal noise criteria are specified for the purge scenario, during which the expulsion of odours and/or fumes such as burned toast or drying paint is the priority.

3.6.6 A detailed overheating study has not been conducted at this stage and would require the input of a third-party, competent specialist, if required.

3.6.7 The above analysis is based on controlling internal noise levels to the aspirational target criteria outlined in the ProPG.

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

4.0 ELEMENT 3 – EXTERNAL AMENITY AREA NOISE ASSESSMENT

4.1 The ProPG makes it clear that consideration of noise in proposed external amenity areas is an important element in managing noise impact in new residential developments. The ProPG encourages a more holistic consideration of the amenity than simply rating the level of noise outside.

4.2 PROPG EXTERNAL NOISE LEVEL GUIDELINES

4.2.1 ProPG states the following regarding the consideration and assessment of noise in external amenity spaces:

3(i) *“If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended”.*

3(ii) *“The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB LAeq,16hr.”*

3(iii) *“These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces.”*

3(iv) *“Whether or not external amenity spaces are an intrinsic part of the overall design, consideration of the need to provide access to a quiet or relatively quiet external amenity space forms part of a good acoustic design process.”*

3(v) *“Where, despite following a good acoustic design process, significant adverse noise impacts remain on any private external amenity space (e.g. garden or balcony) then that impact may be partially off-set if the residents are provided, through the design of the development or the planning process, with access to:*

- *a relatively quiet facade (containing openable windows to habitable rooms) or a relatively quiet externally ventilated space (i.e. an enclosed balcony) as part of their dwelling; and/or*
- *a relatively quiet alternative or additional external amenity space for sole use by a household, (e.g. a garden, roof garden or large open balcony in a different, protected, location); and/or*
- *a relatively quiet, protected, nearby, external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or*

a relatively quiet, protected, publicly accessible, external amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance). The local planning authority could link such provision to the definition and management of Quiet Areas under the Environmental Noise Regulations.”

4.3 EXTERNAL AMENITY SPACE ASSESSMENT – PROPOSALS

4.3.1 It is proposed that all dwellings will have external amenity spaces to the rear, which are to be surrounded by 1.8m high close-boarded timber fencing.

4.4 EXTERNAL AMENITY SPACE ASSESSMENT – ANTICIPATED NOISE LEVELS

4.4.1 Anticipated noise levels in the areas of external amenity described above have been calculated from existing noise levels across the proposed development site, taking into account screening losses afforded by the proposed building mass, the 1.8m boundary fence and distance losses. On the basis of the proposed site layout, it is anticipated that noise levels in all amenity areas would be commensurate with or lower than the aspirational design range of 50 – 55 dB LAeq,16hour.

5.0 ELEMENT 4 – ASSESSMENT OF OTHER RELEVANT ISSUES

5.1 COMPLIANCE WITH RELEVANT NATIONAL AND LOCAL POLICY

- 5.1.1 National planning policy for England, set out in the Noise Policy Statement for England (NPSE), the National Planning Policy Framework (NPPF) and the ProPG, aims to promote the building of high quality sustainable homes in desirable areas whilst ensuring future and existing nearby residents and businesses are not adversely affected by the scheme (including by noise, amongst others).
- 5.1.2 The ProPG outlines a staged process by which to initially assess the risk posed by the existing noise climate followed by a more in-depth assessment of those risks and consideration of strategies by which they can be mitigated.
- 5.1.3 This assessment has demonstrated that through the use of good acoustic design, suitable mitigation measures, appropriate design of façade performance and layout of the site, acceptable noise levels can be achieved both internally and externally.

5.2 CONFORMANCE OF THE PROPG GUIDANCE

- 5.2.1 This assessment has demonstrated that whilst the acoustic environment at the development site is determined by road noise from North End Road, appropriate internal and external noise levels can still be achieved across the proposed scheme. The development therefore conforms with the guidance of ProPG.

5.3 LIKELY FUTURE OCCUPANTS

- 5.3.1 The scheme consists of six three-bedroom dwellings. Occupants are likely to be professionals and families.
- 5.3.2 Each house will have a private fenced garden, all of which are adequately screened from the road traffic noise on North End Road. It is unlikely that the noise exposure of the site would be expected to conflict with the likely future occupant's aspirations and expectations for these dwellings.

5.4 ACOUSTIC DESIGN VS. WIDER PLANNING OBJECTIVES

The acoustic design outlined in the report generally supports the wider planning objectives of providing new homes in desirable areas, close to local and national transport links and local amenities.

6.0 BS4142:2014+A1:2019

- 6.1 As BS4142 Assessment was requested by Arun District Council and undertaken for the consented development directly north of this development (report ref. ASI0285.180326.ADS). Additional information was also provided as part of this application (Tech Note dated 15th February 2019).
- 6.2 All measurements were witnessed on Friday 16th March 2018 by Fiona Fitzgerald of Arun District Council, where it was agreed that an assessment of noise arising from the 'Classic Perfections' unit's extractor fan was the primary concern.

- 6.3 The assessment indicated a low impact from Classic Perfections' extractor fan to the most affected receptors of the consented development. It is understood that Classic Perfections have since ceased trading, however should a similar business occupy the unit, the most affected receptor of the proposed site is approximately 8 – 10m further away from the unit than that of the previously assessed location, indicating that the specific sound arising from the extractor fan would also have a low impact on the proposed development.

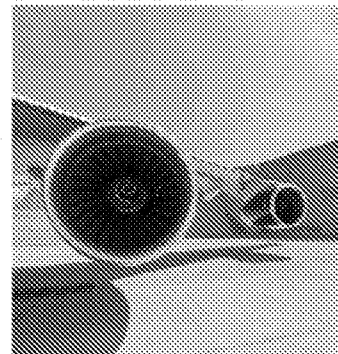
7.0 CONCLUSIONS

- 7.1 Measurements have been made of the prevailing noise climate at the proposed site for residential development at the land to the west of Church Lane Nursery, Yapton.
- 7.2 The measured levels have been assessed against the National Planning Policy Framework and currently available standards and guidance documents including the Professional Practice Guidance on Planning and Noise, World Health Organisation *Guidelines for community noise (1999)* and BS8233:2014 *Guidance on sound insulation and noise reduction for buildings*, to consider whether the site is suitable for its proposed residential use.
- 7.3 Good acoustic design has been considered throughout the planning stages, including careful attention to building mass screening, and placement of house and external amenity spaces, wherever possible, maximising noise attenuation between habitable rooms and North End Road.
- 7.4 Appropriate acoustically specified glazing units and passive background ventilation have been provided, where necessary, which indicate that it is feasible to achieve the aspirational internal noise level guidance in habitable rooms throughout the development.
- 7.5 Noise levels across much of the site are such that occupants should be able to keep windows closed in order to maintain appropriate internal noise levels. However, natural ventilation via partially opened windows will still be possible on the eastern façade.
- 7.6 Screening and maximisation of distance from North End Road mean that all residents will have access to a private, quiet external amenity space where noise levels are expected to be commensurate with the aspirational design range provided in the ProPG.
- 7.7 The assessment of Orchard Business Park following BS4142 indicates a 'low impact', when considered in the context of the environment in which the assessment is set.



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REPORT AS10284.180326.RA



LAND TO THE WEST OF CHURCH LANE NURSERY YAPTON



STAGE 1 RISK ASSESSMENT



Prepared: 11 April 2018



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List of Attachments

AS10284/PPG01	Initial Noise Risk Assessment Summary
AS10284/TH1-TH8	Environmental Noise Time Histories
Appendix A	Acoustic Terminology



Executive Summary:

A survey of the existing background noise levels was undertaken at the locations shown between 14:20 hours on Friday 16th March and 14:00 hours on Tuesday 20th March 2018.

The site is affected mainly by road traffic noise using North End Road as well as a contribution from industrial noise from Orchard Business Park.

Daytime and night-time noise levels are considered to be a low to medium risk of adverse effect, primarily a result of road traffic noise from North End Road during this period.

A detailed Acoustic Design Statement outlining appropriate measures, where necessary, to mitigate the noise impact will be required in order to demonstrate that the site would be suitable for residential development.

Project: Land to the West of Church Lane Nursery, Yapton

Figure: AS10284/PPG01

Date: 05/04/2018

clarke saunders associates | acoustics

Report Ref: AS10284/PPG01
Project: Land to the West of Church Lane Nursery, Yapton
Date: 05/04/2018
Author: [Name Redacted]
Reviewer: [Name Redacted]
Approved: [Name Redacted]

1.0 INTRODUCTION

It is proposed to develop land to the west of Church Lane Nursey, Yapton for residential use to accommodate 6 new detached houses.

Clarke Saunders Associates has been commissioned by Crayfern Homes Ltd to undertake an assessment of the current environmental noise impact on the site. Noise will be assessed in accordance with the National Planning Policy Framework, the recently published *ProPG: Planning and Noise*¹ for new residential developments and with reference made to the relevant guidance set out in BS8233: 2014 *Guidance on sound insulation and noise reduction for buildings*.

This report presents the results of the Stage 1 Risk Assessment which will be used to inform the requirement for a subsequent Stage 2 Acoustic Design Statement.

2.0 SITE DESCRIPTION

The greenfield site is bounded by Orchard Business Park to the north, Church Lane Nursery to the East, existing residential properties on Church Lane to the south, and North End Road to the west.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Procedure and Equipment

A survey of the existing background noise levels was undertaken at the location shown in Figure AS10284/PPG01. Measurements of consecutive 5-minute L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} sound pressure levels were taken between 14:20 hours on Friday 16th March and 14:00 hours on Tuesday 20th March 2018.

Short term manual measurements were also undertaken on Friday 16th March 2018 in order to assess the noise from Orchard Business Park in accordance with BS4142:2014 *Methods for rating and assessing industrial and commercial sound*. Further manual measurements were undertaken at the western site boundary, at the same distance from the road as measurement Position 1, to verify that noise levels were consistent at both positions.

Measurements were witnessed on Friday 16th March by Fiona Fitzgerald of Arun District Council.

¹ <http://ica.org.uk/publications/propg>

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

- Rion data logging sound level meter type NA28;
- NTi data logging sound level meter type XL2;
- Rion sound level calibrator type NC74.

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

The weather during the survey was mainly dry with light winds, which made the conditions suitable for the measurement of environmental noise. There were some snow showers on Saturday evening and Sunday morning, however this has not been deemed to have a significant effect on the noise environment over the measurement period but has been omitted from the data analysis.

Measurements were made following procedures in BS 7445:1991 (ISO1996-2:1987) *Description and measurement of environmental noise Part 2- Acquisition of data pertinent to land use*.

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

3.2 Results

Figures AS10284/TH1-TH8 show the L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} sound pressure levels as time histories at the measurement positions.

The site is affected mainly by road traffic noise using North End Road with sporadic industrial noise from Orchard Business Park. The average noise levels for the 'Daytime' and 'Night-time' periods are shown in Table 3.1, as well as the typical L_{AFmax} , defined as the 10th percentile of the night-time L_{AFmax} dataset.

Daytime L_{Aeq} , 16 hour	Night-time, L_{Aeq} , 8 hour	Typical Night-time, L_{AFmax}
Position 1: 63dB Position 2: 50dB	Position 1: 55dB Position 2: 42dB	Position 1: 76dB Position 2: 63dB

Table 3.1 Daytime and night-time average; and typical night-time maximum noise levels [dB ref. 20µPa]

4.0 CONCLUSION

This Stage 1 Risk Assessment has identified the development area as a low to medium risk area in terms of noise impact. The Pro PG guidance recommends that a Stage 2 Acoustic Design

Statement be prepared to consider the noise impact of the site in detail and to address the requirement for any outline mitigation measures as appropriate for the proposed residential development.

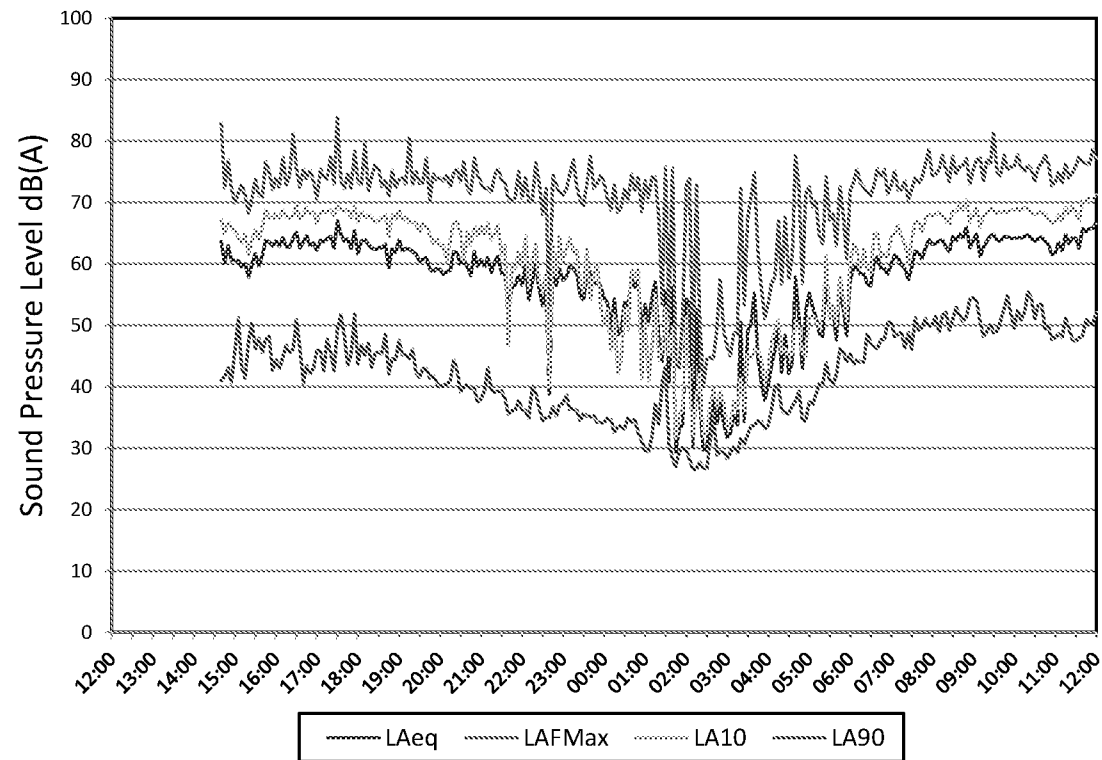


Daniel Saunders MIOA

CLARKE SAUNDERS ASSOCIATES

Land to the West of Church Lane Nursery, Yapton

Environmental Noise Time History: 1

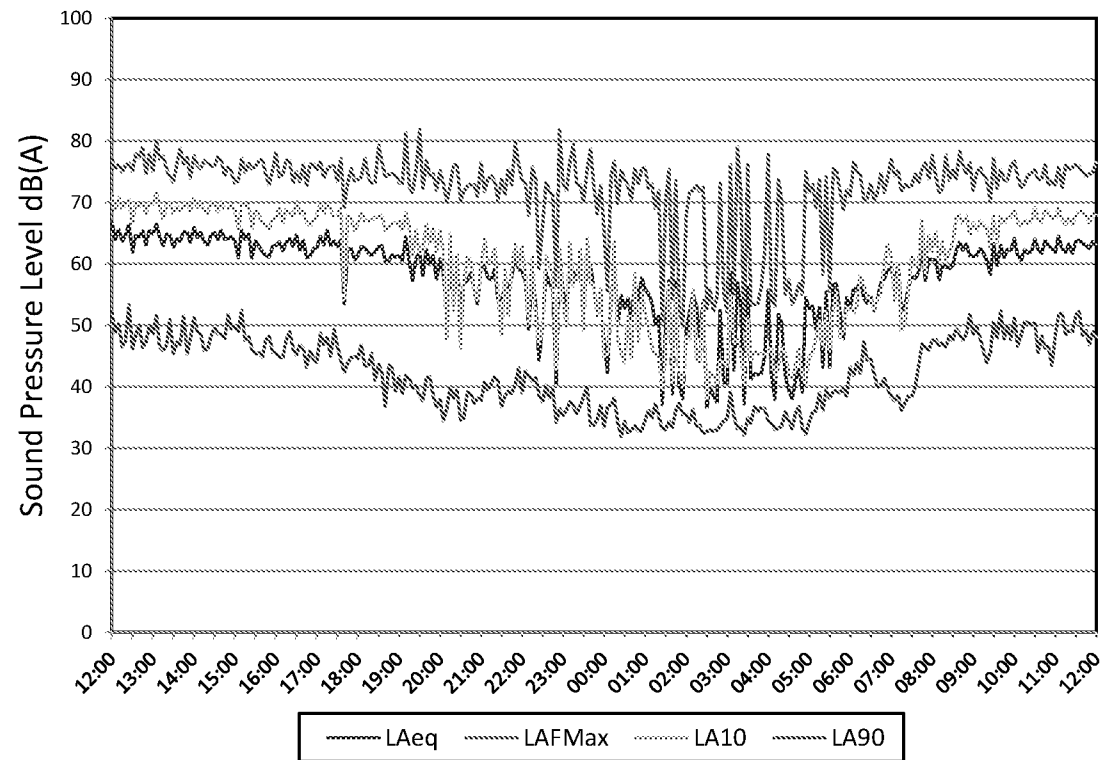


Friday 16 March to Saturday 17 March 2018

Figure AS10284/TH1

Land to the West of Church Lane Nursery, Yapton

Environmental Noise Time History: 1

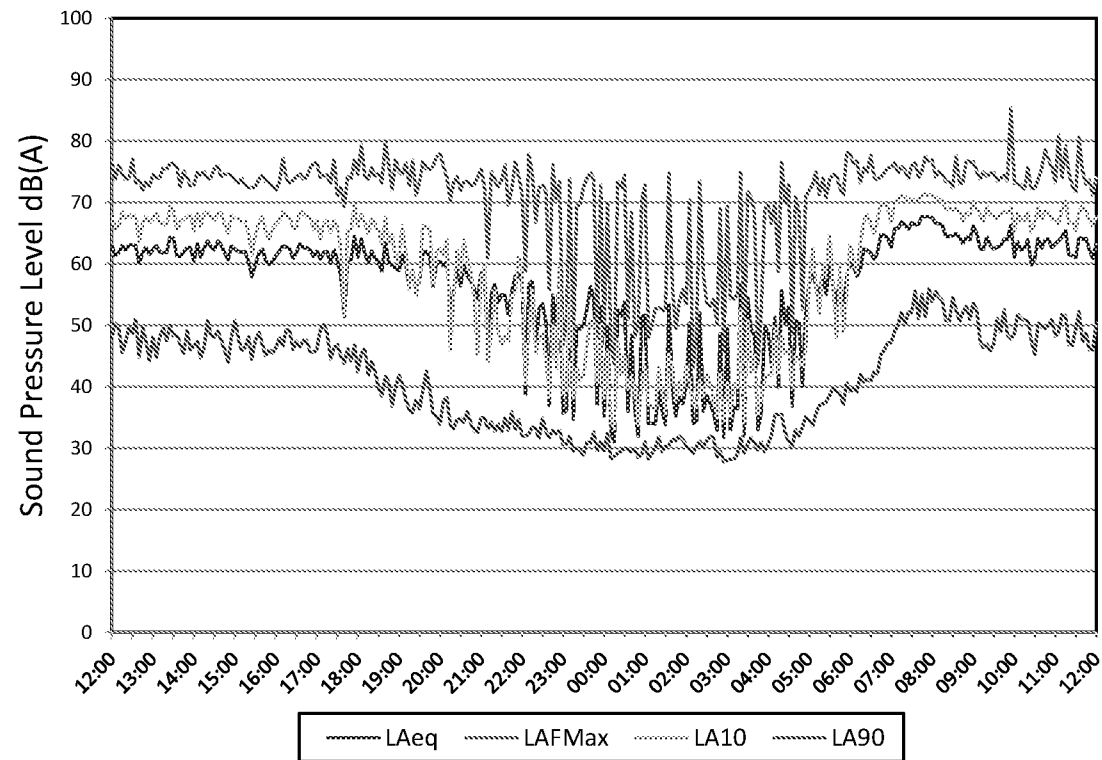


Saturday 17 March to Sunday 18 March 2018

Figure AS10284/TH2

Land to the West of Church Lane Nursery, Yapton

Environmental Noise Time History: 1

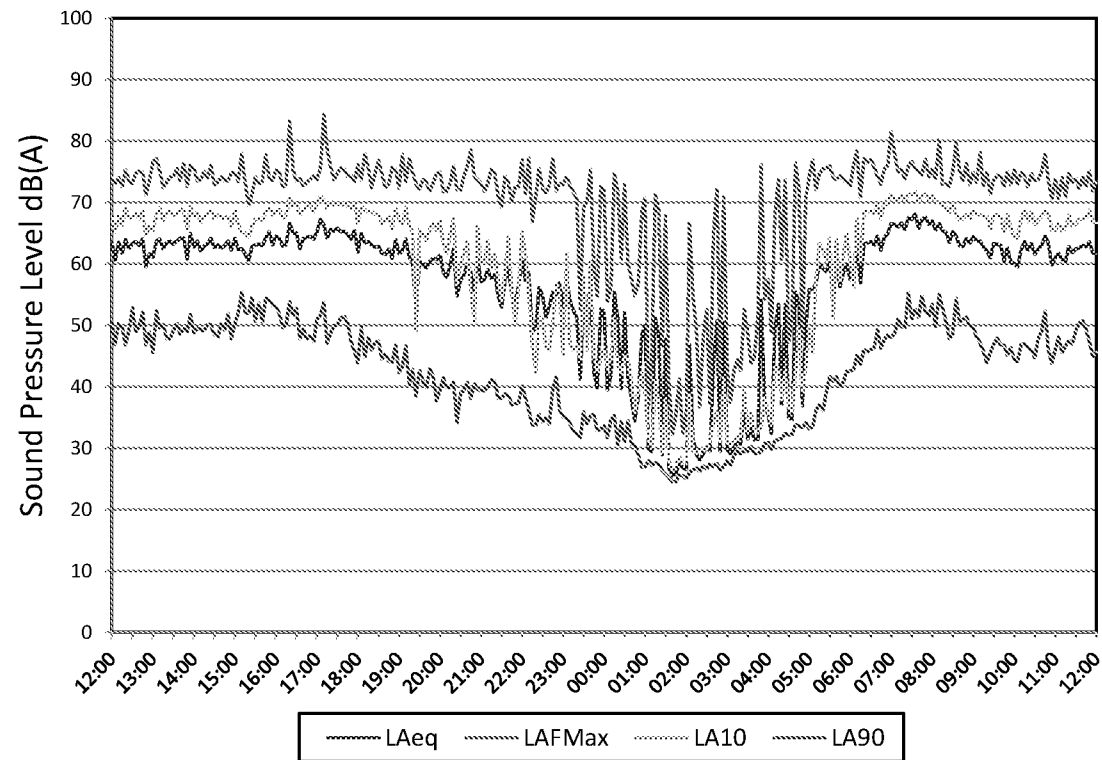


Sunday 18 March to Monday 19 March 2018

Figure AS10284/TH3

Land to the West of Church Lane Nursery, Yapton

Environmental Noise Time History: 1

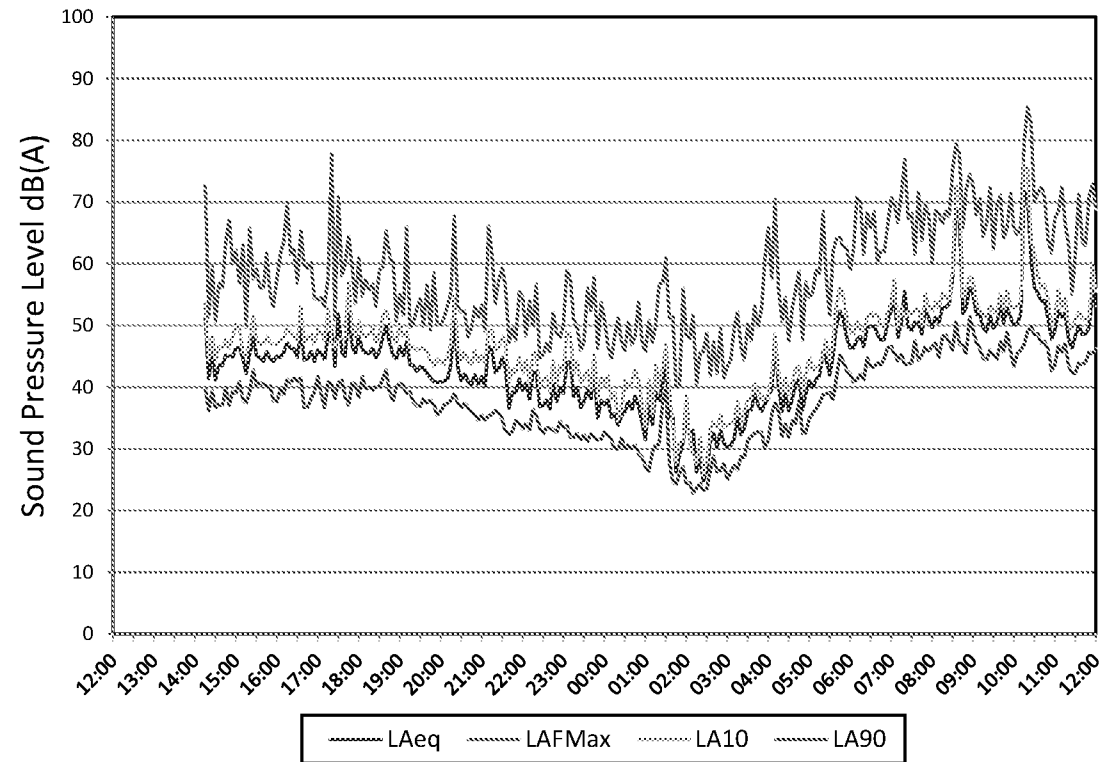


Monday 19 March to Tuesday 20 March 2018

Figure AS10284/TH4

Land to the West of Church Lane Nursery, Yapton

Environmental Noise Time History: 2

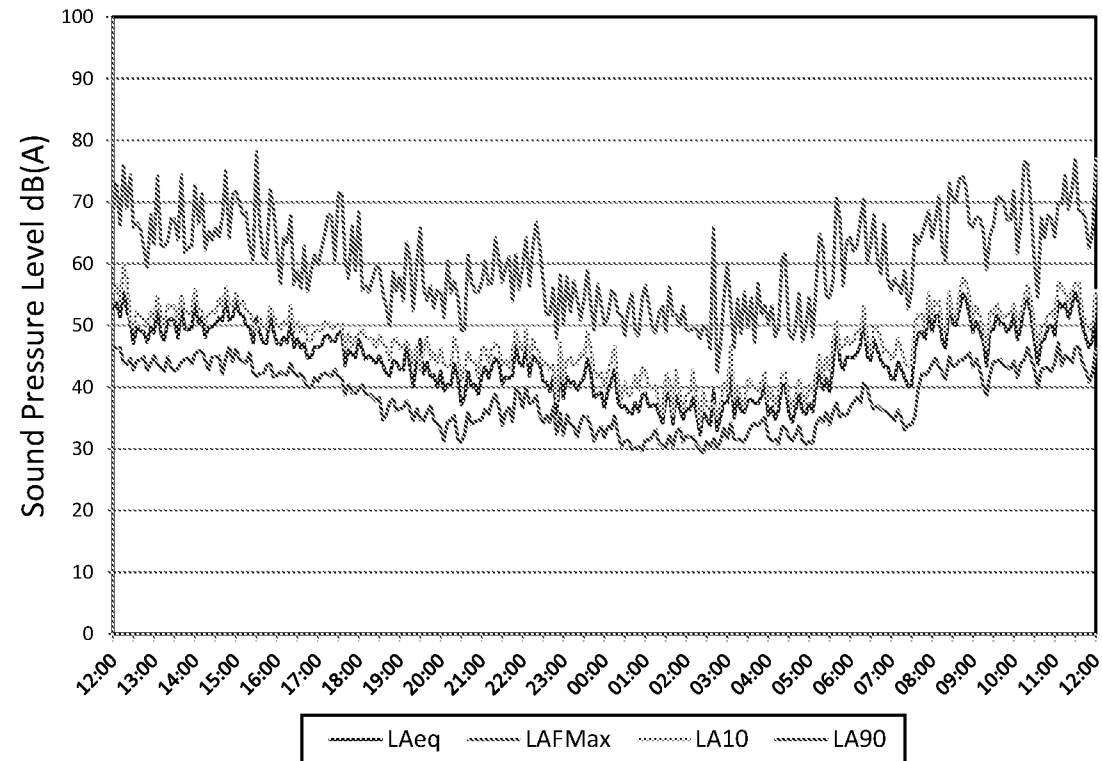


Friday 16 March to Saturday 17 March 2018

Figure AS10284/TH5

Land to the West of Church Lane Nursery, Yapton

Environmental Noise Time History: 2

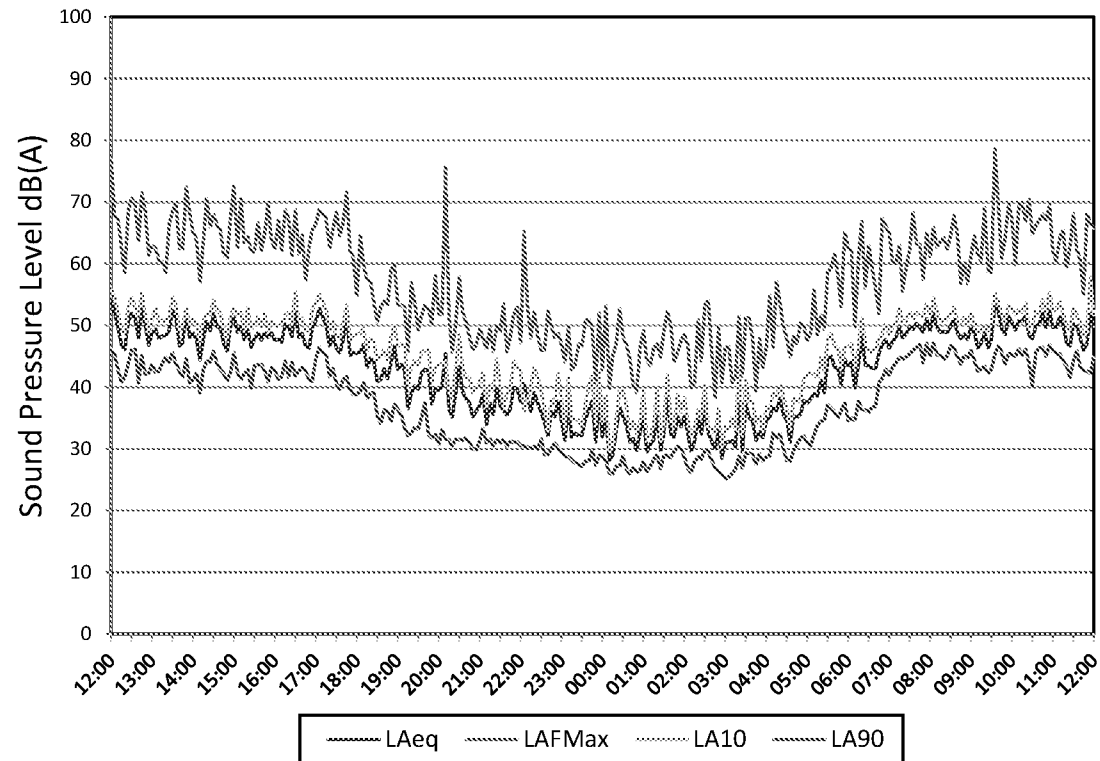


Saturday 17 March to Sunday 18 March 2018

Figure AS10284/TH6

Land to the West of Church Lane Nursery, Yapton

Environmental Noise Time History: 2

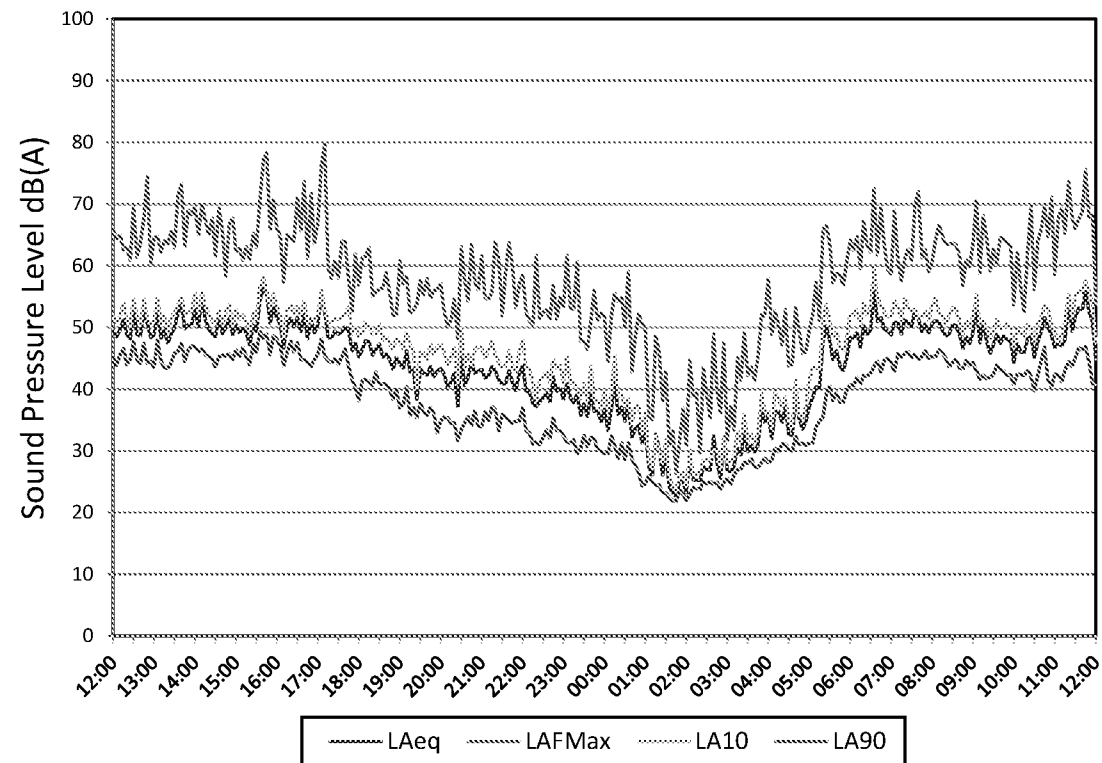


Sunday 18 March to Monday 19 March 2018

Figure AS10284/TH7

Land to the West of Church Lane Nursery, Yapton

Environmental Noise Time History: 2



Monday 19 March to Tuesday 20 March 2018

Figure AS10284/TH8

ACOUSTIC TERMINOLOGY & HUMAN RESPONSE TO BROADBAND NOISE

1.1 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.
L_{10} & L_{90}:	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 L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the average minimum level and is often used to describe the background noise. It is common practice to use the L_{10} 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.

ACOUSTIC TERMINOLOGY & HUMAN RESPONSE TO BROADBAND NOISE

1.2 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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1.3 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

1.4 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.