

59-61 West Street Havant

ENVIRONMENTAL NOISE SURVEY AND NOISE IMPACT ASSESSMENT REPORT 18791/ENIA1

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1.0 INTRODUCTION

A new residential development is proposed at 59-61 West Street, Havant. The site is subject to noise from the surrounding roads, and from commercial and industrial premises to the South. Hann Tucker Associates have therefore been commissioned to undertake a detailed environmental noise survey to determine the currently prevailing noise climate at the site; the results of the survey have been used to assess the site's suitability for residential development.

This report presents the methodology and findings of our noise survey and assessment.

2.0 OBJECTIVES

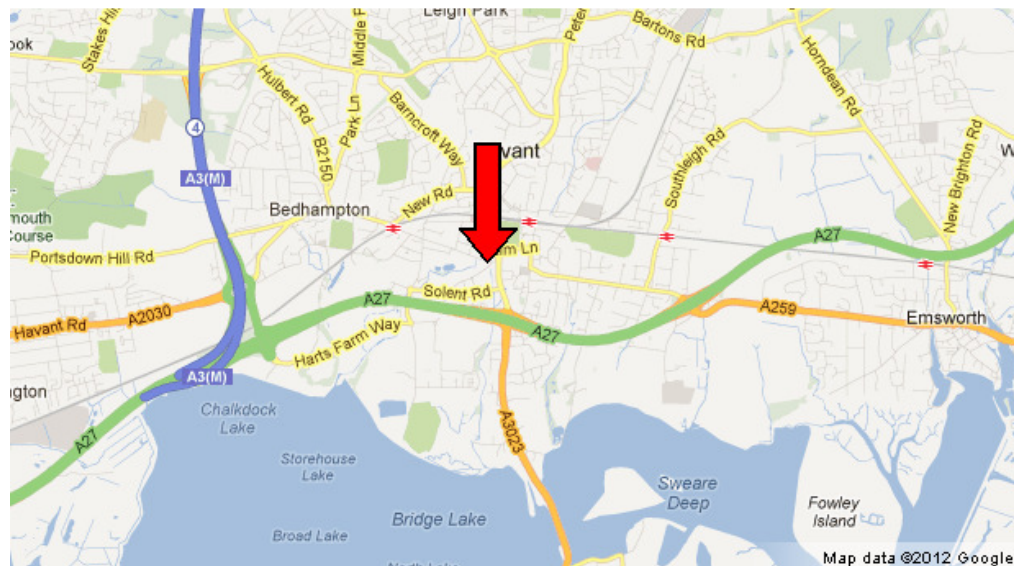
To establish, by means of fully automated environmental noise monitoring, the existing A-weighted (dBA) L_{10} , L_{90} , L_{eq} and L_{max} environmental noise levels at selected accessible positions around the site.

Based on the results of the noise survey, to determine the suitability of the site for residential development, based on the guidance contained in the National Planning Policy Framework.

3.0 SITE DESCRIPTION

3.1 Location

The site is located at 59-61 West Street, Havant and falls within Havant Borough Council's jurisdiction. See Location Map below.



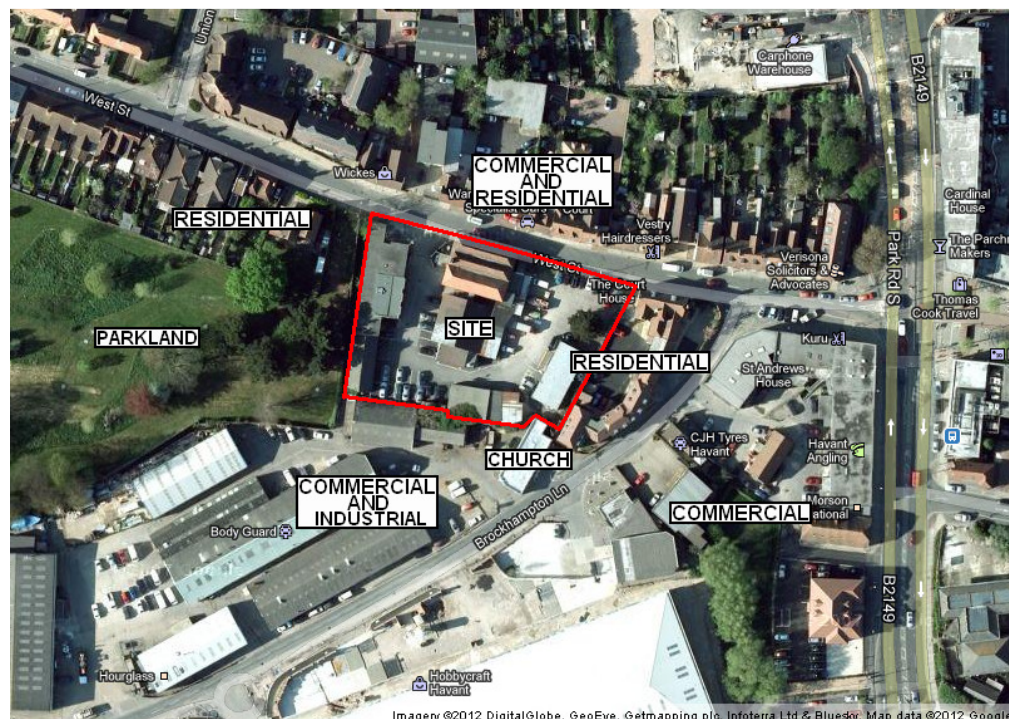
Location Map (maps.google.co.uk)

3.2 Description

The site is bounded by West Street to the North, residential buildings and parkland to the West, residential buildings to the East, commercial and industrial properties to the South, and a church to the South East. The areas to the North, West and East are generally residential and commercial in nature; the area to the South is mostly commercial use. All buildings in the local area are between one and three storeys in height.

The site currently consists of a number of disused buildings and sheds of between one and two storeys in height.

The main sources of noise incident on the site are considered to be traffic on the surrounding roads, and the commercial and industrial premises to the South. See Site Plan below.



Site Plan (maps.google.co.uk)

4.0 ACOUSTIC TERMINOLOGY

For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.

5.0 METHODOLOGY

5.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 14:30 hours on Tuesday 11 December 2012 to 14:45 hours on Friday 14 December 2012.

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately comment on the weather conditions throughout the entire survey period.

However at the beginning of the survey period the wind conditions were light and the sky was generally patchy cloud. At the end of the survey period the wind conditions were light and the sky was generally overcast. We understand that generally throughout the survey period the weather conditions were overcast and dry with some rain towards the end of the survey.

Measurements were taken continuously of the A-weighted (dBA) L_{10} , L_{90} , L_{eq} and L_{max} sound pressure levels over 15 minute periods.

5.2 Measurement Positions

The noise level measurements were undertaken at 2No. positions around the development site. The measurement positions are described in the table below.

Position No	Description
1	The meter was located at second storey level on the East façade of one of the existing buildings in the North of the site, overlooking West Street. The microphone was protruding out from a window at a height of approximately 5m above ground level. The microphone was not considered to be in free field conditions. The main source of noise was considered to be traffic on the surrounding roads.
2	The meter was located at second storey level on top of an outbuilding to the South West of site on the boundary with the commercial and industrial sites. The microphone was fixed to a railing at a height of approximately 3m above ground level. The microphone was not considered to be in free field conditions. The main source of noise was considered to be traffic on the surrounding roads, with intermittent noise noted from the commercial and industrial sites.

The positions were chosen in order to determine the typical noise levels at the development site for use in assessing it's suitability for residential development. The positions are shown on the plan below.



Plan Showing Unmanned Measurement Positions (maps.google.co.uk)

5.2 Instrumentation

The instrumentation used during the survey is presented in the Table below:

Description	Manufacturer	Type	Serial Number	Last Calibrated
Position 1 Type 1 Data Logging Sound Level Meter	Larson Davis	824	3155	LD calibration on 12/11/2012
Position 2 Type 1 Data Logging Sound Level Meter	Larson Davis	824	3695	LD calibration on 22/10/2012
Type 1 Calibrator	Larson Davis	CAL200	3082	02/03/2012

Each sound level meter, including extension cable, was calibrated prior to and on completion of the surveys. No significant changes were found to have occurred (no more than 0.1 dB).

Each sound level meter was located in an environmental case with the microphone connected to the sound level meter via an extension cable. Each microphone was fitted with a Larson Davis windshield.

6.0 RESULTS

The results have been plotted on Time History Graphs 18791/TH1.1 to 18791/TH1.4 enclosed presenting the 15 minute A-weighted (dBA) L_{10} , L_{90} , L_{eq} and L_{max} levels at each measurement position throughout the duration of the survey.

7.0 DISCUSSION OF NOISE CLIMATE

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately describe the dominant noise sources, or specific noise events throughout the entire survey period. However at the beginning and end of the survey period the dominant noise sources were noted to be the surrounding roads.

Noise levels at both positions were significantly louder on the last day of the survey than previously. This may be due to the rainfall that we understand occurred early that day; road noise is generally higher when the surface is wet than when it is dry.

L_{Aeq} noise levels at both positions were generally highest during morning and evening rush hours, indicating the road traffic was the dominant noise source. Levels at each position generally follow the same trend with Position 1 being highest, suggesting the roads to the North and West were more dominant.

L_{Amax} noise levels at Position 1 were generally around 80dB throughout the survey, occasionally falling to around 60dB during night time. L_{Amax} noise levels at Position 2 are lower, generally between 60dB and 70dB; only rarely did levels exceed 75dB. It is likely these rare exceedances were due to industrial premises to the South, given their proximity to the measurement position.

8.0 ENVIRONMENTAL NOISE IMPACT ASSESSMENT

The National Planning Policy Framework states that Local Authorities should ensure that new developments should not be put at unacceptable levels of risk from or be adversely affected by unacceptable levels of noise.

Havant Borough Council's Adopted Core Strategy references PPG24 : Planning and Noise which "sets out how the planning system can minimise the adverse effects of noise without being unduly restrictive".

8.1 PPG24 Planning Policy Guidance

Annex 1 of PPG24 states the following:

Noise Exposure Categories for Dwellings

When assessing a proposal for residential development near a source of noise, local planning authorities should determine into which of the four noise exposure categories (NECs) the proposed site falls, taking account of both day and night-time noise levels. Local planning authorities should then take into account the advice in the appropriate NEC, as below:

NEC	
A	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level.
B	Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.
C	Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.
D	Planning permission should normally be refused.

Recommended Noise Exposure Categories for New Dwellings Near Existing Noise Sources

Noise Levels Corresponding to the Noise Exposure Categories for New Dwellings $L_{Aeq,T}$ dB				
Noise Source	Noise Exposure Category			
	A	B	C	D
Road Traffic 07.00 – 23.00 23.00 – 07.00	<55 <45	55 - 63 45 - 57	63 - 72 57 - 66	>72 >66
Rail Traffic 0700 – 2300 2300 – 0700	<55 <45	55 - 66 45 - 59	66 - 74 59 - 66	>74 >66
Mixed Sources 0700 – 2300 2300 – 0700	<55 <45	55-63 45-57	63-72 57-66	>72 >66

In addition to the above, PPG 24 also states that during the night (23:00 - 07:00 hrs):

“Sites where individual noise events regularly exceed 82dB L_{Amax} several times in any hour should be treated as being in NEC C, regardless of the $L_{Aeq(8-hour)}$ (except where the $L_{Aeq(8-hour)}$ already puts the site into NEC D).”

8.1.1 L_{eq} Noise Levels

In order to compare the results of our survey with the guidelines stated within PPG24, it is necessary to convert the measured $L_{Aeq(15\text{ minute})}$ noise levels into single figure daytime $L_{Aeq(16-hour)}$ (07:00-23:00 hours) and night-time $L_{Aeq(8-hour)}$ (23:00-07:00 hours) levels. PPG24 states that where data exists for more than one day, the $L_{Aeq(16\text{ hours})}$ or $L_{Aeq(8\text{ hour})}$ for each day should be arithmetically averaged.

The daytime $L_{Aeq(16-hour)}$ and night-time $L_{Aeq(8-hour)}$ noise levels for each position are presented in the Tables below.

Position	Daytime $L_{Aeq(16-hour)}$	Night-Time $L_{Aeq(8-hour)}$
1	63dB	52dB
2	53dB	47dB

N.B. The above levels have been corrected for façade reflections where appropriate, for comparison with the free field levels stated in PPG24.

8.1.2 Night-time L_{max} Levels

The following Table presents the number of L_{max} events which exceeded 82dBA during the night-time period.

Time	No of Events	
	Position 1	Position 2
23:00-00:00	0	0
00:00-01:00	1	0
01:00-02:00	0	0
02:00-03:00	0	0
03:00-04:00	0	0
04:00-05:00	1	0
05:00-06:00	0	0
06:00-07:00	2	0

N.B. The above levels have been corrected for façade reflections where appropriate, for comparison with the free field levels stated in PPG24.

8.1.3 Local Authority Discretion

The table in the previous section contains the recommended range of traffic noise levels for each NEC covering daytime and night-time periods. However, paragraph 9 of the main text of PPG24 states:

The table in Annex 1 contains a recommended range of noise levels for each NEC covering day and night-time periods. However, in some cases it may be appropriate for local planning authorities to determine the range of noise levels which they wish to attribute to any or each of the NECs. For example, where there is a clear need for new residential development in an already noisy area, some or all NECs might be increased by up to 3dBA above the recommended level. In

other cases, a reduction of up to 3dBA may be justified.

8.1.4 Measured NECs

With reference to the above noise exposure categories for road traffic noise sources, the measured noise levels (corrected to free field conditions where appropriate) fall within the following categories for daytime and night-time periods.

Noise Exposure Category		
Position	Daytime	Night-time
1	B/C	B
2	A	B

8.1.5 Predicted NECs

Noise levels incident on the proposed façades will vary depending on their location; some facades will be closer to the noise sources and some will be screened by other buildings.

Taking this into account, we predict the proposed development site falls within the following Noise Exposure Categories for daytime and night-time periods.

Noise Exposure Category		
Location of Façade	Daytime	Night-time
North	C	B
South	A	B
East	B	B
West	A	B

8.1.6 Discussion

With reference to the noise exposure categories for dwellings, as detailed in Section 8.1, when assessing planning application for sites which fall into NEC B, PPG24 advises noise should be taken into account when determining planning applications, and where appropriate, conditions imposed to ensure an adequate level of protection against noise.

When assessing planning applications for sited which fall into NEC C, PPG24 advised planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure an adequate level of protection against noise.

It should be recognised that PPG24 does not reflect the situation that in many areas of the country noise levels and the demand for housing are both high. In our experience many proposed residential sites in urban areas fall into NEC C along at least one boundary. PPG24 unfortunately does not reflect the situation that higher noise levels are expected, and so the guidance is rather conservative.

It is also important to note that PPG24 considers external noise levels. However, given the intensely urban nature of the application site, the internal noise levels should be the overriding consideration in determining suitability for use.

Furthermore purchasers buying a property are able to exercise choice and accept a higher degree of noise, especially if acceptable internal noise levels can be achieved, as discussed in the following section.

For those reasons it is common for planning permission to be granted for sites which partially fall into Noise Exposure Category C.

Paragraph 8 of PPG24 states:

“Categories B and C deal with situations where noise mitigation measures may make development acceptable”.

8.2 Suitable Internal Noise Levels

PPG24 and the previous sections of this report consider the external noise levels. However noise levels within the proposed dwellings should be the overriding consideration.

8.2.1 BS 8233

Section 7.6.1 of BS 8233: 1999 states that reasonable resting and sleeping conditions in living rooms and bedrooms can be achieved by the following target $L_{Aeq,T}$ internal noise levels:

Room Type	$L_{Aeq,T}$	
	Good	Reasonable
Living Room	30dB	40dB
Bedrooms	30dB	35dB

The Standard also states *“For a reasonable standard in bedrooms at night, individual noise events (measure with F time-weighting) should not normally exceed 45dB L_{Amax} .”*

8.2.2 World Health Organisation

The World Health Organisation document on “Guidelines for Community Noise” states the following guideline values for community noise in specific environments.

Specific Environment	Critical Health Effect(s)	L_{Aeq}	$L_{Amax,fast}$
Dwelling, indoors	Speech intelligibility and moderate annoyance	35dB	-
Inside Bedrooms	Sleep disturbance, night-time	30dB	45dB

The document also states *“For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dBA L_{Amax} more than 10-15 times per night, (Vallet & Varnet 1991).”*

The above levels are however the subject of much controversy, as indicated by one of the feature articles in the January/February 2003 edition of the Institute of Acoustics' publication.

In our opinion the above criteria for bedrooms should thus be regarded as preferred, rather than mandatory maxima to be achieved in all cases.

8.2.3 Proposed Criteria

On the basis of the above we would propose the following internal noise levels be adopted as minimum design targets in the worst affected dwellings.

Room Type	Period	Criterion
Living Areas	Daytime (07:00-23:00 hours)	40dB L _{Aeq} , 16hr
Bedrooms	Night-time (23:00-07:00 hours)	35dB L _{Aeq} , 8hr

Additionally, L_{Afmax} noise levels in bedrooms should not exceed 45 dB more than 10-15 times a night.

The above levels correspond to "reasonable", as defined in BS 8233. If these criteria are adopted as minimum standards for worst affected dwellings, the typical levels in typical flats will approach, and in many cases exceed, "good" as defined in BS 8233.

Note: The criteria termed "reasonable" in BS8233: 1999 would generally be considered to be pretty stringent and acceptable. It would in fact be fair to substitute the word "reasonable" for "acceptable". To expect "good" in the worst case dwellings would thus be consistent with BS 8233: 1999. If the worst case was designed to "good" this would lead to "over design" for other dwellings – which could be undesirable for various reasons (including cost and acoustic privacy between dwellings).

If planning permission is granted, planning conditions should be imposed to ensure an adequate level of protection against external noise, and the above criteria would form a reasonable basis for a condition.

8.2.4 Mitigation Measures

Provision exists to provide additional sound insulation as required. The external envelope of the new residences will incorporate suitably specified glazing and ventilation, so as to achieve the BS 8233 criteria summarised above.

At this stage of the design scheme the precise types of window to be used is not known. Nor have selections of acoustic vents been made.

The Local Planning Authority would expect to be provided with details of the sound insulation treatments when available. Therefore in granting consent it would be appropriate for planning condition to be imposed along the following lines, based on example condition 1

drawn from PPG24:

Construction work shall not begin until a scheme for protecting the dwellings against noise from [] has been submitted to and approved by the Local Planning Authority; for each applicable dwelling all works which form part of the scheme for that dwelling shall be completed before the dwelling is occupied.

8.2.5 Achievable Internal Noise Levels

We have predicted the levels that would be achievable in the worst-case dwellings closest to the dominant noise source.

Annex 6 of PPG24 states the following:

“Typical noise reduction of a dwelling façade with windows set in brick/block wall.”

Difference Between External and Internal Noise Levels			
Noise Source	Single Glazing	Thermal Double Glazing	Secondary Glazing
Road Traffic	28dBA	33dBA	34dBA
Civil Aircraft	27dBA	32dBA	35dBA
Military Aircraft	29dBA	35dBA	39dBA
Diesel Train	28dBA	32dBA	35dBA
Electric Train	30dBA	36dBA	41dBA

Note: The values in the above Table are the difference between dBA levels measured outside and inside typical dwellings, therefore 3dBA should be added to free field noise levels to determine outside levels.

A simple assessment based on the above, and the noise levels measured during our survey, indicates the following noise levels may be expected within the proposed worst case dwellings with thermal double glazing.

Location of Facade	Daytime $L_{Aeq}(16\text{-hour})$ dBA	Night-time $L_{Aeq}(8\text{-hour})$
North	33 dBA	22 dBA
South	23 dBA	17 dBA

In addition, $L_{A_{fmax}}$ noise levels in bedroom should not exceed 45 dB more than 10-15 times per night.

These predicted worst case internal noise levels meet the proposed criteria. It is thus demonstrated that acceptable internal noise levels are achievable.

8.3 Nearby Commercial and Industrial Premises

We understand that Havant Borough Council have raised concerns regarding the impact on any potential residential development of noise from the commercial and industrial units to the South of the site. Whilst PPG24 is primarily focussed on noise levels from traffic sources, it provides a good indication of potential disturbance from other sources. Noise levels recorded during our survey indicate that the Southern boundary of site, where the commercial and industrial premises are located, falls into NEC A during daytime; PPG24 states that for Category A noise need not be taken into account when considering planning applications.

The survey data indicates that external $L_{Amax,15mins}$ levels at the boundary with the industrial premises to the South are generally between 60dB and 65dB and rarely exceed 70dB. It can be seen from Section 8.2 above that predicted internal daytime and night time L_{Aeq} noise levels are well below the proposed criteria. All of the above is a positive indication that the commercial and industrial premises will not be a substantial nuisance to future residents of the proposed development.

9.0 CONCLUSIONS

A detailed environmental noise survey has been undertaken in order to establish the currently prevailing environmental noise climate around the site. From the measured environmental noise levels an assessment has been undertaken to determine the suitability of the site for residential development based on the guidance contained in the National Planning Policy Framework.

The noise exposure categories of the site have been determined as per PPG24 and worst case internal noise levels have been specified as per BS8233:1999.

The worst case facades fall into Noise Exposure Category C. the remainder of the facades fall into Noise Exposure Category B or A. With reference to the noise exposure categories for dwellings, noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.

Appropriate internal noise criteria are achievable using conventional constructions.

Noise from the commercial and industrial premises to the South should not cause substantial nuisance to future residents of the proposed development.



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Appendix A

The acoustic terms used in this report are explained below:

dB : Decibel - Used as a measurement of sound pressure level. It is the logarithmic ratio of the noise being assessed to a standard reference level.

dBA : 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 dBA level.

Because of being a logarithmic scale noise levels in dBA do not have a linear relationship to each other. For similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA is just perceptible.

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.

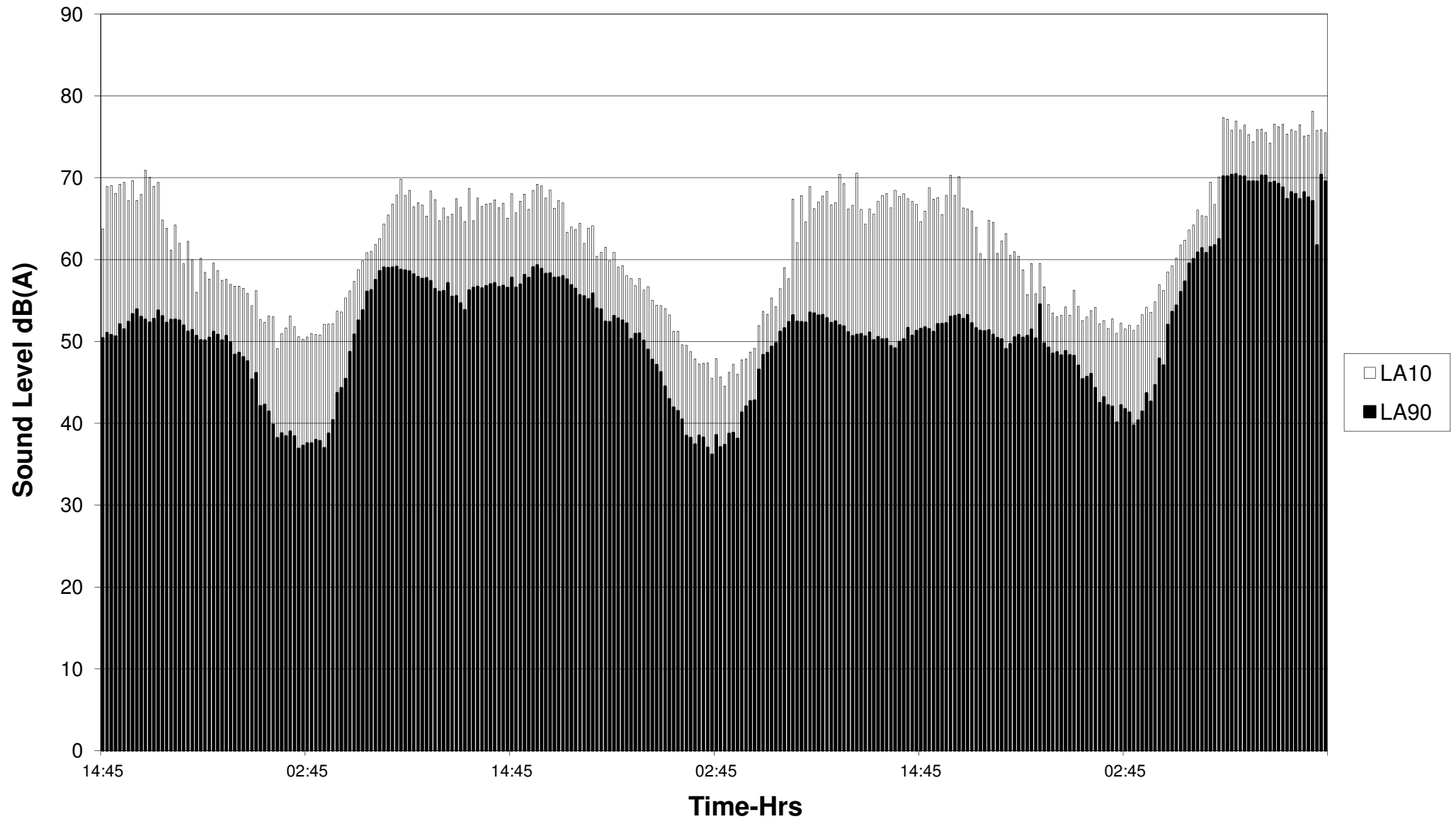
L_{eq} : The concept of L_{eq} (equivalent continuous sound level) has up to recently been primarily used in assessing noise in industry but seems now to be finding use in defining many other types of noise, such as aircraft noise, environmental noise and construction noise.

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. 1 hour).

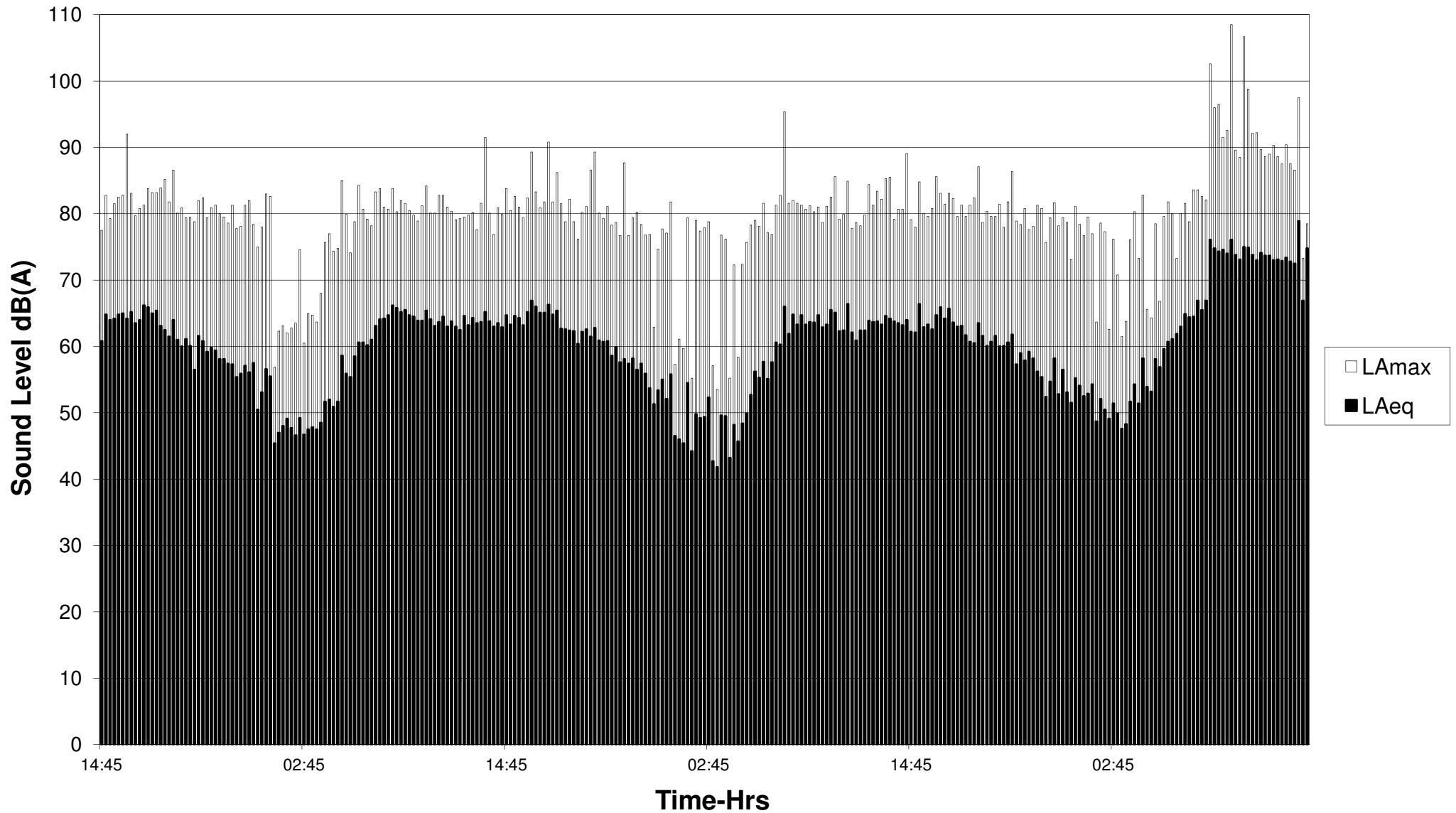
The use of digital technology in sound level meters now makes the measurement of L_{eq} very straightforward.

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.

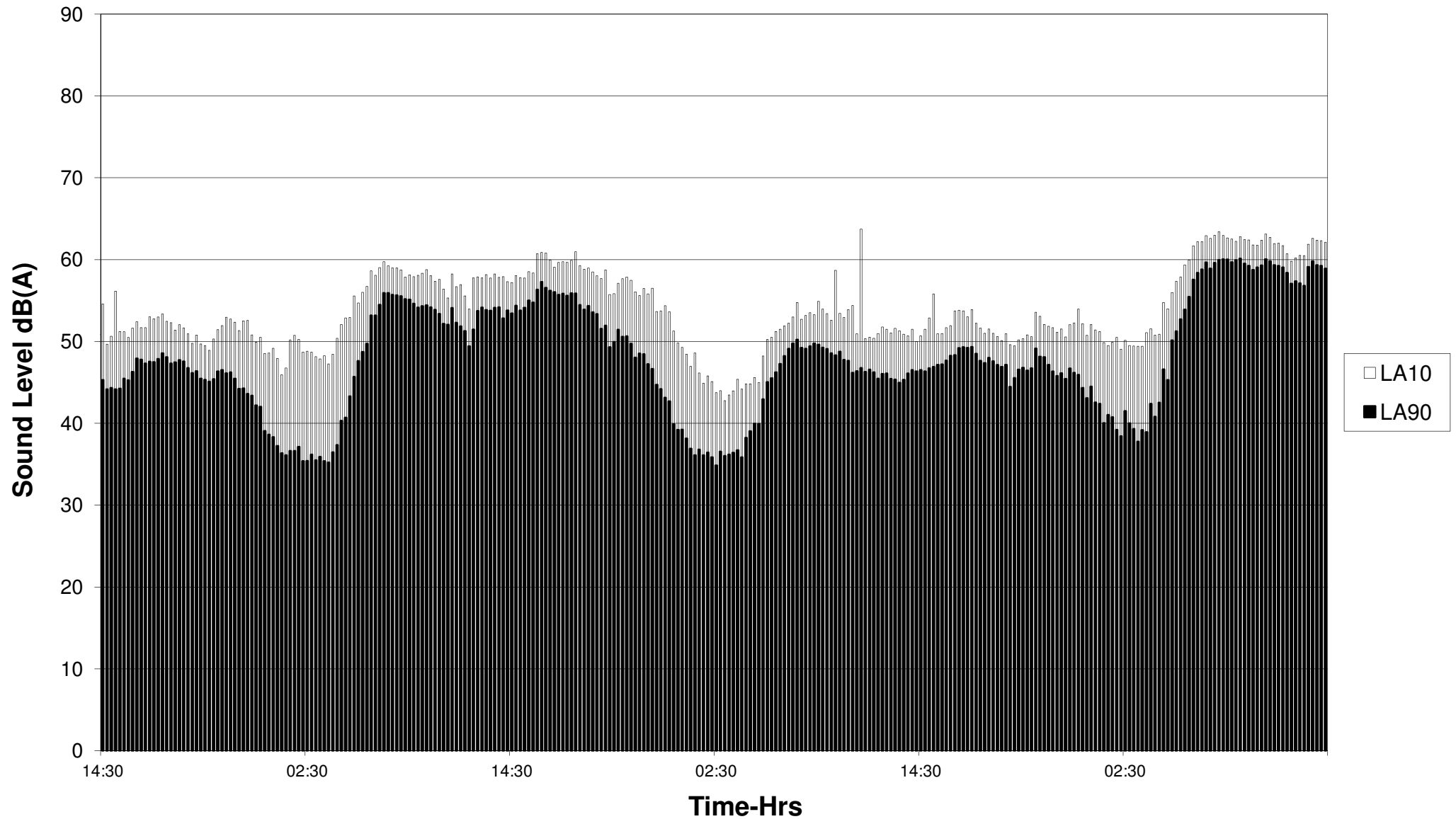
West Street, Havant
Position 1
L_{A10} and L_{A90} Noise Levels
Tuesday 11/12/2012 - Friday 14/12/2012



West Street, Havant
Position 1
 L_{Aeq} and L_{Amax} Noise Levels
Tuesday 11/12/2012 - Friday 14/12/2012



West Street, Havant
Position 2
L_{A10} and L_{A90} Noise Levels
Tuesday 11/12/2012 - Friday 14/12/2012



West Street, Havant
Position 2
 L_{Aeq} and L_{Amax} Noise Levels
Tuesday 11/12/2012 - Friday 14/12/2012

