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REPORT AS4884.100804.NIA

**SCRATCHFACE LANE
HAVANT**

PPG24 ASSESSMENT REPORT

Prepared: 4th August 2010

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AS4884/SP1	Indicative Site Plan
AS4884/TH1-TH7	Environmental Noise Time Histories
AS4884/NC1	Noise Contour Map (Daytime)
AS4884/NEC	PPG24 Noise Exposure Categories
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1. INTRODUCTION

It is proposed to redevelop the site at Scratchface Lane, Bedhampton, Havant for residential use.

Alan Saunders Associates have previously surveyed the daytime noise climate at this site and established the majority to fall within NEC B as defined in PPG24, with areas closest to the A3(M) entering NEC C.

Alan Saunders Associates has been commissioned by Crayfern Homes Limited to undertake a further environmental noise survey in order to measure the prevailing background noise climate to which the site is currently exposed in line with specific requests from Havant Borough Council.

This assessment will also consider the requirement for any outline mitigation measures as appropriate for residential development.

2. DESCRIPTION OF SITE

The land is currently scrub land bounded by Scratchface Lane to the north, existing residential properties to the east, Portsdown Hill Road to the south and the A3(M) motorway to the west.

3. SURVEY PROCEDURE & EQUIPMENT

3.1 Traffic Noise Survey

An environmental noise survey has been undertaken in general accordance with the requirements of PPG24 and Havant Borough Council's request for additional night-time data, specifically at 1st floor window height.

Noise levels were measured at two fixed locations on the site over consecutive 15-minute periods between 12:00 hours on Friday 15th January and 12:00 hours on Tuesday 19th September 2009.

The fixed monitoring positions used for continuous measurements are indicated on the attached site plan AS4884/SPI. Microphones were located at 1.5m above local ground height as per the PPG24 assessment requirement. These positions were located at the proposed building line of the most affected properties at the north and southern ends of the site.

Additional manual measurements were undertaken at a height of 4m at the two fixed monitoring positions in order to simulate 1st floor window height, as requested for additional information by Havant Borough Council.

The following equipment was used for the survey:

- 1 no. Norsonic sound level meter type 116
- 1 no. Norsonic sound level meters type 118
- 1 no. Rion sound level meters type NA28

The calibration of the equipment was verified before and after use. No calibration drift was observed.

The weather during the survey was generally dry with wind speeds within acceptable parameters, with the exception of the evening of Saturday 16th January when heavy rain was prevalent. These measurements have been excluded from any assessment of the noise climate.

Descriptions and explanations of the acoustic parameters used in this report are shown in Appendix A.

3.2 Noise Contour Modelling

A contour map of the $L_{Aeq,16hour}$ noise levels due to road traffic has previously been calculated for daytime periods based on published traffic flow data and site topography.

A topographical survey of the site, undertaken by Crayfern Homes, has been used for the input data for the model.

The source data used to generate these maps is derived from manual and automated monitoring traffic noise data collected during our site visit in September 2009 and traffic flow data on the A3(M) from Department for Transport.

The table below shows the supplementary A3(M) traffic flow data incorporated into the model from a traffic count point to the south of the proposed residential site.

Road (Count Point)	Annual Average Daily Flow (AADF: 24-hour)	Percentage of Heavy Vehicles
A3(M) [73577]	83968	3.0%

Table 1 - AADF traffic flow data for A3(M) near to proposed residential site (Source: DfT)

The noise contour map has been prepared using the noise mapping software package Cadna A by Datakustic GmbH which calculates road noise propagation in accordance with Calculation Of Road Traffic Noise (CRTN): 1988 [DoT – Welsh Office. HMSO].

Neutral meteorological conditions have been assumed in the calculations. As the site immediately adjoins the road noise source, the model will be relatively insensitive to different meteorological conditions.

Traffic noise levels due to smaller roads have not been included in production of the noise contour maps since the noise climate is entirely dominated by the A3(M) motorway.

The noise map was calibrated to the measurement data from September 2009 by varying the traffic flow (i.e. the number of vehicles) and the average speed at which the traffic travels.

4. RESULTS

4.1 Environmental Noise Survey - January 2010

The results from the continuous monitoring positions at the site are shown as time histories of the L_{Aeq} , L_{Amax} , L_{A10} and L_{A90} over 15-minute sample periods in Figures AS4884/TH1-TH4 (Position 1 – North) and AS4884/TH5-TH7 (Position 2 – South).

Simultaneous measurements were undertaken at a height of 4m at each of the monitoring positions. At the monitoring locations, when compared to the 1.5m monitor, noise levels were approximately 2dB higher at first floor level at the north end of the site and 1dB higher at the south end of the site.

4.2 Noise Contour Map – September 2009

The results of the noise contour plot are shown in Figure AS4884/NC1 for daytime $L_{Aeq, 16\text{ hour}}$. The noise contour plot has been calculated at 1.5m above local ground height in accordance with the requirements of PPG24 and with a grid spacing of 2m.

5. SUITABILITY OF THE SITE FOR RESIDENTIAL DEVELOPMENT

The noise climate on the site is determined by road traffic noise from the A3(M) motorway to the west.

5.1 Planning Policy Guidance PPG24: Planning & Noise

In order to assess the suitability of the site for residential development, reference to current guidance documents is appropriate. The document Planning Policy Guidance PPG24 'Planning & Noise: September 1994', gives guidance to local authorities in England on the use of their planning powers to minimise the impact of noise.

PPG24 introduces in paragraph 8 the concept of Noise Exposure Categories (NEC) from A to D, to assist planning authorities in the consideration of applications for residential development near transport noise sources. Category A represents the circumstance in which noise is unlikely to be a determining factor, whilst Category D relates to a situation in which development should normally be refused.

The document also introduces a definition of night and day:

- Daytime 07:00 – 23:00 hours
- Night-time 23:00 – 07:00 hours

PPG24 uses the L_{Aeq} value for the above periods to assess the potential impact of noise on any developments.

5.2 Noise Assessment

The average measured noise levels at each position ($L_{Aeq,T}$) are shown in Table 2.

Monitoring Position	Daytime $L_{Aeq, 16hrs}$	Night-time $L_{Aeq, 8hrs}$
Position 1 (North)	65	56
Position 2 (South)	64	56

Table 2 - Average daytime and night-time sound pressure levels (dB ref. 20 μ Pa)

PPG24 uses the $L_{Aeq,T}$ value for the above periods to assess the potential impact of noise on residential developments.

AS4884/NEC shows the noise exposure categories of PPG24 and their significance with regard to noise exposure.

These measurements and the attached daytime noise map AS4884/NCI indicate that the site is generally in NEC B. There are some small strips of land at the western boundary adjacent to the A3(M) which lie within NEC C.

The results of the automated noise monitoring show noise levels being slightly higher at the two fixed positions than those predicted by the noise model. The variation at the southern position is very small (approx. 1dB) and within the range of accepted repeatability for different days of the week. Whereas the model underestimates noise levels at the northern position by slightly more (approx. 2dB). It is most likely that this difference is due to inconsistencies in the actual height of the bund on the boundary between the site and the motorway.

For sites within NEC B, PPG24 states that

'Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.'

For sites within NEC C, PPG24 states that

'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.'

It should be noted that, in urban areas, development sites generally fall into NEC B or NEC C, (and sometimes NEC D), and mitigation measures are frequently incorporated within building design to provide appropriate internal acoustic conditions.

5.3 Predicted impact from Hindhead Tunnel

Data has been sourced from the Department of Transport regarding the predicted 2012 AADF (24-hour) traffic flows with and without vehicles following the opening of the Hindhead Tunnel. The nearest predictions to the site are for the A3(M) at Petersfield where the AADF is predicted to be 38000 vehicles without the tunnel and 40000 vehicles with the opening of the tunnel. This represents a 5% increase in traffic flows, equivalent to a 0.2dB increase in noise level when calculated in accordance with the methodology detailed in CRTN. This would be insignificant in terms of additional noise impact on the proposed residential site. Furthermore, this increase in the number of vehicles is likely to

represent a smaller percentage on the traffic flows at the site which as noted in Table 1, above, are currently more than double those predicted at the A3(M) Petersfield count point.

5.4 BS8233:1999 'Sound insulation and noise reduction for buildings'

The guidance in this document indicates 'good' and 'reasonable' noise levels for various activities within residential and commercial buildings. The relevant sections of this standard are shown in the following table together with the requirements of Havant Borough Council for internal noise levels.

Criterion	Typical Situations	Design range $L_{Aeq,T}$ dB		Havant BC requirements
		Good	Reasonable	
Reasonable resting/sleeping conditions	Living Rooms	30	40	$L_{Aeq,16hour}$ 38 dB
	Bedrooms	30	35	$L_{Aeq,8hour}$ 30 dB

Table 3 - Excerpt from BS8233: 1999

(dB ref. 20 μ Pa)

Residential development would, therefore, be designed and all elements of the building envelopes specified to ensure that acceptable internal noise levels as shown in Table 3 are achieved, whilst taking into account all current and future permanent noise sources.

6. MITIGATION MEASURES

As noted above, the proposed residential site falls into NEC B and NEC C. The noise contour map provides a useful tool in the development of the design to assist with layout of residential buildings and to demonstrate the benefit of mitigation measures such as boundary screening and earth bunds.

A proposed housing layout on the site has been configured to provide the most practical screening arrangement from the A3(M), thus minimising the extent of the mitigation measures required. Proposed houses have been largely restricted to areas of the site in NEC B. Protection against noise in external amenity spaces has also been considered.

As noted previously, the earth bund at the boundary of the site with the A3(M) has some variation in height which generates a level of uncertainty in the level of screening the site is offered from traffic noise. Some landscaping of the bund area to provide a consistent, and higher, level of screening would be recommended in order to optimise the level of protection from motorway noise.

It is anticipated that in most cases a well sealed proprietary thermal double glazed unit *would provide sufficient attenuation* for satisfactory internal noise levels to be achieved. In some areas which are exposed to marginally higher levels of noise, an acoustically specified thermal double glazed unit may be required in order to achieve the necessary internal noise criteria.

Calculations of the necessary attenuation required should be undertaken once the layout, façade design and internal room layouts have been finalised.

Allowance should be made for an alternative means of background ventilation which may be required such that windows may remain closed, other than when 'purge' ventilation is required.

7. CONCLUSIONS

An environmental noise survey has been undertaken at the proposed residential site at Scratchface Lane, Bedhampton, Havant by Alan Saunders Associates between Friday 15th and Tuesday 19th January 2010.

The measured noise levels have been used to classify the development in accordance with *PPG24 Planning & Noise: September 1994*.

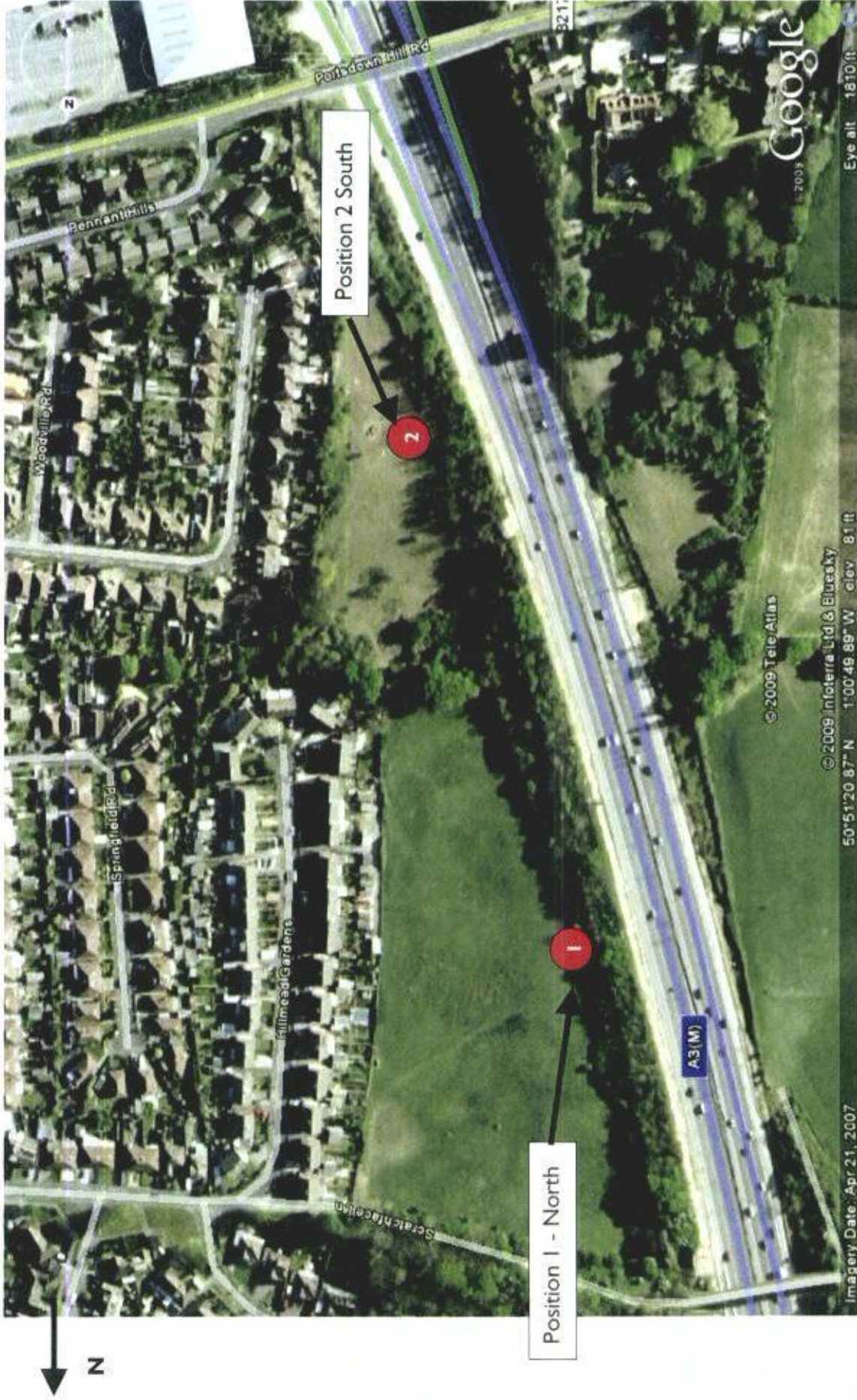
The results of long term noise monitoring survey and the noise model demonstrate that the large majority of the site lies within Noise Exposure Category B with some areas closer to the road in Noise Exposure Category C.

The opening of the Hindhead Tunnel in 2011 is not expected to significantly affect the noise climate on the site.

Outline mitigation measures have been proposed which would require incorporation into the design in order to achieve the proposed internal noise criteria.

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Project:
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Title:
 Indicative Site Plan

Figure:
 AS4884/SP1

Date:
 4th August 2010

LAND AT SCRATCHFACE LANE, HAVANT

Environmental Noise Time History (Position 1 - North)

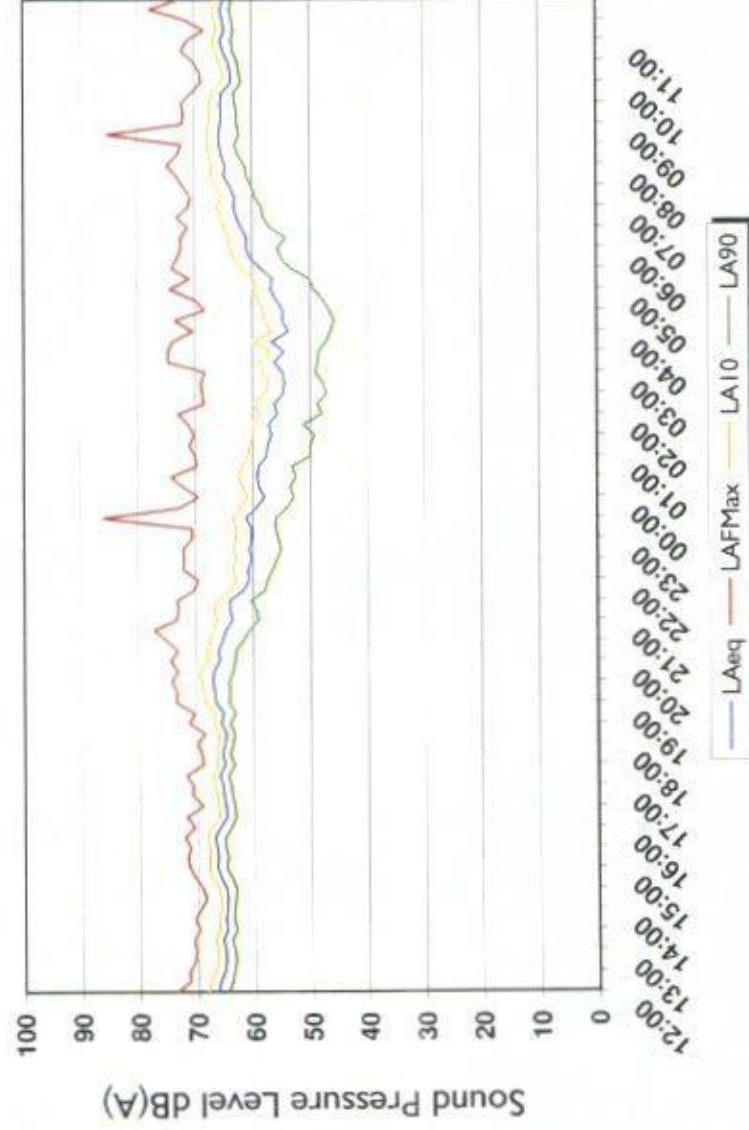
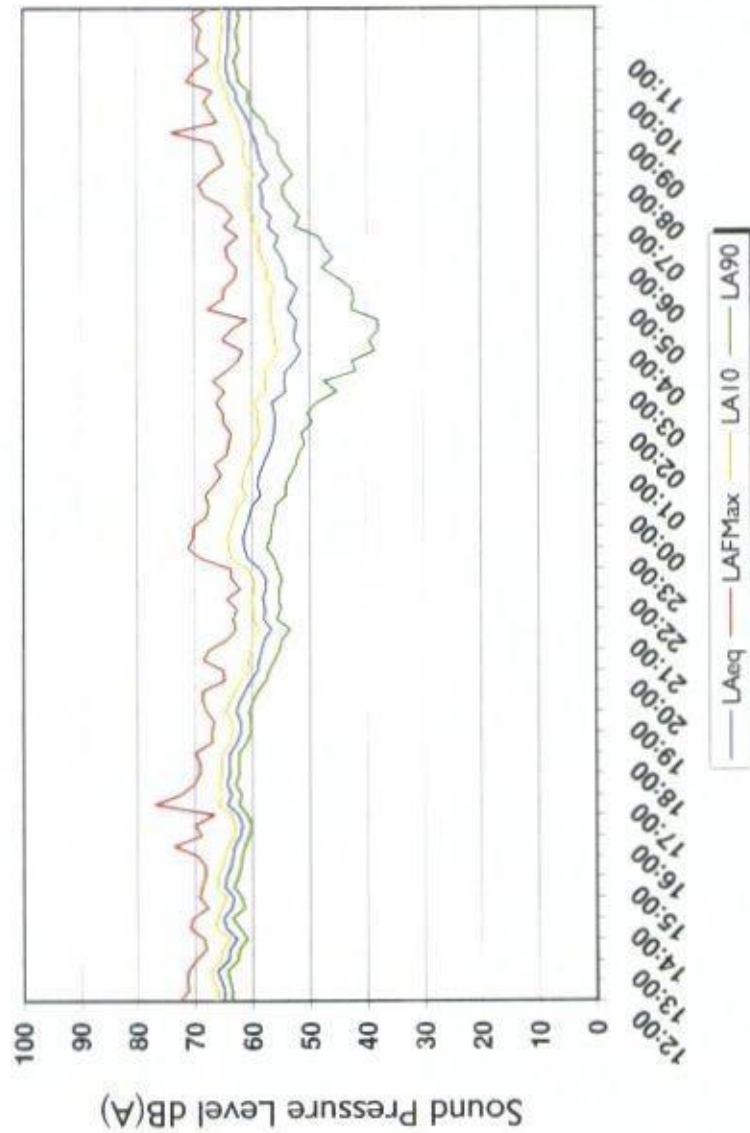


Figure AS4884/THI

Friday 15 January to Saturday 16 January 2010

LAND AT SCRATCHFACE LANE, HAVANT

Environmental Noise Time History (Position 1 - North)

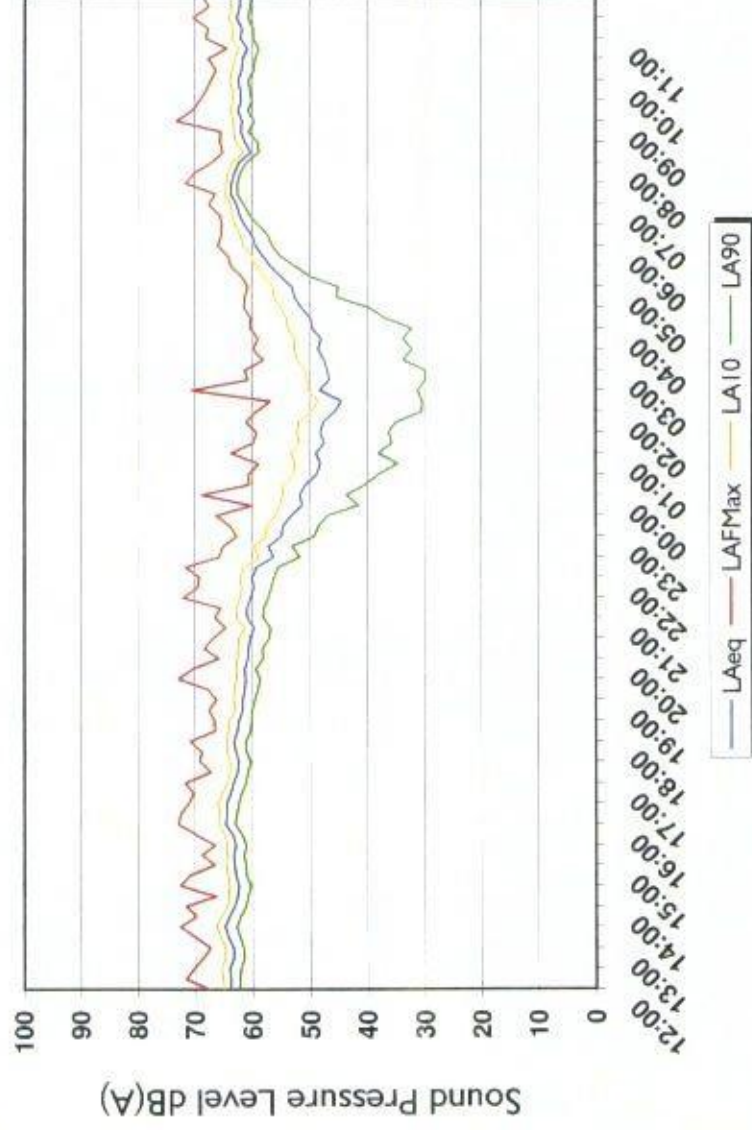


Saturday 16 January to Sunday 17 January 2010

Figure AS4884/TH2

LAND AT SCRATCHFACE LANE, HAVANT

Environmental Noise Time History (Position 1 - North)

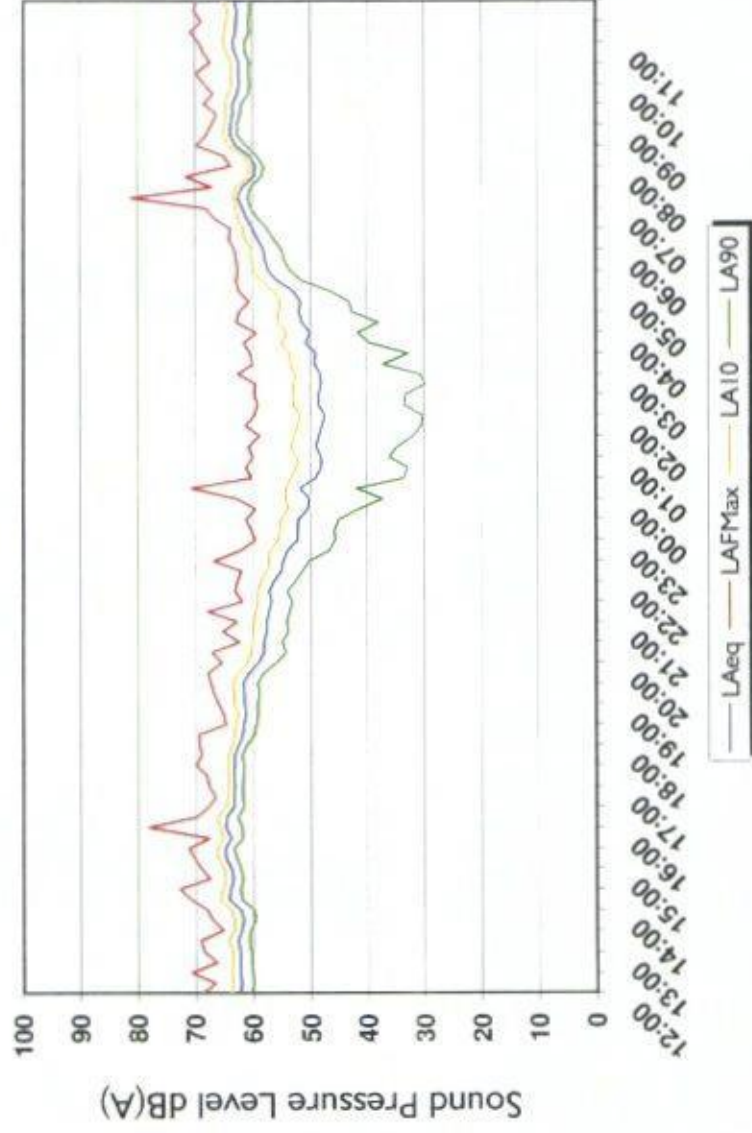


Sunday 17 January to Monday 18 January 2010

Figure AS4884/TH3

LAND AT SCRATCHFACE LANE, HAVANT

Environmental Noise Time History (Position 1 - North)

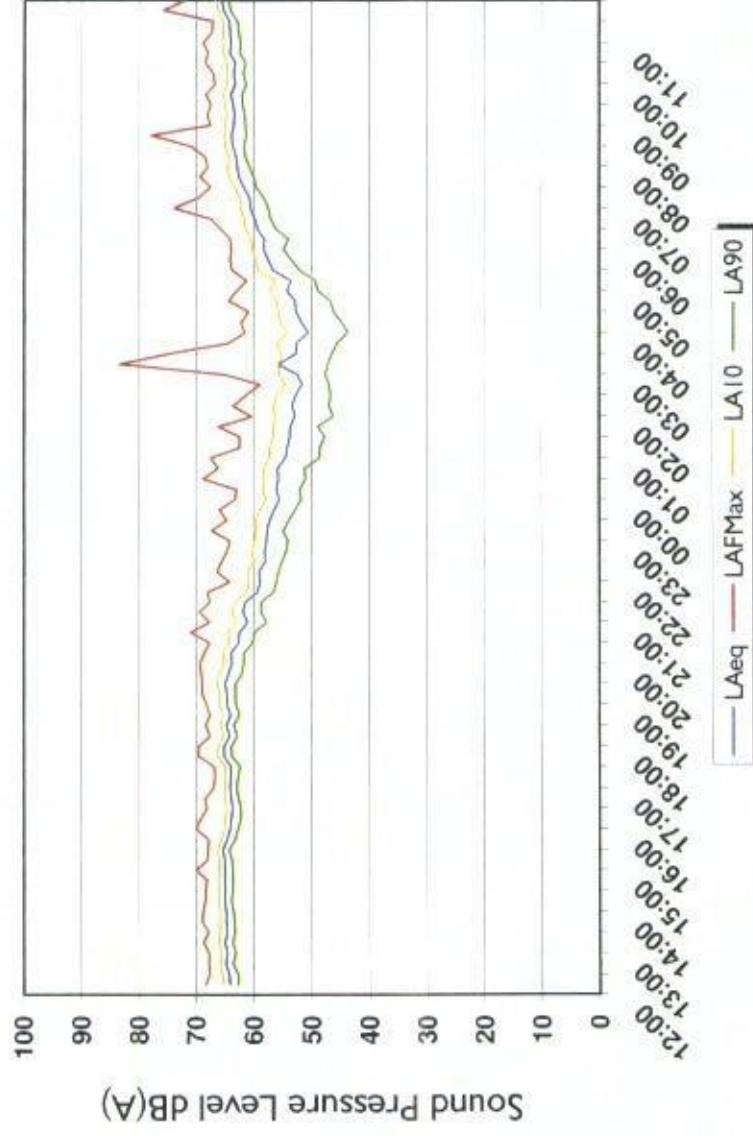


Monday 18 January to Tuesday 19 January 2010

Figure AS4884/TH4

LAND AT SCRATCHFACE LANE, HAVANT

Environmental Noise Time History (Position 2 - South)

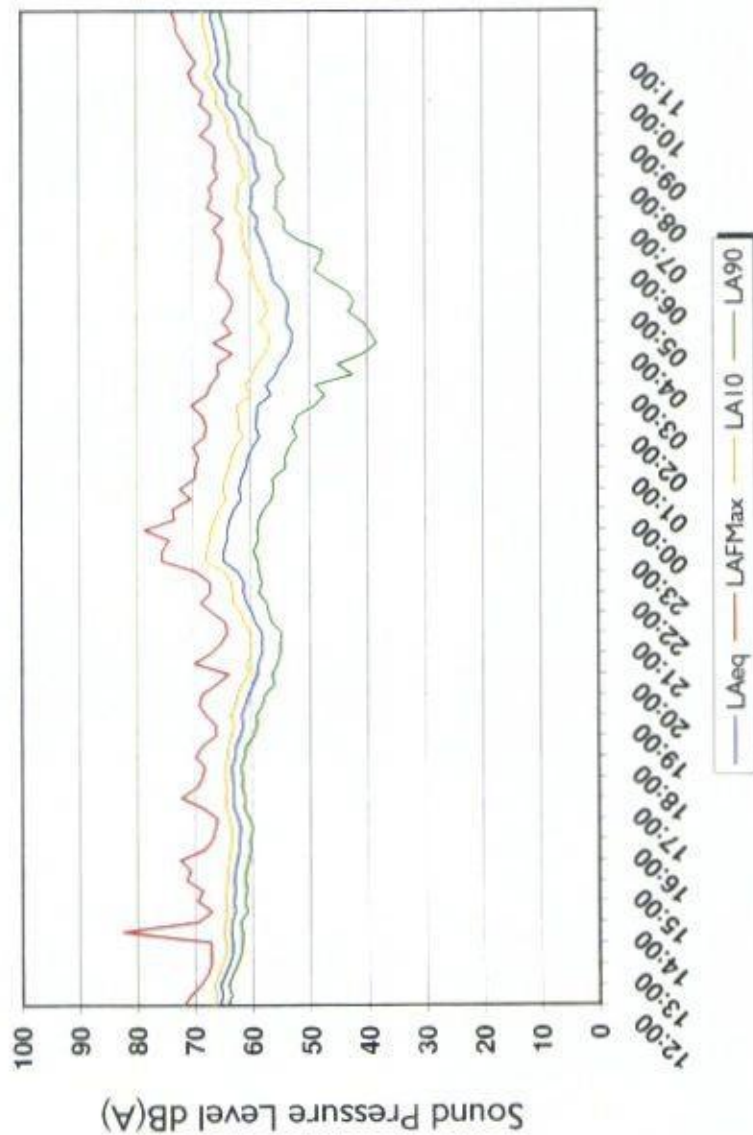


Friday 15 January to Saturday 16 January 2010

Figure AS4884/TH5

LAND AT SCRATCHFACE LANE, HAVANT

Environmental Noise Time History (Position 2 - South)

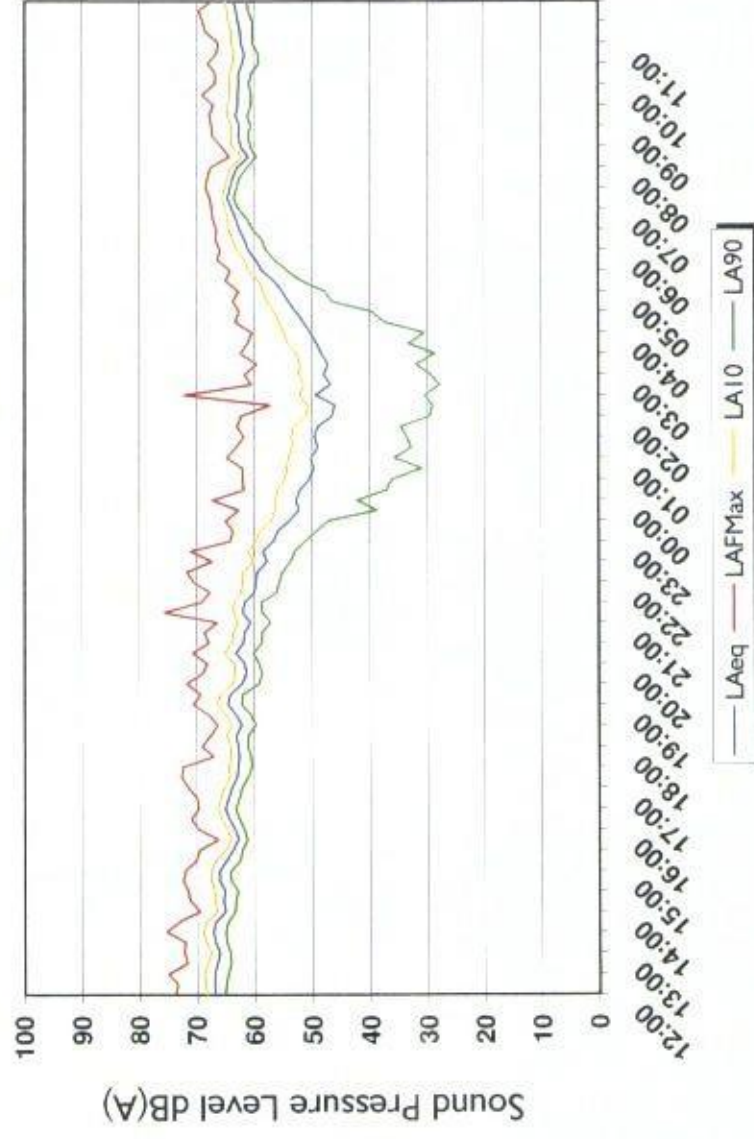


Saturday 16 January to Sunday 17 January 2010

Figure AS4884/TH6

LAND AT SCRATCHFACE LANE, HAVANT

Environmental Noise Time History (Position 2 - South)



Sunday 17 January to Monday 18 January 2010

Figure AS4884/TH7

RECOMMENDED NOISE EXPOSURE CATEGORIES FOR NEW DWELLINGS NEAR EXISTING NOISE SOURCES: PPG24

NOISE LEVELS ⁰ CORRESPONDING TO THE NOISE EXPOSURE CATEGORIES FOR NEW DWELLINGS L _{Aeq,T} dB					
NOISE SOURCE	PERIOD	NOISE EXPOSURE CATEGORY			
		A	B	C	D
road traffic	07.00 - 23.00 23.00 - 07.00 ¹	<55 <45	55 - 63 45 - 57	63 - 72 57 - 66	>72 >66
rail traffic	07.00 - 23.00 23.00 - 07.00 ¹	<55 <45	55 - 66 45 - 59	66 - 74 59 - 66	>74 >66
air traffic ²	07.00 - 23.00 23.00 - 07.00 ¹	<57 <48	57 - 66 48 - 57	66 - 72 57 - 66	>72 >66
mixed sources ³	07.00 - 23.00 23.00 - 07.00 ¹	<55 <45	55 - 63 45 - 57	63 - 72 57 - 66	>72 >66

NOTES

⁰ Noise Levels: the noise level(s) (L_{max}) used when deciding the NEC of a site should be representative of typical conditions

¹ Night time noise levels (23:00 - 07:00): sites where individual noise events regularly exceed 82dB L_{max} (5 time weighting) several times in any hour should be treated as being in NEC C, regardless of the L_{max} (except where the L_{max} is already put in the site in NEC D).

² Aircraft noise: daytime values adopted by the Department of Transport which relate to levels measured 1.2m above open ground. For the same amount of noise energy, contour values can be up to 2dB(A) higher than those of other sources because of ground reflection effects.

³ Mixed sources: this refers to any combination of road, rail, air and industrial noise sources. The 'mixed source' values are based on the lower numerical values of the single source limits in the table. The 'mixed source' NECs should only be used where no individual noise source is dominant.

To check if any individual noise source is dominant (for the purposes of this assessment) the noise level from the individual sources should be determined and then combined by decibel addition (remembering first to subtract 2 dB(A) from any aircraft noise contour values). If the level of any one source then lies within 2 dB(A) of the calculated combined value, that source should be taken as the dominant one and the site assessed against the appropriate NEC for that source, rather than using the A 'mixed source' NECs. If the dominant source is industrial noise see paragraph 19 of Annex 3.

If the contribution of the individual noise sources to the overall noise level cannot be determined by measurement and/or calculation, then the overall measured level should be used and the site assessed against the NECs for 'mixed sources'.

NEC	GUIDANCE
A	Noise need not be considered as a determined 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.

TABLE AS4884/NEC

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.

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.

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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APPENDIX A

ACOUSTIC TERMINOLOGY & HUMAN RESPONSE TO BROADBAND NOISE

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.