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Hospital for the Provision of Children and Adolescent Mental Health Service

Project:	Noise Assessment
Site:	Land at Shortwood Business Park, Barnsley
For:	The Earlswood Project Limited
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1 Contents

Summary

1. Introduction	4
2. Noise Units, Standards and Guidance	5
3. Analysis of Existing Noise Climate	7
4. Internal Noise Assessment	8
5. Conclusions	8

Summary

It is proposed to develop a site at Shortwood Business Park, Barnsley.

Noise monitoring has been carried out at the site and an analysis of the monitored data indicated that mitigation measures would reduce internal noise levels to acceptable levels, as given in PPG24 and B.S.8233. There are no external recreation areas with direct views of the Dearne Valley Parkway.

1 Introduction

- 1.1 It is proposed to develop a site on land at Shortwood Business Park, Barnsley and a report was carried out by RPS Planning and Development which indicated that internal noise levels would be in line with guidance and would therefore be acceptable.
- 1.2 Since that time the scheme has been altered slightly and the local planning authority required the previous report to be updated, AEC Acoustics have been commissioned by The Trevor Price Partnership to undertake a noise impact assessment of the existing noise climate of the area and to propose mitigation measures to ensure acceptable noise levels .
- 1.3 This report describes a noise survey of the site, the subsequent analysis to determine the noise environment at the proposed development and proposes typical mitigation measures to ensure acceptable noise levels.

2 Noise Units, Standards and Guidance

a) Noise Units

- 2.1 Noise is defined as unwanted sound. The range of audible sound is from 0 dB to 140 dB. The frequency response of the ear is usually taken to be about 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dB(A) weighting. This is an internationally accepted standard for noise measurements.
- 2.2 For variable noise sources such as traffic, a difference of 3 dB is just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dB. The "loudness" of a noise is a purely subjective parameter but it is generally accepted that an increase/decrease of 10 dB corresponds to a doubling/halving in perceived loudness.
- 2.3 External noise levels are rarely steady but rise and fall according to activities within an area. In an attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:

i) The L_{Amax} noise level

- 2.4 This is the "equivalent continuous A-weighted sound pressure level, in decibels" and is defined in British Standard B.S.7445 [1] as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time".
- 2.5 It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.

iii) The L_{A90} noise level

- 2.5 This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.

Noise Standards and Guidelines

Planning and Noise

- 2.6 Principles and specific guidelines on noise and planning issues are given in PPG24 Planning and Noise and offers guidance on the development of new housing near to existing noise sources, and defines four noise exposure categories, which indicate to what extent noise should be considered in the granting of planning permission. PPG24 also defines noise levels for each category, for a variety of noise sources.
- 2.7 PPG24 further states in Annex 1 paragraph 2 that where there is a clear need for new residential development in, for example, an already noisy area some or all of the NECs might be increased by up to 3dB(A) above recommended levels. In other cases, a reduction of up to 3dB(A) may be justified, particularly in tranquil areas. PPG24 recommends that the night-time period is 23:00 hours to 07:00 hours and the daytime period is 07:00 hours to 23:00 hours.
- 2.8 Table 3.1 below reproduces the summary in PPG24 relating to the recommended noise exposure categories for new dwellings near to existing noise sources.

Table 3.1 : Noise Exposure Categories for New Dwellings Near Existing Sources

Noise Levels and Advice 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 07:00 - 23:00 23:00 - 07:00	<55 <47	55 - 66 45 - 59	66 - 74 59 - 66	>74 >66
Mixed Sources 07:00 - 23:00 23:00 - 07:00	<55 <45	55 - 63 45 - 57	63 - 72 57 - 66	>72 >66
Advice	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.	Noise should be taken into account when determining planning applications and where appropriate, conditions imposed to ensure an adequate level of protection against noise.	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.	Planning permission should normally be refused.

- 2.9 The guidelines given in PPG24 correspond to a noise level measured under free field conditions (away from any reflecting facades) and at a height of 1.2 to 1.5 m above ground.
- 2.10 A further stipulation of PPG24 is that, for night-time noise levels (23:00 hours to 07:00 hours), sites where individual noise events regularly exceed 82 dB L_{Amax} (Slow time weighting) more than twice in any hour in any hour, should be treated as being in NEC C, regardless of the $L_{Aeq,8h}$ (except where the $L_{Aeq,8h}$ already puts the site in NEC D).
- 2.11 PPG24 further advises in paragraph 51 that:
- “.....Categories B and C deal with situations where noise mitigation measures may make development acceptable.....”***
- 2.12 When internal levels are considered, PPG 24 recommends that guidance on suitable internal noise levels can be found in BS 8233: 1999. It is considered that, with suitable glazing and acoustically attenuated ventilation, acceptable internal noise environments can be achieved
- Sound Insulation and Noise Reduction in Buildings (BS 8233)
- 2.13 BS 8233 defines ambient noise limits for a number of design criteria, in order that good or reasonable conditions are achieved in certain environments. Table 3.2 shows a summary of the levels recommended in BS 8233 for the rooms expected in the proposed development. Table 3.2: Indoor Ambient Noise Levels for Residential Development as Recommended in BS 8233

Criterion	Typical Situation	Design Range dB $L_{Aeq,T}$	
		Good	Reasonable
Reasonable resting conditions	Living rooms	30	40
Reasonable sleeping conditions	Bedrooms	30	35

3 Analysis of Existing Noise Climate

- 3.1 In order to determine the current noise climate of the area, noise monitoring was carried out at the development site closest to the Dearne Valley Parkway on 27th April 2010 between 07.00 and 23.00 hours some 12 metres from Wakefield Road. No monitoring was carried out during the night time period as noise levels fall during this period.
- 3.2 The instrumentation used for the on site noise survey was a Precision Integrating/Logging Sound Level Meter. The instrument was calibrated before and after the monitoring periods and no significant deviations were noted.
- 3.3 During all measurements, the microphone was mounted on a tripod at a height of 1.5m above the site ground level and was set to measure L_{Aeq} , L_{A90} , L_{A10} and L_{Amax} levels.
- 3.4 The weather conditions during the survey period were dry with very little wind and all noise monitoring undertaken was attended.

- 3.5 The following table summarises the average L_{Aeq} dB values recorded during the day time period, and gives the resulting NEC classification for that periods:

Table 3.1: Summary of Noise Monitoring Results

Location	Time Period	$L_{Aeq}(15 \text{ minute})$	NEC Category
Site boundary		46.5 to 57.7	A

- 3.6 Subjectively, it was noted that the principal sources of noise during the monitoring period was traffic on the nearby Dearne Valley Parkway. It should also be noted that during last monitoring period the noise level was elevated due to a heavy goods vehicle parked near the meter with its engine running.
- 3.7 Furthermore it can be seen from the above results that the current noise climate is lower than that measured previously which may be due to the holiday period and the economic downturn.

4 Internal Noise Assessment

- 4.1 Considering typical external wall construction, facade area, window area and reverberant time within the room its is predicted that external noise levels would be reduced by 39 dB(A) so giving acceptable internal noise levels even using the previous higher noise levels at the site.
- 4.2.1 Noise from road traffic reduces during the night time period internal noise levels within bedrooms would be within the guidance given PPG24 and BS8233.

5 Conclusions

- 5.1 The measurement of background noise levels was undertaken externally at the proposed development site on 27th April 2010 between the hours of 07.00 and 22.48. Measurements were made in terms of L_{Aeq} ,
- 5.2 The results of the noise monitoring together with typical façade construction (brick, cavity, block), 10/12/6 double glazing confirm the previous noise assessment in that internal levels during the day time and night time periods would be below the levels specified in B.S.8223.

