



South West Hertfordshire Secondary
Schools
Site D

Noise Review

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South West Hertfordshire Secondary Schools Site D

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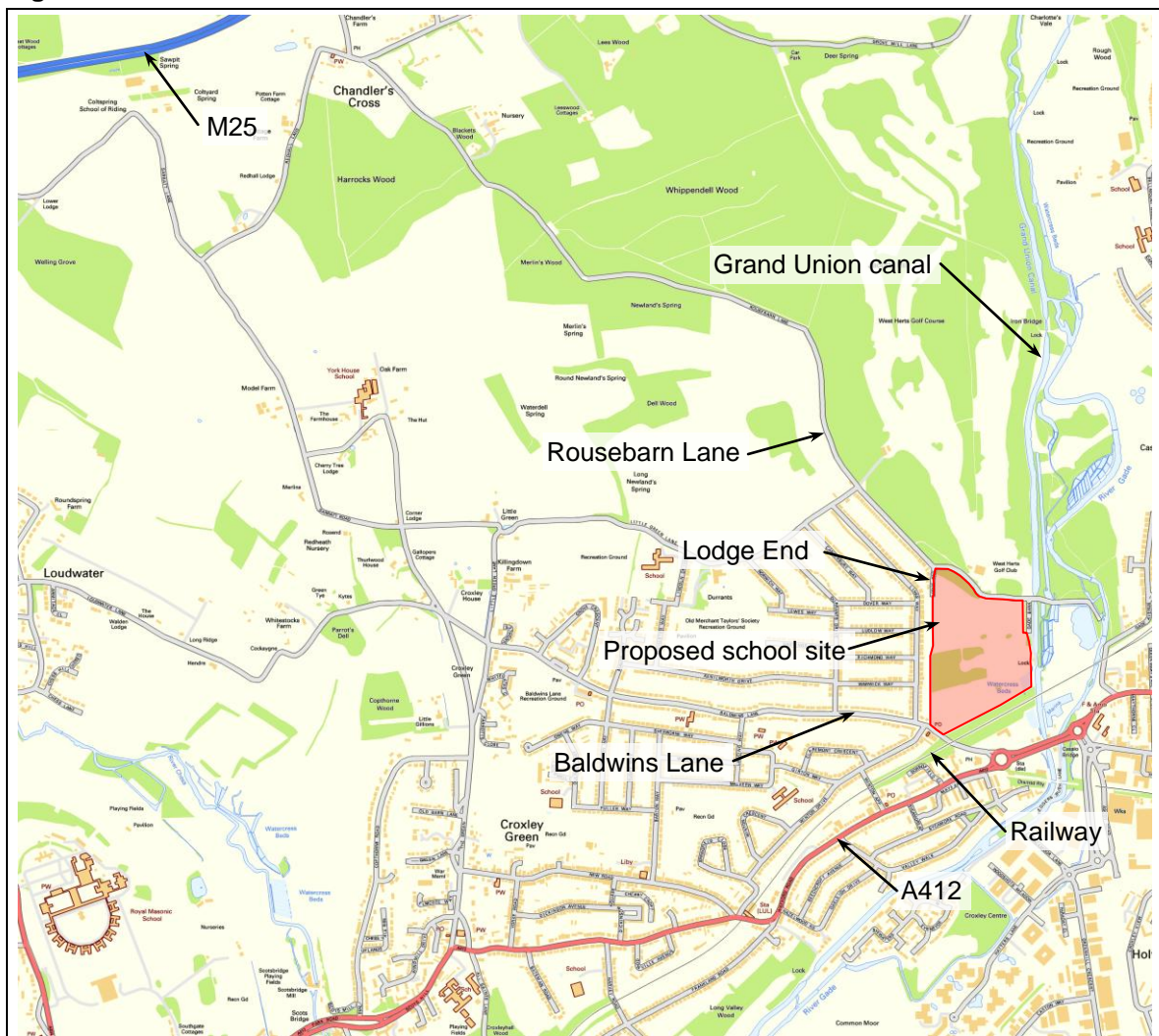
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1 Introduction

General

- 1.1 JMP Consultants Ltd has been commissioned by Hertfordshire County Council to undertake a Noise Review (NR) and comparison of the noise environment at four potential secondary school sites (Site A, Site B, Site C and Site D), to support the LDF preparation process.
- 1.2 This report focuses on Site D, which is located on land north east of Baldwins Lane, Croxley Green and to the west of the Grand Union Canal. The southern boundary of the site is formed by a railway line. The site location is shown in Figure 1.1.

Figure 1.1 Site location



Source: OS OpenData. Contains Ordnance Survey data © Crown copyright and database right 2011

Scope of the Noise Review

- 1.3 In order to establish the noise environment around the school site this Noise Review will present the findings of a period of noise monitoring undertaken within and around the proposed school site.
- 1.4 An Executive Summary document containing an appraisal of the noise environment at all four potential sites has been produce separately.

Report Structure

1.5 Following this introductory section the structure of the this report is as follows:

- **Section 2** defines the noise and planning context of the proposed development and the local area.
- **Section 3** describes the methodology applied to the assessment, specifically the requirements of BB93 *Acoustic Design of Schools a Design Guide*.
- **Section 4** presents the assessment findings and summarises the results.
- **Section 5** presents the construction impacts of the proposed development.
- **Section 6** presents the conclusions of the study.

2 Noise Context

General

- 2.1 This section of the report outlines the noise context of the proposed development, particularly with regard to relevant guidance documents. Sound levels and the health impact of noise are also discussed.

The Health Impact of Noise

- 2.2 Long-term exposure to noise (unwanted sound) has been shown to have a negative impact on human health and general wellbeing. The World Health Organisation (WHO) estimates that one in three Europeans is adversely affected by traffic noise. The detrimental effects of traffic noise include the following (source: WHO, 2008).
- Pain and hearing fatigue;
 - Hearing impairment including tinnitus;
 - Annoyance;
 - Interferences with social behaviour (aggressiveness, protest and helplessness);
 - Interference with speech communication;
 - Sleep disturbance and all its consequences on a long and short term basis;
 - Cardiovascular effects;
 - Hormonal responses (stress hormones) and their possible consequences on human metabolism (nutrition) and immune system; and
 - Poor performance at work and school.
- 2.3 As a consequence of the health implications of exposure to noise, it is often considered necessary to determine the existing transport-related noise level at a location of a proposed school development. This planning requirement is principally addressed by Building Bulletin 93 (BB93) 'Acoustic Design of Schools a Design Guide'. With regard to acceptable internal noise levels, BS8233 'Sound Insulation and Noise Reduction for Buildings' and the World Health Organisation have recommended limits for school buildings.

Relevant Guidance

BB 93 Acoustic Design of Schools a Design Guide

- 2.4 BB93 provide s regulatory framework for the acoustic design of schools. At the feasibility stage of the planning and design process BB93 recommends that a noise survey is undertaken to establish the suitability of a site for a school development. This Noise Review presents the findings of a noise survey undertaken to do this. Table 2.1 below shows the recommended external noise levels within a playground and at the boundary of a proposed school building.

Table 2.1 Recommended BB93 noise levels

Criterion	Ideal	Limit
The boundary of external premises used for formal and informal teaching	60dB(A) $L_{Aeq\ 30min}$	
Noise level in an unoccupied playing fields	50dB(A) $L_{Aeq\ 30min}$	55dB(A) $L_{Aeq\ 30min}$
Area used for outdoor teaching activities	At least one area should be below 50dB(A) $L_{Aeq\ 30min}$	

Source: BB93

BS8223:1999 Sound Insulation and Noise Reduction for Buildings

- 2.5 BS8223, Table 5 recommends internal noise levels for new or refurbished buildings. These internal noise limits are primarily intended to apply to new or refurbished buildings and are not for the assessment of changes in the external noise environment. Table 2.2 below shows the internal noise levels recommended in BS8223.

Table 2.2 BS8223:1999 Recommended noise levels

Criterion	Typical situations	Design range L_{AeqT} dB(A)	
		Good	Reasonable
Reasonable listening conditions	Classroom	35	40
Reasonable conditions for study and work requiring concentration	Library	40	50

Source: BS8233

- 2.6 In order to convert a monitored noise level to an internal noise level, in accordance with BS8233, it is assumed that:
- An open window will provide a decibel reduction of 13dB(A).
 - A closed double glazed window (specification 6-12-6) will reduce external noise levels by 34dB(A).
 - A closed secondary glazed window (specification 4-200-4) will reduce external noise levels by 43dB(A).

World Health Organisation Guidelines for Community Noise

- 2.7 *Guidelines for Community Noise*, published by the World Health Organisation in 1999, state that, in order to prevent speech interference the internal background noise level within a classroom should not exceed 35dB(A) L_{Aeq} during a teaching session. In outdoor playground areas noise from external sources should not exceed 55dB(A) L_{Aeq} . Table 2.3 shows the noise levels recommended in this document.

Table 2.3 World Health Organisation recommended noise levels

Specific environment	L_{Aeq} dB(A)	Time base (hours)
School Classrooms	35	During Class
School Playground Outdoor	55	During Play

Source: *Guidelines for Community Noise*, World Health Organisation (1999)

3 Methodology

Noise Monitoring

- 3.1 To determine the noise levels at the site, it was necessary to conduct a period of on-site noise monitoring. The on-site noise monitoring was conducted by a JMP staff member who has attained the Institute of Acoustics (IOA) *Certificate of Competence in Environmental Noise Measurement*.
- 3.2 At this feasibility stage, noise was monitored for a limited period at the locations indicated in Figure 3.1 below. The monitoring locations were selected due to their proximity to nearby traffic noise sources and the proposed locations of playgrounds and school buildings.
- 3.3 The monitoring was undertaken during typical school hours (including a peak traffic period) on Wednesday 13th July 2011 between 14:47 and 17:56. At each specified point noise was measured for periods of 15 minutes at various times throughout the monitoring period. During the monitoring period weather conditions were dry and warm with low wind speeds.

Figure 3.1 Monitoring locations



Source: JMP

Noise Meter

- 3.4 Noise was monitored at locations using a Type 1 Casella 440 integrated sound level meter. All measurements were A-weighted and recorded using a fast time response. The noise meter was set at a height of 1.5m above the ground.
- 3.5 The Casella noise meter was calibrated using a CEL-284/2 calibrator at the beginning and end of each monitoring period. No significant deviations were observed. Calibration certificates can be provided upon request.

4 Results

Noise Environment

4.1 Measured external noise levels at the monitoring locations are shown below in Table 4.1.

Table 4.1 Noise Levels at the monitoring locations

Location / distance from dominant noise source(s)	Time		L _{Aeq 15min} dB(A) *	Observed noise sources
	Start	Stop		
1 10m from Lodge End	14:47	15:02	43.9	Lodge End was the dominant noise source.
	16:35	16:50	55.2	
	-	-	-	
	Arithmetic Average		49.6	
2 10m from Baldwins Lane	16:08	16:23	62.0	Baldwins Lane was the dominant noise source.
	17:41	17:56	57.5	
	-	-	-	
	Arithmetic Average		59.8	
3 25m from railway line	15:29	15:44	54.1	The railway line was the dominant noise source.
	15:44	15:59	51.1	
	17:19	17:34	52.2	
	Arithmetic Average		52.5	
4 Within the site.	15:10	15:25	51.0	No noise source was dominant.
	16:58	17:13	49.4	
	-	-	-	
	Arithmetic Average		50.2	

* The Ambient Noise Level during the monitoring period was consistent. Therefore the 15 minute measurements are considered representative of a 30 minute period.

Analysis

Playground Area – The Ideal Noise Limit

4.2 The noise levels measured at the locations indicated in Figure 3.1, with the exception of Location 1, exceed the ideal limit of 50dB(A) L_{Aeq30min} recommended by BB93 for an area used for outdoor teaching across the site. However, as the ideal noise limit only needs to be met at at least one outdoor teaching location, this is considered acceptable.

Playground Area – The Upper Noise Limit

4.3 The noise levels measured at location 1, 3, and 4 meet the upper limit of 55dB(A) L_{Aeq30min} as recommended by BB93 for an unoccupied playground, playing field, or other outdoor area.

- 4.4 In order for the upper limit noise level to be met at the south western boundary of the site (location 2) adjacent to Baldwins Lane it will be necessary to offset any playground, playing field, or other outdoor area away from the road network. Using a line source distance attenuation calculation an offset distance of 30m from Baldwins Lane will be required in order to achieve a noise level of 55dB(A) $L_{Aeq30min}$. The calculations can be seen in **Appendix A**.

School Building Areas

- 4.5 The noise levels measured across the site meet the required upper permitted noise level presented in BB93 for the boundary of a proposed school building.

5 Construction Impacts

General

- 5.1 In terms of construction, the main noise impacts that are required to be considered are the generation of noise arising from construction plant. For this site sensitive receptors are located on Lodge End.

Recommended Measures

- 5.2 To minimise the impact of construction noise it is recommended that the following measures are implemented:
- Noise-generating plant should be placed as far as possible from sensitive receptors.
 - Where possible, fixed plant/facilities should be powered by shore-supply rather than by generators.
 - Construction plant and equipment should be:
 - Maintained to ensure optimum performance.
 - Fitted with appropriate silencers, mufflers or acoustic screens.
 - Operated in a manner that will reduce noise emissions.
 - Vehicles and plant should be switched off, or throttled down to a minimum, when not in use.
 - Nearby residents should be shielded from noise by temporary noise hoardings located along the perimeter of the work site.
 - Where practical, mulching-breaking equipment should be used in preference to percussion-breaking machines.
 - The (general) permitted hours of site operation are limited to:
 - Monday to Friday 0:800 hrs to 18:00 hrs.
 - Saturday 08:00hrs to 13:00 hrs.
 - No working on Sunday or Bank Holidays.

6 Conclusion

- 6.1 The measured noise levels taken at the boundary of the site with Lodge End met the ideal noise limit as prescribed by BB93 for an area to be used for outdoor teaching.
- 6.2 The measured noise levels taken at the boundary of the site achieved the upper noise limit as prescribed by BB93 for an area used for outdoor teaching at all locations with the exception of location 2 adjacent to Baldwins Lane. Calculations have shown that at a distance of 30m away from Baldwins Lane, the upper limit can be achieved.
- 6.3 The noise levels measured across the site meet the required upper permitted noise level presented in BB93 for the boundary of a proposed school building.

Appendix A

Calculations

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Line Source Distance Calculations

Distance Corrected Noise Level = $10 \text{ LOG}_{10} (R/r)$

where R = Distance from the road to the point the measurement was taken

where r = Distance from the road to the point where the measurement is to be corrected to

Playground Area – The Upper Noise Limit

In order to meet the required noise level of $L_{Aeq\ 30\ mins}$ 55dB(A) the following offset distances will be required.

Table A.2 Playground Area – Upper Noise Limit

Boundary	Monitoring location	Dominant noise source	Calculation	Offset distance required
South western	2	Baldwins Lane	$10 \text{ LOG}_{10} (10/30) = -4.7$ $59.7 - 4.7 = 55\text{dB(A)}$	30m from Baldwin's Lane.