Camden

Building Schools for the Future

Adelaide Road

Planning Application

– Noise and Vibration Assessment

bam

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Swiss Cottage Schools Development:

Noise & Vibration Impact Assessment

Planning Submission
May 2010

Revision 00

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1 Acoustic design - planning

1.1 Overview

This report will focus on the noise and vibration impact issues associated with the proposed development of new school buildings on a site at Swiss Cottage. The proposed development comprises new learning facilities for the Swiss Cottage Specialist SEN School and a new build academy for University College London. The site is located to the south of Adelaide Road, Camden, London and is approximately 2 ha (hectares) in size. The existing site currently comprises 3 No. schools, namely, Swiss Cottage (primary and secondary) and Frank Barnes (primary, for deaf children) Schools. The site comprises existing school buildings and hardstanding with minor areas of soft landscaping.

The school facilities will operate during normal school hours, and are not expected to have any plant or other noise emitting operations occurring at night.

The proposed development is shown below (new build sections in colour), in context with the surrounding area:

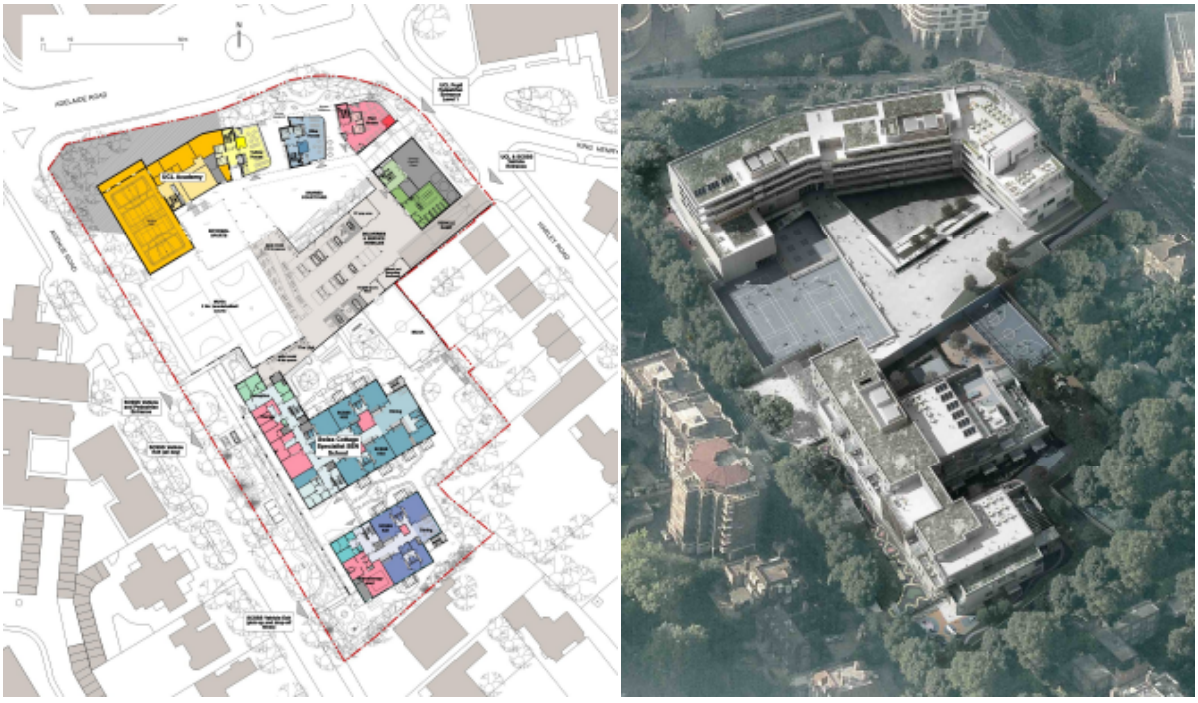

Figure 1—1 Site layout drawing (excerpt from AR-Arch 1000) and illustration of proposals in context

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Work on noise and vibration issues for this planning submission has included the following:

- Assessment of ambient noise levels affecting the site
- Assessment of background noise at locations near the development that may be affected by operational noise
- Consideration of design provisions to avoid and mitigate adverse impacts
- Design development of the proposals in accordance with the relevant standards for acoustic performance of the proposed buildings.

This report describes the work undertaken and the design proposals, including provisions for mitigation or control of potential noise and vibration sources.

1.2 Relevant guidance and legislation

Local authority policy

The local authority has a policy framework for control of noise and vibration through the planning process [(3)] Within Camden the (2006 Replacement) UDP policies SD7 and SD8 apply. Appendix 1 – 'Noise and Vibration Thresholds'- presents limiting criteria for a range of cases, although these appear primarily directed at residential development.

Camden has produced supplementary planning guidance material with definition of requirements for acoustic performance (Camden Planning Guidance - December 2006) [(4)]. The document provides additional advice and information on how the Council will apply the planning policies in the London Borough of Camden Replacement Unitary Development Plan (UDP), which was adopted in June 2006.

National Guidance (PPG24)

Guidance on consideration of noise and vibration issues within the planning process for England and Wales is included in Planning Policy Guidance note PPG 24 [(5)]. For noise sensitive developments such as schools this document refers to use of BS8233:1999 [(6)] and use of BS4142:1997 [(7)] for assessing likelihood of complaint due to operational noise emission. PPG 24 also provides examples of planning condition clauses related to noise and vibration control.

Building Bulletin 93

Part E of the Building Regulations.(2000) (1)identifies a requirement for schools to meet particular acoustic performance standards, normally achieved where the guidance and requirements of Building Bulletin 93 (BB93) (2) are used as the basis of design. Within BB93 Section 2.8 'Noise from schools to surrounding areas' it is noted that:

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"…noise from schools to the surrounding area can also be a problem, and consideration should be given to nearby residential and other noise-sensitive developments which could be disturbed by noise from playgrounds, playing fields, music rooms and halls used for events such as after school concerts and discos. The local planning authority will normally consider this in assessing any planning application for new schools or extensions to existing premises. The effect of playground noise on children inside parts of the school near the playground should also be considered as part of the design."

In summary, the design principles of the development are to ensure all noise emissions from new mechanical services plant meet the local planning criteria, and that all other noise sources (e.g. noise break out from halls etc and playground noise) are designed using best practicable means to minimise noise impacts on the surrounding area.

1.3 Existing Ambient Noise Levels

Noise survey

In developing the detailed proposals the design team has referred to an acoustic survey and appraisal of the site prepared by Hoare Lea in 2008 [8]. A copy of the report is appended.

The appraisal was prepared in support of the Outline Planning Application for development on the site. It is recognised that the developed scheme for which detailed permission is sought differs from that submitted at outline stage in regard to overall scale and layout. The validity of the noise survey and conclusions from the earlier appraisal have been reviewed.

The design of the noise survey undertaken by Hoare Lee in 2008 provided baseline information about the noise exposure of the site and about the background noise levels at locations potentially subject to disturbance by development.

Measurements to assess noise exposure were made at locations along Adelaide Road and Harley Road, with road traffic noise identified as the dominant component of the noise climate. The relationship between the measurement locations used in 2008 and the proposed location of new building facades within the detailed proposals is such that the noise exposure of the planned buildings can be estimated with an appropriate level of accuracy using the 2008 survey information. It is also reasonable to assume that variation in source sound levels from 2008 will be insignificant, given the relative insensitivity of ambient noise level to change in traffic flow.

Measurements to assess background noise level at the nearest (noise sensitive) residential properties were made at the rear of properties in Harley Road. These properties are still the closest noise sensitive locations to the new development and it is unlikely that there has been substantive reduction in the ambient noise since 2008. Therefore the 2008 measurements can be considered a reasonable basis for setting noise emission targets, with reference to local authority policy.

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Key results from the noise survey are as follows:

Period	Description	Noise levels
Daytime	Ambient noise levels at the proposed façade facing Adelaide Road:	68 to 69 dB L_{Aeq}
Daytime	Ambient and background noise levels at nearest residential:	53 dB LAeq/ 43dB LA90
Night time:	Ambient and background noise levels at nearest residential	45 dB LAeq / 35dBLA90

These figures match subjective impressions of a site that is noisy during daytime where there is adjacency to busy roads, with a significant reduction in noise towards the centre of the site due to a combination of distance and acoustic screening. The typical minimum or background noise level at the nearest housing, indicated by the L_{A90} metric (*ie the A-weighted sound pressure level exceeded for 90% of the sample duration*) during daytime is typical of a location that is urban but not directly affected by major noise sources. The night time condition might be described by many as 'quiet' for an urban location.

Vibration

The site is also known to be subject to groundborne vibration from mainline railway traffic passing in tunnel some 20 to 25 metres below ground level. Initial assessment of the site indicates that groundborne noise is not routinely audible within the existing buildings and vibration is not normally perceived within the existing buildings in their current use.

Survey work is proposed to confirm these initial assessments, together with evaluation of vibration exposure by means of a numerical estimation process. The results from these activities will be available prior to completion of the detailed design of building substructure.

1.4 Acoustic design of the proposed development

The fabric of the proposed school development is designed to meet the acoustic performance standards specified in Building Bulletin 93. This will include control of internal ambient noise under background ventilation conditions, internal acoustic separation, and room acoustic conditions.

The overall proposals for both schools, incorporating the required measures to meet the acoustic design standards, are described separately in the design team reports. Relevant excerpts from Design Notes describing the acoustic design are appended.

For UCL Academy and the SCSSS the principal acoustic design provisions relevant to planning are as follows:

1.4.1 Protection of the buildings from external noise

The façades are designed and specified to offer sufficient airborne sound insulation to reduce external ambient noise to meet the internal noise criterion for each space. Where the use of openable windows would

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compromise sound insulation a mechanical ventilation system is provided, such that with windows closed the internal noise criterion is achieved.

The planning and layout of the internal spaces places the most noise sensitive rooms on quieter facades where possible, so that there is maximum opportunity to employ low energy passive ventilation techniques.

1.4.2 Limiting the impact of noise from inside the building

Where room use may be noisy (eg music, theatre) the building envelope is specified to limit sound emission so that potential disturbance of other teaching areas and nearby residential buildings is avoided.

Within UCL the potentially noisy spaces (music, assembly hall, drama) are located within the north block of buildings, separated by approximately 75m from the housing in Harley Road.

Within SCSSS the hall is on the west side, toward Avenue Road, at a distance of approximately 70m from houses in Harley Road.

In each case the sound insulation required to maintain acceptable indoor conditions is expected to be adequate to reduce noise emission from internal activity to below the background noise level at the nearest sensitive receiver at all normal school operating times. This would be likely to comply with local planning conditions for noise break out.

1.4.3 Limiting the impact of noise from external activities

The UCL site is designed with a large external low level courtyard that will be used for shared congregation and amenity, on the south side of the buildings. An active play area (podium) partially surrounds and crosses over this at a level 4m above ground. A multi use games area (MUGA) is provided on the west side of the site at ground level, adjacent to the Adelaide Road boundary. Terraced external teaching areas are provided on the southeast side of the building.

These locations are acoustically screened from road traffic noise to varying degrees and will provide good quality external areas in line with the requirements of BB93.

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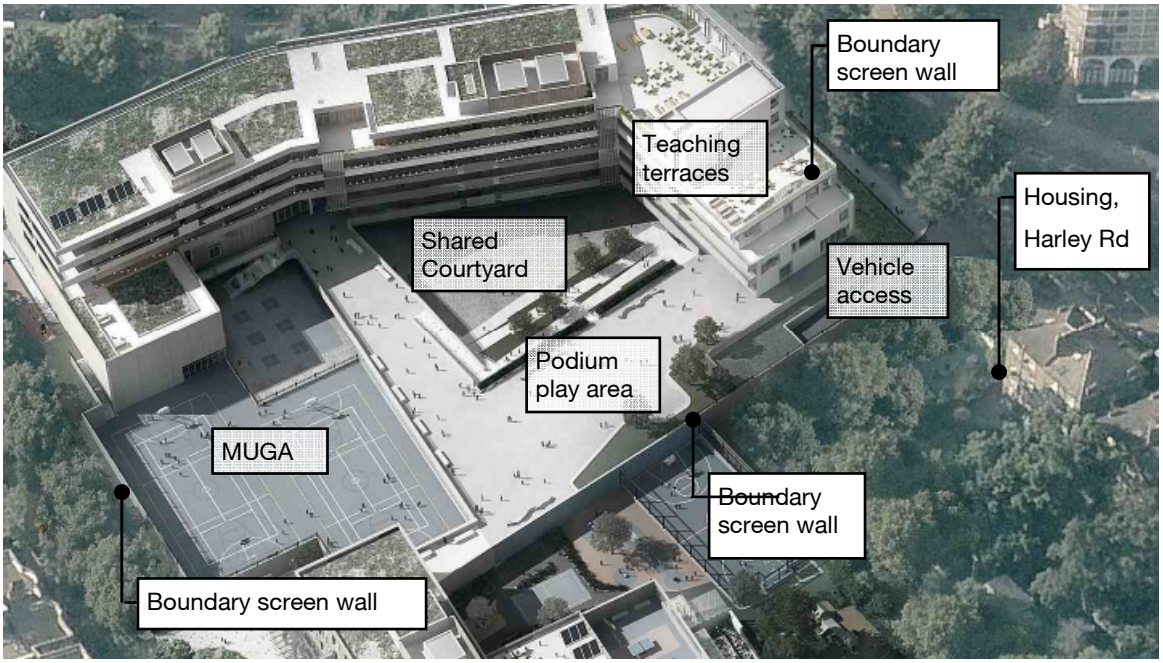

Figure 1—2 Illustration of UCL proposals showing key external noise sources and mitigation

The SCSSS buildings have less extensive external play and sport areas than UCL, with similar use of terracing and roof areas to provide external teaching and learning space.

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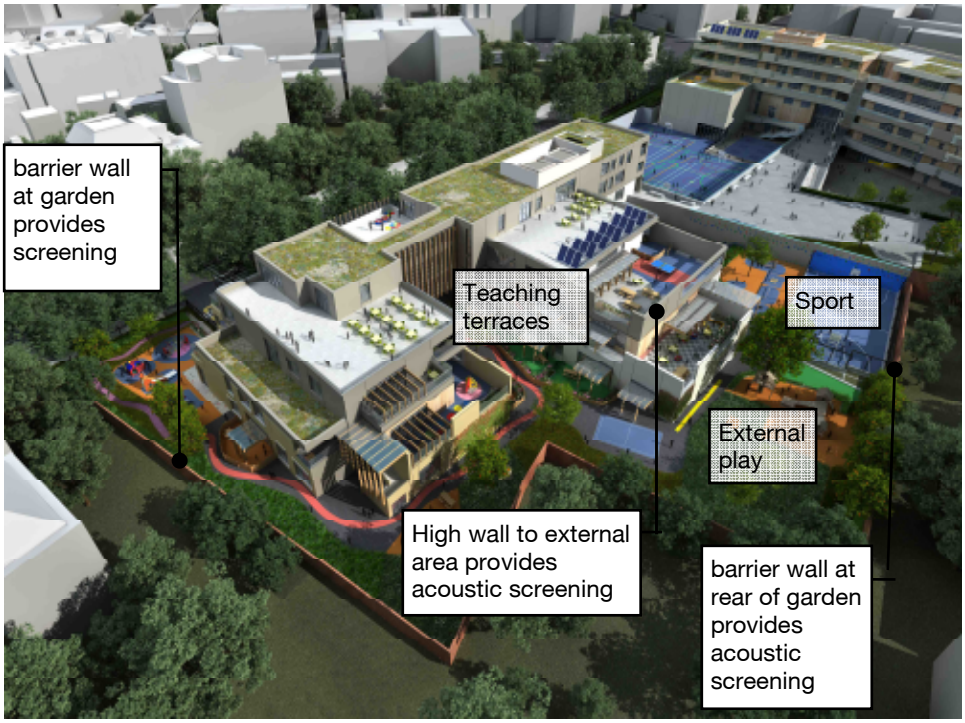

Figure 1—3 Illustration of SCSSS proposals showing key external noise sources and mitigation

for noise control have been incorporated in design of both UCL and SCSSS:

- the external areas have been arranged to separate the noisiest area (UCL MUGA) from the housing by as large a distance as possible,
- the UCL design makes use of changes in level to maximise acoustic screening between sources of noise and the housing,
- the required boundary walls are used as part of a noise barrier strategy
- external terraces around UCL and SCSSS will be used for teaching and closely managed activity and are not provided as external play areas.

The closest area of the elevated UCL external play podium will be some 25 to 30m in plan from the rear of the nearest housing in Harley Road, with line of sight acoustic screening provided by the play area boundary wall. As an indication of the sound levels to be expected from play area use, one could assume a group of 100 children speaking at raised voice level.

With allowance for distance attenuation and screening, the estimated sound level at the housing would be between 50 and 55 dB(A), some 7 to 12 dB(A) higher than the measured daytime background noise levels of 43dBL_{A90}. By assuming the noise from the play area to be constant over a 1 hour period within a 12 hour day

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(07:00 to 19:00) the time averaged value of play area noise at the housing would be in the range 39 to 44 dBL_{Aeq}, between 9 and 14 dB below the existing ambient noise level of 53dBL_{Aeq}.

Noise levels generated within the MUGA could be expected to be higher than generated in the play area as a result of shouting and activity noise associated with playing sport, but due to increased distance and screening the impact at the nearest housing would not be significantly different to that of activity on the podium play area.

These estimates suggest noise from external areas of the UCL development, whether play or sport related, would be audible at the housing. The estimated values exceed 10dB(A) above background, used in BS 4142:1997 for indicating a positive likelihood of complaint. However, the character of playground noise makes application of that approach to assessment of limited use. The standard is directed at, and most suitable for, assessment of building services or industrial noise. There is no clear evidence of suitability for playground noise assessment.

At present, the southern end of the SCSSS site is comprised of a large play area between the school buildings and the residential property at the site boundary. In the proposed scheme, the play areas are greatly reduced, with quieter informal teaching spaces introduced. The carefully managed teaching approach for the SEN School can be expected to result relatively quiet activity in external spaces, giving a positive impact to noise break out on the residential façade from typical play activities.

In summary, the design is expected to have a positive impact on external noise levels at the nearest noise sensitive facades close to the SCSSS..

The design team consider that the combination of existing use of the site for school accommodation with associated playground noise, taken together with the practical measures provided in the proposed designs to mitigate noise, are a realistic approach to providing the best possible mitigation of noise impact from external activities.

1.4.4 Limiting the impact of noise from site access

The main pedestrian access to the schools will be taken from Adelaide Road.

A ramped and gated route off Harley Road is proposed for service vehicle access to the lower level enclosed garaging shared between UCL and SCSSS. This will carry a mix of staff or visitors vehicles and site delivery and service traffic. Parking is provided for 25 cars. The overall number of vehicle movements in any one day will be small. As an estimate, the peak hour might include all 25 cars and 5 service vehicles.

The majority of the access route will be acoustically screened from the housing through a combination of difference in ground level and barrier fencing. The access system will be managed to avoid vehicles spending an extended period in the ramp area and vehicles will not normally park with engines running. The road surface

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will be designed to minimise gullies, breaks and discontinuities that might generate vibration or impact noise. The gate system will be specified for quiet operation.

Overall, this arrangement is expected to produce a small increase in noise exposure to the housing in Harley Road adjacent to the access. Average noise levels at the adjacent property (in terms of period L_{Aeq} values) are unlikely to increase significantly due to the low number of events overall, although individual events are likely to be audible at the property.

Vehicular access for the SCSSS will be gained from Avenue Road. There is one entrance point, which will be open throughout the day, and two exit points. One exit, located adjacent to the entrance to the north of the SCSSS building will be open during the school day for drop off, pick up and visitors. A secondary exit will be located to the south of the SCSSS building. This will be for dedicated school buses to exit and will only be open during school drop off and pick up times. The access road is approximately 20m from the nearest residential façade. However, as vehicular access will be minimal, and the noise impact from these vehicles will be masked by traffic on Avenue Road (25m away), no significant impact from the vehicle access is expected.

Overall vehicle numbers within Avenue Road will not be changed significantly by the proposed school bus and vehicle access arrangements and the proposal will not create a significant impact on noise sensitive properties in Avenue Road.

1.4.5 Limiting the impact of noise from fixed plant

Each school building will include items of mechanical plant providing ventilation, heating and cooling services. Within UCL the majority of the equipment is located within the energy centre at lower ground, on the east side of the building. Air handling plant is located on the roof.

For SCSSS the majority of larger plant items for ventilation are located on the Hall roof to the west side of the site.

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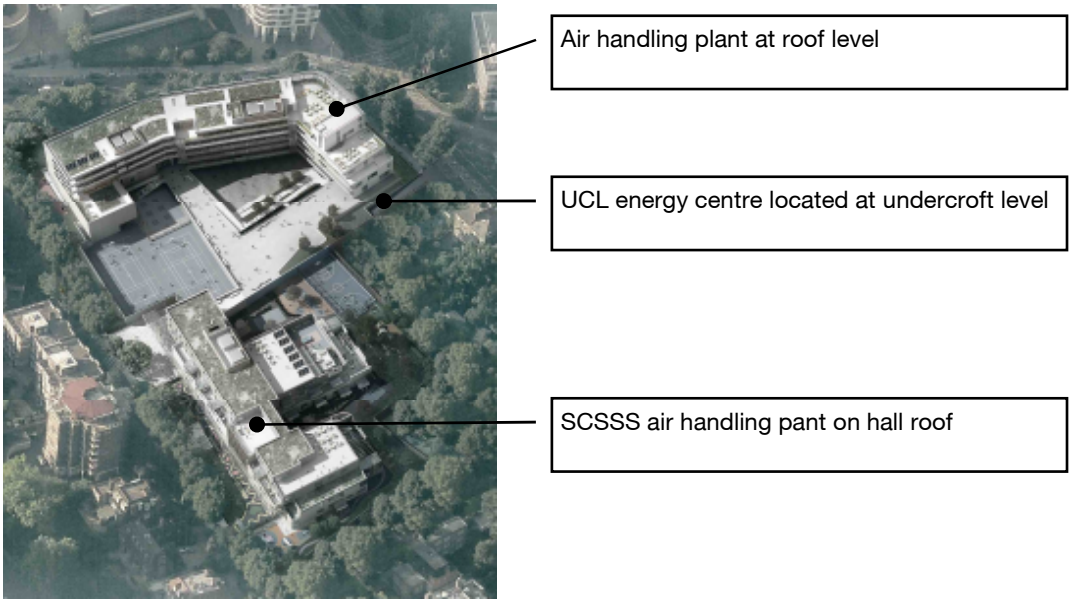

Figure 1—4 Illustration of UCL and SCSSS proposals showing principal building services plant locations

cooling and ventilation will be based on a BS4142 assessment. All principal plant items will be included in assessment. The proposed limit criterion for combined plant noise emission is a level 5 dB(A) below the background noise level (L_{A90}) during operational hours except where that noise exhibits particular characteristics (eg whine, screech, bangs, clatters, clicks) where the noise level should be 10dB(A) below the L_{A90}. This approach is compliant with the requirements within Camden noise policy.

Noise control measures for plant include low noise equipment selection, enclosure and provision of attenuation as appropriate. Provision at this stage is indicative only and subject to design development alongside final selections of specific equipment.

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References

1. Building Regulations 2000
2. Building Bulletin 93
3. London Borough of Camden Replacement Unitary Development Plan Adopted June 2006 (published London Borough of Camden, July 2007)
4. Camden Planning Guidance - December 2006 (published London Borough of Camden, May 2007)
5. Planning Policy Guidance 24: Planning and Noise.(published Office of the Deputy Prime Minister, September 1994).
6. BS8233:1999 'Sound insulation and noise reduction for buildings. Code of practice'.
7. BS4142: 1997 'Method for rating industrial noise affecting mixed residential and industrial areas'.
8. Swiss Cottage School, Adelaide Road, London – Acoustic Strategy Report Rev 0 (prepared by Hoare Lee, issued 10 July 2008)

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Appendix 1

Noise survey report

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SWISS COTTAGE SCHOOL, ADELAIDE ROAD, LONDON

ACOUSTIC STRATEGY REPORT

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Acoustics

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AUDIT SHEET

REVISION	DESCRIPTION	DATE	ISSUED BY	REVIEWED BY
0	Acoustic strategy report	10/07/2008	MR	BJ

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1 INTRODUCTION

An environmental noise assessment has been undertaken by Hoare Lea Acoustics on behalf of London Borough of Camden in relation to the proposed re-development of Swiss Cottage School, on Adelaide Road.

The purpose of this report is to support the application for planning permission. This report is set out to inform the client, the design team and other interested third parties including the Planning Authority and Environmental Health Department of the acoustic design issues associated with the proposed development.

Where appropriate, outline advice is offered on mitigation strategies that may be employed to control any potential noise impacts both affecting and resulting from the proposed development.

2 SITE AND ENVIRONS

2.1 Description of the site

The proposed development site, as indicated in Figure 1, is currently occupied by Swiss Cottage School.

Figure 1: Development site and its surrounding area *(source: Google Maps)*