MAX FORDHAM

Plot 5 – Purchese Street Housing North and Community Hall and Plot 6 – Purchese Street Housing South

Central Somers Town

Noise Impact Assessment

Rev B

November 2015

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ISSUE HISTORY

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A	2/11/2015	Planning submission
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MAX FORDHAM LLP TEAM CONTRIBUTORS

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1. INTRODUCTION

Max Fordham LLP ("MFLLP") has been appointed to provide advice in relation to acoustic matters for the Central Somers Town Community Investment Project ("CIP"). Proposed developments for the project include the following:

- new buildings for Edith Neville School and St Aloysius Nursery
- redesign and rebuilding of Plot 10 play project (Community Facilities)
- improving the parks and open spaces
- residential developments at Charrington Street, Purchese Street and Brill Place.

This report covers Plots 5 and 6 of the development – Purchese Street Housing North and Community Hall ("Plot 5") and Purchese Street Housing South ("Plot 6"). These plots consist of two residential housing blocks – blocks B and C. Block A is also on the Central Somers Town site, at Plot 2 (Charrington Street Housing).

The objectives of this report are to assess:

- The likely impact of Plots 5 and 6 of the proposed development, including plant equipment on nearby noise sensitive premises; and
- The likely impact of the existing noise environment on Plots 5 and 6 of the development.

The following statement has been prepared on behalf of the London Borough of Camden in support of a planning application for the redevelopment of Central Somers Town.

Project Background and Masterplan
The redevelopment of Central Somers Town is led by the Department for Children, Schools and Families and will be delivered as part of an approved regeneration strategy to deliver significant improvements to the public realm, provide a replacement primary school, nursery, play facilities and community hall. The development will also provide 136 housing units as well as maximising the amount of affordable housing which can be delivered by the scheme. Central to the development is the provision of public open space across the site. This space will be greatly improved as a result of the proposals and there will be no net loss of area following completion of the scheme.

The Central Somers Town project is self-funding, with the receipts from the private sale housing used to cross subsidise the delivery of the public realm, Edith Neville Primary School, nursery, community play facilities and community hall, in line with the wider vision for the Central Somers Town area.

This development is coming forward as part of the Community Investment Programme (CIP) which is a strategic programme focussed on ensuring the best use of the Council's assets to improve, shape and transform key places and services within Camden, whilst simultaneously addressing a critical capital funding gap. The programme includes a significant number of regeneration schemes across the Borough and involves the disposal of property assets that are surplus to requirements in order to unlock funding that will be reinvested in schools, the Better Homes programme and other supporting community infrastructure.

The reduction in government funding, including the money no longer available for schools, means that the Council has to be more innovative in how they make the best use of buildings and land to improve facilities. Working across the Council a borough-wide strategy has been initiated called 'The Community Investment Programme' (CIP) with the purpose of addressing this funding shortfall. The programme is making an important contribution to the delivery of objectives within the Camden Plan, particularly through harnessing the benefits of economic growth, tackling inequality, investing in communities to secure sustainable neighbourhoods and delivering value for money.

Under the CIP there are a number of objectives which need to be achieved:

- *High quality schemes achieving high sustainability standards, including minimum BREEAM 'Excellent' ratings;*

- *Deliver 'fit for purpose' community facilities;*
- *Reduce revenue and capital costs through the efficient use of land and buildings;*
- *Increase revenue and capital value;*
- *Deliver affordable and private homes;*
- *Deliver improved public realm*

Central Somers Town CIP
The Council has a significant property portfolio in the Somers Town area. Primarily this is made up of residential stock but also includes schools, a play project, children's centres and nurseries. These facilities provide an important service to children and their families and form an important part of bringing the wider community together. The area also contains two distinctive areas of public open space, these being Polygon Open Space and Purchese Open Space, which are maintained by the Council and provide a key component in how Somers Town functions as a place to live and work.

Central to the CIP is the Edith Neville Primary School and Children's Centre which were constructed as buildings with a short life expectancy. Remedial works have been necessary (both planned and unplanned) to keep it in service but the pressing need for replacement has been widely agreed for a considerable period of time.

Central Somers Town area is being addressed strategically as part of the CIP to tackle the significant need for investment. The scheme is intended to be self-funding, with the provision of residential development being utilised to pay for the redevelopment of the primary school and community facilities. It will also be possible to provide wider benefits through the delivery of an element of new affordable housing as well as public realm and public open space improvements.

2. THE SITE

Plots 5 and 6 are located at the corner of Purchese Street and Hampden Close, London NW1. An aerial image identifying the location of the plots and each of the other plots relative to the existing site is shown in Figure 1.

The plots each consist of a residential housing block – blocks B and C. Block A is also on the Central Somers Town site, at Plot 2 (Charrington Street Housing).

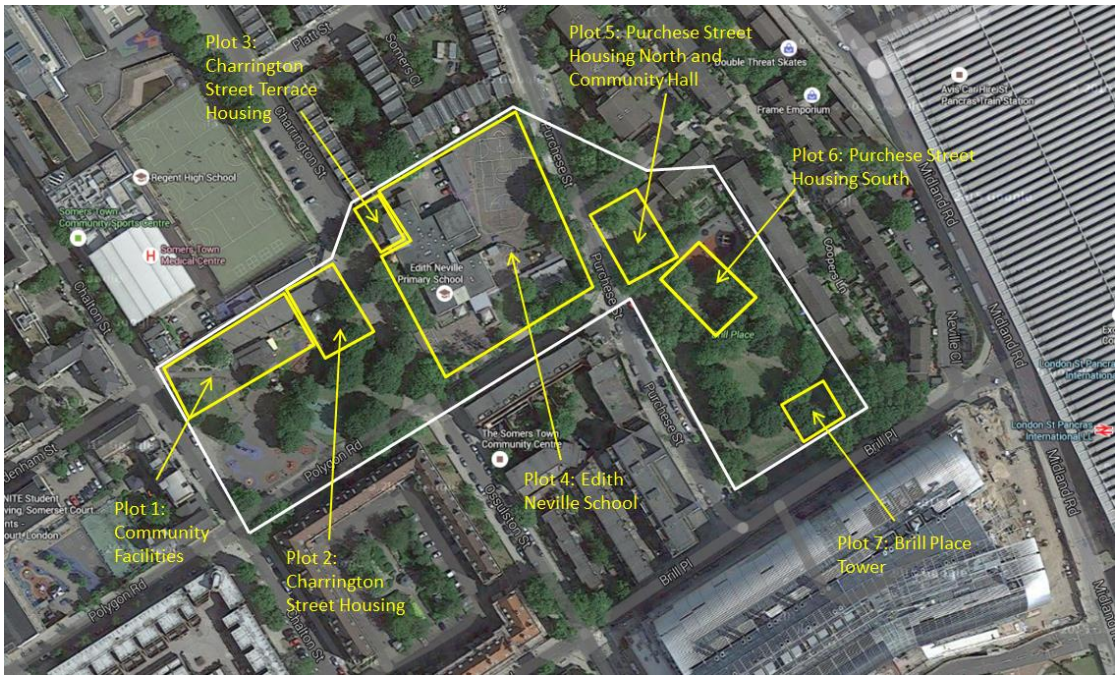

Figure 1: An aerial image of the existing site of the CIP identifying individual plots

Figure 2 identifies locations relevant to the noise survey for these plots, including long term and short term measurement locations ("L1" and "S1"). The nearest noise sensitive receiver was identified to be a residential property on Hampden Close, adjacent to plot 5.

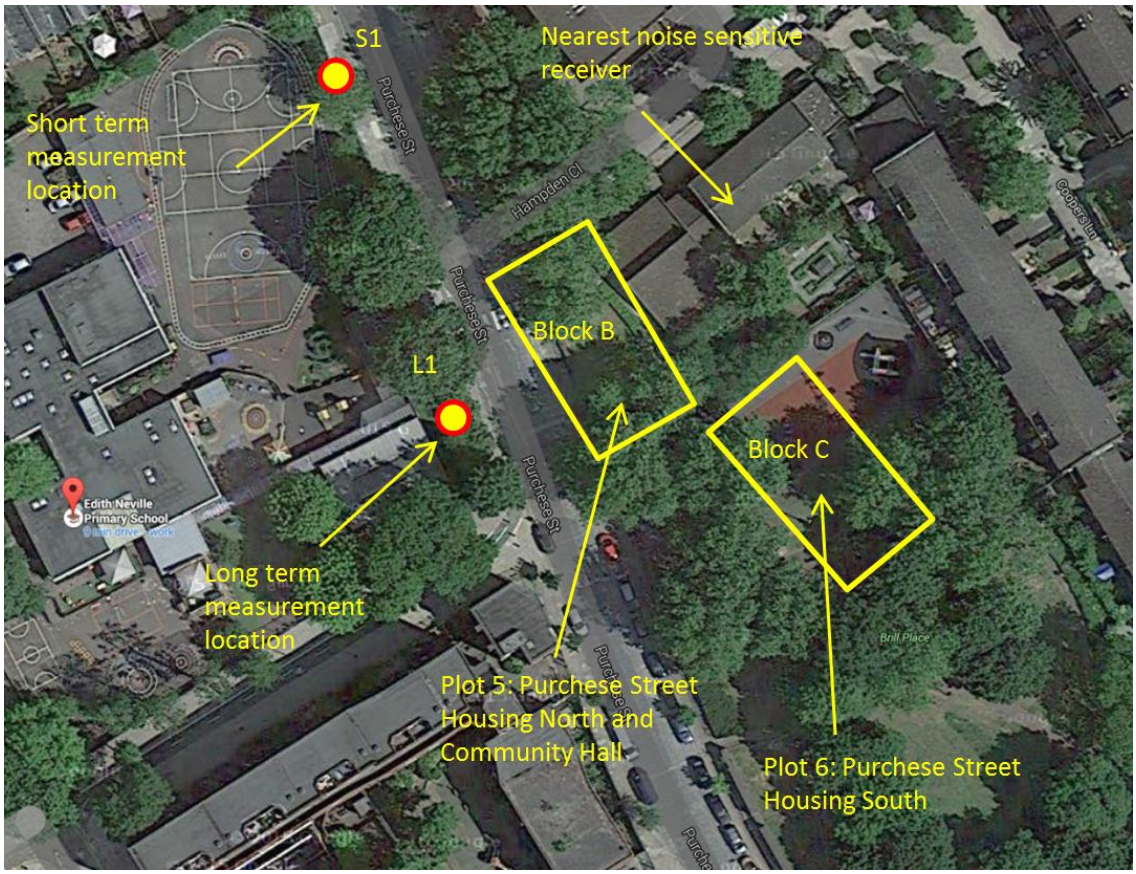

Figure 2: Aerial image of site and noise survey locations

A subjective assessment from a site visit indicates that the local noise environment is relatively benign and is well shielded from traffic noise from the nearby main roads such as Midland Road next to London St. Pancras station. The roads surrounding the site are principally residential. Traffic volume was observed to be low on Purchese Street.

Figure 3: Ground floor plan of proposed Plots 5 and 6 including Community Hall. Drawing correct as at 26/09/2015 – coordination issue.

3. ASSESSMENT CRITERIA

Local Authority Requirements

The site is located within the London Borough of Camden. The Camden Council Local Development Framework (LDF) sets out the planning criteria for noise and vibration used to determine applications for planning permission in the borough. An extract of the sections relevant to this development is provided in Figure 4.

Should noise levels on adjoining roads in the vicinity of Plots 5 and 6 reach the levels in Table B, attenuation measures would be required. Should the noise levels exceed those levels in Table A, planning permission would not be granted. Plant and machinery noise should not exceed 5 dB below background noise as set out in Table E (with additional restrictions placed on tonal or impulsive noise).

Table A: Noise levels on residential sites adjoining railways and roads at which planning permission will not be granted

Noise description and location of measurement	Period	Time	Sites adjoining railways	Sites adjoining roads
Noise at 1 metre external to a sensitive façade	Day	0700-1900	74 dB L_{Aeq} 12h	72 dB L_{Aeq} 12h
Noise at 1 metre external to a sensitive façade	Evening	1900-2300	74 dB L_{Aeq} 4h	72 dB L_{Aeq} 4h
Noise at 1 metre external to a sensitive façade	Night	2300-0700	66 dB L_{Aeq} 8h	66 dB L_{Aeq} 8h

Table B: Noise levels on residential streets adjoining railways and roads at and above which attenuation measures will be required

Noise description and location of measurement	Period	Time	Sites adjoining railways	Sites adjoining roads
Noise at 1 metre external to a sensitive façade	Day	0700-1900	65 dB L_{Aeq} 12h	62 dB L_{Aeq} 12h
Noise at 1 metre external to a sensitive façade	Evening	1900-2300	60 dB L_{Aeq} 4h	57 dB L_{Aeq} 4h
Noise at 1 metre external to a sensitive façade	Night	2300-0700	55 dB L_{Aeq} 1h	52 dB L_{Aeq} 1h
Individual noise events several times an hour	Night	2300-0700	>82 dB L_{Amax} (S time weighting)	>82 dB L_{AMAX} (S time weighting)

Table E: Noise levels from plant and machinery at which planning permission will not be granted

Noise description and location of measurement	Period	Time	Noise level
Noise at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	5dB(A) <LA90
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive façade.	Day, evening and night	0000-2400	10dB(A) <LA90
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade.	Day, evening and night	0000-2400	10dB(A) <LA90
Noise at 1 metre external to sensitive façade where LA90>60dB	Day, evening and night	0000-2400	55dB L_{Aeq}

Figure 4: Extract from Camden Council Local Development Framework - planning criteria for noise and vibration

BS 8233:2014

BS 8233:2014 *Guidance on Sound Insulation and Noise Reduction for Buildings* sets out desirable limits for indoor ambient noise levels for dwellings from steady external noise sources (see Table 1).

Activity	Location	07:00-23:00	23:00-07:00
Resting	Living room	35 dB $L_{Aeq,16h}$	–
Dining	Dining room / area	40 dB $L_{Aeq,16hr}$	–
Sleeping	Bedrooms	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

Table 1: Proposed indoor ambient noise limits (from BS 8233:2014 Table 4)

It is proposed that the levels in BS 8233:2014 are adopted as the basis for assessing the façade sound insulation requirements.

BS 8233 advises that these noise limits should apply in background ventilation conditions i.e. with trickle vents open (if applicable).

In circumstances where noise levels are above the proposed indoor ambient noise limits, BS 8233 advises that a relaxation of up to 5 dB may be applied if the development is considered necessary or desirable. This would still achieve reasonable internal conditions.

Building Regulations

The Building Regulations Approved Document E 2003 (incorporating 2004, 2010, 2013 and 2015 amendments) applies to this development. Key requirements of Approved Document E detail the minimum acceptable airborne sound insulation and maximum impact noise performance standards.

It is proposed that a performance uplift of 5 dB with respect to the airborne sound insulation and impact noise performance is targeted for Plots 5 and 6.

Note, the 5 dB uplift over Approved Document E standards also aligns with the Mayor's preferred standards set out in the Mayor's Sustainable Design and Construction SPG (2006).

BS 4142 (2014)

BS 4142:2014 *Methods for Rating and Assessing Industrial and Commercial Sound*, has now replaced BS 4142:1997. In BS 4142:1997 plant noise ratings were compared with the existing local background noise levels, and if the rating level was more than 10 dB below the measured background noise level then this would be a positive indication that complaints are unlikely.

In BS 4142:2014, a noise rating is still determined and compared with the existing local background sound level (i.e. as before) although several more cumulative acoustic feature corrections to the noise rating are available to apply where appropriate. For example if the noise includes a distinguishable tone, impulse, intermittency or other readily distinguishable sound characteristic, then additional *cumulative* penalties individually ranging from 0 to 9 dB may be applied depending on the type of noise.

BS 4142:2014 seeks to determine a "representative" background sound level, stating that "…*the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods*".

The assessment of the impact depends upon the margin by which the rating level of the specific sound source exceeds the background sound level (i.e. as before) but also promotes a consideration of the context in which the sound occurs when making an assessment. BS 4142:2014 states that an initial estimate of the impact of the specific sound is made by subtracting the measured background sound level from the rating level, while considering the following points:

a) Typically, the greater this difference, the greater the magnitude of the impact.
b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

Note then, a BS 4142:2014 assessment may deduce a low impact where the specific sound level is approaching the background sound level, and thus may conclude that the specific noise is acceptable.

4. NOISE SURVEY

An unattended noise survey was undertaken between the 30th April and 5nd May 2015 to establish existing environmental noise conditions at the site.

In addition, short term attended measurements were carried out on 23rd October 2014.

Procedure

A long term unattended noise survey (approx. 113 hours) was conducted on the site of the existing Edith Neville School on 30 April - 5 May 2015 by MFLLP, in order to determine typical mean (L_{Aeq}), maximum (L_{Amax}) and background (L_{A90}) sound levels in the vicinity of the proposed developments. The survey location is identified in Figure 2 ("L1").

Additionally, a short term attended survey was carried out on Purchese Street on 23rd October 2014 between 10-11.30 am on the site boundary, also identified in Figure 2 ("S1").

All noise measurements were made with a Norsonic 140 precision sound level analyser with a Norsonic weather protection kit. This equipment complies with BS EN IEC 61672 class 1. The meter uses a Nor 1225 free-field response microphone and NOR 1209 microphone pre-amplifier. The calibration of the sound level meter was checked at the beginning and end of measurements with a Nor 1251 sound calibrator, complying with BS EN IEC 60942 class 1. No significant calibration deviation occurred. Details of the equipment are given in Appendix A.

The microphone of the sound level meter was mounted on a tripod and positioned adjacent to the boundary fence between Edith Neville School and Purchese Street. The sound level meter was set up to make consecutive 15-minute measurements and left unattended to capture noise data for duration of the survey period starting at 15:45 on Thursday 30th April 2015.

For the duration of the survey the weather was dry and clear with light winds. The weather conditions are not considered to have had a significant impact on the noise survey results.

Results

The time history of the results from the long term survey (at location L1) is shown in Figure 5. Derived values from the data are presented in Table 2 .

The short-term Purchese Street survey (location S1) yielded a range of ambient noise levels of 56-60 dB(A) $L_{Aeq,5\ mins}$ with an average of 58 dB(A).

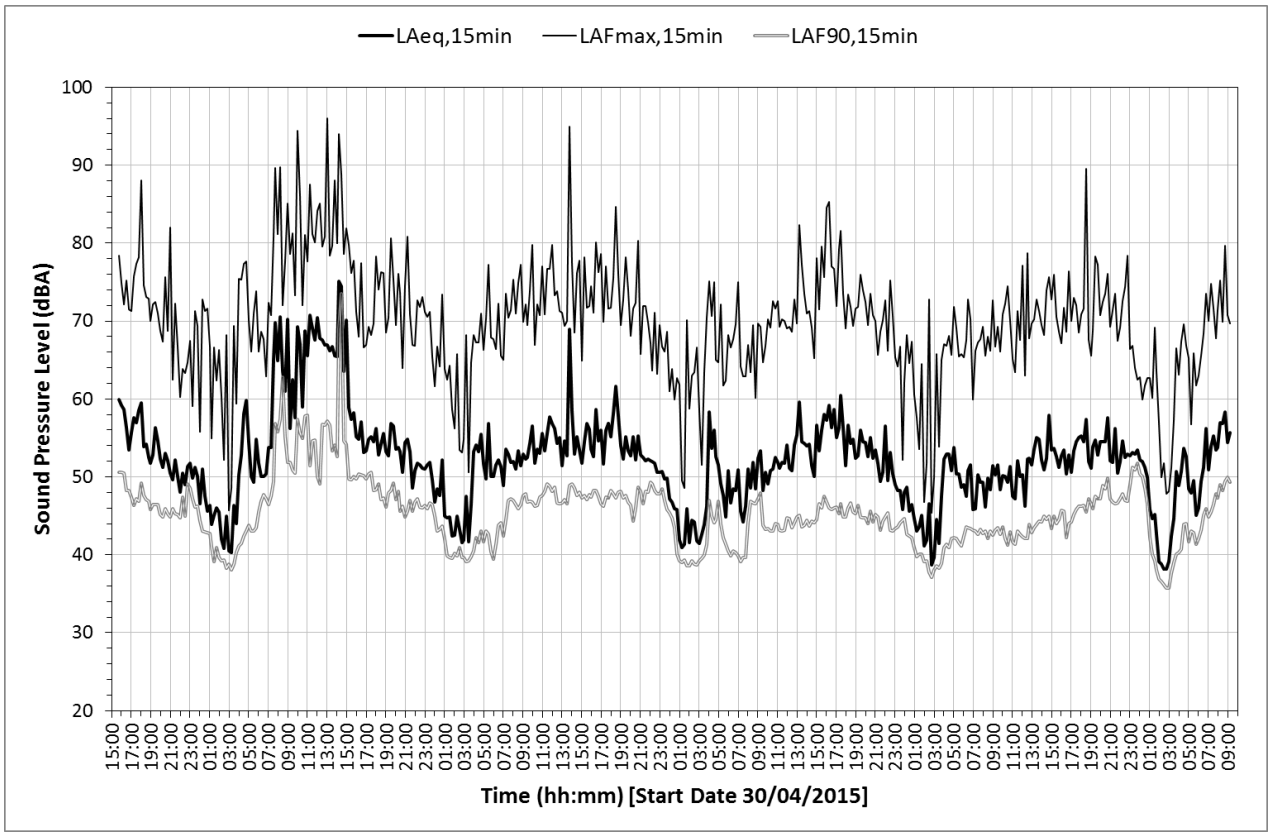

Figure 5: Long term noise survey (Location L1) results (free-field)

Date	Period	$L_{Aeq,15mins}$ dB (average)	$L_{ASmax,15mins}$ dB (90th percentile)	$L_{AF90,15mins}$ dB (40th percentile)
Friday 1st May	Day 16 hours (07:00-23:00)	66	N/A	N/A
	Day 12 hours (07:00-19:00)	67		51
	Evening 4 hours (19:00-23:00)	53		46
	Night 8 hours (23:00-07:00)	51	82	42
Saturday 2nd May	Day 16 hours (07:00-23:00)	56	N/A	N/A
	Day 12 hours (07:00-19:00)	57		47
	Evening 4 hours (19:00-23:00)	53		48
	Night 8 hours (23:00-07:00)	50	74	41
Sunday 3rd May	Day 16 hours (07:00-23:00)	54	N/A	N/A
	Day 12 hours (07:00-19:00)	54		44
	Evening 4 hours (19:00-23:00)	53		45
	Night 8 hours (23:00-07:00)	49	72	40
Monday 4th May	Day 16 hours (07:00-23:00)	53	N/A	N/A
	Day 12 hours (07:00-19:00)	52		43
	Evening 4 hours (19:00-23:00)	54		47
	Night 8 hours (23:00-07:00)	50	70	41

Table 2: Summary of long term noise survey at location L1 (free-field)

Background Sound Level Assessment Methodology

BS 4142:2014 seeks to determine a "representative" background sound level, stating that "…*the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods*". A definitive method of selecting a representative background sound level is not prescribed in BS 4142:2014, although an example is presented where the modal value is selected from a statistical analysis.

In our experience, a reasonable approach is to adopt the repeatable method of selecting the 40th percentile value of the L_{AF90} data periods. This generally accounts for potentially unrepresentative high values and untypical events, while usually representing values near the median of the remaining 'valid' distribution.

5. NOISE EXPOSURE

The long term data in Table 2 is used to derive expected noise levels at the proposed facades. It is considered that data taken from Saturday 2nd May is most representative of external ambient noise levels at the façade of the proposed Plot 5 and 6 development. Data taken on Friday 1st May is considered to have been affected by activity noise from the school due to the proximity of the measurement location to the playground. Site observations and results from the short term survey on Purchese Street on Thursday 23rd October 2014 corroborate this.

Local Authority Requirements

Table 3 sets out these noise levels in comparison to the levels above which attenuation measures would be required by Camden Council in the Local Development Framework Table B (see Figure 4).

Period	Expected Façade Exposure L_{Aeq} dB	Noise levels above which attenuation measures will be required (Camden Council LDF Table B) L_{Aeq} dB
Day 12 hours (07:00-19:00)	57	62
Evening 4 hours (19:00-23:00)	53	57
Night 8 hours (23:00-07:00)	50	52
Individual noise events (Night)	74 L_{ASmax}	82 L_{ASmax}

Table 3: Expected Façade Exposure and Camden Council LDF limits

Measured results suggest that the average and maximum noise levels determined at L1 are below noise levels above which attenuation measures will be required by Camden Council.

BS 8233:2014 Assessment

Expected internal noise levels have been calculated based on the measured external noise levels and sound insulation of an indicative building façade.

Location	Expected Façade Exposure L_{Aeq} dB	Indicative Façade Sound Reduction dB	Calculated Indoor Ambient Noise Level LAeq dB	BS 8233:2014 desirable limit LAeq dB
Living room (07:00-23:00)	56	24	32	35
Dining room/area (07:00-23:00)	56		32	40
Bedroom (07:00-23:00)	56		32	35
Bedroom (23:00-07:00)	50		26	30

Table 4: Calculated Indoor Ambient Noise Level and BS 8233:2014 guidlines

The indicative façade performance is based on typical façade construction with no specific acoustic attenuation measures – a light-weight wall construction, standard glazing and standard trickle vents with no acoustic treatment. With this type of construction, internal noise levels are well within the guideline indoor ambient noise level limits in BS 8233:2014 as set out in Table 4.

6. EXTERNAL PLANT NOISE EMISSIONS

Noise Emission Limits

The Camden Council policy (Section 3.1) requires that plant noise does not exceed a level that is 5 dB below the external background noise or 10dB below if the noise has a 'distinguishable, discrete, continuous note' or 'distinct impulses'.

The representative background sound levels determined by a methodology consistent with BS 4142 (2014) were presented in Table 2. It is considered that data taken from Saturday 2nd May is most representative of background noise levels at the façade of the proposed Plot 5 and 6 development. Data taken on Friday 1st May is considered to have been affected by activity noise from the school due to the proximity of the measurement location to the playground. These levels are adopted as the baseline "background noise" levels.

Plant noise emission limits at a point 1 m outside any window of any noise sensitive façade are as set out in Table 5.

Period	Plant noise emission limit – broadband noise ($L_{Aeq,T}$)	Plant noise emission limit – tonal / impulsive noise ($L_{Aeq,T}$)
Day 12 hours (07:00-19:00)	42	37
Evening 4 hours (19:00-23:00)	43	38
Night 8 hours (23:00-07:00)	36	31

Table 5: Plant noise emission limits for broadband and tonal/impulsive noise

Proposed Fixed Plant Equipment

The Purchese Street Housing blocks are expected to employ continuously running MVHR units to provide ventilation and heat recovery. These will draw air in and out through the facades of each flat.

There may also be externally venting residential kitchen extract fans.

The noise levels emitted externally by these units would normally be comfortably within the limits set out in the previous section at the nearest noise sensitive receiver. Once ventilation strategy has advanced further, additional consideration will be given to any requirements for attenuation e.g. duct attenuators. However it is not anticipated at this stage that these will be necessary.

It is understood that noise emitted by all other plant equipment is negligible.

7. COMMUNITY HALL

A Community Hall is to be included on the ground floor of Block B, at the southern end of the building. The hall is intended to be used by a range of users including community groups, educational clubs, youth groups, and dance / fitness classes.

Due to the potentially high noise levels associated with some of these uses, the building envelope design will be developed to ensure that noise breakout is kept within the existing ambient noise levels at nearby housing in order to minimise any impact. If the building is to be naturally ventilated, the ventilation openings will be appropriately acoustically attenuated. Glazing and external wall constructions will also be specified to achieve a high level of sound insulation. The floor construction separating the Community Hall from the apartments above (and associated flanking details) will be developed to ensure noise transmission is minimised.

8. SUMMARY

A noise survey was carried out by Max Fordham LLP between 30 April 2015 and 4 May 2015.

Ambient noise levels measured during the survey suggest that:

- Noise levels at the facades of the proposed development will not be above levels at which attenuation measures would be required by Camden Council
- Guideline indoor ambient noise levels set out in BS 8233:2014 can be achieved with standard façade building elements.

Background noise levels measured during the survey suggest that:

- Depending on whether plant noise emissions are broadband or tonal/impulsive, noise emission limits should be set to 37-42 dBA during the day (07:00-19:00), 38-43 dBA during the evening (19:00-23:00), and 31-36 dBA during the night (23:00-07:00)
- Noise emissions for plant equipment associated with the apartments at the nearest noise sensitive receiver are expected to be comfortably within these limits.

A Community Hall is to be included on the ground floor of Block B. The building envelope design will be developed to ensure that noise breakout is kept within the existing ambient noise levels at nearby housing in order to minimise any impact.

APPENDIX A – NOISE MONITORING EQUIPMENT DETAILS

The measurements were made with a Norsonic 140 precision sound level analyser. This equipment complies with BS EN IEC 61672 class 1. The meter uses a Nor 1225 free field response microphone and NOR 1209 microphone pre-amplifier.

This equipment, summarised in the table below, has been calibrated by a UKAS accredited laboratory in accordance with the laboratory requirements of the United Kingdom Accreditation Service (UKAS) on the dates indicated.

Item	Make	Type	Serial no.	Calibration Intervals	Last Calibrated	Next Due Calibration	Calibration Certificate Number
Class 1 sound level meter	Norsonic	140	1405942	2 years	20/03/2014	20/03/2016	473706412
Microphone	Norsonic	1225	208215	2 years	20/03/2014	20/03/2016	No number – see chart
Microphone preamplifier	Norsonic	1209	15804	2 years	20/03/2014	20/03/2016	473706412
Calibrator	Norsonic	1251	34059	1 year	14/04/2015	14/04/2016	U18539