79 CAMDEN ROAD
& 86-100 ST PANCRAS WAY

noise assessment

November 2013

by URS

REVISION SCHEDULE					
Rev	**Date**	**Details**	**Prepared by**	**Reviewed by**	**Approved by**
1	21.10.13	Draft	Peter Davies	Robbie Pattison	Alf Maneylaws
2	25.11.13	FINAL	Peter Davies	Robbie Pattison	Alf Maneylaws

URS Infrastructure and Environment UK Ltd.
St George's House
5 St George's Road
Wimbledon
London
SW19 4DR

Limitations

URS Infrastructure & Environment UK Limited ("URS") has prepared this Report for the sole use of Barratt West London ("Client") in accordance with the Agreement under which our services were performed as outlined in our fee proposal of 9th July 2013. No other warranty, expressed or implied, is made as to the professional advice included in this Report or any other services provided by URS. This Report is confidential and may not be disclosed by the Client nor relied upon by any other party without the prior and express written agreement of URS.

The conclusions and recommendations contained in this Report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by URS has not been independently verified by URS, unless otherwise stated in the Report.

The methodology adopted and the sources of information used by URS in providing its services are outlined in this Report. The work described in this Report was undertaken between 26 April 2013 and 25 November 2013 and is based on the conditions encountered and the information available during the said period of time. The scope of this Report and the services are accordingly factually limited by these circumstances.

Where assessments of works or costs identified in this Report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

URS disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to URS' attention after the date of the Report.

Certain statements made in the Report that are not historical facts may constitute estimates, projections or other forward-looking statements and even though they are based on reasonable assumptions as of the date of the Report, such forward-looking statements by their nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. URS specifically does not guarantee or warrant any estimate or projections contained in this Report.

Unless otherwise stated in this Report, the assessments made assume that the sites and facilities will continue to be used for their current purpose without significant changes.

Copyright

TABLE OF CONTENTS

1 INTRODUCTION

URS has been commissioned by Barratt West London to provide a noise assessment report in respect of a proposed residential development at 79 Camden Road, London (herein referred to as the 'site'). The site is currently occupied by vacant office buildings.

This report establishes the suitability of the site for residential development in terms of the existing ambient noise levels.

Acoustic terminology used in this report is explained in Appendix A.

2 DEVELOPMENT DESCRIPTION AND SITE LOCATION

2.1 Existing Site Description

The site is located in a mixed residential and commercial area bounded by Camden Road (A503) to the south east and St Pancras Way (A5202) to the south west. Wilmot Place and Rochester Place bound the north-west and north-east of the site respectively.

2.2 Development Description

The proposed residential development comprises 6 blocks up to 7 storeys in height and will provide a total of 166 residential units, including one, two, three and four bedroom private, social-rented and intermediate dwellings. Two areas of outdoor space are proposed in courtyards created by the layout of the proposed development. No car parking is proposed other than for wheelchair users.

3 PLANNING POLICY CONTEXT

3.1 NPPF

The National Planning Policy Framework (NPPF) was introduced in March 2012[1]. The document sets out the Government's planning policies for England and how these are expected to be applied. In relation to noise the Framework replaces the previous guidance document PPG 24 'Planning and Noise'. It should be noted that elements of the methodology contained within PPG 24 are referred to within the noise specific Development Policy of Camden Council (discussed later in this report).

Applications for planning permission must be determined in accordance with the Local Authority Development Plan, unless material considerations indicate otherwise. The NPPF is a material consideration in the determination of planning applications. Planning policies and decision must also reflect, and where appropriate promote, relevant EU obligations and statutory requirements.

The planning system is required to contribute to and enhance the natural and local environment. Consequently, the aim is to prevent both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of noise pollution.

[1] The National Planning Policy Framework, Department for Communities and Local Government, March 2012

The NPPF states that planning policies and decisions should aim to:

- '*avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *mitigate and reduce to a minimum other adverse impacts on quality of life arising from noise from new development, including through the use of conditions;*
- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established [subject to the provisions of the Environmental Protection Act 1990 and other relevant law]; and*
- *identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason*.'

With regards to 'adverse effects' and 'significant adverse effects' the NPPF refers to the Noise Policy Statement for England (NPSE)[2].

The statement sets out the long term vision of the government's noise policy, which is to '*promote good health and a good quality of life through the effective management of noise within the context of policy on sustainable development*'.

This long term vision is supported by three aims:

- '*avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvements of health and quality of life*.'

The long term policy vision and aims are designed to enable decisions to be made regarding what is an acceptable noise burden to place on society.

The 'Explanatory Note' within the NPSE provides further guidance on defining 'significant adverse effects' and 'adverse effects' using the concepts:

- No Observed Effect Level (NOEL) - the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established;
- Lowest Observable Adverse Effect Level (LOAEL) - the level above which adverse effects on health and quality of life can be detected; and
- Significant Observed Adverse Effect Level (SOAEL) - the level above which significant adverse effects on health and quality of life occur.

The three aims can therefore be interpreted as follows:

[2] Noise Policy Statement for England, Department for Environment, Food and Rural Affairs, March 2010

- the first aim is to avoid noise levels above the SOAEL;
- the second aim considers situations where noise levels are between the LOAEL and SOAEL. In such circumstances, all reasonable steps should be taken to mitigate and minimise the effects. However this does not mean that such adverse effects cannot occur; and
- the third aim considers situations where noise levels are between the LOAEL and NOEL. In these circumstances, where possible, reductions in noise levels should be sought through the pro-active management of noise.

The NPSE recognises that it is not possible to have single objective noise-based measures that define the SOAEL, LOAEL and NOEL that are applicable to all sources of noise in all situations. The levels are likely to be different for different noise sources, receptors and at different times of the day.

The NPPF and associated NPSE provide the concepts for defining various levels of effect, but do not translate these into actual noise levels against which a proposed residential development can be assessed as acceptable, acceptable with various degrees of mitigation, or unacceptable. The Noise Exposure Categories of A-D used in PPG 24 which provided this advice no longer form part of the national planning guidance in England. Instead, it is up to individual Local Authorities to interpret the concepts in the NPPF and NPSE and translate them into noise level criteria for residential development to be applied in their area.

3.2 Local Authority Consultation

Liaison with Claire Parsons, Environmental Health Officer at Camden Council has been undertaken to discuss the ambient noise survey and assessment methodology. The following was discussed and agreed:

- Ambient noise survey locations, durations and protocol;
- Due to a lack of detailed information at this stage, a qualitative assessment of construction noise is acceptable;
- In terms of internal noise, the recommended internal levels within BS8233 are appropriate;
- Policy 28 of Camden Council Development Policies relates to how planning applications are considered with regard to potential noise and vibration impacts. An acoustic report is required to ensure compliance with PPG24 and a local interpretation of PPG24 is presented, including an evening period, in addition to the standard day and night-time periods. Noise thresholds are presented during daytime (07:00 to 19:00), evening (19:00 to 23:00) and night-time (23:00 to 07:00) above which planning permission for residential development will be granted subject to attenuation measures, and above which planning permission will not be granted;
- Acceptable noise levels in terms of fixed plant are also presented within Policy 28; and

- A quantitative assessment of road traffic noise is scoped out, based on the understanding that road traffic flows will not be significantly influenced by the proposed development as it is an overall car-free scheme.

It should be noted that Policy 28 sets out two sets of thresholds; one which indicates levels where the Council will grant planning permission subject to specific attenuation measures; and a second series of thresholds for which planning permission will be refused. This is a similar methodology to that used in PPG24.

Whilst it is recognised that PPG24 is now superseded, it states in part that:

"where there is a clear need for new residential development in an already noisy area some or all NECs might be increased by up to 3-dB (A) above the recommended levels."

4 ASSESSMENT METHODOLOGY AND CRITERIA

4.1 Suitability of the Site for Residential Development

The suitability of the site for residential development will be based upon the results of the ambient noise surveys and the thresholds provided in Camden Council's guidance document, provided in Table 1.

TABLE 1: CAMDEN COUNCIL NOISE THRESHOLDS

Noise Description	Period	$L_{Aeq,T}$ (dB), above which attenuation measures will be required	$L_{Aeq,T}$ (dB), at which planning permission will not be granted
Noise at 1 metre external to a sensitive facade	Day (07:00 to 19:00)	62	72
	Evening (19:0 to 23:00)	57	72
	Night (23:00 to 07:00)	52	66
Individual $L_{Amax\ (s)}$ noise events several times an hour	Night (23:00 to 07:00)	>82 dB $L_{Amax(s)}$	-

In terms of internal noise levels, British Standard 8233 'Sound Insulation and Noise Reduction for Buildings - Code of Practice' provides criteria for the assessment of internal noise levels for various uses including residential dwellings.

Table 2 presents the required noise levels in unoccupied spaces according to BS8233. Camden Council have confirmed their recommendation to achieve the 'good' design level.

TABLE 2: INDOOR AMBIENT NOISE LEVELS LISTED BY BS 8233

Criterion	Typical situation	Design range $L_{Aeq,T}$ Good	Design range $L_{Aeq,T}$ Reasonable
Reasonable resting/sleeping conditions	Living rooms Bedrooms[a]	30 30	40 35

[a] for a reasonable standard in bedrooms at night , individual noise events (measured with F time-weighting) should not normally exceed 45 dB L_{Amax}.

In terms of the outdoor spaces (courtyard areas), likely noise levels have been predicted using CadnaA proprietary noise modelling software to calculate the propagation of noise from surrounding traffic flows into these spaces.

Predicted noise levels have been assessed against World Health Organisation (WHO) 'Community Noise Guidelines' 1999 which recommend external environmental daytime and evening limits of 55 dB L_{Aeq} or less over the 16-hour daytime period (07:00 to 23:00) "to avoid minimal serious annoyance", and 50 dB L_{Aeq} "to avoid minimal moderate annoyance"[3].

4.2 Construction Noise

The noise levels generated by construction activities and experienced by any nearby sensitive receptors, such as residential properties, depend upon a number of variables, the most significant of which are:

- the noise generated by plant or equipment used on site, generally expressed as sound power levels (L_W);
- the periods of operation of the plant on the site, known as its 'on-time';
- the distance between the noise source and the receptor; and
- the attenuation provided by ground absorption and any intervening barriers.

At this stage, sufficient details on the construction activities, programme or number and type of construction plant to allow a detailed construction noise assessment are not currently available. Therefore, as agreed with Camden Council, a qualitative approach has been adopted focussing on the likely noisy construction activities, the guidance in BS 5228 2009 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise', and best practice mitigation measures.

4.3 Operational Noise – Fixed Plant

BS 4142: 1997 'Rating industrial noise affecting mixed residential and industrial areas' details a method of rating the acceptability of new noise sources against the background noise level, L_{A90}, at noise-sensitive properties affected by noise from fixed plant associated with developments such as utilities, factories and commercial/industrial units.

In Section 8 "Assessing the noise for complaint purposes" it is stated that an excess above the existing background noise level L_{A90} of up to 5 dB(A) due to noise from fixed plant at a new development is of 'marginal significance'.

An excess of between 5 and 10 dB(A) falls into an intermediate area where local conditions may affect the likelihood of complaints arising (such as local feeling towards the proposed development, the nature of the proposals, etc.). An excess above the background noise level of greater than 10 dB(A) can be taken as an indication that complaints are likely. If the noise level is more than 10 dB below the background noise level then this is a positive indication that complaints are unlikely.

BS 4142 recommends a 'penalty' of +5 dB(A) is applied to the predicted operational noise level if the noise contains the following acoustic characteristics; 'distinct impulses (bangs,

[3] Guidelines for Community Noise, World Health Organization, Geneva, April 1999

clicks, clatters, or thumps)' or a 'distinguishable, discrete, continuous note (whine, hiss, screech, hum etc.)'. This corrected noise level is called the Rating Level.

Camden Council's local interpretation of this standard and consequent noise level thresholds as a result of fixed plant, taken from Development Policy 28, are provided in Table 3.

TABLE 3: CAMDEN COUNCIL NOISE THRESHOLDS

Noise Description	Period	Noise Level
Noise at 1 metre external to a sensitive facade	Day, evening and night (00:00 to 24:00)	5dB(A) < L_{A90}
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive facade		10dB(A) < L_{A90}
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive facade		10dB(A) < L_{A90}
Noise at 1 metre external to a sensitive façade where L_{A90} > 60dB		55dB L_{Aeq}

Although some fixed plant may be introduced as part of the proposed development, sufficient details to allow a detailed assessment of the fixed plant are not available at this stage of the design and therefore no calculation of noise levels at nearby sensitive receptors is currently possible.

Based on past projects of similar schemes it is considered that any potential impact on nearby sensitive receptors arising from proposed fixed plant can be effectively controlled. It is considered that the criteria specified in DP28 can be achieved through the use of standard mitigation strategies including but not limited to screening and in duct attenuation.

A detailed assessment of the noise impacts from the fixed plant can be undertaken as part of detailed design work, employing the methodology provided in BS 4142: 1997 'Rating industrial noise affecting mixed residential and industrial areas'.

4.4 Operational Noise – Road Traffic Flows

The Design Manual for roads and Bridges (DMRB) requires that an assessment is undertaken where the changes in the noise level from a road are greater than 1 dB which approximately equates to a change in road traffic flow of +25%/-20%, implying that road traffic flow changes of up to 25% offer no significant impact in environmental noise terms.

Due to the relatively small scale nature of the proposed development and lack of proposals for associated car parking, road traffic flows on surrounding roads are not expected to change significantly as a result of the proposed development and a negligible impact of environmental noise levels is anticipated. Therefore an assessment of changes on road traffic on noise levels has been scoped out of this assessment.

5 BASELINE NOISE SURVEY

A 24-hour noise survey was undertaken from the 7th to the 8th of August 2013, with microphones protruding 1m from the existing building façade at second floor level on the Camden Road and St Pancras Way facades. In addition, shorter term attended noise monitoring was undertaken at two further (street level) locations on the 8th August 2013.

Following consultation with Camden Council, an additional longer term noise survey was undertaken between 29th August and 3rd September 2013, replicating the monitoring positions at second floor level on the Camden Road and St Pancras Way façades.

The approximate measurement positions at the site are shown in Figure 1 and are described in Table 4.

The noise climate was dominated by road traffic on Camden Road (A503), and local traffic on surrounding roads including St Pancras Way (A5202).

Additional noise sources included occasional aircraft flyovers. However, these were considered insignificant, relative to road traffic noise.

FIGURE 1: SITE LOCATION AND MEASUREMENT POSITIONS

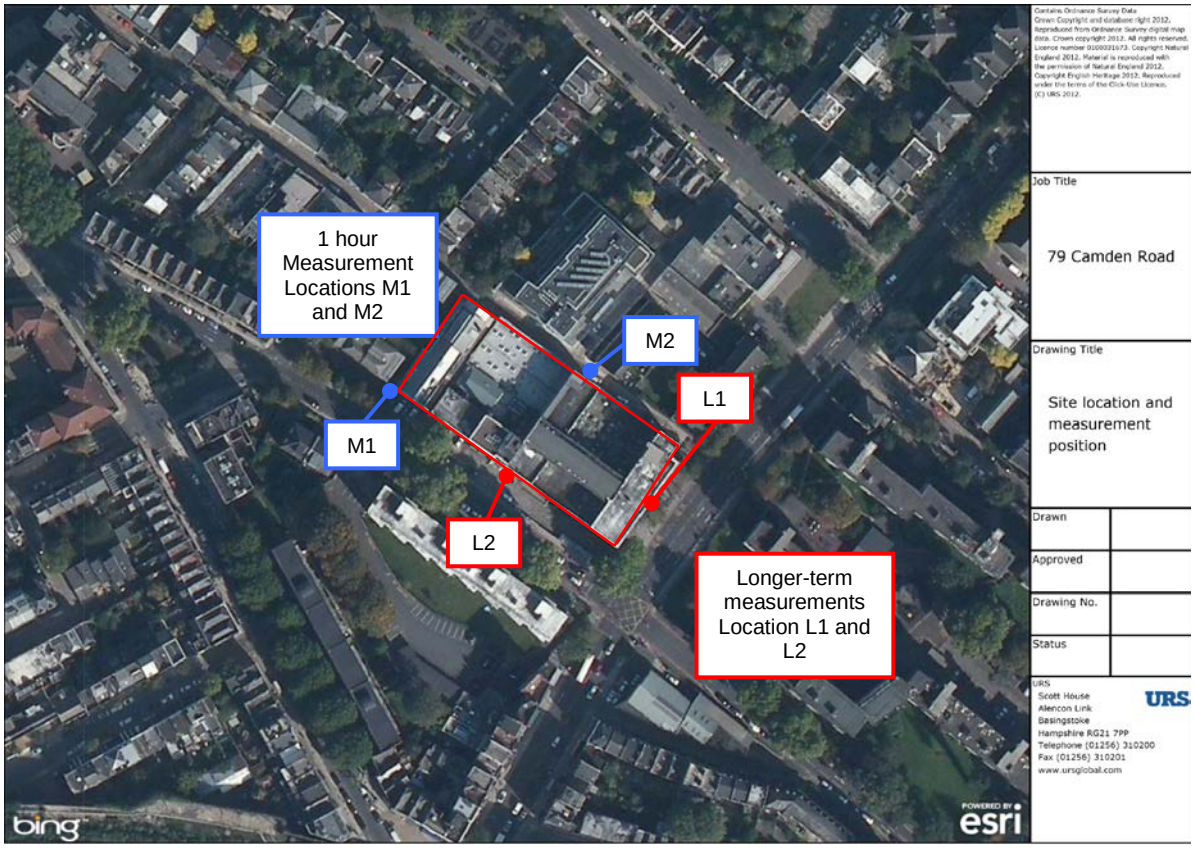


TABLE 4: MEASUREMENT LOCATION DESCRIPTIONS	
Location	**Description of Location**
L1 (Long-term monitoring)	Located on the existing façade of 79 Camden Road building at second floor, at an approximate distance of 8 m from the edge of the Camden Road (microphone height approximately 8 m above ground level).
L2 (Long-term monitoring)	Located on the existing façade of St Pancras Way building at second floor, at an approximate distance of 10 m from the edge of St Pancras Way (microphone height approximately 10m above ground level).

TABLE 4: MEASUREMENT LOCATION DESCRIPTIONS	
Location	**Description of Location**
M1 (Short-term monitoring)	Located at the approximate façade position of the proposed development buildings at the south - west of the existing building, at an approximate distance of 8 m from the edge of St Pancras Way (microphone height 1.5m above ground level).
M2 (Short-term monitoring)	Located at the approximate façade position of the proposed development buildings at the north east of the existing building, at an approximate distance of 1m from the edge of Rochester Place (microphone height 1.5m above ground level).

5.1 Instrumentation

Six integrating sound level meters (SLMs), of type Rion NL-52 or NL-31 along with Rion NC-74 Type 1 field calibrators were used to undertake the measurements. The instruments were calibrated before and after all measurements and no significant calibration drift was detected (~0.2 dB). The SLMs were programmed to log environmental noise parameters including $L_{Aeq, T}$, L_{A90}, and L_{AFmax}.

For the long term surveys, the SLMs were set to continuously log the noise levels over 15 minute sampling periods at position L1 and L2. For the short term surveys, 60 minute measurements were undertaken at M1 and M2, using 5 and 15 minute sampling periods respectively. Calibration certificates for the noise monitoring equipment are available upon request. A summary of equipment used for the noise survey work is presented below in Table 5.

TABLE 5: SURVEY EQUIPMENT			
Location	**Item**	**Model**	**Serial Number**
L1 (7th to 8th August 2013)	SLM	RION NL52	00420767
	Microphone	RION UC59	03575
	Calibrator	RION NC74	351173436
L1 (29th August to 3rd September 2013)	SLM	RION NL31 (fast) and RION NL31 (slow)	00672929 (fast) and 00672930 (slow)
	Microphone	RION UC53A (fast) and RION UC53A (slow)	312393 (fast) and 312385 (slow)
	Calibrator	RION NC74	34304647
L2 (7th to 8th August 2013)	SLM	RION NL52	00420766
	Microphone	RION UC59	03575
	Calibrator	RION NC74	351173436
L2 (29th August to 3rd September 2013)	SLM	RION NL32	01172390
	Microphone	RION UC53A	313190
	Calibrator	RION NC74	34304647
M1	SLM	RION NL52	00420763
	Microphone	RION UC59	03572
	Calibrator	RION NC74	351173436

M2	SLM	RION NL52	00420765
	Microphone	RION UC59	03574
	Calibrator	RION NC74	351173436

5.2 Meteorological Conditions

The weather conditions at the beginning and end of the survey periods were dry with measured wind speeds less than 5m/s. Based on meteorological data available on-line, similar conditions prevailed throughout the survey.

5.3 Data analysis and Results

The measured levels at the long-term measurement positions are considered to be representative of the typical noise environment experienced on site. The measured data shows typical daily trends associated with road traffic.

The results of the long term noise monitoring are summarised in Tables 6 and 7. The full results are provided graphically in Appendix B.

The calibration certificates for the noise monitoring equipment are available upon request.

TABLE 6: LONG TERM NOISE SURVEY RESULTS (POSITION L1)

Day	Date	Ambient Level $L_{Aeq,T}$ dB			Typical (average) Background Level $L_{A90,15min}$ dB		
		Daytime (0700 - 1900)	Evening (1900 - 2300)	Night-time (2300 - 0700)	Daytime (0700 - 2300)	Evening (1900 - 2300)	Night-time (2300 - 0700)
Wednesday to Thursday	7/8.08.13	72	72	68	63	61	54
Thursday	29.08.13	73*	71	69	63	62	56
Friday	30.08.13	73	72	70	63	62	59
Saturday	31.08.13	73	72	72	62	62	59
Sunday	01.09.13	73	75	69	61	61	53
Monday	02.08.13	73	73	68	63	61	54
Tuesday	03.08.13	74*	-	-	64*	-	-
Average		73	73	69	63	62	56

*Not full measurement period

TABLE 7: LONG TERM NOISE SURVEY RESULTS (POSITION L2)

Day	Date	Ambient Level $L_{Aeq,T}$ dB	Typical (average) Background Level $L_{A90,15min}$ dB

		Daytime (0700 - 1900)	Evening (1900 - 2300)	Night-time (2300 - 0700)	Daytime (0700 - 2300)	Evening (1900 - 2300)	Night-time (2300 - 0700)
Wednesday to Thursday	7/8.08.13	67	66	62	59	56	49
Thursday	29.08.13	67*	64	61	58	56	50
Friday	30.08.13	67	65	64	58	56	52
Saturday	31.08.13	65	65	64	56	56	52
Sunday	01.09.13	64	67	62	56	56	47
Monday	02.08.13	67	67	63	58	55	48
Tuesday	03.08.13	66*	-	-	58*	-	-
Average		66	66	63	58	56	50

*Not full measurement period

Over the course of the long term monitoring $L_{Amax\ (s)}$ noise levels did exceed 82 dB several times in an hour. In the worst case this occurred twice in a single night. Over the whole survey period it occurred on nine separate occasions. It is noted that this means that attenuation measures will be required in accordance with DP28.

The results of the short term noise monitoring are presented in Table 8.

TABLE 8: SHORT TERM NOISE SURVEY RESULTS

Position	Date & Time	Ambient Noise Level $L_{Aeq,1h}$ dB	Background Noise Level $L_{A90,1h}$ dB
M1	08/08/2013 11:25	64	50
M2	08/08/2013 11:25	58	47

6 ASSESSMENT

6.1 Existing Noise Environment

The average day period and evening period noise levels at 1m from the façade on Camden Road (Position L1) were 73 dB $L_{Aeq,12hr}$ and 73 dB $L_{Aeq,4hr}$ respectively. The average night period noise level at the same position was 69 dB $L_{Aeq,8hr}$.

The average day period and evening period noise levels at 1m from the façade on St Pancras Way (Position L2) were 66 dB $L_{Aeq,12hr}$ and 66 dB $L_{Aeq,4hr}$ respectively. The average night period noise level at the same position was 63 dB $L_{Aeq,8hr}$.

To correct the measured façade levels to free field levels for the purposes of the assessment 3 dB has been subtracted in each case. Whilst not explicitly stated in DP28, PPG24 makes reference to the free field correction[4] on more than one occasion.

[4] An adjustment applied to a noise level measured at 1m from a façade, to represent the free field level (i.e. in the absence of vertical reflective surfaces).

It is noted that the free field correction has been utilised for similar successful planning applications in the borough, such as Twyman House at 31 - 39 Camden Rd, London NW1 9LR in April 2011.The results of our survey reveal that the worst case façade is on Camden Road. The corrected free field noise levels associated with this façade are 70 dB $L_{Aeq,12hr}$, 70 dB $L_{Aeq,4hr}$ and 66 dB $L_{Aeq,8hr}$ for day, evening and night periods respectively.

As a consequence of the free field levels specified above as well as the noise level maxima exceeding 82 dB $L_{Amax\ (s)}$ several times within an hour on several occasions, it is concluded that the proposal can be granted planning permission subject to appropriate attenuation measures.

6.2 Indoor Spaces

'Good' design levels as specified in Table 5 of BS 8233 are specified by Camden Council as required internal noise criteria for a residential proposal of this nature. The 'good' criterion for reasonable resting/sleeping conditions is specified as 30 dB $L_{Aeq,T}$. This applies to habitable spaces (i.e. both living rooms and bedrooms need to meet this requirement).

Recommendations have been made by the Department of Environmental Health for Camden to design internal areas such that habitable areas are:

- situated away from elevations exposed to noise sources such as road traffic noise;
- stacked such that bedrooms are placed adjacent/above/below bedrooms; and
- stacked such that living rooms are placed adjacent/above/below living rooms.

6.3 Preliminary Façade Recommendations

The façade of the proposed residential blocks adjacent to Camden Road will be subjected to the highest external noise levels and will therefore have the most onerous sound insulation requirements. With regards to noise intrusion, the path of least resistance is typically via the glazed elements of a building envelope. In the worst case for this proposal the external free field noise level incident on the Camden Road façade is 70 dB $L_{Aeq,12hr}$. If habitable spaces were to be located along this façade, glazing would be required to achieve a noise reduction of 40 dB.

Guidance for good sleeping conditions is provided by the World Health Organisation stating that it is believed that indoor sound pressure levels should not exceed approximately 45 dB $L_{Amax\ (f)}$ more than 10-15 times per night. The tenth highest maximum noise level (fast weighting) typically measured overnight is 86 dB $L_{Amax\ (f)}$. To ensure that internal levels meet WHO guidelines significant glazing mitigation measures will be required.

Where habitable spaces are located on southern façades, glazing specifications will ensure that internal noise levels as recommended by Camden Council will be achieved. Insulated Glass Units by Pilkington in the Optiphon™ range offer examples of glazing that can achieve the required noise attenuation performance. Finalised floor plans showing the locations and floor areas of habitable spaces along with their respective fenestration are required in order to provide specific glazing performance recommendations.

6.4 Courtyard Level

Noise modelling has been undertaken to predict noise levels in the proposed courtyard areas. The model was validated against the baseline measurements. The massing of the proposed development was then added to the noise model to determine the effects of self-screening and to predict noise levels in the courtyards.

The noise model of the existing Site was developed in CadnaA©[5] which employs the Calculation of Road Traffic Noise prediction methodology.

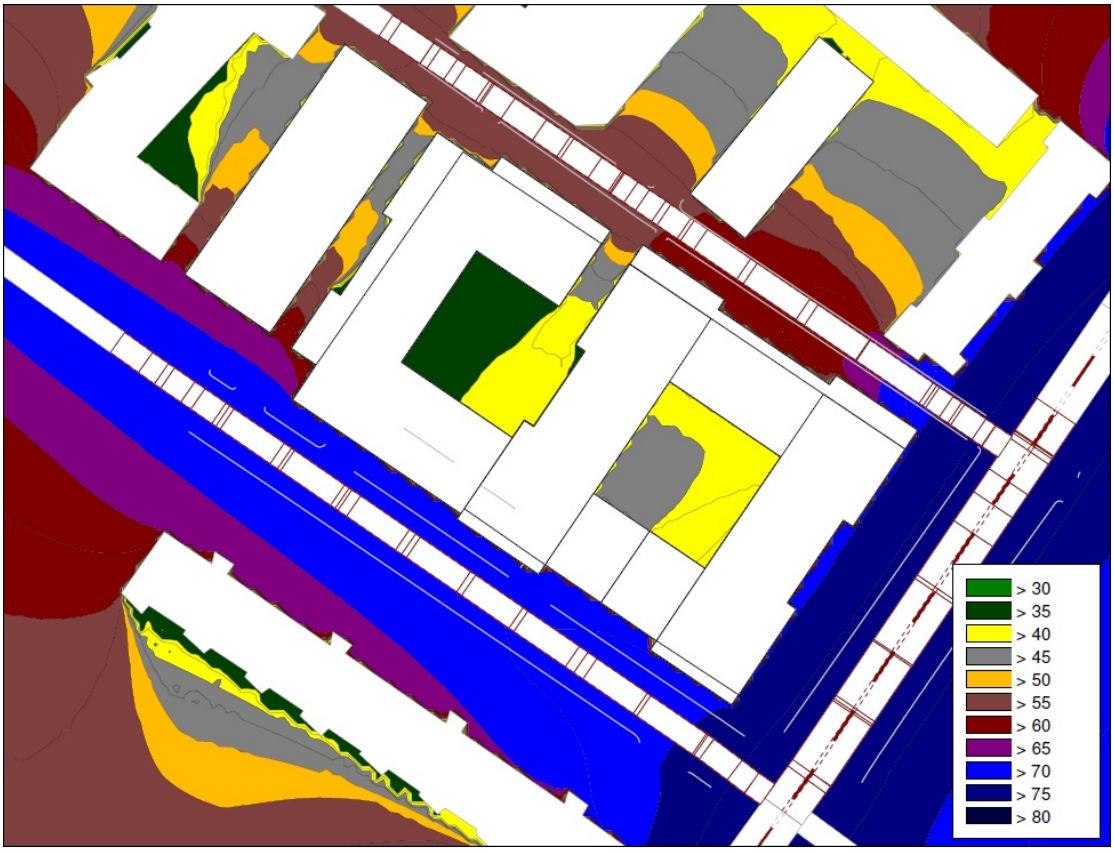
A noise contour plot for daytime has been prepared for the proposed development. This is presented in Figure 2.

The proposed building massing will sufficiently screen the courtyard area opening on Rochester Place from the main noise source of road traffic. Noise levels in the courtyard opening onto St Pancras Way are effectively screened by the glazed concierge office. It is noted that the footprint of the concierge office has been simplified in our noise model. The height of the glazed structure has been set to 3.5m from the ground floor. This is based upon information given in Sheppard Robson drawing number 4998-20-120 dated 07.08.2013. It is also noted that the courtyards are in fact below the ground floor. Consequently the predicted noise levels shown in figure 2 are deemed to be conservative, and road traffic noise within these amenity areas are expected to be better than those reported in this document.

The assumptions and input data used for the noise model are presented in Appendix C.

[5] CadnaA®, registered trademark of Datakustik GmbH (Munich, Germany). (www.datakustik.com)

FIGURE 2: DAYTIME NOISE LEVELS (dB L_{Aeq}) IN COURTYARDS AND AROUND THE SITE



We note further comment from the Department of Environmental Health for Camden. This refers to the location of amenity space and recommends that it is away from noise sources such as road traffic noise (including any proposed balconies on properties).

6.5 Rooftop Garden

The model compiled in order to assess amenity spaces at lower ground level was further adopted to assess the potential for noise impact from local roads upon the proposed roof gardens.

Noise levels of 43 dB $L_{Aeq,16hr}$ in the roof garden proposed on Block A and 48dB $L_{Aeq,16hr}$ within the roof garden proposed between Blocks D and E have been predicted. These levels are below recommended levels within both BS 8233 and WHO guidance. More specifically, WHO Community Guidelines state that based on annoyance studies:

'To protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB L_{Aeq} for a steady, continuous noise. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound pressure level should not exceed 50 dB L_{Aeq}'.

6.6 Demolition and Construction Noise

Best Practicable Means will be employed to keep the level of noise and vibration generated on site as low as reasonably practicable. Measures to be considered in implementing best

practicable means will be consistent with recommendations of BS 5228 and include the following;

- Considerate selection of plant and construction methods. Only plant conforming to relevant national, EU or international standards or directives will be used;
- Careful programming to ensure activities which may generate significant noise are planned with regard to local occupants and sensitive receptors;
- The recommendations set out in Annex B of BS5228 will be adopted with regard to noise and vibration mitigation options;
- It is considered that noise effects would be the greatest during the initial substructure works (which would include excavation and piling works), and that noise effects would be lowest during the fit-out and landscaping stages of works. Noise effects from structure and envelope works would be in the middle of these two stages.
- It is likely that demolition and construction noise levels will exceed 75 dB L_{Aeq} for temporary periods. Noise mitigation measures should be put into practice during all construction activities to ensure that noise impacts at sensitive receptors are kept to a minimum.
- With appropriate mitigation and management plans in place, it is anticipated that demolition and construction noise impacts will be no worse than **moderate adverse** for limited periods of time. Moderate adverse semantically describes total daytime demolition and construction noise levels exceeding 75 dB L_{Aeq} but for a total of less than 10 days in any 15-day period, or for a total of days less than or equal to 40 in any 6 month period.

6.7 Fixed Plant

A Combined Power Technical Data Sheet has been received from Whitecode Design Associates (06.09.2013). It is understood from Sheppard Robson drawing number 4998-20-101 that the CHP room is situated on the lower ground floor on the north eastern façade adjacent to Rochester Place. No further information regarding the locations of ventilation to atmosphere or exhaust outlet has been provided to date. At this stage therefore a detailed assessment of the noise impact to potentially sensitive receivers as a result of the fixed plant proposed for the Site cannot be carried out. It is considered however that noise control measures can be incorporated into the placement and orientation of the proposed plant to ensure that compliance with BS 4142 and associated local authority criteria is achieved.

The CHP location is noted to be adjacent to habitable spaces (bedroom 1 of duplex SR03 and living / dining area of duplex SO03). In order to preserve amenity within these spaces, significant mitigation measures maybe required. Sound transmission between these spaces will need to be appraised to ensure compliance with internal noise levels recommended by Camden Council. Noise emissions from ventilation and exhaust openings associated from the CHP room will also require assessment in order to achieve compliance with BS 4142.

It is recommended that a detailed acoustic assessment of all fixed plant associated with the building is carried out once plant selections, locations and ventilation systems are confirmed.

7 CONCLUSIONS

URS has been instructed to undertake a noise impact assessment for the proposed development at 79 Camden Road, London Borough of Camden, London NW1 9NF.

The daytime, evening and night period noise levels across the site are dominated by traffic noise from Camden Road (A503) and St Pancras Way (A520).

Reflecting Camden Council planning policy for accessible sites such as that under consideration, the proposed development is essentially for a car free scheme, aside from a limited number of disabled parking spaces. There is unlikely therefore to be a material increase in vehicular trip generation and indeed the removal of the permitted B1 Office use is in fact likely to result in a reduction in historical vehicular movements.

As no areas at the redeveloped Site are allocated for non-disabled parking, the predicted change in local road traffic flows will not be significant and any consequential change in noise level will be negligible.

Due to the prominent noise levels from the nearby traffic, mitigation procedures will be required to meet the internal noise requirements. The sound reduction required to achieve the 'good' design values specified in BS 8233 of 30 dB in habitable spaces can be attained with the installation of appropriate glazing, and ventilation systems inside the building.

The noise levels in the courtyards were predicted using acoustic modelling. The required noise level of 50 – 55 dB L_{Aeq} will be achieved in both of the courtyard areas from the main noise source of road traffic. It is also predicted that noise levels due to road traffic in amenity areas on rooftops will not exceed recommended levels as provided in WHO guidance.

With suitable mitigation treatment and careful consideration of plant design, it is considered that compliance with relevant noise planning policies can be achieved.

APPENDIX A: NOISE TERMINOLOGY

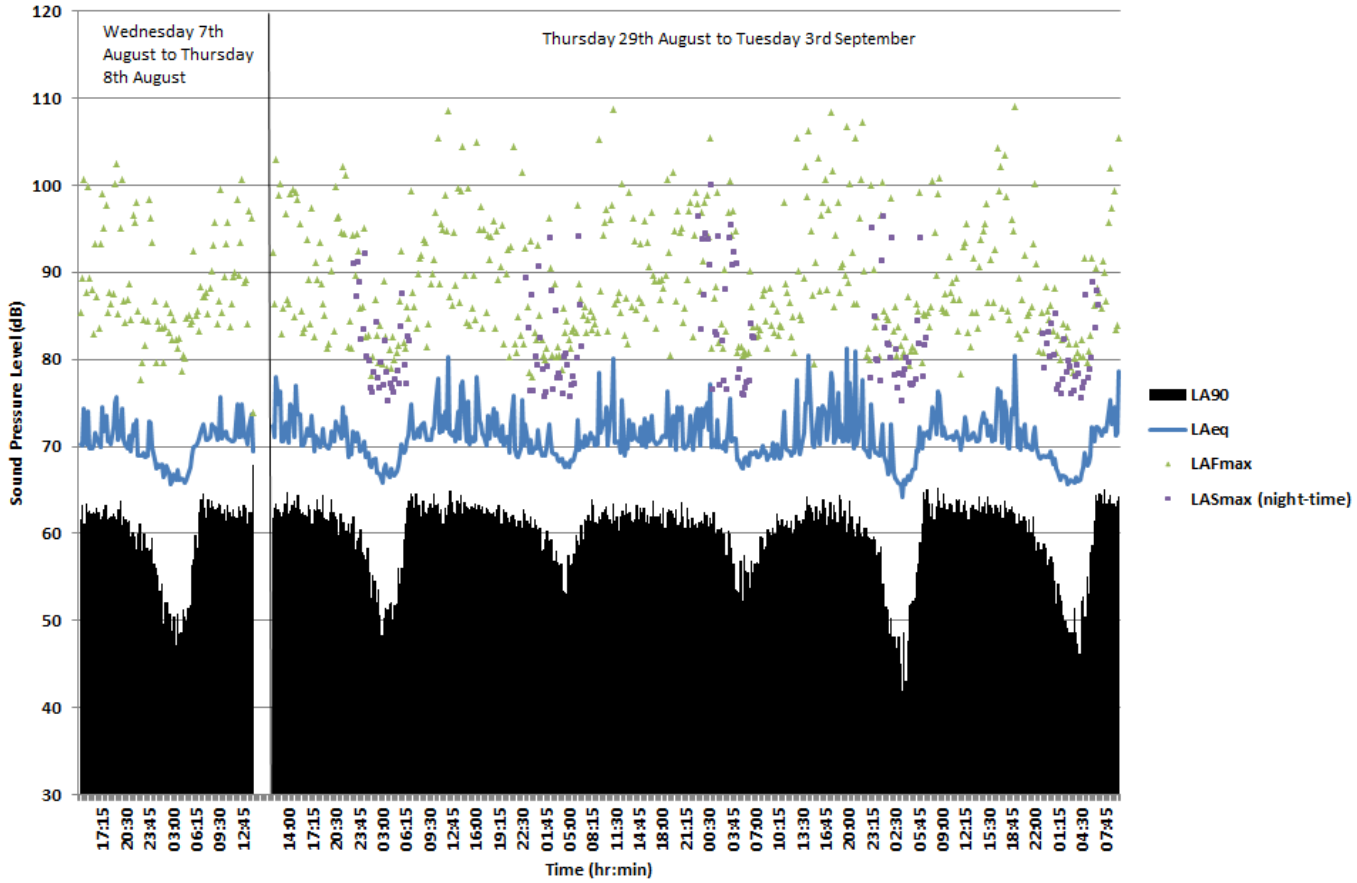
For the purposes of this ES Chapter, the following terminology and abbreviations are used:

- dB(A) – The unit of noise measurement that expresses the loudness in terms of decibels (dB) based on a weighting factor for humans sensitivity to sound (A);
- Hz – Hertz (unit of frequency);
- L_{A1}, L_{A5}, L_{A10}, L_{A50}, L_{A90}, L_{A99} – A-weighted sound pressure level exceeded for 1, 5, 10, 50, 90 or 99% of the measured time;
- L_{Aeq} – Equivalent continuous A-weighted sound pressure level over a given period of time;
- L_{Amax} – The maximum A-weighted sound pressure level over a given period of time. The averaging time used to assess the L_{Amax} can be either fast or slow. Both are defined in BS 5969.
- SWL – Sound Power Level; and
- SPL – Sound Pressure Level.

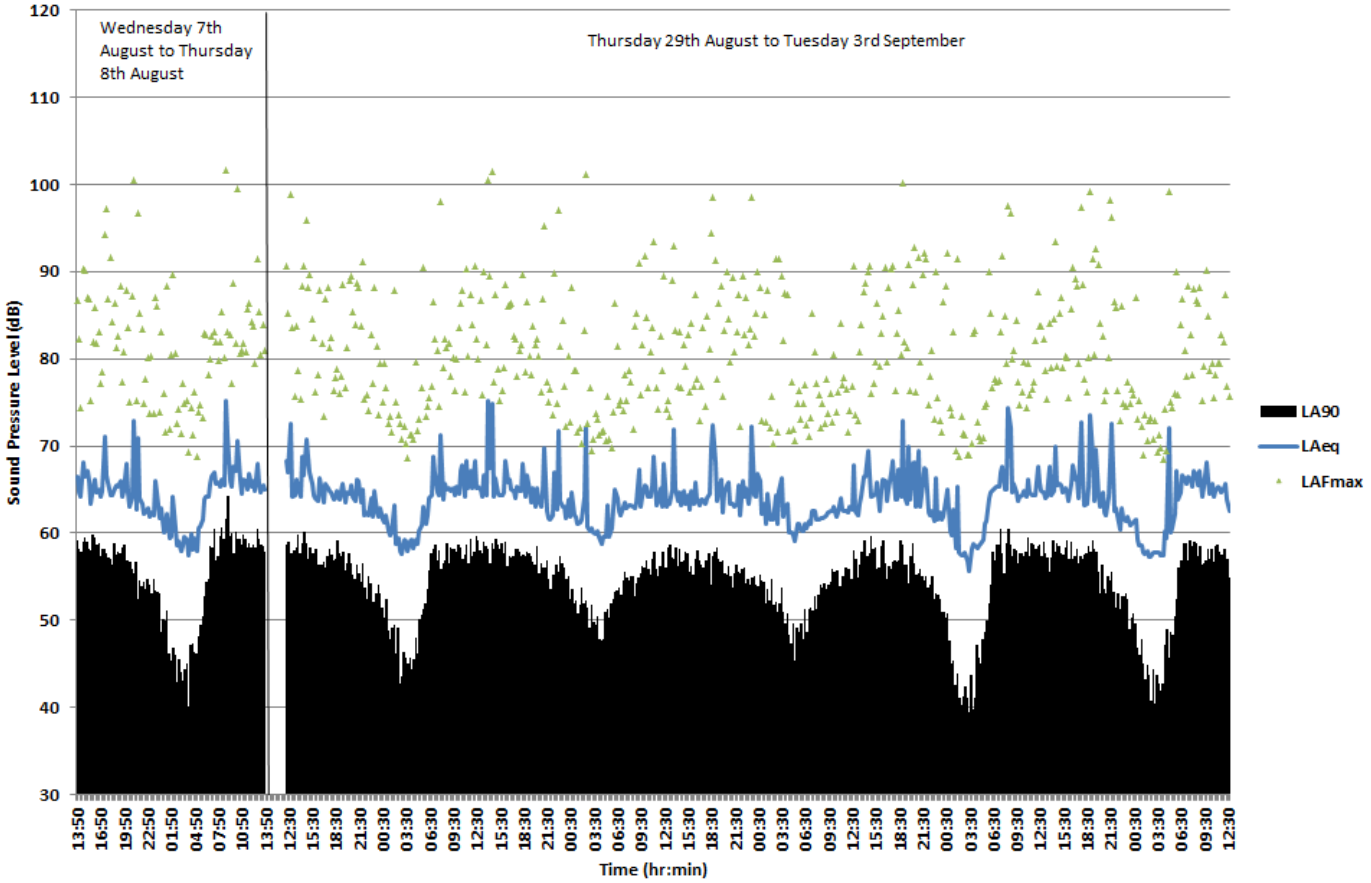
Where decibel (dB (A)) levels are followed by a given noise indicator (e.g. L_{Aeq}), then the annotation will read as dB L_{Aeq}.

APPENDIX B: LONG TERM MONITORING DATA

Camden Road Facade



St Pancras Way Façade



APPENDIX C: NOISE MODEL ASSUMPTIONS / INPUT DATA

Table 9 shows the assumptions and data used for each element of the noise model for the existing site.

TABLE 9: DATA AND ASSUMPTIONS

Model Element	Baseline / Existing Site
Noise Sources / Traffic Noise	The only noise source taken into account is road traffic noise associated with vehicle movements on St Pancras Way (A5202), Camden Road (A503) and Rochester Place The roads have been modelled as 'line sources' and calibrated against the existing average ambient noise levels (L_{Aeq}) measured on site.
Ground Conditions	The majority of the ground within and surrounding the development is concrete as well as the roads around the site. As such, hard ground has been assumed (Ground Absorption G = 0).
Flat Earth	The ground within majority of the site is judged to be relatively flat. DGM (Digital Ground Modelling) data were used for elevation around the new development.
Buildings	Surrounding existing and proposed buildings have been included within the noise model.
Reflections	All buildings have been assumed to have hard reflecting facades. The noise model allows for three reflections of sound from any of the modelled buildings within the site and surrounds.
Atmospheric Absorption	Atmospheric absorption coefficients corresponding to a temperature of 10ºC and a relative humidity of 70% have been used as detailed within ISO9613-1. The corresponding values provide relatively little atmospheric attenuation and are a standard assumption.