NOVA ACOUSTICS
CONSULTANTS

www.novaacoustics.co.uk
info@novaacoustics.co.uk
0113 322 7977

NOISE IMPACT ASSESSMENT

BS8233:2014

8437ML - October 2022

Environmental Noise Survey, Noise Break-In Assessment & Sound Insulation Scheme

Site Address

164-170 High Street,
Yiewsley, Uxbridge UB7

Prepared For

Nirmal Chawla,
Satnam Prop Ltd

1 Agincourt Villas,
Uxbridge Road,
Hillingdon UB10 0NX

Authorisation and Version Control	
Report Prepared By	Mr A Garcigoy, MSc, MIOA
Report Checked By	Mr P Soler, BEng, MIOA, MIET
Report Approved By	Mr A T Martin, MSc, MIOA, MCIEH, MIET, MInstSCE
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Executive summary

An environmental noise survey and noise impact assessment have been undertaken to assess the suitability of the top floor extension at 164-170 High Street, Yiewsley, Uxbridge UB7 7BE for residential development. The measured ambient sound levels have allowed a BS8233:2014 noise assessment to be carried out.

A sound insulation scheme has been provided in Section 4.0, including glazing and an alternative ventilation strategy. These recommendations should be sufficient to achieve the internal and external noise levels for the proposed development according to the BS8233:2014 internal noise criteria. An overview of all recommendations can be found in the table below:

Recommendations and Mitigation Overview
- All glazing along the front façade requires the octave band sound reduction specific in Table 3.0. Appropriate glazing specifications can be found in Table 4.0. - All glazing along the rear facade requires the octave band sound reduction specific in Table 3.0. Appropriate glazing specifications can be found in Table 5.0 - Appropriate acoustically treated alternative ventilation can be found in Table 6.0.

The findings of this report will require written approval from the Local Authority prior to work commencing.

1. Introduction

Overview

NOVA Acoustics Ltd has been commissioned to prepare a noise assessment for a residential development top floor extension ('the Proposed Development') at 164-170 High Street, Yiewsley, Uxbridge UB7 7BE ('the Site').

The applicant is preparing a planning application to be submitted ('the Application') to Hillingdon Council.

The following technical noise assessment has been prepared to support the planning application to Hillingdon Council. This report details the ambient sound climate at the proposed development site and provides a sound insulation scheme to protect the amenity of the occupants of the proposed residential dwellings.

This noise assessment is necessarily technical in nature; therefore, a glossary of terms is included in Appendix A to assist the reader.

Scope & Objectives

The scope of the noise assessment can be summarized as follows:

- Ambient sound monitoring survey to evaluate the prevailing ambient and maximum sound levels incident on the proposed development;
- A detailed assessment of the suitability of the Site, in accordance with relevant standards in respect of sound from the surrounding noise sources; and
- Recommendation of mitigation measures, where necessary, to comply with the requirements of the National Planning Policy Framework (2019), Noise Policy Statement for England (2010) and British Standard BS8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings. Further information on the legislation can be found in Appendix B.

2. Environmental Noise Survey

Measurement Methodology

In order to characterise the sound profile of the area at the proposed development, an environmental sound survey has been carried out from 23/09/2022 to 26/09/2022. The monitoring positions were chosen in order to collect representative sound levels at the proposed development during the day and night. The sound level meter was positioned attached to a lamppost at approximately 4m above the ground level and 5m from the closest window for MP1. For MP2, the sound level meter was positioned on a pole 1m away from the rear façade attached to a drainpipe. The monitoring locations are shown in Figure 1.0.

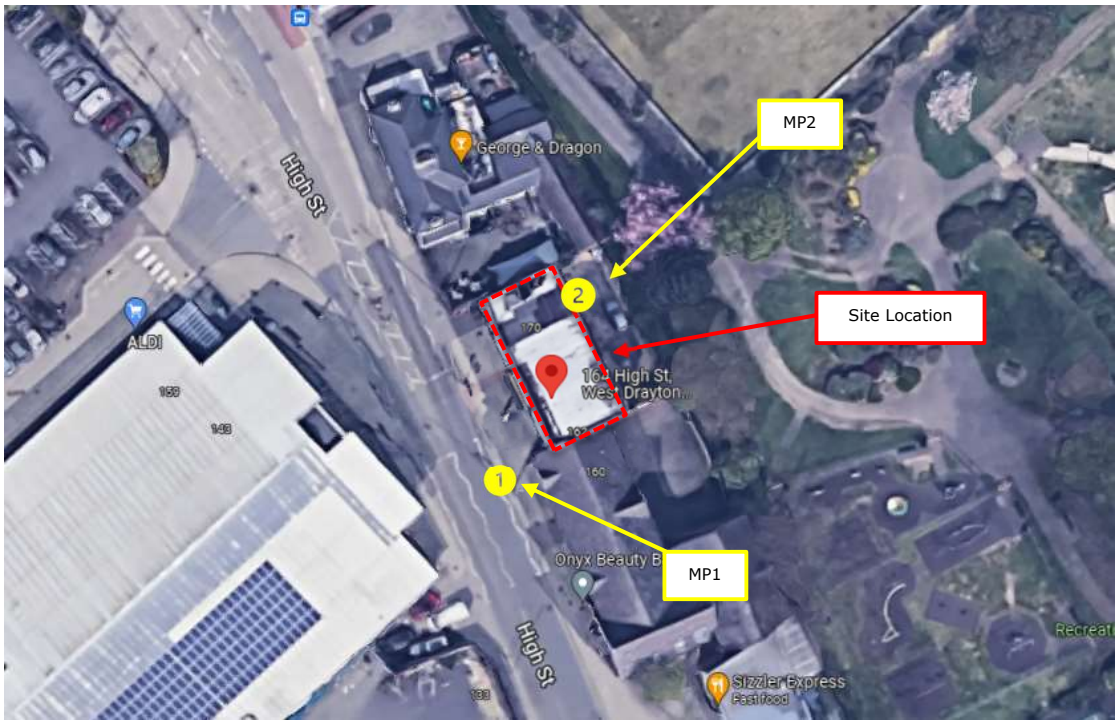


Figure 1.0 - Indicative Site Layout

Context & Subjective Impression

The area surrounding the site is primarily mixed in nature with both residential dwellings and commercial premises. Directly to the southwest of the site runs the High Street, facilitating high levels of traffic flow and it is where the commercial activity takes place, including a large supermarket (Aldi) and various shops (Lily Brow Bar, Mansons Eyecare) and a pub (George & Dragon). The rear of the site backs onto Yeawsley Recreation Ground, an open green space with a skate bowl and various ball sports grounds. The noise profile of the area is dominated by traffic flow coming from the High Street, mixed with other noise sources secondary in nature e.g. patron noise.

Environmental Noise Survey Results

Due to the likely influence of patron noise and because the commercial noise is, at times, readily distinctive against the residual noise climate, the following table outlines the highest octave band

Leq,1hour sound levels measured during the day and night periods that will be used in the noise break in assessment. A full summary of all results can be found in Appendix D.

Measurement Position MP1							
Measurement Period ('t')	**Octave Band $L_{eq,t}$ (Hz)**						**$L_{Aeq,t}$**
	125	**250**	**500**	**1K**	**2K**	**4K**	
Highest Leq,1hour (Day)	73.0	70.0	69.0	69.0	69.0	63.0	73.0
Highest Leq,1hour (Night)	69.0	66.0	67.0	67.0	64.0	57.0	70.0
Measurement Position MP2							
Measurement Period ('t')	**Octave Band $L_{eq,t}$ (Hz)**						**$L_{Aeq,t}$**
	125	**250**	**500**	**1K**	**2K**	**4K**	
Highest Leq,1hour (Day)	55.0	53.0	54.0	53.0	49.0	43.0	56.0
Highest Leq,1hour (Night)	53.0	51.0	54.0	53.0	47.0	38.0	56.0

Table 1.0 – Octave Band Sound Levels during day & night

In the following section, the maximum noise level events are assessed. ProPG states:

"…in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night."

The following table shows a summary of the maximum sound level results.

Measurement Position MP1			
Measurement Period ('t')	**$L_{AFMax,15min,}$**	***SMR $L_{AFMax,15min}$**	**No. Exceedances of 82dB $L_{AFMax,15min}$**
Night 1	100.0	80.0	4
Night 2	96.0	78.0	7
Night 3	86.0	81.0	5
Measurement Position MP2			
Measurement Period ('t')	**$L_{AFMax,15min}$**	***SMR $L_{AFMax,15min}$**	**No. Exceedances of 70dB $L_{AFMax,15min}$**
Night 1	80.0	54.0	2
Night 2	79.0	59.0	6
Night 3	69.0	58.0	0

Table 2.0 – Maximum Sound Level Summary Results

**Statistically Most Repeated*

3. Noise Break In Level Assessment

Noise Break In Assessment

The following section analyses the ambient sound levels incident on the development compared with the internal noise level criteria presented within BS8233:2014. Where octave band sound levels have been assessed these have been compared to the appropriate Noise Rating Curve (NR Curve). To ensure a robust analysis the following considerations have been taken:

- The $L_{AFmax,15min}$ during the night exceeded less than ten times.
- The highest Leq,1hour during the day and nighttime period.

Due to the measuring position MP1 being 5 meters away from the nearest window of the proposed development and traffic noise as the primary source of noise, a 4 dB (10log(r1/r2)) distance correction has been applied to the measured ambient sound levels. The following table outlines the minimum octave band sound reduction required of the building envelope in order to achieve appropriate internal noise levels.

Measurement Position MP1								
Measurement Period ('t')	**Octave Band $L_{eq,t}$**						**$L_{Aeq,t}$**	**$L_{AMax,t}$**
	125	**250**	**500**	**1K**	**2K**	**4K**		
Highest Leq,1hour (Day)	69.0	66.0	65.0	65.0	65.0	59.0	69.0	--
NR30 Curve (dB)	48.1	39.9	34.0	30.0	26.9	24.7	35.0	--
Min. Sound Reduction	21.0	27.0	32.0	36.0	39.0	35.0	34.0	--
Highest Leq,1hour (Night)	65.0	62.0	63.0	63.0	60.0	53.0	66.0	82.0
NR25 Curve (dB)	43.7	35.2	29.2	25.0	21.9	19.5	30.0	45.0
Min. Sound Reduction	22.0	27.0	34.0	39.0	39.0	34.0	36.0	37.0
Measurement Position MP2								
Measurement Period ('t')	**Octave Band $L_{eq,t}$**						**$L_{Aeq,t}$**	**$L_{AMax,t}$**
	125	**250**	**500**	**1K**	**2K**	**4K**		
Highest Leq,1hour (Day)	55.0	53.0	54.0	53.0	49.0	43.0	56.0	--
NR30 Curve (dB)	48.1	39.9	34.0	30.0	26.9	24.7	35.0	--
Min. Sound Reduction	7.0	14.0	20.0	23.0	23.0	19.0	21.0	--
Highest Leq,1hour (Night)	53.0	51.0	54.0	53.0	47.0	38.0	56.0	70.0
NR25 Curve (dB)	43.7	35.2	29.2	25.0	21.9	19.5	30.0	45.0
Min. Sound Reduction	10.0	16.0	25.0	28.0	26.0	19.0	26.0	25.0

Table 3.0 – Octave Band Internal Noise Level Analysis

4. Sound Insulation Scheme

The following section outlines the required sound insulation scheme that should be installed at the proposed development to protect the amenity of the future residents. The sound insulation scheme should be installed prior to occupation and be retained thereafter.

Building Envelope

The noise levels within the proposed dwellings will be dictated by the configuration, materials, and elements of the façade. The non-glazed elements of the facade will contribute significantly to the reduction of ambient noise levels. The façade construction for lightweight or heavyweight constructions will provide ample levels of sound insulation, for the purposes of this report it is assumed the façade provides a minimum sound reduction of 50dB R_w. The following section provides a sound insulation scheme based on the weakest elements of the façade, including the glazing, ventilation and roof construction.

a) Roof Specification

If the development has rooms within the roof space the roof system will require additional sound insulation to achieve appropriate internal noise levels.

Where the roof is being utilized as a voided loft space with thermal insulation the following detailing is not required. Where rooms are within the roof, the ceilings should consist of standard roofing slates, 100mm 45kg/m2 fitted tightly between the 200mm roof joists and 1no. 15mm SoundBloc plasterboard fixed to British Gypsum RB1 resilient bars to achieve a minimum sound reduction of 50dB R_w. Any other configuration of roof that would achieve at least 50dB R_w will be suitable for the development.

For a concrete base roof construction, where rooms are within the roof, the ceilings should achieve a minimum sound reduction of 50dB R_w. Concrete base constructions typically should achieve the minimum sound reduction.

b) Glazing Specification

Windows can be considered the weakest point of a façade in terms of noise reduction from external noise. The glazed elements installed in all the living rooms and bedrooms require the minimum sound reduction as shown in Section 3.0.

The glazing units shown in the following table provide a suitable sound reduction, any other window capable of providing this attenuation will be suitable. The performance is specified for the whole window unit, including frame and other design features. The glazing specifications have been taken from the Pilkington Optiphon Range.

Front Façade – Glazing Configuration								
Location	**Specification**							
Bedrooms	Optiphon 10mm Glass – 20mm Argon – 8.8mm Optiphon							
Description	**125**	**250**	**500**	**1k**	**2k**	**4k**	**R_w**	**$R_w + C_{tr}$**
Sound Reduction	28.0	36.0	43.0	47.0	49.0	58.0	46.0	40.0
Location	**Specification**							
Living Room	Optiphon 8mm Glass – 16mm Argon – 8.8mm Optiphon							
Description	**125**	**250**	**500**	**1k**	**2k**	**4k**	**R_w**	**$R_w + C_{tr}$**
Sound Reduction	21.0	30.0	39.0	47.0	50.0	55.0	42.0	34.0

Table 4.0 – Glazing Specification – Front Façade

Rear Façade – Glazing Configuration								
Location	**Specification**							
Bedrooms	*Double Glazing* 6mm Glass – 16mm Air Cavity – 4mm Glass							
Description	**125**	**250**	**500**	**1k**	**2k**	**4k**	**R_w**	**$R_w + C_{tr}$**
Sound Reduction	21.0	20.0	26.0	38.0	37.0	39.0	*32.0*	*28.0*

Table 5.0 – Glazing Specification – Rear Façade

The glazing suppliers are required to demonstrate the acoustic performance of their proposed system either by providing an acoustic test report in accordance with BS EN ISO 10140-2:2010 or an evidence-based calculation.

c) Ventilation Specification

BS8233 states;

"If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level."

and

"The Building Regulations' supporting documents on ventilation [48, 49, 50] recommend that habitable rooms in dwellings have background ventilation. Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used and sound attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant's choice. Alternatively, acoustic ventilation units are available for insertion in external walls. These can provide sound reduction comparable with double glazed windows. However, ducted systems with intakes on

the quiet side of the building might be required in very noisy situations, or where appearance rules out through-the-wall fans."

An alternative ventilation system should be installed within habitable rooms to fully protect the amenity of future residents. As stated in BS8233:2014 section 5.4.4, having complete enclosure of the noise source or receiver is the most effective barrier of sound. An alternative ventilation strategy allows for maximum sound insulation from the noise source whilst still maintaining a sufficient level of ventilation. It is recommended that the alternative ventilation should provide the same resistance to sound as the glazed elements. The following table provides ventilation systems that meets the above recommendations.

Background Ventilation		
Location	**Model**	**Attenuation (dB)**
Front – Bedrooms	Simon Acoustic EHAS Trickle Ventilation	38dB Open $D_{n,e,w}$
Front – Living Room	Simon Acoustic EHA Trickle Ventilation	36dB Open $D_{n,e,w}$
Rear – Bedrooms	Simon Acoustic FV Trickle Ventilation	32dB Open $D_{n,e,w}$
Through Wall Ventilation (not purge)		
Model		**Attenuation (dB)**
Titon Sonair F+ Mechanical Input Ventilator with G3 filter and DV100F duct [1]		56 dB $D_{n,e,w}$

Table 6.0 – Ventilation Specification

[1] *The self-generated noise from the Titon Sonair F+ when measured at the maximum ventilation capacity of 60m^3/h emits 23.5dB $L_{PA:10m2}$ which is below the required internal noise criteria from BS8233:2014.*

The through wall ventilation specified within the table above is also capable of providing background ventilation. If the mechanical ventilation option is opted for the background trickle ventilation option is not required to be installed.

The ventilation suppliers are required to demonstrate the acoustic performance of their proposed system either by providing an acoustic test report in accordance with BS EN ISO 10140-2:2010 or an evidence-based calculation.

Appendix A – Acoustic Terminology

Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of 20μPa (20x10-6 Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1 / s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20μPa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. Lmax is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. L90 can be considered to be the "average minimum" noise level and is often used to describe the background noise.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L10 can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m
Facade	At a distance of 1m in front of a large sound reflecting object such as a building façade.
Fast Time Weighting	An averaging time used in sound level meters. Defined in BS 5969.

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided. The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at 1m away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

The ear is less sensitive to some frequencies than to others. The A-weighting scale is used to approximate the frequency response of the ear. Levels weighted using this scale are commonly identified by the notation dB(A).

In accordance with logarithmic addition, combining two sources with equal noise levels would result in an increase of 3 dB(A) in the noise level from a single source. A change of 3 dB(A) is generally regarded as the smallest change in broadband continuous noise which the human ear can detect (although in certain controlled circumstances a change of 1 dB(A) is just perceptible). Therefore, a 2 dB(A) increase would not be normally be perceptible. A 10 dB(A) increase in noise represents a subjective doubling of loudness.

A noise impact on a community is deemed to occur when a new noise is introduced that is out of character with the area, or when a significant increase above the pre-existing ambient noise level occurs.

For levels of noise that vary with time, it is necessary to employ a statistical index that allows for this variation. These statistical indices are expressed as the sound level that is exceeded for a percentage of the time period of interest. In the UK, traffic noise is measured as the L_{A10}, the noise level exceeded for 10% of the measurement period. The L_{A90} is the level exceeded for 90% of the

time and has been adopted to represent the background noise level in the absence of discrete events. An alternative way of assessing the time varying noise levels is to use the equivalent continuous sound level, L_{Aeq}.

This is a notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound. To put these quantities into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3 dB, while an increase of more than 25%, or a decrease of more than 20%, in traffic flows represent changes of 1 dB in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds).

Note that the time constant and the period of the noise measurement should be specified. For example, BS4142:2014 specifies background noise measurement periods of 1 hour during the day and 15 minutes during the night. The noise levels are commonly symbolised as $L_{A90,1hour}$ dB and $L_{A90,15mins}$ dB. The noise measurement should be recorded using a 'FAST' time response equivalent to 0.125ms.

Appendix B – Legislation, Policy and Guidance

This report is to be primarily based on the following legislation, policy and guidance.

B.1 - National Planning Policy Framework (2019)

Government policy on noise is set out in the National Planning Policy Framework (NPPF), published in 2019. This replaced all earlier guidance on noise and places an emphasis on sustainability. In section 15, Conserving and enhancing the natural and local environment, paragraph 170e, it states:

Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;

Paragraph 180 states:

Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) *Mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
b) *Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
c) *Limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

B.2 - Noise Policy Statement for England (2010)

Paragraph 180 of the NPPF also refers to advice on adverse effects of noise given in the Noise Policy Statement for England (NPSE). This document sets out a policy vision to:

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

To achieve this vision the Statement identifies the following three aims:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life;*
- *Where possible, contribute to the improvement of health and quality of life.*

In achieving these aims the document introduces significance criteria as follows:

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur. It is stated that "significant adverse effects on health and quality of life should be avoided while also considering the guiding principles of sustainable development".

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected. It is stated that the second aim above lies somewhere between LOAEL and SOAEL and requires that: "all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also considering the guiding principles of sustainable development. This does not mean that such adverse effects cannot occur."

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise. This can be related to the third aim above, which seeks: "where possible, positively to improve health and quality of life through the pro-active management of noise while also considering the guiding principles of sustainable development, recognising that there will be opportunities for such measures to be taken and that they will deliver potential benefits to society. The protection of quiet places and quiet times as well as the enhancement of the acoustic environment will assist with delivering this aim."

The NPSE recognises that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations and provides no guidance as to how these criteria should be interpreted. It is clear, however, that there is no requirement to achieve noise levels where there are no observable adverse impacts but that reasonable and practicable steps to reduce adverse noise impacts should be taken in the context of sustainable development and ensure a balance between noise sensitive and the need for noise generating developments.

Any scheme of noise mitigation outlined in this report will, therefore, aim to abide by the above principles of the NPPF and NPSE whilst recognizing the constraints of the site.

B.3 - BS8233:2014`Guidance on sound insulation and noise reduction for buildings'

The British Standard BS 8233: 2014, Guidance on Sound insulation and noise reduction for buildings provides additional guidance on noise levels from sources without specific character in the built environment, based on the recommendations of the World Health Organization; specifically, WHO Guidelines on Community Noise, 1999. The criteria desirable levels of steady state, "anonymous" noise in unoccupied spaces within dwellings, from sources such as road traffic, mechanical services and other continuously running plant, are tabulated below:

Activity	Location	07:00 – 23:00	23:00 – 07:00
Resting	Living Room	35 dB $L_{Aeq,16hour}$	--
Dining	Dining Room/Area	40 dB $L_{Aeq,16hour}$	--
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

Table 7.0 - BS8233 Internal Noise Level Criteria

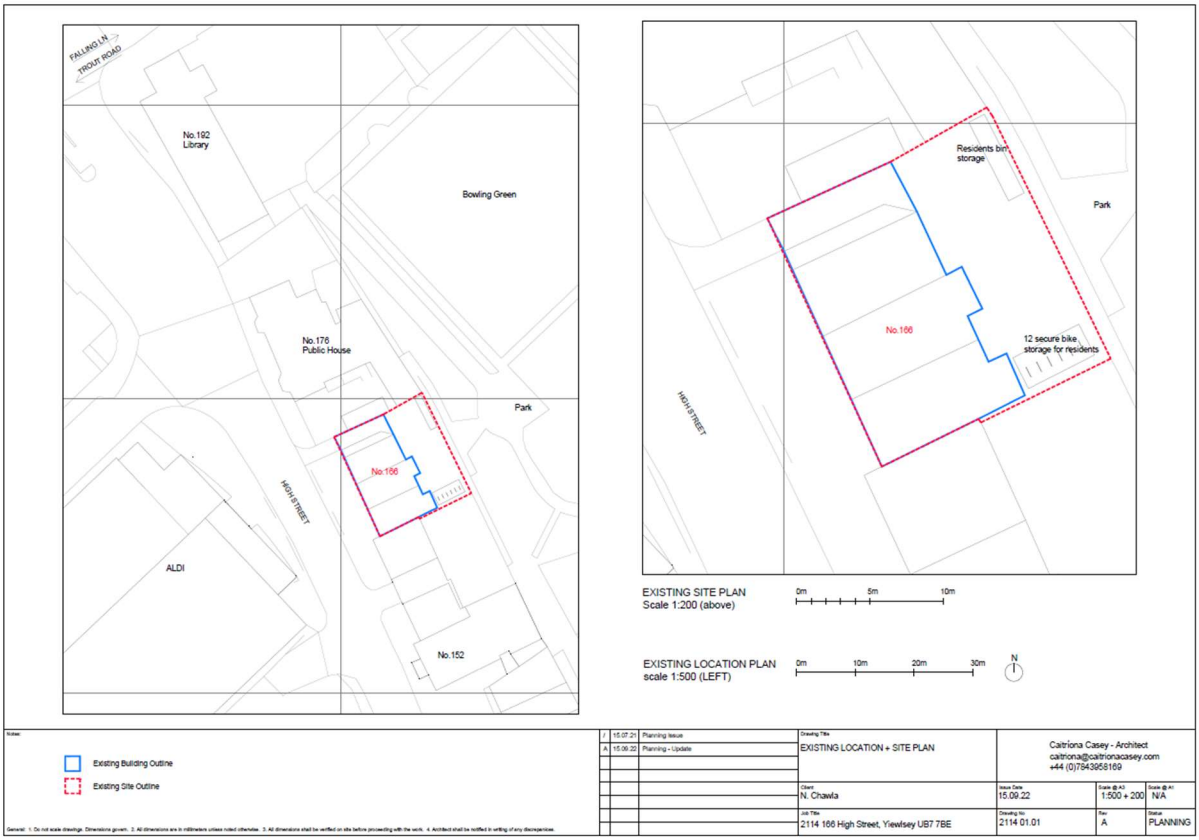
It is noted, however that where development is considered necessary or desirable, despite external noise level above WHO guidelines, the above target levels may be relaxed by up to 5 dB.

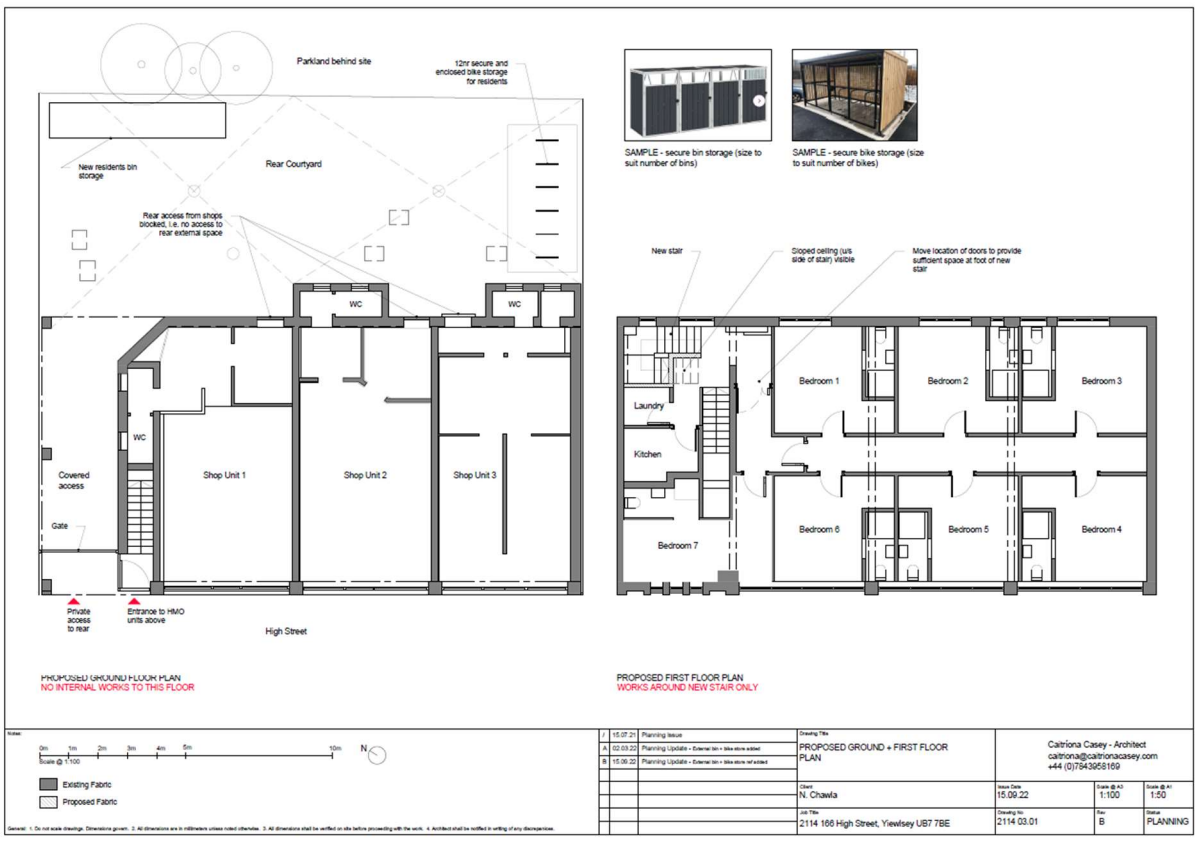
The standard also recommends that for traditional external amenity areas, such as gardens, it is desirable that external noise levels do not exceed 50 dB $L_{Aeq,T}$, and that 55 dB $L_{Aeq,T}$ would be acceptable in noisier environments. However, it is recognised that these values may not be achievable in all areas where development is desirable and in such locations development should be designed to achieve the lowest practicable levels.

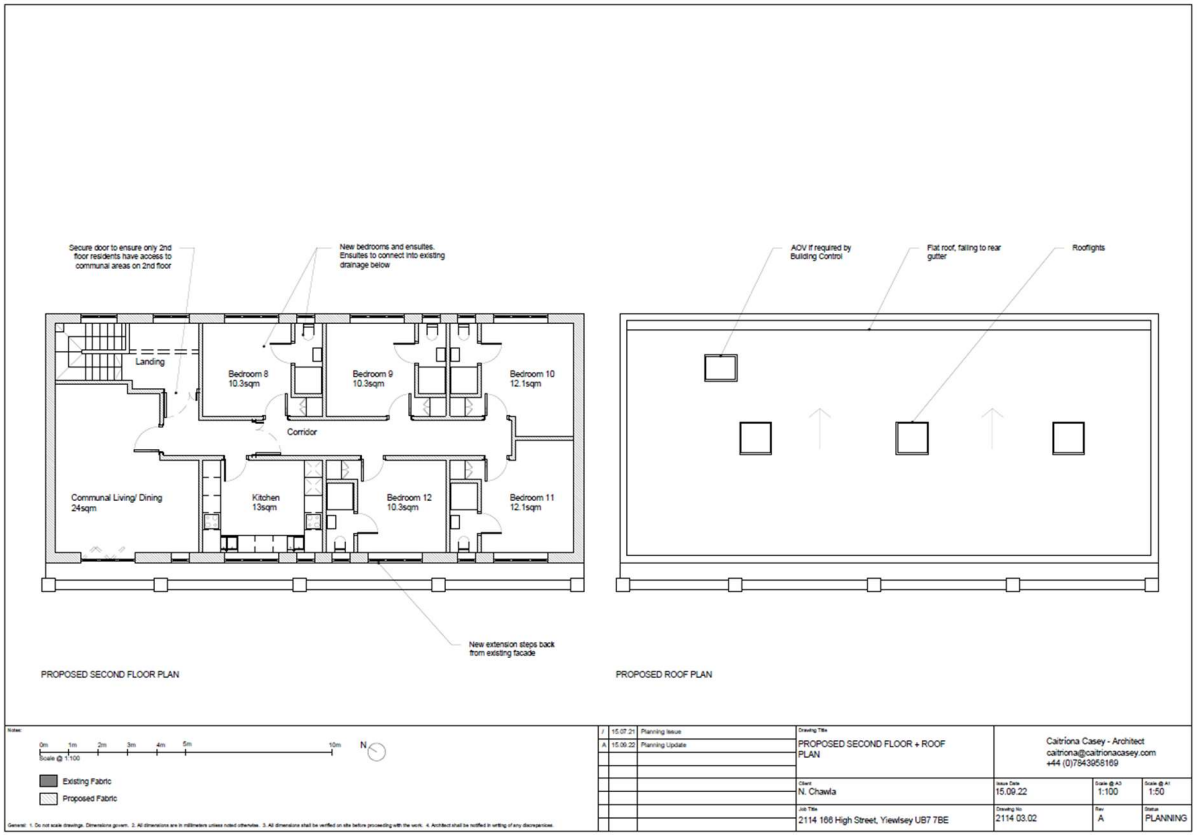
General recommendations for mitigation to enable these targets to be achieved are provided, including the use of bunds and barriers to reduce external noise and space planning and sound insulation for the control of internal noise levels.

For this assessment, the above criteria are considered to be the LOAEL as defined in the NPSE above.

Appendix C – Site Plans






Secure door to ensure only 2nd floor residents have access to communal areas on 2nd floor
New bedrooms and ensuites. Ensuites to connect into existing drainage below
Landing
Bedroom 8 10.3sqm
Bedroom 9 10.3sqm
Bedroom 10 12.1sqm
Corridor
Communal Living/ Dining 24sqm
Kitchen 13sqm
Bedroom 12 10.3sqm
Bedroom 11 12.1sqm
New extension steps back from existing facade
PROPOSED SECOND FLOOR PLAN
AOV if required by Building Control
Flat roof, falling to rear gutter
Rooflights
PROPOSED ROOF PLAN
Existing Fabric
Proposed Fabric
PROPOSED SECOND FLOOR + ROOF PLAN
Caitriona Casey - Architect
caitriona@caitrionacasey.com
+44 (0)7543858169
N. Chawla
15.09.22
1:100
1:50
2114 168 High Street, Yiewlsey UB7 7BE
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Appendix D – Environmental Survey

D.1 Tabulated Summary Noise Data

Measurement Position MP1								
Measurement Period ('t')	Octave Band $L_{eq,1h}$						$L_{Aeq,1h}$	$L_{AMax,1h}$
	125	250	500	1K	2K	4K		
Day 1 – 23/09/2022 – 09:13 – 22:59	71.0	69.0	66.0	68.0	69.0	63.0	73.0	104.0
Night 1 – 23/09/2022 – 23:00 – 06:59	67.0	64.0	62.0	64.0	61.0	52.0	67.0	87.0
Day 2 – 24/09/2022 – 07:00 – 23:59	72.0	69.0	65.0	67.0	65.0	62.0	71.0	100.0
Night 2 – 24/09/2022 – 23:00 – 06:59	67.0	63.0	67.0	67.0	61.0	53.0	70.0	94.0
Day 3 – 25/09/2022 – 07:00 – 22:59	73.0	70.0	69.0	67.0	64.0	59.0	71.0	100.0
Night 3 – 25/09/2022 – 23:00 – 06:59	69.0	66.0	65.0	67.0	64.0	57.0	70.0	86.0
Day 4 – 26/09/2022 – 07:00 – 09:42	69.0	68.0	68.0	69.0	67.0	61.0	73.0	99.0
Graphical Time History								

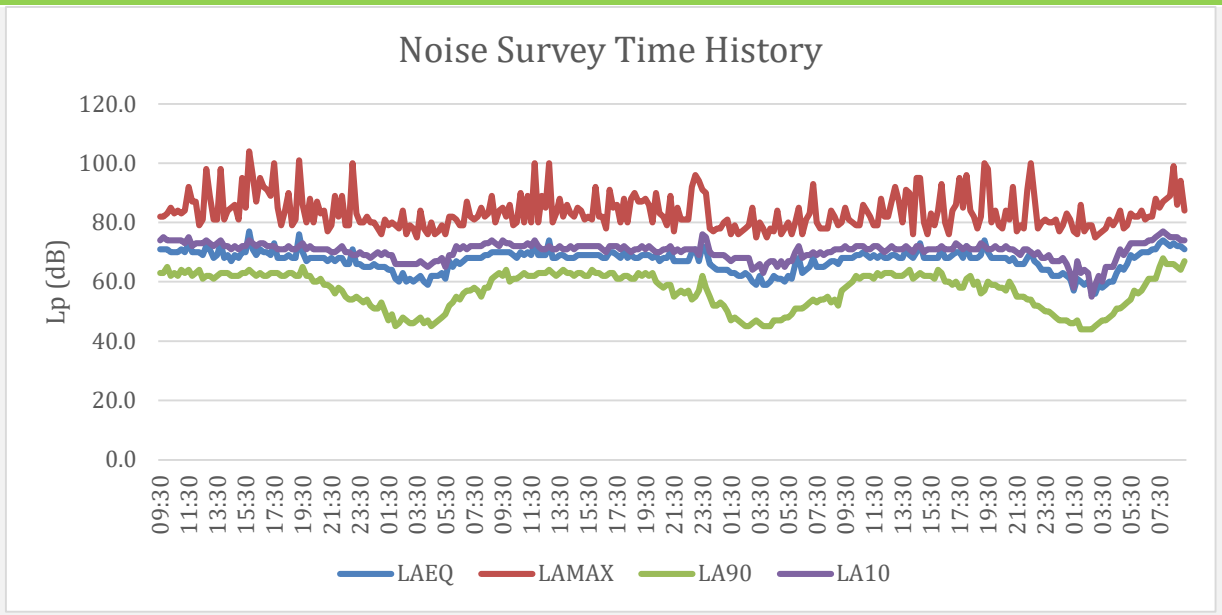

Table 8.0 – Sound Survey Summary Results – MP1

Measurement Position MP2								
Measurement Period ('t')	Octave Band $L_{eq,1h}$						$L_{Aeq,1h}$	$L_{AMax,1h}$
	125	250	500	1K	2K	4K		
Day 1 – 23/09/2022 – 09:38 – 22:59	55.0	52.0	52.0	52.0	49.0	43.0	56.0	83.0
Night 1 – 23/09/2022 – 23:00 – 06:59	53.0	51.0	54.0	51.0	47.0	38.0	55.0	80.0
Day 2 – 24/09/2022 – 07:00 – 23:59	54.0	53.0	54.0	53.0	48.0	38.0	56.0	85.0
Night 2 – 24/09/2022 – 23:00 – 06:59	52.0	51.0	54.0	53.0	47.0	38.0	56.0	79.0
Day 3 – 25/09/2022 – 07:00 – 22:59	55.0	51.0	48.0	49.0	45.0	37.0	52.0	79.0
Night 3 – 25/09/2022 – 23:00 – 06:59	52.0	47.0	45.0	44.0	40.0	35.0	48.0	69.0
Day 4 – 26/09/2022 – 07:00 – 09:32	53.0	50.0	48.0	47.0	44.0	39.0	52.0	74.0

Graphical Time History

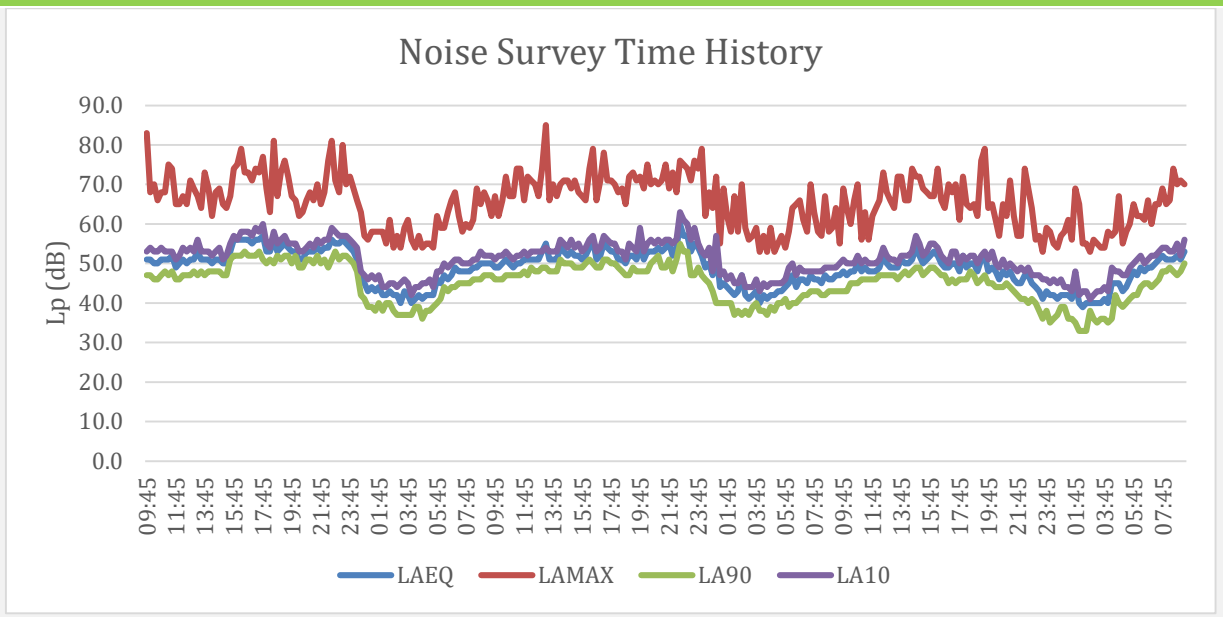

Table 9.0 – Sound Survey Summary Results – MP2

D.2 Surveying Equipment

Piece of Equipment	Serial No	Calibration Deviation
CESVA SC420 Class 1 Sound level meter	T238593	≤0.5
CESVA CB006 Class 1 Calibrator	901013	
CESVA SC420 Class 1 Sound level meter	T250680	≤0.5
CESVA CB006 Class 1 Calibrator	902441	

Table 10.0 – Measurement Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with a negligible deviation of ≤0.5 dB. All sound level meters are calibrated every 24 months and all calibrators are calibrated every 12 months, by a third-party calibration laboratory. All microphones were fitted with a protective windshield for the entire measurements period. Calibration certificates can be provided upon request.

D.3 Meteorological Conditions

As the environmental noise survey was carried out over a long un-manned period no localized records of weather conditions were taken. However, during the set up and collection of the monitoring equipment the weather conditions have been documented in the following table. All measurements have been compared with met office weather data of the area, specifically the closest weather station, the data from the weather station is outlined in the table below. When reviewing the time history of the noise measurements, any scenarios that were considered potentially to be affected by the local weather conditions have been omitted. The analysis of the noise data includes statistical and percentile analysis and review of minimum and maximum values, which aids in the preclusion of any periods of undesirable weather conditions. The weather conditions were deemed suitable for the measurement of environmental noise in accordance with BS7445 Description and Measurement of Environmental Noise. The table below presents the average temperature, wind speed and rainfall range for each 24-hour period during the entire measurement.

Weather conditions – Hillingdon Weather Station				
Time period	**Air temp (°C)**	**Rainfall mm/h**	**Prevailing Wind Direction**	**Wind Speed (m/s)**
23/09/2022 – 00:00 – 23:59	12.3 – 23.9	0.0	SSE	0.0 – 1.9
24/09/2022 – 00:00 – 23:59	9.5 – 19.8	0.0	SE	0.0 – 2.35
25/09/2022 – 00:00 – 23:59	8.3 – 18.1	0.0	SSW	0.0 – 1.65
26/09/2022 – 00:00 – 23:59	10.5 – 16.9	0.0	SW	0.0 – 3.0

Table 11.0 – Weather Summary