Mulgrave Developments Limited

Noise Impact Assessment
T9789 – Ousefield House

25th January 2024

NOISE IMPACT ASSESSMENT

Prepared for:

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Document Control

Version	Date	Author	Reviewed By	Approved By
1.0	25/01/2024	Richard Budesha	John Fisk	John Fisk

Contents

Introduction

Temple Group has been appointed by Mulgrave Developments Ltd to undertake a noise impact assessment for the Proposed Development at Ousefield House, Fulford Road, York.

Prior approval has been given to develop four new detached residential properties subject to several planning conditions. Condition 10 of the prior approval for the development relates to noise and states the following:

"The building envelope of all new-build residential accommodation (plots1-4) shall be constructed so as to achieve internal noise levels in habitable rooms of no greater than 35 dB LAeq (16 hour) during the day (07:00-23:00 hrs) and 30 dB LAeq (8 hour) and LAFMax level during the night (23:00-07:00 hours) should not exceed 45dB(A) on more than 10 occasions in any night time period in bedrooms and should not regularly exceed 55dB(A). These noise levels shall be observed with all windows open in the habitable rooms or if necessary windows closed and other means of ventilation provided.

Reason: To protect the amenity of people living in the new property from externally generated noise and in accordance with the National Planning Policy Framework. The information is sought prior to commencement to ensure that it is initiated at an appropriate point in the development procedure."

The purpose of this report is to demonstrate that the proposed development can be constructed to achieve the criteria in the condition.

Unattended noise measurements have been completed at the site to characterise the existing typical noise environment over the daytime and night-time. The measured noise levels have then been used to inform glazing specifications to ensure that the criteria stipulated by the local authority can be met.

Details of the assessment methodology used, together with the results of the survey undertaken and the subsequent conclusions and recommendations drawn are presented in this report.

A glossary of acoustic terms and their meanings has been included in **Appendix A.**

Noise Principles and Standards Used

This section of the report outlines the policy, technical standards and guidance documents the subsequent noise assessment has been undertaken with reference to. Further Information of each document is Provided in **Appendix B**.

Planning Policy

The National Planning Policy Framework (NPPF)[1]

The Noise Policy Statement for England (NPSE)[2]

The National Planning Practice Guidance (NPPG)[3]

Local Policy

City of York Development Control Local Plan (April 2005)[4]

City of York Local Plan Publication Draft (February 2018)[5]

Technical Standards and Guidance

British Standard 7445 Part-1:2003 (BS 7455) 'Description and measurement of environmental noise. Guide to quantities and procedures[6]

British Standard 8233:2014 (BS 8233) 'Guidance on Sound Insulation and Noise Reduction for Buildings'[7]

The World Health Organisation (WHO) Guidelines for Community Noise[8]

ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise New Residential Development[9]

[1] Department of Communities and Local Government (September, 2023), The National Planning Policy Framework
[2] Defra (March 2010), The Noise Policy Statement for England
[3] Department for Communities and Local Government (DCLG) (July 2019), National Planning Practice Guidance
[4] City of York. Development Control Local Plan (April 2005)
[5] City of York. Local Plan Publication Draft (February 2019)
[6] British Standards Institute (BSI), (2003): 'BS 7445 – Description and Measurement of Environmental Noise. Part 1: Guide to Quantities and Procedures'. BSI, London.
[7] British Standards Institute (BSI), (2014). 'BS 8233 – Guidance on sound insulation and noise reduction for buildings. BSI, London.
[8] World Health Organisation (1999), WHO Guidelines for Community Noise.
[9] IOA, ANC and CIEH (2017), ProPG: Planning & Noise Professional Practice Guidance on Planning &Noise New Residential Development

The Proposed Development and Surrounding

The application site is located on Fulford Road, York. To the east runs Fulford Road; to the north south and west are neighbouring residential properties.

The Proposed Development comprises of four new fully detached residential buildings up to 3 storeys tall, which will be located on the northern half of the site. The existing building Ousefield House in the southern half of the site will remain but is not part of this assessment.

Appendix C shows the site boundary and site plan.

Measurement Methodology

Unattended Noise Monitoring

An unattended environmental noise survey was carried out at the Proposed Development between 6th June and 13th June 2023 to obtain full daytime and night-time ambient noise levels during weekdays and at a weekend. The environmental noise survey was undertaken in accordance with BS 7445: Part 2.

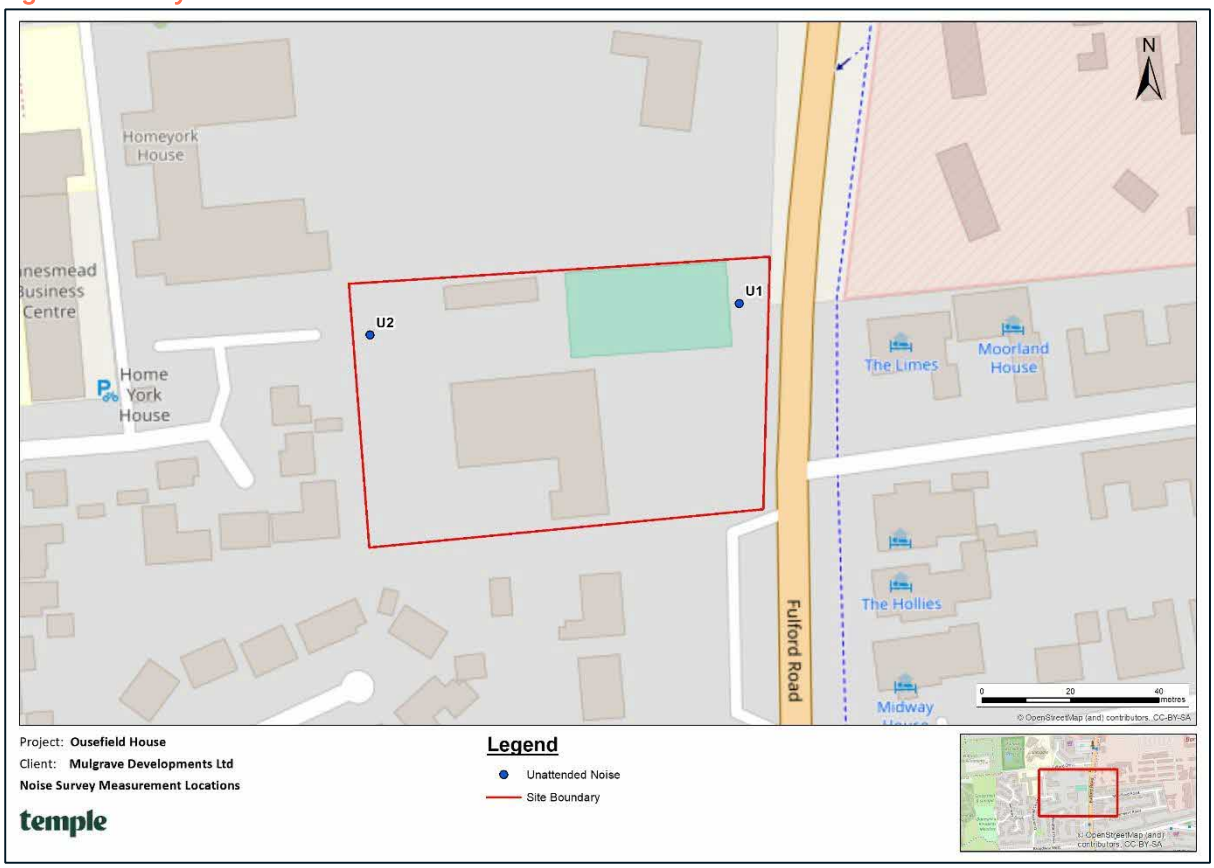
The unattended sound level meter's microphone at UN1 was positioned at a height of 4 m above the ground level, and at a height of 1.2 m above ground level at UN2.

The microphones were located more than 3 m away from any reflective surface and therefore are considered to have measured free-field levels. The sound level meter microphones were also fitted with a windshield and appropriate corrections applied.

The sound level meters were set to log continuously over 15-minute periods measuring octave band and A-weighted L_{eq} and L_{Fmax} parameters.

The unattended measurement positions are shown in **Figure 1**. Photos of each measurement position can be seen in **Appendix D**.

Figure 1 Survey measurement locations



Equipment

The equipment used is detailed in **Table 1** below. The sound level meters were field checked for calibration before and after their respective measurement periods. The equipment is subject to manufacturer's certificates of periodic verification within one year for the field calibrator and two years for sound level and vibration meters. Copies of these certificates are available upon request.

Table 1 Survey Equipment

Manufacturer	Item	Type	Serial Number	Calibration Date
RION	Sound Level Meter	NL-52	00410086	27/08/2021
RION	Sound Level Meter	NL-52	00510141	27/08/2021
RION	Calibrator	NC-74	34936354	06/09/2022

Meteorological Conditions

Weather conditions throughout the survey period were dry with wind speeds below the recommended limit of 5 m/s, as a result, no data has been excluded due to adverse weather conditions.

Noise Survey Results

Survey Observations

During the daytime visits to site, observations regarding perceptible noise sources influencing the baseline were noted by the surveyor at each measurement location, a summary of which is presented below.

Noise Survey

U1 – East boundary facing Fulford Road

The noise climate at this location was dominated by continuous road traffic on Fulford Road. Other perceptible noise sources included distant aircraft noise, pedestrians, birdsong and neighbourhood noise from bordering properties.

U2 – West boundary

The noise climate at this location was similar to that of U1.

Unattended Noise Results

A summary of the results of the daytime and night-time continuous noise measurements at the unattended locations are presented in **Table 2** and **Table 3**. A graph showing the time history of the measured results for the unattended monitoring locations is given in **Appendix E**

The daytime/night-time $L_{Aeq,\,T}$ has been calculated for each day, and the typical $L_{Aeq,\,T}$ is the arithmetic average of all the daytime/night-time values. The typical L_{AFmax} has been based on the tenth highest occurring L_{AFmax} on the worst-case night.

Table 2 Unattended noise survey results

		U1	U2
Typical $L_{Aeq,T}$, dB	Daytime (07:00-23:00)	66	49
	Night-time (23:00-07:00)	61	46
Typical L_{AFmax}, dB	Night-time (23:00-07:00)	77	63

Table 3 Typical octave band data

Sound level, dB at Octave band centre frequency, Hz							
Location	**Parameter**	**125**	**250**	**500**	**1000**	**2000**	**4000**
U1	Typical $L_{eq\ 16hr}$	61	61	59	63	58	47
	Typical $L_{eq\ 8hr}$	52	54	54	59	53	43
	Typical $L_{Fmax\ 8hr}$	71	70	72	74	68	60
U2	Typical $L_{eq\ 16hr}$	51	47	45	44	44	39
	Typical $L_{eq\ 8hr}$	41	35	37	39	44	37
	Typical $L_{Fmax\ 8hr}$	65	57	57	57	58	53

Noise Assessment

Internal Noise Levels

Daytime internal noise levels should be controlled to allow reasonable resting conditions in living rooms and bedrooms. Night-time internal noise levels should be controlled to allow reasonable sleeping conditions in bedrooms. These can be controlled through use of appropriate mitigation measures to meet the requirements of Condition 10.

Table 4 shows the predicted external noise levels at the worst affected bedroom in the Proposed Development. These contain a small distance correction compared to the values at U1 shown in Table 3.

Table 4 External noise levels for assessment (worst affected bedroom)

Location	$L_{Aeq\ 16hr}$	$L_{Aeq\ 8hr}$	$L_{AFmax\ 8hr}$
Plot 4 – First floor bedroom facing Fulford Road	65	61	74

Detailed noise ingress calculations (worst case room example in **Appendix G**, further examples available on request) have been undertaken for the proposed new dwellings based on room layouts and glazing sizes provided by the applicant (presented in **Appendix C**) and typical sound insulation performance for external block and brick walls from BS 8233. All units will be mechanically ventilated (Zehnder ComfoAir Q system) therefore the assessment has been based on rooms with closed windows.

The following glazing is proposed to be used and has been assessed in the noise ingress calculations to achieve internal noise levels outlined in Condition 10 (BS 8233 and WHO guideline internal noise levels).

Glazing

Guardian Glass Acoustic Triple Glazing 6mm/18mm/4mm/16mm/6mm (R_w 39 dB)

Octave Band Sound Reduction Index R_w dB				
125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz
19	31	37	49	41

A data sheet for the above specified glazing is presented in **Appendix F.**

Walls

The following sound reduction index for external walls has been assumed in the noise ingress calculation:

Block and Brick External Wall (BS 8233)

Octave Band Sound Reduction Index R_{ew} dB				
125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz
40	44	45	51	56

Conclusion

Temple Group has been appointed by Mulgrave Developments to undertake a noise impact assessment to discharge Condition 10 for the Proposed Development at Ousefield House, Fulford Road, York.

Unattended noise measurements have been completed at the site to characterise the existing noise environment over daytime and night-time. A noise model has been calibrated based on the measured survey data at the site and used to predict noise levels at each facade of the Proposed Development. The predicted noise levels have then been used to predict internal noise levels in habitable rooms based on the proposed glazing and ventilation.

The detailed noise ingress calculations indicate that internal noise levels below 35 dB $L_{Aeq, 16hr}$ during the day (07:00-23:00) and 30 dB dB $L_{Aeq, 8hr}$ during the night with regular $L_{AFm\ ax}$ events controlled to 45 dB or below can be achieved in habitable rooms with the following façade elements:

Guardian Glass Acoustic Triple Glazing 6mm/18mm/4mm/16mm/6mm (R_w 39 dB)

Mechanical ventilation

Appendix B Acoustic Glossary

Decibel (dB)

This is the unit sound pressure levels are presented in. They are a logarithmic ratio between the sound pressure and a reference sound pressure (20 µPa). A 3dB increase is a doubling of sound energy but is generally a just noticeable increase; a 10dB increase is a 10 fold increase in sound energy and is generally perceived as being twice as loud.

dB(A)

This indicates that the overall dB noise level has been 'A-weighted'; this is a weighting applied to instrument-measured sound levels to account for the relative loudness perceived by the human ear.

L_{Aeq}

This represents the A-weighted 'ambient noise level' also known as the equivalent continuous sound level. As almost all sounds vary or fluctuate with time it is helpful to have an average of the total acoustic energy experienced over its duration. The LAeq,16hr for example, describes the equivalent continuous sound level over the 16-hour period between 7am and 11pm.

L_n

Another method of describing, with a single value, a noise level which varies over a given time period is to consider the length of time for which a particular noise level is exceeded. If a level of X dB(A) is exceeded for say 6 minutes within one hour, then that level can be described as being exceeded for 10% of the total measurement period. This is denoted as the L_{A10} = X dB.

The L_{A10} index is often used in the description of road traffic noise, whilst the L_{A90}, the noise level exceeded for 90% of the measurement period, is the usual descriptor for underlying background noise.

$L_{AFm\ ax}$

The maximum RMS A-weighted sound pressure level, using the Fast time weighting.

Appendix B Standards and Guidance

Planning Policy

National Planning Policy Framework

The National Planning Policy Framework[10] (NPPF) sets out the government's planning policies for England and how these are expected to be applied. It was revised in 2018 following a review of the 2012 document and was updated in September 2023.

The recently revised NPPF comments on noise in the following ways:

Paragraph 174: Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) 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.

Paragraph 185: 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 impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life; and

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

Noise Policy Statement for England

The Noise Policy Statement for England[11] (NPSE) seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise. The statement applies to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise.

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".

The guidance promotes the effective management and control of noise, within the context of Government policy on sustainable development and thereby aims to:

Avoid significant adverse impacts on health and quality of life;

[10] Department of Communities and Local Government (September 2023), The National Planning Policy Framework
[11] Defra (March 2010), The Noise Policy Statement for England

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 statement adopts established concepts from toxicology that are currently being applied to noise impacts. The concept details noise levels, at which the effects of an exposure may be classified into a specific category. The classification categories as detailed within NPSE are as follows:

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.

It is recognised that SOAEL does not have a single objective noise-based level that is applicable to all sources of noise in all situations and therefore the SOAEL is likely to be different for different sources, receptors and at different times of the day.

No guidance has been issued at the time of writing to identify the SOAEL and LOAEL for typical noise sources and receptors.

Planning Practice Guidance – Noise

The National Planning Practice Guidance[12] (NPPG) expands on the use of SOAEL:

“If the exposure is above this level the planning process should be used to avoid this effect occurring, by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused.”

The NPPG also goes on to identify unacceptable noise exposure:

“At the highest extreme, noise exposure would cause extensive and sustained changes in behaviour without an ability to mitigate the effect of noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be prevented from occurring.”

In addition, NPPG refers to further considerations to mitigating noise on residential developments. NPPG states that the noise impact may be partially offset if the residents of those dwellings have access to:

a relatively quiet facade (containing windows to habitable rooms) as part of their dwelling, and/or;

[12] Department for Communities and Local Government (DCLG) (July 2019), National Planning Practice Guidance

a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced with increasing noise exposure and could be such that significant adverse effects occur, and/or;

a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings, and/or;

a relatively quiet, protected, external publicly accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance).

Local Policy

City of York Development Control Local Plan (April 2005)

The existing York Local Plan[13] states the following with regards to noise:

"To enhance the health, safety and amenity of the public, improve the natural and built environment and to achieve more sustainable forms of development. When considering planning applications the intention is to seek a standard of development that maintains or enhances the general amenity of the area and provides a safe and attractive environment for all. Development proposal should aim to:

…

i) ensure that residents living nearby are not unduly affected by noise, disturbance, overlooking, overshadowing or dominated by overbearing structures."

City of York Local Plan Publication Draft (February 2018)

York Council are currently working towards producing a new local plan[14], which currently is in the process of examination by independent planning inspectors following Submission of the draft Local Plan to the Secretary of State for Housing, Communities and Local Government on 25th May 2018.

Policy ENV2: Managing Environmental Quality states:

"Development will not be permitted where future occupiers and existing communities would be subject to significant adverse environmental impacts such as noise, vibration, odour, fumes/emissions, dust and light pollution without effective mitigation measures. Evidence must be submitted to demonstrate that environmental quality is to the satisfaction of the Council."

[13] City of York. Development Control Local Plan (April 2005)

[14] City of York. Local Plan Publication Draft (February 2019)

Technical Standards and Guidance

British Standard 7445

British Standard 7445 Part 1 (BS 7455-1:2003)[15] defines the basic quantities to be used for the description of noise in community environments and describes basic procedures for the determination of these quantities.

The methods and procedures described in this British Standard are intended to be applicable to sounds from all sources, individually and in combination, which contribute to the total noise at a site.

British Standard 7445 Part 2 (BS 7455-2:1991)[16] describes methods for the acquisition of data which provide descriptors that enable:

a) a description of the environmental noise in a specified area of land to be made in a uniform way.

b) the compatibility of any land use activity or projected activity to be assessed with respect to existing or predicted noise.

Using the data as a basis, authorities may establish a system for selecting the appropriate land use, as far as levels of noise are concerned, for a specified area, or the sources of noise - existing or planned - which are acceptable with respect to land use, existing or planned.

British Standard 8233

British Standard 8233:2014[17] (BS 8233) 'Guidance on Sound Insulation and Noise Reduction for Buildings' provides criteria for the assessment of internal noise levels for various uses including dwellings and commercial properties. The standard suggests suitable internal noise levels within different types of space with examples for dwellings shown in Error! R eference source not found..

Table 5 BS 8233 Guideline indoor noise levels for dwellings

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq,\ 16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,\ 16hour}$	-
Sleeping	Bedroom	35 dB $L_{Aeq,\ 16hour}$	30 dB $L_{Aeq,\ 8hour}$

[15] British Standards Institute (BSI), (2003): 'BS 7445 – Description and Measurement of Environmental Noise. Part 1: Guide to Quantities and Procedures'. BSI, London.
[16] British Standards Institute (BSI), (1991): 'BS 7445 – Description and Measurement of Environmental Noise. Part 2: Guide to the Acquisition of Data Pertinent to Land Use'. BSI, London.
[17] British Standards Institute (BSI), (2014). 'BS 8233 – Guidance on sound insulation and noise reduction for buildings. BSI, London.

Note 7: Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

The suitability of the use of outdoor amenity spaces within the Proposed Development has been assessed using BS 8233 criteria. BS 8233 states;

might not be possible at the outer edge of these areas but should be achievable in some areas of the space."

World Health Organisation

The World Health Organisation (WHO) Guidelines for Community Noise[18] also sets out guidance on suitable internal and external noise levels in and around residential properties. The following internal noise levels are recommended by the WHO:

35 dB LAeq in living rooms over a 16-hour day;

30 dB LAeq in bedrooms during the 8-hour night; and

45 dB LAFmax in bedrooms during the 8-hour night.

This document states that, in dwellings, the critical effects of noise are on sleep, annoyance and speech interference. These indoor noise levels correspond to sound pressure levels at the outside facades of the living spaces (bedrooms) of 45 dB LAeq and 60 dB LAmax. These external values have been obtained by assuming that the noise reduction of a facade from outside to inside with a window partly open is 15 dB(A).

According to this document, 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 LAeq for a steady, continuous noise.

Additional WHO environmental noise guidelines were published in 2018, however the 1999 document is currently considered to be the most relevant guidance given its reference in BS 8233 and ProPG.

ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise New Residential Development

Current Government guidance on planning and noise for new residential developments is found in the National Planning Policy Framework (NPPF). One of the strengths of the NPPF is that it sets clear objectives. However, the Institute of Acoustics (IOA), Association of Noise Consultants (ANC) and Chartered Institute of Environmental Health (CIEH) feel there is insufficient technical guidance to practitioners and developers on how to deliver the Government's objectives. Therefore, these professional bodies have jointly produced the ProPG[19] which aims to complement existing Government advice and provides a

[18] World Health Organisation (1999), WHO Guidelines for Community Noise.

[19] IOA, ANC and CIEH (2017), ProPG: Planning & Noise Professional Practice Guidance on Planning &Noise New Residential Development

recommended approach that can be applied proportionately to each development site to encourage good acoustic design.

The ProPG seeks to promote the use of good acoustic design to:

enable new homes to be built in areas previously considered unsuitable because of noise by appropriate evaluation and careful use of suitable mitigation.

allow rapid identification of sites where noise is unlikely to be a constraint for new residential developments, hence saving developers time and unnecessary costs on considering the matter further.

permit swift recognition of noisy sites that are very unlikely to be suitable for new residential developments, hence saving developers time and unnecessary costs pursuing schemes that are unlikely to be permitted; and help to reduce the harmful impact of noise on those moving into the properties and the surrounding communities.

The ProPG internal noise level guidelines reflect and extend current practice contained in Table 4 of BS 8233 and this is shown in **Table 6** below.

Table 6 ProPG Additions to the Guidance in Table 4 of BS 8233

Activity	Location	07:00 to 23:00	23:00 to 07:00
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,\ 16\ hr}$	30 dB $L_{Aeq,\ 8\ hr}$ 45 dB L_{AFmax}*

* NOTE 4 For a reasonable standard in noise-sensitive rooms at night (e.g. bedrooms) individual noise events should not normally exceed 45 dB LAFmax more than 10 times a night.

Appendix C Site Plans

Figure 2 Site Plans

Figure 3 Plot 4 Floorplans

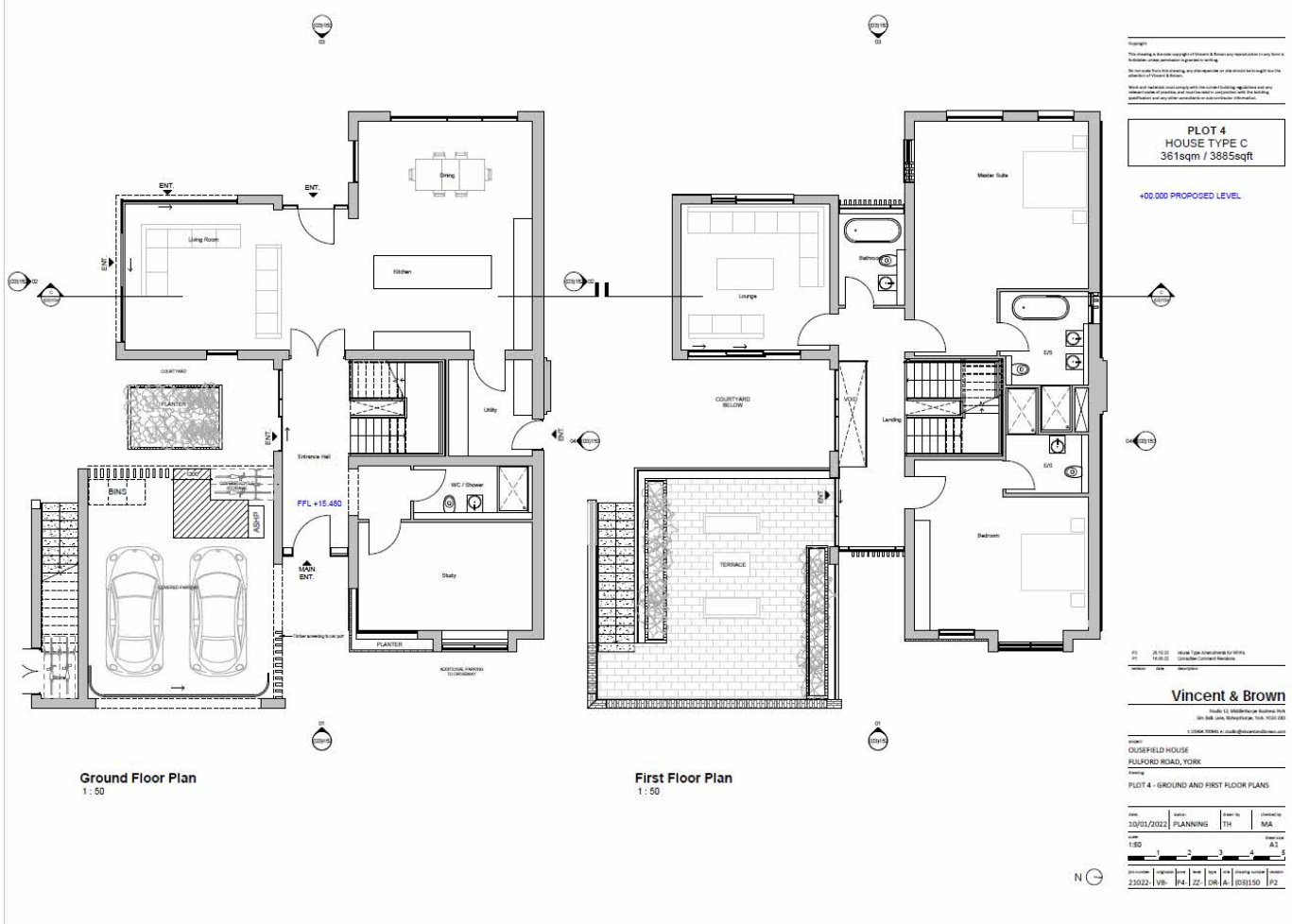


Figure 4 Plot 4 Floorplans

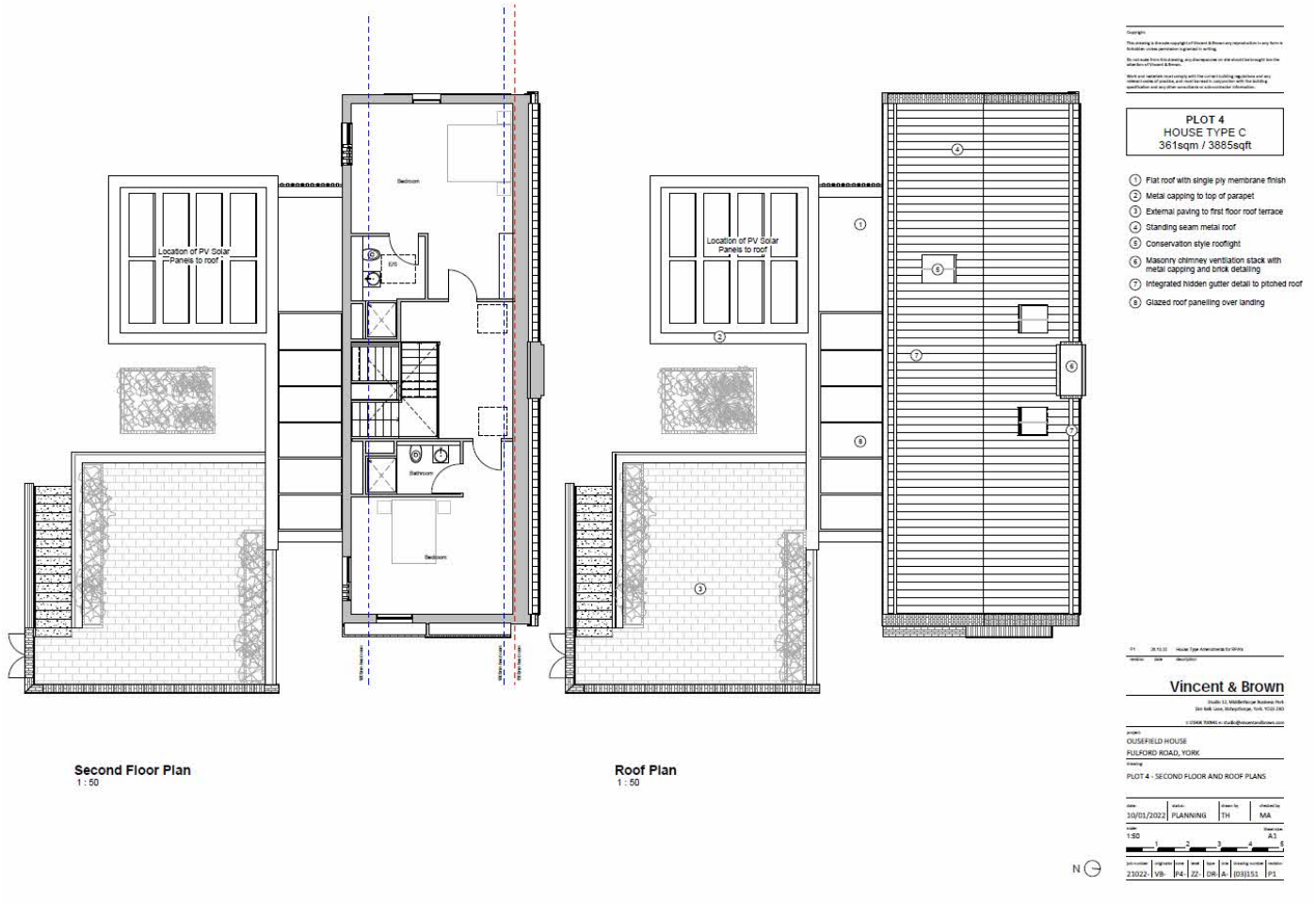


Figure 5 Plot 4 Elevations

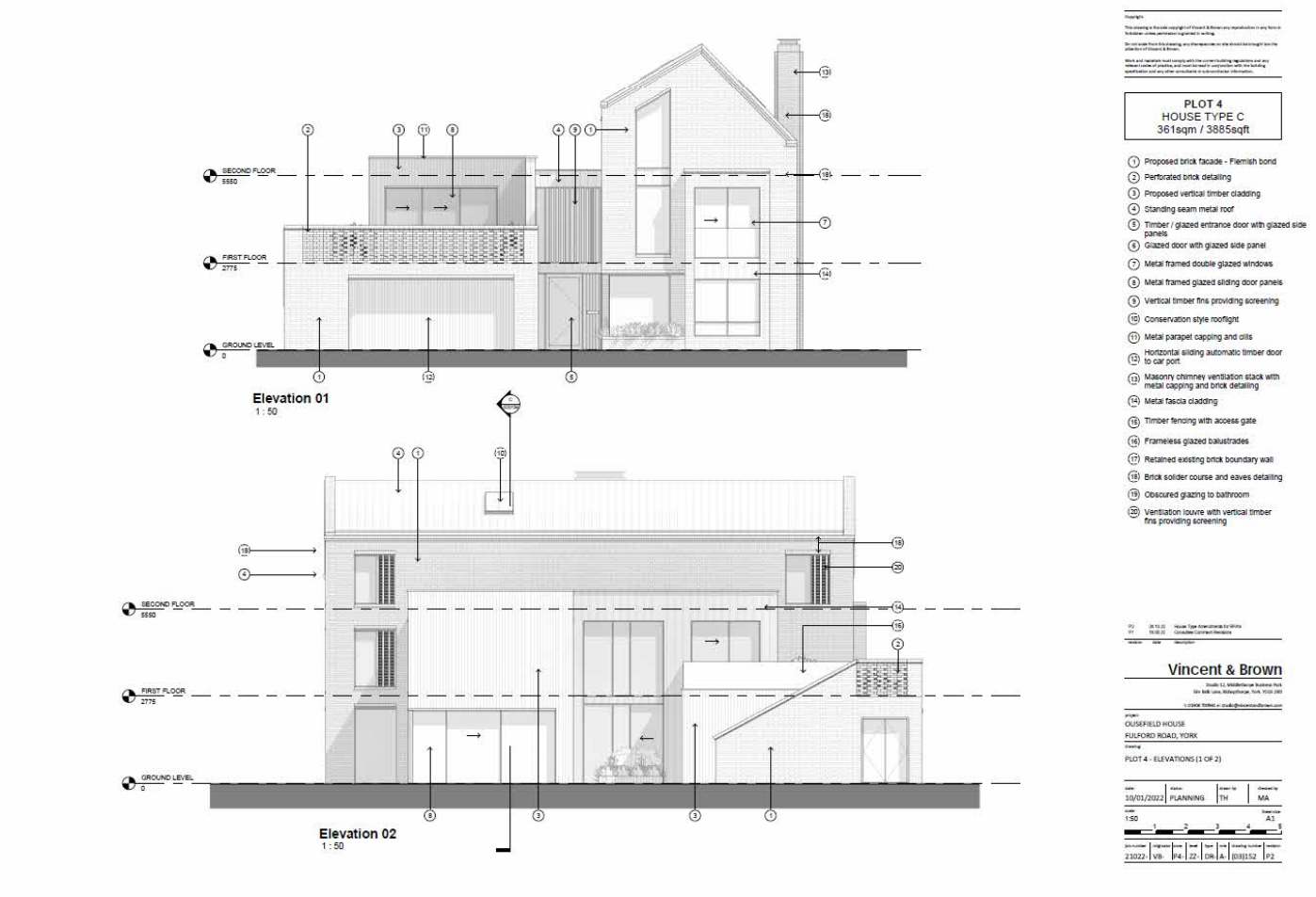
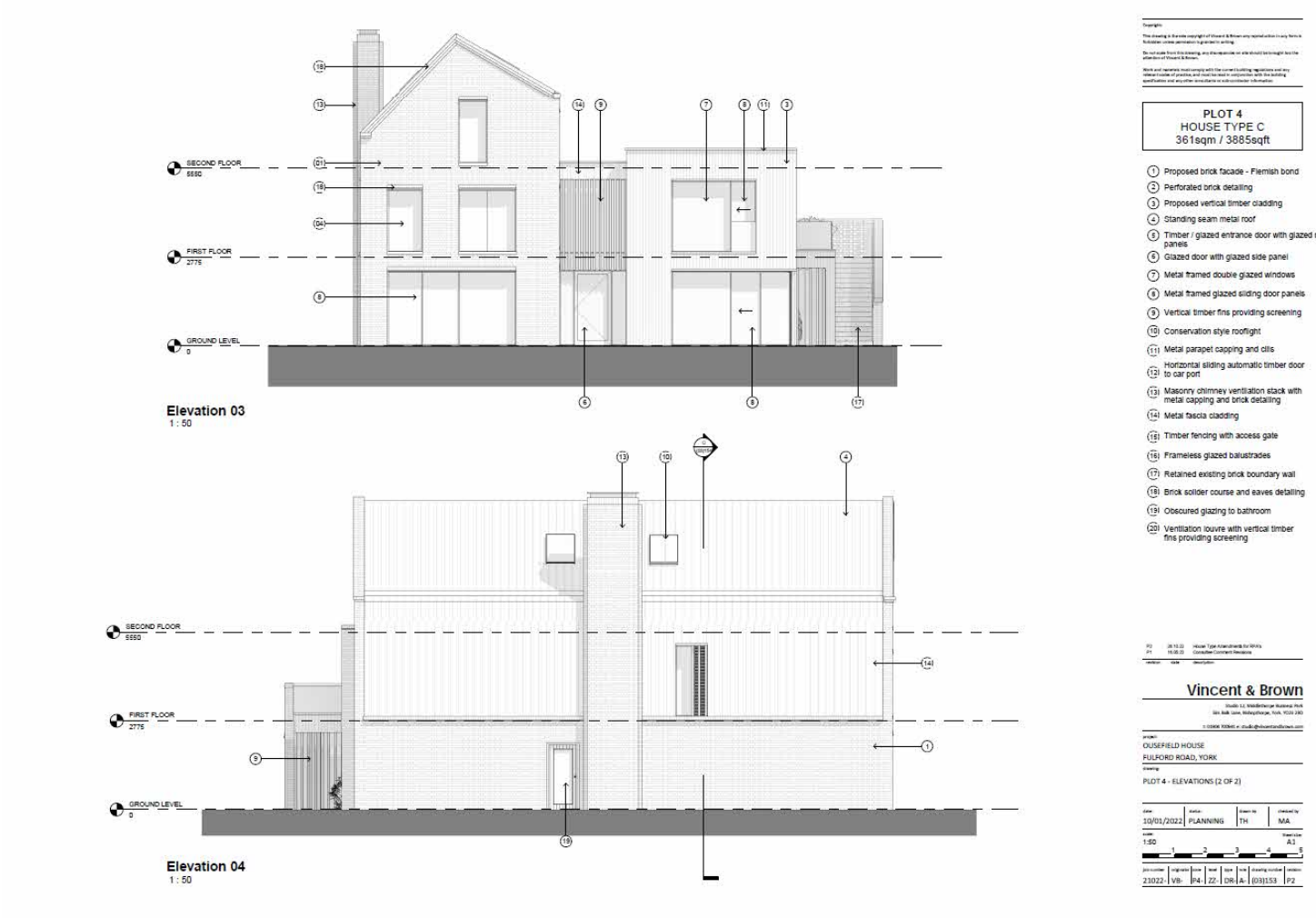


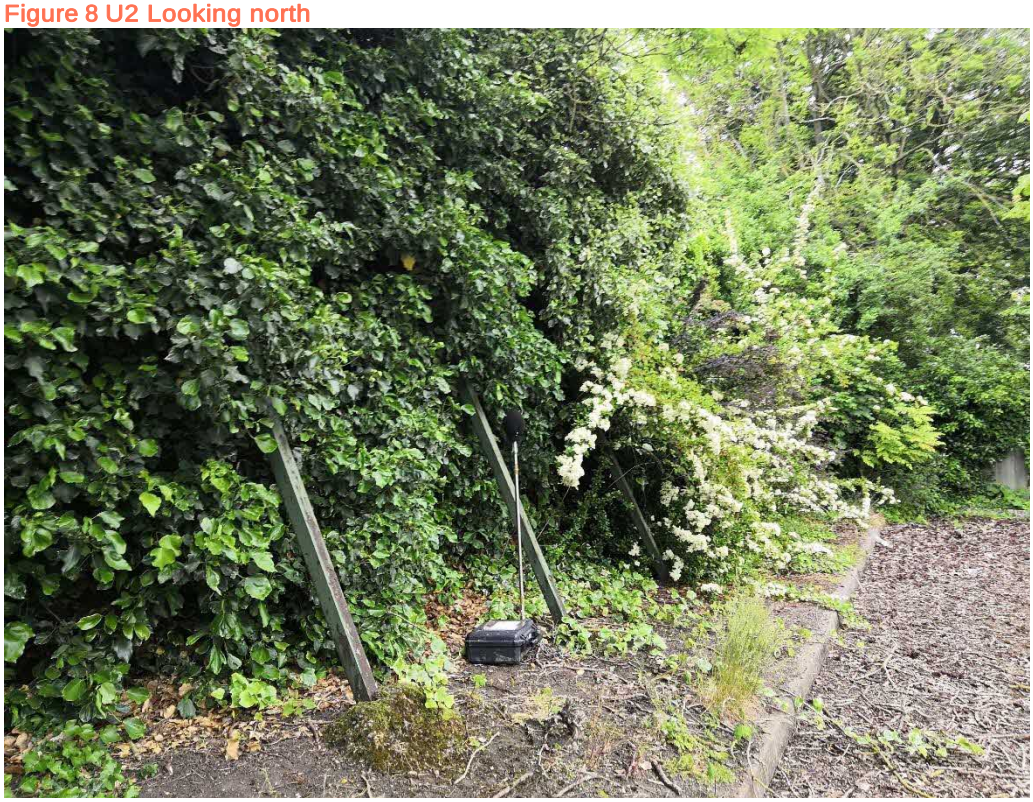
Figure 6 Plot 4 Elevations



Appendix D Survey Photos

Figure 7 U1 Looking west

Figure 8 U2 Looking north



Appendix E Unattended Measurement Time History

Figure 9 U1 Unattended noise data

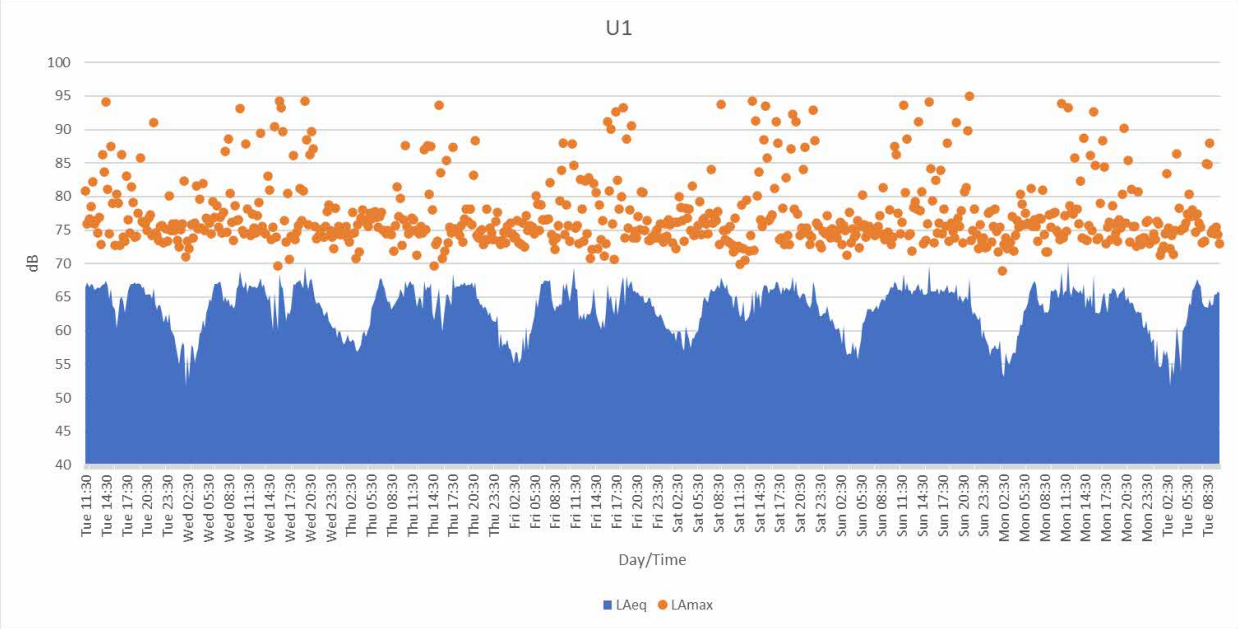
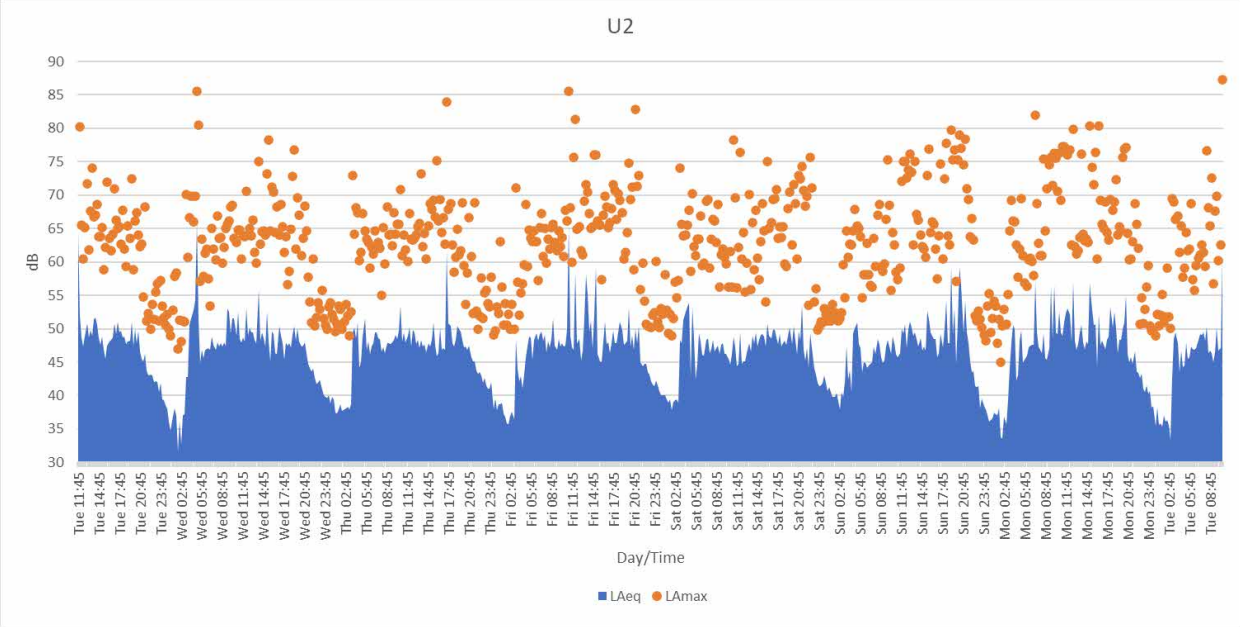
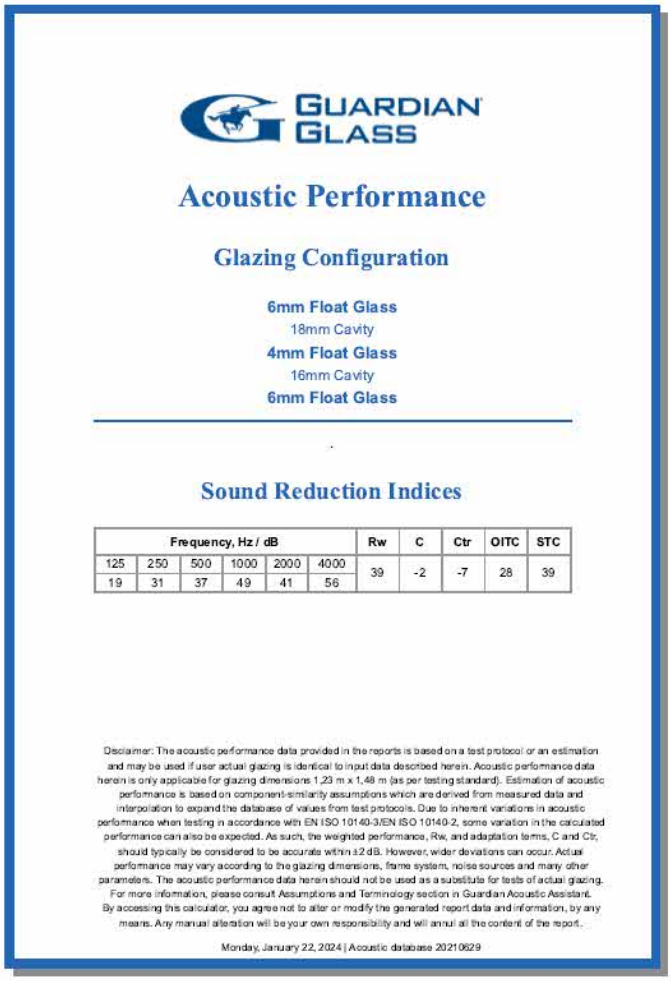


Figure 10 U2 Unattended noise data



Appendix F Data Sheets

Figure 11 Glazing data sheet



GUARDIAN GLASS

Acoustic Performance

Glazing Configuration

6mm Float Glass
18mm Cavity
4mm Float Glass
16mm Cavity
6mm Float Glass

Sound Reduction Indices

Frequency, Hz / dB						Rw	C	Ctr	OITC	STC
125	250	500	1000	2000	4000	39	-2	-7	28	39
19	31	37	49	41	56					

Disclaimer: The acoustic performance data provided in the reports is based on a test protocol or an estimation and may be used if user actual glazing is identical to input data described herein. Acoustic performance data herein is only applicable for glazing dimensions 1,23 m x 1,48 m (as per testing standard). Estimation of acoustic performance is based on component-similarity assumptions which are derived from measured data and interpolation to expand the database of values from test protocols. Due to inherent variations in acoustic performance when testing in accordance with EN ISO 10140-3/EN ISO 10140-2, some variation in the calculated performance can also be expected. As such, the weighted performance, Rw, and adaptation terms, C and Ctr, should typically be considered to be accurate within ±2 dB. However, wider deviations can occur. Actual performance may vary according to the glazing dimensions, frame system, noise sources and many other parameters. The acoustic performance data herein should not be used as a substitute for tests of actual glazing. For more information, please consult Assumptions and Terminology section in Guardian Acoustic Assistant. By accessing this calculator, you agree not to alter or modify the generated report data and information, by any means. Any manual alteration will be your own responsibility and will annul all the content of the report.

Monday, January 22, 2024 | Acoustic database 20210629

Appendix G Noise Ingress Calculation Example

Figure 12 Worst affected bedroom (Plot 4 first floor, facing Fulford Road) noise ingress calculation.

Room Width	5.56
Room Height	2.78
Room Depth	4.26
Volume	65.8
S_t = Facade Area	39.1424
S_{wi} = Window Area	6.82
$S_{ow} = S_t - S_{wi}$	32.3224
S_{rr} = Area of ceiling	
$S = S_t + S_{rr}$	39.1424
R_t	0.5
Absorption Area m^2 = 0.161*V/Rt	21.2
A_0 Given in BS EN 20140-10	10

	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz
Lzeq Day Leq, ff	60	60	59	63	57
Lzeq Night	53	54	54	59	54
Lzmax Night	68	67	68	71	65
Window Rwi	19	31	37	49	41
Wall Rew	40	44	45	51	56
Vent Dn,e					
Ceiling Rrr					

$$L_{eq,2} = L_{eq,0} + 10\log_{10}\left(\underbrace{\frac{A_0}{S}10^{\frac{-R_t}{10}}}_{A} + \underbrace{\frac{S_{ow}}{S}10^{\frac{-R_w}{10}}}_{B} + \underbrace{\frac{S_{ow}}{S}10^{\frac{-R_w}{10}}}_{C} + \underbrace{\frac{S_{rr}}{S}10^{\frac{-R_r}{10}}}_{D}\right) + \underbrace{10\log_{10}\left(\frac{S}{A}\right)}_{E} + 3 \quad \text{(G.1)}$$

A (vent)					
B (window)	0.002193	0.000138	3.48E-05	2.19E-06	1.38E-05
C (Wall)	8.26E-05	3.29E-05	2.61E-05	6.56E-06	2.07E-06
D (roof)					
E	5.662624	5.662624	5.662624	5.662624	5.662624
A weighting	-16.1	-8.6	-3.2	0	1.2
Laeq,2 (Day)	23.56785	19.59891	19.02076	17.97443	16.02882
Laeq,2 (Night)	15.66082	13.57499	14.49856	14.16514	12.41143
Laeq,2 (Lmax)	30.96261	26.75759	28.77862	25.61042	23.78138

Laeq Day Total	27.0
Laeq Night Total	21.3
Lmax Total	34.9

Figure 13 Worst affected bedroom dimensions

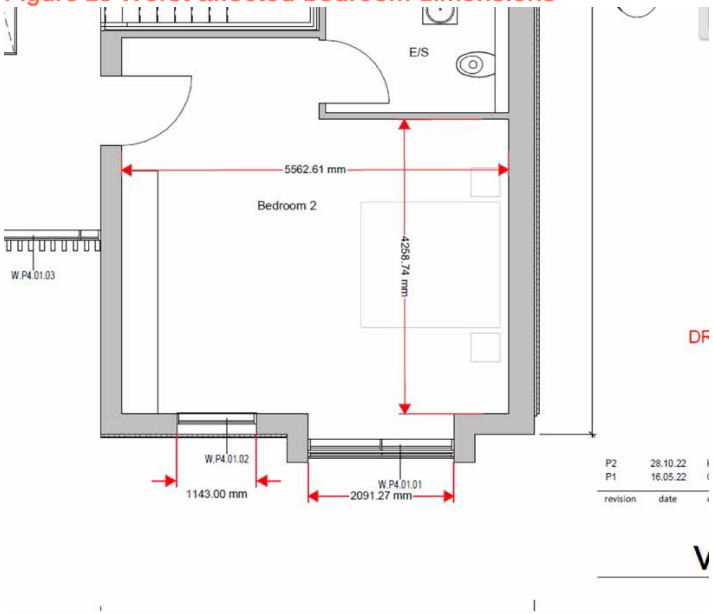
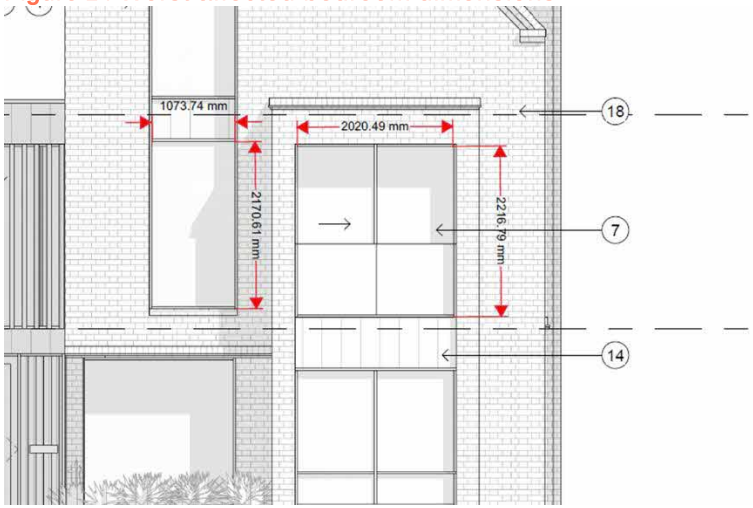


Figure 14 Worst affected bedroom dimensions



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