

EATON COURT, OXFORD ROAD,
READING

Class MA Noise Impact Assessment



Document History

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1. INTRODUCTION

MZA Acoustics has been appointed to undertake a noise impact assessment of the site at Eaton Court, 104-112 Oxford Road, Reading RG1 7NG (the Site) in relation to conversion to a residential scheme.

The proposal converts the existing building for residential use under permitted development provisions for change of use of commercial, business and service use (use class E) to residential (Part 3 of the GPDO, class MA). This report is presented in support of the prior approval application to Reading Borough Council.

Under Permitted Development legislation there is no requirement to consider noise from transport infrastructure type noise sources such as from road traffic, railways, or aircraft etc.

This report presents the results of a baseline environmental noise survey undertaken at the Site, with an assessment of the impact of commercial noise sources on the Proposed Development based on the measurements and observations made.

This report occasionally employs technical terminology. To assist the reader, a glossary of terms is provided in Appendix A.

1.1 Changes to Revision 03 (response to Officer's comments)

This report has been revised in response to the comments provided by the Case Officer, Matthew Harding, at Reading Borough Council.

The comments are outlined below, with reference to the specific sections of the report where these are addressed.

"Mechanical Ventilation and Heat Recovery (MVHR) is recommended to minimise the need for residents to open their windows. Will this have summer bypass cooling? It is recommended that an overheating assessment be carried out so that suitable measures can be identified to reduce the risk of overheating."

Concerns around the risk of overheating to dwellings, and that the necessity to open windows under such conditions may lead to noise disturbance, are acknowledged. These are addressed through implementation of measures to reduce overheating risk, and therefore noise exposure, in Section 6 of this report.

"The standard proposed for internal noise (low frequency protection) is not as stringent as for the new flats proposed to be built on top, whereby the standard proposed is NR20 for the existing building and NR15 for the proposed building. I assume that this is because it will not be practicable to achieve NR15 for the existing building, but can this reasoning be confirmed?"

This is an error. Initially MZA were designing to NR20, as per the previous application at the site. The more stringent NR15 target has been adopted for both elements, and the current specification for the conversion meets NR15 internally.

"A significant scheme for mitigating the external noise from The Face Bar is proposed, which is not limited to improving the windows but also the facade. This may be acceptable, although is there is a risk that the required measures won't be possible/practicable?"

The proposals for façade upgrades have been co-ordinated and agreed with the project architect and the Client and are understood to be suitable for implementation. The final build-ups will be subject to confirmation of the retained elements' performance, however the recommendations made assume a relatively worst-case existing performance.

"Also, concerns are raised with the potential use of any heating and colling systems to limit or potentially prevent the opening of windows. Whilst it is likely to be beneficial to have these systems maintain a constant comfortable temperature in the dwellinghouses, the occupants should have the opportunity to open main windows and not be subject to unacceptable noise from commercial premises."

We disagree with the suggestion that the implementation of alternative means of cooling, to preclude the need to open windows (and therefore expose occupants to noise which exceed internal noise criteria), is not an appropriate means of mitigating noise exposure.

Almost all urban development would exceed internal criteria with windows open, and it is very common for such development to rely on windows being closed as a means of mitigating external noise ingress (whether that be for background ventilation, or ventilation for mitigating overheating).

Should alternative means of cooling be implemented, occupants would have the ability to regulate both the thermal and acoustic environment internally. MZA acknowledge that it would be preferable for noise not to impact future occupants when their windows are open, however that is simply impossible to implement in the design proposals of the development itself – as the noise is extant.

It should also be borne in mind that the noise from the Face Bar and Butler Pub is not constant or even every day.

Of note, a recent development proposal (PL/20/1104) for a five-storey residential building at 10 Eaton Place was dismissed at appeal (October 2024), with the site located to the rear of The Butler Public House and the proposal detailing the use of mechanical ventilation with heat recovery systems (MVHR). The location, nature and use of MVHR system are all consistent with this proposal. The Planning Inspector advising the following:

[refer to Officer report for full text]

Broadly the same conclusions are drawn with this proposal in that the use of the MVHR system cannot be relied upon for year-round mitigation without expecting occupants will want to open their windows, the proposal would likely increase the risk of complainants to those nearby nighttime uses and likely result in unacceptable levels of noise and disturbance to the proposed occupants of the building.

It is worth mentioning that the Proposed Development was not found to be significantly affected by noise from the Butler Pub, although we understand that the comment made is not specific to entertainment noise from that venue alone and the two will produce noise of similar natures (albeit the Butler Pub is likely to be quieter and

appears to be mainly bands without electronic music – which tends to feature more bass).

While it should be clarified by the mechanical engineers, MVHR systems are generally implemented as a year-round solution, providing constant background levels of ventilation as an alternative to open windows or trickle ventilators, and, typically summertime bypass modes are automated using sensors on incoming/outgoing air temperature. Often this automation allows the MVHR units to provide sustainability benefits over non-mechanical ventilation.

We acknowledge the concerns raised relating to overheating and these are discussed and addressed in Section 6 of this report.

2. THE SITE

2.1 Existing Site Description

The site is located on Oxford Road, Reading, RG1 7NG in Reading Borough Council.

The Site of the proposed development is a disused office building with a two-storey west wing and a three-storey east wing. The Site also contains car parking spaces to the front and a two-storey car parking structure to the rear, which is currently closed and disused. It is directly adjacent to Bond House, a residential building, to the west, and the Royal Meteorological Society building to the east.

An existing site layout is provided in Figure 1, with the Site indicated in red.

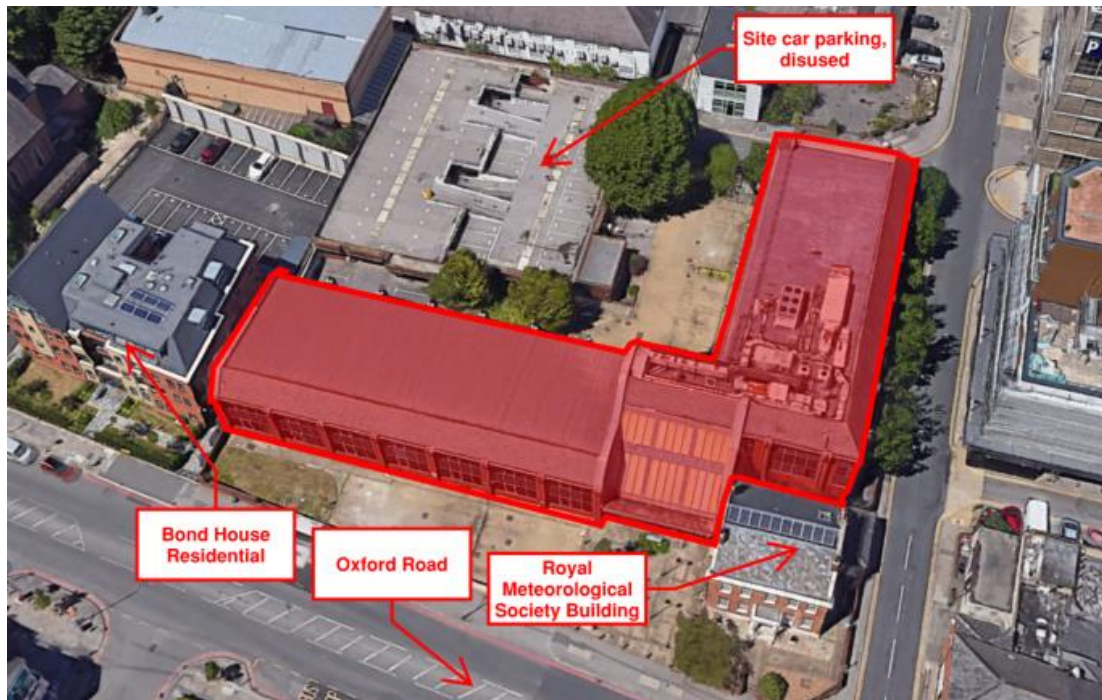


Figure 1: Existing site location layout.

2.2 Surrounding Context

The surrounding area contains a mix of residential and commercial buildings including offices, a multi-storey car park, high street shops and takeaways, a garage, a pub, and a live music venue (The Face Bar). The Site is nearby to the A329 main road.

Figure 2 shows the Site's proximity to potential sources of commercial noise.

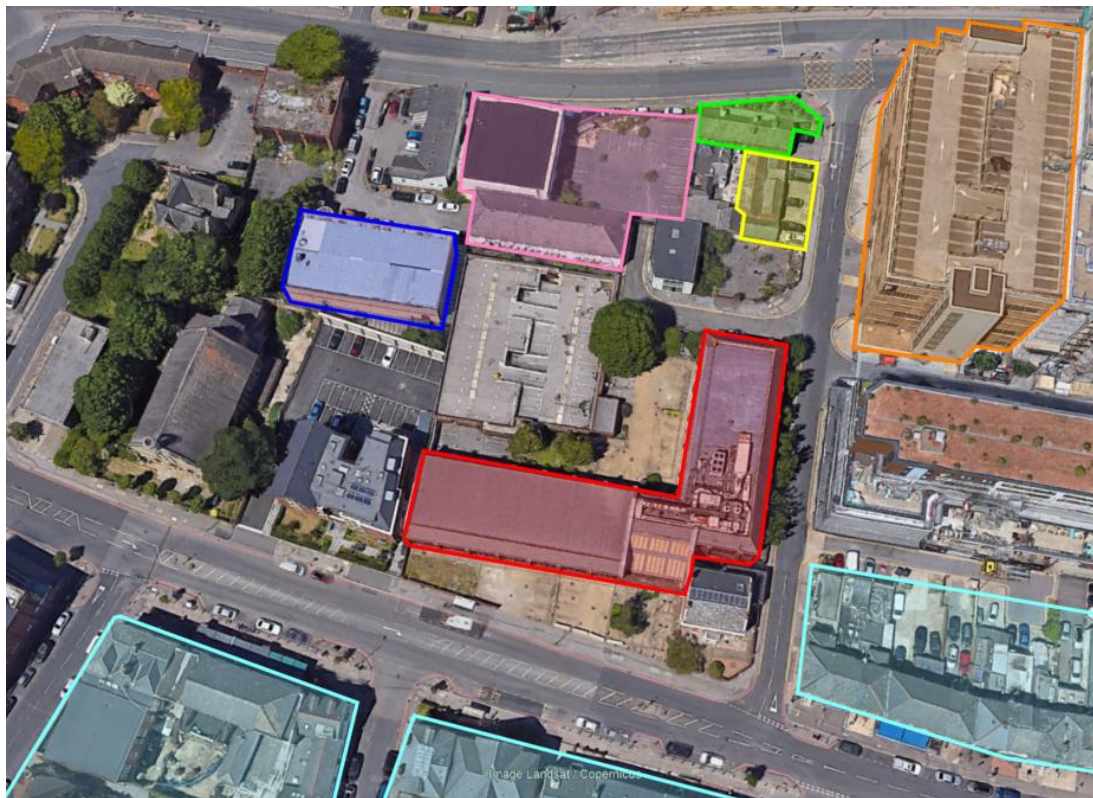


Figure 2: The Site's (red) proximity to: highstreet shops and takeaways (light blue), a multi-storey car park (orange), a garage (yellow), a pub (green), and a live music venue and nightclub (The Face Bar, dark blue). The area in pink is currently under redevelopment to residential flats.

2.3 The Proposed Development

The proposal is to convert the existing building to residential use under Class MA of the General Permitted Development Order (GPDO). It is understood that the current proposal is for 52 one and two bed flats.

3. ASSESSMENT POLICY AND GUIDANCE

3.1 Introduction

The following section of the report summarises the relevant policy and guidance documents that will inform the noise assessments that follow in relation to the proposed permitted development in relation to the change of use of commercial, business and service use (use class E) to residential (Part 3 of the GPDO, class MA).

Further information on relevant planning guidance for acoustics is provided in Appendix B.

3.2 National Planning Policy Framework (NPPF), December 2024

The NPPF determines the government's planning policy for England. The document was first published in March 2012, revised in July 2018, updated in 2019, 2021 and 2023.

The current version (issued 12/12/24) of the policy document remains largely unchanged with regards to noise which is considered in Chapter 15 – 'Conserving and enhancing the natural environment', specifically in terms of pollution.

Paragraph **187** states that planning policies and decisions should contribute to and enhance the natural and local environment by "*...preventing new and existing development from contributing to, being put at 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 **198** states that:

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 by 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.
- b) **Identify and protect tranquil areas** which have remained relatively undisturbed by noise and are prized for their recreational 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.

Furthermore, Paragraph **200** continues:

Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

The guidance contained within the NPPF reference the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010).

3.3 Town and Country Planning (General Permitted Development) (England) Order 2015 (SI 2015/596) as amended.

Permitted development rights are a national grant of planning permission which allow certain building works and changes of use to be carried out without having to make a full planning application. Permitted development rights are subject to conditions and limitations to control impacts and to protect local amenity.

The amendment to the GPDO in August 2021 was made to introduce the Class MA permitted development right which enables Commercial, Business and Service uses within Use Class E (which includes offices) to convert to residential uses within Use Class C3 subject to the 'Prior Approval' application process and certain restrictions.

Class MA was an effective replacement of an earlier Class O permitted development right that had enabled office to residential conversions. It was brought in to reflect the Use Classes Order that had been updated the year before.

A further update to permitted development rights on 5th March 2024 removes the requirement for office accommodation to be vacant for 3 months prior to approval application, and there is no longer a limit on the maximum floor space which may be converted.

When considering noise impact for proposed change of use from commercial to residential developments sought via Prior Approval under Permitted Development legislation, it is important to note that in terms of legislation, the assessment need only relate to noise specifically from commercial premises.

"Commercial premises" is defined within the GPDO 2015 (as amended) as meaning any premises normally used for the purpose of any commercial or industrial undertaking which existed on the date of the Prior Approval application, and includes any premises licensed under the Licensing Act 2003(a) or any other place of public entertainment.

Under Permitted Development legislation there is no requirement to consider noise from transport infrastructure type noise sources such as from road traffic, railways, or aircraft etc.

3.4 Local Policy

Reading's Local Plan 2018 references noise impact several times, although does not provide specific, quantitative guidance on the control of noise impacts either on new developments from existing sources of noise, or on existing noise-sensitive receptors from new development.

4. BASELINE NOISE SURVEY

4.1 Noise Survey Methodology

Detailed noise measurements were obtained at the Site between Friday 9th and Tuesday 13th May 2025 and have been used to evaluate the ambient noise climate and noise from nearby commercial sources.

Two long term, unattended measurements were taken over a ~96-hour period outside the northeast and northwest facades of the building at second and first-floor levels, respectively. A short term attended measurement was taken on the evening of Friday, 9th May 2025 during a rock concert at The Face Bar to discern levels of audibility around the Site.

In addition, observations were made externally during the installation and collection of equipment, and during daytime and evening periods while music events were occurring at the nearby music venue.

Figure 3 shows the measurement locations.



Figure 3: Long- and short-term measurement positions around the Site. LT1 was intended to measure noise from the nearby music venue and LT2 was intended to measure noise from the nearby pub, garage, and multi-storey car park.

4.1.1 Meteorological Conditions

The weather conditions throughout the surveys were considered to be conducive to the measurement of environmental sound, i.e. they remained dry, with low wind speeds (< 5 m/s). As such, the weather conditions are not considered to have had any influence on the noise survey results.

4.1.2 Equipment

The sound level meters were calibrated prior to commencement, and upon completion, of the survey. No significant calibration drift was observed in any of the sound level meters.

Details of the equipment used to undertake the survey are included in Appendix C.

4.2 Long Term Survey

The results from the long-term noise survey at both positions are presented as they were measured in this section. Specific noise levels produced by notable commercial sources are discussed in Section 5.1.

4.2.1 Long Term Noise Survey Results

The results of the unattended noise survey measurements are presented in graphical format in Appendix D. The following have been used to determine the presented noise levels:

- The daytime and night-time periods are taken to be 07:00 to 23:00 hrs and 23:00 to 07:00 hrs, respectively.
- The daytime and night-time levels presented are the arithmetic average of the 16-hour and 8-hour $L_{Aeq,T}$ measurement periods.
- 'Typical' maximum event noise levels have been established by taking the 10th-15th highest $L_{AFmax,1min}$ value.
- The background sound level presented is that which is the lowest typically occurring, by statistically analysing the measured values during the relevant assessment period.

Table 1: Unattended noise survey results, levels rounded to integer decibel values (façade location, no correction applied).

Location	Period	Equivalent Continuous Sound Level dB $L_{Aeq,T}$	Typical Maximum Noise Level dB L_{AFmax}	Typical Background Sound Level dB $L_{AF90,T}$ ¹
LT1 – west wing	Daytime	52	N/A	47
	Night-time	47	63	41
LT2 – east wing	Daytime	60	N/A	53
	Night-time	54	71	42

¹ Reference period (T) is 1-hour for the daytime and 15-minutes for the night-time, as per BS 4142. All background levels rounded in accordance with BS 4142.

4.2.2 Observations

It was observed that, though both positions were exposed to a certain amount of ambient traffic noise, this level was higher at LT2 as it had a direct line-of-sight and closer to the busy Chatham Street to the north and Eaton Place to the east. It was also exposed to the multi-storey car park, garage, and from the nearby pub (The Butler, Chatham Street), while LT1 is mostly screened from these sources.

Analysis shows, however, that most of the noise reaching the façades of the building is traffic noise from cars, motorcycles, and most notably busses, which stop nearby on

Chatham Street and Oxford Road. This leaves the amount of noise from commercial sources throughout most of the day and night to be comparably low.

4.3 Short Term Survey

A short term attended survey took place between 21:00 and 23:00 on Saturday 10th May, 2025. The intention of the survey was to observe and measure noise breakout from The Face Bar during a live music event.

The survey found that on the sides of the building that are not directly exposed to The Face Bar, traffic noise from Oxford Road is significant enough during the evening time to mask any noise from events. The measured results from ST1 are included in Table 2 to provide a typical noise level reaching the south façade, including commercial noise from the shops and takeaways on Oxford Road, which were packing up at the time of the survey.

Table 2: Attended noise survey results, free-field levels rounded to integer decibel values.

Location	Period	Equivalent Continuous Sound Level dB L _{Aeq,T}	Typical Maximum Noise Level dB L _{AFmax}	Typical Background Sound Level dB L _{AF90,T} ¹
ST1	21:00-22:00	57	77	48

5. NOISE IMPACT ASSESSMENT FOR PERMITTED DEVELOPMENTS

As discussed in Section 3 of this report, the Permitted Development application only requires consideration of *the impacts of noise from commercial premises on intended occupiers* and, therefore, does not need to consider the effects of environmental noise sources (e.g. road, rail, aircraft) on the future development.

Typical internal acoustic criteria are usually aimed towards the control of “environmental” noise sources, these generally being considered to include road, rail, aircraft etc. and exclude noise from commercial or industrial sources.

It is very common for sites in urban areas to be affected in some way by noise of a commercial or industrial nature, and it is generally accepted to form part of the cumulative ambient noise climate in many cases.

Where noise of an industrial or commercial nature is particularly loud or pervasive, its impact may warrant special consideration in isolation from the standard “environmental” noise sources.

5.1 Commercial Noise Sources

5.1.1 The Face Bar

The nearby music venue to the north west of the site (The Face Bar) was found to be the most significant commercial noise source affecting the Site.

During the survey, it is known that two events took place at The Face Bar: a rock concert on Friday 9th and a mixed rock/electronic concert on Saturday 10th. Noise breakout from these two events was audible at both measurement positions, but was more dominant at LT1.

Both events were assessed using data from LT1, finding a high proportion of low frequency (bass) content present at the site façade due to the noise breakout from the venue.

5.1.1.1 Noise Emitted from The Face Bar

Noise level data was extracted during a music event at Face Bar. On Site observations confirmed this was a mixed rock/electronic music event, and the time period containing a single ‘set’ was analysed as a representative example of noise breakout.

It was found that the 63Hz octave band at the nearest measurement position was considerably above the ambient noise levels measured. This level is provided in Table 3.

Table 3 also contains the level of the 63Hz octave band when distance corrected to the nearest new façade of the proposed extension.

Table 3: Noise levels from The Face Bar (levels 1 m from the building façade)

Location	Period	63 Hz Octave Band Level
Measured at LT1	During Face Bar event	75
Distance corrected to East	During Face Bar event	70

Due to the proximity and licensed operating hours of Face Bar, this high level of low frequency noise can occur throughout the night, making mitigation for the proposed residences important.

The octave band level in Table 3 will be used, alongside the other measured octave band levels, for break-in calculations for the proposed residences. These inform suggestions for the façade and roof buildups and glazing that will be necessary to prevent this level of low frequency noise breaking into habitable rooms with direct exposure to Face Bar.

It is understood that The Face Bar hosts music events during the daytime, evening, and nighttime periods, and holds a license to operate until 4am on Friday and Saturday nights. It is therefore important that habitable rooms (bedrooms and living areas) with direct line of sight to The Face Bar (the development's north and east elevations) are all constructed with a suitable building envelope, capable of controlling low frequency noise ingress. This is discussed in further detail in Section 6.

5.1.2 Other Commercial Noise Sources

Other commercial noise sources have been assessed based on a detailed review of the survey data and on-site observations.

LT2 captured a small amount of noise from the nearby pub (The Butler, Chatham Street), which is licensed as a small music venue. The noise reaching the Site from The Butler is significantly lower than that from The Face Bar and would not likely create disturbances inside the proposed residences. Furthermore, it is understood that live music at The Butler does not continue into the night, finishing at 23:00. As such, it is considered that noise from The Face Bar would drive the requirement for mitigation at the site.

Plant noise from a nearby unknown location was identified in the measured data at LT1 during certain points throughout the night. The overall level of the noise was relatively low and not subjectively audible during periods of attendance on Site. Based on the measured data, plant noise is expected to be indistinguishable against the residual noise climate.

The other commercial noise sources identified in Section 2.2 were not found to cause any significant levels of noise that would not otherwise be expected from a typical urban environment. They are not anticipated to require exceptional consideration or mitigation strategy.

6. NOISE IMPACT ASSESSMENT FOR PERMITTED DEVELOPMENTS

This section addresses the impact of noise on the Proposed Development, and provides recommendations, where necessary, on mitigation to control noise ingress from the sources identified above.

6.1 Elevations with Line of Sight to The Face Bar

Given the relatively low noise levels reaching the Site façade measured during the acoustic survey, The Face Bar is considered the only nearby commercial source likely to result in a significant noise impact.

In particular, dwellings with a direct line of sight to the venue will require consideration of enhanced ventilation strategies and building envelope constructions to mitigate noise ingress from amplified music, particularly at low frequencies.

Considering the relatively high levels of low frequency noise measured, it is recommended that an internal noise limit of ~NR15 is targeted to prevent sleep disturbance to future occupants.

6.1.1 Ventilation

Typical passive means of providing background ventilation (open windows, trickle ventilators) tend to reduce the acoustic performance of a building envelope.

Standard passive trickle ventilation is not likely to be appropriate to the elevations with line of sight to The Face Bar. Rather, ventilation should be provided mechanically (either full mechanical ventilation, or mechanically assisted extract ventilation), with appropriate attenuation.

On this basis, it has been agreed with the Client that mechanical ventilation with heat recovery (MVHR) will be installed to elevations which require this to control noise ingress.

6.1.2 Overheating

The provisions of Approved Document O (relating to overheating) do not apply to conversion projects and, therefore, there is no statutory requirement to achieve certain internal noise levels when windows are opened for the control of overheating.

However, it is acknowledged that, during warmer months, when windows are open for additional ventilation (e.g. to mitigate overheating), internal noise levels from external noise sources would inevitably increase.

Given the relatively limited scope to design the existing building to reduce overheating risk, and the extant nature of the noise from The Face Bar, comfort cooling is to be installed to dwellings which have a direct line of sight to the venue (north and west facing elevations).

This will allow occupants the flexibility to control both their internal acoustic and thermal environments as they prefer.

6.1.3 Building Envelope

The acoustic performance of the existing building envelope is not known. It is noted that most windows appear to be double-glazed and the façade comprises a masonry construction.

The external roof construction is also unknown, however it is understood that the conversion will comprise a concrete deck with suspended ceiling.

Assuming a worst-case scenario comprising a 103 mm single-skin masonry façade and a concrete deck roof with a suspended metal frame ceiling, it is anticipated that acoustic upgrades will be required in the most affected rooms (those on north facing and west facing elevations). These will include the introduction of acoustic plasterboard linings mounted on acoustic isolating clips, with reasonably sized cavities containing mineral wool insulation, to limit low-frequency sound transmission.

Final upgrade recommendations will depend on confirmation of existing façade construction details, including masonry thickness, number of leaves, and cavity dimensions (if present).

The existing windows on elevations facing towards The Face Bar should be reviewed to determine their current configuration and performance. Based on the assumptions above, and to meet a recommended internal criterion of NR15, standard thermal double-glazing is unlikely to be suitable. Therefore, windows are likely to need to be replaced with enhanced acoustic laminated double-glazed units.

Indicatively, a glazing build-up of 8mm glass / 15 mm air gap / 8 mm glass with 0.8mm PVB laminate, achieving ~30 dB $R_w + C_{tr}$ and a minimum performance of 28 dB at 63 Hz would be suitable. However, this will depend on the performance offered by the remainder of the building envelope and should, therefore, be confirmed once that has been developed.

Alternatively, the existing windows could be retained and improved with the addition of internal secondary glazing – which would typically provide higher levels of low frequency sound insulation performance than a single double-glazed unit.

A detailed performance specification for all relevant façade and roof components should be developed during the design stages and reviewed to confirm that the proposed construction offers sufficient acoustic protection from the Face Bar.

Regarding the other adjacent and more distant commercial sources of noise effecting these elevations, while there is potential for the noise to be audible occasionally when windows are opened, we recommend that the impact could be related to the No Observed Effect Level as defined in the 2019 Planning Practice Guidance (PPG) (Appendix B), as follows:

Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.

6.2 Other Elevations

The south and west elevations, fully screened from The Face Bar, are not expected to be significantly affected by low frequency noise breaking out from The Face Bar or any other significant commercial sources – as confirmed by observations made on site.

Therefore, they will likely not require enhanced acoustic glazing, with an ordinary façade specification and ventilation strategy likely suitable for the control of noise ingress from nearby commercial sources.

6.3 **Assessment Summary**

It is consequently recommended that, with respect to the acoustic requirements of the GPDO, the scheme is considered suitable for the conversion to residential use, subject to appropriate mitigation measures being installed to control low frequency noise from The Face Bar on elevations which are exposed to it.

The details of the ventilation strategy and building envelope construction should be reviewed and designed such that they control the noise ingress from the surrounding commercial sources, namely low-frequency noise from the nearby music venue / nightclub.

It is recommended that this is controlled by a suitably worded planning condition, requiring a further scheme of mitigation to be submitted once detailed assessment of the existing façade is undertaken and design proposals (including ventilation strategy) are developed.

7. CONCLUSION

MZA Acoustics has been appointed to undertake a noise impact assessment for the Site at 104-112 Oxford Road, Reading RG1 7NG in relation to conversion to a residential scheme.

Informed by the results of a noise survey undertaken at the Site, the likely impact of commercial noise sources on the Proposed Development has been assessed to support the Prior Approval application.

The only source of commercial noise that was measured to cause a potentially significant impact is the nearby music venue and nightclub, The Face Bar.

Recommendations are made for the implementation of appropriate measures to control low frequency noise ingress, including those influencing the ventilation strategy, the control of overheating and the building envelope construction.

With adequate considerations during the planning and construction stage of the development, nighttime noise impact from music events at the venue can be suitably mitigated.

It is consequently recommended that, with respect to the acoustic requirements of the GPDO, the scheme is considered suitable for the conversion to residential use.

The details of the ventilation strategy and building envelope construction should be reviewed and designed such that they control the noise ingress from the surrounding commercial sources, namely low-frequency noise from the nearby music venue / nightclub.

It is recommended that this is controlled by a suitably worded planning condition, requiring a further scheme of mitigation to be submitted once detailed assessment of the existing façade is undertaken and design proposals (including ventilation strategy) are developed.

The limitations to this report are included in Appendix E.

Appendices

Appendix A – Glossary of Acoustic Terminology

Airborne Sound	Sound that reaches the point of interest by propagation through air.
Ambient Sound:	Sound from all sources at any given time, from both near and far. Usually measured in terms of L_{Aeq} .
A-Weighting	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.
Background Sound Level	The A-weighted sound pressure level that can be considered the baseline in the absence of any noise from a specific source of sound under assessment. Measured in terms of $L_{A90, T}$.
Calibration	The measurement system/ chain should be periodically calibrated, within a laboratory, against traceable calibration instrumentation, to either National Standards or as UKAS-Accredited, as required. The calibration of the system should also be checked in the field using a portable calibrator before and after each short-term measurements, and periodically for longer term monitoring.
Class 1	The Class of a sound level meter describes its accuracy as defined by the relevant international standards – Class 1 is more accurate than Class 2. The older standard IEC 60651 referred to the grade as "Type", whereas the new standard IEC 61672 refers to it as the "Class". The most accurate meters used in the field (as opposed to a laboratory) are Class 1. Class 2 meters can be used in some instances; however MZA Acoustics use Class 1 (or Type 1) meters by default, as required by BS 4142:2014, for example.
Decibel	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds (s_1 and s_2) is given by $20 \log_{10} (s_1/s_2)$. 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 20 Pa.
Fast time Weighting (F)	Averaging time used in sound level meters. Defined in BS EN 61672-2:2013 Electroacoustics. Sound level meters. Pattern evaluation tests.
Free-field / Façade	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5 m away.
$L_{AF90, T}$	The A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time fast time-weighting (F). Generally used to describe the 'background' sound conditions.
L_{AFmax}	The maximum A-weighted sound pressure level during a given time period. L_{max} is sometimes used for the assessment of occasional loud sounds, which may have little effect on the overall L_{eq} noise level, but could still affect the sound environment. Unless described otherwise, it is measured using the fast time-weighting (F).

$L_{eq,T}$	A sound level index called the equivalent continuous sound 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. Where the value is A-weighted, is will be presented ' $L_{Aeq,T}$ ' or 'dBA $L_{eq,T}$ ', otherwise is should be an un-weighted (or linear) value.
L_p	See Sound Pressure Level.
Noise	Related to human response to sound. Unwanted sound, or sound that is considered undesirable or disruptive.
Octave Band	Frequency ranges in which the upper limit of each band is twice the lower limit. Octave bands are identified by their geometric mean frequency, or centre frequency.
Sound Absorption Coefficient	A measure of how effective a material is at absorbing sound incident to its surface. The index range is between 0 and 1, where 1 indicates a perfectly absorbent material and 0 indicates a perfectly reflective one.
Sound Power	In a specified frequency band, the rate at which acoustic energy is radiated from a source. In general, the rate of flow of sound energy, whether from a source, through an area, or into an absorber.
Sound Power Level	Of airborne sound, ten times the common logarithm of the ratio of the sound power under consideration of the standard reference power of 1 pW. Expressed in decibels.
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level	The sound level is the sound pressure relative to a standard reference pressure of 20 Pa (20×10^{-6} Pascals) on a decibel scale.
Weighted Sound Reduction Index (R_w)	A single-figure quantity which characterises the airborne sound insulating properties of a material or element over a range of frequencies.

Appendix B – Summary of Guidance Documents and Standards

National Planning Guidance

In preparation of this assessment, several national and local planning policies are considered, including:

- The National Planning Policy Framework (NPPF), 2021
- The Noise Policy Statement for England (NPSE), 2010
- Planning Practice Guidance – Noise (PPG-N), 2019
- The London Plan, 2021

The above documents guide on why the control of noise impact is important for residential development to protect the amenity of future occupants and provide an approach to the assessment of noise impact on proposed developments. However, they are, primarily, qualitative in their guidance.

As such, this report focusses on documents which provide quantitative assessment procedures.

NATIONAL PLANNING POLICY AND GUIDANCE

NOISE POLICY STATEMENT FOR ENGLAND (NPSE), 2010

The NPSE provides more detail than the NPPF setting out the long-term vision of the Government noise policy and applying to all forms of noise excluding occupational noise. The NPSE repeatedly refers to the management and control of noise within the context of Government Policy on sustainable development.

The NPSE also stresses that noise impact should not be treated in isolation from other related factors. At paragraph 2.7 for example it states:

'...the application of the NPSE should enable noise to be considered alongside other relevant issues and not to be considered in isolation. In the past, the wider benefits of a particular policy, development or other activity may not have been given adequate weight when assessing the noise implications.'

The NPSE introduces and describes three categories, or levels, describing the presence or absence of noise effects but does not quantify those categories, stating that the corresponding objective levels are likely to be different for different noise sources, receptors and times of the day or night.

These categories are:

- **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
- **LOAEL** – Lowest Observed Adverse Effect Level – This is the level above which adverse effects on health and quality of life can be detected
- **SOAEL** – Significant Observed Adverse Effect Level – This is the level above which significant adverse effects on health and quality of life occur.

The NPSE recognised that, at the time of publication, further research was needed into how these categories might be quantified for different scenarios. There is still no robust, universally accepted method of deriving suitable values and a variety of approaches are adopted in different circumstances. The subjective guidance provided in the Planning Practice Guidance (PPG) for noise can be of assistance in deriving suitable values.

The three aims of the NPSE are:

- Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

PLANNING PRACTICE GUIDANCE – NOISE (PPG-N), 2019

The Government launched the Planning Practice Guidance (PPG) web-based resource in March 2014 and refreshed it in July 2019. The section on noise provides tabulated descriptions of example outcomes of the categories introduced in the NPSE based on the likely average response. It also adds a fourth category termed Unacceptable Adverse Effect (UAE).

The PPG-N describes sound that is not noticeable to be at levels below the NOEL. It describes exposures that are noticeable but not to the extent there is a perceived change in quality of life as below the LOAEL and need no mitigation. With reference to the definition of noise in the NPSE, such emissions are 'sound; and not 'noise'. On this basis, the audibility of sound from a development is not, in itself, a criterion to judge noise effects that is commensurate with national planning policy.

The PPG-N suggests that noise exposures above the LOAEL cause small changes in behaviour. Examples of noise exposures above the LOAEL provided in the PPG-N is having to turn up the volume on the television; needing to speak more loudly to be heard; where there is no alternative ventilation, closing windows for some time because of the noise; or, a potential for some reported sleep disturbance. In line with the NPPF and NPSE, the PPG-N states that consideration needs to be given to mitigating and minimising effects above the LOAEL but taking account of the economic and social benefits being derived from the activity causing the noise.

The PPG-N suggests that noise exposures above the SOAEL cause material changes in behaviour. Examples of noise exposures above the SOAEL cause material changes in behaviour. Examples

of noise exposures above the SOAEL provided in the PPG-N are, where there is no alternative ventilation, keeping windows closed for most of the time or avoiding certain activities during periods when the noise present; and/or there is a potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. In line with the NPPF and NPSE, the PPG-N state that effects above the SOAEL should be avoided and that whilst the economic and social benefits being derived from the activity causing the noise must be taken into account, such exposures are undesirable.

The guidance in the PPG-N, which is based on that provided in the NPSE, is summarised in the following table.

The PPG-N states that there are many factors which should be considered when determining if noise is of concern; one factor is the number of noise events, the frequency and pattern of occurrence of the noise.

The PPG-N provides further information on the adverse effects of noise and how it can be mitigated. For noise sensitive development, mitigation measures can include: avoiding noisy locations; designing the development to reduce the impact of noise from the local environment, including noise barriers; and optimising the sound insulation provided by the building envelope including through noise insulation.

Perception	Examples of Outcomes	Increasing Effect Levels	Action
No Observed Effect Level			
Not present	No effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

PROFESSIONAL PRACTICE GUIDANCE ON PLANNING AND NOISE (PROPG) 2017

The Professional Practice Guidance on Planning and Noise (ProPG) has been produced to provide practitioners with guidance on a recommended approach to the management of noise within the planning system in England.

The scope of the ProPG is limited to the consideration of new residential development that will be exposed predominantly to airborne noise from transport sources and is implemented in this assessment as it provides a logical approach to the assessment of noise impact on the Proposed Development.

The recommended approach to the ProPG assessment is a 2-stage approach summarised as follows:

Stage 1 – An initial noise risk assessment of the proposed development site, which will inform the level of detail required in the more detailed ‘Stage 2’ assessment.

Stage 2 – A systematic consideration of four key assessment elements:

1. Demonstrating a “Good Acoustic Design Process”
2. Observing internal “Noise Level Guidelines”
3. Undertaking an “External Amenity Area Noise Assessment”
4. Consideration of “Other Relevant Issues”

The Stage 2 assessment also refers to quantitative guidance for the acoustic design of residential development in the following documents:

- British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings;
- The World Health Organisation Guidelines for community noise; and
- British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound.

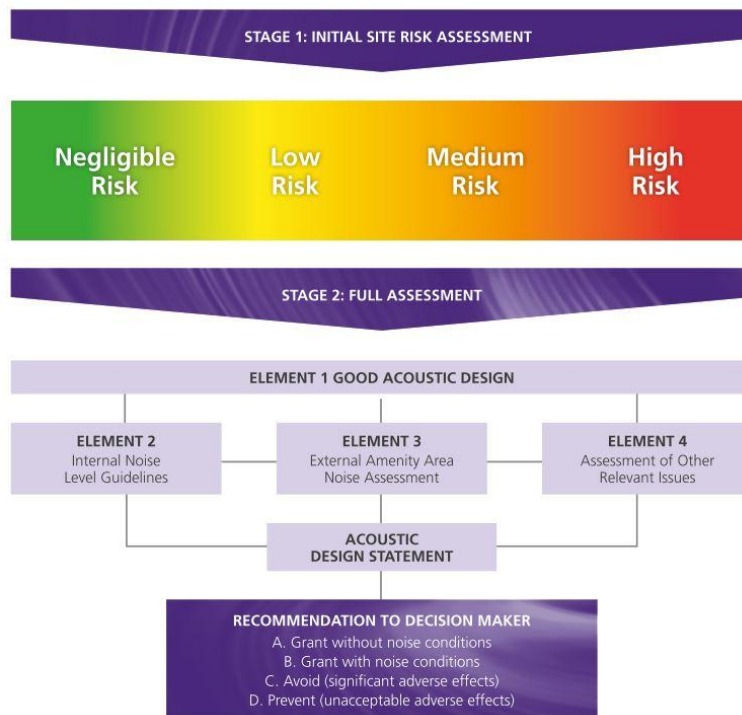


Figure 4: Summary of the ProPG approach

The ProPG is designed to provide practitioners with guidance on a recommended assessment approach to the management of noise within the planning system in England for new residential development.

The guidance is non-statutory and is primarily aimed at the assessment of proposed residential development ‘exposed predominantly to noise from existing transport sources’. Despite being non-statutory, it is expected to be widely adopted by planning authorities as best practice when considering noise affecting new residential development.

The ProPG aims to complement Government planning and noise policy and guidance, and in particular it strives to:

- “advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;
- encourage the process of good acoustic design in and around new residential developments;
- outline what should be taken into account in deciding planning applications for new noise-sensitive developments;
- improve understanding of how to determine the extent of potential noise impact and effect; and
- assist the delivery of sustainable development.”

The assessment approach, as summarised and implemented in the body of this report, is described as follows.

Stage 1 Risk Assessment

The Stage 1 initial noise risk assessment is based on placing the site within ranges of external noise levels, which correspond to varying degrees of risk. The external noise levels refer to the combined free-field noise level from all relevant sources of transport noise that affect the site. The external noise levels may also include industrial/commercial noise where it is present, but where it is “not dominant”.

The indicative noise levels are intended to provide a sense of the noise challenge at a potential residential development site and should be interpreted flexibly having regard to the locality, the project and the wider context.

The initial noise risk assessment approach is presented in Figure 5 in the ProPG, which is reproduced in the following figure.

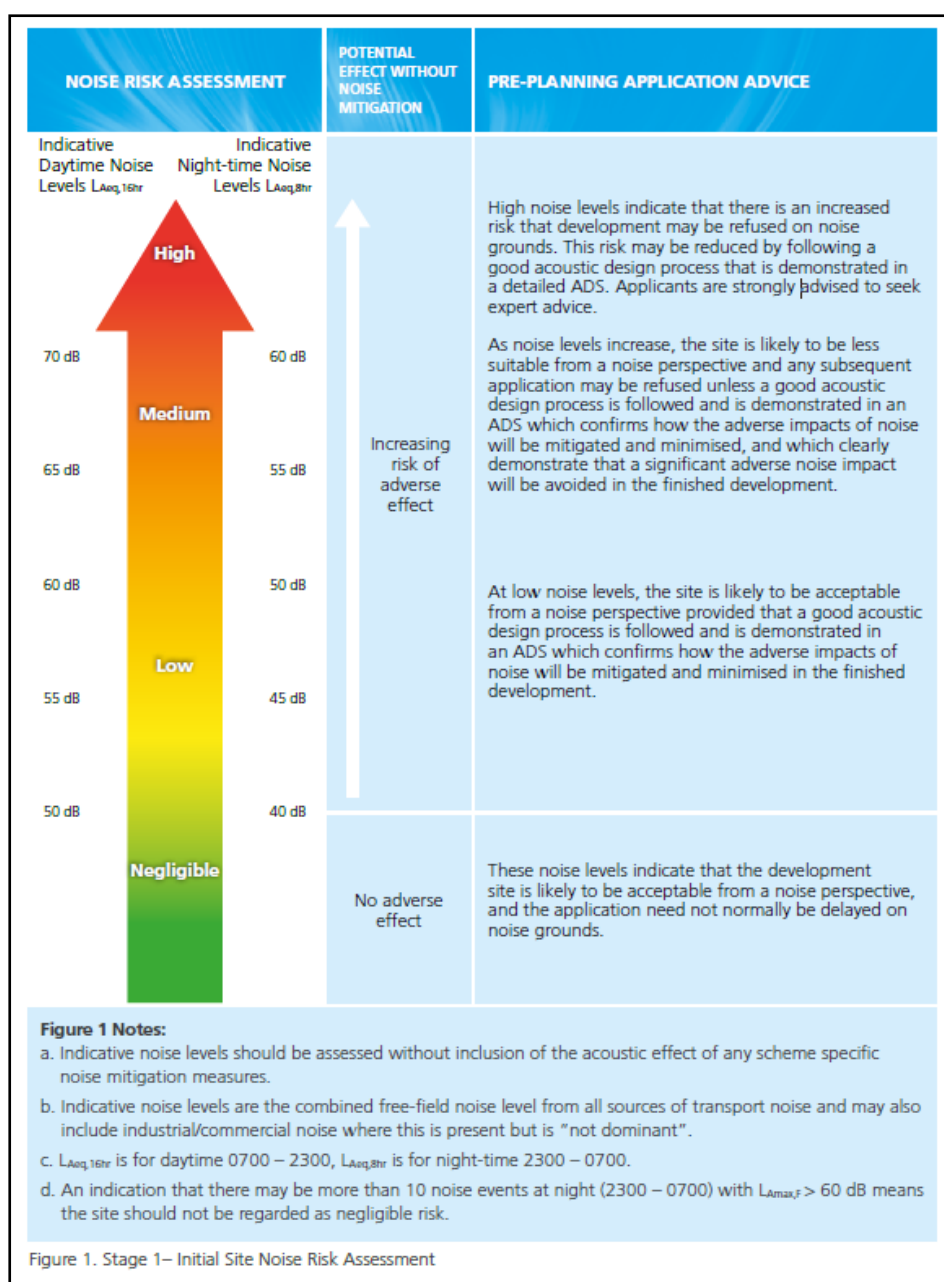


Figure 5: ProPG Stage 1 Risk Assessment

Stage 2 Element 1 – Good Acoustic Design Process

ProPG states that planning applications for new residential development should include evidence that the following have been properly considered:

- Check the feasibility of relocating, or reducing noise levels from relevant sources.
- Consider options for planning the site or building layout.
- Consider the orientation of proposed building(s).
- Select construction types and methods for meeting building performance requirements.
- Examine the effects of noise control measures on ventilation, fire regulation, health and safety, cost CDM (construction design and management) etc.
- Assess the viability of alternative solutions.
- Assess external amenity area noise.

Stage 2 Element 2 – Internal Noise Level Guidelines

The internal noise level guidelines provided under Element 2 within Figure 2 of the ProPG are based upon the guidance in BS 8233:2014. Accompanying notes 4 – 7 from Figure 2 of the ProPG state the following:

“Note 4 – Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or L_{Amax,F} depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB L_{Amax,F} more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number distribution, predictability and regularity of noise events.

Note 5 – Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the “open” position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7.

Note 6 – Attention is drawn to the requirements of the Building Regulations.

Note 7 – Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as “unreasonable”. Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as “unacceptable” by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing “unacceptable” noise levels at all and where

such levels are likely to occur frequently, the development should be prevented in its proposed form."

Stage 2 Element 3 – External Amenity Area Noise Assessment

ProPG refers to the design ranges in BS 8233:2014 with respect to the assessment of external amenity, as well as guidance in the PPG-N. Based on these two documents the following guidance is provided with respect to the assessment of noise in external amenity areas:

3(i) "If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended"

3(ii) "The acoustic environment of external amenity areas that are an intrinsic part of the overall design should always be assessed and noise levels should ideally not be above the range 50 – 55 dB LAeq,16hr."

3(iii) "These guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces."

3(iv) "Whether or not external amenity spaces are an intrinsic part of the overall design, consideration of the need to provide access to a quiet or relatively quiet external amenity space forms part of a good acoustic design process."

3(v) "Where, despite following a good acoustic design process, significant adverse noise impacts remain on any private external amenity space (e.g. garden or balcony) then that impact may be partially off-set if the residents are provided, through the design of the development or the planning process, with access to:

- a relatively quiet façade (containing openable windows to habitable rooms) or a relatively quiet externally ventilated space (i.e. an enclosed balcony) as part of their dwelling; and/or
- a relatively quiet alternative or additional external amenity space for sole use by a household, (e.g. a garden, roof garden or large open balcony in a different protected location); 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, publicly accessible, external amenity space (e.g. a public park or local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance)."

Stage 2 Element 4 – Other Relevant Issues

ProPG states that the following other relevant issues, should be considered, where appropriate:

- 4(i) compliance with relevant national and local policy
- 4(ii) magnitude and extent of compliance with ProPG
- 4(iii) likely occupants of the development
- 4(iv) acoustic design verses unintended adverse consequences
- 4(v) acoustic design verses wider planning

Planning Recommendations

Following the ProPG assessment approach, will lead the noise practitioner to choose between four possible recommendations to the decision maker. These are as follows:

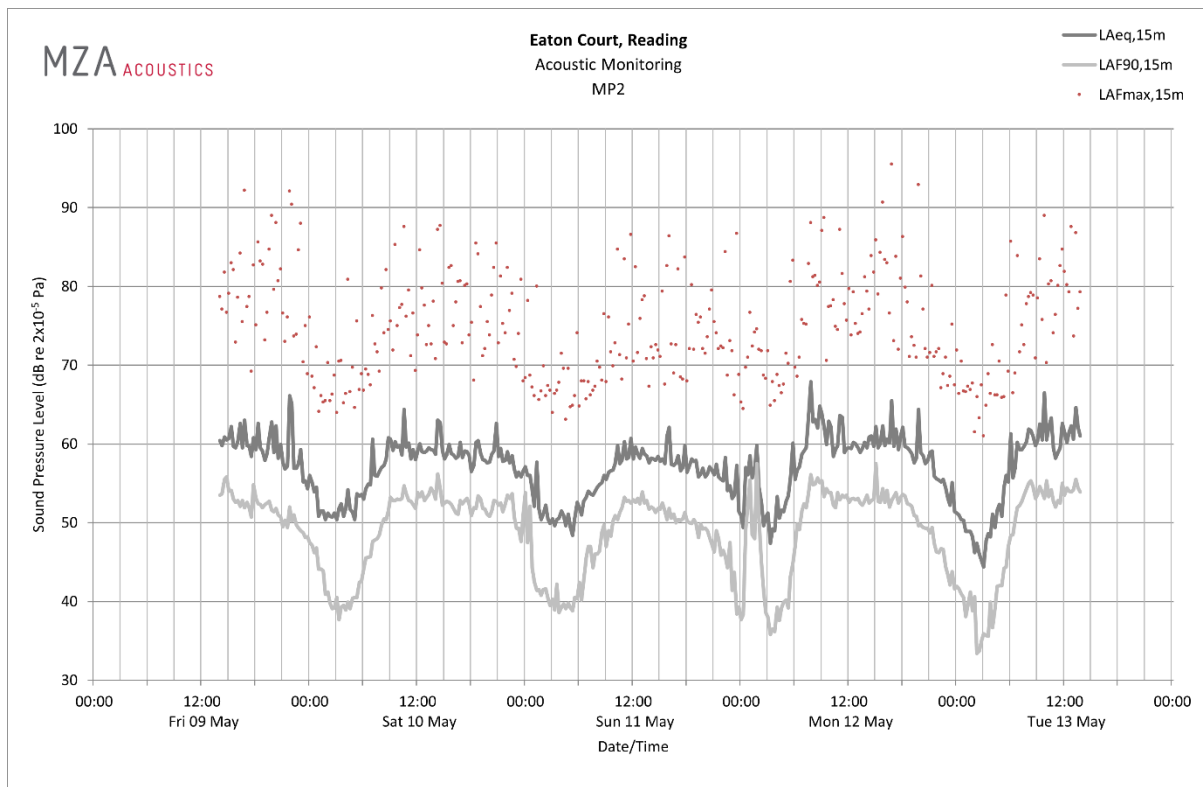
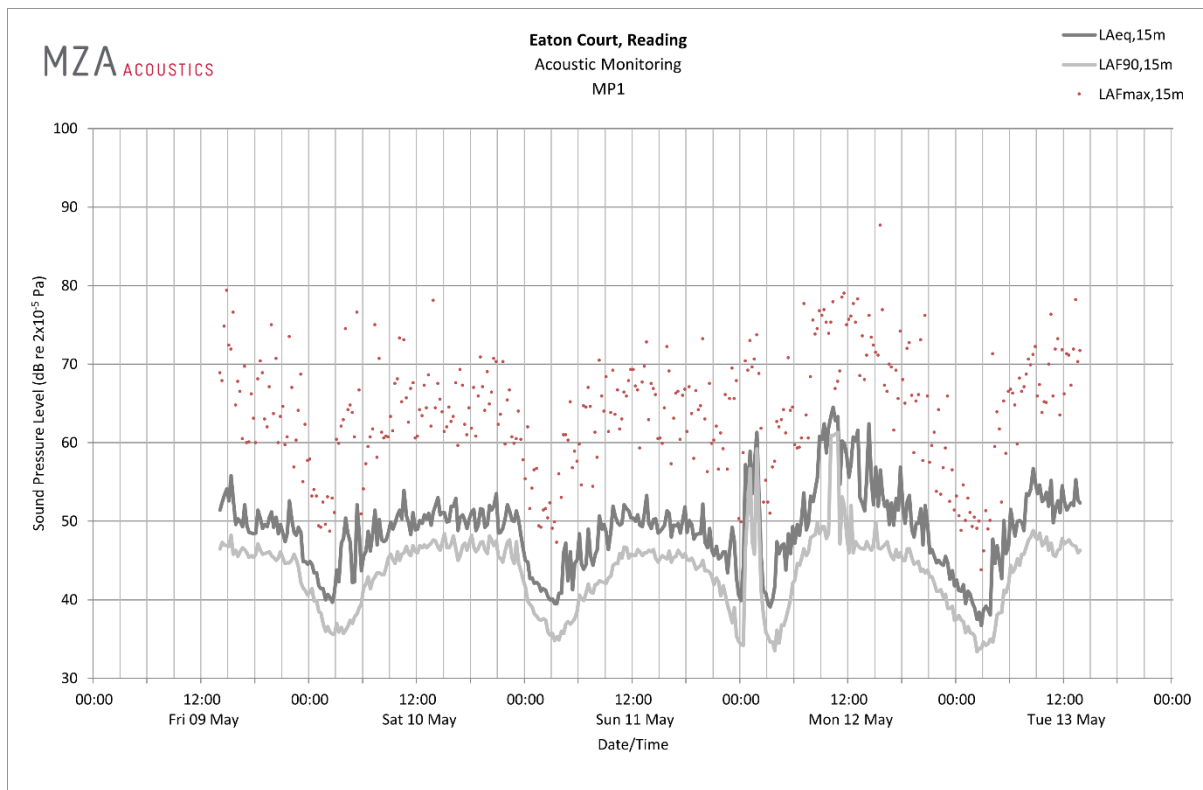
- planning consent may be granted without any need for noise conditions.
- planning consent may be granted subject to the inclusion of suitable noise conditions.
- planning consent should be refused on noise grounds in order to avoid significant adverse effects (“avoid”); or
- planning consent should be refused on noise grounds in order to prevent unacceptable adverse effects (“prevent”).

Full details of where and when the above recommendations apply are provided in Section 3 of ProPG.

Appendix C – Noise Survey Equipment

Equipment	Type	Serial Number	Calibration Due Date
Attended Monitoring Location (ST1)			
Sound Level Meter	Nti Audio XL2-TA	A2A-14034-E0	31/10/2026
Pre-amplifier	Nti Audio MA220	9379	
Microphone	NTI Audio MC230A	A19094	
Calibrator	Cirrus CR:515	93522	30/10/2025
Unattended Monitoring Location (LT1)			
Sound Level Meter	01dB Metravib FUSION	14465	02/06/2026
Pre-amplifier	01dB Metravib PRE22	2135015	
Microphone	GRAS 40CD 1/2" Pre-polarised free-field	470849	
Calibrator	01dB Metravib CAL31	98855	03/04/2026
Unattended Monitoring Location (LT2)			
Sound Level Meter	01dB Metravib FUSION	14087	19/10/2025
Pre-amplifier	01dB Metravib PRE22	2113049	
Microphone	GRAS 40CD 1/2" Pre-polarised free-field	446548	
Calibrator	01dB Metravib CAL31	87801	29/04/2026

Appendix D – Noise Survey Time History



Appendix E – Limitations to this Report

This report has been prepared for the titled project or named part thereof and should not be used in whole or part and relied upon for any other project without the written authorisation of MZA Acoustics Limited. MZA Acoustics Limited accepts no responsibility or liability for the consequences of this document if it is used for a purpose other than that for which it was commissioned. Persons wishing to use or rely upon this report for other purposes must seek written authority to do so from the owner of this report and/ or MZA Acoustics Limited and agree to indemnify MZA Acoustics Limited for any and all loss or damage resulting therefrom. MZA Acoustics Limited accepts no responsibility or liability for this document to any other party other than the person by whom it was commissioned.

The findings and opinions expressed are relevant to the dates of the site works and should not be relied upon to represent conditions at substantially later dates. Opinions included therein are based on information gathered during the study and from our experience. If additional information becomes available which may affect our comments, conclusions or recommendations MZA Acoustics Limited reserve the right to review the information, reassess any new potential concerns and modify our opinions accordingly.



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