

Noise Impact Assessment Report for Class G Permitted Development Application

73,74 & 74A Broad Street, Reading, Berkshire, RG1 2AP

Report Reference 21063.PDNIA.RPT.01

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Report Title	Noise Impact Assessment Report for Class G Permitted Development Application
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Document Revision History		
Revision Reference	Issue Date	Purpose and/or Description of Revision
First Issue	2 nd May 2025	Noise impact assessment report prepared in support of a Class G Permitted Development application for the conversion of an office to residential
Rev A	8 th October 2025	Report updated to address comments from the Local Authority: <i>“Closed windows are being relied on to achieve acceptable noise levels, can the ventilation strategy be clarified? It is likely that MVHR with cool air summer bypass will be required.</i> <i>The assessment states that if there is a suspended ceiling below the floor slab then the insulation between first and second floor is likely to meet 55 dB, can this be confirmed?</i> <i>Can noise between the party walls of the adjoining premises be further considered as there is limited information in the assessment regarding this, what are the adjoining uses and what is the party wall insulation that is present? Or is there no adjoining use on the second floor?”</i> Regarding Point 1, the applicant has confirmed that the scheme would be served by MVHR with a cooling coil to provide mitigation against internal heat gains during summer. Section 5.1 of the report has been updated to clarify this. Regarding Point 2, it has been confirmed that there is a suspended ceiling below the floor slab of the 2nd floor, and the performance would achieve $D_{nTw} + C_{tr}$ 55 dB. Section 5.2 of the report has been updated to clarify this. Regarding Point 3, Section 5.2 of the report, and other relevant descriptions, have been updated to clarify this. The 2nd floor of the adjacent buildings is understood to be in office use.

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EXECUTIVE SUMMARY

An environmental noise survey, manual noise measurements and a noise impact assessment have been undertaken for the Proposed Development at 73,74 & 74A Broad Street, Reading, Berkshire, RG1 2AP in support of a Class G Permitted Development application for the conversion to residential.

An initial site inspection of the application site surroundings revealed several external plant unit installations serving neighbouring commercial units. Listening tests noted that noise emissions associated with adjacent commercial plant installations were the major contributing factors to the noise level directly outside the north, east and west façades of the application site. Manual measurements of the plant were undertaken to assess worst-case scenarios. Noise levels at the south façade were dominated by road traffic noise, with no definitive commercial sources of noise observed.

By following the rigorous calculation procedure outlined in Section G.2 of Annex G of BS8233:2014 the sound insulation performance for the whole existing building envelope was assessed, considering each individual façade element.

Internal noise levels were predicted based on the worst-case noise levels measured. Initial calculations noted that the current external building fabric constructions would not be sufficient to meet the set internal noise criteria and mitigation measures were proposed in the form of a secondary glazing system, as below:

- East, south & west facades: 4mm secondary glass pane spaced at a minimum distance of 100mm from the primary window system, such as the Selectaglaze Slimline 45 (HC) hinged casement system.
- North façade: 12mm secondary glass pane spaced at a minimum distance of 200mm from the primary window system, such as the Selectaglaze Heavy Duty 41 (HC) hinged casement system.

Repeat predictions were undertaken considering the mitigation measures proposed. A summary of the resultant levels shown in the table below:

Facade	Time	Criteria	Internal Noise Level
East	07:00-23:00	≤ 30 dB L_{Aeq}	17 dB L_{Aeq}
	23:00-07:00	≤ 25 dB L_{Aeq}	14 dB L_{Aeq}
South/Front	07:00-23:00	≤ 30 dB L_{Aeq}	18 dB L_{Aeq}
	23:00-07:00	≤ 25 dB L_{Aeq}	15 dB L_{Aeq}
West	07:00-23:00	≤ 30 dB L_{Aeq}	16 dB L_{Aeq}
	23:00-07:00	≤ 25 dB L_{Aeq}	16 dB L_{Aeq}
North/Rear	07:00-23:00	≤ 30 dB L_{Aeq}	30 dB L_{Aeq}
	23:00-07:00	≤ 25 dB L_{Aeq}	15 dB L_{Aeq}

As shown above, the proposed mitigation measures would ensure that the external building fabric construction would be sufficient to meet the set internal noise criteria targets, therefore ensuring that the future residents are adequately protected from noise impacts from commercial premises.

With regards to ventilation and overheating mitigation, the applicant has confirmed that an MVHR system with a cooling coil would be installed for each flat. This would mean that residents would not need to open their windows, as sufficient ventilation and cooling would be provided by design.

An assessment of the party wall and floor constructions was undertaken, with no upgrades deemed necessary to ensure impacts from commercial premises upon the future occupants of the development site, with regard to noise transfer via the party walls and floors.

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1 INTRODUCTION

ES Acoustics Ltd has been commissioned by Broadstreet to undertake an environmental noise survey and prepare a noise impact assessment for the Proposed Development at 73,74 & 74A Broad Street, Reading, Berkshire, RG1 2AP, in support of a Class G Permitted Development application for the conversion of commercial to residential.

The purpose of this report is to;

- Review the legislation presented in The Town and Country Planning (General Permitted Development) (England) (Amendment) Order 2015 with regards to Class G;
- Determine noise levels incident on the Proposed Development from commercial sources via an environmental noise survey and manual noise measurements;
- Undertake an acoustic assessment of the existing external building fabric constructions to confirm whether sufficient sound insulation is provided;
- Undertake an assessment of the existing party floor sound insulation provision to ensure no adverse impact with regards to direct noise transfer from commercial premises; and
- Where appropriate provide outline mitigation advice to ensure there is no impact from commercial premises on the future occupiers of the development.

1.1 Forward to Noise Assessment

This noise impact assessment covers the legislation presented in The Town and Country Planning (General Permitted Development) (England) (Amendment) Order 2015, specifically:

G. Development consisting of a change of use of a building—

(a) from a use within Class E (commercial, business and service) of Schedule 2 to the Use Classes Order, to a mixed use for any purpose within that Class and as up to 2 flats;

When considering a change of use to residential via the above legislation, it is important to note that in terms of legislation, the assessment only needs to consider noise specifically from commercial premises (which in this case is understood to mean any Class E use). Under Permitted Development legislation there is no requirement to consider noise from transportation noise sources such as road traffic, railways, or aircraft.

Nevertheless, the measurements of existing noise undertaken as part of the process would unavoidably include some contribution of noise from road traffic and other activity within the surrounding area with regards to externally generated noise.

However, care would be taken to ensure that the predominant noise assessed would be that from commercial premises as required by the Permitted Development legislation.

2 PROPOSED DEVELOPMENT

2.1 Proposal

The proposal involves the conversion of the second floor of the premises at 73, 74 & 74A Broad Street, Reading to residential under Class G of The General Permitted Development Order (2015). Existing and proposed site plans are shown in Appendix B. Note that the ground and first floor would remain unchanged as part of the proposal.

2.2 Site Description

The application site is located in Reading town centre on the corner of Broad Street and West Street. The site is located in an area of mixed use and mixed character, comprised of predominantly commercial and residential uses.

As the key noise consideration of a Class G application is the assessment of “*impacts of noise from commercial premises on the intended occupiers of the development*”, all neighbouring commercial units are annotated and listed below, with the application site boundary shown in red:

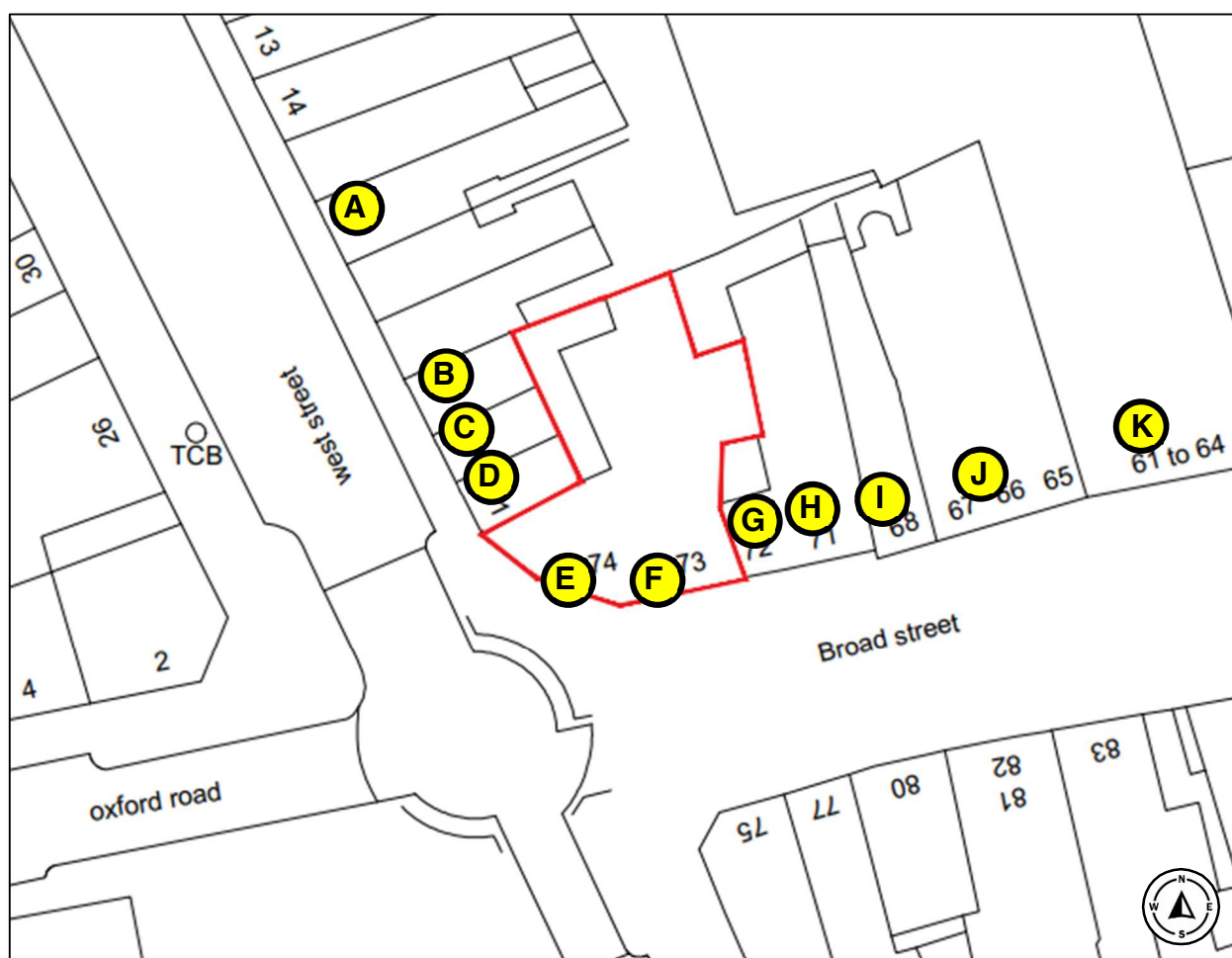


Figure 1 Proposed development site (Image Reference: PR Architecture)

- A. *Just Fresh Supermarket at 16 West Street*
- B. *Fix Tech & Vape at 19 West Street*
- C. *Kenya Butchers at 20 West Street*
- D. *American Nail at ground floor with office use at upper floors at 21 West Street*
- E. *Davina's (Convenience Store) at ground floor of 73-74 Broad Street*
- F. *KFC at ground floor of 73-74 Broad Street*
- G. *Western Union at ground floor with office use at upper floors at 72 Broad Street*
- H. *Paul's Cafe at 70 Broad Street*
- I. *Mr Simms Sweet Shop at 68 Broad Street*
- J. *Halifax Bank at 65-67 Broad Street*
- K. *Sports Direct at 61-64 Broad Street*

A site inspection of the application site surroundings revealed the plant unit installations as shown in Figure 2. It is possible that there are other building services installations surrounding the site which are out of line of sight.

Observations and listening tests on site noted the following:

- Noise emissions associated with the restaurant extraction flue serving KFC (F) was the primary contributing factor to the noise level directly at the north/rear façade of the application site.
- Noise emissions associated with the condenser units serving Paul's Café and the assumed residential properties in the floors above (H), the extraction system and condenser units serving Halifax Bank (J) and the condenser units serving Sports Direct (K) all contributed to noise levels at the east façade of the application site.
- Noise emissions associated with pedestrian noise and bus traffic on the nearby West Street and Oxford Road were the primary contributing factors to noise levels at the front/south facades.
- Noise emissions associated with the condenser units and extraction system serving Fix Tech & Vape, Kenya Butchers and American Nail (B,C,D) all contributed to noise levels at the east façade of the application site. Due to the layout of these buildings it was not possible to identify which plant unit was serving which commercial site specifically.



Figure 2 Identified potential sources of external noise

Based on the initial observations, manual noise measurements were undertaken at the position on the roof closest to the units shown as F for the north façade and B, C and D for the west façade.

Measurement of the other plant shown would not be practical due to the distances involved and the inability to isolate the individual noise sources, and therefore an automated environmental noise survey position would aim to capture all external sources within the area.

With regards to direct noise transfer, the building shares a party floor with the KFC restaurant eating, kitchen and WC areas on the first floor below. In addition, the party walls to the adjacent buildings are to office uses. No noise transfer via the separating walls and floors was observed during the site visits.

Additional information with regards to direct noise transfer is included in Section 5.2.

3 NOISE ASSESSMENT GUIDANCE AND CRITERIA

3.1 The Town and Country Planning (General Permitted Development etc.) (England) (Amendment) Order 2021

Class G – commercial, business and service or betting office or pay day loan shop to mixed use Permitted development

G. Development consisting of a change of use of a building—

(a) from a use within Class E (commercial, business and service) of Schedule 2 to the Use Classes Order, to a mixed use for any purpose within that Class and as up to 2 flats;

(c) from a use within article 3(6)(n) (betting office) or 3(6)(o) (pay day loan shop) of the Use Classes Order, to a mixed use for any purpose within Class E (commercial, business and service) of Schedule 2 to that Order and as up to 2 flats;

(e) from a use falling within article 3(6)(n) (betting office) or 3 (6)(o) (pay day loan shop) of the Use Classes Order to a mixed use falling within article 3(6)(n) (betting office) or 3 (6)(o) (pay day loan shop) of the Use Classes Order and as up to 2 flats.

Conditions

G.1 Development permitted by Class G is subject to the following conditions—

(a) some or all of the parts of the building used for a use within, as the case may be, article 3(6)(n) (betting office) or 3(6)(o) (pay day loan shop) of, or Class E of Schedule 2 to, the Use Classes Order is situated on a floor below the lowest part of the building used as a flat;

(b) where the development consists of a change of use of any building with a display window at ground floor level, the ground floor must not be used in whole or in part as a flat;

(c) a flat must not be used otherwise than as a dwelling (whether or not as a sole or main residence)—

(i) by a single person or by people living together as a family, or

(ii) by not more than 6 residents living together as a single household (including a household where care is provided for residents).

(d) before beginning development, the developer must apply to the local planning authority for a determination as to whether the prior approval of the authority will be required as to—

(i) contamination risks in relation to the building;

(ii) flooding risks in relation to the building;

(iii) impacts of noise from commercial premises on the intended occupiers of the development;

(iv) the provision of adequate natural light in all habitable rooms of the dwellinghouses;

(v) arrangements required for the storage and management of domestic waste.

Interpretation of Class G

G.2 For the purposes of Class G, “care” means personal care for people in need of such care by reason of old age, disablement, past or present dependence on alcohol or drugs or past or present mental disorder.

3.2 Best Practice and Guidance

Suitable guidance is presented below to ensure that impacts of noise from commercial premises on the intended occupiers of the development are adequately assessed.

3.2.1 World Health Organization (WHO) Guidelines

WHO Environmental Noise Guidelines for European Region (WHO, Regional office for Europe, 2018) have now supplemented elements of the WHO Guidelines for Community Noise (1999) upon which Westminster City Council’s Planning Noise Policy is based.

While this application is not a full planning application and instead a permitted development application, we would still consider the noise levels reported within the WHO Guidelines to be appropriate to ensure a good quality residential environment for future residents. The WHO guideline values most relevant to new residential development are outlined in the table below:

Specific Environment	Critical Health Effects	L _{Aeq} [dB]	Time [hours]	L _{Afmax} [dB]
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	16	n/a
	Sleep disturbance night-time	30	8	45
Outside bedrooms (from noise sources other than road traffic, railways, aircraft or wind turbines)	Sleep disturbance, window open (outdoor values)	45	8	60

Table 1 Guideline Values from WHO Guidelines for Community Noise (1999)

The effects of noise in dwellings are typically sleep disturbance, annoyance and speech interference. For bedrooms the critical effect is sleep disturbance. Indoor guideline values for bedrooms at night are 30dB L_{Aeq} for continuous noise and 45dB L_{Amax} for single sound events, but the guidance also notes that lower noise levels may be disturbing depending on the nature of the noise source.

The value of 45dB L_{Aeq} outside bedrooms (at night, due to the reference of sleep disturbance) assumes a partially open window, with the value was obtained by assuming that the noise reduction from outside to inside with the window open is 15dB i.e. 30dB + 15dB = 45dB. However, the logic of needing a window open would be for the purpose of purge ventilation (as defined in Approved Document F of the Building Regulations) or to provide increased ventilation rates for the purpose of overheating mitigation. With regards to purge ventilation, it is accepted that the internal noise criteria would not apply as it would only occur for short durations and is fully controllable by the occupant i.e. to remove paint odours or burnt toast smells, etc.

3.2.2 BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'

BS 8233:2014 provides guidance on recommended internal ambient noise levels in residential spaces. The recommended levels are supported by advice contained in the WHO Community Noise Guidelines, and are repeated in the table below for the sake of completeness:

Room	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Living Room	35 dB $L_{Aeq,16hr}$	N/A
Dining Room	40 dB $L_{Aeq,16hr}$	N/A
Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

Table 2 BS 8233:2014 indoor ambient noise levels for dwellings

The following notes should be considered alongside the levels presented above:

- The levels presented above are for steady external noise sources without a specific character. Noise is considered to have a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate*
- The levels are based on annual average data and do not have to be achieved in all circumstances e.g. it is normal to exclude occasional events, such as fireworks night or New Year's Eve*
- 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*
- If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level*
- The levels outlined above are not applicable under "purge ventilation" conditions as defined by Approved Document F of the Building Regulations, as this should only occur occasionally e.g. to remove odour from painting or burnt food). However, the levels above should be achieved whilst providing sufficient background ventilation, either via passive or mechanical methods*

3.3 Criteria

Based on the guidance presented within World Health Organization Guidelines and BS 8233:2014, we would suggest internal noise criteria for daytime and night-time 5dB below the values presented in the tables above in cases where there is an obvious commercial noise source nearby. This would apply to the north, east and west façades, but not the south (front) elevation. For the avoidance of doubt, the dominant source at the front elevation was road traffic noise, where the standard BS 8233:2014 criteria would be appropriate. This has been derived from the commonly accepted acoustic feature corrections of +5dB for distinguishable audible features, such as tonality, impulsivity and intermittency.

The proposed internal noise criteria for daytime and night-time are shown in the table below:

Room	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Living Room	30 dB $L_{Aeq,16hr}$	N/A
Bedroom	30 dB $L_{Aeq,16hr}$	25 dB $L_{Aeq,8hr}$

Table 3 Project specific noise criteria for daytime and night-time based on the external noise environment and consideration of noise with a specific character

In addition to the overall noise levels presented above, consideration would be given to the frequency content of the internal noise level.

The Department for Environment, Food and Rural Affairs (DEFRA) published a University of Salford research paper titled a '*Procedure for the assessment of low frequency noise disturbance – Contract NANR45, Dec 2011 (Moorhouse, AT, Waddington, DC and Adams, MD)*' which provides a criterion curve (reproduced below) to assist in determining whether an environmental sound could potentially cause a disturbance:

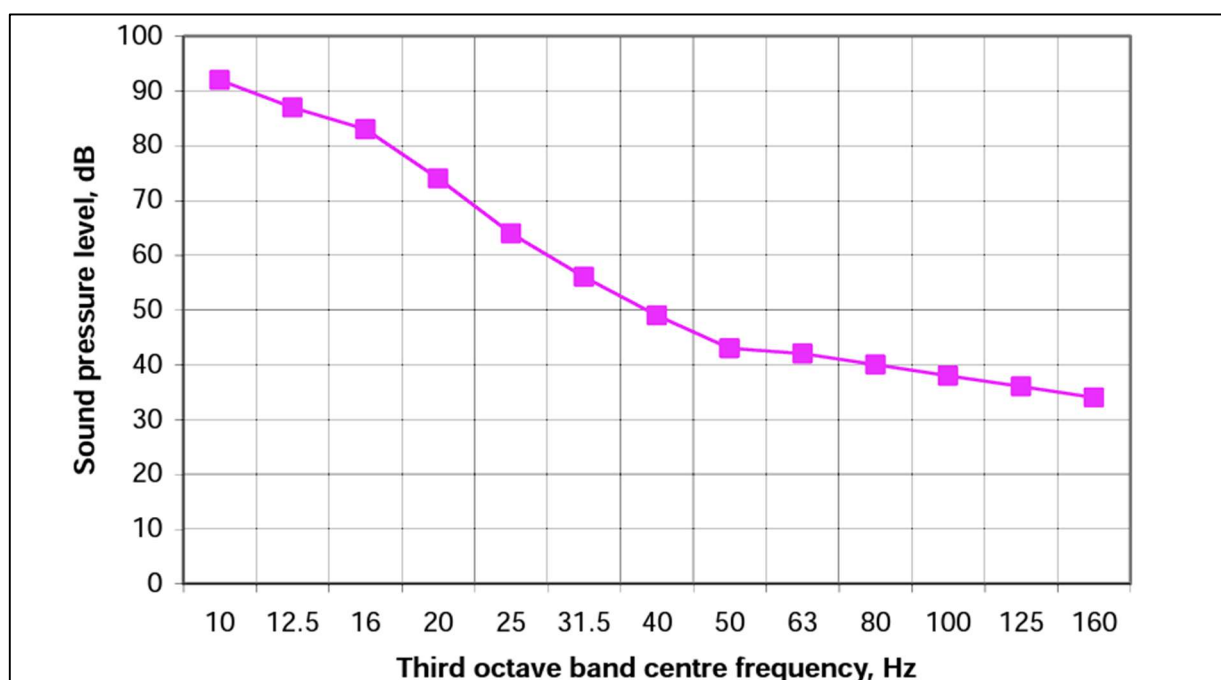


Figure 3 Criterion curve for the assessment of low frequency noise

The predicted noise levels would also be compared against the curve above to ensure a low likelihood of disturbance.

4 ENVIRONMENTAL NOISE SURVEY

4.1 Measurement Location and Procedure

Noise surveys were undertaken on the proposed site as shown in the figure below:

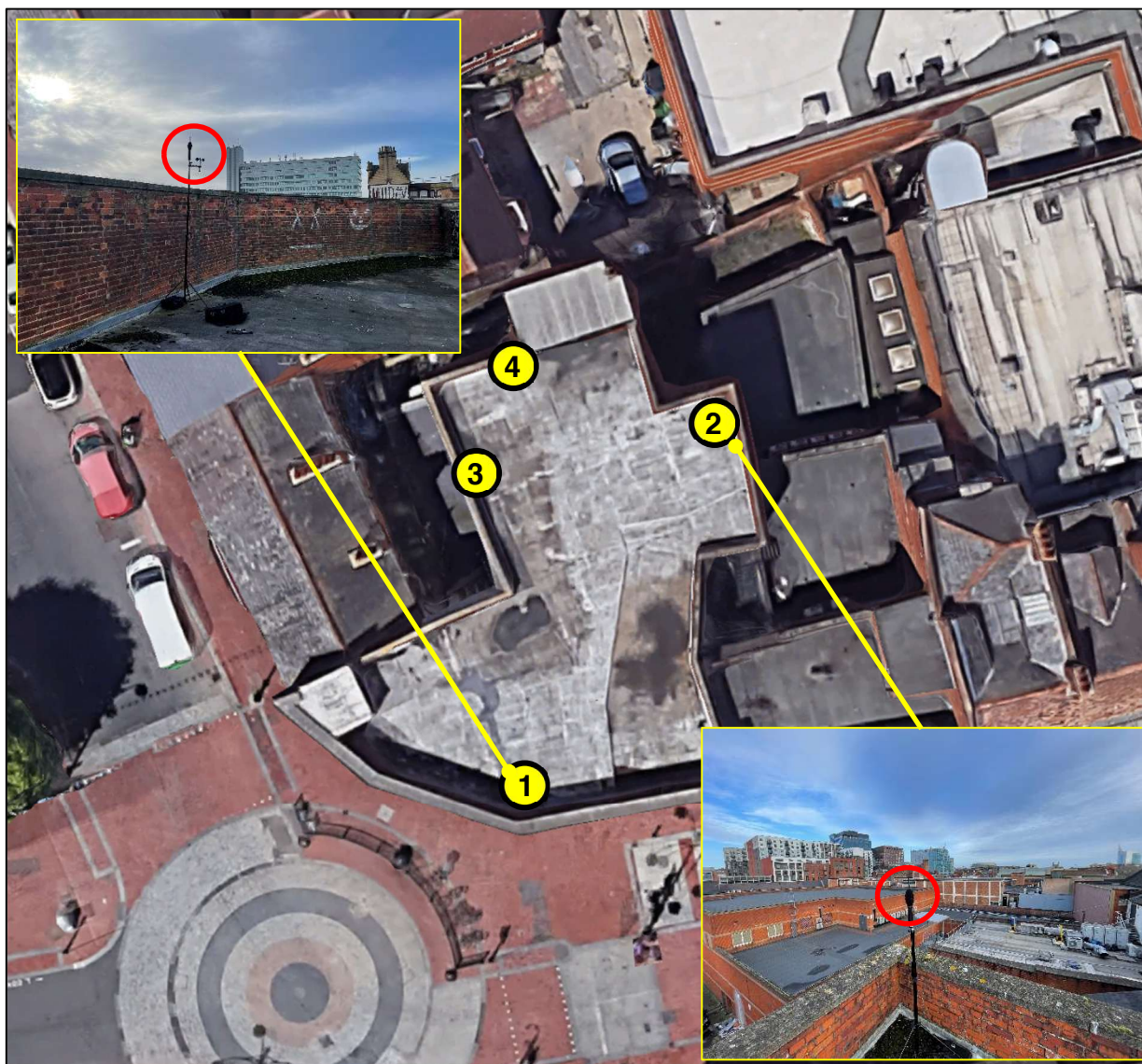


Figure 4 Noise survey measurement locations

The locations were chosen in order to collect data representative of the worst-case levels expected on the site due to all nearby sources:

- 1 - Automated measurement position to capture all sound sources to the front of the site undertaken between 14:00 on 24/01/2025 and 09:00 on 26/01/2025
- 2 - Automated measurement position to capture all sound sources to the rear of the site, including the condenser units serving Paul's Café, Halifax Bank and Sports Direct (H,J,K), undertaken between 15:00 on 27/01/2025 and 15:00 on 28/01/2025

- 3 - *Manual measurement position to capture noise specifically from the condenser units and extraction system serving Fix Tech & Vape, Kenya Butchers and American Nail (B,C,D) undertaken between 14:00 and 15:00 on 24/01/2025. Measurements were taken over a representative 1-hour period to capture the cyclic nature of the units.*
- 4 - *Manual measurement position to capture noise specifically from the KFC extract flue (F) undertaken between 14:45 and 15:00 on 28/01/2025. A measurement period of 15 minutes was deemed suitable due to the constant non-fluctuating sound source under measurement.*

The measurement procedure complied with ISO 1996-2:2017 Acoustics '*Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels*'.

The key acoustic descriptors measured for this assessment are as follows:

- $L_{Aeq,T}$ (the continuous equivalent A-weighted noise level over a given time period, T);
- $L_{A90,T}$ (the noise level exceeded for 90% of the measurement period T , referred to as the 'background' noise level); and
- $L_{AFMax,T}$, the maximum sound level over each measurement period.

4.2 Measurement Equipment

The table below presents the equipment used for the baseline noise surveys. The equipment calibration was verified before and after use and no abnormalities were observed.

Equipment	Make and Model	Serial Number
Sound & Vibration Meter	Svantek 958A	69072
Microphone Capsule	PCB 377B02	
Microphone Preamplifier	PCB 378B02	168159
Sound Level Meter	Svantek 977C Class 1 Sound Level Meter	97547
Microphone Capsule	MTG MK 255	21272
Microphone Preamplifier	Svantek SV 12L	108454
Calibrator	Svantek SV36 Class 1 Sound Calibrator	122255

Table 4 Noise survey equipment

4.3 Weather Conditions

Weather Measurements of temperature and wind speed were undertaken during the survey.

Description	Installation Date 24/01/2025	Interim Date 25/01/2025	Collection Date 26/01/2025
Average Wind Speed (m/s)	4	2	3
Maximum Wind Speed (m/s)	9	7	7
Average Temperature (°C)	7	4	2

Table 6 Weather conditions

From a review of environmental noise data captured, periods of high wind speeds above 5m/s have not affected the results on the days listed above, and as such are not considered to adversely impact the survey findings.

4.4 Survey Results

4.4.1 Automated Environmental Noise Survey

A time history of the automated measurements is shown in Appendix C with a summary of the results presented in the table below:

Location	Period	Residual Sound Level	Lowest Background Noise Level	10 th Highest Maximum Noise Level
		L _{Aeq, T} (dB)	L _{A90} (dB)	L _{AFmax} (dB)
1	Daytime 07:00-23:00	60	56	n/a
	Night-time 23:00-23:00	56	52	78.4
2	Daytime 07:00-23:00	63	57	n/a
	Night-time 23:00-23:00	47	52	72.2

Table 5 Measured noise levels of full automated noise survey

4.4.2 Manual Noise Measurement Surveys

The manual survey was undertaken over a period of 1 hour to capture the cyclic nature of the plant in question at the closest point of the roof boundary to the plant installation. The single octave band data and overall A-weighted level for overall plant installation is shown in the table below:

Source	Linear dB at Octave Band Centre Frequency								dB(A)
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
All units operating simultaneously	64	60	56	54	52	47	38	29	57

Table 6 Manual noise measurements of plant adjacent to west facade at roof boundary

A summary of the manual noise measurements of the KFC extract flue (E) is shown in the table below. The survey was undertaken over a period of 15 minutes which was deemed suitable due to the constant non-fluctuating sound source under measurement, at 1m from the exhaust of the extraction flue.

Plant Unit	Linear dB at Octave Band Centre Frequency								dB(A)
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
KFC Extract Flue	77	83	82	76	77	74	71	66	82

Table 7 Manual noise measurements of KFC extract at 1m from exhaust

Note that the frequency content of the plant presented above would be considered generally broadband in nature, and the octave band data suggests no tonal acoustic feature.

5 NOISE IMPACT ASSESSMENT

With regards to the numerous commercial premises surrounding the site and potential noise impact, the two key considerations would be as follows:

- **External Noise** – Any source which could potentially transmit into the proposed dwellings via the building external building fabric (walls, doors, windows, etc)
- **Internal Noise** – Any source which could transmit via the party walls between the proposed development and adjacent commercial properties

Assessments for both scenarios are presented below to ensure that suitable mitigation measures are proposed that would protect the future residents from noise.

5.1 External Building Fabric Assessment

A scheme of suitable noise mitigation measures to protect the proposed dwelling against external noise relates principally to the sound insulation performance of elements of the existing overall external building envelope.

The existing external building envelope is formed by a brickwork cavity wall, which will provide a high level of noise insulation by default. Therefore, as for most residential sites, the dominant path for external noise to enter rooms of the proposed dwelling will be via the windows.

The existing external building envelope also comprises single glazed windows, which would provide sound reduction in the range of R_w 29dB. It was observed on site that some existing panes were damaged, it would be assumed that the existing glazed façade would be upgraded to a like-for-like single glazing within the existing window frames.

By following the rigorous calculation procedure outlined in Section G.2 of Annex G of BS8233:2014 the sound insulation performance for the whole building envelope is assessed, considering each individual element. Note that this calculation method is based on that given in BS EN 12354-3. The frequency range has been extended to include the 63Hz single octave band to ensure that the frequency characteristics of the plant noise is adequately considered.

Expected internal noise levels with the existing glazing system are presented in Table 8.

Facade	Time	Criteria	Internal Noise Level
East	07:00-23:00	≤ 30 dB L_{Aeq}	30 dB L_{Aeq}
	23:00-07:00	≤ 25 dB L_{Aeq}	26 dB L_{Aeq}
Front/South	07:00-23:00	≤ 35 dB L_{Aeq}	32 dB L_{Aeq}
	23:00-07:00	≤ 30 dB L_{Aeq}	28 dB L_{Aeq}
West	07:00-23:00	≤ 30 dB L_{Aeq}	29 dB L_{Aeq}
	23:00-07:00	≤ 25 dB L_{Aeq}	29 dB L_{Aeq}
North/Rear	07:00-23:00	≤ 30 dB L_{Aeq}	47 dB L_{Aeq}
	23:00-07:00	≤ 25 dB L_{Aeq}	31 dB L_{Aeq}

Table 8 Expected internal noise levels with existing glazing system

As shown in Table 8 above, upgrade measures are required on all facades.

5.1.1 Proposed Upgrade Measures

As no external changes can be made to the building under permitted development rights, the existing windows would need to be upgraded internally via secondary glazing systems in order to achieve the necessary level of sound insulation to protect the proposed residential units from external noise ingress.

Calculations have been undertaken to determine a suitable secondary glazing strategy for the development. Based on the findings of the calculations, it has been confirmed that the following glazing upgrade strategy would be suitable for the east, south/front and west façades of the building, as follows:

- 4mm secondary glass pane spaced at a minimum distance of 100mm from the primary window system, such as the Selectaglaze Slimline 45 (HC) hinged casement system.

Calculations have indicated that the north/rear façade would require a higher specification of secondary glazing, due to the measured levels of the adjacent KFC extract flue, which would be as follows:

- 12mm secondary glass pane spaced at a minimum distance of 200mm from the primary window system, such as the Selectaglaze Heavy Duty 41 (HC) hinged casement system.

Expected internal noise levels internally of each façade with the secondary glazing systems implemented are presented in Table 9.

Facade	Time	Criteria	Internal Noise Level
East	07:00-23:00	≤ 30 dB LAeq	17 dB LAeq
	23:00-07:00	≤ 25 dB LAeq	14 dB LAeq
South/Front	07:00-23:00	≤ 30 dB LAeq	18 dB LAeq
	23:00-07:00	≤ 25 dB LAeq	15 dB LAeq
West	07:00-23:00	≤ 30 dB LAeq	16 dB LAeq
	23:00-07:00	≤ 25 dB LAeq	16 dB LAeq
North/Rear	07:00-23:00	≤ 30 dB LAeq	30 dB LAeq
	23:00-07:00	≤ 25 dB LAeq	15 dB LAeq

Table 8 Expected internal noise levels with secondary glazing system implemented

As shown in Table 9, the expected internal noise levels would be within the recommended internal noise level guidance provided within BS 8233:2014 and WHO guidelines, and are therefore considered suitable to ensure that future residents are protected from environmental noise.

The predicted noise levels are also compared against the criterion curve for assessment of low frequency noise below:

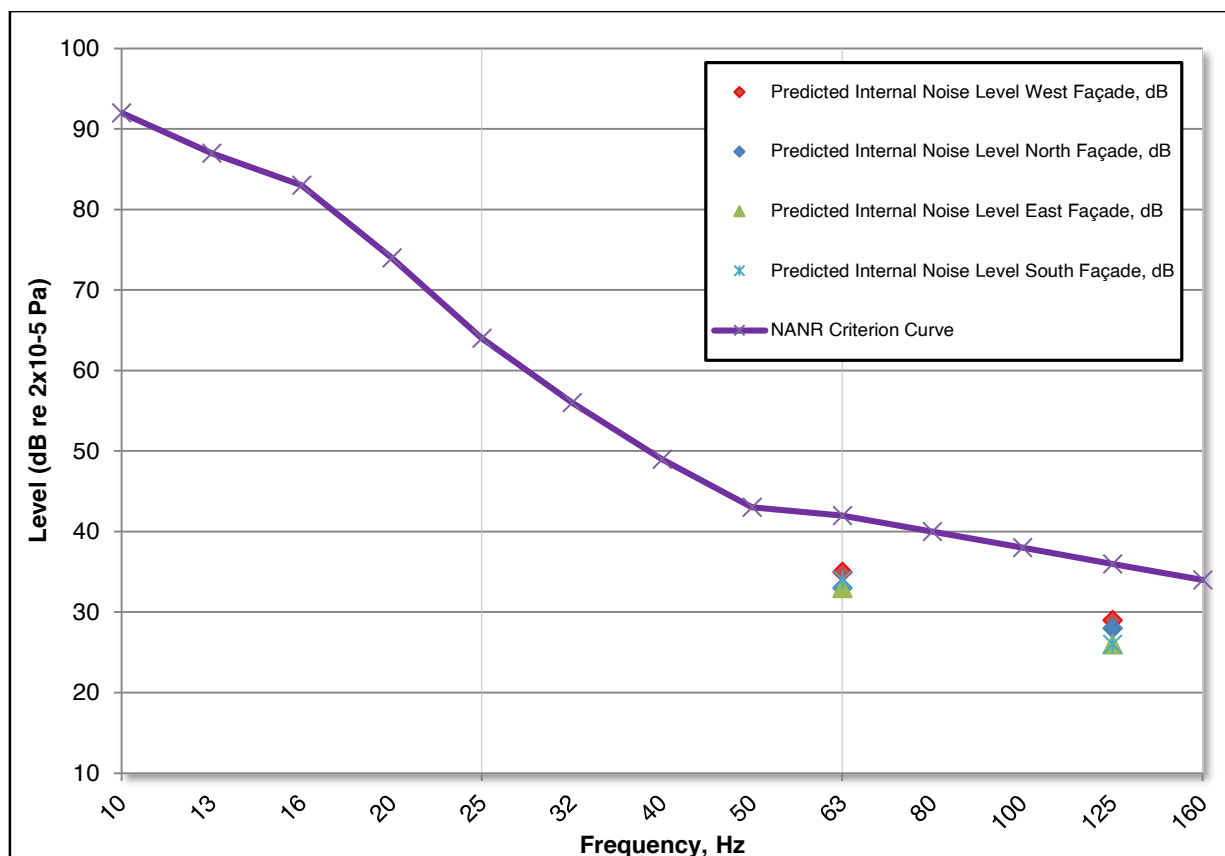


Figure 5 Predicted noise levels compared against the low frequency criterion curve

Note that the calculated measurement results are in single octaves and compared against a one-third octave band curve. If the curve was presented as single octaves for direct comparison, the criteria levels would be higher due to the logarithmic addition of the single octave band levels. The comparison above shows that the predicted noise levels are comfortably below the levels that could cause disturbance to future residents.

With regards to ventilation and overheating mitigation, the applicant has confirmed that an MVHR system with a cooling coil would be installed for each flat. This would mean that residents would not need to open their windows, as sufficient ventilation and cooling would be provided by design.

5.2 Party Floor and Wall Noise Transfer

With regards to noise into residential properties from an adjoining space via separating walls and/or floors, Approved Document E of the Building Regulations is the relevant Regulatory Framework.

Requirement E1 of Building Regulations Approved Document E provides guidance and minimum standards for sound insulation to be achieved for separating floor and wall constructions to residential flats. The target minimum sound insulation standards of Building Regulations Approved Document E for separating floors and walls of material change of use (i.e. conversion) flats are shown in the table below (reproduced from table 0.1a of the regulations):

Element	Airborne Sound Insulation $D_{nTw} + C_{tr}$ (minimum values)	Impact Sound Insulation L'_{nTw} (minimum values)
Party Walls	43	-
Party Floors	43	64

Table 9 Dwelling-houses and flats – performance standards for separating walls, separating floors that have a separating function

The Approved Document advises that the sound insulation performance standards are appropriate for floors and walls that separate spaces used for normal domestic purposes, and that a higher standard of sound insulation may be required between spaces used for domestic purposes and those used for non-domestic purposes. In these situations, the appropriate level of sound insulation will depend on the noise generated in the non-domestic space, and the document further advises that specialist advice may be needed to establish if a higher standard of sound insulation is required, and if so, to determine the appropriate level.

In situations where the non-domestic (commercial) space is a workshop, gym, restaurant, public house or bar etc, where relatively high internal activity noise levels are potentially / routinely generated and in the case of a restaurant, public house or bar including with loud amplified music, TV sports and large / concentrated groupings of customers talking with raised voices, then it is appropriate to set a substantially higher standard of sound insulation especially as peak times (with higher generated noise) for these uses generally occurs late at night and into the early morning hours.

However, it should be noted that in many cases, an adjacent Class E unit would not generate high or even moderately high internal noise levels and can even be considered to have less potential for noise impact than if the adjacent spaces were residential use. This is due to the fact that a Class E unit would generally be occupied during normal daytime hours only, whereas residential use is typically occupied 24 hours a day with domestic noise occurring at any time, including during the night (e.g. loud music, televisions, or white goods such as a washing machine/tumble driers, etc). There is typically no noise at all during the late evening, night or early morning from within Class E use, which are the times most likely to cause disturbance when residents are preparing for sleep and/or sleeping.

In the case of the specific commercial unit in question adjacent to the application site:

- KFC at ground and first floor of 73-74 Broad Street, sharing a party floor with the application site. The business operates from 11:00-22:00 Monday to Sunday.
- Second Floor Office Use at 21 West Street, sharing a party wall with the application site. The nature of the use would not involve high levels of noise generation, and we would expect that sound insulation targets commensurate with the Building Regulations requirement would be sufficient.
- Second Floor Office Use at 71-72 Broad Street, sharing a party wall with the application site.

In all cases, the nature of the adjacent commercial uses would not involve high levels of noise generation, and we would expect that sound insulation targets commensurate with the Building Regulations requirement would be sufficient.

Notwithstanding the above, to ensure protection of the amenity of future occupiers of the proposed change of use dwelling, it is advised that airborne sound insulation performance for the separating walls between the flats and adjoining commercial units aims to have an uplifted performance with target to be at least 3dB higher (better) than the minimum standard noted in Approved Document E i.e. to have airborne sound insulation $D_{nT,w} + C_{tr} \geq 46\text{dB}$.

The existing party floor is a substantial masonry construction, which will provide a good level of noise insulation by default. The project architect has confirmed that the separating floor construction is a 150mm concrete slab, with a suspended ceiling below. The party floor would therefore provide a sound reduction of at least $D_{nT,w} + C_{tr} \geq 55\text{dB}$, which would vastly exceed the Building Regulations requirement.

The party walls to the adjacent buildings at 21 West Street and 71-72 Broad Street are understood to be solid brickwork. From a visual inspection, the walls have been created independently from one another, as shown in the figures below:

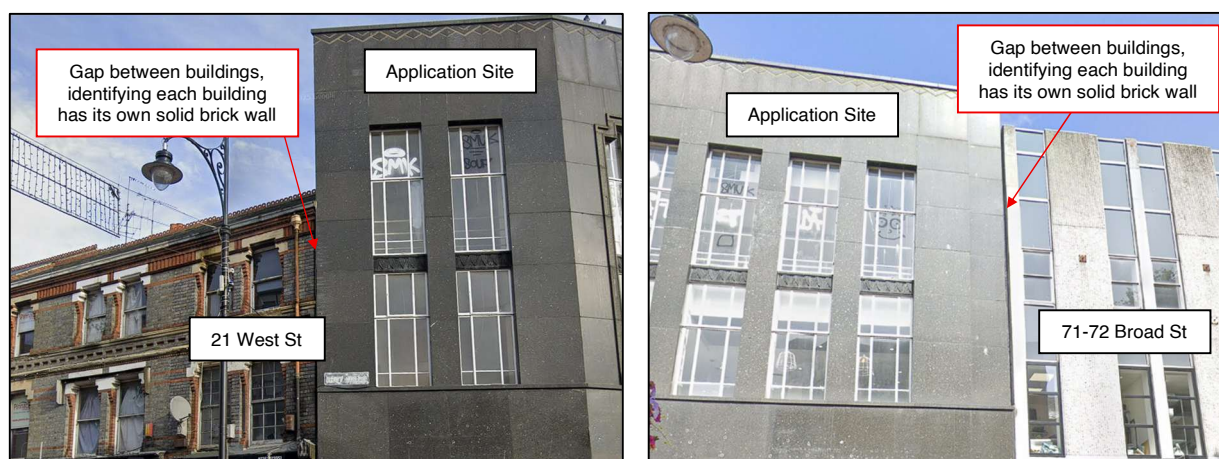


Figure 6 Application site and adjacent buildings in office use (Image Ref: Google Earth)

The construction from room to room would therefore be a 200mm solid brickwork wall of the application site, and then a further 200mm solid brickwork wall of the adjacent building, for an overall wall construction of 400mm solid brickwork. The party walls to either side of the application site would therefore provide a sound reduction of at least $D_{nT,w} + C_{tr} \geq 55\text{dB}$, which would vastly exceed the Building Regulations requirement.

6 CONCLUSION

An environmental noise survey has been undertaken at the site of the Proposed Development at 73,74 & 74A Broad Street, Reading, Berkshire, RG1 2AP as well as manual noise measurements of plant units in close proximity to the application site façade.

Based on the results of the noise surveys a noise impact assessment has been undertaken. This assessment has concluded that impacts of noise from commercial premises on the intended occupiers of the development are unlikely to occur at the proposed residential development if appropriate mitigation measures are implemented, which are detailed within this report.

It is therefore considered that the site is appropriate for residential development.

GLOSSARY OF ACOUSTIC TERMINOLOGY

Decibel scale - dB

The decibel (dB) is a relative unit of measurement used in acoustics. The dB is a logarithmic ratio between a measured level and a reference level of 0 dB (i.e the threshold of human hearing). Simply put, the decibel compresses the wide range of sounds we hear into more manageable numbers.

Addition of noise from several sources

Sound produced by multiple sound sources are added logarithmically e.g. power ratio of 2 = 3dB, power ratio of 10 = 10dB. Therefore, two equally intense sound sources operating simultaneously produce a sound level which is 3dB higher than a single source e.g. 60dB + 60dB = 63dB.

Subjective impression of noise

Human response to sound is highly individualized and often based on psychological factors such as emotion and expectation. Sensitivity to sound typically depends on the loudness, pitch, duration of the occurrence, and time of occurrence (e.g. a sound source could cause annoyance during the night where it would not during the day). The following table is a guide to explain increases or decreases in sound levels for many scenarios.

Change in sound level	Change in perceived loudness
1 dB	Imperceptible
3 dB	Just barely perceptible
6 dB	Clearly noticeable
10 dB	About twice as loud

'A' Weighted Frequency Filter - dB(A)

The human ear is not equally sensitive in all frequencies. The A-weighting filter was devised to take this into account when undertaking noise measurements and allows a sound level meter to replicate the human ears response to sound.

$L_{Aeq, T}$

Sound can fluctuate widely over a given period. L_{Aeq} is the A-weighted equivalent continuous sound level, with T denoting the time period over which the fluctuating sound levels were averaged e.g. $L_{Aeq, 16h}$ is the equivalent continuous noise level over an 16 hour period.

L_{A90}

A-weighted sound level exceeded for 90% of the measurement period, calculated via statistical analysis. The L_{A90} descriptor is typically used to establish background sound levels for noise impact assessments

L_{A10}

A-weighted sound level exceeded for 10% of the measurement period, calculated via statistical analysis.

L_{AFmax}

A-weighted sound level maximum sound pressure level that has been measured over a given time period

GLOSSARY OF ACOUSTIC TERMINOLOGY

Octave Bands

The audio or frequency spectrum of the human ear is in the range of 20Hz to 20 kHz. The spectrum tells how the energy of the sound signal is distributed in frequency. Octave bands divides the audio spectrum into 10 equal parts. The International Standards Organisation defines the centre frequency of these bands as 31.5Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1kHz, 2kHz, 4kHz, 8kHz and 16kHz.

Noise Rating (NR) Curves

A method of rating noise using a set of curves relating octave band sound pressure levels. Typically used for building services systems within offices

Airborne sound

Sound radiated from a source into the surrounding air e.g. musical instruments, tv/radio, machinery/equipment. Airborne sound insulation refers to the reduction or attenuation of airborne sound, usually via a solid partition between a source and receiver.

Impact sound

Sound resulting from the impact between colliding objects, e.g. footfall impact upon a floor. Impact sound insulation refers to the resistance of a floor to the transmission of impact sound, typically via the installation of a 'resilient layer'

Flanking sound

The transmission of airborne sound between two adjacent rooms by paths other than via the separating partition between the rooms, e.g. the abutment point of a wall and floor.

Structure-borne noise

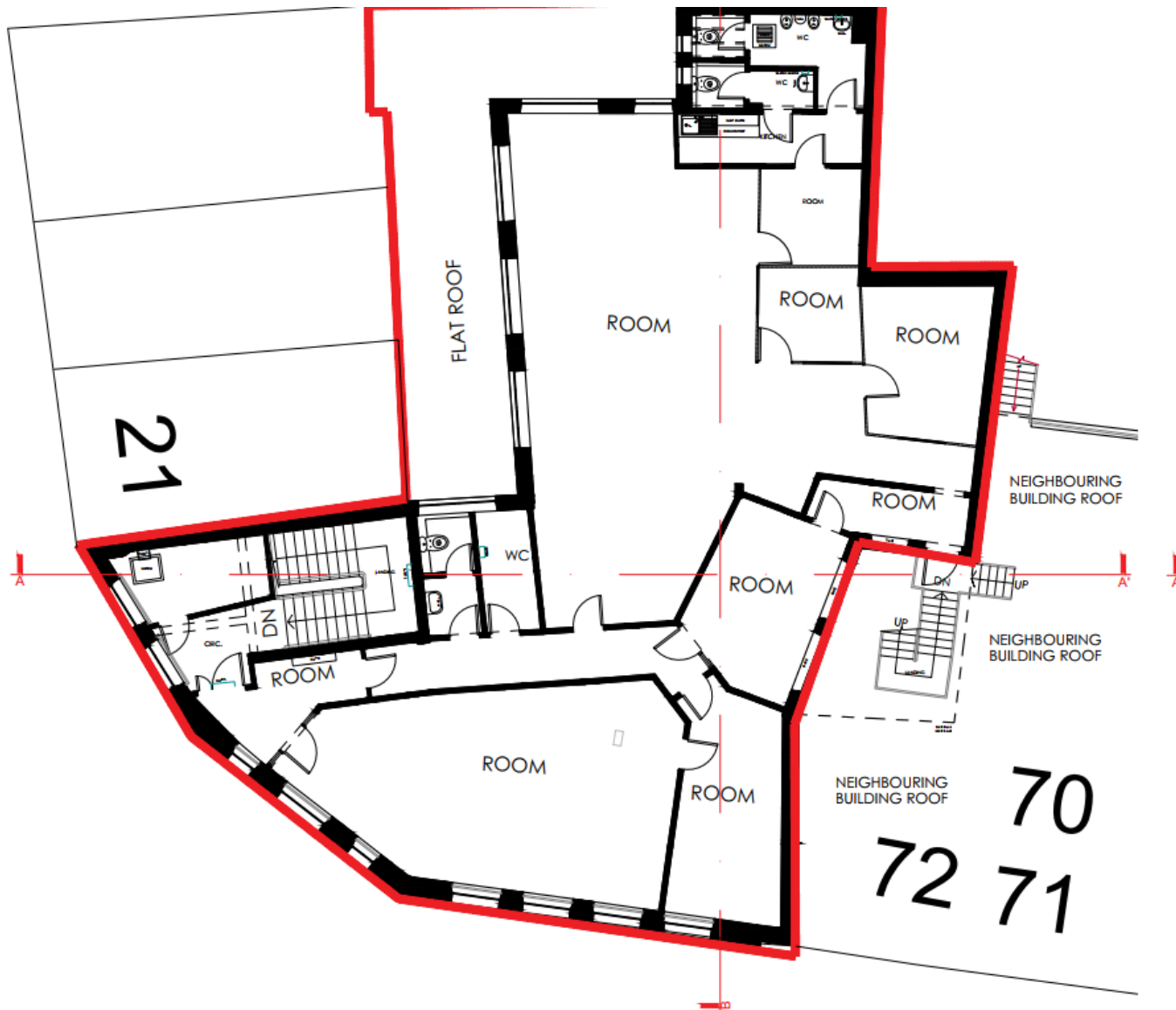
Noise caused by the vibration of elements of a structure. This can result in reradiated noise, whereby the vibrating element transmits airborne sound into a space e.g. vibration caused by mechanical plant installed within a plant room which is not adequately isolated from the structure, or construction/demolition work in an adjacent building.

Reverberant sound

Sound in an enclosed space (usually a room), which results from repeated reflections at the boundaries. Reverberation time is the time taken for a steady sound level in an enclosed space to decay by 60dB, measured from the moment the sound source is switched off. A example of a typically reverberant space would be a classic church. Absorptive materials can be used to reduce reflections and reverberation times.

APPENDIX B

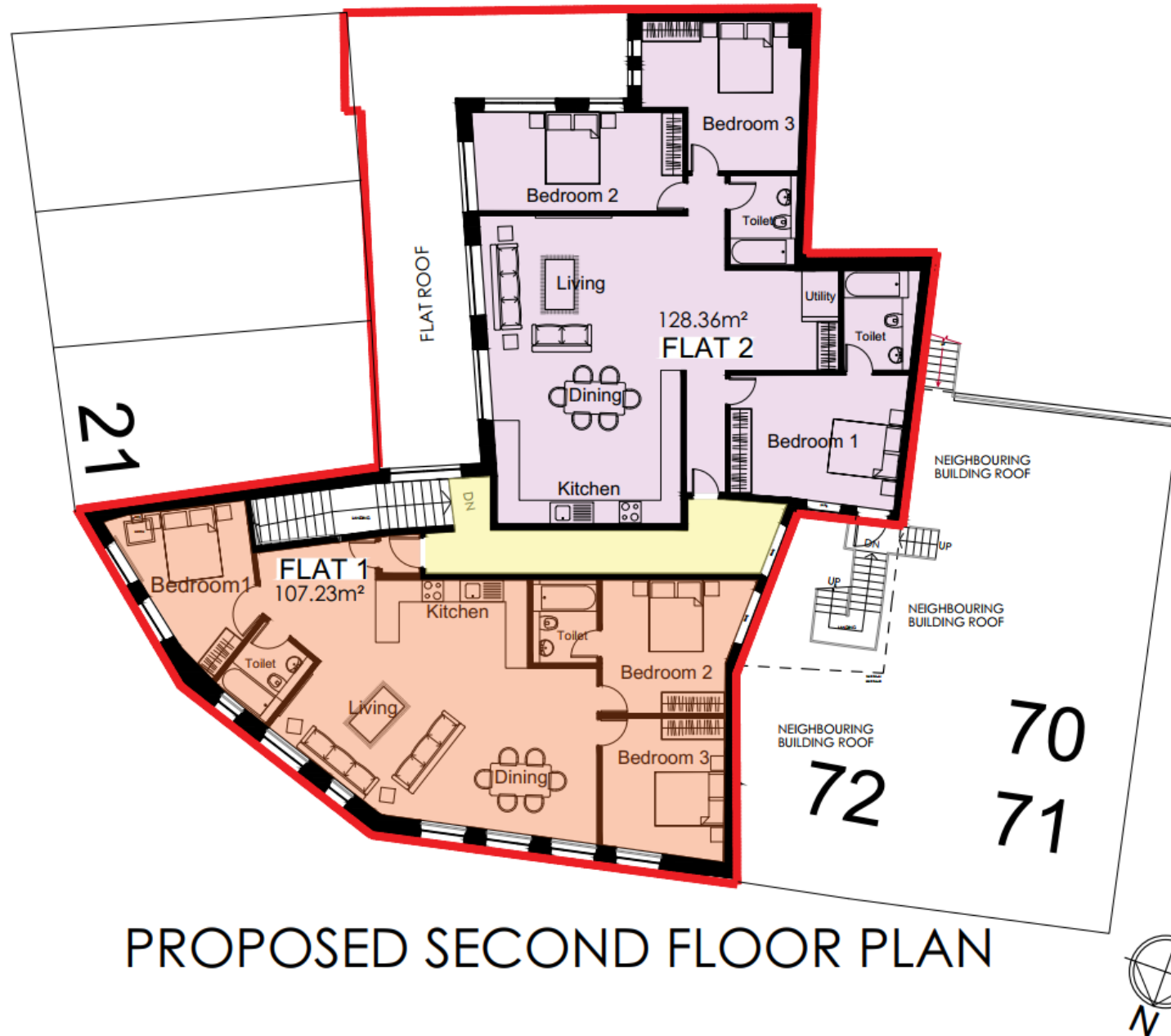
EXISTING PLANS



EXISTING SECOND FLOOR PLAN

APPENDIX B

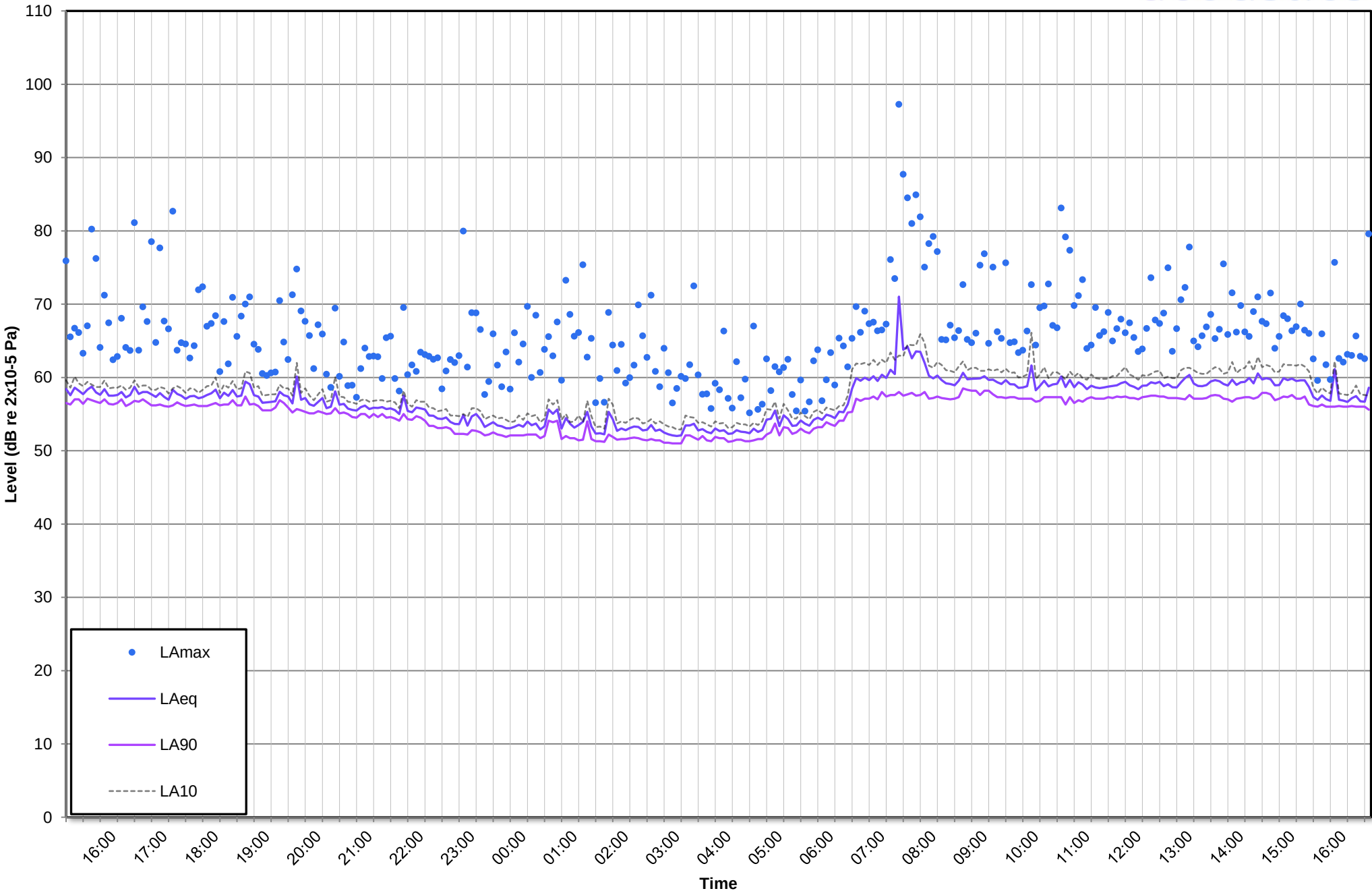
PROPOSED PLANS



PROPOSED SECOND FLOOR PLAN

Appendix C - Position 2

21063.PDNIA-RPT.01
15:00 on 27th and 15:00 on 28th January 2025



Appendix C - Position 1

21063.PDNIA-RPT.01

14:00 on 24th and 09:00 on 26th January 2025

