



**7 Bedford Street
BPN Architects**

1096-A1-1 - Noise Assessment Report (rev1)
23 September 2021

Executive Summary

Proposals are for mixed-use development of 7 Bedford Street in Leamington including ground floor retail premises and dwellings above:

'Demolition of existing single storey retail unit and replacement with proposal that doubles the floor area for retail with 4 no. apartments over.'

We assess noise associated with the proposed development in general accordance with pre-application advice provided by the Environmental Health Office of Warwick District Council with regard to noise.

This includes entertainment noise and activity associated with the Bedford Street Bar, and building services equipment at nearby retail premises, and road traffic noise in the area.

We characterize the existing noise at the application site based on attended noise monitoring and available reference data for the area including noise monitoring data submitted to Warwick District Council in support of other residential developments nearby on Bedford Street.

With regard to entertainment noise (amplified music), we identify limits inside habitable rooms in the proposed development based on guidance in DEFRA NANR45: *Assessment of low frequency noise complaints*. This includes octave band limits for low frequency noise at 63 Hz and 125 Hz centre frequencies.

Our assessment is that these limits can be achieved by design including by specification of windows, external walls and means of ventilation. This affects habitable rooms located on the Bedford Street elevation of the building where entertainment noise is the dominant source.

Windows to habitable rooms on the Bedford Street elevation should be specified to achieve a minimum sound reduction of 20 dB *R* in the 63 Hz *R* octave band and 29 dB *R* in the 125 Hz octave band. These minimum levels of low frequency sound insulation are likely to require the use of wide-airspace secondary glazing.

External wall build-ups to habitable rooms on the Bedford Street elevation should also be specified to provide adequate sound insulation. We consider that normal cavity brick/constructions can provide adequate sound insulation.

In meeting the minimum requirements for control of low-frequency entertainment noise to habitable rooms on the Bedford Street elevation, noise ingress from other sources including general road traffic and retail activity can be readily controlled to levels that are significantly below the relevant limits identified in BS 8233: 2014 *Guidance on sound insulation and noise reduction for buildings*.

Minimum requirements for the sound insulation performance of facade elements to habitable rooms on the rear elevation are determined by noise from the existing roof mounted building services equipment.

Windows to habitable rooms on the rear elevation should be specified to achieve a minimum sound insulation performance of 25 dB $R_w + C_{tr}$. This level of performance can typically be achieved through the use of standard thermal double glazing (6mm glass/16mm cavity/4mm glass).

With regard to means of ventilation, we understand that background ventilation to habitable rooms will be provided by mechanical ventilation with heat recovery (MVHR). This will allow windows to remain closed during the normal ventilation condition. We recommend that the cumulative level of noise associated with the MVHR units is controlled to NR 20 L_{eq} internally.



Proposed plan and section drawings

Project Name:	7 Bedford Street, Leamington
Project Reference:	1096-A1-1
Description:	Noise Assessment Report
Date:	23 September 2021
Prepared by:	Adam Mottershead MIOA
Revisions:	Rev1 - minor amendments and accommodating updated plans

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1. Introduction

Arno Acoustics has been commissioned to provide a noise assessment in support of the proposed mixed-use development at 7 Bedford Street in Leamington.

Proposals include demolition of the existing building and construction of a new 5 storey building including ground floor retail premises with residential accommodation on the floors above.

We describe the relevant standards and guidance in *Section 2* with reference to pre-application advice provided by the Environmental Health Office of Warwick District Council. A full copy of the pre-application advice is provided in *Appendix B*.

We provide a description of the application site and its context in *Section 3* with specific reference to noise. This includes information about the normal operation of the nearby commercial premises and entertainment uses in the area.

We provide a description of the development proposals in *Section 4*. This includes reference to the specific location of habitable rooms in the building that are used in our assessment of noise ingress.

We visited the application site between 17 and 18 July 2021 and on 18 August 2021 to survey existing noise levels at the application site including entertainment noise from the Bedford Street Bar and noise associated with general commercial activity in the area.

Details of our site surveys and noise monitoring are provided in *Section 5* with full noise monitoring data and supporting information provided in *Appendix A*.

Section 7 includes our assessment of entertainment noise associated with activity at the Bedford Street Bar.

Section 8 includes our assessment of noise from existing building services noise associated with roof mounted equipment at the adjacent commercial premises.

Section 9 includes an outline assessment of road traffic noise levels.

We provide a summary of the minimum requirements for the sound insulation performance of facade elements to habitable rooms on different elevations of the building in *Section 10*.

2. Standards, Guidance and Policy Context

2.1. Summary

We provide a summary of the standards and guidance relevant to assessment of noise. This includes:

- Warwick District Council pre-application advice
- DEFRA NANR45: *Assessment of Low Frequency Noise Complaints*
- Institute of Acoustics *Good Practice Guide on Noise from Pubs and Clubs*
- BS 8233: 2014 *Guidance on sound insulation and noise reduction for buildings*
- World Health Organisation (WHO) '*Guidelines for Community Noise*'

2.2. Warwick District Council

Warwick District Council has provided formal pre-application advice under Application No: PRE 20/0082.

This includes comments provided by the Environmental Health Office with regard to potential noise impacts on residential amenity associated with the following:

- Bedford Street Bar
- Commercial Traffic & pedestrian noise
- Rear elevation
- Sound insulation between retail unit and upper floor residential
- Plant noise
- Alternative ventilation

We provide a copy of the relevant pre-application advice in Appendix B for reference.

2.3. DEFRA NANR45: Assessment of Low Frequency Noise Complaints

DEFRA NANR45 identifies an objective method for assessing low frequency noise in the context of use by Environmental Health Officers in the UK and is informed by established criteria in Germany, Sweden, Denmark, Netherlands and Poland.

The above study was supplemented by field and laboratory studies to subsequently inform the proposed criteria (the '*Moorhouse Curve*') in 1/3 octave bands between 10 Hz and 160 Hz. Refer to *table 2.2* and *figure 2.3* opposite.

For the assessment of low frequency music and its transmission through building fabric, it is practical to use the 63 Hz and 125 Hz octave band data due to widespread limitations and poor reliability of one-third octave band data and in particular for low frequencies.

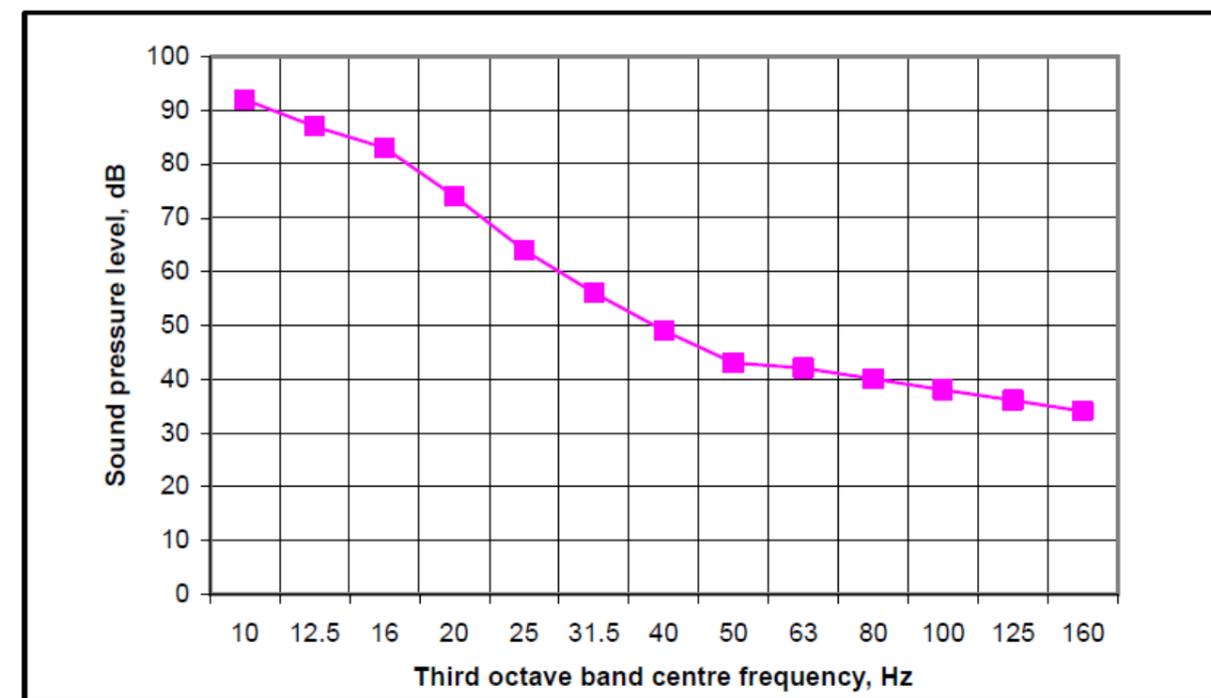
Interpolation of data identified in the '*Moorhouse Curve*' allows limits for low frequency entertainment noise in habitable rooms to be established in the 63 Hz and 125 Hz octave bands which are 47 dB L_{eq} (63 Hz) and 41 dB L_{eq} (125 Hz).

These limits are identified in relation to assessment for the night-time period and a relaxation of 5 dB is considered appropriate with regard to assessment during the day.

This method and its limits form the basis of our assessment criteria specifically in relation to entertainment noise including amplified music.

Description	One-Third Octave Band Centre Frequency (Hz)												
	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
Proposed reference curve, L_{eq} (dB)	92	87	83	74	64	56	49	43	42	40	38	36	34
Criteria in octave bands, L_{eq} (dB)	-	89			65			47			41		

2.2: DEFRA internal noise limits for the control of low frequency entertainment noise



2.3: DEFRA criterion curve for the control of low frequency entertainment noise

2.4. Institute of Acoustics (IOA)

The Institute of Acoustics (IOA) *Good Practice Guide on the Control of Noise from Pubs and Clubs* addresses the need for adequate control of noise impact on future residential accommodation. This omits quantitative criteria for assessment.

This has been addressed separately by the IOA in a 2003 article published in the Acoustics Bulletin which identifies an assessment methodology for entertainment noise from pubs and clubs and its potential impact on residential amenity. The relevant guidance includes:

- 'Venues where entertainment takes place more than once per week or continues after 23:00 hours
- Criteria applicable for both internal and external assessment at noise sensitive properties:
 - The LAeq of the entertainment noise should not exceed the representative background noise level LA90 (without entertainment noise) and,
 - The LA10 of the entertainment noise should not exceed the representative background noise level LA90 (without entertainment noise) in any 1/3 octave band between 40 Hz and 160 Hz.'

An interpretation of 'inaudibility' is provided in 2.2.3.2:

'Noise is considered to be inaudible when it is at a sufficiently low level such that it is not recognizable as emanating from the source in question and it does not alter the perception of the ambient noise environment that would prevail in the absence of the source in question.'

2.5. BS 8233: 2014 and World Health Organization

BS 8233: 2014 *Guidance on sound insulation and noise reduction for buildings* includes limits for noise in habitable rooms inside dwellings. This includes bedrooms and living rooms. See *table 2.4* opposite.

With regard to ventilation, BS 8233 section 8.4.5.4 refers to the Building Regulations recommendation that habitable rooms be provided with background ventilation and states that where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used and sound attenuating types are available. However, windows may remain operable for rapid or purge ventilation, etc.

The World Health Organisation (WHO) '*Guidelines for Community Noise*' includes guidance for the control of noise in dwellings. See *table 2.5* opposite. This guidance is typically relevant to anonymous sources of noise, in particular road and rail traffic, etc.

This includes the following with regard to maximum noise levels in habitable rooms at night:

'For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB LAmax more than 10–15 times per night'

Activity	Location	Daytime (07:00-23:00)	Night Time (23:00-07:00)
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hr}$	-
Sleeping	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

2.4: BS 8233: 2014 guidance

Specific Environment	Critical Health Effect(s)	dB $L_{Aeq,T}$	Time Base (Hours)	dB $L_{AF,max}$
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Dwelling, indoors Inside bedrooms	Speech intelligibility & moderate annoyance, daytime & evening	35 30	16 8	45
	Sleep disturbance, night-time			
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60

2.5: World Health Organisation guidance

2.6. BS 4142: 2014

BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' provides a method to assess the likelihood of adverse comment due to noise from new or existing industrial and commercial sources.

An estimate of the potential impact of a specific sound source(s) is obtained by subtracting the BS 4142 Background Sound Level (dB $L_{A90,Tr}$) from the BS 4142 Rating Level (dB $L_{Ar,Tr}$).

'Typically, the greater this difference, the greater the magnitude of the impact.'

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact.
- Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.'

Section 8.5 of BS 4142 includes guidance in relation to extant sources of industrial or commercial sound where new noise sensitive receptors are proposed. This is relevant to the nature of the proposed application and we provide further discussion in *Section 6.5*.

'8.5 Introduction of a new noise-sensitive receptor'

Measure the background sound at the intended location of any new noise-sensitive receptor(s) in the absence of any specific sound.

Note Where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it should be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation.'

BS 4142 Assessment Level	Description
<0	This is a good indication that the specific sound source is likely to have a low impact depending on the context
+5	A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context
+10	A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context

2.6: Summary of BS 4142:2014 guidance on the likelihood of noise impacts

3. The Application Site and Context

3.1. Location & Context

The location of the application site is described as follows:

'The site is located in Bedford Street, within the Town Centre Boundary and the designated Retail Area of Leamington Spa. It is also within the Royal Leamington Spa Conservation Area, though the building itself is unlisted and sits between un-listed buildings. To the rear, Nos. 58 and 58a which have a frontage onto The Parade are Grade II listed buildings, which would be a consideration in any forthcoming planning application in terms of the resulting impact on the setting of these listed premises any future development proposal might have. Opposite the application site, in Bedford Street, there is a public house/drinking establishment and a mix of E-class uses (formerly A1/A3 prior to the change to the Use Classes Order on September 1st 2020).'

Existing uses in the vicinity of the application site and its surrounding area include a mix of established residential dwellings, retail buildings and entertainment premises.

We show the approximate application boundary *figure 3.1* opposite with the nearby existing uses highlighted.

Bedford Street provides one-way access for vehicles from the south towards Warwick Street and is the main route for services access to retail premises with frontages on Parade including WH Smith, H&M and M&S, etc.

The defining factor in terms of the existing noise climate in the immediate vicinity is the Bedford Street Bar directly opposite the application site.

3.2. Bedford Street Bar

The Bedford Street Bar is located opposite the proposed development site and is a late-license venue with permission for live and amplified music and similar entertainment events.

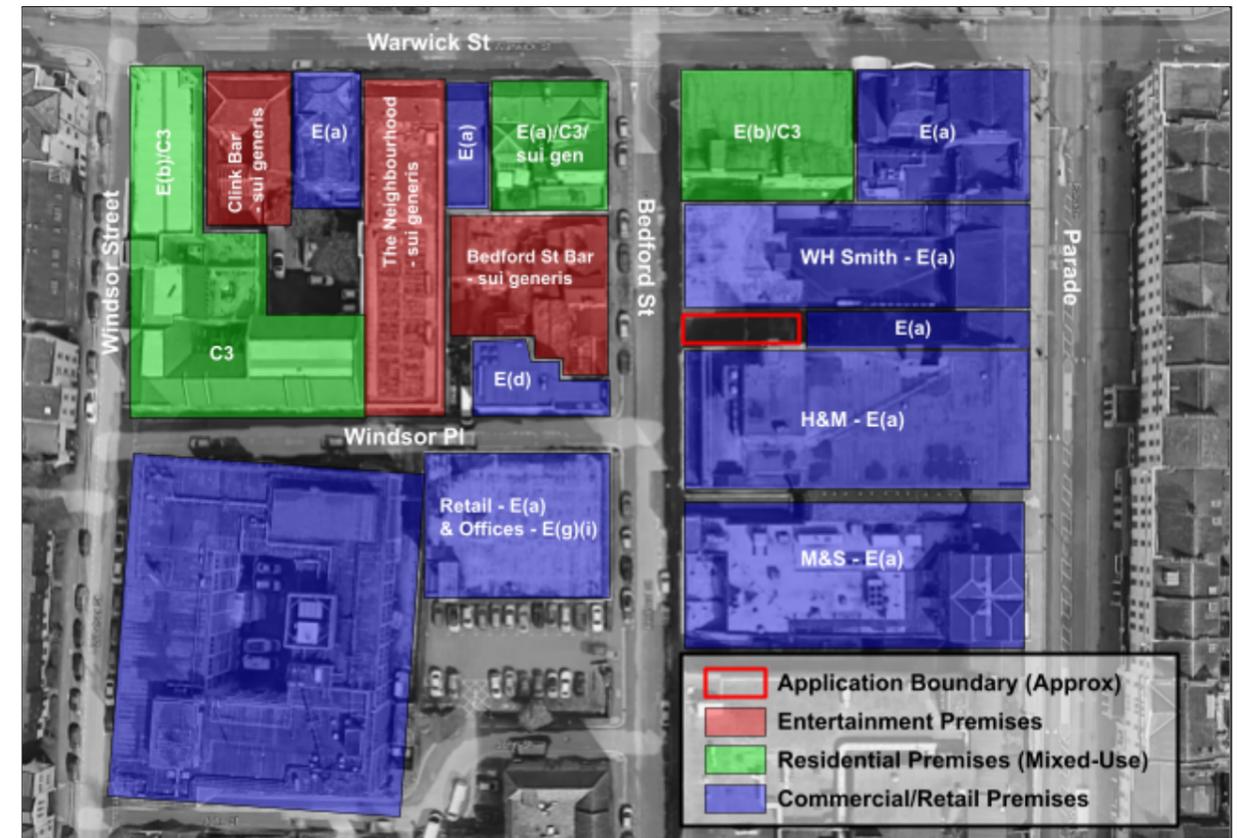
Opening hours for the Bedford Street Bar are as follows:

- Monday - Thursday 11:00 to 01:00
- Friday - Saturday 11:00 to 02:00
- Sunday 11:00 to 01:00

Access to the premises is off Bedford Street and includes a main front entrance in addition to a gated side entrance that provides access to an outside seating area at the rear of the property. We understand that there is a separate services entrance located off Windsor Place.

The frontage to the Bedford Street Bar includes bifold doors and a lobbied entrance. We have observed during warmer weather that both the bifold doors and lobbied entrance remain open for significant periods of time during the late evening period including during events with live amplified music.

We anticipate that requirements for doors (and windows) to remain closed after 23:00 may be included in the licensing conditions for the premises.



3.1: Application boundary and existing uses

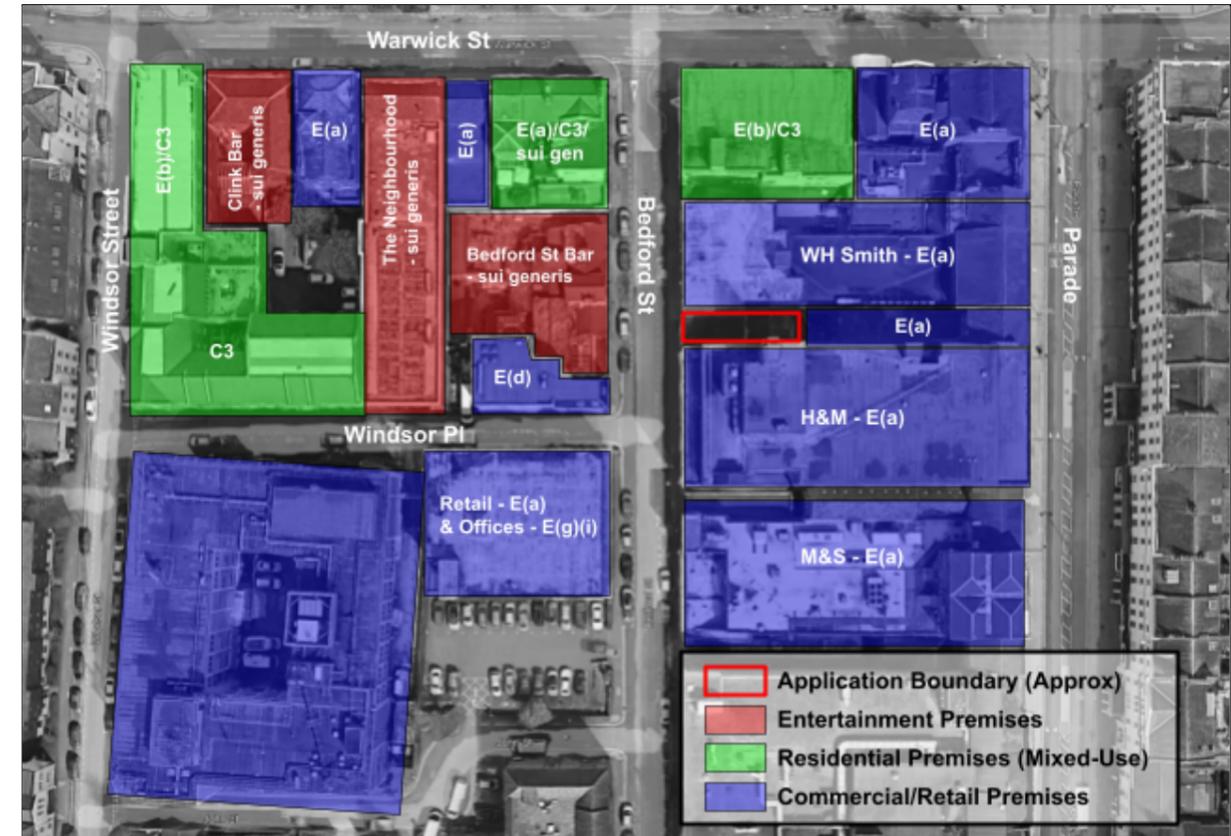
3.3. Existing Retail Premises

Existing building services equipment is located on the rooftop of the WH Smith at the rear of the proposed development.

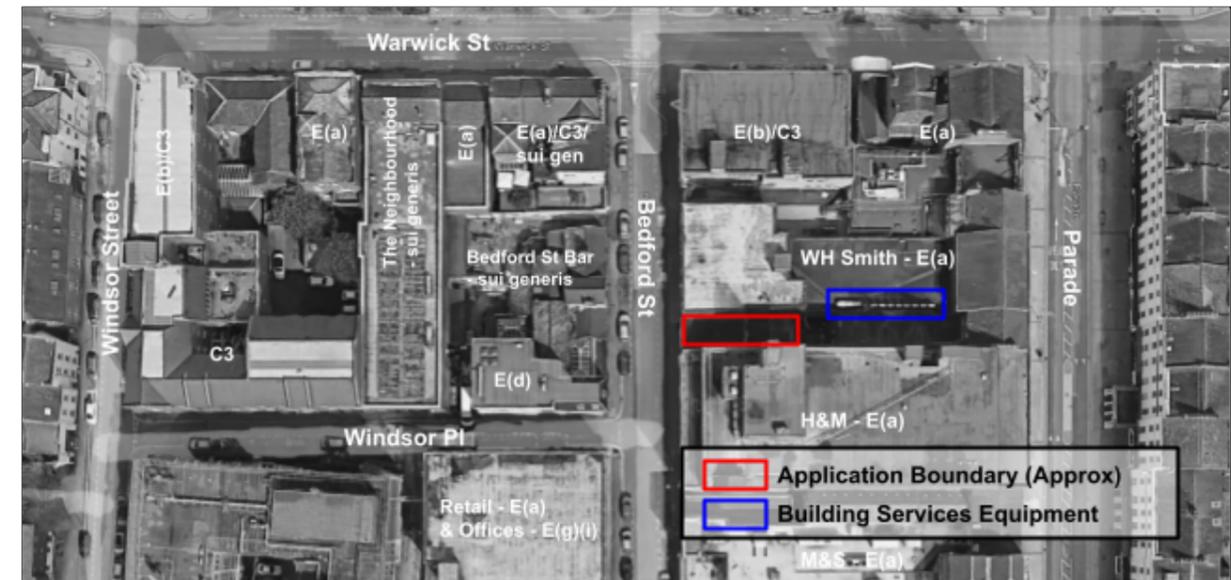
We have identified approximately 8 no. roof air-conditioning (condenser-type) units that serve the adjacent WH Smith retail premises. We highlight the location of the roof-mounted building services equipment in *figure 3.3* opposite.

The existing roof-mounted building services equipment is located in close proximity to the application site with unobstructed lines of sight to habitable rooms located on the rear elevation of the proposed building.

The potential impact of noise emissions from the existing roof-mounted building services equipment is included in our assessment based on representative reference data for typical condenser-type air-conditioning units. See also *Section 8*.



3.2: Application boundary and existing uses



3.3: Application boundary and existing uses

4. Proposals

4.1. Application Description

Proposals are for mixed-use development of 7 Bedford Street in Leamington including ground floor retail space and residential apartments.

'Demolition of existing single storey retail unit and replacement with proposal that doubles the floor area for retail with 4 no. apartments over.'

We show the proposed floor plans in figure 4.1 opposite and a proposed section drawing in figure 4.2.

The application includes ground floor commercial premises under Planning-Use Class E(a) for the display or retail sale of goods, other than hot food. We understand that the current retail tenant (Kong) will be retained as part of the proposed development.

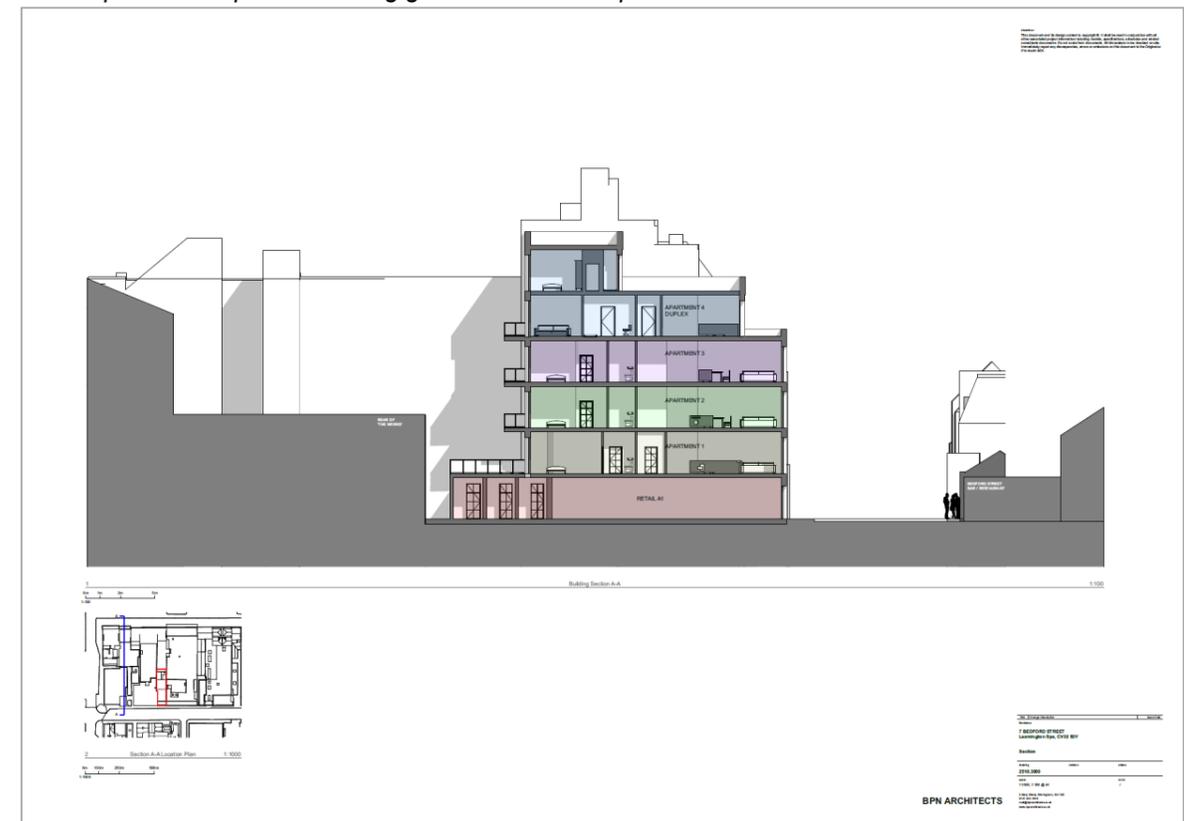
The proposed development includes habitable rooms located on two main elevations of the building.

Habitable rooms on the rear elevation facing East towards Parade including bedrooms and living rooms.

Habitable rooms located on Bedford Street elevation of the building (facing West) include living rooms and figure 4.2 opposite is indicative of these arrangements.



4.1: Proposed floor plans including ground floor retail space and residential accommodation above



4.2: Proposed building section including ground floor retail space and residential accommodation above

5. Site Surveys

5.1. Summary

We visited the application site on the following occasions to survey the existing noise:

- 17 to 18 July 2021
- 28 August 2021

Our assessment also includes noise monitoring data collected by others during 2020 in support of a nearby residential development at 61 Bedford Street. See also *Section 5.5*.

5.2. Noise Monitoring Location A

This location was selected for attended noise monitoring on 17 July 2021 and 28 August 2021 at a location that is representative of the nearest residential facade of the proposed development.

Noise monitoring on 17 July 2021 was completed on a Saturday during the late evening and night-time period with live amplified music at the Bedford Street Bar including periods with the premises frontage open.

Noise monitoring on 28 August 2021 was completed on a weekday to assess normal road traffic and commercial activity in the vicinity of the application site, and in the absence of activity and amplified music at the Bedford Street.

We provide a summary of noise monitoring results in *table 5.1* and *table 5.2* opposite. Our full noise monitoring data is shown in *Appendix A* for reference.

Maximum noise levels ($\text{dB } L_{AFmax}$) are assessed based on the 3rd highest maximum noise level measured during the night time period. This method is used in order to calculate and compare maximum noise levels against the relevant guidance in *World Health Organization Guidelines for Community Noise*.

5.3. Equipment

Details of the noise monitoring equipment used in our site surveys are provided in *table 5.3* opposite.

Weather conditions during our site surveys were suitable for environmental noise monitoring and did not significantly affect our measurement results. Wind speeds were typically below 5 m/s. There were no periods of significant rain and the roads in the area remained dry throughout.



Date	Period	Time	$\text{dB } L_{Aeq,T}$	$\text{dB } L_{A90,T}$	$\text{dB } L_{AFmax}$
17/07/21	Evening	20:35-23:00	70	63	-
	Night	23:00-01:00	68	61	85
28/08/21	Day	13:13-15:13	59	49	-

5.1: Summary of noise monitoring results at Location A

Noise Levels ($\text{dB } L_{eq}$)	Octave Band Centre Frequency (Hz)								$\text{dB } L_{Aeq,T}$
	63	125	250	500	1k	2k	4k	8k	
Measured Entertainment Noise Levels at Noise Monitoring Location A	70	73	64	67	65	60	54	46	69

5.2: Measured noise levels at location A during Bedford Street Bar opening hours

Equipment	Serial Number
NOR 140 sound level meter	1404473
NOR 1209 pre amp	13881
NOR 1225 microphone	122684
NOR 1251 sound calibrator	34811

Accuracy:

The accuracy of the sound level was field-checked at the start and end of each survey period. No significant drift was observed.

Sound Calibrator:

The accuracy of the sound calibrator used can be traced to National Physical Laboratory Standards.

Calibration Certificates:

Calibration certificates (current at the time of surveys and writing) can be provided on request.

5.3: Noise monitoring equipment

5.4. Observations & Subjective Assessment

Entertainment including amplified music at the Bedford Street is the dominant source of noise in the immediate vicinity of the application site and will determine minimum requirements for the sound insulation performance of facade elements to habitable rooms located on the Bedford Street elevation of the proposed building.

Minimum requirements for the sound insulation performance of facade elements to habitable rooms on the rear elevation (Assessment Location B) will be determined by noise from the existing roof mounted building services equipment.

Locations at the rear of the proposed development are well screened from other noise sources in the area including general road traffic and commercial/retail activity on Bedford Street and Parade, and entertainment noise at the Bedford Street Bar.

Our observation is that traffic on Bedford Street is infrequent and includes occasional HGVs and smaller commercial vehicles.

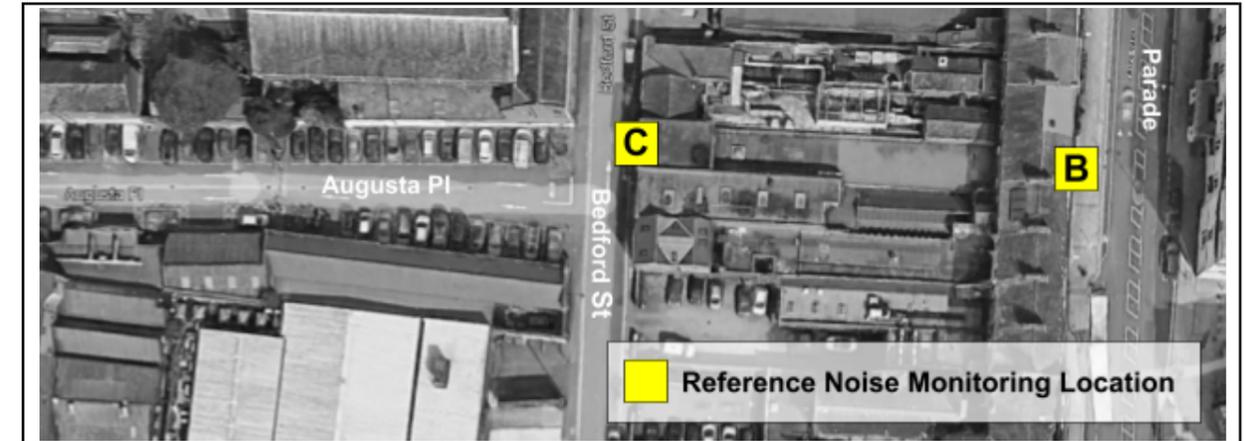
Our noise measurements on 28 August 2021 include delivery to the rear of M&S from a refrigerated truck including unloading goods. Noise from this unloading was insignificant in the context of noise levels measured at the application site.

5.5. Reference Noise Monitoring Data

Our assessment includes additional noise monitoring data submitted to Warwick District Council in support of application for residential development at 61 Bedford Street in 2020.

We show a summary of the noise monitoring results given in *report reference 3583MD* corresponding to remote noise monitoring at Locations B and C shown in *table 5.4* opposite.

Our assessment is that the additional noise monitoring data from December 2020 closely matches the noise levels measured in August 2021 during the periods where there is no entertainment activity at the nearby commercial premises.



Location	Date	Daytime (07:00-23:00)	Night time (23:00-07:00)	
		dB $L_{Aeq,16hr}$	dB $L_{Aeq,16hr}$	dB L_{AFmax}
B	4/12/20	59	55	73
B	65/12/20	61	52	69
B	6/12/20	59	56	72
B	7/12/20	59	-	-
C	4/12/20	61	52	74
C	5/12/20	60	51	73
C	6/12/20	57	-	-

5.4: Reference measurement data at 61 Bedford Street - Location B & C

6. Assessment Method

6.1. Summary

We describe our assessment method to calculate minimum requirements for the sound insulation performance of facade elements to habitable rooms in the proposed development.

Our assessment includes noise from the following sources:

- Entertainment noise (amplified music)
- Existing building services equipment
- General road traffic and commercial activity
- (Cumulative noise levels)

We identify the proposed habitable rooms that are the main assessment locations in *Section 6.3*. These locations are likely to be the worst affected in terms of potential noise impact and so constitute a worst-case assessment.

Minimum requirements for the sound insulation performance of facade elements to habitable rooms on the Bedford Street elevation are determined by requirements to control entertainment noise ingress (amplified music) to the levels identified in *Section 2.3*.

Minimum requirements for the sound insulation performance of facade elements to habitable rooms on the rear elevation of the building are determined by requirements to control noise from existing roof mounted building services equipment to levels identified in BS 8233: 2014 *Guidance on sound insulation and noise reduction for buildings*.

Noise from general road traffic and other retail and commercial activity is insignificant in this context and does not affect minimum requirements for the sound insulation performance of facade elements to habitable rooms required to achieve the appropriate internal noise level limits.

6.2. Noise Model

We assess noise propagation based on calculations in a detailed 3D model of the application site using iNoise by DMGR Software.

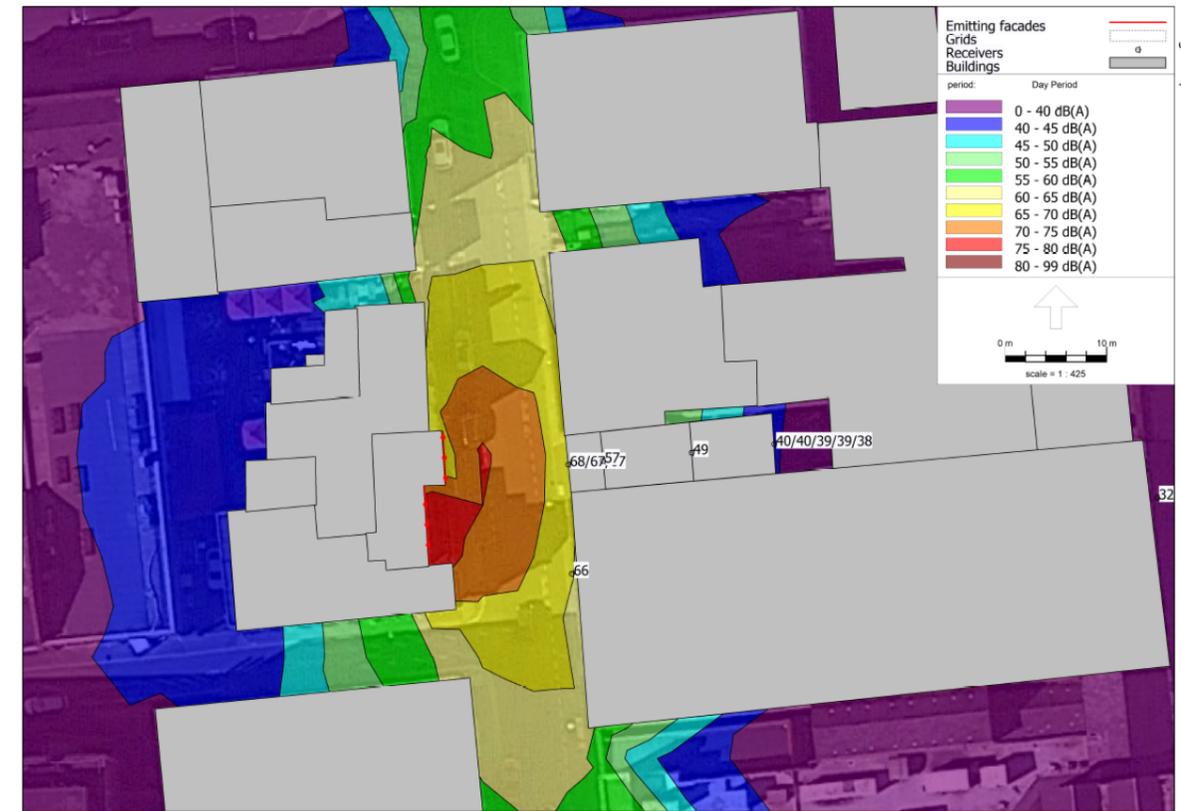
Noise sources are added to the model which are representative of the significant noise generating activities and equipment in the vicinity of the application site.

The levels of resulting noise propagation from these specific noise sources added to the iNoise model are then calibrated using the noise monitoring data from the site surveys described in *Section 5*.

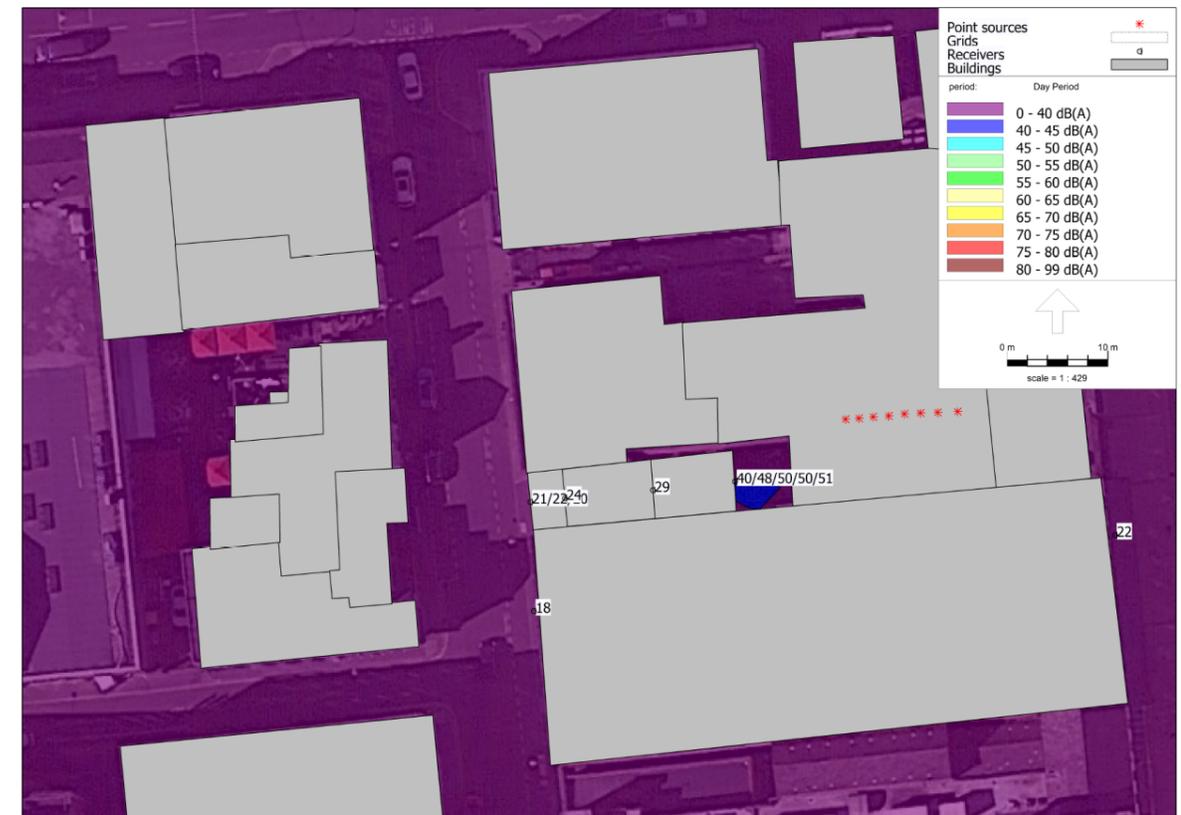
Receiver points then are added to the model that are representative of facades (windows) to habitable rooms which form the proposed development. This allows the facade noise level to be calculated for the purposes of separate calculations of noise ingress to habitable rooms based on the method described in *Section 6.4* which follows.

iNoise calculations are in general accordance with ISO 9613-2:1996 *Acoustics -- Attenuation of sound during propagation outdoors -- Part 2: General method of calculation*.

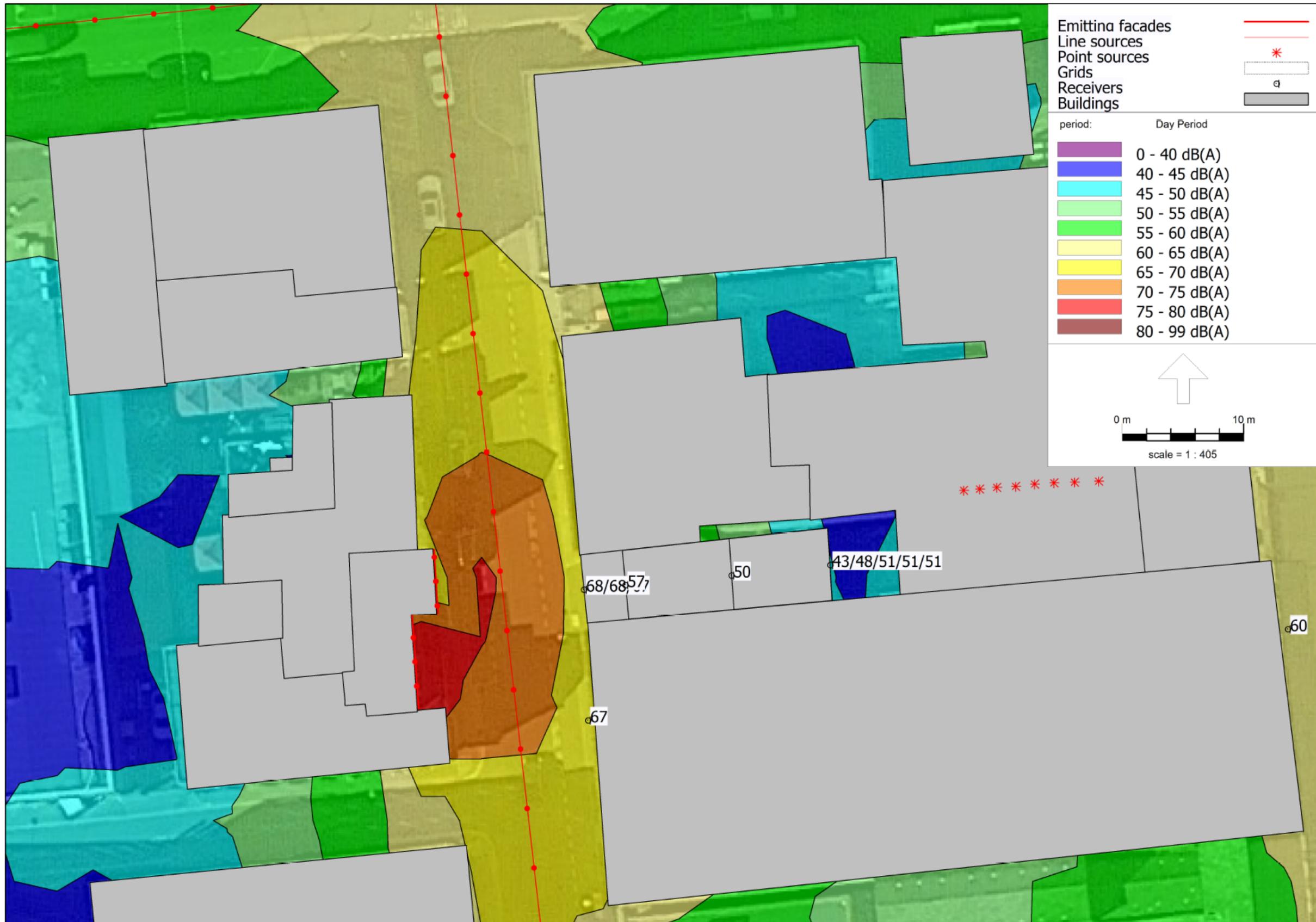
We show example 2D noise contour maps opposite from our iNoise model of the application site. This includes entertainment noise (amplified music) in *figure 6.1*, noise from existing external building services equipment in *figure 6.2*, and the calculated cumulative noise levels in *figure 6.3* on the next page.



6.1: 2D noise contour map - entertainment noise due to amplified music



6.2: 2D noise contour map - existing building services noise



6.3: 2D noise contour map - cumulative noise levels

6.3. Assessment Locations

For the purposes of our assessment, we identify the locations of key habitable rooms on each elevation of the building that will be most exposed to existing noise in the area including entertainment noise, existing building services equipment, retail activity and road traffic.

We identify two assessment locations

- A - first floor living space on the Bedford Street elevation
- B - fifth floor bedroom

See also *figure 6.4* and *figure 6.5* opposite.

We consider that these spaces in the development will be most affected by noise and therefore provide a basis for worst-case assessment.

6.4. Noise Ingress to Habitable Rooms

We calculate noise ingress via closed facades to habitable rooms based on composite sound insulation performance and in general accordance with BS EN ISO 12354-3: 2017 'Building acoustics. Estimation of acoustic performance of buildings from the performance of elements. Airborne sound insulation against outdoor sound'.

Internal noise levels are calculated based on the following equation:

$$L2 = L1 - SRI + 10\log(S/A)$$

Where:

- L2 = noise level inside (dB $L_{Aeq,T}$)
- L1 = noise level outside (dB $L_{Aeq,T}$)
- SRI = sound reduction index of facade element (dB $R_w + C_{tr}$, etc)
- S = surface area of the facade element (m²)
- A = equivalent sound absorption



6.4: Proposed floor plans with Assessment Locations A and B highlighted



6.5: Proposed building section with Assessment Locations A and B highlighted

7. Entertainment Noise (Amplified Music)

7.1. Summary

We calculate entertainment noise ingress to habitable rooms (Assessment Locations A and B) in terms of the following:

- The 63 Hz and 125 Hz octave band noise levels (dB $L_{eq,63Hz}$ and dB $L_{eq,125Hz}$)
- The overall A-weighted noise level (dB $L_{Aeq,T}$)

We compare the calculated levels of entertainment noise inside habitable rooms with the limits described in DEFRA NANR45: *Procedure for the assessment of low frequency noise complaints*. See also *Section 2.3*.

Minimum requirements for the sound insulation performance of facade elements to habitable rooms on the Bedford Street elevation (Assessment Location A) are determined by entertainment noise including amplified music.

Our assessment is that entertainment noise including amplified music from the nearby Bedford Street Bar can be controlled to meet DEFRA NANR45 limits inside habitable rooms by design. This includes the specification of windows and external walls in the building envelope to achieve the minimum values of specified sound reduction identified here.

Entertainment noise is also significant in relation to the minimum specification of facade elements to habitable rooms located on the rear elevation of the building (Assessment Location B) but is not the dominant noise source at that elevation. See also *Section 8*.

7.2. Assessment

Our assessment is based on the DEFRA NANR45 criteria for the control of low frequency entertainment noise to habitable rooms in the 63 Hz and 125 Hz octave bands. See *table 7.1* opposite and also *Section 2*.

Our assessment is based on calculated entertainment noise levels (external) at the facades of the nearest and worst affected habitable rooms (Reference A in *Section 6.3*).

It will be necessary for windows to remain closed during the normal ventilation condition to provide adequate control of entertainment noise ingress to habitable rooms.

Our assessment is that windows to habitable rooms should be rated to achieve the minimum values of sound insulation (dB R and dB $R_w + C_{tr}$) identified in *table 7.4* opposite.

External walls and/or roofs to habitable rooms should also achieve the minimum values of sound reduction in *table 7.4* opposite (dB R and dB $R_w + C_{tr}$). We consider that this level of performance can be achieved with the use of standard plasterboard linings to the existing building fabric.

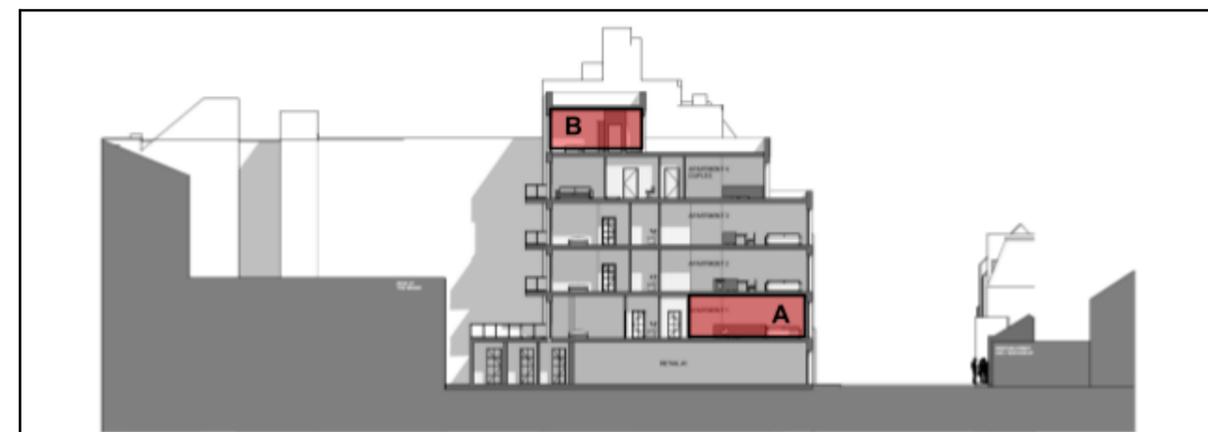
We understand that MVHR units will provide background ventilation to habitable rooms. This will allow windows to remain closed during the normal ventilation condition. We recommend that the cumulative level of noise associated with the MVHR units is controlled to NR 20 L_{eq} and will be subject to design development in due course.

Room Type/Location	Entertainment Noise Limit <u>Inside</u> Habitable Rooms (dB L_{eq})		
	63 Hz Octave Band (dB $L_{eq,63Hz}$)	125 Octave Band (dB $L_{Aeq,125Hz}$)	A-Weighted (dB $L_{Aeq,T}$)
Bedrooms and Habitable Rooms	47	41	

7.1: DEFRA NANR45 limits for the control of low frequency noise to habitable rooms

Noise Levels (dB L_{eq})	Octave Band Centre Frequency (Hz)								dB $L_{Aeq,T}$
	63	125	250	500	1k	2k	4k	8k	
Measured Entertainment Noise Levels at Noise Monitoring Location A	70	73	64	67	65	60	54	46	69

7.2: Measured noise levels at location A during Bedford Street Bar opening hours



Assessment Location Reference (see <i>Section 6.3</i>)	Calculated Entertainment Noise Levels <u>Outside</u> the Nearest Proposed Elevations		
	63 Hz Octave Band (dB $L_{eq,63Hz}$)	125 Octave Band (dB $L_{Aeq,125Hz}$)	A-Weighted (dB $L_{Aeq,T}$)
A - Bedford Street Elevation	70	72	68
B - Rear Elevation	44	44	40

7.3: Calculated entertainment noise levels at facades to the nearest habitable rooms

Assessment Location Reference (see <i>Section 6.3</i>)	Facade Element	Minimum Required Sound Insulation Performance		
		63 Hz Octave Band (dB $L_{eq,63Hz}$)	125 Octave Band (dB $L_{Aeq,125Hz}$)	A-Weighted (dB $L_{Aeq,T}$)
A - Bedford Street Elevation	Windows	20 dB R	29 dB R	≈39 dB $R_w + C_{tr}$
B - Rear Elevation		See <i>Section 8 table 8.4</i> Minimum requirements are determined by noise associated with existing roof mounted building services equipment.		
A - Bedford Street Elevation B - Rear Elevation	External Walls	30 dB R	39 dB R	≈49 dB $R_w + C_{tr}$

7.4: Minimum required sound insulation performance for facade elements to habitable rooms on the Bedford Street elevation of the proposed building

8. Existing Building Services Equipment

8.1. Summary

We assess noise from existing roof mounted building services equipment in the vicinity of the application site. This includes 8 no. condenser-type air-conditioning units associated with the WH Smith retail premises.

Minimum requirements for the sound insulation performance of facade elements to habitable rooms on the rear elevation (Assessment Location B) will be determined by noise from the existing roof mounted building services equipment.

We calculate minimum requirements for the control of building services noise ingress to habitable rooms in the proposed development based on the limits identified in BS 8233: 2014 *Guidance on sound insulation and noise reduction for buildings*.

This is in general accordance with guidance in Section 8.5 BS 4142: 2014+A1:2019 which includes the following:

'Where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it should be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation.'

8.2. Assessment

We calculate the existing building services noise levels based on reference data for a representative condenser-type air-conditioning unit which is the Daikin ReyQ16U. We show the manufacturer's noise level data used in our calculations in *table 8.2*.

We include point sources in our 3D model for 8 no. roof mounted condenser-type units associated with the adjacent WH Smith retail premises. This accounts for all 8 no. air-conditioning-units operating simultaneously at design duty.

This method of assessment by calculation is used in lieu of direct measurement of noise from the existing building services equipment due to access constraints.

The calculated level of specific noise from the existing equipment is 51 dB $L_{Aeq,T}$ at the worst affected facade to habitable rooms on the rear elevation of the building (Assessment Location B).

We show the calculated external noise levels at the facade to Assessment Location B in *table 8.3* opposite.

It may be necessary for windows to remain closed during the normal ventilation condition to provide adequate control of building services noise ingress to habitable rooms.

Our assessment includes calculated noise levels in the 63 Hz and 125 Hz octave bands to allow direct comparison with levels of entertainment noise (amplified music) which is the other significant source in the vicinity of the application site.

This demonstrates that the levels of existing building service noise at the rear elevation of the building are likely to be dominant and exceed levels of entertainment noise (amplified music) from the Bedford Street Bar.

The calculated levels of existing building services to the Bedford Street elevation of the building are insignificant compared with the levels of entertainment noise associated with the Bedford Street Bar.

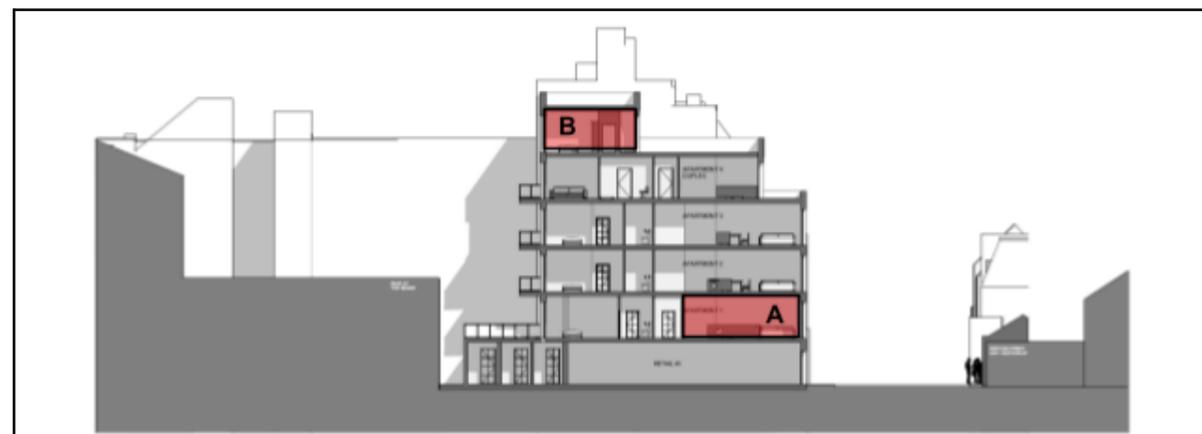
Our assessment is that existing building services noise ingress to habitable rooms on the rear elevation of the building can be controlled to a level below the limits described in BS 8233: 2014 *Guidance on sound insulation and noise reduction for buildings*.

Room Type/Location	Entertainment Noise Limit <u>Inside</u> Habitable Rooms (dB L_{eq})		
	63 Hz Octave Band (dB $L_{eq,63Hz}$)	125 Octave Band (dB $L_{eq,125Hz}$)	A-Weighted (dB $L_{Aeq,T}$)
Bedrooms and Habitable Rooms	--	--	<30 dB $L_{Aeq,T}$

8.1: DEFRA NANR45 limits for the control of low frequency noise to habitable rooms

Reference Unit	Octave Band Centre Frequency (Hz)								dB L_{pA}
	63	125	250	500	1k	2k	4k	8k	
Daikin ReyQ16U, dB L_p at 1m	62	63	60	60	53	49	49	47	60

8.2: Reference noise data for assessment of building services noise



Assessment Location Reference (see Section 6.3)	Calculated Building Services Noise Levels <u>Outside</u> the Nearest Proposed Elevations		
	63 Hz Octave Band (dB $L_{eq,63Hz}$)	125 Octave Band (dB $L_{eq,125Hz}$)	A-Weighted (dB $L_{Aeq,T}$)
A - Bedford Street Elevation	--	--	--
B - Rear Elevation	54	56	51

8.3: Calculated building services noise levels at facades to the nearest habitable rooms

Assessment Location Reference (see Section 6.3)	Facade Element	Minimum Required Sound Insulation Performance		
		63 Hz Octave Band (dB R_{63Hz})	125 Octave Band (dB R_{125Hz})	A-Weighted (dB $R_w + C_{tr}$)
A - Bedford Street Elevation	Windows	See Section 7 table 7.4 Minimum requirements are determined by noise associated with entertainment noise (amplified music) from the Bedford Street Bar.		
B - Rear Elevation		9 dB R	17 dB R	25 dB $R_w + C_{tr}$

8.4: Minimum required sound insulation performance for windows to habitable rooms

9. Road Traffic Noise & Commercial Activity

9.1. Summary

We have assessed existing levels of general road traffic noise and retail activity at the application site based on the noise monitoring data described in *Section 5*. This includes our recent noise monitoring results in addition to other reference data for road traffic noise levels at equivalent locations on Bedford Street, Warwick Street and Parade.

Road traffic noise ingress to habitable rooms should normally be controlled to the limits described in BS 8233: 2014 *Guidance on sound insulation and noise reduction for buildings*. See *table 9.1* opposite and also *Section 2*.

9.2. Assessment

Our assessment is that minimum requirements for the sound insulation performance of facade elements to habitable rooms (windows and external walls) are determined by requirements to control entertainment noise (amplified music) and noise from existing roof mounted building services equipment. Refer to *Section 7* and *Section 8* respectively.

Assessment based on these established values of sound insulation for facade elements to habitable rooms demonstrates that noise from general road traffic and nearby retail activity can be readily controlled to levels significantly below the normal limits described in *BS 8233: 2014*.

Therefore our assessment is that noise from general road traffic and retail activity in the vicinity of the application site is insignificant in the context of other established sources.

Activity	Location	Daytime (07:00-23:00)	Night Time (23:00-07:00)
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hr}$	-
Sleeping	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

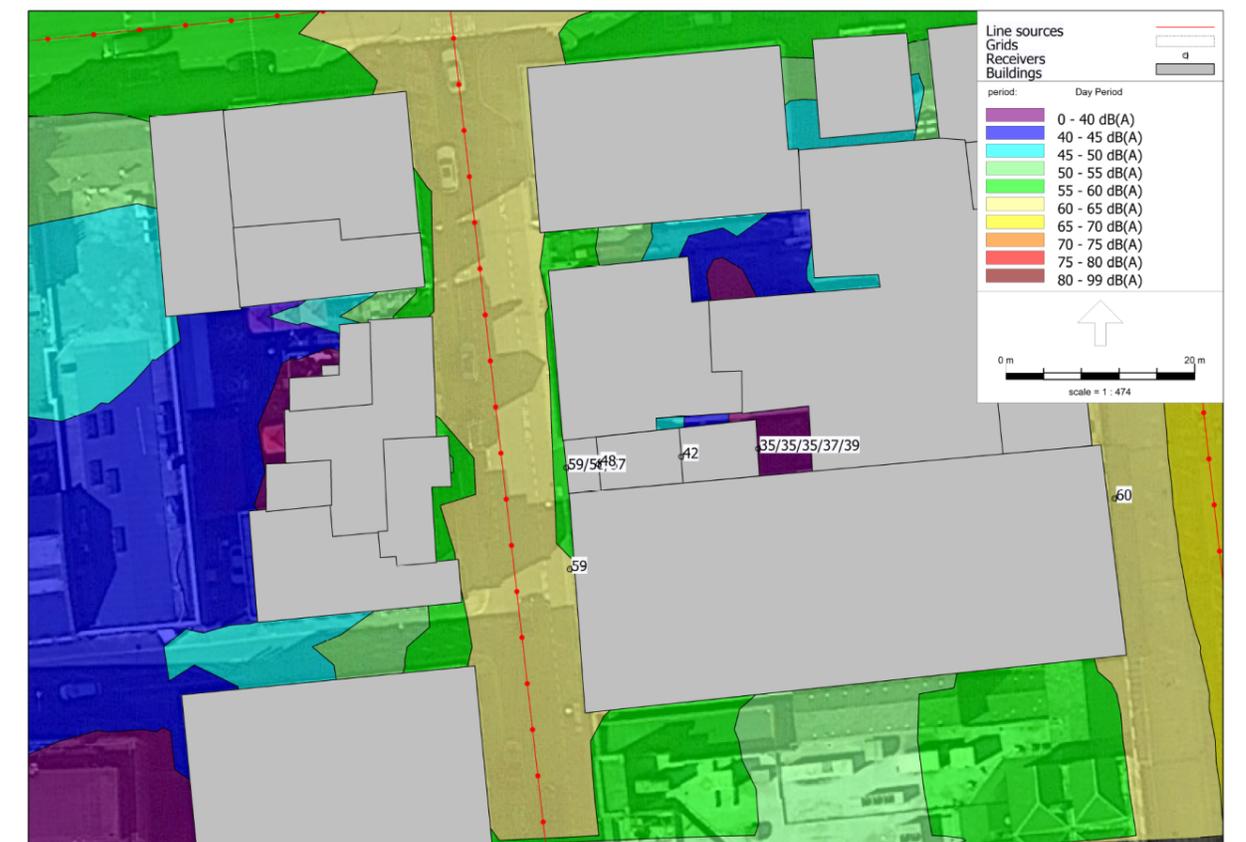
9.1: BS 8233: 2014 guidance

Assessment Location Reference (see <i>Section 6.3</i>)	Calculated Road Traffic Noise Levels <u>Outside</u> the Nearest Proposed Elevations		
	Daytime (07:00-23:00)	Night Time (23:00-07:00)	
	$L_{Aeq,16hr}$	$L_{Aeq,8hr}$	L_{AFmax}
A- Bedford Street Elevation	59	51	74
B - Rear Elevation	39	34	57

9.2: Calculated noise levels at the facade of the proposed development - road traffic noise levels

Assessment Location Reference (see <i>Section 6.3</i>)	Calculated Road Traffic Noise Levels <u>Inside</u> the Nearest/Most Exposed Habitable Rooms		
	Daytime (07:00-23:00)	Night Time (23:00-07:00)	
	$L_{Aeq,16hr}$	$L_{Aeq,8hr}$	L_{AFmax}
A- Bedford Street Elevation	19	11	34
B - Rear Elevation	14	9	32

9.3: Calculated internal noise levels inside habitable rooms due to general road traffic and retail activity



9.4: 2D noise contour map - general road traffic and retail activity

10. Minimum Building Envelope Performance

10.1. Summary

We provide a summary of minimum requirements for the sound insulation performance of facade elements to habitable rooms in the proposed development. See *table 10.1*.

Minimum requirements for the sound insulation performance of facade elements to habitable rooms on the Bedford Street elevation (Assessment Location A) are determined by entertainment noise including amplified music.

Minimum requirements for the sound insulation performance of facade elements to habitable rooms on the rear elevation (Assessment Location B) are likely to be determined by noise from the existing roof mounted building services equipment.

10.2. Bedford Street Elevation

Windows

Windows to habitable rooms on the Bedford Street elevation should be specified to achieve the minimum values of sound insulation identified in *table 10.1*.

Minimum requirements for the control of low-frequency entertainment noise are significant with 20 dB R at 63 Hz and 29 dB at 125 Hz. These levels of performance are likely to require the use of wide air-space secondary glazing such as 6mm glass/150mm cavity/4mm glass.

External Walls

We recommend that external walls to habitable rooms located on the Bedford Street elevation are specified to achieve a minimum weighted sound reduction index of 48 dB $R_w + C_{tr}$ or thereabouts including a minimum of 30 dB R at 63 Hz and 39 dB R at 125 Hz. These values are based on the calculation of a level that is 10 dB higher than the minimum value of sound insulation identified for windows to habitable rooms on the Bedford Street elevation.

We consider that these minimum values can be achieved by standard cavity brick/block constructions with internal plasterboard wall linings typical to modern new-build residential developments.

10.3. Rear Elevation

Windows

Windows to habitable rooms on the rear elevation of the building should be specified to achieve a minimum weighted sound reduction index of 25 dB $R_w + C_{tr}$. This level of performance can typically be achieved by modern standard thermal double glazing with complete and well sealed frames.

External Walls

Minimum requirements for the sound insulation performance of external walls to habitable rooms on the rear elevation of the building away from Bedford Street are lower.

We consider that normal residential cavity brick/block construction can readily provide adequate sound insulation performance including in the 63 Hz and 125 Hz octave bands.



Assessment Location Reference (see Section 6.3)	Facade Element	Minimum Required Sound Insulation Performance		
		63 Hz Octave Band (dB $L_{eq,63Hz}$)	125 Octave Band (dB $L_{eq,125Hz}$)	A-Weighted (dB $L_{Aeq,T}$)
A - Bedford Street Elevation	Windows	20 dB R	29 dB R	40 dB $R_w + C_{tr}$
B - Rear Elevation		9 dB R	17 dB R	25 dB $R_w + C_{tr}$
A - Bedford Street Elevation	External Walls	30 dB R	39 dB R	≈ 49 dB $R_w + C_{tr}$
B - Rear Elevation				

10.1: Minimum required sound insulation performance for windows to habitable rooms

10.4. Calculated Internal Noise Levels (Cumulative)

We show the calculated cumulative internal levels inside the worst affected habitable rooms (Assessment Location A and B) in the proposed development in *table 10.2* opposite.

These values are calculated based on the minimum values of sound insulation performance of facade elements to habitable rooms on the different elevations of the building.

10.5. Background Ventilation

We understand that MVHR units will provide background ventilation to habitable rooms. This will allow windows to remain closed during the normal ventilation condition. We recommend that the cumulative level of noise associated with the MVHR units is controlled to NR 20 L_{eq} internally. This will be subject to design development in due course.

Our assessment is that the calculated cumulative levels of existing noise at the rear elevation of the building could also support the use of acoustically rated trickle vents to provide background ventilation to habitable rooms.

11. Sound Insulation to Commercial Premises

Proposals are for ground floor commercial premises including retail space under Planning Use Class E(a) for the display or retail sale of goods, other than hot food.

We recommend that noise transfer from the ground floor commercial premises to habitable rooms above is controlled to levels below NR 25 L_{eq} .

This can be readily achieved by design including specification of the separating floor build-up between the ground floor retail spaces and dwellings.

We recommend that the separation floor build-up to commercial premises is specified and constructed to achieve 50 dB DnTw + Ctr based on a +5 dB enhancement to the normal Building Regulations requirements described in Approved Document E: 2003 (amended 2004, 2010, 2013 and 2015) - *Resistance to the Passage of Sound*.

We anticipate that this level of performance can be readily achieved using standard concrete floor constructions with the addition of a suspended sound isolating ceiling to the ground floor premises.

12. Conclusion

Our assessment is that proposals for the mixed use development at 7 Bedford Street including new residential accommodation can avoid 'adverse' and 'significant adverse' impacts on health, quality of life and amenity as a result of noise. This is in general accordance with the aims of the National Planning Policy Framework and its associated guidance.



Assessment Location Reference (see Section 6.3)	Calculated Entertainment Noise Levels <u>Inside</u> the Nearest Proposed Elevations			
	63 Hz Octave Band (dB $L_{eq,63Hz}$)	125 Octave Band (dB $L_{Aeq,125Hz}$)	A-Weighted (dB $L_{Aeq,T}$)	A-Weighted (dB $L_{AF,max}$)
A - Bedford Street Elevation	47	41	25	41
B - Rear Elevation	47	41	28	44

10.2: Calculated cumulative noise levels inside the worst affected habitable rooms

Appendix A: Full Measurement Results

Noise Monitoring Location A

We show the measurement location in figure A1.

We show measured noise levels in *table A2* and *table A3* including $\text{dB } L_{\text{Aeq},5\text{min}}$, $\text{dB } L_{\text{AFmax},5\text{min}}$, $\text{dB } L_{\text{A90},5\text{min}}$ and octave band measurements.



Equipment	Serial Number
NOR 140 sound level meter	1404473
NOR 1209 pre amp	13881
NOR 1225 microphone	122684
NOR 1251 sound calibrator	34811

Accuracy:
The accuracy of the sound level was field-checked at the start and end of each survey period. No significant drift was observed.

Sound Calibrator:
The accuracy of the sound calibrator used can be traced to National Physical Laboratory Standards.

Calibration Certificates:
Calibration certificates (current at the time of surveys and writing) can be provided on request.

A.1: Noise monitoring equipment

Start Time	dB					dB $L_{\text{eq},15\text{min}}$ Octave Band Centre Frequency (Hz)							
	$L_{\text{Aeq},15\text{min}}$	L_{AFmax}	$L_{\text{A1},15\text{min}}$	$L_{\text{A10},15\text{min}}$	$L_{\text{A90},15\text{min}}$	63 Hz	125 Hz	250 Hz	500 Hz	1k	2k	4k	8k
13:13	57	75	69	60	49	63	57	55	53	53	50	43	43
13:28	63	83	76	66	49	70	60	59	61	58	55	50	42
13:43	56	77	68	59	48	65	59	57	53	52	49	43	34
13:58	61	88	69	65	48	67	61	62	59	56	52	45	36
14:13	57	76	68	59	49	65	60	56	53	53	49	42	37
14:28	57	73	69	61	49	64	58	56	54	53	50	43	37
14:43	59	77	69	63	50	68	59	57	55	55	52	46	39
14:58	60	86	70	62	49	64	58	57	56	56	52	46	39

A2: Noise monitoring results - Measurement Location A - 24 August 2021

Start Time	dB $L_{\text{Aeq},5\text{min}}$	dB L_{AFmax}	dB $L_{\text{A1},5\text{min}}$	dB $L_{\text{A10},5\text{min}}$	dB $L_{\text{A90},5\text{min}}$	1/3 Octave Band Centre Frequency (Hz)					
						50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz
20:35	65	81	72	68	61	61	63	64	62	62	60
20:40	65	80	73	68	60	63	64	63	62	59	59
20:45	65	73	70	67	61	66	67	61	62	60	58
20:50	69	91	78	71	63	61	62	62	62	59	62
20:55	66	83	74	69	62	60	64	63	63	59	59
21:00	65	74	70	67	60	63	61	60	60	56	57
21:05	66	77	72	68	62	60	62	63	64	63	62
21:10	68	76	73	70	64	63	62	61	62	59	60
21:15	66	81	72	68	61	62	68	60	59	58	57
21:20	66	75	73	69	62	64	66	68	62	63	62
21:25	66	84	75	69	61	61	63	66	61	62	61
21:30	67	76	73	70	64	60	61	61	62	59	61
21:35	68	77	73	70	64	62	63	64	69	63	62
21:40	67	85	72	69	60	59	60	61	62	59	59
21:45	72	83	79	75	65	64	66	70	77	70	66
21:50	73	82	79	76	66	63	69	70	75	76	72
21:55	72	82	78	74	68	60	67	72	72	70	70
22:00	74	82	79	77	70	63	71	73	77	75	73
22:05	73	88	79	75	68	62	69	72	76	76	72
22:10	73	83	79	75	65	63	69	73	71	74	72
22:15	73	82	78	75	68	65	67	69	74	73	73
22:20	72	83	78	75	69	62	68	72	73	72	70
22:25	74	85	80	76	69	65	68	73	72	74	72
22:30	72	86	80	76	63	63	66	70	71	72	70
22:35	67	86	73	69	62	60	59	57	59	56	55
22:40	66	80	72	69	62	61	63	57	57	54	54
22:45	66	81	73	68	62	57	56	60	57	55	56
22:50	67	78	73	70	62	63	65	66	60	58	56
22:55	64	75	72	67	57	59	66	63	61	59	57
23:00	68	78	75	72	63	62	68	65	65	68	64
23:05	69	78	75	71	64	63	66	66	62	66	66
23:10	69	79	76	72	64	61	67	70	68	72	69
23:15	69	82	76	72	64	61	66	69	66	69	69
23:20	69	79	76	72	64	61	63	66	67	67	65
23:25	69	84	77	72	60	70	69	69	66	67	65
23:30	66	77	75	70	58	62	64	67	65	66	61
23:35	65	77	74	68	59	63	63	66	66	68	63
23:40	67	87	78	70	56	60	61	59	63	64	60
23:45	65	78	72	68	60	61	62	62	61	59	58
23:50	67	79	75	70	62	62	62	66	66	67	64
23:55	68	77	75	71	62	62	64	65	66	67	66
00:00	69	89	76	73	62	64	66	69	65	68	65
00:05	68	77	74	71	62	62	63	68	65	67	61
00:10	67	77	74	70	61	61	61	64	67	72	64
00:15	67	82	74	69	62	60	60	62	67	66	62
00:20	67	77	74	71	62	60	62	70	66	66	63
00:25	68	79	76	72	61	62	66	65	66	65	60
00:30	68	81	76	71	60	63	64	64	62	62	60
00:35	68	82	75	72	61	63	64	64	63	61	59
00:40	68	85	77	71	58	63	66	64	65	64	59
00:45	67	79	75	71	59	66	70	69	66	64	61
00:50	64	81	73	68	57	62	63	66	64	61	58
00:55	62	72	70	65	56	67	65	66	64	62	59

A3: Noise monitoring results - Measurement Location A - 17 July 2021

Appendix B: Pre-Application Advice

We show the pre-application advice with regard to noise and residential amenity that has been provided by the Environmental Health Office of Warwick District Council.

Bedford Street Bar

Whilst acknowledging that similar schemes have been previously granted for the site, there are concerns about the noise impacts of the late night bar on the proposed residential apartments. The bar, currently known as 'Bedford Street' has the following opening hours on their premises licence:

Sunday, Monday and Wednesday from 10:00 to 01:30
Tuesday and Thursday from 10:00 to 02:30
Friday and Saturday from 10:00 to 03:30

The proposed replacement retail unit and residential apartments above will be located immediately opposite the entrance of the Bedford Street bar which means that future occupiers of the proposed upper floor apartments are likely to experience very high noise levels from music breakout, customers queuing as well as customers smoking on the street into the late hours of the night. The proposed floor plans have located bedrooms at the rear elevation of the development which is a positive as this will reduce the potential for sleep disturbance as a result of the late night bar activities and customers. Living rooms and dining rooms have been located at the front of the development on the Bedford Street façade. These rooms are still considered habitable rooms under BS8233:2014 and therefore there is a potential for noise disturbance to occur, particularly in living room areas where residents would be expected to relax in the evenings. The proposed elevation drawings also show large areas of glazing on the front elevation which may prove harder to achieve the necessary level of sound reduction required to reduce noise levels from the Bedford Street bar. The provision of what appear to be Juliet balconies may also give residents an optimistic expectation that these windows could be opened whereas the reality is that the properties are likely to be affected by high levels of road traffic and pedestrian noise if these windows were open. In order to demonstrate that noise from the Bedford Street bar and its customers will not have an adverse noise impact on the proposed apartments, a detailed noise assessment would need to be submitted along with a noise mitigation scheme to protect residents of the proposed apartments. The noise assessment would need to consider the octave band frequencies of the noise from the Bedford Street and provide appropriate building fabric (including glazing) designs. The difficulty that the applicant will face is that the Bedford Street bar is unlikely to be operating as normal during the current COVID pandemic and that customer numbers are likely to be lower so it will not be possible to conduct an accurate noise assessment. The Environmental Health Officer (EHO) would be uncomfortable with the noise levels from the bar being estimated as the introduction of new residential apartments so close to the existing bar could compromise the continued operation of the business and could result in restrictions being placed on the premises that may not otherwise have been required.

Commercial Traffic & Pedestrian Noise

Without prejudice to the difficulties in obtaining an accurate noise assessment, the applicant's noise assessment should also consider the noise impacts of road traffic and pedestrian noise from Bedford Street on the proposed apartments. This assessment should be made with regards to BS8233: 2014 and the WHO guidelines for community noise (1999).

The proposed apartments will also be located between two 'Goods-in' delivery bays of two large retail units (WHSmith and H&M). As far as it is known, there are no restrictions on delivery hours for these premises so there is a possibility that HGV delivery vehicles could arrive and unload at the sites at all hours of the day and night. This would result in noise disturbance from tail lifts, roll containers, raised voices, reversing alarms, air brakes, and shutter doors as vehicles are unloaded. As the proposed bedrooms would be located at the rear of the building the noise impacts from road traffic and HGV deliveries are likely to occur predominantly during the day time, however, night time noise disturbance cannot be ruled out entirely. The applicant will need to consider the noise impacts of these delivery activities in accordance with BS4142. A comparison of the absolute sound levels with BS8233:2014 may also be appropriate depending on the context.

Rear elevation

The bedrooms of the proposed apartments would look out onto the rear facades of retail units located on the Parade and Bedford Street. These commercial premises are likely to have various items of plant and equipment installed such as refrigeration and air conditioning units which could cause noise disturbance to residents of the proposed apartments. On this basis, it is recommended that the applicant's noise assessment considers the impacts of commercial plant noise on the proposed residential apartments. The noise assessment shall consider the noise levels at the rear of the premises with regards to the recommendations of BS8233, BS4142, and WHO guidelines for community noise (1999) as applicable. It is also possible that entertainment noise from the Bedford Street bar and other nearby licensed premises may still be audible at the rear of the premises.

Sound insulation between retail unit and upper floor residential

To ensure that future residents are not disturbed by noise arising from the lower floor retail unit, it is recommended that the applicant submits details of a sound insulation scheme. As the separating structure between the first and second floor will be separating commercial and domestic uses, a higher level of sound reduction performance may be required above the levels specified in Approved Document E of the Building Regulations. On this basis, the noise assessment will need to include a section regarding the sound reduction performance of the separating structure based on the level of noise likely to be generated within the ground/first floor retail unit.

Plant noise

We note that a plant room is proposed on the ground floor at the rear of the premises. To ensure that the operation of plant and equipment installed as part of the development does not have an adverse impact on residential amenity, it is recommended that it is installed and maintained in accordance with our standard noise condition which would be worded on any forthcoming planning permission as follows:

'Noise arising from any plant or equipment (measured as LAeq,5 minutes), when measured (or calculated to) one metre from the façade of any noise sensitive premises, shall not exceed the background noise level (measured as LA90,T). If the noise in question involves sounds containing a distinguishable, discrete, continuous tone (whine, screech, hiss, hum etc) or if there are discrete impulses (bangs, clicks, clatters, thumps etc.) or if the noise is irregular enough to attract attention, 5dB(A) shall be added to the measured level.'

Alternative ventilation

Given the high noise levels likely to be experienced from the Bedford Street bar, it is anticipated that a form of alternative ventilation will be required for the living rooms and dining rooms on the Bedford Street/front facade. Based on the findings of the noise assessment, the applicant will need to provide details of an alternative ventilation scheme to ensure that a suitable internal living environment can be provided for the residential dwelling aspect of the proposed development.'